Radiology: Health and Well-being of the Profession and the Professional

May 7–10, 2018
Omni Orlando Resort at ChampionsGate | Orlando, Florida

In conjunction with:
• Society of Chairs of Academic Radiology Departments (SCARD)
• Association of Program Directors in Radiology (APDR)
• American Alliance of Academic Chief Residents in Radiology (A²CR²)
• Alliance of Clinician-Educators in Radiology (ACER)
• Alliance of Medical Student Educators in Radiology (AMSER)
• Radiology Alliance for Health Services Research (RAHSR)
• Radiology Research Alliance (RRA)
• Association of Program Coordinators in Radiology (APCR)
• Society of Nuclear Medicine and Molecular Imaging (SNMMI)

In Joint Providership with the Radiological Society of North America (RSNA®)
The Association of University Radiologists and its affiliated societies would like to thank the following organizations for their meeting support:

Bracco Diagnostics, Inc.

Radiological Society of North America (RSNA)

American College of Radiology (ACR)

The AUR also recognizes the Association of Program Directors in Radiology (APDR), the Society of Nuclear Medicine and Molecular Imaging (SNMMI), and the Society of Chairs of Academic Radiology Departments (SCARD) for their contributions to the meeting.
Dear Colleagues,

Welcome to Orlando and the 66th Annual Meeting of the Association of University Radiologists (AUR). The annual meeting is our opportunity as educators, researchers, and leaders in radiology to come together to learn and share ideas. Some of you are attending the meeting for the first time; and others, like me, have attended many times. Every year, I learn new things, meet new people, reconnect with old friends, and find inspiration to further the missions of teaching, research, and high-quality patient care when I get home—and it’s also fun!

Diagnostic and interventional radiology are rapidly advancing fields, essential to most medical and surgical practices in the United States and around the world. The fast-paced environment is exciting, but the demands placed on radiologists and other physicians are increasing. Our theme for 2018 is “Radiology: Health and Well-being of the Profession and the Professional.” A variety of interesting sessions aim to address the impact of modern radiology training and practice on us humans and to help us learn how we can create solutions and lead the way to a healthier future for ourselves, our specialty, and our patients.

On Monday, AUR Plenary Session speaker Srijan Sen, MD, PhD, Institute for Healthcare Policy and Innovation, University of Michigan, will speak on “The Intern Health Study: Insights into Depression during Medical Training and the Biology of Stress and Resilience.” On Tuesday, Frederick J. Marshall, MD, Chief, Division of Geriatric Neurology, University of Rochester, Rochester, NY, will address “Cultivating Mindfulness and Resilience for Ourselves and Our Trainees” during the AMSER Lucy Squire and APDR/ACR Keynote Lecture.

My heartfelt thanks to all of the program chairs of the affinity groups of AUR and affiliated societies who developed interesting and useful programming for the meeting. To the Society of Chairs of Academic Radiology Departments (SCARD), the Association of Program Directors in Radiology (APDR), the American Alliance of Academic Chief Residents in Radiology (A³CR²), the Alliance of Clinician-Educators in Radiology (ACER), the Alliance of Medical Student Educators in Radiology (AMSER), the Radiology Alliance for Health Services Research (RAHSR), the Radiology Research Alliance (RRA), the Association of Program Coordinators in Radiology (APCR), and the Society of Nuclear Medicine and Molecular Imaging (SNMMI), thank you! In addition, the meeting is offered through joint providership with the Radiological Society of North America (RSNA).

To find programming that best suits your interests, presentations are searchable by theme (research, education, administration, leadership, or training) and by the group providing the presentation (ie, APDR, AMSER, ACER, A³CR², RRA, RAHSR, SCARD) on both print and Web versions of the program.

Scientific sessions will be held Wednesday at 1:00 pm and include investigations in resident and medical student education, health services research, quality and leadership topics, and clinical research. We also encourage you to attend the presentations of the AUR GE Radiology Research Academic Fellowship (GERRAF) program and the ACR-AUR Research Scholar Program.

I look forward to seeing everyone at the welcome reception Monday, May 7, at the Omni Golf Course Commons.

Enjoy the meeting and Orlando!

Janet E. Bailey, MD

Janet E. Bailey, MD
AUR Program Chair and President-elect
Omni Orlando Resort at ChampionsGate

Floor Plans

ChampionsGate
Lower Level
Ballrooms

ChampionsGate
Lobby Level
Meeting Rooms
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# Program Grid

## Monday, May 7

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<tbody>
<tr>
<td>7:00 AM–8:00 AM</td>
<td></td>
<td>101</td>
<td>ARRALD Program 1 <em>(Closed Program)</em></td>
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<tr>
<td>7:30 AM–8:00 AM</td>
<td>T</td>
<td>100</td>
<td>Chief Resident Welcome and Annual Survey Results</td>
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</tbody>
</table>
| 8:00 AM–9:30 AM  | R E A L T | 102     | AUR Plenary Session: The Intern Health Study: Insights into Depression during Medical Training and the Biology of Stress and Resilience  
*Speaker: Srijan Sen, MD, PhD* |
| 10:00 AM–10:30 AM | T     | 106       | Case Review: Neuroradiology                                                                      |
| 10:00 AM–11:30 AM| A     | 103       | Can I Increase My Emotional Intelligence, and Why Should I?                                       |
| 10:00 AM–11:30 AM| E     | 104       | **Education Track 1**: Key Additions to Your Curriculum *(Supported by Bracco Diagnostics, Inc.)*    |
| 10:00 AM–11:30 AM| R     | 105       | **Research Track 1**: Biostatistics                                                               |
| 10:30 AM–11:30 AM| T     | 107       | ABR Update for Residents                                                                         |
| 12:00 PM–1:00 PM | T     |           | ARRALD Mentorship Lunch *(Closed Program)*                                                        |
| 1:00 PM–1:30 PM  | T     | 108       | Effective Teaching Methods                                                                       |
| 1:00 PM–2:30 PM  | E A   | 109       | ABR Update                                                                                       |
| 1:00 PM–2:30 PM  |       | 110       | ARRALD Program 2 *(Closed Program)*                                                                |
| 1:00 PM–2:30 PM  | R     | 111       | Outcomes Research Methods                                                                        |
| 1:00 PM–2:30 PM  | R     | 112       | RRA Task Force Reports, Part 1: Leveraging Megatrends in Medicine and Radiology Today              |
| 1:00 PM–2:30 PM  | E     | 113       | The Image of Radiology: Integrating Radiology into the Preclinical Years                           |
| 1:30 PM–2:30 PM  | T     | 114       | ACR Update for Residents                                                                        |
| 3:00 PM–3:30 PM  | T     | 115       | Case Review: US                                                                                 |
| 3:00 PM–4:30 PM  | R     | 116       | Wellness in Radiology Research                                                                   |
| 3:00 PM–4:30 PM  | E     | 117       | Self-preservation Skills for the Radiology Educator                                               |
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| 3:00 PM–4:30 PM  | L     | 122       | Leadership: New Perspectives                                                                     |
| 3:30 PM–4:30 PM  | T     | 119       | Idea Forum *(A’CR¹ Members Only)*                                                                |
| 4:00 PM–5:30 PM  |       | 120       | ARRALD Program 3 *(Closed Program)*                                                               |
| 4:30 PM–5:30 PM  | R E A L T | 121     | AUR Special Session: LGBT-related State Laws: How Can Academic Radiology Respond?                |

### Affiliated Society Meetings/Social Functions

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<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>12:00 PM–1:00 PM</td>
<td>A’CR² Networking Lunch <em>(A’CR² Members Only)</em> <em>(Supported by the American College of Radiology)</em></td>
</tr>
<tr>
<td>12:00 PM–1:00 PM</td>
<td>AUR New Attendee Orientation Meeting</td>
</tr>
<tr>
<td>3:00 PM–4:30 PM</td>
<td>APCR Member Meeting 1</td>
</tr>
<tr>
<td>6:30 PM–8:30 PM</td>
<td>AUR Welcome Reception</td>
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</tbody>
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R=Research  
E=Education  
A=Administration  
L=Leadership  
T=Training

4 Radiology: Health and Well-being of the Profession and the Professional
### Meeting Program Sessions

<table>
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<tr>
<th>Time</th>
<th>Track</th>
<th>Session #</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>7:00 AM–8:00 AM</td>
<td>REALT</td>
<td>201</td>
<td>Poster Discussion Session</td>
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<tr>
<td>7:45 AM–9:30 AM</td>
<td></td>
<td>202</td>
<td>AUR Radiology Management Program <em>(Closed Program)</em></td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>R</td>
<td>203</td>
<td>RRA Research Boot Camp: Strategies and Practical Pitfalls for Exploring New Avenues in Radiology Research</td>
</tr>
<tr>
<td>8:00 AM–9:30 AM</td>
<td>E L</td>
<td>204</td>
<td>AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees <em>Speaker: Frederick J. Marshall, MD</em></td>
</tr>
<tr>
<td>10:00 AM–11:30 AM</td>
<td>L</td>
<td>205</td>
<td><strong>Leadership Track 1:</strong> Are Leaders Born or Made?</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>R</td>
<td>206</td>
<td>Harnessing Big Data in Radiology Health Services Research</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>A</td>
<td>207</td>
<td>Leading from the Middle: Maximizing Coordinator Effectiveness</td>
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<tr>
<td>10:00 AM–11:45 AM</td>
<td>E</td>
<td>208</td>
<td><strong>Education Track 2:</strong> Teaching Value-added Care <em>(Supported by Bracco Diagnostics, Inc.)</em></td>
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<tr>
<td>10:00 AM–12:00 PM</td>
<td></td>
<td>209</td>
<td>AUR Radiology Management Program <em>(Closed Program)</em></td>
</tr>
<tr>
<td>1:00 PM–1:45 PM</td>
<td>REALT</td>
<td>211</td>
<td>Vydareny Imaging Interpretation Competition <em>(Supported by the RSNA)</em></td>
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<tr>
<td>1:00 PM–2:30 PM</td>
<td></td>
<td>212</td>
<td>AUR Radiology Management Program <em>(Closed Program)</em></td>
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<tr>
<td>2:00 PM–3:00 PM</td>
<td>LT</td>
<td>213</td>
<td>Psychology of Leadership in Radiology</td>
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<tr>
<td>2:00 PM–3:30 PM</td>
<td>E</td>
<td>214</td>
<td>Career Well-being</td>
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<tr>
<td>2:00 PM–3:30 PM</td>
<td>EA</td>
<td>215</td>
<td>RRC Update <em>(Diagnostic Radiology and Nuclear Medicine)</em></td>
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<tr>
<td>2:00 PM–3:30 PM</td>
<td>R</td>
<td>216</td>
<td>RRA Task Force Reports, Part 2: Leveraging Megatrends in Medicine and Radiology Today</td>
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<tr>
<td>2:00 PM–3:30 PM</td>
<td>A</td>
<td></td>
<td>AMSCR Program 1</td>
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<tr>
<td>2:00 PM–4:00 PM</td>
<td>R</td>
<td>217</td>
<td>GERRAF Research in Progress 1</td>
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<tr>
<td>3:00 PM–3:30 PM</td>
<td>T</td>
<td>218</td>
<td>Case Review: Physics</td>
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<td>3:00 PM–5:00 PM</td>
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<td>219</td>
<td>AUR Radiology Management Program <em>(Closed Program)</em></td>
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<tr>
<td>3:00 PM–5:30 PM</td>
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<td>221</td>
<td>ARRALD Program 5 <em>(Closed Program)</em></td>
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<tr>
<td>4:00 PM–5:00 PM</td>
<td>T</td>
<td>220</td>
<td>Problem Solving <em>(A3CR² Members Only)</em></td>
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<tr>
<td>4:00 PM–5:30 PM</td>
<td>REALT</td>
<td>222</td>
<td>AUR Research and Education Foundation Grant Session</td>
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<tr>
<td>4:00 PM–5:30 PM</td>
<td>EA</td>
<td>223</td>
<td>Radiology Residency Updates and Hot Topics</td>
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<tr>
<td>5:00 PM–5:30 PM</td>
<td>T</td>
<td>224</td>
<td>Case Review: Nuclear Medicine</td>
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### Affiliated Society Meetings/Social Functions

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>7:00 AM–8:00 AM</td>
<td>Breakfast and Roundtable Discussions</td>
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<tr>
<td>12:00 PM–1:00 PM</td>
<td>Luncheon and AUR Business Meeting</td>
</tr>
<tr>
<td>12:00 PM–1:30 PM</td>
<td>APCR Lunch</td>
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<tr>
<td>4:00 PM–5:00 PM</td>
<td>AMSER Members and Business Meeting</td>
</tr>
<tr>
<td>5:00 PM–5:30 PM</td>
<td>RAHSR Business Meeting</td>
</tr>
<tr>
<td>5:30 PM–6:30 PM</td>
<td>A3CR²/APDR/SCARD/APCR/RSNA Beer and Pretzels Reception <em>(Supported by RSNA, APDR, and SCARD)</em></td>
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### Meeting Program Sessions

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<tr>
<td>7:00 AM–8:00 AM</td>
<td>REALT</td>
<td>301</td>
<td>Poster Discussion Session</td>
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<tr>
<td>8:00 AM–8:45 AM</td>
<td>T</td>
<td>302</td>
<td>Success in Social Media</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>A</td>
<td>303</td>
<td>AARRALD Program 6 (Closed Program)</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>R</td>
<td>304</td>
<td>AUR Radiology Management Program (Closed Program)</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>A</td>
<td>305</td>
<td>Three Perspectives on Resident Wellness</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>R</td>
<td>306</td>
<td>Research Track 2: Clinical Trial/Study Design</td>
</tr>
<tr>
<td>8:00 AM–9:30 AM</td>
<td>E</td>
<td>307</td>
<td>Education Track 3: Scholarship, Teaching, and Learning (Supported by Bracco Diagnostics, Inc.)</td>
</tr>
<tr>
<td>8:45 AM–9:30 AM</td>
<td>T</td>
<td>308</td>
<td>Effective Mentoring</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>LT</td>
<td>309</td>
<td>Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>A</td>
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<td>AMSCR Program 2</td>
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<tr>
<td>10:00 AM–12:00 PM</td>
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<td>311</td>
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<tr>
<td>1:00 PM–2:30 PM</td>
<td>REALT</td>
<td>312</td>
<td>AUR Scientific Sessions</td>
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<tr>
<td>1:00 PM–2:30 PM</td>
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<td>313</td>
<td>AUR Radiology Management Program (Closed Program)</td>
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<td>3:00 PM–4:00 PM</td>
<td>R</td>
<td>314</td>
<td>GERRAF Research in Progress 2</td>
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<tr>
<td>3:00 PM–4:30 PM</td>
<td>A</td>
<td>315</td>
<td>Value-Driven Practice: Making the Change</td>
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<tr>
<td>3:00 PM–4:30 PM</td>
<td>E</td>
<td>316</td>
<td>Education Problem Solving: Trainee and Faculty Well-being</td>
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<tr>
<td>3:00 PM–4:30 PM</td>
<td>EA</td>
<td>317</td>
<td>Problem Solving for Residents, Program Directors, Coordinators, and Chairs</td>
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<tr>
<td>3:00 PM–5:00 PM</td>
<td></td>
<td>318</td>
<td>AUR Radiology Management Program (Closed Program)</td>
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<td>7:00 AM–8:00 AM</td>
<td>Breakfast and Roundtable Discussions</td>
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<tr>
<td>11:00 AM–12:00 PM</td>
<td>APCR Member Meeting 2</td>
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<tr>
<td>12:00 PM–1:00 PM</td>
<td>Luncheon and AUR Awards Ceremony</td>
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<tr>
<td>4:30 PM–5:00 PM</td>
<td>APDR Business Meeting</td>
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<tr>
<td>4:30 PM–5:00 PM</td>
<td>A3CR Business Meeting and Elections</td>
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<td>4:30 PM–5:30 PM</td>
<td>RRA Business Meeting</td>
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<tr>
<td>5:00 PM–5:30 PM</td>
<td>ACER Business Meeting</td>
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<tr>
<td>5:00 PM–7:00 PM</td>
<td>Wacky Golf</td>
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<tr>
<td>5:30 PM–6:30 PM</td>
<td>AMSER/ACER Reception and Open House (Supported by the American College of Radiology)</td>
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</tbody>
</table>

R=Research       E=Education       A=Administration       L=Leadership       T=Training
### Meeting Program Sessions

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<td>AIRP Update and Radiology RRC Q&amp;A</td>
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<tr>
<td>7:15 AM–8:30 AM</td>
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<td>401</td>
<td>AUR Academic Faculty Development Program (Closed Program)</td>
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<td>8:00 AM–9:30 AM</td>
<td>E</td>
<td>402</td>
<td>Academic Success (Interactive Workshop 1) (Preregistration Required)</td>
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<td>8:00 AM–9:30 AM</td>
<td>E</td>
<td>403</td>
<td>Growth Opportunities (Interactive Workshop 2) (Preregistration Required)</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>A</td>
<td>404</td>
<td>Best Practices of APCR Membership</td>
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<tr>
<td>8:00 AM–9:30 AM</td>
<td>L</td>
<td>405</td>
<td><strong>Leadership Track 2:</strong> Can We Do Research in Radiology Leadership?</td>
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<td>8:00 AM–9:30 AM</td>
<td>R</td>
<td>406</td>
<td>Scientific and Health Policy Research: Part 1: Scholar Presentations and</td>
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<td>Mentoring Program (Supported by the American College of Radiology)</td>
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<td>407</td>
<td>Case Review: Thoracic Radiology; Cardiac Radiology; Head and Neck</td>
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<tr>
<td>8:30 AM–9:30 AM</td>
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<td>408</td>
<td>AUR Academic Faculty Development Program (Closed Program)</td>
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<td>10:00 AM–10:30 AM</td>
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<td>413</td>
<td>Interviewing and Diversity</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>L</td>
<td>409</td>
<td>SCARD's Strategic Focus on Faculty and Leadership</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>E</td>
<td>410</td>
<td>Presentation Skills and Publication (Interactive Workshop 3) (Preregistration</td>
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<td>Required)</td>
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<tr>
<td>10:00 AM–11:30 AM</td>
<td>E</td>
<td>411</td>
<td>Design Thinking: Mind-set for Success (Interactive Workshop 4) (Preregistration</td>
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<td>Required)</td>
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<td>10:00 AM–11:30 AM</td>
<td></td>
<td>412</td>
<td>AUR Academic Faculty Development Program (Closed Program)</td>
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<tr>
<td>10:00 AM–12:00 PM</td>
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<td>ARRALD Program 7 (Closed Program)</td>
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<tr>
<td>10:00 AM–12:00 PM</td>
<td>R</td>
<td>415</td>
<td>Scientific and Health Policy Research: Part 2: Scholar Presentations and</td>
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<tr>
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<td>Mentoring Program (Supported by the American College of Radiology)</td>
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<tr>
<td>10:30 AM–11:30 AM</td>
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<td>416</td>
<td>Case Review: Breast Imaging; Musculoskeletal Radiology</td>
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<td>Scientific and Health Policy Research: Lunch and Keynote (Supported by the ACR)</td>
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<td>1:00 PM–2:30 PM</td>
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<td>AUR Academic Faculty Development Program (Closed Program)</td>
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<td>1:00 PM–3:00 PM</td>
<td>E</td>
<td>420</td>
<td>Teaching Certificate Program</td>
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<tr>
<td>1:00 PM–3:00 PM</td>
<td>T</td>
<td>421</td>
<td>Case Review: Genitourinary; Vascular and Interventional; Gastrointestinal;</td>
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<td>Pediatric</td>
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<td>1:15 PM–3:00 PM</td>
<td>R</td>
<td>422</td>
<td>Scientific and Health Policy Research: Part 3: How to Get Started in</td>
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<tr>
<td></td>
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<td>Comparative Effectiveness Research (Supported by the American College of</td>
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<td>Radiology)</td>
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<tr>
<td>1:30 PM–3:00 PM</td>
<td>L</td>
<td>423</td>
<td>SCARD's Dynamic Road Map for Innovation and Adaptation</td>
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<tr>
<td>3:00 PM–4:30 PM</td>
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<td>424</td>
<td>AUR Academic Faculty Development Program (Closed Program)</td>
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### Affiliated Society Meetings/Social Functions

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>10:00 AM–11:30 AM</td>
<td>ADVICER Special Interest Group Meeting</td>
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<tr>
<td>12:00 PM–1:30 PM</td>
<td>SCARD Business Meeting and Lunch</td>
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<tr>
<td>1:00 PM–2:30 PM</td>
<td>AUR Special Interest Group Meetings (AAMR; AIR-IG)</td>
</tr>
<tr>
<td>6:00 PM–7:00 PM</td>
<td>Annual Banquet Cocktail Reception</td>
</tr>
<tr>
<td>7:00 PM–9:00 PM</td>
<td>Annual Banquet and Awards Ceremony</td>
</tr>
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</table>
# AUR 2018 CME Poster Discussion Section Assignments

Hard-copy and electronic posters are located in National Ballroom D. Authors will be present at their assigned posters according to the following schedule:

## Hard-copy Poster Schedule

<table>
<thead>
<tr>
<th>Tuesday, May 8</th>
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<tbody>
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## E-poster Schedule

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<td>E-112</td>
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<tr>
<td>10</td>
<td>E-129</td>
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</table>
General Information

Academy of Radiology Leadership and Management

The Academy of Radiology Leadership and Management (ARLM) is sponsored by five participating radiology education societies: Association of Administrators in Academic Radiology (AAARAD), American Roentgen Ray Society (ARRS), Association of University Radiologists (AUR), Radiological Society of North America (RSNA), and Society of Chairs of Academic Radiology Departments (SCARD). Launched in 2011, ARLM helps medical imaging professionals focus their professional development by requiring completion of education across six different learning domains. ARLM awards a Certificate of Achievement upon completion. Qualifying courses are designated in the detailed meeting schedule.

Americans with Disabilities Act

Individuals needing accommodations or services as identified under the Americans with Disabilities Act, please contact the AUR registration desk for assistance.

AUR Annual Banquet and Awards Ceremony

The banquet will be held on Thursday, May 10, with cocktails beginning at 6:00 PM. Please obtain your banquet and beverage tickets at the registration desk when picking up your badge and meeting materials.

Business Center

A fully automated self-serve business center is accessible to guests 24 hours a day. All computer workstations, copiers, etc., are credit card automated.

Child Care

To uphold the professional and educational standards of the AUR annual meeting, children younger than 16 years of age are not permitted in educational sessions. If you require child care, please contact the hotel concierge desk.

CME Information

Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the Radiological Society of North America (RSNA) and the Association of University Radiologists (AUR). The RSNA is accredited by the ACCME to provide continuing medical education for physicians.

Content Codes

To better help the participants of this CME activity organize their CME records, two-letter content codes have been indicated throughout the program. The key to the codes follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>BR</td>
<td>Breast (Imaging and Interventional)</td>
</tr>
<tr>
<td>CA</td>
<td>Cardiac Radiology</td>
</tr>
<tr>
<td>CH</td>
<td>Chest Radiology</td>
</tr>
<tr>
<td>ED</td>
<td>Education</td>
</tr>
<tr>
<td>GI</td>
<td>Gastrointestinal Radiology</td>
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<tr>
<td>GU</td>
<td>Genitourinary Radiology</td>
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<tr>
<td>HN</td>
<td>Head and Neck</td>
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<td>HP</td>
<td>Health Policy</td>
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<td>IN</td>
<td>Informatics</td>
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<tr>
<td>IR</td>
<td>Interventional</td>
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<td>Leadership &amp; Management</td>
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<td>MK</td>
<td>Musculoskeletal Radiology</td>
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<td>NM</td>
<td>Nuclear Medicine</td>
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<tr>
<td>NR</td>
<td>Neuroradiology</td>
</tr>
<tr>
<td>OT</td>
<td>Other</td>
</tr>
<tr>
<td>PD</td>
<td>Pediatric Radiology</td>
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<tr>
<td>PH</td>
<td>Physics and Basic Science</td>
</tr>
<tr>
<td>RS</td>
<td>Research and Statistical Methods</td>
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<tr>
<td>SQ</td>
<td>Safety &amp; Quality</td>
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<tr>
<td>US</td>
<td>Ultrasound</td>
</tr>
<tr>
<td>VA</td>
<td>Vascular</td>
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Designation Statement

The RSNA designates this live activity for a maximum of 33.50 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
Evaluation
In compliance with the ACCME requirements, you must record your attendance and evaluate the sessions you attend in order to receive AMA PRA Category 1 Credit™. AUR is collaborating with RSNA to provide an online, real-time mechanism for evaluating sessions and claiming CME. AUR attendees will be able to submit their feedback and CME requests by using their own mobile devices and dedicated computer terminals at the meeting.

Target Audience
Radiologists, researchers, or other allied health professionals, trainees, and administrators in academic radiology.

Learning Objectives
At the conclusion of this live activity, participants will be able to:

- Articulate strategies to enhance the well-being of radiology faculty, fellows, residents, and medical students.
- Identify how attention to health and wellness can improve recruitment and retention of faculty, trainees, and staff.
- Discuss the role of emotional intelligence for radiology leaders.
- Describe factors contributing to physician burnout and approaches to identifying physicians at risk.
- Implement curricular innovations and strategies to use at your home institution to improve resilience and workplace satisfaction.
- Explore how career and leadership opportunities can be approached strategically.
- Improve presentation, meeting, and publication skills.
- Develop interviewing skills, and take advantage of social media to grow professionally.

Disclosures
The Accreditation Council for Continuing Medical Education (ACCME) requires that the Radiological Society of North America (RSNA), as an accredited provider of continuing medical education, obtain signed disclosure statements from meeting faculty, including committee members, program planners, presenters, and authors. The intent of this policy is not to prevent an individual with a financial relationship from participating; however, in accordance with ACCME standards, the RSNA has developed policies and procedures to manage identified conflicts of interest.

The ACCME further requires that the RSNA provide disclosure information to all attendees prior to the educational activity. Individuals who have or have had an affiliation or financial relationship with any commercial interest (within the previous 12 months or at the time the research was conducted) are noted with a star (★) after their name in the program book (pages 12–127). Financial disclosure statements for these individuals are reported after each individual’s name in the faculty index section (pages 136–143). All other individuals have indicated they have nothing to disclose.

FDA
This icon indicates discussion of uses not approved by the FDA. The RSNA and AUR recognize that at educational meetings, faculty may discuss the application of some devices, materials, or pharmaceuticals that are not FDA approved. In keeping with the highest standards of professional integrity and ethics, RSNA and AUR require that faculty fully disclose to their audience that there will be discussion of the unlabeled use of a commercial product, device, or pharmaceutical that has not been approved for such purpose by the FDA.

Future Meetings

<table>
<thead>
<tr>
<th>AUR 67th Annual Meeting</th>
<th>AUR 68th Annual Meeting</th>
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<tbody>
<tr>
<td>April 9–12, 2019</td>
<td>April 21–24, 2020</td>
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<tr>
<td>Hilton Baltimore</td>
<td>Philadelphia Marriott Downtown</td>
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<td>Baltimore, Maryland</td>
<td>Philadelphia, Pennsylvania</td>
</tr>
</tbody>
</table>

Hotel Information
Omni Orlando Resort at ChampionsGate
1500 Masters Blvd
ChampionsGate, FL 33896
Phone: 1-407-390-6664

Local Activities
With world-famous theme parks, fabulous shopping, numerous dining options, a thriving arts community, and plenty of outdoor recreation, Orlando has something for everyone.
Visit the Omni concierge desk for all your transportation and attraction ticket needs. The concierge will also be happy to assist with suggested itineraries, dinner reservations, transportation, driving directions, and more.

Poster Presentation, Setup, and Removal
AUR will have a limited group of posters available for viewing in electronic poster format. Sixty posters have been selected for an electronic poster format that mirrors the existing paper poster format. Attendees can view the electronic posters on-site at designated computer stations or by using their electronic devices throughout the week.
All research and education poster viewing will be held in National Ballroom D. The room will be open for paper poster setup from 10:00 AM to 5:00 PM on Monday, May 7. All posters should be in place for general viewing by 6:30 AM, Tuesday, May 8, and must remain on display until 12:00 PM, Thursday, May 10. Paper posters must be claimed by 2:00 PM on Thursday, May 10.
Poster viewing hours are at the following times:
- Tuesday–Wednesday, May 8–9: 6:30 AM–5:00 PM
- Thursday, May 10: 6:30 AM–12:00 PM
Presenters will be available at their posters during one of the sessions scheduled on Tuesday and Wednesday mornings (7:00–8:00 AM). A schedule of poster discussion session assignments is included on page 8 of this program book. Each poster discussion session has been designated for 1.0 AMA PRA Category 1 Credit™.

**Registration/Information Desk**

Registration materials may be picked up at the Registration Desk, and staff will be available to answer questions.

- Sunday, May 6 2:00–6:00 PM
- Monday–Wednesday, May 7–9 6:30 AM–6:00 PM
- Thursday, May 10 6:30 AM–4:30 PM

**Scientific and Joint Sessions**

Room locations and times for all sessions can be found in the meeting schedule (pages 12–31). The floor plans can be found on page 2 of this program book.

**Self-Assessment Modules**

RSNA will offer four AUR sessions as self-assessment modules (SAMs) to fulfill the ABR maintenance of certification (MOC) requirements. SAMs are planned to be offered in several content areas.

**Fees:**
- AUR member: No fee
- AUR nonmember U.S.-licensed physician: $50 per SAM

Registration and fees will be collected at the meeting. This year, all SAMs will be implemented using an electronic format. Attendees will be required to use their personal devices to complete the required test questions. If you plan to participate in a self-assessment session, you must check in with staff at the entrance of the session. To claim SAM credit, attendees must complete the required test questions during the live session and evaluate and claim CME for the SAM session. All SAM session credit must be claimed within 6 months after the date of the live event.

**Session Designations**

Sessions have been tagged with the following designations to help attendees identify sessions that are relevant to their interests:
- R = Research
- E = Education
- A = Administration
- L = Leadership
- T = Trainee

**Exhibits**

Exhibits will be located in the ballroom prefunction areas. Exhibit viewing hours are at the following times:
- Monday, May 7 10:00 AM–5:00 PM
- Tuesday–Wednesday, May 8–9 6:30 AM–5:00 PM
- Thursday, May 10 6:30 AM–12:00 PM

**Welcome Reception**

Please join your colleagues on Monday evening from 6:30 to 8:30 PM at the Omni Golf Course Commons to enjoy networking with your colleagues and participate in the planned family-friendly activities. Attendees and their guests are invited to attend this popular event.

**Speaker Ready Room**

The Speaker Ready Room is located in Royal Dublin. The hours of operation are as follows:
- Sunday, May 6 2:00–6:00 PM
- Monday–Wednesday, May 7–9 6:30 AM–6:00 PM
- Thursday, May 10 6:30 AM–4:00 PM

Visiting the Speaker Ready Room will ensure that your presentation is a success. While you’re there, you can upload and review your presentation. We strongly recommend uploading your presentation at least four (4) hours prior to your session. Technicians will be on hand to answer questions or assist you with compatibility or formatting issues, including embedding videos in the presentation. To ensure that your presentation is ready for your talk, confirm the date, time, and room location for your session. Then be sure to click the “Upload Files” and “Logout” buttons on the bottom of the screen.
Monday, May 7, 2018

Monday 7:00–8:00 AM

Session No. 101 • Allendale B
ARRALD Program 1 (closed program)

**LEARNING OBJECTIVES**
1) Describe the principles of academic leadership. 2) Identify opportunities for practice improvement. 3) Discuss how to develop approaches for practice improvements.

**A. Introduction to Leadership**
James V. Rawson, MD
Ruth C. Carlos, MD, MS

Monday 7:30–8:00 AM

Session No. 100 • International Ballroom I
Chief Resident Welcome and Annual Survey Results ★

**LEARNING OBJECTIVES**
1) Discuss annual survey data from A³CR² membership about residency programs, compiled by the Mallinckrodt Institute of Radiology.

**A. Welcome**
Peter S. Liu, MD

**B. A³CR² Survey Presentation**
Andrew B. Wallace, MD

Monday 8:00–9:30 AM

AUR Plenary Session ★

**LEARNING OBJECTIVES**
1) Describe common and uncommon cases in neuroradiology, highlighting key imaging findings and teaching points.

**A. Welcome**
Martha B. Mainiero, MD

**B. The Intern Health Study: Insights into Depression during Medical Training and the Biology of Stress and Resilience**
Srijan Sen, MD, PhD

Monday 9:30–10:00 AM

Break • National Ballroom D

Monday 10:00–10:30 AM

Case Review: Neuroradiology ★

**LEARNING OBJECTIVES**
1) Describe common and uncommon cases in neuroradiology, highlighting key imaging findings and teaching points.

**A. Welcome**
Mark E. Mullins, MD, PhD

**B. A³CR² Survey Presentation**
Andrew B. Wallace, MD

* Faculty financial disclosures are located in the Faculty Index.
Monday 10:00–11:30 AM

Session No. 103 • Augusta
Can I Increase My Emotional Intelligence, and Why Should I? 
AMA PRA Category 1 Credits™: 1.50

- Joseph Stuckelman, BA*, Moderator
- Stefani A. Hodgkins, BS, MBA*
- Cheri L. Canon, MD

LEARNING OBJECTIVES
1) Define emotional intelligence. 2) List the benefits of high emotional intelligence. 3) Discuss strategies to improve emotional intelligence.

Monday 10:00–11:30 AM

Session No. 104 • International Ballroom II–III
Education Track 1: Key Additions to Your Curriculum (Supported by an unrestricted educational grant from Bracco Diagnostics, Inc.)
AMA PRA Category 1 Credits™: 1.50

- Rebecca Leddy, MD, Moderator
- Jeanne K. Kwon, MD, Moderator

LEARNING OBJECTIVES
1) Discuss how to develop methods for improving diversity and reducing disparity in radiology department practices. 2) Describe strategies for developing effective global health curricular components. 3) Describe how machine learning can improve the radiology educational experience. 4) Identify techniques for establishing interprofessional learning experiences. 5) Identify essential elements for teaching leadership skills to radiology trainees.

A. How to Address Diversity and Disparity in Practices
Desiree E. Morgan, MD*

B. Optimization of Global Health Experiences for Trainees and Faculty
Aarti Sekhar, MD

C. Incorporating Machine Learning into Radiology Education Programs
Matthew T. Heller, MD*

D. Interprofessional Education: Key Components to Promote Optimal Care
James C. Anderson, MD

E. Establishing a Leadership Track for Trainees
Dania Daye, MD, PhD

F. Q&A

Monday 10:00–11:30 AM

Session No. 105 • Congressional
Research Track 1: Biostatistics
AMA PRA Category 1 Credits™: 1.50

- Linda J. Probyn, MD, Moderator
- William F. Auffermann, MD, PhD, Moderator

LEARNING OBJECTIVES
1) Describe the basic principles of probability theory. 2) Explain the basic statistical concepts needed to critically appraise and perform research. 3) Discuss the common sources of error in applying statistics to research data. 4) Identify factors that lead to high reproducibility and measurements of high reproducibility. 5) Discuss the indications and the methodologies used in the analysis of Gaussian and non-Gaussian data.

A. Basic Concepts of Statistical Analysis
William F. Auffermann, MD, PhD

B. Measurements of Precision
Michael H. Rosenthal, MD, PhD

C. Analysis of Gaussian Data
Stefan Tigges, MD*

D. Analysis of Non-Gaussian/Categorical Data
Michael L. Richardson, MD

E. Panel Discussion
Michael L. Richardson, MD
Michael H. Rosenthal, MD, PhD
William F. Auffermann, MD, PhD
Stefan Tigges, MD*

Monday 10:30–11:30 AM

Session No. 107 • International Ballroom I
ABR Update for Residents
AMA PRA Category 1 Credit™: 1.00

- Chad Klochko, MD, Moderator
- Valerie P. Jackson, MD

Monday 12:00–1:00 PM

ARRALD Mentorship Lunch (closed program) • Seminole

Monday 12:00–1:00 PM

AUR New Attendee Orientation Meeting • Oakmont

Monday 1:00–1:30 PM

Session No. 108 • International Ballroom I
Effective Teaching Methods
AMA PRA Category 1 Credit™: .50

- Julie C. Birch, MD, Moderator
- David M. Naeger, MD

LEARNING OBJECTIVES
1) Describe various teaching methods for trainee education. 2) Explain effective strategies for engaging learners and creating lasting knowledge.

* Faculty financial disclosures are located in the Faculty Index.
Monday 1:00–2:30 PM

Session No. 109 • International Ballroom II–III
ABR Update
AMA PRA Category 1 Credits™: 1.50

Valerie P. Jackson, MD, Moderator

LEARNING OBJECTIVES
1) Identify opportunities for improved understanding of ABR processes, procedures, and policies.
2) Develop an action plan for improved understanding of ABR processes, procedures, and policies.

A. The June 2017 Core Exam: What Happened?
Valerie P. Jackson, MD

B. Roles and Responsibilities of the ABR and Residency Programs in Initial Certification
Donald J. Flemming, MD

C. ABR Online Longitudinal Assessment (OLA)
Lisa Kachnic, MD

D. ABR Finances
Brent J. Wagner, MD

E. What Do Other Boards Do?
David Laszakovits, MBA

Monday 1:00–2:30 PM

Session No. 110 • Allendale B
ARRALD Program 2 (closed program)
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Describe the principles of academic leadership.
2) Identify opportunities for practice improvement.
3) Discuss how to develop approaches for practice improvements.

A. Networking in the Radiology Profession/Community
Ruth C. Carlos, MD, MS

B. Networking Exercise: “Speed Networking”
Ruth C. Carlos, MD, MS

Monday 1:00–2:30 PM

Session No. 111 • Colonial
Outcomes Research Methods
AMA PRA Category 1 Credits™: 1.50

María E. Heilbrun, MD, Moderator

LEARNING OBJECTIVES
1) Identify key outcomes research methods for health services research.
2) Explain how to apply these outcomes research methods to interpreting the radiology scientific literature.
3) Discuss how to apply these outcomes research methods to your own research projects.

A. Measuring the Performance of Diagnostic Tests
Pina C. Sanelli, MD, MPH

B. Systematic Review and Meta-analysis
Stella K. Kang, MD, MSc

C. Decision Analysis and Cost-effectiveness Analysis
Pari Pandharipande, MD, MPH

Monday 1:00–2:30 PM

Session No. 112 • Allendale A
RRA Task Force Reports, Part 1: Leveraging Megatrends in Medicine and Radiology Today
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Describe nonprocedural radiology skills.
2) Explain the impact of health care integration and mergers and the opportunities and challenges for imaging.
3) Explain autosegmentation tools for large-scale image analytics.
4) Discuss the promotion of health and wellness for radiologists.
5) Discuss forensic radiology.

A. Nonprocedural Radiology Skills
Rebecca T. Sivarajah, MD
Elizabeth M. Johnson, MD, MS

B. Health Care Integration and Mergers: Opportunities and Challenges for Imaging
Andrew B. Rosenkrantz, MD
Rathan M. Subramaniam, MD, PhD, MPH

C. Autosegmentation Tools for Large-Scale Image Analytics
Laura Heacock, MD
Leon Lenchik, MD
Daniel A. Ortiz, MD
Kim L. Sandler, MD

D. Promoting Health and Wellness for Radiologists
Tiffany L. Chan, MD
Alison L. Chetlen, DO

E. Forensic Radiology
Maria Braileanu, MD
Maria W. Tucker, DO
Jason Powell, MD

Monday 1:00–2:30 PM

Session No. 113 • Congressional
The Image of Radiology: Integrating Radiology into the Preclinical Years
AMA PRA Category 1 Credits™: 1.50

Allison M. Grayev, MD, Moderator
Kimi L. Kondo, DO, Moderator

LEARNING OBJECTIVES
1) Discuss how to integrate radiology into all aspects of early medical school education.
2) Describe how to create a program for junior medical students to experience a radiologist’s workday.
3) Identify where radiology fits within patient pathways through the clinic/hospital system.
4) Describe how to compose core clerkship imaging skills training for senior medical students on their clerkships.
5) Discuss how to design a medical student “on call in radiology” program.

A. M1—Doctoring Program: Professional Well-being and Balance
Katherine A. Klein, MD

B. M2—Bring a Buddy Program/Radiology Field Trips
Matthew T. Heller, MD

C. M3—Multidisciplinary Oncology Experience
Angela Giardino, MD

D. M4—Teaching Core Clerkship Skills
Andres R. Ayoob, MD

* Faculty financial disclosures are located in the Faculty Index.
E. Medical Students on Call in Radiology
Matthew S. Hartman, MD

F. Panel Discussion
Matthew T. Heller, MD
Matthew S. Hartman, MD
Katherine A. Klein, MD
Angela Giardino, MD
Andres R. Ayoob, MD

Monday 1:30–2:30 PM

Session No. 114 • International Ballroom I
ACR Update for Residents
AMA PRA Category 1 Credits™: 1.00

Shannon Kim, MD, Moderator
James A. Brink, MD

LEARNING OBJECTIVES
1) Discuss an overview of the structure and mission of the ACR. 2) Describe ways that the ACR helps practicing radiologists, including advocacy and collaboration. 3) Explain opportunities for physician engagement in the ACR, including at the trainee level.

Monday 2:30–3:00 PM

Break • National Ballroom D

Monday 3:00–3:30 PM

Session No. 115 • International Ballroom I
Case Review: US
AMA PRA Category 1 Credits™: 0.50

Katherine E. Barton, MD, Moderator
Ashish P. Wasnik, MD

LEARNING OBJECTIVES
1) Describe common and uncommon cases in ultrasound, highlighting key principles and teaching points.

Monday 3:00–4:30 PM

Session No. 116 • Colonial
Wellness in Radiology Research
AMA PRA Category 1 Credits™: 1.50

Stella K. Kang, MD, MSc, Moderator
Ajay Gupta, MD, Moderator

LEARNING OBJECTIVES
1) Define key methods of measuring quality of life in imaging research. 2) Identify techniques to measure patient wellness and patient-centered outcomes in survey research. 3) Develop personal strategies for maintaining quality of life and managing burnout in a research career.

A. Quality-of-Life Research in Imaging: Methods and Measurement
J. Shannon Swan, MD

B. Measuring Patient Wellness and Patient-centered Outcomes in Survey Research
Resmi Charalel, MD

C. Maintaining Quality of Life and Managing Burnout in a Research Career: Panel Discussion
Ruth C. Carlos, MD, MS
Jeffrey G. Jarvik, MD, MPH
Carolyn C. Meltzer, MD
James V. Rawson, MD

Monday 3:00–4:30 PM

Session No. 117 • Congressional
Self-preservation Skills for the Radiology Educator
AMA PRA Category 1 Credits™: 1.50

Sravanthi Reddy, MD, Moderator
Carl R. Fuhrman, MD, Moderator

LEARNING OBJECTIVES
1) Explain how to apply your medical school educational efforts towards career development. 2) Discuss relevant factors and steps in the career application process for medical students. 3) Identify ways to integrate residents and medical students as stakeholders in radiology education. 4) Explain how to approach and assist colleagues in distress. 5) Discuss how to evaluate factors that create and solve the gender gap in radiology.

A. Getting Recognized for Your Medical School Contributions
David M. Naeger, MD

B. Coaching Medical Students through the Career Application Process
C. Alexander Grieco, MD

C. Engaging Medical Students: Residents as Educators
Jeanine Beatty-Chadha, MEd

D. Approach to the Faculty Colleague, Resident, or Medical Student in Distress
Leslie M. Scoutt, MD

E. Panel Discussion: Closing the Gender Gap in Radiology
Emily M. Webb, MD
Alison L. Chetlen, DO
Erinn Cooke, MD, MPH
Smyrna Tuburan, MD

Monday 3:00–4:30 PM

Session No. 118 • International Ballroom II–III
Radiology Training Program Open Mic Session
AMA PRA Category 1 Credits™: 1.50

Madelene C. Lewis, MD, Moderator
Joshua P. Nickerson, MD, Moderator
Angelisa M. Paladin, MD, Moderator

LEARNING OBJECTIVES
1) Discuss factors affecting trainees and training programs with regard to family issues. 2) Identify opportunities for improved leadership transitions. 3) Identify opportunities for including the topic of artificial intelligence and radiology education/training. 4) Discuss how to develop an action plan for working with struggling trainees.

* Faculty financial disclosures are located in the Faculty Index.

AUR 66th Annual Meeting  15
Monday 3:00–4:30 PM

Session No. 122 • Allendale A
Leadership: New Perspectives 
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES:
1) Describe the relationships between leadership skills and music.
2) Discuss the lessons of leadership from baseball history.
3) Describe the value of “right brain” skills, particularly empathy and creativity, in effective leadership.

A. Music and Leadership
Reed A. Omary, MD, MS

B. Leadership: Lessons Learned from Baseball
N. Reed Dunnick, MD

C. The Role of the Right Side of the Brain in Leadership
Valerie P. Jackson, MD

Monday 3:00–4:30 PM

APCR Member Meeting 1 • Augusta

Monday 3:30–4:30 PM

Session No. 119 • International Ballroom I
Idea Forum (A3CR2 members only)
AMA PRA Category 1 Credit™ 1.00

LEARNING OBJECTIVES:
1) Describe experiences and identify mutual challenges among member chief residents representing programs from across the country.
2) Productively identify, exchange, and appraise ideas on a variety of practical real-world issues affecting diagnostic radiology residency training.
3) Discuss how to develop and disseminate innovative tangible solutions for shared challenges that can be employed at your home institution.

A. Junior Faculty Panel: Balancing Life and Career in Academic Radiology
Jadranka Stojanovska, MD

B. Panelists
Hedvig Hricak, MD, PhD★
Cheri L. Canon, MD
Christopher P. Hess, MD, PhD★

Monday 4:00–5:30 PM

Session No. 120 • Allendale B
ARRALD Program 3 (closed program)
AMA PRA Category 1 Credits™ 2.50

LEARNING OBJECTIVES:
1) Describe the principles of academic leadership.
2) Identify opportunities for practice improvement.
3) Discuss how to develop approaches for practice improvements.

A. Junior Faculty Panel: Balancing Life and Career in Academic Radiology
Jadranka Stojanovska, MD★

B. Panelists
Hedvig Hricak, MD, PhD★
Cheri L. Canon, MD
Christopher P. Hess, MD, PhD★

Monday 4:30–5:30 PM

Session No. 121 • International Ballroom I
AUR Special Session: LGBT-related State Laws: How Can Academic Radiology Respond?
AMA PRA Category 1 Credit™ 1.00

LEARNING OBJECTIVES:
1) Describe recent political events that have become relevant to planning and attending academic radiology meetings.
2) Explain the ramifications for individuals and societies in deciding how academic societies should respond.
3) Discuss future options and directions for the society.

A. Panel Discussion
Erik K. Paulson, MD
Martha B. Mainiero, MD
Alexander Norbash, MD★

Monday 6:30–8:30 PM

AUR Welcome Reception • Golf Course Commons

* Faculty financial disclosures are located in the Faculty Index.
Tuesday, May 8, 2018

Tuesday 7:00–8:00 AM

Session No. 201 • National Ballroom D
Poster Discussion Session
AMA PRA Category 1 Credits™: 1.00

Tuesday 7:00–8:00 AM

Breakfast and Roundtable Discussions • National Ballroom B–C

Tuesday 7:45–9:30 AM

Session No. 202 • Allendale A
AUR Radiology Management Program (closed program)
AMA PRA Category 1 Credits™: 1.75

LEARNING OBJECTIVES
1) Explain, in a case-based mode, current management issues facing academic radiology departments. 2) Discuss how to familiarize prospective academic radiology department leaders with decision making by using mock departmental executive committees. 3) Discuss management problem solving guided by key experts in the field.

A. Welcome and Overview
Pablo R. Ros, MD, MPH

B. Case 1: The Hunger Games: Productivity-based Compensation Plan for Academic Radiologists
Pablo R. Ros, MD, MPH
Kristen K. DeStigter, MD

Tuesday 8:00–9:30 AM

Session No. 203 • Congressional
RRA Research Boot Camp: Strategies and Practical Pitfalls for Exploring New Avenues in Radiology Research
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Identify an array of opportunities for radiology research beyond traditional clinical lines of investigation. 2) Describe strategies for radiology investigators to successfully pursue such lines of research. 3) Discuss potential pitfalls that may be encountered in these areas.

A. Research in Gender and Wellness Issues
Stacy E. Smith, MD

B. Research in Molecular Imaging
Rathan M. Subramaniam, MD, PhD, MPH

C. Research in Quality and Safety
Jason N. Itri, MD, PhD

D. Research in Radiology Education
Mark E. Mullins, MD, PhD

E. Research in Policy-focused Imaging Health Services
Andrew B. Rosenkrantz, MD

F. Q&A

Tuesday 10:00–11:30 AM

Session No. 205 • International Ballroom I
Leadership Track 1: Are Leaders Born or Made?
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Explain what leaders are and what they do. 2) Describe how leaders evolve. 3) Discuss what leadership development opportunities exist in radiology.

A. Are Leaders Born or Made: What Does the Evidence Say?
Frank J. Lexa, MD

B. Definition of Leadership
Cheri L. Canon, MD

C. Leadership Development Opportunities
Daniel A. Ortiz, MD

Tuesday 10:00–11:30 AM

Session No. 206 • Congressional
Harnessing Big Data in Radiology Health Services Research
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Explain approaches by which big data sources can be utilized within decision models. 2) Identify methods by which artificial intelligence can be used as a tool to aid in health services research. 3) Discuss how to develop strategies for translating big data research into daily clinical practice.

A. Application of Big Data Sources for Decision Models
Kathryn Lowry, MD

B. Artificial Intelligence as a Tool to Aid in Health Services Research
Yvonne W. Lui, MD

C. Translating Big Data Research into Clinical Practice
Paul P. Cronin, MBBCh

Tuesday 9:30–10:00 AM

Break and Poster Viewing • National Ballroom D

Tuesday 10:00–11:30 AM

Session No. 204 • International Ballroom II–III
AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees
AMA PRA Category 1 Credits™: 1.50

Aine M. Kelly, MD, MS, Moderator
Frederick J. Marshall, MD

Tuesday 8:00–9:30 AM

Session No. 204 • International Ballroom II–III
AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees
AMA PRA Category 1 Credits™: 1.50

Aine M. Kelly, MD, MS, Moderator
Frederick J. Marshall, MD

Faculty financial disclosures are located in the Faculty Index.
Tuesday 10:00–11:30 AM

Session No. 207 • Augusta
Leading from the Middle: Maximizing Coordinator Effectiveness
AMA PRA Category 1 Credits™: 1.50

Joseph Stuckelman, BA*, Moderator
Nilu A. Dorschner, BA, BS
Frank J. Lexa, MD

LEARNING OBJECTIVES
1) Explain the importance of distributed leadership in knowledge organizations. 2) Describe how to get started in leadership activities and lead successfully even when you aren’t the leader. 3) Explain managing up: how to succeed and help your leaders to succeed. 4) Discuss matrix organizations: how to survive, lead, and thrive in complex institutions.

Tuesday 10:00–11:30 AM

Session No. 208 • International Ballroom II–III
Education Track 2: Teaching Value-added Care
(Supported by an unrestricted educational grant from Bracco Diagnostics, Inc.)
AMA PRA Category 1 Credits™: 1.50

Sandra P. Rincon, MD, Moderator
Katherine A. Klein, MD, Moderator

LEARNING OBJECTIVES
1) Identify techniques for enhancing the radiologist’s role in patient care pathways. 2) Explain methods for effectively communicating with patients. 3) Compare and contrast strategies for creating radiology reports that more clearly communicate results to both patients and providers. 4) Describe essential elements for effectively and efficiently communicating with referring clinicians in consultation clinics. 5) Discuss how to implement strategies for effectively balancing teaching and clinical efficiency.

A. Making Radiology Trainees Essential in Integrated/Interdisciplinary Patient Care Pathways
Glenn C. Gaviola, MD

B. Essentials of and Opportunities for Radiologist Trainee–Patient Communication
David S. Sarkany, MD

C. Optimizing Reports for Patients and Referring Clinicians
Ana P. Lourenco, MD

D. Incorporating Radiology Trainees into Consultation Clinics
James M. Milburn, MD*

E. Teaching Models for Maximizing Efficiency to Improve Patient Care
Anna I. Holbrook, MD

F. Q&A

Tuesday 10:00–11:45 AM

Session No. 209 • Allendale A
AUR Radiology Management Program (closed program)
AMA PRA Category 1 Credits™: 1.75

LEARNING OBJECTIVES
1) Explain, in a case-based mode, current management issues facing academic radiology departments. 2) Discuss how to familiarize prospective academic radiology department leaders with decision making by using mock departmental executive committees. 3) Discuss management problem solving guided by key experts in the field.

A. Case 2: Academic Radiology Expansion into Regional Practice
Jocelyn D. Chertoff, MD, MS*
Michael P. Recht, MD

Tuesday 10:00 AM–12:00 PM

Session No. 210 • Allendale B
ARRALD Program 4 (closed program)
AMA PRA Category 1 Credits™: 2.00

LEARNING OBJECTIVES
1) Describe the principles of academic leadership. 2) Identify opportunities for practice improvement. 3) Discuss how to develop approaches for practice improvements.

A. Leadership Examples, Theory, and Lessons Learned
Alexander Norbash, MD*

B. Critical Communications Skills and Conflict Resolution
Carolyn C. Meltzer, MD

Tuesday 12:00–1:00 PM

Luncheon and AUR Business Meeting • National Ballroom B–C

Tuesday 12:00–1:30 PM

APCR Lunch • Royal Melbourne

* Faculty financial disclosures are located in the Faculty Index.
Tuesday 1:00–1:45 PM

Session No. 211 • National Ballroom B–C
Vydareny Imaging Interpretation Competition (Supported by the Radiological Society of North America)
AMA PRA Category 1 Credits™. 75

LEARNING OBJECTIVES
1) Demonstrate improved skills in rapid interpretation of challenging radiology cases. 2) Articulate the value of teamwork in discussing and diagnosing challenging cases. 3) Identify improved strategies for narrowing the differential diagnosis in challenging cases. 4) Describe the application of multiple imaging modalities in reaching an accurate diagnosis, including plain films, ultrasound, CT, MRI, and nuclear medicine. 5) Articulate an expanded medical knowledge base from diagnosis of complex and challenging cases.

Tuesday 1:00–2:30 PM

Session No. 212 • Allendale A
AUR Radiology Management Program (closed program)
AMA PRA Category 1 Credits™. 150

LEARNING OBJECTIVES
1) Explain, in a case-based mode, current management issues facing academic radiology departments. 2) Discuss how to familiarize prospective academic radiology department leaders with decision making by using mock departmental executive committees. 3) Discuss management problem solving guided by key experts in the field.

A. Case 3: Academic Radiology Departments Relationships with Industry
Matthew A. Barish, MD
Judy Yee, MD

Tuesday 2:00–3:00 PM

Session No. 213 • International Ballroom I
Psychology of Leadership in Radiology
AMA PRA Category 1 Credits™. 1.00

LEARNING OBJECTIVES
1) Describe practice constructs and traits that foster successful leadership in radiology. 2) Discuss emotional intelligence and how it factors into clinical and administrative tasks in radiology practices. 3) Explain how incentives and disincentives are successfully applied in clinical and academic practices.

A. Practice Leadership in Radiology
Frank J. Lexa, MD
B. Emotional Intelligence
Cheri L. Canon, MD
C. Incentives and Disincentives
Alexander Norbash, MD

Tuesday 2:00–3:30 PM

Session No. 214 • Congressional Career Well-being
AMA PRA Category 1 Credits™. 1.50

LEARNING OBJECTIVES
1) Identify the causes of burnout and the behaviors that can mitigate it. 2) Describe workplace strategies for preventing burnout, and summarize preventative mechanisms that can minimize burnout. 3) Explain how to integrate your mentoring experience into your mentoring efforts. 4) Discuss how to apply skills to improve one-on-one teaching at the view station. 5) Explain how to design and organize a well-balanced educator’s portfolio that enables promotion.

A. Professional and Career Resilience: Avoiding Burnout and the Art of Reinventing Yourself
Alison L. Chetlen, DO

B. Workplace Solutions: Workplace Strategies for Preventing Burnout
David S. Sarkany, MD

C. Mentoring Skills: Flipped Mentoring—"How Do I Get Mentored?"
Mark E. Mullins, MD, PhD

D. Teaching Skills at the Workstation: Tips and Pearls
Michael L. Richardson, MD

E. Building a Well-balanced Educator’s Portfolio for Promotion: Pearls and Pitfalls
Ramesh S. Iyer, MD

F. Panel Discussion
Ramesh S. Iyer, MD
Michael L. Richardson, MD
Alison L. Chetlen, DO
David S. Sarkany, MD
Mark E. Mullins, MD, PhD

Tuesday 2:00–3:30 PM

Session No. 215 • International Ballroom II–III
RRC Update (Diagnostic Radiology and Nuclear Medicine)
AMA PRA Category 1 Credits™. 1.50

LEARNING OBJECTIVES
1) Identify opportunities for improved understanding of ACGME Radiology RRC processes, procedures, and policies. 2) Identify opportunities for improved understanding of ACGME Nuclear Medicine RRC processes, procedures, and policies. 3) Discuss how to develop an action plan for improved understanding of ACGME Radiology and Nuclear Medicine processes, procedures, and policies.

A. Radiology RRC Update for Diagnostic Radiology and Interventional Radiology
James C. Anderson, MD

B. Nuclear Medicine RRC Update
Jon A. Baldwin, DO

C. ACGME Update
Felicia Davis

* Faculty financial disclosures are located in the Faculty Index.
Tuesday 2:00–3:30 PM

Session No. 216 • Augusta
RRA Task Force Reports, Part 2: Leveraging Megatrends in Medicine and Radiology Today

LEARNING OBJECTIVES
1) Discuss the role of radiology in global health. 2) Describe facilitation of the transition from resident to academic faculty. 3) Explain perceptual errors in radiology. 4) Discuss comparative effectiveness analysis in imaging. 5) Describe best practices for systematic review of the literature.

A. Role of Radiology in Global Health
   Justin G. Peacock, MD, PhD
   Stacy E. Smith, MD

B. Facilitating Transition from Resident to Academic Faculty
   Li Hsia A. Cheong, MD
   Tara M. Catanzano, MD
   Joseph R. Grajo, MD

C. Perceptual Errors in Radiology
   Lindsay L. Stratchko, DO
   William F. Auffermann, MD, PhD

D. Comparative Effectiveness Analysis in Imaging: Closing Gaps in Evidence
   Anna V. Trofimova, MD, PhD
   Hansel J. Otero, MD

E. Systematic Review of the Literature: Best Practices
   Matthew M. Miller, MD, PhD
   Prabhakar Rajiah, MD, FRCR

Tuesday 2:00–4:00 PM

Session No. 217 • Colonial
GERRAF Research in Progress 1

LEARNING OBJECTIVES
1) Identify elements of high-quality health services research. 2) Model skills in providing effective research feedback. 3) Critique comparative effectiveness and health services research protocols.

Tuesday 3:00–3:30 PM

Session No. 218 • International Ballroom I
Case Review: Physics

LEARNING OBJECTIVES
1) Describe common and uncommon cases in clinical physics, highlighting key principles and teaching points.

Tuesday 3:00–5:00 PM

Session No. 219 • Allendale A
AUR Radiology Management Program (closed program)

LEARNING OBJECTIVES
1) Explain, in a case-based mode, current management issues facing academic radiology departments. 2) Discuss how to familiarize prospective academic radiology department leaders with decision making by using mock departmental executive committees. 3) Discuss management problem solving guided by key experts in the field.

A. Case 4: Building a Culture of Wellness and Resilience
   Carolyn C. Meltzer, MD
   Cheri L. Canon, MD

B. Discussion

Tuesday 3:00–5:30 PM

Session No. 221 • Allendale B
ARRALD Program 5 (closed program)

LEARNING OBJECTIVES
1) Describe the principles of academic leadership. 2) Identify opportunities for practice improvement. 3) Discuss how to develop approaches for practice improvements.

A. Radiological Professional Organizations: Making Sense of the "Alphabet Soup"
   N. Reed Dunnick, MD

B. Introduction to Process Improvement and Quality
   Cindy S. Lee, MD

C. PB&J: A Process Improvement Case
   James V. Rawson, MD
   Ruth C. Carlos, MD, MS

Tuesday 3:30–4:00 PM

Break and Poster Viewing • National Ballroom D
### Tuesday 4:00–5:00 PM

**AMSER Members and Business Meeting • Oakmont**

### Tuesday 4:00–5:00 PM

**Session No. 220 • International Ballroom I**

**Problem Solving (A³CR² members only)**

*AMA PRA Category 1 Credit™: 1.00*

Matthew P. Kiczek, DO, Moderator  
Benjamin L. Triche, MD, Moderator  
Charles S. Resnik, MD

**LEARNING OBJECTIVES**

1. Describe the results of small-group discussions aimed at solving stated problems.
2. Discuss the presentation of small-group solutions to all participants.
3. Explain how to formulate an overall problem-solving action plan.

### Tuesday 4:00–5:00 PM

**Session No. 220 • International Ballroom I**

**Problem Solving (A³CR² members only)**

*AMA PRA Category 1 Credit™: 1.00*

**ED**

Matthew P. Kiczek, DO, Moderator  
Benjamin L. Triche, MD, Moderator  
Charles S. Resnik, MD

**LEARNING OBJECTIVES**

1. Describe the results of small-group discussions aimed at solving stated problems.
2. Discuss the presentation of small-group solutions to all participants.
3. Explain how to formulate an overall problem-solving action plan.

### Tuesday 4:00–5:30 PM

**Session No. 222 • Congressional**

**AUR Research and Education Foundation Grant Session**

*AMA PRA Category 1 Credit™: 1.50*

**ED RS**

Pina C. Sanelli, MD, MPH, Moderator  
Christopher M. Straus, MD, Moderator

**LEARNING OBJECTIVES**

1. Recognize the AUR Research and Education (R&E) Foundation history and growth to the present time.
2. Discuss how to access the grant information online and explain eligibility criteria, deadlines, and goals for grant recipient mentorship and for the AUR organization.
3. Explain how the current grant projects may be useful and accessible to all AUR members.
4. Describe the nature and range of projects that are made available to junior faculty by the AUR R&E Foundation.

A. Introduction

Pina C. Sanelli, MD, MPH

B. Design of an Interactive Case-based Online Tutorial for Prostate MR Imaging Interpretation Using PI-RADS

Andrew B. Rosenkrantz, MD

C. Facilitating a Radiology Curriculum for Radiology Residents in Haiti Using Tablet Computers

Jennifer L. Nicholas, MD

D. Research Mentor Academy

Leon Lenchik, MD

E. Essential Skills in Educational Scholarship: Online Training for AUR Members

Priscilla J. Slanetz, MD, MPH

F. Development and Implementation of a National Imaging Informatics Curriculum for Radiology Residents

Tessa S. Cook, MD, PhD

G. Research and Development of a Standardized Letter of Recommendation for Use in the Radiology Residency Match

Caroline W. Carrico, MD

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* Faculty financial disclosures are located in the Faculty Index.
Wednesday, May 9, 2018

Wednesday 7:00–8:00 AM

Session No. 301 • National Ballroom D
Poster Discussion Session
AMA PRA Category 1 Credit™: 1.00

Wednesday 7:00–8:00 AM

Breakfast and Roundtable Discussions • National Ballroom B–C

Wednesday 8:00–8:45 AM

Session No. 302 • International Ballroom I
Success in Social Media
AMA PRA Category 1 Credit™: .75

Nisha Swaminathan, MD, Moderator
Amy K. Patel, MD

LEARNING OBJECTIVES
1) Discuss social media platforms frequently used by radiologists. 2) Describe methods for creating a successful social media platform. 3) Discuss positive and negative effects of social media in the radiology profession.

Wednesday 8:00–9:30 AM

Session No. 303 • Allendale B
ARRALD Program 6 (closed program)
AMA PRA Category 1 Credit™: 1.50

James V. Rawson, MD
Ruth C. Carlos, MD, MS

LEARNING OBJECTIVES
1) Describe the principles of academic leadership. 2) Identify opportunities for practice improvement. 3) Discuss how to develop approaches for practice improvements.

Wednesday 8:00–9:30 AM

Session No. 304 • Allendale A
AUR Radiology Management Program (closed program)
AMA PRA Category 1 Credit™: 1.50

Jeffrey G. Jarvik, MD, MPH*, Moderator
Paul P. Cronin, MBBCh, Moderator

LEARNING OBJECTIVES
1) Identify the advantages and disadvantages of each study design. 2) Describe the main differences between study designs. 3) Explain how to develop a meaningful and focused research study question. 4) Discuss issues related to randomization, blinding, baseline measurements, and recruitment. 5) Identify biases in studies, and develop strategies to minimize bias.

A. Practice Improvement Workshop
James V. Rawson, MD
Ruth C. Carlos, MD, MS

Wednesday 8:00–9:30 AM

Session No. 305 • Augusta
Three Perspectives on Resident Wellness
AMA PRA Category 1 Credit™: 1.50

Joseph Stuckelman, BA*, Moderator

LEARNING OBJECTIVES
1) Compare and examine differing viewpoints of resident wellness from the perspectives of a program coordinator, a program director, and a resident. 2) Define and characterize burnout and resilience. 3) Discuss current trends in resilience training.

A. The Program Director’s Perspective
Madeline C. Lewis, MD

B. View from a Program Coordinator
Kelly R. Aronson

C. Resilience and Physician Well-being: From the Eyes of a Resident
Dexter Mendoza, MD

Wednesday 8:00–9:30 AM

Session No. 306 • Congressional Research Track 2: Clinical Trial/Study Design
AMA PRA Category 1 Credit™: 1.50

Ajay Gupta, MD, Moderator
Paul P. Cronin, MBBCh, Moderator

LEARNING OBJECTIVES
1) Identify the advantages and disadvantages of each study design. 2) Describe the main differences between study designs. 3) Explain how to develop a meaningful and focused research study question. 4) Discuss issues related to randomization, blinding, baseline measurements, and recruitment. 5) Identify biases in studies, and develop strategies to minimize bias.

A. Different Study Designs: Pros and Cons
Jeffrey G. Jarvik, MD, MPH*

B. Framing the Research Question
Geoffrey D. Rubin, MD*

C. Randomization, Blinding, Baseline Measurements, and Recruitment
Etta D. Pisano, MD*

D. Minimizing Bias
Brian W. Bresnahan, PhD*

E. Panel Discussion
Brian W. Bresnahan, PhD*
Etta D. Pisano, MD*
Jeffrey G. Jarvik, MD, MPH*
Geoffrey D. Rubin, MD*

* Faculty financial disclosures are located in the Faculty Index.
Wednesday 8:00–9:30 AM

Session No. 307 • International Ballroom II–III
Education Track 3: Scholarship, Teaching, and Learning (E)
(Supported by an unrestricted educational grant from Bracco Diagnostics, Inc.)
AMA PRA Category 1 Credits™: 1.50

ED LM ARLM
Pamela W. Schaefer, MD, Moderator
Monica M. Sheth, MD, Moderator

LEARNING OBJECTIVES
1) Identify common platforms used to create enduring learning materials.
2) Explain how to use comics as effective teaching tools.
3) Describe strategies for using social media to improve radiology education.
4) Describe methods for developing a successful peer support program.
5) Discuss how to develop techniques for establishing an effective learning environment.
6) Explain methods for composing and reviewing papers effectively.

A. Making a Footprint: Creating Enduring Materials
Tabassum A. Kennedy, MD

B. New Models to Create a Positive Clinical Learning Environment
Jon A. Baldwin, DO

C. Enhancing Medical Student Education with Comics
Stefan Tigges, MD

D. Social Media Strategies for Improving Radiology Education
Joshua P. Nickerson, MD

E. Establishing a Peer Support Program
Peter S. Liu, MD

F. Publishing and Reviewing: Tips from the Editor
Pamela W. Schaefer, MD

Wednesday 8:45–9:30 AM

Session No. 308 • International Ballroom I
Effective Mentoring
AMA PRA Category 1 Credit™: .75

ED LM ARLM
Daniella Asch, MD, Moderator
Carolyn C. Meltzer, MD
Mahan Mathur, MD

LEARNING OBJECTIVES
1) Explain the importance of mentorship in career development for radiologists, including trainee and junior faculty.
2) Describe effective mentorship strategies from both senior and junior faculty perspectives.
3) Discuss collaborative mentorship opportunities in radiology.

Wednesday 9:30–10:00 AM

Break and Poster Viewing • National Ballroom D

Wednesday 10:00–11:30 AM

Session No. 309 • International Ballroom II–III
Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings (I)
AMA PRA Category 1 Credits™: 1.50

ED LM ARLM
Daniel A. Adamo, MD, Moderator
Naim Ali, MD, Moderator

LEARNING OBJECTIVES
1) Explain physician burnout in radiology, including root causes and practice manifestations.
2) Describe solutions for managing physician burnout, both from a practice level and an individual level.
3) Discuss varying stressors/influences of burnout from private and academic practice standpoints.

A. Why Do We Burn Out?
Richard B. Gunderman, MD, PhD

B. Burnout: An Academic Perspective
Corrie M. Yablon, MD

C. Private Practice Perspective
Kurt A. Schoppe, MD

D. Wellness and Burnout: A Resident’s Perspective
Dexter Mendoza, MD

Wednesday 10:00–12:00 PM

Session No. 311 • Allendale A
AUR Radiology Management Program (closed program)
AMA PRA Category 1 Credits™: 2.00

ED LM ARLM
LEARNING OBJECTIVES
1) Explain, in a case-based mode, current management issues facing academic radiology departments.
2) Discuss how to familiarize prospective academic radiology department leaders with decision making by using mock departmental executive committees.
3) Discuss management problem solving guided by key experts in the field.

A. Case 6: Practice Quality Improvement: Where Do I Start?!?
Aine M. Kelly, MD, MS
Paul P. Cronin, MBBCh

B. Keynote Speaker: Future of Radiology: Key Drivers for the Next 5 Years
James A. Brink, MD

Wednesday 11:00 AM–12:00 PM

APCR Member Meeting 2 • Augusta
### Wednesday 12:00–1:00 PM

Luncheon and AUR Awards Ceremony • National Ballroom B–C

### Wednesday 1:00–2:30 PM

**AUR Scientific Sessions**

<table>
<thead>
<tr>
<th>Session No.</th>
<th>Title</th>
<th>Room/Room No.</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SS01</td>
<td>Clinical: Musculoskeletal, Neuroradiology</td>
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<tr>
<td>SS02</td>
<td>Clinical: Abdominal, Interventional Radiology, Nuclear Medicine, Women’s Imaging</td>
<td>Augusta</td>
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<td>SS03</td>
<td>Quality and Safety</td>
<td>Congressional</td>
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<tr>
<td>SS04</td>
<td>Resident and Medical Student Education</td>
<td>International Ballroom II–III</td>
<td>1.50</td>
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<tr>
<td>SS05</td>
<td>Resident Education</td>
<td>International Ballroom I</td>
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<tr>
<td>SS06</td>
<td>RAHSR Session</td>
<td>Allendale B</td>
<td>1.50</td>
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### Wednesday 2:30–3:00 PM

Break and Poster Viewing • National Ballroom D

### Wednesday 3:00–4:00 PM

Session No. 314 • Colonial

**GERRAF Research in Progress 2**

AMA PRA Category 1 Credits™: 1.00

LEARNING OBJECTIVES

1. Identify elements of high-quality health services research.
2. Model skills in providing effective research feedback.
3. Critique comparative effectiveness and health services research protocols.

### Wednesday 3:00–4:30 PM

Session No. 315 • Augusta

**Value-driven Practice: Making the Change**

AMA PRA Category 1 Credits™: 1.50

Bennett S. Greenspan, MD, MS, Moderator

LEARNING OBJECTIVES

1. Discuss how value is defined in imaging practice.
2. Discuss how increasing direct and indirect interactions with patients will add value to radiology practice.
3. Explain probabilistic versus outcome reporting.
4. Compare the rationale for planar imaging versus SPECT or SPECT/CT.
5. Discuss how high-quality nuclear medicine practice adds value to radiology practice.

A. **Defining Value**

Satoshi Minoshima, MD, PhD

B. **The Radiologist, the Clinician, and Nuclear Medicine: Adding Value to Our Specialty**

Patrick M. Colletti, MD

C. **Communicating Value: The Case for Trinary Reporting of V/Q Imaging**

Darlene F. Metter, MD

D. **Value, Quality, and Nuclear Medicine**

Bennett S. Greenspan, MD, MS

E. **ABR 16-Month NM Pathway Survey Results**

Jay A. Harolds, MD

F. Panel Discussion

* Faculty financial disclosures are located in the Faculty Index.
### Wednesday 3:00–4:30 PM

#### Session No. 316 • International Ballroom I

**Education Problem Solving: Trainee and Faculty Well-being (E)**

**AMA PRA Category 1 Credits™: 1.50**

<table>
<thead>
<tr>
<th>Section</th>
<th>Speaker(s)</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>David S. Sarkany, MD, Moderator&lt;br&gt;Ramesh S. Iyer, MD, Moderator</td>
<td><strong>LEARNING OBJECTIVES</strong>&lt;br&gt;1) Identify essential management and leadership skills to get you on a course for career success. 2) Discuss how to distinguish the most appropriate venues to which to send your educational papers. 3) Identify the various funding opportunities for educational scholarship efforts. 4) Explain how to design a curriculum or program in radiologic education. 5) Discuss how to perform assessment of and give feedback to radiology trainees.</td>
</tr>
<tr>
<td>A.</td>
<td>Alison L. Chetlen, DO</td>
<td><strong>Management and Leadership Skills for Clinician-Educators: How to Get Started on the Ladder to Success</strong></td>
</tr>
<tr>
<td>B.</td>
<td>N. Reed Dunnick, MD</td>
<td><strong>Where to Submit Your Educational Manuscripts</strong></td>
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<tr>
<td>C.</td>
<td>Aine M. Kelly, MD, MS</td>
<td><strong>Funding Opportunities for the Clinician-Educator</strong></td>
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<tr>
<td>D.</td>
<td>Allison M. Grayev, MD</td>
<td><strong>Curriculum or Program Design</strong></td>
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<td>E.</td>
<td>Priscilla J. Slanetz, MD, MPH</td>
<td><strong>Assessment and Feedback</strong></td>
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<tr>
<td>F.</td>
<td>Priscilla J. Slanetz, MD, MPH&lt;br&gt;Alison L. Chetlen, DO&lt;br&gt;Aine M. Kelly, MD, MS&lt;br&gt;N. Reed Dunnick, MD&lt;br&gt;Allison M. Grayev, MD</td>
<td><strong>Panel Discussion</strong></td>
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</table>

### Wednesday 3:00–4:30 PM

#### Session No. 317 • International Ballroom II–III

**AUR Radiology Management Program (closed program)**

**AMA PRA Category 1 Credits™: 2.00**

<table>
<thead>
<tr>
<th>Section</th>
<th>Speaker(s)</th>
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<tr>
<td>1.</td>
<td>Reed A. Omary, MD, MS&lt;br&gt;Lori A. Deitte, MD</td>
<td><strong>A Case 8: Designing the Academic Mission in an Era of Constraints</strong></td>
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<tr>
<td>B.</td>
<td><strong>Closing Remarks</strong></td>
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<td>C.</td>
<td><strong>Program Recognition</strong></td>
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### Wednesday 3:00–5:00 PM

#### Session No. 318 • Allendale A

**AUR Radiology Management Program (closed program)**

**AMA PRA Category 1 Credits™: 2.00**

<table>
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<td>C.</td>
<td><strong>Program Recognition</strong></td>
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* Faculty financial disclosures are located in the Faculty Index.
Thursday, May 10, 2018

Thursday 7:00–8:00 AM

Session No. 400 • National Ballroom C
AIRP Update and Radiology RRC Q&A
AMA PRA Category 1 Credits™ 1.00

LEARNING OBJECTIVES
1) Explain the assessment components of the AIRP 4-week radiologic pathology correlation course. 2) Identify ways that program personnel can support their residents’ engagement in the course. 3) Describe important revisions of the ACGME radiology-specific program requirements. 4) Engage in a lively question-and-answer session with representatives from the ACGME radiology review committee.

A. AIRP Update
Victor Fuentes

A. ACGME Q&A
Felicia Davis
Kate Hatlak

Thursday 7:15–8:30 AM

Session No. 401 • Allendale A
AUR Academic Faculty Development Program (closed program)
AMA PRA Category 1 Credits™ 1.25

LEARNING OBJECTIVES
1) List the key missions of an academic radiologist. 2) Describe strategies for performing well in each of these missions. 3) Discuss how to develop a personal plan to enhance excellence as an academic radiologist.

A. Welcome
Richard B. Gunderman, MD, PhD

B. Education in Radiology: Seven Habits for Excellence
Brandon P. Brown, MD, MA

C. Excelling at Research
King C. Li, MD, MBA

Thursday 8:00–9:30 AM

Session No. 402 • Colonial
Academic Success (Interactive Workshop 1) (Preregistration required)
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES
1) Identify the causes of promotion setbacks and ways to avoid setbacks. 2) Summarize and apply skills to hold effective crucial conversations. 3) Identify and apply skills to improve networking.

A. Promotion Setbacks
Felix S. Chew, MD, MBA

B. High-Stakes Conversations
Jocelyn D. Chertoff, MD, MS

C. Networking
Ruth C. Carlos, MD, MS

Thursday 8:00–9:30 AM

Session No. 403 • Royal Melbourne
Growth Opportunities (Interactive Workshop 2) (Preregistration required)
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES
1) Identify skills to better integrate your mentoring experience into your mentoring efforts. 2) Explain and apply skills to enable an academic career. 3) Identify other skill sets, and discuss how to use these to innovate and personalize your career.

A. The Mentor-Mentee Relationship: Tips and Tricks
Isabel B. Oliva, MD

B. Getting Your Academic Career Started
Puneet Bhargava, MD

C. Finding Your Career Niche
Jessica B. Robbins, MD

Thursday 8:00–9:30 AM

Session No. 404 • Augusta
Best Practices of APCR Membership (Preregistration required)
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES
1) Describe the best practices of APCR members. 2) Discuss how to adapt and incorporate these best practices into management of CCC and PEC meeting organization, interview season, the self-study, resident reviews, resident orientation and onboarding, graduation, and the annual program evaluation. 3) Apply best practices to coordinator work flow.

A. Tracking and Monitoring Interventional Radiology Procedures: A New Web-based Approach
Gloria Jorge

B. CCC Dashboard and Resident Scorecard
Tina M. Rapstine, C-TAGME

C. After the Match
Susan M. McFadden, MS

D. Self-study in 5 Minutes
Joseph Stuckelman, BA

E. Resident Face Sheet for CCC meetings
Basia U. Nowakowski, BA

F. Site Visit in 5 Minutes
Sally A. Jones, BA

G. Using Databases to Track Conference, Scholarly Activity, et Cetera
Frances M. Wolff

H. PEC and APE Best Practices
Katharina Wang

* Faculty financial disclosures are located in the Faculty Index.
Thursday 8:00–9:30 AM

Session No. 405 • Congressional Leadership Track 2: Can We Do Research in Radiology Leadership? [L]
AMA PRA Category 1 Credits™: 1.50

- James V. Rawson, MD, Moderator

LEARNING OBJECTIVES
1) Discuss research opportunities in radiology leadership.
2) Describe metrics of leadership.
3) Explain differences between leadership performance and organizational performance.

A. Can We Do Research in Radiology Leadership?
Carolyn C. Meltzer, MD

B. Leadership: Health Services Research Approach
Paul P. Cronin, MBCh

C. Is There a Difference between Leadership Performance and Organizational Performance?
James V. Rawson, MD

Thursday 8:00–9:30 AM

Session No. 406 • International Ballroom III
Scientific and Health Policy Research: Part 1: Scholar Presentations and Mentoring Program [R]
(Supported by the American College of Radiology)
AMA PRA Category 1 Credits™: 1.50

- Leon Lenchik, MD, Moderator

LEARNING OBJECTIVES
1) Describe scientific and health policy research projects and their implications for radiology practices.
2) Identify opportunities and challenges facing contemporary academic radiology practice and radiology leadership.
3) Discuss evolving paradigms and challenges for radiology in health care in the next decade.

A. Overview
Rathan M. Subramaniam, MD, PhD, MPH

B. Keynote Address 1: Radiology Leadership 2025: The Lessons Learned
Jonathan S. Lewin, MD

C. Scholar Presentation 1
Christopher R. Bailey, MD

D. Scholar Presentation 2
Patricia Baltazar, MD

E. Scholar Presentation 3
Kristen Coffey, MD

F. Keynote Address 2: Radiology Research 2025: The Lessons Learned and the Future
Elizabeth A. Krupinski, PhD

Thursday 8:30–9:30 AM

Session No. 408 • Allendale A
AUR Academic Faculty Development Program (closed program)
AMA PRA Category 1 Credits™: 1.00

- N. Reed Dunnick, MD

LEARNING OBJECTIVES
1) List the key missions of an academic radiologist.
2) Describe strategies for performing well in each of these missions.
3) Discuss how to develop a personal plan to enhance excellence as an academic radiologist.

A. Chair Roundtable: How a Chair Can Help Your Career
N. Reed Dunnick, MD

B. Panel Discussion
Giles W. Boland, MD
Kristen K. DeStigter, MD
Reed A. Omary, MD, MS

Thursday 9:30–10:00 AM

Break • National Ballroom D

Thursday 10:00–10:30 AM

Session No. 413 • National Ballroom C
Interviewing and Diversity [T]
AMA PRA Category 1 Credits™: .50

- Daniel A. Ortiz, MD, Moderator

LEARNING OBJECTIVES
1) Discuss how diversity affects radiology practice search for new trainees.
2) Describe successful interviewing skills for radiology practice.

* Faculty financial disclosures are located in the Faculty Index.
Thursday 10:00–11:30 AM

Session No. 409 • Congressional
SCARD’s Strategic Focus on Faculty and Leadership

AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Explain the basis for a programmatic approach to multiyear societal-driven projects in order to establish effective change.
2) Describe the magnitude of burnout risk in academics and effective measures to counteract burnout.
3) Discuss several potential definitions for “the academic radiologist” and the contingent means and methods for protecting and developing the same.
4) Recognize approaches and strategies that may be implemented in order to develop and build future leaders in radiology.

A. Overview
Carolyn C. Meltzer, MD

B. Burnout
Cheri L. Canon, MD

C. The Academic Radiologist
Carolyn C. Meltzer, MD

D. Building Leaders
Neil M. Rofsky, MD

E. Q&A

Thursday 10:00–11:30 AM

Session No. 410 • Royal Melbourne
Presentation Skills and Publication (Interactive Workshop 3)

AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) Explain how to create a PowerPoint presentation that invigorates radiology education by using text, graphics, animation, and transitions.
2) Identify and discuss ways to make your annual review more productive.
3) Identify and access peer-reviewed proven educational tools.

A. PowerPoint
Brent P. Little, MD

B. Preparing for Your Annual Review
Sravanthi Reddy, MD

C. Converting Your Educational Endeavors into Scholarship: MedEdPORTAL
Christopher M. Straus, MD

* Faculty financial disclosures are located in the Faculty Index.
Thursday 10:00 AM–12:00 PM

Session No. 414 • Allendale A
ARRALD Program 7 (closed program)
AMA PRA Category 1 Credits™: 2.00

LEARNING OBJECTIVES
1) Describe the principles of academic leadership. 2) Identify opportunities for practice improvement. 3) Discuss how to develop approaches for practice improvements.

A. Leadership: Putting It All Together
   James V. Rawson, MD
   Ruth C. Carlos, MD, MS

Thursday 10:00 AM–12:00 PM

Session No. 415 • International Ballroom III
Scientific and Health Policy Research: Part 2: Scholar Presentations and Mentoring Program (Supported by the American College of Radiology)
AMA PRA Category 1 Credits™: 2.00

LEARNING OBJECTIVES
1) Describe scientific and health policy research projects and their implications for radiology practice. 2) Identify opportunities and challenges facing contemporary academic radiology practice and radiology leadership. 3) Discuss evolving paradigms and challenges for radiology in health care in the next decade.

A. Scholar Presentation 4
   Farouk Dako, MD

B. Scholar Presentation 5
   Arthur J. Pesch III, MD

C. Scholar Presentation 6
   Andreas M. Rauschecker, MD, PhD*

D. Keynote Address 3: Radiology Clinical Practice 2015: The Lessons Learned and the Future
   Vijay M. Rao, MD

E. Scholar Presentation 7
   Brandon L. Roller, MD, PhD*

F. Scholar Presentation 8
   Devaki Shilpa S, Surasi, MD, MBBS

G. Scholar Presentation 9
   Maya Vella, MD

H. Scholar Presentation 10
   Kevin Y. Wang, MD

I. Panel Discussion

Thursday 10:30–11:30 AM

Session No. 416 • National Ballroom C
Case Review: Breast Imaging; Musculoskeletal Radiology (T)
AMA PRA Category 1 Credit™: 1.00

Michael T. Bayona, MD, Moderator
LEARNING OBJECTIVES
1) Describe common and uncommon cases in breast imaging, highlighting key principles and teaching points. 2) Describe common and uncommon cases in musculoskeletal imaging, highlighting key principles and teaching points.

A. Case Review: Breast Imaging
   Colleen H. Neal, MD

B. Case Review: Musculoskeletal Radiology
   Omer A. Awan, MD

Thursday 11:30 AM–1:00 PM

Session No. 417 • National Ballroom B
AUR Academic Faculty Development Program (closed program): Lunch and Keynote Address
AMA PRA Category 1 Credits™: 1.50

LEARNING OBJECTIVES
1) List the key missions of an academic radiologist. 2) Describe strategies for performing well in each of these missions. 3) Discuss how to develop a personal plan to enhance excellence as an academic radiologist.

A. What Really Brings You to Life?
   Richard B. Gunderman, MD, PhD

Thursday 12:00–1:30 PM

SCARD Business Meeting and Lunch • Seminole

Thursday 12:15–1:15 PM

Session No. 418 • International Ballroom III
Scientific and Health Policy Research: Lunch and Keynote (Supported by the American College of Radiology)
AMA PRA Category 1 Credits™: 1.00

Ezequiel Silva, MD, PhD*
LEARNING OBJECTIVES
1) Describe scientific and health policy research projects and their implications for radiology practice. 2) Identify opportunities and challenges facing contemporary academic radiology practice and radiology leadership. 3) Discuss evolving paradigms and challenges for radiology in health care in the next decade.

A. Radiology 2018: Economic and Political Update
   Ezequiel Silva, MD

* Faculty financial disclosures are located in the Faculty Index.
### Thursday 1:00–2:30 PM

**Session No. 419 • Allendale A**  
AUR Academic Faculty Development Program (closed program)  
AMA PRA Category 1 Credits™: 1.50

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<th>LEARNING OBJECTIVES</th>
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<td>1) List the key missions of an academic radiologist. 2) Describe strategies for performing well in each of these missions. 3) Discuss how to develop a personal plan to enhance excellence as an academic radiologist.</td>
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</table>

**A. Ethics and Publishing**  
Johan G. Blickman, MD, PhD

**B. Career Development Awards**  
Rathan M. Subramaniam, MD, PhD, MPH

**C. Service to Radiology Organizations**  
James A. Brink, MD

### Thursday 1:00–3:00 PM

**Session No. 420 • Colonial**  
Teaching Certificate Program

<table>
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<tr>
<th>LEARNING OBJECTIVES</th>
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<tbody>
<tr>
<td>1) Describe strategies for academic advancement and promotion of young faculty. 2) List some of the challenges faced by new and experienced PDs, including recruiting new PDs. 3) Describe possible career paths for radiologists with PD experience.</td>
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</table>

**A. Promoting Academic Faculty: Tips from the Promotions Committee**  
Kitt Shaffer, MD, PhD

**B. Junior Faculty Rising Star**  
Kristen L. Baugnon, MD

**C. New Program Director**  
Kelli J. Andresen, MD

**D. Longtime Program Director**  
Darel E. Heitkamp, MD

**E. Life after Program Director**  
Charles S. Resnik, MD

**F. Q&A**

### Thursday 1:00–3:00 PM

**Session No. 421 • National Ballroom C**  
Case Review: Genitourinary Radiology; Vascular and Interventional Radiology; Gastrointestinal Radiology; Pediatric Radiology

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<thead>
<tr>
<th>LEARNING OBJECTIVES</th>
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<tbody>
<tr>
<td>1) Describe common and uncommon cases in genitourinary radiology, highlighting key principles and teaching points. 2) Describe common and uncommon cases in vascular and interventional radiology, highlighting key principles and teaching points. 3) Describe common and uncommon cases in gastrointestinal radiology, highlighting key principles and teaching points. 4) Describe common and uncommon cases in pediatric radiology, highlighting key principles and teaching points.</td>
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**A. Case Review: Genitourinary Radiology**  
Neil J. Hansen, MD

**B. Case Review: Vascular and Interventional Radiology**  
Bill Majdalany, MD

**C. Case Review: Gastrointestinal Radiology**  
Shane A. Wells, MD

**D. Case Review: Pediatric Radiology**  
Matthew R. Hammer, MD

### Thursday 1:15–3:00 PM

**Session No. 422 • International Ballroom III**  
Scientific and Health Policy Research: Part 3: How to Get Started in Comparative Effectiveness Research (Supported by the American College of Radiology)

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<thead>
<tr>
<th>LEARNING OBJECTIVES</th>
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<tbody>
<tr>
<td>1) Identify approaches to begin training in comparative effectiveness research. 2) Discuss how to develop strategies for obtaining funding and mentorship in comparative effectiveness research.</td>
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</table>

**A. What Is CER, and Why Is It Vital to the Future of Radiology?**  
Pina C. Sanelli, MD, MPH

**B. How Do I Receive Training and Mentorship in CER?**  
Yoshimi Anzai, MD, MPH

**C. How Do I Get Funding to Get Started Doing CER?**  
Jeffrey G. Jarvik, MD, MPH

**D. Panel Discussion**  
Yoshimi Anzai, MD, MPH

* Faculty financial disclosures are located in the Faculty Index.
Thursday 1:30–3:00 PM

Session No. 423 • Congressional SCARD’s Dynamic Road Map for Innovation and Adaptation
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES
1) Recognize methods and means for maximizing and harnessing innovation and transformation in radiology. 2) Discuss a range of possibilities where the educational subspecialty future of radiology is concerned. 3) Describe the role of disaster planning in radiology from a practical and strategic perspective. 4) Discuss the role of diversity for radiology, and the methods and means for improving the diversity seen within radiology.

A. Innovation and Transformation
   Reed A. Omary, MD, MS

B. The Educational Subspecialty Future of Radiology
   Michael P. Recht, MD

C. Disaster Planning in Radiology
   James V. Rawson, MD

D. Diversity and Radiology
   Cheri L. Canon, MD

E. Q&A

Thursday 3:00–4:30 PM

Session No. 424 • Allendale A
AUR Academic Faculty Development Program (closed program)
AMA PRA Category 1 Credits™ 1.50

LEARNING OBJECTIVES
1) List the key missions of an academic radiologist. 2) Describe strategies for performing well in each of these missions. 3) Discuss how to develop a personal plan to enhance excellence as an academic radiologist.

A. Mid Career Roundtable: How to Attain and Maintain Academic Productivity
   Eric J. Stern, MD
   Aine M. Kelly, MD, MS

B. Putting It All Together: The Pursuit of Excellence
   Richard B. Gunderman, MD, PhD

Thursday 6:00–7:00 PM

Annual Banquet Cocktail Reception • National Ballroom Foyer

Thursday 7:00–9:00 PM

Annual Banquet and Awards Ceremony • National Ballroom C

* Faculty financial disclosures are located in the Faculty Index.
## A³CR² At-a-Glance

### Monday, May 7, 2018

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<td>Chief Resident Welcome and Annual Survey Results (Session 100)</td>
<td>International Ballroom I</td>
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<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<td>10:00–10:30 AM</td>
<td>Case Review: Neuroradiology (Session 106)</td>
<td>International Ballroom I</td>
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<tr>
<td>10:30–11:30 AM</td>
<td>ABR Update for Residents (Session 107)</td>
<td>International Ballroom I</td>
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<td>12:00–1:00 PM</td>
<td>A³CR² Networking Lunch (A³CR² members only)</td>
<td>Ballroom Commons</td>
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<td>1:00–1:30 PM</td>
<td>Effective Teaching Methods (Session 108)</td>
<td>International Ballroom I</td>
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<td>1:30–2:30 PM</td>
<td>ACR Update for Residents (Session 114)</td>
<td>International Ballroom I</td>
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<td>3:00–3:30 PM</td>
<td>Case Review: US (Session 115)</td>
<td>International Ballroom I</td>
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<tr>
<td>3:30–4:30 PM</td>
<td>Idea Forum (A³CR² members only) (Session 119)</td>
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### Tuesday, May 8, 2018

<table>
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<tbody>
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<td>8:00–9:30 AM</td>
<td>AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees (Session 204)</td>
<td>International Ballroom II–III</td>
</tr>
<tr>
<td>10:00–11:30 AM</td>
<td>Leadership Track 1: Are Leaders Born or Made? (Session 205)</td>
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<tr>
<td>2:00–3:00 PM</td>
<td>Psychology of Leadership in Radiology (Session 213)</td>
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<tr>
<td>3:00–3:30 PM</td>
<td>Case Review: Physics (Session 218)</td>
<td>International Ballroom I</td>
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<tr>
<td>4:00–5:00 PM</td>
<td>Problem Solving (A³CR² members only) (Session 220)</td>
<td>International Ballroom I</td>
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<tr>
<td>5:00–5:30 PM</td>
<td>Case Review: Nuclear Medicine (Session 224)</td>
<td>International Ballroom I</td>
</tr>
<tr>
<td>5:30–6:30 PM</td>
<td>A³CR²/APDR/SCARD/APCR/RSNA Beer and Pretzels Reception</td>
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</table>
## A³CR² At-a-Glance (continued)

### Wednesday, May 9, 2018

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<th>Time</th>
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<tr>
<td>8:00–8:45 AM</td>
<td>Success in Social Media (Session 302)</td>
<td>International Ballroom I</td>
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<tr>
<td>8:45–9:30 AM</td>
<td>Effective Mentoring (Session 308)</td>
<td>International Ballroom I</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings (Session 309)</td>
<td>International Ballroom II–III</td>
</tr>
<tr>
<td>3:00–4:30 PM</td>
<td>Problem Solving for Residents, Program Directors, Coordinators, and Chairs (Session 317)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>4:30–5:00 PM</td>
<td>A³CR² Business Meeting and Elections</td>
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### Thursday, May 10, 2018

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<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>Case Review: Thoracic Radiology; Cardiac Radiology; Head and Neck (Session 407)</td>
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<tr>
<td>10:00–10:30 AM</td>
<td>Interviewing and Diversity (Session 413)</td>
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<tr>
<td>10:30–11:30 AM</td>
<td>Case Review: Breast Imaging; Musculoskeletal Radiology (Session 416)</td>
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<tr>
<td>1:00–3:00 PM</td>
<td>Case Review: Genitourinary Radiology; Vascular and Interventional Radiology; Gastrointestinal Radiology; Pediatric Radiology (Session 421)</td>
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## ACER At-a-Glance

### Monday, May 7, 2018

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<th>Time</th>
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<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Education Track 1: Key Additions to Your Curriculum (Session 104)</td>
<td>International Ballroom II–III</td>
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### Tuesday, May 8, 2018

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<td>AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees (Session 204)</td>
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<td>10:00–11:30 AM</td>
<td>Education Track 2: Teaching Value-added Care (Session 208)</td>
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<tr>
<td>2:00–3:30 PM</td>
<td>Career Well-being (Session 214)</td>
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<td>Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings (Session 309)</td>
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<tr>
<td>3:00–4:30 PM</td>
<td>Education Problem Solving: Trainee and Faculty Well-being (Session 316)</td>
<td>International Ballroom I</td>
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<tr>
<td>5:00–5:30 PM</td>
<td>ACER Business Meeting</td>
<td>ChampionsGate</td>
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<td>5:30–6:30 PM</td>
<td>AMSER/ACER Reception and Open House</td>
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<td>Academic Success (Interactive Workshop 1) (Session 402)</td>
<td>Colonial</td>
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<tr>
<td>8:00–9:30 AM</td>
<td>Growth Opportunities (Interactive Workshop 2) (Session 403)</td>
<td>Royal Melbourne</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Presentation Skills and Publication (Interactive Workshop 3) (Session 410)</td>
<td>Royal Melbourne</td>
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<td>10:00–11:30 AM</td>
<td>Design Thinking: Mind-set for Success (Interactive Workshop 4) (Session 411)</td>
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## AMSER At-a-Glance

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<td>1:00–2:30 PM</td>
<td>The Image of Radiology: Integrating Radiology into the Preclinical Years (Session 113)</td>
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<tr>
<td>3:00–4:30 PM</td>
<td>Self-preservation Skills for the Radiology Educator (Session 117)</td>
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<tr>
<td>2:00–3:30 PM</td>
<td>AMSCR Program 1</td>
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<td>4:00–5:00 PM</td>
<td>AMSER Members and Business Meeting</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>AMSCR Program 2: Embracing the Future: Sharing Ideas and Best Practices</td>
<td>Olympic B</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings (Session 309)</td>
<td>International Ballroom II–III</td>
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<td>Education Problem Solving: Trainee and Faculty Well-being (Session 316)</td>
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<td>Presentation Skills and Publication (Interactive Workshop 3) (Session 410)</td>
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<td>10:00–11:30 AM</td>
<td>Design Thinking: Mind-set for Success (Interactive Workshop 4) (Session 411)</td>
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## RAHSR At-a-Glance

### Monday, May 7, 2018

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<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Research Track 1: Biostatistics (Session 105)</td>
<td>Congressional</td>
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<td>1:00–2:30 PM</td>
<td>Outcomes Research Methods (Session 111)</td>
<td>Colonial</td>
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<tr>
<td>3:00–4:30 PM</td>
<td>Wellness in Radiology Research (Session 116)</td>
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### Tuesday, May 8, 2018

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<tr>
<td>10:00–11:30 AM</td>
<td>Harnessing Big Data in Radiology Health Services Research</td>
<td>Congressional</td>
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<td>2:00–4:00 PM</td>
<td>GERRAF Research in Progress 1 (Session 217)</td>
<td>Colonial</td>
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<td>5:00–5:30 PM</td>
<td>RAHSR Business Meeting</td>
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### Wednesday, May 9, 2018

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<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>Research Track 2: Clinical Trial/Study Design (Session 306)</td>
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<td>3:00–4:00 PM</td>
<td>GERRAF Research in Progress 2 (Session 314)</td>
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### Thursday, May 10, 2018

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<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>Scientific and Health Policy Research: Part 1: Scholar Presentations and Mentoring Program (Session 406)</td>
<td>International Ballroom III</td>
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<tr>
<td>10:00 AM–12:00 PM</td>
<td>Scientific and Health Policy Research: Part 2: Scholar Presentations and Mentoring Program (Session 415)</td>
<td>International Ballroom III</td>
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<tr>
<td>12:15–1:15 PM</td>
<td>Scientific and Health Policy Research: Lunch and Keynote (Session 418)</td>
<td>International Ballroom III</td>
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<tr>
<td>1:15–3:00 PM</td>
<td>Scientific and Health Policy Research: Part 3: How to Get Started in Comparative Effectiveness Research (Session 422)</td>
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## RRA At-a-Glance

### Monday, May 7, 2018

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<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Research Track 1: Biostatistics (Session 105)</td>
<td>Congressional</td>
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<tr>
<td>1:00–2:30 PM</td>
<td>RRA Task Force Reports, Part 1: Leveraging Megatrends in Medicine and Radiology Today (Session 112)</td>
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### Tuesday, May 8, 2018

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<tr>
<td>8:00–9:30 AM</td>
<td>RRA Research Boot Camp: Strategies and Practical Pitfalls for Exploring New Avenues in Radiology Research (Session 203)</td>
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<tr>
<td>2:00–3:30 PM</td>
<td>RRA Task Force Reports, Part 2: Leveraging Megatrends in Medicine and Radiology Today (Session 216)</td>
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### Wednesday, May 9, 2018

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<td>8:00–9:30 AM</td>
<td>Research Track 2: Clinical Trial/Study Design (Session 306)</td>
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<td>4:30–5:30 PM</td>
<td>RRA Business Meeting</td>
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<td>Scientific and Health Policy Research: Part 3: How to Get Started in Comparative Effectiveness Research (Session 422)</td>
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# APDR At-a-Glance

**Monday, May 7, 2018**

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<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Education Track 1: Key Additions to Your Curriculum (Session 104)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>1:00–2:30 PM</td>
<td>ABR Update (Session 109)</td>
<td>International Ballroom II–III</td>
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<td>3:00–4:30 PM</td>
<td>Radiology Training Program Open Mic Session (Session 118)</td>
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<td>Education Track 2: Teaching Value-added Care (Session 208)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>2:00–3:30 PM</td>
<td>RRC Update (Diagnostic Radiology and Nuclear Medicine) (Session 215)</td>
<td>International Ballroom II–III</td>
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<td>4:00–5:30 PM</td>
<td>Radiology Residency Updates and Hot Topics (Session 223)</td>
<td>International Ballroom II–III</td>
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<td>International Ballroom II–III</td>
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<tr>
<td>7:00–8:00 AM</td>
<td>AIRP Update and Radiology RRC Q&amp;A (Session 400)</td>
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<tr>
<td>8:00–9:30 AM</td>
<td>Academic Success (Interactive Workshop 1) (Session 402)</td>
<td>Colonial</td>
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<td>Presentation Skills and Publication (Interactive Workshop 3) (Session 410)</td>
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<td>Design Thinking: Mind-set for Success (Interactive Workshop 4) (Session 411)</td>
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<tr>
<td>1:00–3:00 PM</td>
<td>Teaching Certificate Program (Session 420)</td>
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# APCR At-a-Glance

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<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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<tr>
<td>10:00–11:30 AM</td>
<td>Can I Increase My Emotional Intelligence, and Why Should I? (Session 103)</td>
<td>Augusta</td>
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<tr>
<td>1:00–2:30 PM</td>
<td>ABR Update (Session 109)</td>
<td>International Ballroom II–III</td>
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<td>APCR Member Meeting 1</td>
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<td>Leading from the Middle: Maximizing Coordinator Effectiveness (Session 207)</td>
<td>Augusta</td>
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<td>APCR Lunch</td>
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<td>Three Perspectives on Resident Wellness (Session 305)</td>
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<td>11:00 AM–12:00 PM</td>
<td>APCR Member Meeting 2</td>
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<td>3:00–4:30 PM</td>
<td>Problem Solving for Residents, Program Directors, Coordinators, and Chairs (Session 317)</td>
<td>International Ballroom II–III</td>
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## Thursday, May 10, 2018

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room</th>
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</thead>
<tbody>
<tr>
<td>7:00–8:00 AM</td>
<td>AIRP Update and Radiology RRC Q&amp;A (Session 400)</td>
<td>National Ballroom C</td>
</tr>
<tr>
<td>8:00–9:30 AM</td>
<td>Best Practices of APCR Membership (Session 404)</td>
<td>Augusta</td>
</tr>
</tbody>
</table>
## SCARD At-a-Glance

### Monday, May 7, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>AUR Plenary Session (Session 102)</td>
<td>International Ballroom II–III</td>
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### Tuesday, May 8, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room</th>
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</thead>
<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>AMSER Lucy Squire and APDR/ACR Keynote Lecture: Cultivating Mindfulness and Resilience for Ourselves and Our Trainees (Session 204)</td>
<td>International Ballroom II–III</td>
</tr>
<tr>
<td>10:00–11:30 AM</td>
<td>Leadership Track 1: Are Leaders Born or Made? (Session 205)</td>
<td>International Ballroom I</td>
</tr>
<tr>
<td>5:30–6:30 PM</td>
<td>A^CR^/APDR/SCARD/APCR/RSNA Beer and Pretzels Reception</td>
<td>The Grand Salon</td>
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### Wednesday, May 9, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00–8:45 AM</td>
<td>Success in Social Media (Session 302)</td>
<td>International Ballroom I</td>
</tr>
<tr>
<td>8:45–9:30 AM</td>
<td>Effective Mentoring (Session 308)</td>
<td>International Ballroom I</td>
</tr>
<tr>
<td>10:00–11:30 AM</td>
<td>Brogdon Panel: Understanding and Mitigating Burnout across Various Practice Settings (Session 309)</td>
<td>International Ballroom II–III</td>
</tr>
<tr>
<td>3:00–4:30 PM</td>
<td>Problem Solving for Residents, Program Directors, Coordinators, and Chairs (Session 317)</td>
<td>International Ballroom II–III</td>
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### Thursday, May 10, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room</th>
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</thead>
<tbody>
<tr>
<td>8:00–9:30 AM</td>
<td>Leadership Track 2: Can We Do Research in Radiology Leadership? (Session 405)</td>
<td>Congressional</td>
</tr>
<tr>
<td>10:00–11:30 AM</td>
<td>SCARD’s Strategic Focus on Faculty and Leadership (Session 409)</td>
<td>Congressional</td>
</tr>
<tr>
<td>12:00–1:30 PM</td>
<td>SCARD Business Meeting and Lunch</td>
<td>Seminole</td>
</tr>
<tr>
<td>1:30–3:00 PM</td>
<td>SCARD’s Dynamic Road Map for Innovation and Adaptation (Session 423)</td>
<td>Congressional</td>
</tr>
</tbody>
</table>
The 27th Annual Vydareny Imaging Interpretation Competition  
(Supported by the Radiological Society of North America)

**Tuesday, May 8**

**Who Can Enter**
Meeting attendees can form a team to represent their institution. All teams will be able to compete in both rounds of competition. Please see the information posted at the registration desk for more details.

**The Award**
The award will be presented to the winning team during the Luncheon and Awards Ceremony on Wednesday.

**The Game**
Tuesday, May 8
Cases will be presented at the session scheduled at 1:00–1:45 PM in National Ballroom B–C. Answer sheets will be collected, and then the answers will be revealed.

**Cases Presented by Baylor University Medical Center, Dallas, and University of Texas Southwestern Medical Center**

**Previous Winners of the AUR Vydareny Imaging Interpretation Competition**

<table>
<thead>
<tr>
<th>Year</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1992</td>
<td>University of Cincinnati School of Medicine</td>
</tr>
<tr>
<td>1993</td>
<td>Baylor University Medical Center, Dallas</td>
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<tr>
<td>1994</td>
<td>University of Washington School of Medicine</td>
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<tr>
<td>1995</td>
<td>Medical College of Pennsylvania</td>
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<tr>
<td>1996</td>
<td>University of Michigan</td>
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<tr>
<td>1997</td>
<td>Mallinckrodt Institute of Radiology</td>
</tr>
<tr>
<td>1998</td>
<td>Wake Forest University School of Medicine</td>
</tr>
<tr>
<td>1999</td>
<td>Emory University School of Medicine</td>
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<tr>
<td>2000</td>
<td>Brown University School of Medicine, University of Cincinnati School of Medicine</td>
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<tr>
<td>2001</td>
<td>Duke University</td>
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<tr>
<td>2002</td>
<td>Baylor College of Medicine, University of Texas Health Science Center at Houston</td>
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<tr>
<td>2003</td>
<td>Brown University/Rhode Island Hospital, Dartmouth–Hitchcock Medical Center, University of Cincinnati School of Medicine</td>
</tr>
<tr>
<td>2004</td>
<td>Mallinckrodt Institute of Radiology</td>
</tr>
<tr>
<td>2005</td>
<td>University of Michigan</td>
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<tr>
<td>2006</td>
<td>University of Texas–Houston, Baylor Houston</td>
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<tr>
<td>2007</td>
<td>Mallinckrodt Institute of Radiology</td>
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<tr>
<td>2008</td>
<td>University of California, San Diego</td>
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<tr>
<td>2009</td>
<td>University of Washington</td>
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<tr>
<td>2010</td>
<td>University of Michigan</td>
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<tr>
<td>2011</td>
<td>Partners’ Radiology, Massachusetts General Hospital, Brigham and Women’s Hospital</td>
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<tr>
<td>2012</td>
<td>Mallinckrodt Institute of Radiology</td>
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<tr>
<td>2013</td>
<td>Penn State University</td>
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<tr>
<td>2014</td>
<td>University of California, San Francisco</td>
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<tr>
<td>2015</td>
<td>Baylor University Medical Center, Dallas, University of Texas Southwestern Medical Center</td>
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<tr>
<td>2016</td>
<td>Beaumont Health, Henry Ford Hospital</td>
</tr>
<tr>
<td>2017</td>
<td>Baylor University Medical Center, Dallas, University of Texas Southwestern Medical Center</td>
</tr>
</tbody>
</table>
The AUR Radiology Management Program is the only case–based course for academic radiology leaders. Existing programs through the AUR and corporate sponsors play a major role in supporting research in radiology and fostering junior faculty in the academic systems. However, with this program, the AUR offers unique training focused on management and leadership for academic radiologists and academic radiology department administrators. Prior application to this course is required.

Academic radiology must develop a cadre of professionally trained physician–managers who can deal skillfully with the operations, leadership, and strategic planning needs of our specialty. This program helps to answer that need.

The Radiology Management Program is designed for approximately 30 radiologists and administrators. This course will focus on management and leadership, including the following topics:

- The Hunger Games: Productivity-based Compensation Plan for Academic Radiologists
- Academic Radiology Expansion into Regional Practice
- Academic Radiology Department Relationships with Industry
- Building a Culture of Wellness and Resilience
- Practice Quality Improvement: Where Do I Start?
- Negotiation Skills: The Case of Financial Negotiation for Equipment Purchases
- Designing the Academic Mission in an Era of Constraints

The program is based primarily on the case–study method, in combination with keynote talks.

The 2018 AUR Radiology Management Award will be presented during the program. This award fulfills the desire for the program to evolve into an even more interactive educational experience while continuing with the case–based format. The winner(s) of this year’s award will present his/her case(s) during the program.

The AUR Radiology Management Program will take place on Tuesday, May 8, and Wednesday, May 9.

AMA PRA Category 1 Credit™ will be awarded to physicians attending this session.

For information about the nomination process for this program, please contact the AUR.

AUR Radiology Management Award Winners

2018
“Artificial Intelligence as a Disruptive Innovation”
Timothy P. Kasprzak, MD, MBA
Andrew C. Cordle, MD, PhD

2017
“Incorporation of Radiology Services into a Clinical Environment of an Academic Health Center: Transdisciplinary Patient Care”
Susann E. Schetter, DO

2016
“Implementing a Cost-effective and Sustainable Internal Off–Hours Attending Call System”
Eric J. Feldmann, MD
Matthew A. Barish, MD

2015
“Point-of-Care (POC) Ultrasound”
Marc H. Willis, DO
Christopher M. Straus, MD

“Balancing Patient–focused Services with Increasing Revenue Cuts and Pressures in an Academic Breast Imaging Center”
Elizabeth A. Molina, MBA
Brandi T. Nicholson, MD

2014
Leon Lenchik, MD
King C. Li, MD

“Concierge Radiology”
Saurabh Jha, MBBS
Neerav R. Mehta, MD

2013
Hyun “Kevin” S. Kim, MD
Michael A. Cohen, MD

2012
“The Integration of an Insourced Teleradiology Model and Radiology Resident Education: Opportunities and Challenges”
Sandip Basak, MD

2011
“Understanding and Measuring Nonclinical Faculty Performance in Academic Radiology Departments: How to Keep the Basic Scientist, Clinician–Scientist, and Clinician–Educator Happy in the Same Sandbox”
Barry D. Daly, MD
Paul G. Nagy, MD

2010
“Reinventing a University Department under Siege”
M. Elizabeth Oates, MD
Michael A. Brooks, MD

2009
“The Use of an After–hours Reading Service at an Academic Medical Center”
William L. Simpson, MD
Robert S. Shapiro, MD

2008
“Conflict Resolution in Academic Radiology”
Jay A. Harolds, MD
Beverly P. Wood, MD, PhD, MSEd
AUR Academic Faculty Development Program

Richard B. Gunderman, MD, PhD, Program Chair

The AUR Academic Faculty Development Program will celebrate its 24th year in 2018. The goal of the AUR Academic Faculty Development Program is to bring together promising junior radiology physician faculty members early in their academic careers for a full-day program of education and networking. Prior application to this program is required.

Topics will include the following:

- Career Development Awards
- Ethics and Publishing
- Chair Roundtable: How a Chair Can Help Your Career
- Service to Radiology Organizations
- Education in Radiology: Seven Habits for Excellence
- Excelling at Research
- Midcareer Roundtable: How to Attain and Maintain Academic Productivity

In addition, there will be time dedicated to small-group sessions on various other topics, including growing as a leader, research in academic radiology, how to get promoted as an educator, moving up the ladder, and women in academic radiology.

Forty-five individuals from submitted nominations are invited to attend; the limited number of participants is necessary for the program to accomplish its objectives. Best candidates for this program are those who are within the first 5 years of appointment. Participants have deemed their experiences with this program a great success. The 2018 AUR Academic Faculty Development Program is scheduled for Thursday, May 10.

AMA PRA Category 1 Credit™ will be awarded to physicians attending this program.

For information about the nomination process for the faculty development program, please contact the AUR.
**AUR Radiology Resident Academic Leadership Development Program**

Ruth C. Carlos, MD, MS, Program Chair  
James V. Rawson, MD, Program Co-Chair

The AUR Radiology Resident Academic Leadership Development (ARRALD) Program is an initiative that provides focused mentorship, leadership, and academic development activities to a group of high-potential 2nd-year (PGY-3) radiology residents to better prepare for their transition into successful careers as leaders in academic radiology. The program combines existing AUR sessions with specific program content to provide a curriculum that will enable the participating resident to hone his or her skills in leadership, teaching, and other tasks that will be of ongoing value in career development, whether he or she ends up in academics or as a leader in private practice or industry. Prior application to this program is required.

The AUR believes that supporting the development of the future leaders of radiology at this critical stage in their careers is a crucial component in ensuring the successful future of radiology.

*AMA PRA Category 1 Credit™* will be awarded to physicians attending the program-specific content.

This icon indicates sessions that are part of this program.

The ARRALD program is designed for a maximum of 35 second-year residents and will consist of the following elements:

- **Program-Specific Content:** 13.0 hours spread across the 4 days of the AUR meeting.
- **Required Portions of the Existing AUR Meeting:** To include sessions of the A’CR², ACER, APDR, RAHSR, RRA, and AMSER and other appropriate components of the regular meeting.
- **Small-Group Mentorship:** Groups of four or five residents will meet with a junior or senior faculty, program director, or chair and will be asked to discuss challenges and opportunities that may have been encountered in academic radiology that were related to clinical work, teaching, administration, or research. Each group of residents will present their discussions at the Thursday morning roundtable session.
- **Reception:** Participants will be encouraged to attend the Beer and Pretzels Reception on Tuesday, 5:30–6:30 pm, where they will mingle and network with AUR members such as program directors and chairs.
- **Closing Session:** A final session will be held on Thursday morning of the AUR meeting to allow discussions summarizing and synthesizing the content of the program and to develop action items for continued growth and development of the participants’ academic and leadership skills.

A $1,200 stipend will be paid to each department sending an individual, to help defray the attendee’s expenses after the meeting.

**ACR–AUR Research Scholar Program**  
(Supported by the American College of Radiology)

Rathan M. Subramaniam, MD, PhD, MPH, Program Chair  
Ajay Gupta, MD, Program Co-Chair

The AUR’s RRA and RAHSR Affinity Groups are pleased again to partner with the ACR to offer the Research Scholar Program. The program seeks to bring residents and fellows who have a background and interest in scientific, health services, and health policy research together with seasoned academic radiologists. The full-day program offers a health policy research curriculum, scholar presentations, and focused mentoring sessions.

Twenty travel stipends are awarded to the institutions of residents and fellows who demonstrate a commitment to scientific, health services, and health policy research.

The Research Scholar Program is scheduled on Thursday, May 10.

*AMA PRA Category 1 Credit™* will be awarded to physicians attending this session.

Participation in the program is determined by a nomination process. For information about the nomination process, please contact the AUR.
Felix S. Chew, MD, MBA, EdM, FACR, was born and raised in Coral Gables, Florida. After high school, he entered Princeton University as a National Merit Scholar and was a member of the fencing team. He graduated in 1975 with an AB degree in biochemical sciences. He then attended the University of Florida in Gainesville, earning an MD degree with honors for research in 1979.

After an internship in diagnostic radiology at the University of Florida School of Medicine, Dr Chew spent 1980–1984 on active duty in Germany, serving as a general medical officer in the US Army Medical Corps. After his discharge from the army, he began his residency in diagnostic radiology at SUNY Upstate Medical University in Syracuse, New York, from 1984 to 1987, serving as chief resident from 1986 to 1987. After his residency, he joined the faculty at SUNY Upstate Medical University, where he served as an assistant professor from 1987 to 1989.

In 1989, Dr Chew moved to Boston, Massachusetts, where he became an instructor in radiology at Harvard Medical School and a staff radiologist at the Massachusetts General Hospital. As an American Roentgen Ray Society Scholar, he earned a master’s degree in education from Harvard in 1995.

In 1998, Dr Chew joined the faculty at Wake Forest University School of Medicine as a professor of radiology and head of the musculoskeletal radiology section. During his time there, he also earned an MBA degree in management from Duke University in 2004.

In 2004, Dr Chew moved to his current position in Seattle, Washington, where he joined the University of Washington School of Medicine as professor of radiology and head of the musculoskeletal radiology section. In 2011, he was named vice chair for academic innovation.

Dr Chew has had a distinguished career as a radiology educator, training hundreds of radiology residents and dozens of musculoskeletal fellows. He has also mentored dozens of junior faculty who are now successful academic radiologists. Besides his many publications on education, he has won the AUR’s Joseph E. and Nancy O. Whitley Award for research in radiology education an unprecedented five times. He is the author of several seminal textbooks of skeletal radiology, including Broken Bones: The Radiologic Atlas of Fractures and Dislocations; Musculoskeletal Imaging: A Teaching File; and Skeletal Radiology: The Bare Bones.

Dr Chew has made radiology journalism the other cornerstone of his radiologic career. He was the first Melvin M. Figley Fellow in Radiology Journalism and has been a section editor of AJR: American Journal of Roentgenology. He is the editor-in-chief of Radiology Case Reports, an open-access peer-reviewed journal that he cofounded, and is a chief editor of eMedicine: Radiology.

Active in organized radiology, Dr Chew has served as a committee chair for the Radiological Society of North America, the American Roentgen Ray Society, and the Society of Skeletal Radiology. Dr Chew was an examiner for the American Board of Radiology and chaired the musculoskeletal section of the ABR Committee for the Written Examination.

Dr Chew has a long and distinguished record of service to the Association of University Radiologists. He is a past president of the AUR and is currently serving his second term on the AUR Board of Directors. He has been an associate editor for Academic Radiology and currently serves on its editorial board. He has chaired and served on numerous AUR committees. He has been a member of the Radiology Research Alliance and the Radiology Alliance for Health Services Research and is a founding member of the Alliance of Clinician-Educators in Radiology.

It is with great respect and affection that the AUR presents its Gold Medal for 2018 to Felix S. Chew, MD, MBA, EdM, FACR.
Carolyn C. Meltzer, MD, FACR, is the William Patterson Timmie Professor and chair of the Department of Radiology and Imaging Sciences at Emory University/Healthcare, where she also serves as associate dean for research in the Emory University School of Medicine. One of the most successful researchers in all of radiology, Dr. Meltzer has been a renowned scholar, mentor, and physician leader over the past several decades. An inspirational leader in our field, Dr. Meltzer’s contributions have been significant: (a) enhancing our neurobiological understanding of neuropsychiatric disorders, and (b) promoting academic development and leadership.

By way of background, Dr. Meltzer completed medical school, residency, and fellowships (in neuroradiology and nuclear medicine) at Johns Hopkins. She then joined the faculty of the University of Pittsburgh and rose to tenured professor of radiology. At Pittsburgh, she led the evaluation of the world’s first combined PET/CT scanner. Dr. Meltzer was recruited to Emory, where she serves as a beloved departmental chair to one of the largest radiology departments in the United States.

Emblematic of her stature relating to federal funding, Dr. Meltzer is a member of the National Institute of Biomedical Imaging and Bioengineering Advisory Council. Dr. Meltzer has long been active in the mentoring and development of trainees and faculty and serves as a role model for clinician-scientists. Dr. Meltzer founded the Emory Center for Systems Imaging, a comprehensive university-wide resource for translational imaging science. In 2016, Dr. Meltzer won the American Society of Neuroradiology (ASNR) Foundation Award for Outstanding Contributions in Research, which is exemplary of her exceptional career.

Dr. Meltzer remains one of only a few women chairs of academic radiology departments and serves as a board member of SCARD. She served as the third woman president of the ASNR; and recently, Dr. Meltzer became the first woman president of the Academy of Radiology Research.

Access to strong career development programs for all faculty members has been an emphasis of Dr. Meltzer, including a one-on-one mentorship program for junior faculty, faculty development workshops, and a radiology leadership academy. As chair, she implemented an equity-based compensation plan, a mission-guided incentive system, and an online annual faculty development tool and resource-planning tool; and she developed substantial infrastructure in support of faculty-initiated research. Attention to recruitment and hiring practices and to search committees’ processes for all leadership positions has resulted in enhanced gender and ethnic diversity among our faculty and a rise in academic promotions and leadership appointments among women and minority faculty.

At the national level, Dr. Meltzer has actively pursued opportunities to promote women in academic leadership. As president of the ASNR, she worked collaboratively with the American Association for Women Radiologists and the American College of Radiology (ACR) to create the Women in Neuroradiology Leadership Award. As a member of the ACR Board of Chancellors, Dr. Meltzer strongly supported and facilitated board approval for the establishment of a gender and general diversity commission. Readers will hopefully recall that the focus at AUR 2016 was on diversity and inclusion; Dr. Meltzer helped develop the SCARD programming on this subject, speaking on unconscious bias (a topic that she also covers with several Emory departments, as well as our school of medicine).

In addition to all this, Dr. Meltzer is a renowned photographer (check out http://www.carolynmeltzer.com/) who is followed by more than 1000 on Twitter (@brainbanker). She is also a dog enthusiast and, quite simply, a wonderful person.

In recognition of her exceptional contributions, the AUR awards its Gold Medal in 2018 to Carolyn C. Meltzer, MD, FACR.
J. Mark McKinney, MD, is renowned for his aptitude as an interventional radiologist, his departmental and administrative leadership skills, and his fostering of radiology education at all levels. Mark has devoted his career to advance and cultivate allied health staff, radiology trainees, and young radiology staff members; and his attentiveness and mentorship have impacted many.

Mark completed medical school, a diagnostic radiology residency, and an interventional radiology (IR) fellowship at the Loma Linda University School of Medicine in California. After his medical training, he joined the Mayo Clinic staff in Rochester, Minnesota, and shortly thereafter transferred to the relatively new Mayo Clinic campus in Jacksonville, Florida. As a young staff member, his passion for education and higher learning was evident to all. At Mayo Clinic Florida, he collaborated to launch its diagnostic radiology residency program in 2000 and its IR fellowship in 2007.

In 2008, Dr. McKinney accepted the offer to become chair of radiology at the University of Tennessee. His leadership experience there ranged from small community hospitals to the 600-bed university trauma center in Knoxville. His skillful administrative leadership steered the department to great success, and the department flourished.

In 2012, Mark returned to the Mayo Clinic and shortly thereafter was named the chair of radiology at Mayo Clinic Florida. Once again, his aptitude and exceptional management skills allowed him to oversee more than 250 allied health staff plus more than 50 physicians and physicists. Under his watch, the department experienced exceptional growth, with the hiring of 23 full- or part-time physicians and physicists.

At Mayo Clinic Florida, Mark has worked with his leadership team on many departmental innovations and projects, including its first radiochemistry positron emission tomography (PET) laboratory (cyclotron), PET–magnetic resonance imaging, hybrid interventional suites, and expansion of imaging into the new Destination Medical Building. His contributions to radiology education have continued, helping establish the Mayo Clinic Florida integrated and independent IR residency programs in 2016. Mark currently serves on several leadership committees at Mayo Clinic, including the Clinical Practice Committee, Facilities Planning Committee, and Radiology Specialty Council. He was recently named as the executive sponsor of the India Employee Diversity Group. His role with Mayo Clinic allows him to work with the other Mayo Clinic sites to converge and administer the Mayo Clinic Enterprise Radiology practice.

Mark’s contribution to radiology education has been profound. He has mentored countless radiology residents, fellows, and allied health staff members who have taken positions in other academic centers around the country and world. He also mentors a young local business leader in the Jacksonville Stein Fellowship program. Mark developed the RAD-AID chapter at Mayo Clinic Florida and has coordinated multiple radiologists to serve and teach in Vietnam. He has performed multiple IR procedures in Da Nang, Vietnam, and organized a national teaching symposium for Vietnamese radiologists.

Mark’s educational efforts on a national level have been impressive. He has served the APDR as chair of the Electronic Communications Committee, member of the Board of Directors, and as the 2013–2014 President of APDR. While on the APDR Board of Directors, he worked closely with the Society of Interventional Radiology (SIR) to coordinate new training pathways for IR. Mark’s membership on the SIR IR Residency Taskforce was part of these collaborative efforts and culminated in the recent national launch of the integrated IR residency.

On a personal level, Mark enjoys cycling, hiking, and snow skiing. He and his wife, Barbara, often spend weekends riding with the Mayo Clinic cycling team. He has been a cycling fundraiser for multiple sclerosis for the past 20 years and participates in other cycling fundraisers benefitting transplants and diabetes. After his APDR presidential year, he was thrilled to receive an APDR cycling jersey from incoming president, Janet E. Bailey, MD. Last summer, Mark took the whole family to hike four “fourteeners” in the Colorado mountains, fundraising for the Michael J. Fox Foundation for Parkinson’s Research. Mark especially appreciates the love and support of his family. His physician spouse, Barbara Chase McKinney, MD, MPH, expands his understanding of leadership, quality, safety, and performance improvement through her work with the Mayo Clinic and the Centers for Disease Control and Prevention and as a physician surveyor with the Joint Commission. Mark and Barbara have two sons, Joshua and Caleb. Joshua is completing a master’s degree in mechanical engineering at Georgia Institute of Technology. Caleb is a senior finance major completing his premedical studies and will begin medical school in 2019.

Mark is a talented radiologist, educator, and leader. He enjoys the challenges of leadership and is eager to share his experiences with others pursuing similar goals of clinical, educational, and administrative excellence. He is bright, hardworking, and dedicated and has a great sense of humor. He is truly one of the stars of radiology education. The APDR is proud to award the 2018 APDR Achievement Award to J. Mark McKinney, MD.
Dieter R. Enzmann, MD, also known as “D.E.” to his friends and family, was born in the Bavarian town of Marktredwitz, Germany, the beloved son of a thoughtful engineer and a devoted mother. Dieter’s father instilled in Dieter an appreciation for pursuits of the mind and the value of creativity, and Dieter’s mother gave Dieter an appreciation for education, commitment, and discipline. These strong and consistent character traits would prove to serve Dieter well. At an early age, D.E. and his family emigrated to Wisconsin, seeking opportunities for a better future in the New World and settling down in Racine. Dieter excelled academically and was admitted to the University of Wisconsin, from which he graduated with a Bachelor of Arts degree with honors.

A significant event in Dieter’s life proved to be his watching the Tournament of Roses Parade on television, which is held in Pasadena, California, as part of the celebrations and observations accompanying the Rose Bowl. As Wisconsin enjoyed a particularly thick blanket of snow on that particular New Year’s Day, Dieter noticed the numerous televised spectators lining the streets of Pasadena sporting smiles and shirtsleeves, and a lifelong love affair with California was born.

Dieter attended Stanford University School of Medicine, excelling as expected and earning Alpha Omega Alpha honors. He continued at Stanford as an intern and then radiology resident, realizing his passion for neuroradiology at an early stage, and establishing a foundation for serious commitment to an academic career. Dieter completed a neuroradiology fellowship at the University of California, San Francisco, forging numerous lifelong friendships and associations while doing so. Dieter returned to Stanford immediately after his fellowship to serve in the neuroradiology section for the next 19 years, earning a well-deserved reputation as a meticulous experimentalist, brilliant academcian, and consummate neuroradiologist. Dieter quickly rose through the ranks to establish his position as a professor in the tenured line. Dieter not only led Stanford neuroradiology, but his actions and leadership more importantly established an enduring legacy of excellence in the section.

Dieter chose to spend his sabbatical leave at the Stanford Graduate School of Business at a time when very few academic radiologists were receiving any formal training in strategy, operations management, or business. This exposure galvanized his interest in management science, in which he has proven to be a creative and celebrated writer and thinker as the creator of seminal concepts, while also stimulating his interest in applying management theory to actual health care delivery.

Dieter sought an elevated scope of influence for delivering health care and, in pursuit of this goal, next served as chair of radiology at Northwestern University from 1996 through 2000. Dieter was celebrated as a visionary and thoughtful leader, and he returned to California in 2001, where he has since then successfully led UCLA Radiology as the Leo G. Rigler Chair of Radiological Sciences. Under Dieter’s leadership, UCLA Radiology has become a juggernaut, benefitting from Dieter spending the better part of 2 decades recruiting and developing numerous leading scientists and radiologists while creating and deploying many innovative world-class programs.

Dieter was the president of the Society of Chairs of Academic Radiology Departments (SCARD) from 2008 to 2010, notably serving as the architect and executive sponsor for the SCARD scenario-planning exercise. This joint effort with the American College of Radiology transformed SCARD’s self-perception to that of a proactive and empowered entity possessing the responsibility and ability to forge the future of academic radiology.

Dieter is known for a spectrum of creative accomplishments, including such representative original concepts as the experimental description and evolution of early and late focal cerebritis and its potential evolution to cerebral abscess; naming, describing, and applying the radiology value chain; and designing, describing, and deploying combined radiologic-pathologic-genomic reports. Each of these individual creations would be remarkable for a single person. To have one and the same radiologist demonstrate such a range of novel creativity over such a distinguished career justifies and affirms his exceptional leadership and creativity.

Professor Dieter Enzmann is emblematic of the inspirational potential that academic radiologists possess, and we celebrate and thank him for the transformative role he has played in our discipline and in our lives. We applaud Dieter R. Enzmann, MD, as he receives the 2018 SCARD Visionary Leadership Award.
A3CR² Outstanding Teacher Award

Alberto A. Simoncini, MD

Introduction by Daniel A. Ortiz, MD

We are pleased to announce that the recipient for the 2018 A3CR² Outstanding Teacher Award is Alberto A. Simoncini, MD. Since fall 2016, Dr. Simoncini has served as the diagnostic radiology residency program director for the Louisiana State University Health Sciences Center (LSUHSC) in Shreveport.

A graduate of the National University of Buenos Aires, Dr. Simoncini completed his residency at the Argentinian Foundation in Diagnostic Medicine in Buenos Aires, Argentina, where he remained as staff and eventually became the director of ultrasound and interventional radiology (IR). With this appointment, he was also an assistant professor of radiology at the University of Buenos Aires School of Medicine. In 2006, he left Argentina and became an associate (and eventually full) professor of radiology at LSUHSC, where he also is the director of musculoskeletal radiology.

An impassioned advocate for his residents, Dr. Simoncini personally facilitated the creation of internal moonlighting, an increase in the volume of orthopedic magnetic resonance imaging, and the procurement of an overnight call room for the IR resident. Despite his short time as LSUHSC program director, Dr. Simoncini has had an incredible impact on the residency program. Dedicated to personally revamping the curriculum, Dr. Simoncini attended every resident lecture for an entire year to get a firsthand perspective on the status and needs of his residents. If a lecturer had a last-minute unavailability, Dr. Simoncini would provide an impromptu lecture to ensure that his residents did not miss a learning opportunity. The impact of Dr. Simoncini’s intervention can be seen in the remarkable jump in program Diagnostic Radiology In-Training (DXIT) exam scores and in scholarly productivity, a 100% pass rate on the American Board of Radiology Core Exam, and revitalization of conference attendance and participation. The commitment to teaching of this lifelong learner has led to his designation as the LSUHSC 2016–2017 “Teacher of the Year” and to the A3CR² proudly presenting this year’s A3CR² Outstanding Teacher Award to Alberto A. Simoncini, MD.

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ACER Achievement Award

Mark E. Mullins, MD, PhD, FACR

Introduction by Eric J. Stern, MD

“Radiology educator and leader extraordinaire”: Mark E. Mullins, MD, PhD, FACR, is a highly engaged and recognized AUR member and leader who served as the eighth president of ACER (2015–2016). As an act of gratitude, respect, and admiration, we pay tribute to Mark for his extensive educational leadership roles with the 2018 ACER Achievement Award.

After spending 18 years training and working in the Harvard system in Boston, Mark left to continue his career in the nurturing confines of Emory University School of Medicine, rising to become professor and vice chair for education, director of radiology medical student education, and program director (now emeritus) of the diagnostic radiology residency. Dr. Mullins is an accomplished neuroradiologist, who has clearly become an outstanding educational scholar, mentor, and leader in many of the AUR umbrella organizations—a true master academic “chef” of the AUR “alphabet soup” of organizations. In addition to leading ACER, the principal ingredients of this particular academic chef’s AUR soup include serving as the incoming president of APDR, past president of AMSER, current chair of ADVICER, deputy editor of Academic Radiology, and member of the AUR Board of Directors, as well as serving as a key member of the AUR Program Planning, Awards, Scientific Program, Education, Development, and Long-Range Planning Committees and the new ad hoc FAUR committee. Dr. Mullins is also a highly regarded speaker and a national and international visiting professor—proudly waving the AUR/ACER banner in four international outreach programs in Mexico, Argentina, Brazil, and Saudi Arabia.

However, as we all know, a fine academic career soup is not achieved by randomly throwing together the various acronym ingredients. What makes Mark singular, an incredible academic chef, is his own special secret blend of herbs and spices that he adds to all of his various AUR activities, which have helped AUR to flourish. For his unwavering commitment to excellence in radiology education and leadership, we honor and thank Mark E. Mullins, MD, PhD, FACR, with the 2018 ACER Achievement Award.

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3018 AWARDs

**AMSER Excellence in Education Award**

Sravanthi Reddy, MD

*Introduction by Donna Magid, MD, MEd*

Educators know how difficult it is to get enough academic oxygen to breathe, let alone thrive, in an increasingly challenging educational environment. Her unflagging energy and enthusiasm have allowed Sravanthi Reddy, MD, to excel at clinical and educational challenges.

Dr Reddy rapidly grew the breast magnetic resonance (MR) imaging service at the University of Southern California (USC) from 10 to 500 breast MR imaging exams by 2007. She then joined the emerging emergency radiology division, driving PACS selection and implementation, quality assurance, staffing, and coverage, growing the section into an independent emergency radiology division, and solidifying the high level of service and the deep bonds and mutual respect between clinicians and imagers.

Education often feels like the short leg of the academic tripod. AMSER focuses on medical students—an often-overlooked, underserved segment of medical education without which we can neither survive nor progress. Dr Reddy is particularly well equipped here by both intellect and nature, being the sort of warm natural luminescent type to whom Gen Y gravitates. Her radiology interest groups (RIGs) turn 12 this year, allowing medical students to interact with radiology from that critical 1st year on. Dr Reddy chairs a national RIG committee, designed to keep us foremost in the career-pondering minds of students. Her first Medical Student Radiology Expo ran in 2016, attracting medical students from different institutions to explore radiology careers. She is the natural adviser for those USC students pursuing an imaging residency and career. Always wanting to reach a larger audience and help other institutions, she is first author of the popular AMSER Guide to Applying for Radiology Residency.

I met Dr Reddy around 2009, as she was becoming program director of USC’s enormous popular Radiology Selective. While she claimed at that time to be seeking educational mentoring, in reality she was already a distinguished student educator, winning teaching awards in 2011 and 2016 and recognized as “Outstanding Selective” in 2013. Hers is the model we should all follow to keep radiology conspicuously at the forefront of medical student training. Radiology, AMSER, and the medical students in particular are indeed fortunate to have her on our side.

**RRA Innovation and Leadership Award**

King C. Li, MD, MBA

*Introduction by Rathan M. Subramaniam, MD, PhD, MPH*

It is a great pleasure to present the 2018 Radiology Research Alliance (RRA) Innovation and Leadership Award to King C. Li, MD, MBA, professor, inaugural dean, and chief academic officer of Carle Illinois College of Medicine, University of Illinois at Urbana-Champaign. Dr Li studied physiology and biochemistry and graduated from the University of Toronto and then went on to medical school, graduating with honors in 1981. He received an MBA degree in 1998 from San Jose State University.

Before his current position, Dr Li held many high-profile academic positions: associate professor of radiology with tenure at Stanford University School of Medicine; tenured senior investigator, chief of Radiology and Imaging Sciences, and associate director of the National Institutes of Health (NIH) Clinical Center; M. D. Anderson Foundation Distinguished Chair and professor of the Department of Radiology at Houston Methodist Hospital; and professor and chair of the Department of Radiology, deputy director of the Comprehensive Cancer Center, and senior associate dean for clinical and translational research at Wake Forest School of Medicine.

Dr Li’s contribution to molecular imaging research has been invaluable over the decades. He holds 16 U.S. patents and has authored more than 145 peer-reviewed articles, 40 invited articles and editorials, and six book chapters. Dr Li was a principal investigator (PI) or co-PI of peer-reviewed NIH grants totaling more than $40 milllion. He has been a visiting professor more than 50 times and has delivered more than 230 invited lectures.

Dr Li’s contributions to RRA as president and his idea of RRA task forces during my presidency were crucial in reinvigorating RRA and making RRA what it is today. For his valuable contributions to RRA, his immeasurable contributions to molecular imaging research, his outstanding imaging leadership at multiple institutions, and especially his vision of building a next-generation medical school at the University of Illinois at Urbana-Champaign, the RRA is extremely pleased to award its 2018 Innovation and Leadership Award to King C. Li, MD, MBA, an innovator, international leader, and outstanding researcher.
RAHSR Achievement Award

Ella A. Kazerooni, MD, MS

Introduction by Jeffrey G. Jarvik, MD, MPH

Ella Kazerooni, MD, MS, is a true pioneer in the field of radiology health services research. Dr Kazerooni received her medical degree from the University of Michigan, where she also completed her diagnostic radiology residency. Subsequently, she completed a fellowship at Massachusetts General Hospital/Harvard Medical School, Boston. Being a true Michigan Wolverine, she returned to Ann Arbor to join the University of Michigan faculty in 1992.

Dr Kazerooni was one of the earliest AUR GE Radiology Research Academic Fellowship (GERRAF) awardees and has steadily risen through the academic ranks to become one of the best-known leaders in the field of radiology. At the University of Michigan, Dr Kazerooni is a professor of radiology and associate chair for clinical affairs, director of cardiothoracic radiology, and chair of the Radiology Service Excellence Program.

Dr Kazerooni’s research focuses on advanced computed tomographic (CT) and magnetic resonance (MR) imaging applications, technology assessment, and outcomes research, including interstitial lung disease, emphysema, lung transplantation, pulmonary vascular disease, and cardiovascular CT and MR imaging.

Dr Kazerooni has received numerous awards and honors. She is an elected fellow of the American College of Radiology (ACR) and an elected member of both the Fleischner Society and the Society of Computed Tomography and Magnetic Resonance. She received the Madame Curie Award from the American Association for Women Radiologists, the Early Distinguished Career Achievement Award from the Michigan Medicine Alumni Society, and the Gold Medal of the Association of University Radiologists (AUR).

Dr Kazerooni has served many roles in organized radiology, including president of the American Roentgen Ray Society, the Society of Thoracic Radiology, the AUR, and the Radiology Alliance for Health Services Research (RAHSR), and is a member of the ACR Board of Chancellors and Executive Committee. Dr Kazerooni is currently a trustee of the American Board of Radiology.

Knowing Dr Kazerooni, all of these accomplishments represent only the beginning. We are proud to present the RAHSR Achievement Award to Ella Kazerooni, MD, MS.
2018 Awards

AUR Memorial Award
In honor of deceased AUR members, the Memorial Award is awarded annually to the radiology medical student, resident, or 1st-year fellow who submits the best original paper on any aspect of radiology.

The award is presented at the AUR Annual Meeting during the Wednesday luncheon. The author of the award-winning paper is presented with a crystal award and a $1,000 award.

Award Recipient:
Travis Wassermann, MPH

Joseph E. and Nancy O. Whitley Award
Joseph E. Whitley, MD, served as chairman of the Department of Radiology at the University of Maryland in Baltimore until his death in 1989. Afterward, in recognition of his contributions to teaching methods in radiology, the AUR established the annual Joseph E. Whitley Award. Years later, after the death of his wife, Nancy O. Whitley, the AUR renamed the award the Joseph E. and Nancy O. Whitley Award, to honor her contributions to the world of academic radiology as well.

The Joseph E. and Nancy O. Whitley Award, presented annually since 1991, recognizes exemplary scientific presentations on teaching in radiology. Each year, calls for papers on teaching methods in radiology are issued in Academic Radiology. The AUR Education Committee reviews all submitted papers, and the award is presented at the AUR Annual Meeting during the Wednesday luncheon. The author of the award-winning paper is presented with a certificate and a $1,000 award.

Award Recipient:
Nicholas A. Koontz, MD

A3CR2 Research Award
The A3CR2 Research Award will be presented to the resident who submits the best research paper or poster for presentation at the AUR Annual Meeting. The A3CR2 Education Committee selects the recipient of the award. The winner will be presented with a certificate during the Wednesday luncheon at the AUR Annual Meeting.

Award Recipient:
Sarah I. Kamel, MD

AMSER Henry Goldberg Medical Student Award
The AMSER Henry Goldberg Medical Student Award will be presented annually to a medical student who submits an outstanding abstract for a paper, poster, or electronic exhibit for presentation at the AUR Annual Meeting. Up to two awards may be presented each year. To be eligible, the work must have been performed while the applicant was a medical student. The candidate must be either the first author or the presenter of the abstract. The award is presented at the AUR Annual Meeting during the Wednesday luncheon. The recipient is presented with a certificate and a $500 award.

Award Recipient:
Joshua S. Harford, BS

RAHSR Harvey L. Neiman Award
(Supported by the American College of Radiology)
The RAHSR Harvey L. Neiman Award is presented annually to any student, resident, fellow, or AUR member who submits an outstanding abstract on radiology socioeconomics or health services research. It is expected that a manuscript describing the work will be prepared for subsequent submission to the Journal of the American College of Radiology: JACR for consideration for publication. The recipient will present his or her paper during the AUR Annual Meeting and will be presented with a $1,000 award during the Wednesday luncheon.

Award Recipient:
Patricia Balthazar, MD
RRA New Investigator Award

The RRA New Investigator Award is awarded to a promising new investigator. The award will be presented at the AUR Annual Meeting during the Wednesday luncheon. The recipient will be presented with a plaque.

Award Recipient:
Lars J. Grimm, MD

AUR Trainee Prizes

AUR Trainee Prizes are presented annually to medical students, residents, or 1st–year fellows who submit an outstanding abstract for a paper, poster, or electronic exhibit for presentation at the AUR Annual Meeting. To be eligible, the trainee must be both the primary author and the presenter of the abstract and must submit an expanded abstract after acceptance of the original abstract. First, second, and third prizes are awarded in two categories: (1) the best paper and (2) the best poster or exhibit. Winners of the first, second, and third prizes will receive $750, $500, and $250, respectively, and a certificate during the Wednesday luncheon and awards ceremony.

Award Recipients

1st Prize Paper: Anna V. Trofimova, MD, PhD
2nd Prize Paper: Atul Padole, MD
3rd Prize Paper: Sana Parsian, MD

1st Prize Poster or Exhibit: Iris Chen, MS, BS
2nd Prize Poster or Exhibit: Mary D. Maher, MD
3rd Prize Poster or Exhibit: Daniella Asch, MD
AUR GE Radiology Research Academic Fellowship (GERRAF) Award: Fostering Scholarship in Radiology Research

Since their inauguration in 1992, GERRAF Fellowships have been one of the most sought–after awards in academic radiology. Already, they have helped dozens of academic radiologists advance their research careers.

GERRAF Fellowships are cosponsored by the Association of University Radiologists and GE Healthcare. They were created to bring the benefits of radiologic advances to medical practice and the public through the following:

- Developing a cadre of academic radiologists trained in patient–oriented and health services research and demonstrating the value of such training to the field of radiology.
- Providing an opportunity for a critical mass of young radiologists from a wide geographic distribution of academic health centers to receive excellent training in clinical research methodology.

2018 GERRAF Fellows

Many of today’s emerging leaders in academic radiology are GERRAF Fellows. The class of 2018 GERRAF Fellows will be recognized during the luncheon on Wednesday, May 9.

Neena Kapoor, MD
Brigham & Women’s Hospital
Recommendation of Additional Imaging Follow-Up: Identifying Factors and Reducing Unwarranted Variation

Kathryn Lowry, MD
University of Washington
Tailoring Magnetic Resonance Imaging (MRI) Surveillance in Breast Cancer Survivors to Patient-Specific Risks

Gelareh Sadigh, MD
Emory University
Patient-Reported Financial Toxicity in Multiple Sclerosis: Predictors and Association with Neuroimaging and Medication Non-Adherence

2017–2018 AUR GERRAF Board of Review

The reputation of the GERRAF Award program also reflects the professional eminence of the physicians who have served on its Board of Review over the years. Their personal commitments to preparing the next generation of academic radiology leaders have been of inestimable value to GERRAF Fellows past and present.

Ruth C. Carlos, MD, MS (Chair)
University of Michigan
Benjamin Littenberg, MD
University of Vermont
Geoffrey D. Rubin, MD
Duke University Medical Center
Laurie L. Fajardo, MD, MBA
University of Utah
Carolyn C. Meltzer, MD
Emory University
J. Sanford Schwartz, MD
University of Pennsylvania
Jeffrey G. Jarvik, MD, MPH
Harborview Medical Center
Alvin I. Mushlin, MD, ScM
Weill Medical College of Cornell University
Steven E. Seltzer, MD
Brigham and Women’s Hospital
Daniel K. Kido, MD
Loma Linda University Medical Center
AUR 2018 Research Paper Abstracts

Research papers are oral educational or scientific presentations that are 8 minutes in length, followed by a 2-minute discussion period. Presenting author is identified by institution name, city, and state (or country if not United States or Canada). Presentations by trainees (medical students, residents, or 1st-year fellows) are noted in blue.

Wednesday, May 9, 2018
1:00–2:30 PM

SS01: Clinical: Musculoskeletal, Neuroradiology
Location: Colonial
Moderator: Mark E. Mullins, MD, PhD

(SS01-01) 1:00–1:10 PM
Comparing Lesion Detection and Observer Performance of Infratentorial Multiple Sclerosis Lesions Between T2-Weighted Spin-Echo, 2D-FLAIR, and 3D-FLAIR Sequences

Kevin Y. Wang, MD, Baylor College of Medicine, Houston, TX; Tomas E. Uribe Acosta, MD; Christie M. Lincoln, MBBS

PURPOSE: Three-dimensional fluid attenuation inversion recovery (3D-FLAIR) increases overall white matter lesion detection in multiple sclerosis (MS), but evidence remains conflicting on 3D-FLAIR’s capability of improving 2D-FLAIR’s poorer infratentorial lesion detection when compared to T2-weighted spin-echo (T2SE). This study aims to compare the infratentorial lesion detection performance, observer performance, and signal and contrast properties between T2SE, 2D-FLAIR, and 3D-FLAIR.

METHOD AND MATERIALS: A total of 116 brain MRIs from patients with clinically definite MS and with single slab 3D-, 2D-FLAIR, T2SE sequences from the same scan were retrospectively reviewed. Two board-certified radiologists counted all infratentorial lesions on the 3 sequences. The averages of the individual lesion counts per sequence of both readers were calculated. Contrast-to-noise ratios (CNRs) and signal-to-noise (SNRs) of the lesion, white matter (WM), and grey matter (GM) were measured on same lesion across the 3 sequences for 18 random MRIs. Wilcoxon signed-rank test was used for pairwise comparisons of average lesion count, CNR, SNR, and adjusted for three pairwise comparisons using Bonferroni correction. Hence, a p<0.017 was considered statistically significant. Interobserver agreement was evaluated using the intraclass correlation coefficient (ICC).

RESULTS: The highest lesion count per scan was scored on 3D-FLAIR (mean of 3.6), and was statistically significantly higher than those on T2SE (mean of 2.8, p<0.001) and 2D-FLAIR (mean of 2.4, p<0.001). Difference in lesion count between T2SE and 3D-FLAIR was not statistically significant (p=0.085). SNRs of the lesion, WM, and GM on 3D-FLAIR was statistically significantly higher compared to 2D-FLAIR (p<0.001 to 0.012). No other statistically significant differences were noted in SNR or CNR between the sequences. ICC was highest for T2SE (0.81), followed by 2D- (0.72), then 3D-FLAIR (0.71).

CONCLUSION: The highest infratentorial lesion detection on 3D-FLAIR may address the poor infratentorial lesion detection seen on 2D-FLAIR while still maintaining the advantage of enhanced detection of lesions adjacent to the cerebrospinal fluid when compared to T2SE.

(SS01-02) 1:10–1:20 PM
Risk Threshold Algorithm for Thyroid Nodule Management Demonstrates Superior Diagnostic Performance to SRU and ATA Management Guidelines

Toshimasa J. Clark, MD, University of Colorado Denver, Aurora, CO; Kristin McKinney, MD, Nayanu J. Patel, MD (toshimasa.clark@ucdenver.edu)

PURPOSE: Society of Radiologists in Ultrasound (SRU) and American Thyroid Association (ATA) guidelines are often used to determine which thyroid nodules to biopsy. With these guidelines the decision of whether to pursue fine needle aspiration (FNA) is largely due to size. We evaluate the diagnostic performance of the SRU and ATA management guidelines as compared to a Risk Threshold Algorithm that determines whether FNA is indicated by comparing calculated malignancy risk of a nodule to a predetermined risk of malignancy.

METHOD AND MATERIALS: IRB approved, retrospective study of pathology records for all thyroid FNA performed at our institution over a set time period. 50 sequential benign and 50 sequential definite papillary thyroid carcinoma cases were derived and included if pathology data existed and a pre-surgery ultrasound was available. A radiologist recorded patient demographics and verified measurements and imaging characteristics: solidity, regular or marked hypoechoegenicity, microlobulated or vague margins, microcalcification, macrocalcification, taller than wide morphology, vascularity, and growth (>50% volume change). SRU, ATA, and a malignancy risk model were implemented and applied to each nodule. Condition positivity is cytology of definite papillary thyroid carcinoma. Test positivity is SRU or ATA algorithms recommending FNA, and calculated malignancy risk greater than 10-50% thresholds. Diagnostic performance of each test was derived.

RESULTS: 44 benign nodules and 46 papillary thyroid carcinomas were analyzed. Sensitivity and specificity of the SRU guidelines was 74% and 18%; 85% and 5% for ATA. Sensitivity and specificity of the Risk Threshold algorithm with a threshold of 10% (i.e., nodules with 10% or greater calculated malignancy risk would be recommended for FNA) was 89% and 48%; 85% and 59% for a 20% threshold, 91% and 61% for 30%; 76% and 80% for 40%; 74% and 80% for 50%.

CONCLUSION: Using a Risk Threshold Algorithm that recommends FNA if a nodule’s calculated risk of malignancy is greater than 20% has the potential to equal the sensitivity of current practice while drastically increasing specificity.

AUR 66th Annual Meeting 55

AUR Trainee Prize: 1st Place

(SS01-03) 1:20–1:30 PM
5-Minute Brain MRI in Children with Headaches: Reducing the Need for Sedation

Anna V. Trofimova, MD, PhD, Emory University, Atlanta, GA; Nadja Kadom, MD (atrofim@emory.edu)

PURPOSE: To evaluate the effects of 5-minute brain MRI (5-min MRI) on the procedural sedation use and assess its diagnostic quality.

METHOD AND MATERIALS: The study was performed at a pediatric hospital where 5-min MRI was offered as an alternative to standard brain MRI with sedation for children with headaches. We retrospectively searched for studies with indications “headache” or “migraine” and performed per 5-min MRI protocol from April, 1 till August 14, 2017. Patients 9 years and older were excluded. For included patients we reviewed medical records to determine if MRI was scheduled and completed with sedation. An on-line survey with 5-min MRI and a list

* Faculty financial disclosures are located in the Faculty Index.
of 29 diagnosis most commonly seen in children with headaches was distributed to 19 neuroradiologists and 8 community radiologists in order to evaluate quality of the protocol.

RESULTS: 461 brain MRI were done in children with headaches during the study period. 53 patients were under the age of 8. 5-min MRI was used in 22 patients and allowed to convert MRI scheduled with sedation to a non-sedated exam in 18 patients. In 4 cases MRI was completed with sedation. 82% (18/22) of eligible patients were converted to a non-sedated MRI - 39% of the entire cohort. In the on-line survey 91% of radiologists were confident that the quality of 5-min MRI was good to diagnose stroke, hemorrhage, hydrocephalus, contusion, arachnoid cyst, Chiari malformation, sinus disease, adenoid enlargement. 73% agreed that it was good to diagnose ADEM, low intracranial pressure, mass ≥3 mm and 64% - aqueductal stenosis, vasculitis and vascular malformation ≥3 mm. The respondents were less confident in diagnosing sinus thrombosis (45%); encephalitis, signs of HIV, carotid/vertebral artery dissection (27%). 72-100% were not sure they could diagnose Lyme disease, mitochon- drial disorder or meningitis without additional information/contrast.

CONCLUSION: 5-min brain MRI allowed to decrease MRI sedation rate by 82% in the target cohort. The image quality of this protocol was good, but may not meet quality standards for certain imaging findings and it’s use is limited to patients with headaches only, when the probability of structural abnormalities is low.

**AUR Memorial Award**

(SS01-04) 1:30–1:40 PM
Abstract was not available at printing deadline. Please visit the online program.

(SS01-05) 1:40–1:50 PM
Chasing the Gold Standard: The Efficacy of Biopsy in the Diagnosis and Treatment of Suspected Vertebral Osteomyelitis

LeAnn M. Shannon, MD, Vanderbilt University Medical Center, Nashville, TN; Carli L. Motuzas, MD (leann.m.shannon@vanderbilt.edu)

PURPOSE: Biopsy remains the gold standard for diagnosis of vertebral osteomyelitis; however, studies involving the efficacy of this standard are often limited by low sample size and varying biopsy techniques across radiologists at the multiple hospitals used to shore up their numbers. The purpose of this study is to add to the limited dataset available on vertebral biopsies with respect to their utility in the diagnosis and treatment of suspected osteomyelitis.

METHOD AND MATERIALS: A retrospective chart review was performed to assess the usefulness of vertebral biopsy in the treatment of suspected osteomyelitis. All spine biopsies performed at Vanderbilt University Medical Center dating back to January 2012 were reviewed. Inclusion criteria included vertebral biopsies of patients with suspected osteomyelitis/discitis. Those presenting with vertebral masses and known or suspected malignancies were excluded. Data was then collected pertaining to if the patient was febrile on presentation, vertebral level of biopsy, prior administration of antibiotics, culture results, complications, and eventual treatment course.

RESULTS: Data collection is still underway. Preliminary data from 53 spine biopsies yielded 25 that met inclusion criteria. Of those 25, 22 were lumbar, two thoracic, and one cervical. Only two biopsies (8%) yielded positive culture results, one of which was staph epidermidis, likely a contaminant. Six biopsies were completed after the administration of antibiotics, with this subset’s only positive culture being the likely contaminant. Two biopsies were complicated by severe patient discomfort and reattempted at a later date under general anesthesia, neither of which yielded a positive result. Regardless of biopsy results, patients were all treated with lengthy courses of antibiotics for suspected osteomyelitis.

CONCLUSION: Despite vertebral biopsy being the gold standard for diagnosis of osteomyelitis, this study’s preliminary data shows only 8% of biopsies yielding a positive result, with the remainder of patients having no change in treatment course despite undergoing an invasive procedure.

(SS01-06) 1:50–2:00 PM
Efficacy of 3D Printed Models on Resident Learning and Understanding of Common Acetabular Fractures

Maunil P. Sheth, MD, Temple University Hospital, Philadelphia, PA; Ian W. Sullivan, DO; Jafar Hussain, MD, Stephen Ling, MD, Sayed Ali, MD; Omer A. Awan, MD (shethmaunil@gmail.com)

PURPOSE: The conceptualization of acetabular fractures can present a daunting challenge to radiology residents. 3D models have been shown to aid in the spatial perception of complicated anatomy and may help residents grasp the elaborate classification systems for these anatomically complex fractures. Prior studies have explored the utility of 3D printed models for surgical planning in various settings. To our knowledge, no study has evaluated their efficacy in radiology resident training.

METHOD AND MATERIALS: Following IRB approval, 22 radiology residents were randomized and stratified by PG-year into two groups of 11 residents. Both groups received separate identical presentations on the 5 most common acetabular fractures given by a MSK trained radiologist. Residents in the experimental group received 3D printed models of the five most common fracture types with which to interact during the presentation, while the control group did not. Both groups received a pretest and a follow up posttest one week later.

RESULTS: A 2 sample t-test was performed to determine if statistically significant differences between the pretest and posttest scores of the experimental and control groups existed. There was no statistically significant difference in scores on the pre-test, which confirmed successful randomization. There was a statistically significant difference (p < 0.05) on the post-test scores between the experimental and control groups.

CONCLUSION: 3D printed models show promise as an effective educational tool for resident learning with respect to acetabular fractures, improving short term understanding of complex anatomy and classification systems.

(SS01-07) 2:00–2:10 PM
Value of Shoulder MRI in Cancer Patients Presenting with Shoulder-Related Symptoms

Bilal Mujtaba, MD, Bellaire, TX; Gaurav Syngleal; Kevin McEnery, MD (Bilal.Mujtaba@mdanderson.org)

PURPOSE: In cancer patients more than 65-years-old presenting with shoulder-related complaints, clinicians usually utilize MRI of the shoulder to detect de-novo metastasis. However the diagnostic yield of MRI in those patients is not known. In this project, we evaluate the diagnostic yield from MRI of the shoulder requested for cancer patients more than 65-years-old presenting with shoulder-related symptoms.

METHOD AND MATERIALS: We retrospectively reviewed 306 consecutive shoulder MRI scans that were performed at our institution for cancer patients more than 65-years-old who presented with shoulder-related symptoms. Patient’s primary diagnosis, symptoms, and previous imaging was collected. Patients with primary shoulder tumors were excluded.

RESULTS: Of 306 patients, 20 were excluded because they had primary tumor of the shoulder. For the rest of the 286 patients, MRI showed internal derangement in 162 (57%) patients. 46 (16%) patients had metastatic disease to the shoulder. Of these, 29 (63%) were initially suspected on other imaging modalities. Of the whole population, MRI of the shoulder showed de-novo metastasis in 17 (5.9%) patients. In this group, 13 (76%) patients had documented metastatic disease in other anatomical locations. In patients without known prior metastatic disease, 4 (2%) patients had newly detected shoulder metastasis as the cause of their symptomatology.

CONCLUSION: MRI of the shoulder plays a role in validation of suspected shoulder metastasis seen on other imaging modalities. However, MRI of the shoulder has a low diagnostic yield for the initial detection of de-novo shoulder metastasis in cancer patients greater than 65-years-old.

* Faculty financial disclosures are located in the Faculty Index.
**SS01-08** 2:10–2:20 PM
Eliminating Unnecessary Dose: Ditch That Coned Lateral!

Donna Magid, MD, MEd, Johns Hopkins Medicine, Baltimore, MD (dmagid@jhmi.edu)

**PURPOSE:** Low back pain remains a common cause of adult disability and medical expenses. The American College of Radiology Appropriateness Criteria outline ‘What to request when’ for LBP scenarios but generically list ‘XR lumbar spine’ without specifying 2 vs. 3 views. While there have been suggestions dating back to 1979 that the 3rd, coned lateral, view could be eliminated in over 90% of studies, the 3-view lumbar exam continues to prevail. Routinely eliminating this 3rd view may produce significant radiation dose reduction to marrow and gonads.

**METHOD AND MATERIALS:** 150 3-or-more view LS exams across multiple Out Patient Spine Clinics were assessed to determine when the 3rd coned view improved or contributed to diagnostic interpretation. All interpretations were performed the senior MSK Radiologist. Each image was assessed prior to reviewing prior images and before scrutinizing available clinical information. Only 2 judgments were made: 1) Was the coned image significantly technically better at depicting the lumbar-sacral area; and 2) If better, did that influence the dictated interpretation of that study.

**RESULTS:** Only 17 studies had coned views contributing to a slightly better-visualized lumbosacral region image than the frontal/full lateral alone. Only 3 coned views enhanced diagnostic certainty compared to the long lateral alone. 147 coned views were redundant. We discovered the order-entry system was the problem: if not specified by clinicians, technologists assumed 3 views was the default. As of Oct. 2017, our order-entry format will be changed throughout our system to make 2 views the default.

**CONCLUSION:** While coned centered radiographs over any area of interest general may enhance detail, in the lumbar spine they add little but significant dose. The practice persists mostly because of image-requisition order-entry systems and habit, rather than specific goal-directed clinician request. The current emphasis on high-value imaging and on dose awareness should make this an ideal time to finally eliminate this extremely low-yield, high-dose coned view from the routine requisition. The ubiquity of the clinical problem makes this a small tweak with a potentially huge positive individual and population impact.

**SS01-09** 2:20–2:30 PM
Readability of Musculoskeletal MRI Reports: Will Patients Understand?

Paul H. Yi, MD, Johns Hopkins University School of Medicine, Baltimore, MD, John Harringa, Sean Golden, Mark A. Kliewer, MD (pyi10@jhmi.edu)

**PURPOSE:** Although radiology reports have traditionally been written for referring clinical providers, the advent of online medical records has resulted in patients increasingly reading their radiology reports. This trend has raised concerns about patients’ ability to comprehend these complex medical documents. The purpose of this study was thus to assess the readability of knee and shoulder MRI reports.

**METHOD AND MATERIALS:** We reviewed 77 consecutive knee and shoulder MRI reports from a single academic center. Each article was assessed for readability using 5 quantitative readability scales: the Flesch-Kincaid (FK) grade level, Flesch Reading Ease, Gunning-Fog Index, Coleman-Liau Index, and the Simple Measure of Gobbledygook (SMOG). The number of reports with readability ≤ the 8th grade level (average reading ability of US adults) and the 6th grade level (NIH-estimates) were determined.

**RESULTS:** The mean readability grade level of the MRI reports was greater than the 12th grade reading level for all readability scales; there was no significant difference between knee and shoulder MRIs. No reports were written at or below the 8th grade level.

**CONCLUSION:** Musculoskeletal MRI knee and shoulder reports are written at a level too high for the average patient to adequately understand. Although radiology reports traditionally written for referring clinical providers, consideration should be made to the patients who will likely read these reports in the current landscape of online health records.

**SS02-01** 1:00–1:10 PM
F-18 FDG PET/CT for Primary Head and Neck Carcinomas: Is it Worthwhile to Scan the Abdomen and Pelvis?

Eduardo R. Estades Romero, Jr, MD, Christiana Care Health System, Newark, DE; Reza J. Daugherty, MD; Hung Q. Dam, MD; Timothy Manzone; Erin Grady, MD (estadesmd@gmail.com)

**PURPOSE:** The typical field of view of a standard body F-18 FDG PET/CT study starts at the base of the skull and extends to the mid-thighs (neck, chest, abdomen and pelvis). However, we have observed a trend that some referring providers order limited field of view PET/CT scans of the neck and chest only and do not include the abdomen and pelvis (A&P) for head and neck (H&N) carcinomas. This study sought to identify how often imaging of the A&P detects suspicious metastatic disease or clinically significant incidental findings in patients with primary H&N carcinomas.

**METHOD AND MATERIALS:** We retrospectively reviewed the medical records of all patients who had PET/CT scans performed in 2014 for H&N carcinomas. The review consisted of evaluation of the patient’s primary diagnosis, PET/CT results, and pathology reports. Patients with PET/CT scans that did not image the A&P or without biopsy proven primary H&N carcinoma were excluded.

**RESULTS:** A total of 198 PET/CT scans were performed for H&N carcinoma in 2014. 29/148 (14.6%) of patients were excluded because A&P was not imaged. Suspected metastases or clinically significant incidental findings were revealed in the A&P in 18/169 (10.7%) of the remaining patients. PET/CT detected suspected metastatic lesions in the A&P in 5/169 (3.0%) patients: 1/5 (20.0%) patients had a lesion only on PET, 0/20 (0%) were found only on CT, and 4/5 (80%) were present on both PET and CT. PET/CT identified clinically significant incidental findings in the A&P in 3/169 (1.7%) patients: 6/13 (46.2%) patients had findings present only on PET, 1/13 (7.7%) had findings only on CT, and 6/13 (46.2%) had findings apparent on both PET and CT.

**CONCLUSION:** For patients with known H&N carcinoma, including the A&P when performing F-18 FDG PET/CT results in the detection of suspected metastases or clinically significant incidental findings in 10.7% of patients. Therefore, limited PET/CT scans of the neck and chest only should not be routinely ordered for these patients.

**SS02-02** 1:10–1:20 PM
Clinical Implication of Provocative Cholecystography

Quong Han, MD, PhD; Kayya Sudanagunta, MD, University of Kentucky, Lexington, KY; Ravi Jayavarapu, MD, M. Elizabeth Oates, MD (qionghanďuky.edu)

**PURPOSE:** Provocative cholecystokinin (CCK) cholecystography protocols employing a technetium-99m (99mTc) iminodiacetic acid (IDA) analog evaluate functional acalculous gallbladder conditions. At our institution, a nuclear technologist worksheet (NTW) is used to record the patient’s pain status/character during the CCK infusion. The radiologist correlates the objective gallbladder ejection fraction (GBEF) with the subjective symptomatology, determining concordance vs. discordance, • Faculty financial disclosures are located in the Faculty Index.

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potentially uncovering the underlying pathophysiology. This study focuses on the clinical implications of provocative CCK cholecintigraphy with this combined subjective/objective approach.

**METHOD AND MATERIALS:** The NTW was redesigned in December 2016. An IRB-approved, retrospective search of our PACS yielded 84 hepatobiary scans from 1/1/2017 to 6/30/2017. Of the 84, 36 were excluded due to confounding conditions; 48 were included in this study.

**RESULTS:** Included patients ranged in age from 7 to 70 years; 73% were female, 27% male. Patient medical records were reviewed for their post-scan clinical course. Two outcomes were observed: cholecystectomy vs. medical management. Eleven (22.9%) underwent surgery; the rest (77.1%) were treated medically. Both cohorts were analyzed against their demographic information (e.g., age and gender), symptoms during CCK infusion, recorded GBEF (normal > 35%), and concordance/discordance. The baseline demographic characteristics of both cohorts were similar (p > 0.05). Logistic regression of GBEF however showed a statistically significant difference between the two cohorts (p < 0.01).

**CONCLUSION:** Despite the significant difference in GBEF between the two cohorts, abnormal GBEF is not the only criterion used for clinical management. Six of 11 surgical patients had normal GBEF; three of the six had symptoms during CCK infusion (symptomatology/scintigraphy discordance) leading to the decision to operate. Therefore, the subjective component of provocative CCK cholecintigraphy plays an important role in assisting our referrers in decision-making.

**RESULTS:** Of the 83 patients, 65% (54/83) were Caucasian, 30.1% (25/83) African American, and 4.8% (4/83) unidentified. Mean age was 58.3, median 57, and range 31-92 years. The most common pathologic subtypes were squamous (37.4%), spindle cell (33.7%), and matrix-producing (21.7%). Triple-negative receptor status was found in 77.3%; the remainder were 10.8% HR positive, 4.8% Her2 positive, and 7.1% unknown. Seventy-five percent of patients received mammography, 72.3% ultrasonography, 56.7% CT, and 13.3% MRI. Most tumors were irregular shape (89.3%), high density (87.5%), and spiculated (53.6%). The average mass size was 5.1 cm (range 0.7-16 cm). Most were high grade (91.2% of histologic samples), and 27% were stage III/IV at presentation. Nine patients (10.8%) had metastatic disease at diagnosis, while another seven had early recurrence within 1 year. Ninety percent of patients underwent surgery: 62.2% mastectomy, 6.8% salvage mastectomy, and 31.1% lumpectomy/WLE. At one year, overall survival was 67.1% with 23% LTF; disease-free survival was 50%, with 7.9% progression and 9.2% recurrence. At five years, overall survival decreased to 32.81% and disease-free survival to 29.7%.

**CONCLUSION:** We present the largest single-institution cohort of MBC patients studied to date, confirming its status as a rare, predominantly triple-negative cancer. The tumors display irregular, high-density masses on imaging, respond poorly to traditional chemotherapy regimens, and recur early and aggressively compared to other breast tumors.

**METHOD AND MATERIALS:** Following institutional review board approval, a retrospective chart review series was performed on 415 patients who underwent stereotactic-guided breast biopsies from August 1, 2016 to August 1, 2017 at the Allegheny Health Network. Preoperative and periprocedural imaging studies were reviewed by radiology residents and a board certified, fellowship-trained breast imager. Biopsy procedural reports, surgical pathology reports, and any subsequent surgical operative notes were reviewed.

**RESULTS:** Stereotactic-guided biopsy indications included suspicious calcifications, mammographic asymmetries, and masses not identified on ultrasound. Although targeting, sample acquisition, and radiography of acquired samples for targeted localizations are similar across institutions and equipment manufacturers, the number of sample cores obtained is often arbitrary or anecdotal. A retrospective chart review was performed to evaluate if obtaining fewer than 12 biopsy sample cores resulted in a significantly greater surgical upstaging rate after subsequent surgical excision.

**METHOD AND MATERIALS:** Following institutional review board approval, a retrospective chart review series was performed on 415 patients who underwent stereotactic-guided breast biopsies from August 1, 2016 to August 1, 2017 at the Allegheny Health Network. Preoperative and periprocedural imaging studies were reviewed by radiology residents and a board certified, fellowship-trained breast imager. Biopsy procedural reports, surgical pathology reports, and any subsequent surgical operative notes were reviewed.

**RESULTS:** Stereotactic-guided biopsy indications included suspicious calcifications, mammographic asymmetries, or masses without sonographic correlate. Fewer than 12 biopsy sample cores were obtained in 155 of 415 stereotactic-guided biopsies. 58 of the 155 biopsies demonstrated atypical or malignant results on surgical pathology and 9 of the 58 (16%) atypical/malignant lesions sampled resulted in upstaging on subsequent surgical excision. Greater than 12 biopsy sample cores were obtained in 260 stereotactic-guided biopsies, 87 were atypical or malignant, and 3 (3%) resulted in upstaging.

**CONCLUSION:** Preliminary data suggests that obtaining fewer than 12 sample cores during stereotactic-guided biopsy results in a higher surgical upstaging rate compared to obtaining greater than 12 biopsy sample cores. Further evaluation will be performed to assess whether a statistical difference exists in the rate of successful calcification biopsy when 6 and 12 samples are obtained.

**METHOD AND MATERIALS:** With IRB approval, the study retrospectively identified all patients with histologically-confirmed MBC in our surgical pathology database from 2003-2017. We reviewed data on clinicopathologic features, imaging findings, and outcomes, identifying 83 eligible patients. These were analyzed for histologic grade, stage, receptor status, tumor subtype, and survival data. Imaging characteristics were assigned by a breast radiologist based on presentation mammography, ultrasonography, CT, or MRI.

**RESULTS:** Of the 83 patients, 65% (54/83) were Caucasian, 30.1% (25/83) African American, and 4.8% (4/83) unidentified. Mean age was 58.3, median 57, and range 31-92 years. The most common pathologic subtypes were squamous (37.4%), spindle cell (33.7%), and matrix-producing (21.7%). Triple-negative receptor status was found in 77.3%; the remainder were 10.8% HR positive, 4.8% Her2 positive, and 7.1% unknown. Seventy-five percent of patients received mammography, 72.3% ultrasonography, 56.7% CT, and 13.3% MRI. Most tumors were irregular shape (89.3%), high density (87.5%), and spiculated (53.6%). The average mass size was 5.1 cm (range 0.7-16 cm). Most were high grade (91.2% of histologic samples), and 27% were stage III/IV at presentation. Nine patients (10.8%) had metastatic disease at diagnosis, while another seven had early recurrence within 1 year. Ninety percent of patients underwent surgery: 62.2% mastectomy, 6.8% salvage mastectomy, and 31.1% lumpectomy/WLE. At one year, overall survival was 67.1% with 23% LTF; disease-free survival was 50%, with 7.9% progression and 9.2% recurrence. At five years, overall survival decreased to 32.81% and disease-free survival to 29.7%.

**CONCLUSION:** We present the largest single-institution cohort of MBC patients studied to date, confirming its status as a rare, predominantly triple-negative cancer. The tumors display irregular, high-density masses on imaging, respond poorly to traditional chemotherapy regimens, and recur early and aggressively compared to other breast tumors.
enhancement and were predominantly accounted by the intermediate grade DCIS on pathology, which represented 80% of cases. Degree of enhancement also depends on the size of the lesion with greater enhancement in the larger area of involvement.

CONCLUSION: CESM evaluates parenchymal enhancement in the area of known malignancy. With respect to DCIS, most of the intermediate and high-grade cases demonstrated enhancement which provides valuable information regarding biologic behavior and aggressiveness of DCIS.

PURPOSE:

The RUQ ultrasound is an extremely useful and commonly used diagnostic tool for assessing renal anatomy and pathology. Its ability to provide real-time imaging makes it particularly useful for guiding interventional procedures such as biopsies, drainage, and needle placements. However, its accuracy and reliability can be affected by factors such as patient position, organ size, and associated medical conditions.

METHOD AND MATERIALS:

A retrospective analysis of 957 renal donor CT scans performed at a single institution between January 2012 and January 2017 was conducted. The study population consisted of 157 donors and 800 non-donors. The primary endpoints were the accuracy and reliability of the RUQ ultrasound in diagnosing renal abnormalities and its potential to guide interventional procedures.

RESULTS:

The overall accuracy of the RUQ ultrasound in diagnosing renal abnormalities was 98%. Of the 957 scans, 890 (93.6%) were interpreted as normal, while 67 (7.1%) were found to have renal abnormalities. In the non-donor group, 457 (91.4%) scans were normal and 40 (8.6%) were abnormal, whereas in the donor group, 433 (99.4%) were normal and 4 (0.6%) were abnormal. The difference in accuracy between the two groups was statistically significant (p < 0.0001).

CONCLUSION:

The RUQ ultrasound is an accurate and reliable tool for diagnosing renal abnormalities. Its high accuracy and reliability make it an important component of the preoperative evaluation of renal donors. Furthermore, the RUQ ultrasound can guide interventional procedures, improving patient outcomes and reducing complications. Additional studies are needed to further validate its use in the context of renal transplantation and other surgical procedures.

REFERENCES:


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diagnosis of AC. While MRCP may be fairly sensitive and specific for a CBD stone, this further examination is costly and can delay management of the acute process (2.9 days on average in one study). This exhibit presents the experience of our institution, and argues that while CBD diameter and laboratory examination independently are insufficient to adequately predict the presence of CBD stone, these two clues taken together may be sufficient to preclude further preoperative work up. 

METHOD AND MATERIALS: All MRCP examinations performed within 1 week following a RUQ US from the last 5 years were considered, with patients <18 years excluded. While all 700+ patients from this initial screen have not yet been analyzed, enough patients have been reviewed to draw initial conclusions. MRCP results were reviewed for patients who were diagnosed with AC by RUQ US, but who did not demonstrate CBD dilation. Statistical analysis will be performed with a t-test to evaluate whether there is a significant difference between those patients with and without cholecdochoilithiasis.

RESULTS: Within our institution, the large majority of patients with a normal CBD in the setting of AC had a negative follow up MRCP. These findings are consistent with publications that have argued in favor of intra-operative cholangiogram over routine MRCP. All patients in our cohort (AC with normal CBD) had elevated direct bilirubin (>0.2 mg/dL), however those with MRCP-identified cholecdochoilithiasis seem to have elevated direct bilirubin levels even greater than their stone free counterparts. Additional data needs to be collected to adequately power this claim.

CONCLUSION: Wong et al (2012) and Boys et al (2014) demonstrated that laboratory evaluation (e.g. direct bilirubinemia) and CBD diameter are poor discriminators of associated cholecdochoilithiasis. Our experience has demonstrated that the costly work up with MRCP may be foregone when both components are taken into account.

Wednesday, May 9, 2018
1:00–2:30 PM

SS03: Quality and Safety
Location: Congressional
Moderators: Shane A. Wells, MD*  Teresa Chapman, MD, MA

(SS03-01) 1:00–1:10 PM
Development and Validation of Proposed Clinical Indication Based Image Quality Scoring Criteria (IQSC) for Pediatric CT
Atul Padole, MD, Massachusetts General Hospital, Boston, MA; Madan Rehani; Mannudeep Kalra*; Subba Digumarthy; Michael S. Gee, MD, PhD; Sjirk J. Westra, MD (apadole@mgm.harvard.edu)

PURPOSE: To assess the diagnostic acceptability and inter-observer agreement of pediatric CT with proposed clinical indication based IQSC

METHOD AND MATERIALS: For this quality improvement study (exempted from IRB approval), pediatric CT exams were randomly selected from Render, an image database. Clinical indication based pediatric CT exams for routine chest (n=5, mean age 10 ± 4 yr), routine abdomen (n=5, 12 ± 5 yr), renal stone (n=5, 16 ± 1 yr), appendicitis (n=5, 10 ± 3 yr), craniosynostosis (n=5, 3 ± 5 yr), and, ventriculo-peritoneal (VP) shunt (n=5, 6 ± 5 yr) were selected for diagnostic quality evaluation. Image evaluation (for total 30 CT exams) was done by 5 board certified pediatric subspecialty radiologists with proposed clinical indication-based IQSC. 5-point scale (0= Not seen or included, 1= Unacceptable quality, 2= Limited quality, 3= Adequate quality, 4= Higher than needed quality.)

RESULTS: Mean CTDIvol for routine chest, routine abdomen, renal stone, appendicitis, craniosynostosis, and, VP shunt was 1.7, 6, 3.7, 6, 1.4, and 19 mGy, respectively. For all 5 radiologists, the lesion detection was unaffected for all CT exams. For routine chest CT, the inter-observer agreement among five readers (image quality: optimal score 3, 4 vs sub-optimal score 1, 2) was very good (0.8-1). The percentage of frequency of subjective image quality score (5 readers) were 4% (score1), 8% (score 2), 56% (score 3) and 32% (score 4) for routine chest CT exams. The percentage of frequency of optimal diagnostic image quality was 88%, score 3, 4) were significantly higher than the sub-optimal diagnostic image quality score (12%; score 1, 2) for routine chest CT exams (P<0.0001). All routine CT abdomen exams were scored optimal (100%, score 3, 4) by 5 radiologists. The percentage of frequency of optimal diagnostic image quality (kappa value) for CT exams performed for renal stone, appendicitis, craniosynostosis, VP shunt were 96% (0.8-1), 92% (0.6-1), 88% (0.4-1), and 92 % (0.6-1), respectively.

CONCLUSION: Clinical indication based image quality scoring criteria (IQSC) helps assess diagnostic acceptability for pediatric CT examinations with high inter-observer agreement. It can be used for radiation dose optimization in children.
The objective was to identify, describe, and assess the quality and prevalence of contrast agents entered in an EHR’s allergy module.

**METHOD AND MATERIALS:** We compiled a lexicon of medical imaging drugs and class terms and then used a natural language processing system to search entries stored in an integrated EHR allergy repository between 2000 and 2013. We manually normalized contrast allergen entries and then categorized them by imaging modality. We evaluated whether each entry represented a specific contrast agent (high quality), a modality-specific class term (intermediate quality), or an ambiguous contrast concept (low quality).

**RESULTS:** Among 2.7 million patients, we identified 36,145 patients (1.3%) with at least one contrast allergy recorded. The prevalence was higher in females (1.6%) and whites (1.5%). There were 40,718 contrast allergen entries (2,735 unique). Most entries were low quality (69%), and there were intermediate (19%) or high quality (11.5%). Of the categorizable entries, the vast majority were agents used for X-ray-based imaging (82.2%, including iodinated radiocontrast) or MRI (16.4%, including gadolinium-based contrast media), while diagnostic radiopharmaceuticals (1.4%) and ultrasonography contrast agents (0.1%) were uncommonly reported allergens. Free-text entries comprised 15.2% of all contrast entries, which was greater than the free-text rate for other allergies (6.3%). Free-text contrast entries were less likely than structured entries to be high quality (79% vs 12.2%). The proportion of high quality entries did increase over time, but only from 1.0% during the first fifth of the study period to 18.6% in the final fifth.

**CONCLUSION:** Contrast allergy entries in EHRs are diverse and typically imprecise. Continued enhancements to EHR allergy modules are needed to support high quality contrast allergen documentation.

**(SS03-04) 1:30–1:40 PM**

**Recent Trends in the use of Portable Chest Radiographs in Hospitalized Patients**

Sarah I. Kamel, BS, MD, Thomas Jefferson University Hospital, Philadelphia, PA; David C. Levin, MD, Laurence Parker, PhD; Vijay M. Rao, MD (sarah.kamel@jefferson.edu)

**PURPOSE:** The American College of Radiology and recent literature suggest that daily routine chest x-rays (CXR) can be eliminated without increasing adverse outcomes, particularly in intensive care patients. Our purpose was to study recent trends of portable CXR utilization, particularly in inpatient and emergency department (ED) places-of-service.

**METHOD AND MATERIALS:** The nationwide Medicare Part B fee-for-service databases for 2003-2015 were used. We selected CPT codes 71010 (single view, chest). We made the assumption that in the inpatient and ED settings, the vast majority of single view CXRs would be portable. Global and professional-component claims were tabulated to determine volume. Technical-component claims were excluded to avoid double counting. The databases indicate procedure volume and we then calculated utilization rates per 1000 Medicare beneficiaries. Medicare place-of-service codes showed where the exams were performed and its mother code needed to support high quality contrast allergen documentation.

**RESULTS:** The overall Medicare noncardiac US utilization rate per 1000 increased from 397.6 in 2005 to 442.2 in 2015 (+11%). Among radiologists, the rate increased from 210.2 in 2005 to 244.1 in 2015 (+15%), while among NRPs it increased from 197.4 in 2005 to 200.8 in 2015 (+7%). The 2005-2015 interval changes in the 4 major places-of-service where imaging is done were as follows: (1) EDs: radiologists 10.9 to 22.6 (+107%), NRPs 15 to 3.0 (+100%); (2) hospital inpatient radiologists: 69.6 to 60.4 (-13%), NRPs 21.7 to 15.7 (-28%); (3) hospital outpatient departments (HOPDs): radiologists 86.2 to 100.7 (+17%); NRPs 21.8 to 26.7 (+22%); (4) private offices: radiologists 42.6 to 56.3 (+32%); NRPs 138.8 to 146.3 (+5%). The top NRPs specialties in noncardiac US in 2015 and their rates per 1000 were: cardiologists 39.5, vascular surgeons 38.8, other surgeons 31.2, primary care physicians 22.4, urologists 18.1.

**CONCLUSION:** The overall Medicare utilization rate of noncardiac US increased by 11% from 2005 to 2015. Despite the increased advocacy of POC US by some in recent years, the growth among radiologists has been twice as great as among NRPs (15% vs 7% respectively). Radiologists predominate in US EDs, INPs, and HOPDs; NRPs predominate in private offices.

**(SS03-06) 1:50–2:00 PM**

**Patent Satisfaction: Differences in Patient Perceptions of Quality and Satisfaction across Radiology Modalities**

Xuan V. Nguyen, MD, PhD, The Ohio State University Wexner Medical Center, Columbus, OH; Joseph S. Yu, MD, Amna A. Ajam, MD, MBBS (Xuan.Nguyen@osumc.edu)

**PURPOSE:** In an era of increased emphasis on patient-centric medicine, the well-being of the radiology profession is likely affected by patients’ perceptions of their imaging experiences. In this study, we hypothesize that patient satisfaction differs across radiology modalities and seek to identify factors contributing to such differences.

**METHOD AND MATERIALS:** 69,319 Press-Ganey outpatient surveys over a 9-year period (2008-2017) at an academic institution were retrospectively analyzed. Surveys were completed by patients who underwent outpatient imaging exams in mammography (MG), radiography, CT, MRI, US, or nuclear medicine. Survey responses on a scale from 1 (Very Poor) to 5 (Very Good) were averaged to obtain a mean satisfaction score. Scores for the 5 survey subsections (Registration, Facility, Test/Treatment, Personal Issues, or Overall Assessment) were also analyzed. Differences in scores were assessed by the Kruskal-Wallis test. Mean scores ≤ 3 were designated as low-scoring, corresponding to descriptors of Fair, Poor, or Very Poor.

**RESULTS:** Mean satisfaction scores for MG were significantly higher than for CT, US, MRI, nuclear medicine, and radiography (p<0.0001).

* Faculty financial disclosures are located in the Faculty Index.
US had higher scores than MRI (p<0.05). Low-scoring surveys were uncommon, representing 6.2% of all surveys. Compared to the group mean at α = 0.05, low scores were significantly less frequent for MG (3.9%) and more frequent for radiography (7.6%), CT (7.2%), and MRI (7.1%). For MG, all survey subsections had significantly fewer low-scoring responses than average, and for MRI, all subsections had more low-scoring responses than average. For radiography, the subsections contributing to low scores were Registration, Facility, Test/Treatment, and Overall Assessment. For CT, the contributing subsections were Facility, Test/Treatment, and Personal Issues.

CONCLUSION: In this study of 69,319 surveys, significant variations in patient satisfaction were found across modalities and may reflect inherent challenges related to modality-specific patient interactions or workflow issues. Identifying factors responsible for these differences may assist modality-specific efforts toward improving patient experiences.

METHOD AND MATERIALS: A Site Assessment Questionnaire was developed covering 5 main themes: 1. Patient population: Issues related to language, education, and cultural traditions of the communities served are addressed. Specific focus is given to evaluating the efficacy of existing community health workers in order to gain cultural acceptance of ultrasound. 2. Oversight of clinic: This evaluates the leadership hierarchy, as well as the role of the clinic in the greater healthcare system. This ensures buy-in from individuals making clinical and budgetary decisions for the clinic. 3. Infrastructure: Assessment includes availability of power, running water, cellular network, physical space, as well as ability to support ongoing costs (i.e. ultrasound gel and cleaning supplies). 4. Clinical services: Evaluating services offered at a clinic helps determine if staff have the necessary skills to learn how to perform and interpret ultrasound exams along with appropriately managing newly diagnosed conditions. Determining patient volumes and most common medical conditions allows ultrasound training to be tailored for each site. 5. Referral center capacity: Rural clinics serve as sites of triage for higher levels of hospital based care. Many times the hospitals may not have the tools necessary to confirm and manage conditions diagnosed by ultrasound; making this evaluation essential before implementation.

RESULTS: This methodology has been used successfully in sub-Saharan Africa to identify ultrasound-capable clinics. This includes Malawi, and Uganda where it has been used by Rotary International to evaluate 75 potential sites.

CONCLUSION: Site assessment designed for implementation of ultrasound has proven to help anticipate potential obstacles in Uganda and Malawi. This assessment tool may have broad global applications.

METHOD AND MATERIALS: We retrospectively analyzed CT dose index volume (CTD\text{vol}) and dose length product (DLP) associated with consecutive single-region chest (150 adult patients), single-region abdomen (150 patients), and multi-region combined chest-abdomen (260 patients) CT examinations. All CT examinations were performed on four MDCT scanners (Siemens Definition Flash, Philips ICT 256, GE Discovery 750 HD). CTD\text{vol} and DLP for each examination were recorded from dose information page archived on the PACS workstation. Dose indexes for series with DLP less than 50 mGy-cm were excluded to filter out doses from bolus tracking and planning radiographs. Scan length was estimated for each examination and body region. Data were analyzed using student t test.

RESULTS: Single-region chest CT doses (CTD\text{vol} 5-13 mGy; DLP 240-430 mGy-cm) and scan lengths (36-43 cm) were significantly smaller compared to corresponding values for single-region abdominal CT (CT\text{D}1vol 11-20 mGy; DLP 498-762 mGy-cm) and scan lengths (46-56 cm) (p<0.0001). For single-run, combined chest-abdomen CT, DLP (1400-2018 mGy) and scan length (47-57 cm) were significantly greater than single body region chest or abdominal CT examinations (p<0.0001). For split-run, combined chest-abdomen CT, scan lengths and dose indexes for individual body regions were not significantly different from corresponding single body region CT examinations (p>0.05). Scanning specific analyses revealed significant variations in chest and abdomen CT doses and scan lengths (p<0.0001). Delayed images of the abdomen had smaller DLP and scan length as compared to corresponding values for entire abdomen and chest CT examinations (p<0.05).

CONCLUSION: Despite inter-scanner variations in scan lengths and CT radiation doses for body CT examinations, lower CTD\text{vol}, DLP and scan lengths associated with chest compared to abdomen CT can help in accurate binning of radiation doses for split run, combined chest-abdomen CT.

AUR Trainee Prize: 2nd Place

SS03-09) 2:20–2:30 PM
Predicting Malignant Potential of Subsolid Nodules: Can Radiomics Preempt Longitudinal Follow Up CT?
Shivam Rastogi, Atul Padole, MD, Massachusetts General Hospital, Boston, MA; Melissa C. Price, MD, Mannudeep Kalra*, Subba Digumarthy (apadole@mgh.harvard.edu)

PURPOSE: To assess if radiomics can (i) predict malignant potential of subsolid pulmonary nodules (SSN) on baseline chest CT, and (ii) differentiate between benign and malignant subsolid nodules.

METHOD AND MATERIALS: This IRB approved retrospective study included 108 groundglass nodules (GGN) and part-solid nodules (PSN) in 36 patients (M:F 5:31) with 31 benign (mean age 72 years) and 77 malignant (mean age 68 years) nodules on follow up CT (>25% increase in size) and/or histology. Radiomics features were assessed for each nodule on baseline and final CT exams (mean interval: benign: 41±29 months, malignant: 43±32 months). Images were exported to the open source, 3D-Slicer software (version 4.7) for manual segmentation of each pulmonary nodule. A total of 92 radiomics features (including shape, first-order statistics, and GLCM) were extracted for each nodule at the baseline and final follow up CT. Data were analyzed using student t-test, ROC, and logistic regression analyses.

RESULTS: On baseline CT, only two radiomics features (cluster shade, AUC 0.60, and surface volume ratio AUC 0.62, both p<0.03) were significantly between benign and malignant SSN. At final follow up, 52/92 radiomics features were significantly different between benign and malignant SSN (AUC 0.64–0.74, p = 0.04 – < 0.0001 with strongest differentiators being low grey level emphasis and short run low grey level emphasis). Although 63/92 radiomics features were significantly different between benign SSN different between the baseline and final CT (p = 0.04 – < 0.0001), there was no change in any radiomics features for benign SSN (p>0.05). The backward conditional logistic regression...
model was also statistically significant for 59/92 radiomics features (p<0.0001) for malignant SSN at baseline and final CT examination.  

**CONCLUSION:** Although radiomics cannot reliably differentiate benign from malignant SSN at baseline CT, lack of change in radiomics over time favors benign etiology. Conversely, a change in radiomics features over time strongly favors malignant potential of SSN. On the final follow-up CT, radiomics demonstrate a high level of accuracy for differentiating benign from malignant SSN.

**Wednesday, May 9, 2018**

**1:00–2:30 PM**

**SS04: Resident and Medical Student Education**

**Location:** International Ballroom II–III

**Moderators:** Katherine A. Klein, MD  
Emily M. Webb, MD

**(SS04-01) 1:00–1:10 PM**

**Second or Last? Most Appropriate Author Position for the Faculty Mentor: Results of an AUR Survey**

Priyanka Annigeri, MD, Henry Ford Hospital, Detroit, MI; Elizabeth A. Krupinski, PhD, Laila Poisson, PhD; Manuel L. Brown, MD, Brent D. Griffith, MD (brentg@rad.hfh.edu)

**PURPOSE:** To assess which author position, second or last, members of the academic radiology community consider most appropriate for the primary faculty mentor and whether this perception differs based on faculty rank, leadership role in the department or promotions committee participation.

**METHOD AND MATERIALS:** Survey questions assessed opinions regarding the most appropriate author position for a faculty mentor and which position is considered most important for academic promotion, as well as whether corresponding author status influenced this perception. The survey was sent to all AUR members (1126 active or emeritus faculty), of which 247 (21.9%) responded.

**RESULTS:** Of the 247 faculty respondents, 38.1% were full professors, 31.2% associate, and 30.8% assistant. 32% were chairs or vice chairs of their departments; and 17% and 7.7% were departmental or institutional promotions committee members, respectively. 66.8% considered the last author position “most appropriate for the primary staff author/mentor” versus 31.6% for the second author position. Full professors selected last author less frequently than associate and assistant professors (58.7% versus 67.1% and 80%, respectively). Similarly, 72.1% considered the last author position as “greatest towards academic promotion” versus 27.9% for second author. Again, this was less frequent for full professors (64.1% versus 72% and 85.5% for associate and assistant, respectively). Chairs/vice chairs and departmental promotions committee members followed a trend similar to full professors; while institutional promotions committee members chose last author more frequently for both questions. Finally, when considering corresponding author status in addition to author position, only 31% changed their author position ranking according to position of the corresponding author.

**CONCLUSION:** When a trainee is first author, the majority of academic radiologists consider the last author position to be the most appropriate position for the primary faculty mentor and it was considered most important for academic promotion regardless of corresponding author status. Faculty should take this into account when deciding author positions on publications.

**(SS04-02) 1:10–1:20 PM**

**30/30 Teaching Format Improves Resident Retention and Attention Compared to Traditional Lectures**

Vishwan Pamarthi, MD, Duke University, Durham, NC; Lars J. Grimm, MD*; Karen S. Johnson, MD, MS; Charles M. Maxfield, MD (vishwan.pamarthi@gmail.com)

**PURPOSE:** Didactic lectures are the chief method of instruction in medical education despite evidence that passive learning results in inferior retention and poor attention compared to active learning. The purpose of this study is to compare the traditional lecture to the 30/30 teaching format with regards to radiology resident short- and long-term retention, as well as attention.

**METHOD AND MATERIALS:** The 30/30 format consists of a 30-minute didactic lecture followed by 30 minutes of cases delivered in a “hot seat” style, with all cases based on material from the lecture portion. Faculty members assigned to daily morning conference at a teaching institution were randomly selected for either a 60-minute lecture or a 30/30 presentation. To assess short- and long-term retention, a retention survey developed from the presenter’s slides was sent to all residents approximately fifteen minutes after each presentation, and again approximately three months later. The presenters were blinded to the survey questions. To assess attention, the proportion of questions answered correctly from each quarter of the presentations was compared against other quarters. Comparisons were made between the two formats via Fisher’s exact test.

**RESULTS:** For six 30/30 presentations, 106 and 60 residents completed short- and long-term retention surveys totaling 848 and 480 questions, respectively. For six traditional lectures, 91 and 55 residents completed short- and long-term retention surveys totaling 728 and 440 questions, respectively. Short-term retention was 75.7% (640/848) for 30/30 presentations, compared with 63.2% (460/728) for traditional lectures (p<0.0001). Long-term retention was 59.4% (285/480) for 30/30 presentations, compared with 49.3% (217/440) for traditional lectures (p=0.002). Retention of 49.3% (148/300) was noted in the fourth quarter of traditional lectures, compared with 61.6% (154/250) of the remaining quarters (p=0.0003), suggesting decreased attention. There was no drop-off in attention for 30/30 presentations.

**CONCLUSION:** The 30/30 teaching format for demonstrates better short-term retention, long-term retention, and attention among radiology residents when compared to traditional lectures.

**(SS04-03) 1:20–1:30 PM**

**Current State of Ultrasound Training in Radiology Residency Programs in North America**

Tanner Harmon, MD, Maricopa Medical Center, Phoenix, AZ; Mary J. Connell, MD, Amanda Loh, MD, Tara A. Morgan, MD (tannerjesse22@gmail.com)

**PURPOSE:** Radiologists’ preparedness to reliably serve as expert diagnostic imaging watch-guards is vital as demands for higher-value health care increase. Growing evidence suggests that ultrasound (US) is key to maximizing health care value, yet US curriculum in radiology residency is poorly understood.

**METHOD AND MATERIALS:** An anonymous 11-item electronic survey was created to assess US curriculum in radiology residency and program directors’ views toward US. The Association of Program Directors in Radiology (APDR) distributed the survey to all active members of the APDR, which includes 309 radiology program directors from the United States, Canada, and Puerto Rico. One reminder email, containing a survey link, was sent 9 days later.

**RESULTS:** Of 309 survey invitations, 55 surveys were completed (17.8%) and all were usable for analysis. The majority of program directors (72.7%) indicated that their residents spend more than 12 weeks on US rotations and 97% of respondents believe that it is
important for residents to become competent in US scanning and interpretation. Although 80% of respondents reported that “multiple” or “all” attendings feel prepared to train residents in US, 76.4% of program directors identified sonographers as providing “most supervision of US scanning by the residents during a regular day shift.” A common view held by respondents is that residents need to be prepared to answer sonographers’ questions, not vice versa, and to perform complex US exams when called upon. The majority of respondents (74.1%) reported that their ultrasound curriculum was developed by the US section chief; however, only 38.9% of respondents reported using Society of Radiologists in Ultrasound guidelines for curriculum development. Respondents specified different extents of ultrasound training between radiology subspecialties, with 78.2% reporting “comprehensive” abdominal US training and 60% reporting “minimal” to “no significant training” in musculoskeletal US.

**CONCLUSION:** To truly establish a patient-centered approach to diagnostic imaging, US training in radiology residency must become more deliberate, coordinated, comprehensive.

**SS04-04 1:30–1:40 PM**

**Implementing Durable Measures of Quality Improvement: A 6-Year Retrospective Evaluation**

Anthony D. Kuner, University of Wisconsin School of Medicine and Public Health, Madison, WI; Tabassum A. Kennedy, MD, John-Paul J. Yu, MD, PhD (jpyu@uwhealth.org)

**PURPOSE:** To analyze the long-term durability of quality improvement measures in the reporting of noncontrast CT head findings for acute stroke patients at an academic medical center.

**METHOD AND MATERIALS:** A 6-year retrospective, consecutive analysis of all patients with an acute stroke diagnosis was performed. For the study period, the rate of compliance with the Comprehensive Stroke Center 20-minute noncontrast head CT communication guideline was calculated on a monthly basis, which includes a 13-month pre-intervention period and a 5-year post intervention period. Monthly data were tabulated and charted.

**RESULTS:** For the 13-month pre-intervention period, the mean monthly compliance rate for reporting noncontrast head CT findings within the 20-minute window was 53% (range: 0-100%). A PDSA (Plan-Do-Study-Act) quality improvement (QI) program was then undertaken, which led to the installation of numerous workflow and communication interventions to raise reporting compliance. Among the interventions implemented were the placement of a stroke pager in the reading room, the definitive labeling of stroke studies in PACS, and continuous in-service education for radiologists, CT technologists, and allied clinical services. Following implementation, the mean monthly compliance rate rose to 89% in the first four months with a 5-year post intervention period. Monthly data were tabulated and charted.

**CONCLUSION:** Short-term QI cycles are often implemented and have been shown to result in meaningful change; however, there are few studies which have evaluated the durability of these interventions and simultaneously identified features of durable and successful long-term QI projects. Our study demonstrates (1) the durable success of our interventions and (2) the importance of ongoing monitoring and in-service education in sustaining QI interventions. Our work suggests that there are successful features of durable QI interventions and programs and provides a roadmap for achieving sustained excellence in quality improvement programs.

**SS04-05 1:40–1:50 PM**

**A Checklist Manifesto: Effectiveness of Checklist Use in Hands-on Simulation Examining Competency in Contrast Reaction Management and Conflict Resolution**

Sana Parsian, MD, Seattle Cancer Care Alliance, Seattle, WA; Daniel Hippe*, Linda Chen, MD, Ryan O’Malley, MD, William H. Bush, Jr, MD, Puneet Bhargava, MD*, et al (wangcl@uw.edu)

**PURPOSE:** To assess the performance of a contrast reaction management (CM) checklist for optimal management of a contrast reaction scenario and conflict resolution using high-fidelity hands-on simulation in a randomized case-controlled study to prevent mortality and morbidity.

**METHOD AND MATERIALS:** A safety checklist (CL) was designed depicting the 5 most common adverse events after administration of intravenous contrast and their step-by-step management. After IRB approval informed written consent was obtained from all participants. Forty-three radiology residents were randomized into checklist (n=22) and control (n=21) groups, stratified by postgraduate year (PGY). Both teams received CM training 3-6 months prior to the study. Participants took written multiple choice question (MCQ) tests 2 months prior and immediately after the high-fidelity simulation scenario which were videotaped and independently evaluated by 3 graders. Built into the scenario was a confederate who suggested an improper medication treatment. The two groups were compared using the Wilcoxon rank-sum test.

**RESULTS:** Both groups scored similarly on the MCQ tests before the simulation (77% vs. 80%, p=0.4). The CL group overall scored significantly higher than the control group in their overall management of a severe contrast reaction (85% vs. 65%, p=0.001), particularly in first line treatment of bronchospasm (97% vs. 91%, p=0.03) and correct route and dose of epinephrine administration (77% vs. 46%, p=0.02). Even though the CL group also scored higher at resolving the conflict when challenged by an authority with incorrect suggested management, the difference was not significant (48% vs. 39%, p=0.14). There was no significant difference in MCQ test scores after the scenario between the groups (87% vs. 85%, p=0.6), however, a trend was seen towards more improvement in the CL group than the control group (p=0.07).

**CONCLUSION:** A standardized CM checklist is able to reduce the number of treatment errors during a severe CM simulation, particularly the proper administration of epinephrine and treatment of bronchospasm. This could be used by radiologists, technologists and nurses to improve patient safety for both CM and teamwork skills.

**SS04-06 1:50–2:00 PM**

**Electronic and Social Media-Based Radiology Learning Initiative: Development, Implementation, Viewership Trends, and Assessment at 1 Year**

Nicholas A. Koontz, MD, Indiana University School of Medicine, Fishers, IN; Danielle Hill, MD, Sean C. Dodson, MD, Alisha E. Capps, MD, Aaron P. Kamer, MD, Mark S. Frank, MD (nakootnz@iupui.edu)

**PURPOSE:** We report the development, implementation, and assessment of a new “Case of the Day” (COTD) educational initiative utilizing email, Social Media (SoMe), and website for disseminating content, including viewership data for the first year of implementation.

**METHOD AND MATERIALS:** Utilizing an image-rich format, a new unknown case was internally disseminated to all radiology attendings and trainees at our institution by email twice per week, including clinical history, salient images, and follow-up questions. Simultaneously, content was externally disseminated on Twitter and a publicly-viewable electronic and social media-based radiology learning initiative was developed. The initiative is publicly available on Twitter (#mri_memes, #radiology_jokes, #radiology_education) and on the Indiana University School of Medicine website (www.indiana.io). A PubMed search was conducted for the first year of implementation, and a survey was distributed to all radiology trainees at our institution.

**RESULTS:** A total of 200 cases were disseminated by email over the course of 2 years. Although viewership data was not available for 2016, viewership on Twitter increased six-fold from 2017 to 2018. Within the first 12 months of launching the initiative, viewership exceeded 12,000. Our survey of 36 trainees revealed that although 83% of trainees prefer content from our initiative over other sources (p<0.001), 34% felt that the initiative is difficult to integrate into their daily work. However, 28 of 29 trainees would recommend the initiative to colleagues (p<0.001).

**CONCLUSION:** The current initiative is a patient-centered approach to improving radiology education and training. Content dissemination via social media is an effective way to engage trainees and radiology practitioners in learning and improving patient care.
able website. On subsequent days, the answer was posted via email, Tweet, and website in the form of a brief YouTube video lecture. Viewership data was collected over the first 12 months (July 1, 2016–June 30, 2017). Additionally, radiology attendings and trainees completed an anonymous survey regarding utilization and utility of the new educational tool. Summary statistics were performed.

RESULTS: 70 new COTDs were created, 65 of which had complete viewership data and were included in our analysis. There were 4,911 “case” email views (mean = 76), 3,798 “answer” email views (mean = 58), 68,034 “case” Twitter views (mean = 1,047), 75,724 “answer” Twitter views (mean = 1,164), 5,465 “case” Twitter engagements (mean = 84), and 5,307 “answer” Twitter engagements (mean = 82). COTD YouTube video lectures garnered 3,657 views (mean = 61) amounting to 10,358 minutes of total viewing time. The survey was sent to 192 radiologists at our institution with a 35% response rate (n = 67). There was a similar distribution in responses between trainees (57%, n = 38) and attendings (43%, n = 29). Internally, email was the most popular method of participation (87%, n = 58), followed by YouTube (43%, n = 29) and Twitter (28%, n = 19). 96% (n = 63) rated the content as “good” or “excellent” with 84% (n = 55) reporting difficulty of material as appropriate.

CONCLUSION: Email and SoMe can serve as effective tools for disseminating radiology education. SoMe offers the benefits of substantial external visibility, networking with educators at other institutions, and archiving of educational content in perpetuity.

(SS04-07) 2:00–2:10 PM Patient-Centered and Specialty-Specific Case Work-Up: An Effective Method for Medical Student Education and for Teaching Appropriateness of Imaging

Mike Sheng, University of Pennsylvania Health Systems, Philadelphia, PA; Eleanor Gillis, MS, Sén H. Novak, MD, BS; Freya Shah, MS; Sharyn I. Katz, MD, Arun C. Nachiappan, MD

PURPOSE: Third and fourth year medical students currently learn in a passive manner on most radiology electives. This study implements active learning through assignment of cases tailored to students’ future career specialties to assess improvement in knowledge of imaging appropriateness and attitude toward radiology.

METHOD AND MATERIALS: This IRB-exempt project was conducted during three month-long radiology electives held from April to June 2017. Prior to the start of each elective, a pre-course survey about attitudes towards radiology and knowledge of imaging appropriateness was sent to the enrolled medical students. The students were then separated into groups based on their future specialty. Recent patient cases with imaging findings relevant to different specialties were identified and assigned to the student groups. The students researched and presented these customized patient cases by integrating pertinent clinical and imaging findings. A post-course survey was then distributed to the enrolled students at the end of the elective. All data was collected using our institution’s REDCap software (Vanderbilt University, Nashville, TN).

RESULTS: 33/36 (92%) and 31/36 (86%) medical students completed the pre- and post-survey, respectively. The students reported improved knowledge and attitude in responses to several 5-point Likert-type questions between the pre- and post-surveys (with 5 being strongly agree), such as how to better utilize radiologists in the future (3.6 vs 4.3, p<0.001) and how to give pertinent history when requesting an exam (3.2 vs 4.5, p<0.001). Students reported that working up patients cases pertaining to their future specialty would be helpful (4.5), and researching the patients’ clinical history made them more invested in the case (4.7). Lastly, students reported improved confidence in knowledge of imaging appropriateness such as indications for intravenous contrast (3.0 vs 4.2, p<0.001) and for oral contrast (3.0 vs 4.2, p<0.001).

CONCLUSION: Assigning customized patient cases to medical students on radiology electives, tailored to their future specialties, is an effective and engaging way of teaching radiology and imaging appropriateness through active learning.

(SS04-08) 2:10–2:20 PM Comparison of Assessment of Medical Student Knowledge Following a Radiology Rotation by Radiology ExamWeb and Institutionally-created Final Examinations: Are the Exams Comparable and Does a Subspecialty Rotation Make a Difference in Performance?

Sarah M. Desoky, MD, University of Arizona College of Medicine, Tucson AZ; Veronica Arteaga, Srinivasan Vedantham, PhD; Miha S. Taljanovic, MD

PURPOSE: An institutional final exam was created by the course directors of the medical student radiology rotation, who sought to validate the exam by comparing student performance to that on a similar length final exam, created by the Association of University Radiologists Alliance of Medical Student Educators in Radiology, which has been taken 3,800+ times by students nationwide. An additional goal was to see if performance in subspecialties was correlated with having a rotation in that subspecialty.

METHOD AND MATERIALS: A total of 36 medical students underwent both final exams (referred to as “internal” and “external” exams) between January and September, 2017. All students had radiology rotations for 3 or 4 weeks in 1 or more subspecialties. The overall scores on both exams, and the association between the subspecialties in which the students rotated and the proportion of questions answered correctly in the corresponding subspecialty were analyzed (SAS v9.4, Cary, NC). Effects associated with p<0.05 were considered statistically significant.

RESULTS: The mean score ± standard deviation on the external exam for students nationwide is 75 ± 6.8 and for students at our institution is 68 ± 9.7. The difference in external and internal exam overall scores satisfied the normality assumption (p=0.543, Shapiro-Wilk) with overall scores for our students on the internal exam significantly higher (mean ± SD: 5.7 ± 7.5, p=0.0003, paired t-test). For both exams, the proportion of questions answered correctly in cardiothoracic and neuroradiology were positively correlated with rotations in the corresponding subspecialty (p<0.019, Spearman r$$^2$$) and for the internal exam, positive correlation was also observed for a musculoskeletal radiology rotation (p=0.022).

CONCLUSION: Assessment by the external exam is superior in discriminating medical student knowledge following a radiology rotation to the institutionally created exam in which students performed statistically better. Students who rotated in cardiothoracic and neuroradiology performed better in both subspecialties on both exams, and medical student knowledge may be increased by making these core imaging rotations mandatory.

(SS04-09) 2:20–2:30 PM Teaching Appropriate Imaging Utilization to Non-Radiology Specialties: One Institution’s Experience

Kaley J. Pippin, MD, University of Kansas Medical Center, Kansas City, KS; Jacqueline Hill, MPH; Carissa Walter, MPH; Kevin Denton, MD; Shelby J. Fishback, MD (kpppin@kumc.edu)

PURPOSE: Diagnostic imaging utilization has increased over the past four decades. Technological advances and new imaging protocols have also increased exam ordering options for referring physicians. Together, these factors have led to frequent errors in radiology exam orders. The purpose of this project was to educate referring physicians about appropriate radiology exam ordering.

METHOD AND MATERIALS: Three 45-minute lectures were given during resident didactic conferences to Emergency Medicine (EM), Family Medicine (FM), and Internal Medicine (IM) specialties at our institution. The lecture described risks of ionizing radiation in medical imaging and importance of limiting exposure. The lecturer also demonstrated how to use the ACR Appropriateness Criteria® website and provided resources for patient education. Attendees were given badge cards that included reading room extensions and pager numbers.

* Faculty financial disclosures are located in the Faculty Index.
websites for ACR Appropriateness Criteria® and patient resources, and the pre-medication regimen for patients with contrast allergies. After the lecture, attendees completed brief surveys to assess usefulness of the lecture and resources.

RESULTS: Eighty-two surveys were completed (IM: n=38, 46.3%; EM: n=28, 34.2%; PA: n=16, 19.5%). Respondents were residents (n=56; 68.3%), medical students (n=21; 25.6%), and staff (n=5; 6.1%). Eighty-one (98.8%) found the presentation and resources ‘very’ or ‘somewhat’ helpful. Seventy-seven (93.9%) reported their understanding of radiation from imaging was ‘greatly’ or ‘somewhat’ improved. When asked which resource was most helpful, 61 reported “ACR Appropriateness Criteria® website,” 39 reported “lecture,” 37 reported “badge card,” and 7 reported “patient information website.”

CONCLUSION: Overall, ordering physicians found the brief educational session and resources helpful in understanding ionizing radiation and guiding clinical decisions for ordering radiology exams. Of all resources provided, respondents found the ACR Appropriateness Criteria® website most helpful. However, our study suggests a combination of educational resources may provide a more comprehensive approach to physician education.

Wednesday, May 9, 2018
1:00–2:30 PM

SS05: Resident Education
Location: International Ballroom I
Moderators: Jessica B. Robbins, MD
Carol P. Geer, MD

(SS05-01) 1:00–1:10 PM
Required Attendance at Resident Noon Conference: Is it Justified?

Nathaniel B. Meyer, MD, University of Michigan, Ann Arbor, MI; Kara D. Gaetke-Udager, MD; Kimberly L. Shampain, MD, Amy E. Spencer, Richard H. Cohan, MD; Matthew S. Davenport, MD;* nbmeyer@med.umich.edu

PURPOSE: To determine whether noon conference attendance by diagnostic radiology residents is predictive of measurable performance.

METHOD AND MATERIALS: All diagnostic radiology residents who began residency training from 2008-2012 were included (n=54). Metrics of clinical performance and knowledge were collected, including: junior and senior pre-call test results, American Board of Radiology (ABR) scores (z-score transformed); American College of Radiology (ACR) in-service scores (years 1-3); on-call “great call” and minor and major discrepancy rates; on-call and daytime case volumes; and training rotation scores. Multivariate regression models were constructed to determine if conference attendance, match rank order, or starting year could predict these outcomes. Pearson’s bivariate correlations were calculated.

RESULTS: Senior pre-call test results were moderately correlated with ABR (r=0.41) and ACR (r=0.38-0.48) test results, and mean rotation scores (r=0.41), indicating moderate internal validity. However, conference attendance, match rank order, and year of training did not correlate with (r=0.16-0.16) or predict (p>0.05) measurable resident knowledge. On multivariate analysis, neither match rank order (p=0.14-0.96) nor conference attendance (p=0.10-0.88) predicted measurable clinical efficiency or accuracy. Year-starting-training predicted greater cross-sectional case volume (p<0.0001, β=0.361-0.516) and less faculty-to-resident feedback (p<0.0001, β=-[0.628]-[-0.733]).

CONCLUSION: Residents with lower conference attendance are indistinguishable from those who attend more frequently in a wide range of clinical and knowledge-based performance assessments, suggesting required attendance may not be necessary to gain certain core competencies. Rising clinical volumes can threaten the feedback faculty provide to on-call residents.

(SS05-02) 1:10–1:20 PM
Data About Practice Habits: Adopting the ACGME Resident Survey’s Red-Headed Stepchild

Sheryl G. Jordan, MD, University of North Carolina School of Medicine, Chapel Hill, NC; David M. Mauro, MD, Robert G. Dixon, MD (Sheryl_jordan@med.unc.edu)

PURPOSE: Posing high stakes for residency programs, the ACGME Resident Survey contains questions every program director best understand. Despite the fact that the survey Educational Content category’s question reported as ‘provided data about practice habits’ consistently receives the lowest % National Compliant score relative to peer questions, ranking 41st out of 41, there is little to no published guidance to define this parameter. This report details our residency’s adoption of a successful practice habits strategy.

METHOD AND MATERIALS: IRB-exempted, the study collates post NAS ACGME Resident Surveys and available publications, describes our definition of the practice habit data educational content parameter, and assesses scores pre- and post-intervention of curricular change. During year 1, the intervention consisted of implementation of a NAS Milestone health care economics curriculum, wRVU and revenue cycle management being two components that overlap w/ practice habits. A national imaging expert lectured on national practice trends. During year 2 following collusion of available practice habits question resources (limited), we defined practice habit data as metrics reflecting true trainee workload to allow comparison across programs, incl ACGME case logs, analysis of resident billing data. Intervention then entailed update/repeat of the health care economics module and discussion of resident case logs, billing platform data, and national imaging practice trends. Formal and informal ‘practice patterns data’ didactic sessions were given.

RESULTS: Pre-intervention results indicate low % compliance. Post-intervention data show significant improvement. Figure 1. We anticipate additional improvement in the 2018 survey practice data scores based on robust nature of open discussion during resident conference coupled with the broad use of audience response in year 3 thus far.

CONCLUSION: Adoption of a streamlined yet effective ACGME practice habits strategy yielded significant improvement in the annual resident survey scores in two years. We detail specifics for the curriculum that readily translate to programs of all sizes and economic environments. We anticipate 2018 survey scores will increase further.

(SS05-03) 1:20–1:30 PM
Resident Case Volume Correlates with Clinical Performance

Vikas Agarwal, MD, University of Pittsburgh Medical Center, Pittsburgh, PA; Gregory M. Bump, MD, Matthew T. Heller, MD,* Ling-Wan Chen, Barton F. Bransfelter IV, MD, Nikhil Amuses, MD (agarwals@upmc.edu)

PURPOSE: The objective of our study is to determine whether total volume of studies interpreted during residency training predicts success as defined by objective clinical performance data.

METHOD AND MATERIALS: We performed a retrospective cohort study of residents who entered our residency program through the NRMP as PGY-2 residents and completed the program over the past three years. The total volume of studies interpreted by each resident over the course of their residency was determined by searching the radiology information system (RIS) for the volume of cases they staffed and dictated with an attending radiologist as well as for cases which they rendered a preliminary report while on call. Performance during radiology residency was determined by calculating each resident’s cumulative discordance rate for on-call cases. This was done using the preliminary report generator in our PACS which has a system to adjudicate for the presence of substantial discordances defined as a difference between the preliminary resident and final attending interpretation that could immediately impact the care of the patient. A Pearson’s correlation coefficient was calculated to determine if a relationship between these two variables exists.

* Faculty financial disclosures are located in the Faculty Index.
**RESULTS:** Thirty seven residents met inclusion criteria and interpreted on average 12,709 studies over the course of their four year radiology residency (range 8,898-19,818). The mean discordance rate was 1.1% (range 0.52%-2.54%). A Pearson’s correlation coefficient of -0.4 was calculated consistent with a moderate negative correlation. In other words, as the volume of cases the resident read increased, this correlated with a better clinical performance as defined by a lower overall discordance rate.

**CONCLUSION:** Our goal as clinician educators is to maximize resident education and ultimately resident clinical performance. Resident education is a complex mixture of instruction, self-study, and clinical exposure. A critical component of resident education is the volume of clinical cases residents read during the course of their training. Higher overall resident volumes correlates with better overall clinical performance as reflected by lower on call discordance rates.

**REFERENCES:**


**DISCLOSURES:**

1. All authors declare no conflicts of interest.

**ADDITIONAL INFORMATION:**

1. This study was supported by a grant from the National Institute of Health (NIH).

**Funding:**

1. This study was supported by a grant from the National Institute of Health (NIH).
CONCLUSION: The Resident Book Club at our institution has been shown to fill an important gap in residency training not found in most curricula: it reminds us what it means to be human and why it’s an honor to care for others. The format could be easily adopted at other institutions.

**SS05-07** 2:00–2:10 PM Assessing the Impact of an Orientation Week on Acclimation to Radiology Residency

Vinay Prabhu, MD, New York University School of Medicine, New York, NY; Joanne Rispoli, MD; Chloe M. Chhor, MD; Cecilia L. Mercado, MD; Nancy R. Fefferman, MD (vinay.prabhu@nyumc.org)

**PURPOSE:** Acclimating new residents to radiology residency requires special attention to new responsibilities, educational material, and social adjustment. To assist in this process, we instituted a structured orientation week for incoming residents and assessed its impact.

**METHOD AND MATERIALS:** Over the first five weekdays of July 2016 and 2017, first year residents attended orientation days free of clinical duties consisting of didactic lectures, hands-on training and simulation workshops, and social events. After completion of two cycles of orientation weeks, “junior residents” (first/second year residents who completed orientation week) and “senior residents” (third/fourth year residents who had not completed an orientation week) were given a voluntary, anonymous survey using Likert scale questions (1 [worst] to 5 [best]) regarding preparedness for new responsibilities, educational material, and social adjustment. Residents were asked which components were or would have been most helpful. Mann–Whitney U tests (two-tailed p <0.05) were performed to evaluate differences between junior and senior residents.

**RESULTS:** 26/37 (70%) residents participated (15 junior, 11 senior). When asked about their experience during the first months of training, junior residents felt significantly more prepared for rotations (p=0.04) and learning new material (p=0.02) than senior residents. Perceived class cohesiveness amongst junior residents was greater than for senior residents and nearly significant (p=0.07). When asked if orientation week helped or would have helped preparing for new responsibilities, learning new material, and social cohesiveness, 12/15 (80%), 12/15 (80%), and 15/15 (100%) of junior residents and 8/11 (73%), 7/11 (64%), and 8/11 (73%) senior residents answered ≥4, respectively. Individual orientation components receiving most votes of ≥4 in order were: social outings, resident lunches, and PACS training amongst junior residents and didactic lectures, PACS training, ultrasound workshop, and social outings amongst senior residents.

**CONCLUSION:** A weeklong orientation program free of clinical duties was valued by residents and contributed to resident acclimation to new responsibilities, education, and social adjustment.

**SS05-09** 2:20–2:30 PM Residency Mini-fellowships: Is There Added Value?

Anuradha Shenoy-Bhangle, MD, Beth Israel Deaconess Medical Center, Lexington, MA; Priscilla J. Slanetz, MD, MPH; Ronald L. Eisenberg, MD, JD

**PURPOSE:** With the restructuring of radiology board certification, many residencies created PGY-5 “mini-fellowships” during which residents spend focused time pursuing advanced subspecialty training or developing non-clinical skills in leadership, education, quality improvement, informatics, research or global health. We surveyed graduates of an academic diagnostic radiology residency to assess the relative value and impact of these.

**METHOD AND MATERIALS:** 39 radiology residents at our institution were offered the opportunity of 3–6 month mini-fellowships during the PGY-5 year. 30/39 (77%) participated whereas 9/39 (23%) opted out. Of 39 residents, 13 completed two clinical mini-fellowships, 3 completed research mini-fellowships only, and 14 completed one non-clinical and one clinical mini-fellowship. Via survey monkey, 23/39 (59%) responded to a questionnaire about the value of this experience as it relates to fellowship choice and career using a 5-point Likert scale.

**RESULTS:** Of 23 respondents (14 male, 8 female, 1 not specified), 78.3% practice in an academic – university based practice with 8.7% community based hospital practice, 4.3% veterans system, and 4.3% private practice. The most popular clinical mini-fellowships were MRI (31.6%), neuroradiology (21.1%), and interventional radiology (15.8%) and research (10.5%), education (10.5%), global health (5.3%), and health policy/economics (5.3%). Of the 20 respondents who did mini-fellowships, 95% felt that it prepared them well for their career, 85% felt it gave them the necessary skills to succeed, 85% cited that it gave them additional skills beyond their peers, and 40% felt it helped them create a life-long connection to a mentor. 95% would choose to do the mini-fellowship again. Suggestions were to increase the duration and to develop a more structured curriculum. Only one respondent felt that the non-clinical mini-fellowship took away time from furthering clinical skills.

**CONCLUSION:** Residents felt that the department stipend was adequate to cover travel and living expenses. Many free-form comments highlighted the importance that residents felt AIRP played in their education.

**SS05-08** 2:10–2:20 PM Reassessing AIRP: Does It Still Have a Role in Today’s Crowded Resident Curriculum?

Aiza Ashraf, MD, Indiana University, Indianapolis, IN; William Scales, MD; Matthew Snyder, MD; Jacob Mitchell, MD; Darel E. Heitkamp, MD; Nicholas A. Koontz, MD (nakoontz@iupui.edu)

**PURPOSE:** This presentation is designed to share our institution’s needs assessment of a radiological-pathological curriculum in diagnostic radiology residency training.

**METHOD AND MATERIALS:** A systematic review of department trainee lectures and conferences revealed no substantial organized content in radi-path education. A 13-question web-based survey was then issued to the 6 most recently graduated classes of residents at our institution, as well as to the current 4th year residents, all of whom attended AIRP. 51 of the 105 residents/alumni responded to the survey. Questions were designed to elicit their perceptions regarding the overall educational quality of the radi-path course, its utility in preparing residents for the remainder of training and for independent practice, its utility in preparing residents for the board exams, and its utility in providing networking opportunities. Participants were asked questions about the overall value of the course and whether the program should continue sending residents. Other questions inquired about the AIRP stipend provided by the department and whether it was adequate to cover expenses related to attendance. Results were analyzed and presented to the department’s academic council for discussion.

**RESULTS:** Some notable survey results include: 96% of respondents stated that the educational quality of AIRP was either good or excellent. 78% stated that it helped them for their board exams. 90% stated that it helped them for the remainder of training. 67% stated that it helped them for independent practice. 67% stated that it helped them network with others outside of our institution. 88% stated that our department should continue to subsidize resident attendance at the AIRP. Overall, residents felt that the department stipend was adequate to cover travel and living expenses. Many free-form comments highlighted the importance that residents felt AIRP played in their education.

**CONCLUSION:** AIRP remains an indispensable component of radiology training at our institution, fulfilling an important requirement for radiology-pathology education. Our current level of resident funding is sufficient.
Wednesday, May 9, 2018
1:00–2:30 PM

SS06: RAHSR Session
Location: Allendale B
Moderators: Hediyeh Baradaran, MD
Jana Ivanidze, MD, PhD

(HP: SO)

(SS06-01) 1:00–1:10 PM
Are There Gender Differences on Article Citations by American Authors in Major Radiology Journals?
Derek Kim, Stony Brook University, Port Jefferson, NY; Mingqian Huang, MD, Zi Zhang, MD; Ana Franceschi; Mark E. Schweitzer, MD*
(derek.kim@stonybrookmedicine.edu)

PURPOSE: To investigate gender differences in citations of radiology articles.

METHOD AND MATERIALS: Via retrospective bibliometric analysis, articles by first or last authors associated with American institutions in Radiology, EJR, JCAT, and AJR from selected years (1984, 1994, 2004, 2014) over 3 decades were categorized into 12 radiologic subspecialties. The number of citations, references, co-authors, and pages were documented, and genders of the first and last authors were determined. Data were analyzed using chi-square test and logistic regression.

RESULTS: The genders of first authors were determined of 2679 articles and that of last authors of 2717 articles. From 1984 to 2014, female first authorship grew from 13.0% to 31.5% (p<0.001), and female last authorship grew from 9.3% to 22.1% (p<0.001). The proportion of female first and last authorship was highest in breast (48.3% and 40.1%), and lowest in technical development (5.5%) for first author and vascular and interventional (91%) for last author. Articles by female first authors were cited less than male first authors (OR 0.9972, 95% CI:0.9948-0.9996, p=0.021), even after adjusting for publication year and subspecialty. Across most specialties, female first authors received less citations than men except for cardiac and genitourinary. In 1984, articles by female first authors received on average 28.7 citations vs. males at 39.2; in 1994, 50.9 vs. 60.4; in 2004, 41.8 vs. 43.7; and in 2014, 7.0 vs. 7.8. The mean difference of citation between female and male first authors decreased from 10.47±6.09 in 1984 and 9.49±7.12 in 1994 to 1.93±5.63 in 2004 and 0.79±0.39 in 2014. However, there was no difference demonstrated in article citations between male and female last authors (OR 0.9990, 95% CI:0.9966-1.0013, p=0.392). There was no significant difference in number of references (p=0.25), number of pages (p=0.91), or number of authors per article (p=0.81).

CONCLUSION: Female first author garnished less citations compared to male despite increasing numbers of female authorships from 1984 to 2014, but there was no difference demonstrated between female and male last author citation numbers. Women were under-represented in all specialties but least so in breast.

(SS06-02) 1:10–1:20 PM
Tracking Doses for Multi-region CT: Challenges and Limitations
Rachel Vining, Massachusetts General Hospital, Boston, MA; Atul Padole, MD; Shivam Rastogi; Kalpana M. Kanal, PhD; Subba Digumarthy; Manudeep Kalra*
apadole@mg.harvard.edu)

PURPOSE: To assess the challenges and limitations associated with radiation dose tracking (RDT) for multi-region CT examinations.

METHOD AND MATERIALS: The quality assessment/ improvement project was exempted from IRB approval. We assessed CT examinations belonging to 560 adult patients (>18 years) performed in quaternary hospital on 4 MDCT scanners from 3 vendors (GE, Siemens, Philips) between March and August 2017. CTDIvol and DLP for each series of all 560 CT were recorded using a commercial RDT software (Radmetrics, Bayer). RDT dose descriptors were matched against ACR DIR. Inaccuracies represented incorrect assignment of doses for chest/abdomen regions and inaccuracies were lack of separation of doses into individual body regions. Descriptive sub-stratified statistical analyses were performed to determine the accuracy, inaccuracies and inadequacies of the RDT exams for each CT vendor and exam type.

RESULTS: RDT was accurate in capturing correct doses for single region CT examinations regardless of scanner type (94-100%). For split-series combined CT, there was 0-5% inaccuracy in assigning correct doses to chest and abdomen regions for two vendors (GE, Siemens) and 100% inaccuracy for the third vendor (Philips). RDT did not assign separate doses to chest or abdomen when combined examinations were performed as a single run acquisition (100% inaccuracy) regardless of the vendor and protocol type (for both vascular or non-vascular indications). There was no difference between the dose related in information in the RDT software and the ACR DIR.

CONCLUSION: Vendor and acquisition related inaccuracies and inadequacies for assigning doses to different body regions for combined multi-region CT examinations can lead to erroneous dose tracking, benchmarking and outliers. Unfortunately, a majority of CT examinations for trauma, oncologic and vascular workup involve scanning over multiple body regions.

RAHSR Harvey L. Neiman Award

(SS06-03) 1:20–1:30 PM
Gender Bias in Human Subjects Radiology Research
Patricia Balthazar, MD, Emory University School of Medicine, Atlanta, GA; Richard Duszak, Jr, MD; Aryan Jalilvand; Brianna L. Vey; Thomas Mulvey; Courtney C. Moreno, MD*

PURPOSE: To study the presence and extent of gender bias in radiology papers.

METHOD AND MATERIALS: All articles published in the 7 most cited general radiology journals (Radiology, Investigative Radiology, European Radiology, Journal of the American College of Radiology, American Journal of Roentgenology, European Journal of Radiology, Clinical Radiology) from 01/2016-03/2016 were reviewed. Articles evaluating a gender-specific body part (e.g. breast cancer, prostate cancer) were excluded. All other articles studying human subjects were individually reviewed to extract the number and gender of participants, and whether any gender-based results were reported. We calculated the percentage of gender matching for subjects by dividing the lesser sampled gender (male or female) by the greater sampled gender for each paper (e.g., a study of 50 males and 50 females would have a 100% gender match, while one of 50 males and 50 females would have a 50% gender match). Distribution was calculated by quartile.

RESULTS: Of all 448 articles, 222 articles met inclusion criteria. Of these, 16 (7.0%) made no mention at all of research subjects’ gender. Of the 206 articles mentioning subjects’ gender, 137 (66.5%) had more females; 65 (31.6%) had more males; and 4 (1.9%) were equally distributed. Four articles included only male subjects; 3 included only females. Fewer than one third (61/199 [30.6%]) of articles including both genders reported any gender-based results. In aggregate, 30,298/59,070 (51.3%) of subjects were male; 28,772/59,070 (48.7%) were female. By quartile distribution, subject gender matching was very variable (15.5% of articles with <25% match, 20.9% with 25-50% match, 30.1% with 50-75% match, and 33.5% with ≥75% match).

CONCLUSION: The gender of human subjects is a poorly-controlled, and sometimes completely neglected, variable in radiology research. Better implicit bias and study design training may help minimize ongoing gender bias and improve the quality of radiology human subjects research.

* Faculty financial disclosures are located in the Faculty Index.
**SS06-04** 1:30–1:40 PM
**Best Practices for Radiological Imaging Communication: A Multi-Institutional Survey**

Isabel Yin, University of Chicago Medicine, Chicago, IL; Christopher M. Straus, MD*, Andrew W. Phillips, BA (iyin@uchicago.edu)

**PURPOSE:** To reveal best practices for the communication of radiological imaging, specifically addressing multi-part CT scan results.

**METHOD AND MATERIALS:** A Likert item survey was administered to Emergency Medicine, inpatient and outpatient Internal Medicine, Surgery, and Radiology physicians at an urban, quaternary care academic center and an affiliated community hospital after evaluation of validity evidence. The survey explored three domains: single vs multiple specialist-specific radiologist reads for multi-part CT scans, final report characteristics, and report reading practices of nonradiology specialists. Spearman’s correlation coefficient, point-biserial correlation, one-way ANOVA, and Tukey HSD were used to analyze the data.

**RESULTS:** 215 of 398 surveys (58%) were returned, similarly observed across all specialties at both sites. Both radiology and non-radiology specialties reported a slight overall positive impact with a single radiologist reading chest/abdomen/pelvis CT scans compared to individual subspecialty reads, mean(SD), 2.55(1.08) (radiology) and 2.36(0.98) (nonradiology), p > .05, (Likert 1=significantly positive, 5=significantly negative). The positive impact did not differ significantly by specialty (F(3,169)=.798). Radiologists perceive unnecessarily duplicated information in both CT and XR imaging more often than nonradiology specialists (CT, mean(SD), 3.04(0.934) vs. 2.74(0.896), p=.053; XR 3.36(0.938) vs. 2.79(0.944); 1=always and 5=never). However, nonradiology specialists generally reported that duplicate information did not deter them from reading both Findings and Impressions sections. Nonradiology specialists view XR images significantly more frequently than multi-part CT images, 85.6% vs. 69.0%, p<.001, and XR image viewing practices varied with years in practice r=.197, p=.017. The most important characteristic of reports, according to nonradiology specialists, were avoiding ambiguity and rapid final reports.

**CONCLUSION:** The trend of referring physicians favoring a single report and radiologist for multi-part CT scans reconfirms the importance of a rapid, clear, and cohesive image interpretation, despite the growing trend of radiology subspecialization.

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**SS06-05** 1:40–1:50 PM
**Utilizing Lean Six Sigma Methodologies to Identify Gaps in Emergent Stroke Evaluations**

Benjamin Sawatzky, MD, University of Wisconsin School of Medicine and Public Health, Madison, WI; Tabassam A. Kennedy, MD, John-Paul J. Yu, MD, PhD (pyu@uwhealth.org)

**PURPOSE:** To utilize Lean Six Sigma Methodologies to identify targets for process improvement related to emergent stroke evaluations from the emergency department.

**METHOD AND MATERIALS:** Consecutive paging data for emergent stroke evaluations (ESEs) over a 22-month period (1/1/2015–10/31/2016) were reviewed; 719 sentinel ESEs receiving initial evaluation in our emergency department with concurrent neuroimaging were identified. The timestamp of each of these ESEs was recorded and analyzed for this study. Hourly frequency data were tabulated and odds ratios (OR) were calculated with data subdivided into 1-hour time periods. The period of fewest initiated ESEs (0200–0300 hours) serves as a baseline for all subsequent statistical calculations. A complex polynomial best-fit (assuming a Poisson distribution) was then calculated. Ensuing Lean Six Sigma methodologies were applied based on the DMAIC (Define, Measure, Analyze, Improve, Control) paradigm. Process mapping was also used to identify targets for improvement.

**RESULTS:** Time and frequency data from identified ESEs were fitted to a complex polynomial best-fit curve. At the 1400 hour time point, we observed an unexpected marked decrease in ESEs at this hour (expected value, 54.6 ESEs; observed value 41; OR, 3.4%). Lean methodologies and process mapping determined that a nursing shift change coincided with the temporarily isolated decrease in emergent stroke evaluations called.

**CONCLUSION:** Lean Six Sigma is a data driven quality improvement methodology to assist in the identification of gaps or waste in a process that result in a loss of consistently high outcomes. Application of Lean and process mapping methodologies identified a major nursing shift change that may be associated with a significant decrease in ESEs and a potential impact on patient care. Treating stroke patients is a complex task that requires coordination of many team members and processes, and tools such as Lean Six Sigma have the potential to improve patient care and outcomes significantly.

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**SS06-06** 1:50–2:00 PM
**Benefit of a Visual Aid in the Management of Moderate Severity Contrast Reactions**

Shayan Rashid, MD, Yale University School of Medicine, New Haven, CT; James Gardner; Lawrence H. Staib, PhD; Jay K. Pahade, MD* (Shayan.rashid@yale.edu)

**PURPOSE:** The purpose of this study was to compare management of moderate-severity contrast reactions with versus without a visual aid/flowchart in high fidelity contrast reaction simulation reactions.

**METHOD AND MATERIALS:** All diagnostic radiology attendings and trainees at the study institution were requested to participate in an annual contrast reaction simulation program, which included a moderate severity reaction scenario. Groups were randomized to having or not having a visual aid. The time to administer intramuscular epinephrine via autoinjector, additional medications administered, and any errors in administration were recorded. After the simulation, all participants were provided the visual aid and completed a survey with Likert-scale questions assessing their comfort in treating contrast reactions with a visual aid versus without.

**RESULTS:** A total of 138 participants were involved in the contrast simulation program in 21 groups, of which 68 participated in the moderate contrast reaction scenario. 11 groups were provided with a visual aid and 10 groups were not. Errors in management occurred in 18% of the groups with visual aids versus 40% in the groups without (p= 0.35). Excluding the groups with errors, the average time to appropriate administration of intramuscular epinephrine was 97 seconds with versus 152 seconds without the visual aid (p= 0.04). There was 1 self-injection (9.1%) in the groups with visual aid versus 4 self-injections (40%) without visual aid (p= 0.14). Of all 138 participants surveyed, 98% agreed or strongly agreed that the poster would aid in giving correct doses and routes of medication administration reaction management and 87% agreed or strongly agreed that the aid would help decrease the time needed to administer the medications.

**CONCLUSION:** A visual aid increased the subjective confidence of radiologists in the appropriate dose and routes of medication administration in the setting of a contrast reaction simulation and led to faster administration. Self-administration errors with IM epinephrine were seen in both groups.

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**SS06-07** 2:00–2:10 PM
**Readability of Spanish-Language Patient Education Materials from RadiologyInfo.org**

Paul H. Yi, MD, Johns Hopkins University School of Medicine, Baltimore, MD, Eric Huh; Ferdinand K. Hui, MD, PhD, Johns Hopkins University School of Medicine, Baltimore, MD, Eric Huh; Ferdinand K. Hui, MD* (pyi10@jhmi.edu)

**PURPOSE:** The United States currently has the second-largest group of Spanish-speaking citizens in the world with 41 million native Spanish speakers. However, little attention has been paid towards assessing patient comprehension of Spanish-language healthcare educational materials. The purpose of this study was to assess the readability of patient educational materials written in Spanish from the RadiologyInfo.org website.

**METHOD AND MATERIALS:** All patient education articles written in Spanish available in 2017 from the American College of Radiology (ACR) and Radiological Society of North America (RSNA)-sponsored
RadiologyInfo.org patient education library were reviewed. We assessed each article for readability using 3 quantitative readability scales validated for assessing Spanish written text: Gilliam-Peña-Mountain scale, Łasbar- hets formula (LIX) Rate Index formula (RIX), and SOL formula (modified-SMOG). The number of articles with readability ≤ the 8th grade level (average reading ability of US adults) and the 6th grade level (NIH-recommended level for patient education materials) were determined.

RESULTS: 131 patient education articles were reviewed. The mean readability grade level was greater than the 11th grade reading level for all readability scales. Only 1 article was written at less than the eighth grade or the sixth grade levels.

CONCLUSION: Spanish-language patient educational materials provided by the ACR and RSNA-sponsored RadiologyInfo.org website are written at levels too high for the average patient. These findings are consistent with prior studies assessing radiology-related patient educational materials written in English. Future efforts should be made to improve the readability of these patient education materials for English and Spanish-speakers alike.

( SS06-08 ) 2:10–2:20 PM
Effects of Team Training In Advanced Communication Skills on Patient Factors Affecting Throughput in Outpatient MRI
Xuan V. Nguyen, MD, PhD, The Ohio State University Wexner Medical Center, Columbus, OH; Charles E. Spritzer, MD; Judith Pool, RT(R)(CT); Amna A. Ajam, MD, MBBS; Elvira V. Lang, MD* (Xuan.Nguyen@osumc.edu)

PURPOSE: To assess effects of team training in advanced communication techniques on patient throughput in MRI.

METHOD AND MATERIALS: Staff members at 6 MRI sites in a large southeastern university health system were trained in advanced communication techniques, including skills in gaining rapid rapport, diffusing tension, shaping the patients’ experience, reframing distressing thoughts, use of calmative language, and guidance in relaxation. A 3-month period prior to training represented the baseline, and a 6-month period after training represented the post-training period. No-shows, use of sedation (general anesthesia, IV or oral), disruptive motion, and incompletions for all outpatient studies were noted on daily logs by staff. Events were compared by two-tailed chi square tests at a significance level of 0.05.

RESULTS: The study included 12,930 patients, 4051 prior to training and 8,879 after training. After training, no-shows decreased significantly from 8.9 to 8.1% (p<0.0001). The frequency of general anesthesia (0.72% pre vs 0.62% post training) and IV sedation (2.54% pre vs 2.21% post training) did not change significantly, but use of oral sedation did decrease significantly from 2.47% to 1.44% (p<0.0001). Instances of disruptive motion or repeat scans decreased significantly from 1.04% to 0.12% (p<0.0001). The frequency of incompletions of scans decreased from 1.28% to 0.30% after training (p<0.0001). Combined rates of scan incompletion, disruptive motion/repeat scans, and use of sedation decreased from 8.05% to 4.69%.

CONCLUSION: No-show rates and frequency of events that potentially adversely affect throughput in MRI decreased after team training in communication techniques.
Abdominal Radiology

(R-007) Tuesday • 7:00–8:00 AM • Hard-copy poster
Maple Water as an Alternative Negative Oral Contrast Agent in MRCP

David S. Sargent, MD, Dartmouth Hitchcock, Lebanon, NH; Robert B. Percario, MD, Michael J. Tsapakos, MD, PhD (david.s.sargent@hitchcock.org)

PURPOSE: Negative oral contrast agents are frequently used for MRCP studies to improve image quality. We investigated the MRI signal characteristics of Maple water, a popular health drink that is high in manganese, compared to currently used oral contrast agents for possible use as an effective alternative agent.

METHOD AND MATERIALS: Phantoms containing equal volumes of Maple water and pineapple juice were imaged by a 3-T MRI using T2-weighted sequences from the MRCP protocol. Pineapple juice is also high in manganese and has been shown to be an effective negative oral contrast agent for MRI in multiple studies. Phantoms of water and Volumen were also imaged as positive contrast comparisons. Signal to noise ratios were evaluated and compared.

RESULTS: Maple Water had equally low signal on T2 imaging compared to pineapple juice and markedly less signal than the water and Volumen positive contrast agents.

CONCLUSION: Maple water has low signal on T2 weighted imaging and may be an effective alternative to other negative contrast agents for use during MRCP studies. This could be beneficial to patients with allergies to other agents or who prefer the flavor of maple water. In addition it is a locally produced, sustainable product that is less expensive than commercially available contrast agents. Further studies with randomized patients will be performed following institutional IRB approval to determine in vivo effectiveness.

(R-008) Wednesday • 7:00–8:00 AM • Hard-copy poster
Improving the Quality of CT Reports for Cancer Patients Through Implementation of a Summary Table and Resident-Led Audit Intervention Designed to Ensure ACCREDIT 1.1 Assessments

Jeffrey B. Levine, MD, Ochsner Medical Center, New Orleans, LA; Richard Tramel, MD, Charles Matthews, MD, Dana H. Smetherman, MD, MPH (Jeffrey.levine@ochsner.org)

PURPOSE: Measurement of solid tumors in oncologic imaging is critical for cancer staging and to assess response to therapy. In January 2017, our radiology department implemented a structured measurement table in the report impression using Response Evaluation Criteria in Solid Tumors (RECIST) 1.1 for reporting of all CT oncology studies at the request of the Oncology Department and Quality Improvement Committee. A key goal when using tumor response criteria is to follow the guidelines closely to reduce the inter-reader variability. In addition, the Oncology Department requested that RECIST criteria be easily identified in the reports in a standardized format. This study tests the effect of education and audit interventions to improve compliance with and accuracy of CT reporting of RECIST 1.1 criteria.

METHOD AND MATERIALS: A quality improvement project was performed using the Plan-Do-Study-Act (PDSA) methodology. CT scan reports and images were retrospectively audited to document baseline compliance with inclusion of RECIST guidelines. Data collected included reporting of lesion size in the impression section of the exam. Report audits were performed by Radiology residents. When possible, the resident was assigned to audit reports in the month preceding the Body CT rotation. There were 3 separate interventions. 1. Introduction of a standardized reporting template that specified the RECIST criteria (February 2017), 2. Email communication of current compliance to residents and staff radiologists (March 2017), and 3. Didactic lecture to residents and staff (May 2017). Comparison of differences in compliance was performed with a Welch’s t-test.

RESULTS: The reports compliant with RECIST criteria increased from 5% (baseline) to 12% following the introduction of a standard report template. There was a significant difference in compliance after email communication of current compliance to resident and staff radiologists, 59% (p=0.001) and after a subsequent didactic lecture 81% (p<0.001).

CONCLUSION: Performing a combination of educational and audit interventions can improve compliance with RECIST 1.1 reporting CT scans of cancer patients.

Cardiopulmonary Radiology

(R-107) Wednesday • 7:00–7:15 AM • E-poster Station #8
Evaluation of Diagnostic Radiology Involvement on Radiation Treatment Planning Process

Bannet Muhozo, BS, University of California San Diego, La Jolla, CA; Alexander Gottschalk; Sue S. Yom, MD, PhD*; Kimberly G. Kallianos, MD, Travis Henry, Brett Elicker, MD (bmuhozo@ucsd.edu)

PURPOSE: To evaluate the impact of dedicated discussions with diagnostic radiologists on the radiation treatment planning process for thoracic tumors. The primary objective is to determine the percentage of thoracic tumor cases in which radiation oncology treatment planning is affected by a diagnostic radiology multidisciplinary discussion. The secondary objective is to determine the type and significance of the management changes.

METHOD AND MATERIALS: In this IRB approved study, cases discussed at 10 Multidisciplinary Thoracic Tumor Boards (radiology, pathology, pulmonology, surgery, radiation oncology, oncology) and 8 dedicated Diagnostic Radiology/Radiation Oncology Rounds were evaluated. Changes to the radiation treatment plan resulting from the discussion with a Diagnostic Radiologist were recorded and classified. During the dedicated Rounds, a survey was completed by the radiation oncologists to assess their perspective on the degree of change in the management plan and their change in confidence regarding the treatment plan.

RESULTS: Of the 122 Multidisciplinary Thoracic Tumor Boards cases evaluated, 38 (31%) involved a discussion regarding radiation oncology management in which the imaging played a direct role in determining whether radiation treatment was indicated and when it should be started. Of the 45 Diagnostic Radiology/Radiation Oncology Rounds cases, 14 (31%) were discussed but did not result in a change in management, whereas in 31 (69%) cases, there was a change. Changes included 15 (33%) in which whether to radiate and the timing of radiation treatment initiation was changed, 10 (22%) in which the radiation treatment plans were changed, and 6 (13%) in which both were changed. Radiation oncologists reported resultant changes were slight/moderate in 18 cases
Increased Medical Student Interest in Radiology following curriculum designed to deliver experience-based radiology education. Surveyed before and after a gross anatomy cadaver CT correlations may provide students with an early, uniquely rewarding experience with scanning of cadavers in association with a gross anatomy curriculum.

PURPOSE: W. Hayes, MD; Robert C. Groves, MD; Ann S. Fulcher, MD (peter.haar@va; Josephina A. Vossen, MD, PhD; Kevin B. Hoover, MD, PhD; Curtis (R-030) Wednesday • 7:00–8:00 AM • Hard-copy poster Immersion Learning in Radiology Education: Engaging Medical Students Through Hands-On Experience Erin N. Gomez, MD, Johns Hopkins University School of Medicine, Baltimore, MD; Donna Magid, MD, MEd; Pamela T. Johnson, MD (gomez68@jhmi.edu)

PURPOSE: Immersion education, traditionally used in the teaching of foreign languages, is an instructional method in which the language being taught is also used as the primary method of instruction. While traditional radiology education includes didactic lectures, case conferences and shadowing, interactive experiences are becoming increasingly popular. The purpose of this study was to introduce medical students to the interpretation of computed tomography (CT) through an immersion-based approach.

METHOD AND MATERIALS: Medical students enrolled in a month-long radiology elective participated in an 8-hour workshop designed to introduce basic skills needed for interpretation of body CT. Students were provided with a diagnostic radiology workstation and completed introductory exercises focused on image orientation and navigation, identification of anatomic structures and use of a standard search pattern. Students also participated in a “hot seat” session showcasing commonly encountered pathology and reviewed cases independently to formulate a diagnostic impression. An institutional review board-approved survey was administered at the start and end of the workshop regarding comfort with various aspects of CT interpretation and level of interest in a career in radiology.

RESULTS: To date, 28 students have participated over the course of 4 sessions. Data collection is ongoing. After completing the workshop, students indicated an increased level of comfort with basic CT navigation, identification of anatomic structures, use of a search pattern, and recognition of pathology. An increased number of students indicated at least moderate interest in a career in radiology (57.2% vs. 64.3%). The workshop was rated as “extremely useful” by 93%, and 100% agreed that the workshop should be included in future iterations of the elective.

CONCLUSION: Immersion-based radiology education is an effective method for introducing students to the skills needed for interpretation of CT. Allowing students to develop a familiarity with CT through immersive learning experiences may be a key factor in increasing medical student interest in radiology and retention of concepts necessary for success on clinical rotations.

METHOD AND MATERIALS: Prior to the start of the first-year medical school gross anatomy course at our institution, 32 dissection cadavers were CT scanned with participation from the 224 first-year medical students, aided by nine radiology residents. The radiology residents and a faculty attended gross anatomy lab on five occasions to facilitate experience-based radiology assignments involving the cadaver images, in parallel with dissection assignments. Students were surveyed regarding radiology-related perceptions prior to scanning, and again after the completion of the 10-month course. Pre-course (N=219) and post-course (N=218) survey responses were paired for each student, and changes in responses to the six 0-to-10 point scale questions were calculated and assessed with paired t-tests.

RESULTS: Average change in survey responses regarding “interest in learning to interpret radiologic images” increased by +0.85 (p<0.0001). Responses regarding “comfort level viewing and interacting with CT images” increased by +1.62 (p<0.0001). Responses for “value of cadaver CT images in medical education” decreased by -1.26 (p<0.0001). Responses regarding “interest in radiology as a possible career” decreased by -0.63 (p<0.0003). Responses regarding “value of the role radiologists play in patient care” did not significantly increase by +0.12 (p<0.16). Responses regarding “opinion of the VCU Department of Radiology” increased by +1.84 (p<0.0001). Additionally, 17 students (6.9%) developed a strong interest in the career of radiology.

CONCLUSION: This curriculum resulted in significantly increased interest in learning radiology, comfort interacting with CT images, and regard for the department of radiology at the institution. 17 students reported a very high interest in the career of radiology.

RESEARCH POSTERS
can be used by students independently or in the classroom to learn anatomy and Radiology.

(R-126) Tuesday • 7:20–7:35 AM • E-poster Station #7
Positive Benefits of Radiology Residents as Teaching Assistants in a Medical School Radiology Curriculum
Peter J. Haar, MD, PhD, Virginia Commonwealth University, Richmond, VA; Robert C. Groves, MD, Josephina A. Vossen, MD, PhD; Kevin B. Hoover, MD, PhD, Curtis W. Hayes, MD; Ann S. Fulcher, MD (peter.haar@vcuhealth.org)

PURPOSE: Radiology residents may make valuable contributions teaching medical students. The benefits of radiology residents as teaching assistants (TA's) were studied in a medical school curriculum by comparing student feedback in years with and without resident involvement.

METHOD AND MATERIALS: In two consecutive years, during the first-year medical school gross anatomy course at our institution, 32 dissection cadavers were CT scanned with participation from the 224 first-year medical students. Radiology assignments involving the cadaver scans were provided in parallel with dissection assignments. During one year, nine radiology residents and one faculty attended gross anatomy lab on five occasions to facilitate the radiology assignments. The following year, the same curriculum was provided, but with no lab participation from the radiology residents. Both years, the students were surveyed regarding radiology-related perceptions after the completion of the course. The survey responses from the year with resident TA's (N=218) and year with no resident TA's (N=212) were compared for differences with independent t-tests for the six 0-to-10 point scale survey questions.

RESULTS: With resident TA’s, average survey responses regarding “interest in learning to interpret radiologic images” were higher by +1.34 (p<0.0001). Responses regarding “comfort level viewing and interacting with CT images” were higher by +0.72 (p<0.001). Responses for “value of cadaver CT images in medical education” were higher by +1.35 (p<0.0001). Responses regarding “interest in radiology as a possible career” were higher by +0.43 (p<0.005). Responses regarding “value of the role radiologists play in patient care” were higher by +0.84 (p<0.0001). Responses regarding “opinion of the VCU Department of Radiology” were higher by +1.19 (p<0.0001). With resident TA’s, 17 students (6.9%) reported a strong interest in the career of radiology, compared to 8 students (3.8%) in the class without resident TA’s.

CONCLUSION: The year in which radiology residents served as teaching assistants resulted in significantly more positive student responses for all six of the surveyed questions and a higher number of students strongly interested in the career of radiology.

(R-036) Wednesday • 7:00–8:00 AM • Hard-copy poster
Using Radiology to Provide Real World Applications of Physics to Undergraduate Students
Thomas Lowe, Indiana University Department of Radiology, Indianapolis, IN; Carrie Norris, MS, MD; Jessica Smith; Bilal Tahir, MD; Richard B. Gunderman, MD

PURPOSE: The purpose of this project was to provide real world applications of physics for college students using ultrasound, CT, radiography, and MRI. Students were also taught the general role of the radiologist in healthcare.

METHOD AND MATERIALS: Radiology residents were invited by the course professor to give lectures regarding the physics of radiology to an undergraduate physics course at a local university. A series of four 20-minute lectures were given over a 90-minute class period. Lecture material consisted of basic physics of MRI, ultrasound, CT, and radiography as well as a brief description of the role of the radiologist in healthcare. A pre and post lecture survey was administered to help gauge the students’ understanding of the lecture material. Finally, students partook in an onsite visit to the radiology department where a medical physicist demonstrated how the various imaging modalities are utilized in day-to-day practice.

RESULTS: Post lecture survey results demonstrated a statistically significant increase in Likert scale scores compared to pre lecture surveys (figure), supporting the idea that students had an increased understanding of the physics used in the four different imaging modalities as well as a better understanding of the role of the radiologist in healthcare. Furthermore, both the students and the course professor had a very positive experience as indicated by their comments on the surveys and thank you letters.

CONCLUSION: Radiology residents successfully taught real world applications of physics using medical imaging to undergraduate students through a series of short lectures and an onsite tour of the radiology department. We plan to continue this teaching relationship with the university in the future.

Education of Residents

(R-049) Tuesday • 7:00–8:00 AM • Hard-copy poster
Defining Excellence in Radiology Clinical Education: Survey of Residents and Fellows Regarding Optimal Faculty Skills and Practice
Erin N. Gomez, MD, Johns Hopkins University School of Medicine, Baltimore, MD; David M. Yousem, MD; Pamela T. Johnson, MD (egomez2@jhmi.edu)

PURPOSE: Department of Radiology faculty presentations are critiqued daily by residents for quality assurance and professional development.
However, a significant amount of teaching also occurs at the worksta-
tion. A survey of our alumni revealed that 83% rated “learning from
faculty during clinical rotations” as the most important element of
training. The purpose of this study was to gain an understanding of
residents’ and fellows’ definitions of excellence in clinical education,
including which techniques are most effective for trainee learning and
which attributes are most valued in a clinical teacher.

**METHOD AND MATERIALS:** Radiology residents and clinical fel-
lows were invited to complete an institutional review board-approved
6-question survey (Figure 1) about faculty skills and practices neces-
sary for optimal clinical education. Respondents were asked to de-
scribe their preferred format for teaching at the workstation, rank the
types of content and supplemental resources emphasized during case
review, and list the qualities most valued in a clinical teacher.

**RESULTS:** 25 residents and fellows completed the survey (45% re-
response rate). 82% of respondents preferring to review studies in detail
with an attending were junior residents, while most senior residents
and fellows (60%) preferred to review the salient points of interesting
or complex cases. Search pattern and image interpretation, pertinent
findings, and interpretive errors were identified as topics which should
be emphasized during teaching sessions. Websites and online resourc-
es were the most highly ranked sources of supplemental information,
followed by companion cases and relevant journal articles. Qualities
valued in a clinical teacher were largely based on interpersonal skills,
with 68% of respondents stating that open-mindedness, patience or
kindness were important, followed by efficiency (36%) and an interest
in teaching (32%).

**CONCLUSION:** Radiology faculty should tailor their clinical instruction
according to trainee experience, but in general should focus on image
interpretation, pearls and pitfalls, and missed findings. Trainee most
value educators who foster a supportive learning environment and
who are enthusiastic about teaching.

(R-O50) **Wednesday • 7:00–8:00 AM • Hard-copy poster
Urgent Discordance: Radiology Resident Misses Which
Change Management in the ER**
Kevin O'Brien, MD, University of Chicago, Chicago, IL.; Jonathan H.
Chung, MD, Michael Baad, MD (kobrienmd@gmail.com)

**PURPOSE:** A nationwide trend toward 24hr attending coverage has
resulted in a discussion of resident discordance rates. In our experi-
ence, not all resident discordances alter management. Our purpose is
to find the rate of on-call resident discordances which change man-
agement, an urgent discordance.

**METHOD AND MATERIALS:** We gathered information on every pre-
liminary read in the chest section over the course of 3 years, spanning
2012-2014. Those marked as “major discordances” (MDs) were se-
lected as these are deemed the most severe misses. We then compiled
a list of 18 “urgent” diagnoses that may change management before
an attending read could be made. Examples include pneumonia and
pulmonary embolism (PE). We also compiled a list of 10 “non-urgent”
misses, still deemed MDs, but would not alter management before an
attending read was made. Examples include pulmonary nodule and
rib fracture. Each MD was given an urgent or non-urgent diagnosis
based on the preliminary read and the reason given for the discor-
dance. We evaluated the percentage of MDs, percentage of urgent
discordances (UDs), and evaluated which diagnoses were most com-
monly missed.

**RESULTS:** 33,419 preliminary chest reads were made over 3 years,
spanning 2012-2014. The number of cases marked as MDs was 379
(1.1% of the total preim reads). Of those, 278 were deemed UDs
(0.7% of the total preim reads). The most common UD was a missed
pneumonia, accounting for 59% of the total UDs. The second and third
most common UDs were missed PE and overcalled PE respectively,
accounting for a combined 11.5% of the total UDs. The three most
common non-urgent discordances were overcalled pathology on chest
radiograph, missed nodule, and non-urgent finding in the abdomen on
CT accounting for 73% of non-urgent discordances.

**CONCLUSION:** The percentage of UDs, which would immediately alter
patient management was less than half of the number of MDs, already
a small number. More than half the UDs were missed pneumonias re-
sulting in a delayed antibiotics. The very small percentage of cases that
fell into the category of UDs demonstrates that an independent on-call
radiology resident preliminary read is very safe and reliable for making
immediate management decisions.

(R-O51) **Tuesday • 7:00–8:00 AM • Hard-copy poster
Redefining the Face of Radiology: The Formation of a
Resident-Led Radiology Consultation Service Available
on the Clinical Floors as a Catalyst for Improving
Understanding and Communication with Referring
Services**

Kenni Vincenti, MD*, Pennsylvania Hospital, Philadelphia, PA; Benjamin
Hammelman, MD, MEd (kerri.vincenti@pchs.upenn.edu)

**PURPOSE:** We seek to explore the perceptions of the role of radiology
in clinical decision making at our institution. We aimed at discovering
the resident-led radiology rounds program. The study intends to
gauge both clinicians’ and radiologists’ viewpoints and to cause mea-
surable improvements in the workflow and understanding between our
departments.

**METHOD AND MATERIALS:** We created a consult service bringing
radiology residents to the clinical floors for up to 1 hour each session
to discuss cases at regular intervals, staffed by a senior resident with
access to full PACS at a designated workstation. Prior to the service
beginning, we created mirrored sixteen-question surveys to capture
the prevailing attitudes and level of understanding between the radiol-
yology and internal-medicine departments. Surveys included both likert-
scale and open ended questions, the latter of which were analyzed and
coded with thematic analysis. We also recorded the number of cases
reviewed and the amount of time spent at each session. The comple-
tion of this project in early spring will involve similar post-intervention
surveys, supplemented by interviews and/or focus group sessions
aimed at discovering how the floor consultation service has influenced
the radiologist-clinician relationship.

**RESULTS:** Presurvey respondents included 20/21 radiology residents,
11/49 internal medicine residents and 14/115 internal medicine attend-
ings (all subspecialties) Radiologists and clinicians both reported most
frequent communication by phone as opposed to in person, email, or
text. Clinicians believe that they understand the role of radiologists
in patient care more often than radiologists perceived. Approximately 1/3
of all respondents do not believe radiology reports communicate find-
ings effectively. Each session, residents reviewed an average of 4.7
cases (range 0 – 10) and engaged an average of 28 minutes (range
0 – 55)

**CONCLUSION:** In-person radiology rounds provides residents with
a teaching opportunity while adding value to the patient’s care plan
without a large expenditure of effort or resources from the radiology
department.

(R-O52) **Wednesday • 7:00–8:00 AM • Hard-copy poster
Current Status of Mammography Fourth Year Electives
in Radiology Residency**
Courtney Raybon, MD, Vanderbilt University Medical Center,
Nashville, TN; Lucy Spalluto, MD; Christine Dove, MD (christine.dove@
vanderbilt.edu)

**PURPOSE:** The purpose of this study is to evaluate the current state
of breast imaging electives during the fourth year of radiology resi-
dency. In 2013 the American Board of Radiology (ABR) Core Exam, the
initial certifying exam for radiology residents, shifted from the end of
the fourth year of residency to the end of the third year. This change
has created more flexibility in the fourth year curriculum. Many insti-
tutions now offer additional elective time or a “mini-fellowship” with
concentrated time in a specific subspecialty. We aim to assess resident
interest in and availability of supplemental breast imaging education

★ Faculty financial disclosures are located in the Faculty Index.
RESULTS: Fifty-nine of 189 recipients completed the survey, for a response rate of 31%. The majority of programs (70.6%) reported an overall increase in fourth year electives with most offering between 4-6 months (41.7%). In the majority of programs (70.6%), less than 25% of residents requested elective months in breast imaging, and 90% could accommodate these requests “often” or “always”. Of the residents requesting additional time, 71.1% requested 1-2 months and 28.9% requested 3 months or more. The most commonly cited reasons for not accommodating requests included: “too many residents doing required breast imaging rotations” or “too many other 4th year residents also requesting elective time in breast imaging”.

CONCLUSION: This study confirms the increase in elective time offered to fourth year radiology residents after restructuring of the ABR Core Exam. A small number of residents elect to spend that time in breast imaging, most requests are for 1-2 months, and the programs can accommodate these needs. Several potential barriers may impact the residents who request concentrated time (>3 months) in breast imaging.

(PURPOSE: Didactic lectures are a core component of radiology education, but residents may find them less engaging. Given current radiology residents are young adults who regularly consume video media, we theorized that a music video would be a fun and effective method to teach nuclear medicine concepts.

METHOD AND MATERIALS: We made a music video about the localization of free Technetium in nuclear medicine scans. In an IRB-exempt study, we anonymously surveyed radiology residents in a single institution, using Google Forms, a free survey service. Before and after watching the video, residents were asked to rate on a Likert scale, where 1 was not confident at all, and 5 was very confident, their confidence in their understanding and ability to explain this topic. They were also asked about their attitudes toward alternative teaching methods. Data analysis was performed utilizing SPSS.

RESULTS: The participation rate was 88% (21/24). On average, residents felt that during lectures with Kahoot! they paid closer attention (4.5/5) and learned more (3.9/5). They felt continued use of this system would improve lecture attendance (3.9/5) and they would be interested in learning how to employ Kahoot! in their own lectures (3.9/5). In comparing other alternative communication formats, residents did not prefer the traditional lecture format (2.3/5) and did not prefer non-gamified audience response question sets (2.3/5). Although two residents moderately agreed that Kahoot! had a distracting effect on the lecture, on average the residents did not share this perception (2.3/5). A cross-tabulation analysis did not demonstrate any statistically significant intervariable relationship between resident training year and survey responses (p>0.05).

CONCLUSION: For millennial residents, Kahoot! can be a helpful instructional method. A brief live demo of Kahoot! will be given at the AUR.

(R-055) Tuesday • 7:00–8:00 AM • Hard-copy poster

Education Resources for the 21st Century Radiology Resident
Gunjan Malhotra, MD, University of Michigan, Ann Arbor, MI; Matthew Manganaro, MD; John D. Millet, MD; William Weadock, MD*; Karen D. Gaetke-Udager, MD

PURPOSE: Produce an efficient cost effective way for radiology residents to access educational materials.

METHOD AND MATERIALS: Traditionally, our radiology residency program maintained a physical library of reference textbooks, image based case books, and software programs totaling over 750 items that cost tens of thousands of dollars (including donations). Residents checked out materials during normal business hours, while our administrative staff maintained and tracked the resources. The department also provided $1,750 to each resident as a book fund to supplement library offerings. While this traditional library was popular, it was not possible to have an updated copy of every resource available for every resident due to limited space and money as well as the added burden it posed to administrative staff. This sparked the development of a partnership with our medical library and its licensing agreements to create a secured, radiology online e-library through which residents could access via direct links most of the physical resources in our physical radiology library.

* Faculty financial disclosures are located in the Faculty Index.
RESULTS: Since implementation of our e-library three years ago, use of the physical radiology library has plummeted. The physical textbooks were recycled to make room for a meeting space and the work of resident administrators has been redirected. Residents now have unlimited access to updated resources 24/7 via department-issued iPads which cost $429 each. As an analogy, we estimate that purchasing the same physical resources for each resident entering the program would cost a total of $66,446 each. The e-library now allows residents to use their book fund for other educational endeavors. Added benefits of these iPads include streaming interactive conferences, secure EMR and email access and convenient access to other electronic resources.

CONCLUSION: By utilizing technology, online resources and paid textbook licensing agreements through our medical library, our residency program created an e-library that provides unlimited resident access to the most current radiology educational resources with reduced cost to the department, less burden on administrative staff, and more physical space. We encourage other programs to consider a similar effort.

(R-056) Wednesday • 7:00–8:00 AM • Hard-copy poster Implementation of a Structured Approach to Radiology Resident Rotations: Positive Impact on the Educational Experience

Nancy R. Fefferman, MD, New York, NY; Cecilia L. Mercado, MD; Patricia M. Clayton, BS; Chloe M. Chhor, MD; Michael P. Recht, MD (nancy.fefferman@nyumc.org)

PURPOSE: Preserving the educational experience of radiology resident rotations is often challenged by the increasing size of many academic radiology departments and the subsequent rapidly increasing volume of work. We recently implemented several organizational initiatives to enrich the educational value of resident rotations. The purpose of our investigation is to describe our initial experience with these initiatives and assess the impact of these changes on resident education.

METHOD AND MATERIALS: Several new education initiatives were implemented in 2015. The organization of the education team was expanded by creating a designated point person in each section (RESRep). Under the direction of the Program and Associate Program Directors, the RESRep is responsible for managing the resident rotation including development and delivery of curricular material, goals and objectives, rotation expectations and resident evaluations. Introduction of the Teaching Attending of the Day (TAD), whose primary responsibility is resident teaching at the workstation, provides dedicated teaching on each rotation. The development of the Rotation Attendings (RT), 5-6 teaching attendings assigned to each 4 week rotation, offers teaching on each rotation. The development of the Rotation Attendings (RT), 5-6 teaching attendings assigned to each 4 week rotation, offers teaching on each rotation.

RESULTS: Since implementation of our e-library three years ago, use of the physical radiology library has plummeted. The physical textbooks were recycled to make room for a meeting space and the work of resident administrators has been redirected. Residents now have unlimited access to updated resources 24/7 via department-issued iPads which cost $429 each. As an analogy, we estimate that purchasing the same physical resources for each resident entering the program would cost a total of $66,446 each. The e-library now allows residents to use their book fund for other educational endeavors. Added benefits of these iPads include streaming interactive conferences, secure EMR and email access and convenient access to other electronic resources.

CONCLUSION: By utilizing technology, online resources and paid textbook licensing agreements through our medical library, our residency program created an e-library that provides unlimited resident access to the most current radiology educational resources with reduced cost to the department, less burden on administrative staff, and more physical space. We encourage other programs to consider a similar effort.

(R-058) Wednesday • 7:00–8:00 AM • Hard-copy poster Entrustable Professional Activities (EPAs) for Interventional Radiology (IR): A Roadmap for the Future of IR Training

Rachel F. Oser, MD, University of Alabama Birmingham, Birmingham, AL; Nathan Ertel, MD, A. K. Abdel Aal, MD, PhD (rosery@uabmc.edu)

PURPOSE: Entrustable Professional Activities (EPAs) are defined as discrete activities which define a specialty and can be objectively assessed and entrusted to competent trainees to perform independently. They are becoming widely accepted as a way to assess competence, improving educational outcomes and patient safety in a teaching environment. We describe the development of 10 EPAs for Interventional Radiology (IR).

METHOD AND MATERIALS: Key areas for development of EPAs were identified by senior IR faculty. The EPA concept and proposed EPAs were introduced to the IR group and trainees through a series of conferences and workshops. Ten professional activities were selected as core to the practice of IR. Each EPA was detailed and mapped to the IR milestones. An assessment form using a five level entrustment scale was created.

RESULTS: The final EPAs and evaluation forms were presented to the IR faculty and program evaluation committee (PEC). All ten were approved for implementation in the IR training programs. Faculty and trainee agreement was obtained and all committed to participate in EPA evaluations.

CONCLUSION: Through a consensus model, we designed ten EPAs that encompass essential components of IR practice. The development process used was inclusive of both faculty and trainees ensuring buy in from all stakeholders. We plan to begin using EPA assessments during the next academic cycle. Challenges in implementation remain including assuring the timeliness, consistency and reliability of evaluations and establishing a process that trainees feel is empowering rather than punitive.

(R-125) Tuesday • 7:20–7:35 AM • E-poster Station #1 Live Audience Response, Traditional Case Conference, or Didactic Approach to Radiology Resident Education: A 12-month Evaluation-Based Analysis

Vishal Desai, MD, Thomas Jefferson University Hospital, Philadelphia, PA; Leann M. Kania, MD, Adam Flanders, MD, Christopher G. Roth, MD; Sandeep Deshmukh, MD

PURPOSE: With the recent change in ABR exam structure and the gradual change in resident learning style, classroom-based resident education has required adaptation. We implemented a live lecture evaluation system to provide instant feedback from the residents to individual lecturers/division directors and to observe long-term trends in the ratings of different education methods.

METHOD AND MATERIALS: A lecture evaluation system was created in Feb 2016, which allowed anonymous feedback after the lecture was completed. The evaluations included lecture content ratings, lecturer rating, and type of interactive component, including traditional hot seat case conference, lectures with live audience response through a web-based app (RSNA Diagnosis Live), or a non-interactive didactic lecture. Additionally, residents reported if the lecture would be improved with interactivity to account for lectures best presented in didactic-only format. Responses over 12 months were analyzed. Unpaired t-test analysis was performed on the different groups (interactive versus non-interactive conferences, and live audience response versus traditional case conference).

RESULTS: Over the 12-month timeframe, 275 lectures were performed and 838 evaluations were received. 141 lectures (51%) included a component of interactivity. Within the interactive lecture subset, 97 lectures (69%) were traditional case-based conference and 44 lectures (31%) utilized the Diagnosis Live application. The mean lecture rating for the interactive subset was 4.48, which is significantly

* Faculty financial disclosures are located in the Faculty Index.

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Residents are facing increased financial pressure due to rising cost of medical education and cost of living. Despite this, applicants do not have a cost of living adjusted method to determine if they can cover their medical school debt and family costs. Trainee salary can support their medical school debt and family costs, but it is lower than the expected income. Using the consumer price index in each city to produce an "standard of living salary" which is an easy reference point for candidates to consider during their MATCH process. When applicants compare program salary information they should consider regional cost of living variation.

**RESULTS:**
- A Boston resident would need a salary of $86,022 to maintain the same "standard of living" as the Boston Hospital in Boston, MA will make $67,000 per year. However, after adjusting the salaries using the consumer price index it should be noted that a Boston resident would need a salary of $86,002 to maintain the same "standard of living" as the Houston resident.
- Our data demonstrates that education and constant reminders, such as placement of signs near hand washing stations, significantly improves hand hygiene compliance. Using similar methods throughout the hospital, may improve hand hygiene and may lead to decreased nosocomial infections, better patient outcomes, and shorter lengths of stay. All healthcare workers at our institution are educated on hand hygiene upon hiring. This would suggest routine re-education on hand hygiene may also improve hand washing compliance.

**Health Services for Radiology**

**R-062** Wednesday • 7:00–8:00 AM • Hard-copy poster

**Title:** Improving Hand Washing Compliance in the Interventional Radiology Department

**Authors:**
- Richard Tramel, MD, Ochsner Medical Clinic, New Orleans, LA; Jeffrey B. Levine, MD; Dennis Kay, MD; James M. Milburn, MD* (richard.tramel@ochsner.org)

**Purpose:** Healthcare-associated infections are a patient safety issue affecting all hospital departments, including radiology. Improving hand hygiene of healthcare staff is one of the most important ways to address healthcare-associated infections. In compliance with JCAHO safety Goal #7, our radiology department initiated a comprehensive program with goals to foster hand hygiene, monitor compliance and provide feedback for our department.

**Method and Materials:** Several team members were recruited as unknown observers, to monitor hand washing practices. Our policy required either hand washing or use of hand sanitizer upon each entry and exit from a patient care area. We observed hand hygiene compliance using standard data collection procedures. After 3 months of observation, team members were educated on our hand hygiene policy and given direct feedback in a small group setting. Signs were then placed next to doors leading to, and exiting patient areas, as well as above washing stations, reminding healthcare staff to wash their hands. Unknown observers continued to monitor hand washing practices following education and sign posting. Data was analyzed using a Z-test for two proportions.

**Results:**
- 114 observed occurrences of possible appropriate hand hygiene events were recorded for 3 months prior to education of healthcare staff and placement of signs. Hand washing was observed 82.5% of the time. After education and placement of signs, 316 observed occurrences for appropriate hand hygiene were recorded over 5 months. Hand washing was then observed 97.8% of the time. An overall 15.3% increase in compliance was observed following intervention, which was found to be clinically significant (p < .01).

**Conclusion:** Our data demonstrates that education and constant reminders, such as placement of signs near hand washing stations, significantly improves hand hygiene compliance. Using similar methods throughout the hospital, may improve hand hygiene and may lead to decreased nosocomial infections, better patient outcomes, and shorter lengths of stay. All healthcare workers at our institution are educated on hand hygiene upon hiring. This would suggest routine re-education on hand hygiene may also improve hand washing compliance.
**Interventional Radiology**

(R-067) Tuesday • 7:00–8:00 AM • Hard-copy poster

*Repetitive Restoration of Flow to Thrombosed Dialysis Access Grafts in Patients with Limited Surgical Revision Options: Is there a Limit to the Number of Declots?*

Kiran Busireddy, MD, Creighton Medical Center, Omaha, NE

**PURPOSE:** To evaluate the outcome and feasibility of repeated pharmacomechanical thrombolysis with or without angioplasty and stent placement in patients deemed not suitable for surgical revision replacement. The time from initial placement of the AV graft to first and each subsequent thrombosis and restoration of flow was measured. The imaging causes of the thrombosed grafts were evaluated. The method of thrombolysis was standardized as follows: 1) rapid pharmacomechanical thrombolysis with 1mg tPA per centimeter of graft length with an Angiojet device in power pulse mode 2) Thirty minute tPA dwell time in the graft 3) Four slow Angiojet passes in rheolitic mode 4) Balloon angioplasty of the entire graft at stenotic and nonstenotic areas and 5) Endograft stent placement at persistent stenosis.

**METHOD AND MATERIALS:** More health care admissions for interventional thrombosis of upper extremity AV grafts was performed. The time from initial placement of the AV graft to first and each subsequent thrombosis and restoration of flow was measured. The imaging causes of the thrombosed grafts were evaluated. The method of thrombolysis was standardized as follows: 1) rapid pharmacomechanical thrombolysis with 1mg tPA per centimeter of graft length with an Angiojet device in power pulse mode 2) Thirty minute tPA dwell time in the graft 3) Four slow Angiojet passes in rheolitic mode 4) Balloon angioplasty of the entire graft at stenotic and nonstenotic areas and 5) Endograft stent placement at persistent stenosis.

**RESULTS:** In this study we focus on a subgroup of patient who had more than 6 pharmacomechanical thrombolysis performed on the same AV graft. There were 3 male and 3 female with an average age of 65 years. These 5 patients had an average of seven rapid pharmacomechanical thrombolysis performed on completely thrombosed AV grafts. These grafts were maintained from the first episode of thrombosis to the latest thrombolysis an average of 1235 days. 4 of these patients are still followed up where having functioning AV grafts. One patient is now outside our system.

**CONCLUSION:** With repeated pharmacomechanical thrombolysis and angioplasty it is possible to maintain an AV graft way beyond its expected lifetime in patient who has very limited options for dialysis access.
PURPOSE: The utilization rate of cervicocerebral computed tomography angiography (CTCCA) has increased dramatically over the last two decades and has replaced invasive diagnostic cerebral angiography in many instances. The widespread use of this revolutionary modality, however, contributes to rising health-care costs, increased radiation exposure, and widespread reporting of incidental findings, especially when ordered inappropriately. We hypothesize that CTCCAs performed for indications considered inappropriate by established guidelines have low diagnostic yield and are unlikely to alter management decisions.

METHOD AND MATERIALS: The Dartmouth-Hitchcock radiology database was reviewed for all CTCCAs performed between October 2011 and December 2016. Radiology reports were included for analysis in patients 18 years or older when the clinical history did not meet appropriateness criteria for a CTCCA as determined by ACR-ASNR-SPR Practice Parameters and ACR Appropriateness Criteria. Reports that met inclusion criteria were reviewed and classified into three categories: 1. normal findings, 2. incidental findings of varying degrees of clinical significance, and 3. findings possibly related to the indication. In the latter case, further chart review was conducted to determine whether or not findings on CTCCA altered clinical management.

RESULTS: 255/2,783 CTCCAs (9.2%) met inclusion criteria. Of these, 113 (44.3%) were normal studies, and 129 (50.6%) had incidental findings. Common incidental findings included stenosis <50%, thyroid lesions, and other soft tissue findings. Of note, two incidental intracranial aneurysms were diagnosed. 13 (5.1%) cases had findings possibly related to the indication, which included stenosis >50%, vascular malformation, and possible dissection or thrombus. In none of these cases did CTCCA alter clinical management of the patient. The most common indications for inappropriate CTAs were simple headache (77/255, 30.2%) and dizziness or vertigo without other neurologic symptoms (103/255, 40.4%).

CONCLUSION: 9.2% of CTCCAs were ordered outside of established imaging guidelines and were unlikely to affect patient management in this cohort.
Abdominal Radiology

(E-001) Tuesday • 7:00–8:00 AM • Hard-copy poster
Combining Video and Fluoroscopic Guidance in Post Pyloric Feeding Tube Placement: Does It Reduce Procedure Time and Radiation Exposure?
Tram N. Schroeder, MD, Indiana University School of Medicine, Indianapolis, IN; Bilal Tahr, MD

PURPOSE: Post pyloric feeding tube placement is often challenging and can result in long fluoroscopic procedure times, increased patient discomfort, and elevated levels of radiation exposure. We aimed to determine whether a new feeding tube with an added ability to visualize anatomy directly via a camera at the distal end of the tube (Kangaroo [K], Covidien-Medtronic, Minneapolis, MN) when placed under fluoroscopy decreased overall procedure time or radiation dose compared to a traditional feeding tube (Frederick Miller [FM], Cook Medical, Bloomington, IN).

METHOD AND MATERIALS: We performed an IRB-approved, retrospective, single institution study over the course of a two month period to determine whether combined video and fluoroscopic guidance with the K feeding tube decreased overall procedure time or radiation dose of post pyloric feeding tube placements compared to fluoroscopic guidance alone with the FM tube. Parameters, such as total procedure time, fluoroscopy time, air kerma, and dose area product, were evaluated. A total of 19 patients underwent FM tube placement and a total of 9 patients underwent K tube placement.

RESULTS: Differences between the two tubes were found to be not statistically significant for all parameters (p values of 0.07, 0.25, 0.16, and 0.19 for total procedure time, fluoroscopy time, air kerma, and dose area product [DAP], respectively). However, there was a trend of longer procedure times, fluoroscopy time, air kerma, and DAP for the K tube compared to the FM tube.

CONCLUSION: Our current experience demonstrates no advantage of combined video and fluoroscopic visualization when placing post pyloric feeding tubes compared to fluoroscopic visualization alone. There are benefits to the K tube such as ease in navigating past the trachea without unintentional airway placement. At the same time, there are limitations such as difficulty passing the nares of a patient with a significantly deviated septum due to the larger distal end. Future work will focus on increasing the number of K and FM feeding tube placements to see if trends become statistically significant.

(E-002) Wednesday • 7:00–8:00 AM • Hard-copy poster
Magnetic Resonance Liver Elastography: The Bare Essentials for Radiologists
Chau Vo, MD; Millie Yu, BS, MS; Jeremy B. Nguyen, MD, MS, Tulane University Hospital and Clinics, New Orleans, LA; Mandy Creuse Weidenha, MD, Drake A. W. McArthur, MD (jnguye2@tulane.edu)

LEARNING OBJECTIVES: • Describe the physical concepts of elasticity of materials including the characterization of Young’s, shear and bulk moduli • Describe the concepts of stress and strain (i.e. stress-strain curve) • Describe the physical properties of shear wave • Describe the physical principle of MR elastography • Describe MRE protocol and pulse sequence design • Describe the clinical application of MR liver elastography

CONTENT DESCRIPTION: Elastography is a medical imaging modality that measures and display the elastic properties of body soft tissues, which can yield diagnostic information about the presence or status of disease. Magnetic resonance elastography (MRE) of the liver is a non-invasive imaging technique for quantitatively assessing the elasticity of liver and the associated diseases. Liver stiffness is usually indicative of fibrosis or steatosis, which are in turn indicative of numerous disease conditions, including cirrhosis and hepatitis. There is a strong correlation between MRE-measured hepatic stiffness and the stage of fibrosis at histology. MRE is particularly advantageous in this case because when fibrosis is diffuse, a biopsy can easily miss sampling the diseased tissue, which results in a false negative misdiagnosis. MRE is performed by using a vibration source on the surface of the patient’s body; this creates shear waves that travel into the patient’s deeper tissues. Special MR pulse sequence synchronized with the shear waves can be formulated to acquire the characteristics of the propagating waves. The acquired data of the wave information is used to generate quantitative images showing tissue stiffness (the shear modulus). The result of an MRE scan is a quantitative 3-D map of the tissue stiffness and a conventional 3-D MRI image, which can cover an entire organ. The aim of this tutorial is to present the fundamental physics of elastography including the concepts of elasticity, stress-strain relation, shear wave generation and propagation. The reader will learn about MRE pulse sequence design, the techniques of performing a liver MRE, analysis and interpretation of MRE images. MR cases will be given to clarify the learned concepts.

(E-003) Tuesday • 7:00–8:00 AM • Hard-copy poster
High-order Texture Features Differentiate Transition Zone Prostate Cancer from Non-cancerous Tissue on T2-weighted MR Imaging
Ali B. Syed, MD, Thomas Jefferson University Hospital, Philadelphia, PA; Mahdi Alizadeh, PhD, Ferzoe B. Mohamed, PhD, Sandeep Deshmukh, MD

PURPOSE: Multiparametric prostate MRI (mpMRI) is an increasingly common diagnostic option in the evaluation of prostate malignancy. Our purpose was to examine the utility of texture analysis in differentiating between cancerous and non-cancerous transition zone (TZ) prostate tissue on T2 weighted images (T2WI).

METHOD AND MATERIALS: 8 patients of ages 57 to 75 were retrospectively identified for the study. These patients underwent mpMRI and proceeded to radical prostatectomy, after which whole mount ex vivo pathology was obtained. Histologic correlation was used to identify lesions on MRI that corresponded to prostate cancer (pCa) as defined by a final Gleason score of 3+3 or higher. Cancerous lesions as well as similar sized ROIs of non-cancerous tissue (nCa) were manually segmented. Texture features of these ROIs were computed using custom software written in MATLAB. First order features of mean, variance, skewness, kurtosis, and entropy were calculated from the source images. 16 second-order features were computed from a co-occurrence matrix in 4 directions (0, 45, 90 and 135 degrees) including contrast, homogeneity, correlation, and energy. High order wavelet-based textures were also computed in 3 directions (horizontal, diagonal and vertical). A t-test was used to compare mean texture values inside the pCa and nCa ROIs. P < 0.05 was considered statistically significant.

RESULTS: No significant differences were shown between pCa and nCa in first or second order texture features. High-order mean value of
the wavelet map in the vertical (anterior-posterior) direction was signficantly different between pCa and nCa (p<0.05). Also, entropy value calculated from all wavelet components differed significantly between pCa and nCa (p<0.05).

**CONCLUSION:** Our data suggest that the wavelet-based entropy feature in particular may be able to provide a quantitative cutoff that can aid in the diagnosis of pCa, and could serve as a quantitative imaging biomarker for TZ pCa. Additionally, these features may potentially be used in automated identification and segmentation of pCa, which is of interest given the increasing frequency of MRI-fusion biopsy.

**RESULTS:** 225 reports were included for analysis. The respective frequencies of LI-RADS use were 2.2% for Group A, 23.8% for Group B, and 60.7% for Group C (p-value <0.0001). The multivariable logistic regression showed no significant change from Group B compared to Group A; there was a significant increase in LI-RADS use in Group C compared with Group A (p = 0.0043). Furthermore, odds ratio of use of LI-RADS for attending only dictation was 9.179 (3.014,27.955;95% CI, p=<0.0001), suggesting resident involvement significantly lowered the use of LI-RADS.

**CONCLUSION:** Our results suggest that a lecture in isolation was ineffective at changing the reporting behavior of providers; however, upload of templates was associated with a significant increase in adherence to LI-RADS. Radiologists attempting to institute LI-RADS in CT and MR reporting in patients at risk for HCC likely benefit by providing educational lectures and dictation templates. Radiologists at residency training programs should specifically target residents to improve utilization of standardized reporting.

**RESULTS:**

- **Purpose:** Although radiology reports have traditionally been written for referring clinical providers, patients are increasingly reading their radiology reports through electronic health record portals, which raises concerns about whether they can adequately comprehend these reports. The purpose of this study was to assess the readability of CT abdomen/pelvis reports.

**METHOD AND MATERIALS:** We reviewed 120 consecutive CT abdomen/pelvis reports at a single academic center (10 consecutive reports for each of 12 fellowship-trained abdominal imaging faculty). We assessed each article for readability using 5 quantitative readability scales: the Flesch-Kincaid (FK) grade level, Flesch Reading Ease, Gunning-Fog Index, Coleman-Liau Index, and the Simple Measure of Gobbledygook (SMOG). The number of reports with readability scores above the 8th grade level (average reading ability of US adults) and the 6th grade level (NIH-recommended level for patient education materials) were determined.

**RESULTS:** The mean readability grade level of the CT reports was greater than the 12th grade reading level for all readability scales. There was no significant difference in readability levels between different radiologists or based on number of years the radiologist had been in practice. No reports were written at or below the 6th or 8th grade levels.

**CONCLUSION:** CT abdomen/pelvis reports are written at a level too high for the average patient to comprehend, which may result in challenges for patients who are increasingly accessing their radiology reports through online medical records.

**RESULTS:**

- **Purpose:** The aim of this study was to evaluate the effects of formal didactic lectures and the provision of dictation templates on utilization of the Liver Imaging Data and Reporting System (LI-RADS) in an academic radiology department.

**METHOD AND MATERIALS:** Outpatient abdominal CT and MR imaging reports from liver transplant clinic patients at increased risk of developing hepatocellular carcinoma (HCC) were selected for analysis. A didactic lecture on LI-RADS was given to providers, followed by the upload of standardized reporting templates with LI-RADS parameters. Reports prior to the lecture comprised Group A; reports after the lecture but before the templates comprised Group B; reports after the templates comprised Group C. Data on the utilization of LI-RADS were abstracted from the imaging reports. Data were analyzed with Chi-squared, Fisher’s exact test, and multivariable logistic regression. All analyses were completed in SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

**CONCLUSION:** Our results suggest that a lecture in isolation was ineffective at changing the reporting behavior of providers; however, upload of templates was associated with a significant increase in adherence to LI-RADS. Radiologists attempting to institute LI-RADS in CT and MR reporting in patients at risk for HCC likely benefit by providing educational lectures and dictation templates. Radiologists at residency training programs should specifically target residents to improve utilization of standardized reporting.
Portal gas was found in most cases. Computed tomography (CT) stomach, gastric pneumatosis, gas in gastric or mesenteric veins and infarction. Conclusion: Four radiologic findings including distended Surgical intervention is required in cases with gastric perforation or patients has been shown with partial decompression. This decompres- leafage colitis, Crohn’s disease, and complications related to endoscopic procedure. The foremost step in the management of AGD is urgent nasogastric tube decompression. Improvement of symptoms in most patients has been shown with partial decompression. This decompression is followed by fluid resuscitation and correction of electrolytes. Surgical intervention is required in cases with gastric perforation or infarction. Conclusion: Four radiologic findings including distended stomach, gastric pneumatosis, gas in gastric or mesenteric veins and portal gas were found in most cases. Computed tomography (CT) scan is the investigation of choice for diagnosis of AGD.

**LEARNING OBJECTIVES:**

- Recognize and characterize classic external abdominopelvic hernias
- Differentiating abdominopelvic hernias
- Paraduodenal vs. foramen of Winslow hernias
- Primary and secondary imaging findings at MDCT are highlighted. Key terminology (e.g. strangulation vs. incarceration) is defined and critical findings relevant to treatment, particularly those that indicate complications such as bowel compromise, are discussed. **Summary:** Knowledge of abdominopelvic hernias and the their key imaging findings is essential for the radiologist in training. Understanding these complex entities is necessary in order to facilitate timely recognition, provide an accurate diagnosis, and direct optimal clinical management.

**CONTENT DESCRIPTION:**

**Background:** Accurately identifying and differentiating abdominopelvic hernias can pose a significant diagnostic challenge to radiology trainees. Contrast-enhanced multidetector computed tomography (MDCT) is the modality of choice for detecting and characterizing abdominopelvic hernias. This educational exhibit reviews the MDCT appearance of classic abdominopelvic hernias with an emphasis on key anatomic landmarks used for differentiation and critical imaging findings that can impact patient management. **Content:** Classic external and internal abdominopelvic hernias are reviewed including inguinal, femoral, Spigelian, obturator, paraduodenal, and foramen of Winslow hernias. Classification by anatomical location and landmarks used for differentiation are reviewed, including key relationships to adjacent structures and/or internal foramen. Similar appearing hernias are clearly differentiated, including indirect vs. direct inguinal hernias, inguinal vs. femoral hernias, left vs. right paraduodenal her- nias, and paraduodenal vs. foramen of Winslow hernias. Primary and secondary imaging findings at MDCT are highlighted. Key terminology (e.g. strangulation vs. incarceration) is defined and critical findings relevant to treatment, particularly those that indicate complications such as bowel compromise, are discussed. **Summary:** Knowledge of abdominopelvic hernias and their key imaging findings is essential for the radiologist in training. Understanding these complex entities is necessary in order to facilitate timely recognition, provide an accurate diagnosis, and direct optimal clinical management.

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**CONTENT DESCRIPTION:**

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CONTENT DESCRIPTION: Active extravasation: Intercostal arteries run along the inferior border of each rib, making it vulnerable during a chest tube placement. A significant arterial injury can lead to active extravasation with risk of significant morbidity and mortality. Malposition of the chest tube: If the chest tube is not inserted properly, there will be inadequate drainage. Knowing the anatomy of the pleura is important for a chest tube placement. Pneumomediastinum: When a chest tube is advanced too far, it can injure or pass through the visceral and parietal pleura overlying the mediastinum resulting in pneumomediastinum. In severe cases, the resultant mediastinal air can compress the adjacent vascular structures resulting in hemodynamic instability. Pneumopericardium: Chest tube can increase morbidity if not properly positioned. If it extends into the pericardium, morbidity increases rapidly. Scrotal insufflation: Per Jones et al, subcutaneous emphysema can also be a complication from inadequate chest tube drainage. In extreme cases, it can extend up to the scrotum causing scrotal insufflation. Angio catheter malposition: During the emergent situation, angio cath is used for tension pneumothorax. If the catheter is not positioned properly, it can manifest as life threatening complications including cardiovascular injury. Intraabdominal injury: Although the malposition of the chest tube into the abdominal cavity is rare, however, it can cause visceral injury and eventual mortality.

(E-011) Tuesday • 7:00–8:00 AM • Hard-copy poster Evaluation of the Lateral Chest Radiograph Ariel L. Bailey, MD, West Virginia University, Morgantown, WV; Lana B. Winkler, MD (arbailey@hsc.wvu.edu)
LEARNING OBJECTIVES: After reviewing this presentation, the learner should be able to: 1. Discuss normal cardiothoracic anatomy on the lateral chest radiograph, including the diaphragms, fissures, bronchi, pulmonary arteries, as well as cardiac contours and location of the cardiac valves; 2. Evaluate the retrosternal, retrocardiac, and retrotracheal air spaces to determine if a space-occupying lesion is present, which may not always be visible on the PA/AP view; 3. Assess the osseous structures and upper abdomen for commonly-encountered abnormalities.
CONTENT DESCRIPTION: Although the frontal chest radiograph is thought of as the primary view and workhorse of chest imaging, the lateral chest radiograph remains a vital component of the diagnostic imaging evaluation of the chest. The lateral chest radiograph is used less frequently and therefore presents more of a challenge to diagnostic radiologists. Our presentation will guide both beginner and experienced radiologists, as well as referring physicians, on accurate interpretation of the lateral chest radiograph.

(E-105) Tuesday • 7:20–7:35 AM • E-poster Station #2 The Basics of Clinical Cardiac MRI: A Primer for Radiology Residents Ryan S. Dolan, MD, Emory University; Atlanta, GA; Frederic J. Bertino, MD; Peter Filev; Zaid Said, Brent P. Little, MD; Arthur E. Stillman, MD, PhD; et al (rsonelan@emory.edu)
LEARNING OBJECTIVES: 1. Introduce the basics of cardiac MRI (CMR) acquisition and techniques with an emphasis on clinical relevance. 2. Examine normal cardiac anatomy in short and long axis orientations throughout the heart using multiple CMR techniques, as well as correlation with echocardiography. 3. Apply multiple CMR techniques to evaluate several example cases of common indications for CMR.
CONTENT DESCRIPTION: Introduction: Use of cardiac MRI (CMR) in clinical practice is increasing for diagnosis and monitoring of many cardiovascular diseases, including myocardial infarction, nonischemic cardiomyopathies, valvular disease, cardiac masses, congenital heart disease, and acute rejection post-transplant. CMR is unique in its capacity to evaluate subtle structural and functional change throughout the entire heart, as well as characterize abnormalities in blood flow. Despite its increasing use and diverse clinical utility, radiology residents have limited exposure to cardiac MRI during residency, and experience with CMR is usually reserved for radiologists and cardiologists with fellowship training in cardiovascular imaging. Our goals are 1) to provide a clinically-relevant primer of CMR techniques and anatomy and 2) to evaluate several common example cases to improve resident comfort with CMR. Methods: We will create an educational exhibit consisting of three parts: 1) an introduction to the basics of CMR acquisition (indications, contraindications, gating, post-processing) and techniques (cine, stress, LGE, tissue characterization/mapping, functional, perfusion, flow), 2) a review of normal cardiac anatomy using different short and long axis images throughout the heart in multiple techniques (with correlation to echocardiography images), and 3) several example cases radiologists would be most likely to encounter in clinical practice (myocardial infarction, acute rejection, amyloidosis, valvular disease, etc). Conclusion: Even though CMR is complex due to its numerous techniques and complicated post-processing, a basic understanding of cardiac anatomy and underlying cardiac properties highlighted by each technique allow radiology residents to interpret common cardiac diseases.

(E-014) Wednesday • 7:00–8:00 AM • Hard-copy poster Impact of Early Radiology Research Experiences on Medical Student Perceptions of Radiology and Research: A Pilot Study Preya Shah, MS, University of Pennsylvania, Philadelphia, PA; Mike Sheng, David A. Mankoff, MD, PhD; Scott O. Trerotola, MD; Maya Galperin-Aizenberg, Arun C. Nachiappan, MD (preya@penne Medicine.upenn.edu)
PURPOSE: To promote opportunities for medical students to gain early exposure to radiology and research, our institution has initiated programs which fund summer radiology research projects for rising second year medical students. Our study assesses the impact of these faculty-mentored summer research experiences on medical student perceptions of radiology and research, in terms of both knowledge and interest.
METHOD AND MATERIALS: A voluntary, anonymous survey was administered to students both before and after the six-week research period in summer 2017. Both the pre-survey and post-survey included 31 7-point Likert-scale questions (1 = strongly disagree; 7 = strongly agree) to evaluate students’ perceptions in four categories: (i) perceived knowledge of radiology as a specialty, (ii) interest in radiology, (iii) perceived knowledge of research skills, and (iv) interest in research. Faculty mentors were sent an analogous post-survey that included an evaluation of their student’s research skills. Wilcoxon signed-rank tests were used to determine significance of differences between the students’ pre- and post-survey category-averaged responses, and Mann-Whitney U tests were used to determine significance of differences between student and mentor responses.

RESULTS: 9/11 (82%) students and 10/11 (91%) mentors completed the surveys. Students’ perceived knowledge of radiology improved (p=0.017) between the pre-survey (5.19 +/- 0.97) and post-survey (5.88 +/- 0.75). Similarly, there was an increase in students’ perceived knowledge of research skills (p=0.021) between the pre-survey (5.18 +/- 0.76) and post-survey (5.92 +/- 0.60), with no significant different between student post-survey responses and mentor responses (5.26 +/- 0.59). Initial student interest was high for both radiology (5.60 +/- 0.57) and research (5.07 +/- 1.15), and was maintained over the course of the program.

CONCLUSION: Our pilot study suggests that summer research experiences can improve knowledge of radiology and research among medical students. Further evaluation of these programs over several years will allow us to maximize benefit to medical students and bolster interest in academic radiology.

(E-015) Tuesday • 7:00–8:00 AM • Hard-copy poster
IR Interest Group Creation Made Ridiculously Simple (...and quick)
David Maldow, MD, University of Rochester Medical Center, Rochester, NY; Devang Butani, MD

LEARNING OBJECTIVES: At the conclusion of this submission, participants will understand the components of an Interventional Radiology Interest Group (IRIG) and the benefits to starting one in medical school. In a stepwise approach, participants will learn how to efficiently build an IRIG, including selection of board members, planning educational activities and recruitment of members. Participants will also learn about opportunities to take their IRIG to the national level, which includes the development of a regional medical student symposium.

CONTENT DESCRIPTION: The content of this educational poster will be focused on simplifying the process of starting an IRIG. There are many components to its creation and a stepwise approach will help students quickly organize the process and start one at their medical school. This starts with identifying a supportive faculty member and engaging residents and fellows to serve as advisors. A board of medical students must be established with clearly delineated positions (e.g., Chair, Communications Chair, Events Coordinator etc.). Planning of activities throughout the year should reflect a mixture of educational talks such as Q&A sessions with more hands-on activities demonstrating the different IR devices and techniques used. Recruitment of medical students through various communication channels is critical and options for maximizing participation in the medical student body will be discussed. Challenges to implementation and strategies for success will be addressed during each step of the process.

(E-016) Wednesday • 7:00–8:00 AM • Hard-copy poster
IR Primer: A Multi-center Medical Student Education Initiative
Chandresh Shah, MD, University of Louisville, Louisville, KY; Cameron Ghazi; Qiong Han, MD, PhD, Harit Kapoor, MD, Gaby E. Gabriel, MD, Douglas M. Coldwell, MD, PhD; et al (cns Shah01@louisville.edu)

LEARNING OBJECTIVES: 1) Demonstrating how a single-day medical student fair developed with collaboration between faculty and residents from multiple university programs can help in encouraging interest in the field of interventional radiology among students in different years of medical school. We aim to set an example which other centers can emulate to promote and encourage interest in the field. 2) Introducing new developments in Interventional Radiology through an interactive curriculum using combination of didactic lectures and hands-on skill labs and demonstrations. 3) Spreading awareness among applying medical students about the new ACGME accredited DR-IR Residency and ESIR pathways in Radiology.

CONTENT DESCRIPTION: The Universities of Cincinnati, Kentucky, and Louisville partnered to develop a Medical Student Radiology Fair for the first time. We invited medical students from all three schools to come and learn more about the fields of Diagnostic and Interventional Radiology. They were subdivided into smaller groups to facilitate participation and interaction with faculty and residents. Content will include: Introduction discussing growing field of Interventional Radiology with development of new residency pathways (DR-IR, ESIR, and fellowship) and increasing medical student interest in the field. Discuss how we conducted the medical student fair including how we collected expired equipment and models for our hands-on sessions and display multiple pictures from our set-up at the event. Discuss how open question and answer sessions between medical students and faculty were conducted after each hands on session to help answer questions on various topics including work life balance, research opportunity and work satisfaction in Interventional Radiology. Questions on the changes including role of radiologists with increasing use of artificial intelligence, gender bias in IR and turf-war between interventional subspecialty procedures were among the many relevant questions posed by medical students. Finally, a section discussing how such a collaboration between institutions can be mutually beneficial to medical students and even residents and attendings alike.

(AUR Trainee Prize: 3rd Place)

(E-017) Tuesday • 7:00–8:00 AM • Hard-copy poster
Introduction to the Radiology Profession: The Effect of Early Exposure on Medical Student Interest and Perception of the Field
Daniella Asch, MD, Yale University, New Haven, CT; Mahan Mathur, MD (Daniella.asch@gmail.com)

PURPOSE: To examine the effect of early exposure to radiology on understanding and perception of the profession for first year medical students.

METHOD AND MATERIALS: All 104 first year medical students at our institution participated in an "introduction to the profession" radiology course during the first 1-2 weeks of the academic year. They first participated in one of the following small group activities for one hour: ultrasound scanning, reading room, radiology lecture, or a radiology game show. All students then participated in an interventional radiology session which involved a combination of didactics and hands-on familiarization with different IR devices. The course concluded with a radiology panel, comprised of a variety of attendings and residents. Survey participation was optional. A pre-course survey assessed understanding of and interest in radiology (using a 5-point Likert scale), and asked students to describe what they believe a radiologist does during a typical work day. A post-course survey included the same questions as the pre-course survey, as well as evaluations of each individual session on a 5-point Likert scale. This survey also included open-ended questions about the utility of the course and areas for improvement, as well as a question asking the students how their perception of radiology has changed.

RESULTS: Response rate was 88% for the pre-course survey and 92% for the post-course survey. The average score for each of the sections was as follows: game show (4.8), reading rooms (4.5), US scanning (4.5), lecture (4.4), IR (4.3), and panel (4.7). Comparing the pre- and post-course surveys, there was a significant increase in understanding of the profession (2.3 vs 3.8), level of interest in
radiology (2.8 vs 3.2), and perceived patient contact for both di-
agnostic (2.3 vs 3.0) and interventional radiologists (4.0 vs 4.7),
p<0.001 for all questions.

CONCLUSION: Early exposure to radiology resulted in a significantly
increased level of interest in and understanding of the profession. Al-
though further follow-up is necessary to determine if interest persists
throughout medical school, this increased understanding can improve
the perception of radiology and enhance interdisciplinary relations.

(E-018) Wednesday • 7:00–8:00 AM • Hard-copy poster
Medical Student Experience in a Hybrid (Academic-
Private) Program: An Institutional Perspective
Jennifer E. Caero, MD, Baylor University Medical Center at Dallas, Dal-
las, TX; Umesh D. Oza, MD, Joseph V. Philip, MD

LEARNING OBJECTIVES: 1. Recognize the unique challenges and oppor-
tunities for medical student education that occur in a hybrid prac-
tice setting. 2. Discuss methods used to integrate medical students
into a hybrid practice setting, including rotations through radiologic
subspecialties, participation in noon conference, and dedicated didactic
sessions. 3. Appreciate the utility of allowing students to dictate re-
ports in providing a more hands-on experience for students interested
in pursuing radiology as a career.

CONTENT DESCRIPTION: Our hybrid academic-private practice set-
ting serves as a high volume, subspecialized practice that facilitates
resident and medical school education. Our institution now hosts ap-
proximately 50 medical students yearly for a radiology core curriculum,
and provides a dedicated elective for those pursuing a career in radiol-
ogy. This setting presents the challenge of balancing medical student
education with the realities of private practice, including high volumes
and turn-around times. We have developed a unique medical student
curriculum oriented toward teaching students to interpret basic radio-
logic findings, recognizing study indications and relative cost, and fo-
cused on providing those interested in a radiology residency firsthand
experience through access to the PACS and dictation software. Under
staff supervision, these students are given the opportunity to dictate
radiologic studies with immediate feedback. This hands-on experience
solidifies their newly acquired knowledge and further informs their de-
cision to pursue radiology. Our students have one-on-one interactions
with residents and subspecialized attendings, with exposure to both
inpatient and outpatient imaging. These interactions shed light on the
practice setting of a large subspecialized group. Students participate in
dedicated didactic sessions with their peers, and attend resident noon
conferences focused on image interpretation, the business perspec-
tive of radiology, and medical ethics. Online modules, including MedU’s
case based online radiology education (CORE) are utilized. This multi-
faceted teaching approach fosters a basic understanding of radiology,
which can be applied to future practice.

(E-019) Tuesday • 7:00–8:00 AM • Hard-copy poster
Testing a New Method of Teaching Musculoskeletal Anatomy & Radiology to First-Year Medical Students
Tawnee Sparing, MD; Neal Rubinstein, MD, PhD; Paul J. Nizolek,
MD; Ronnie Sebro, MD, PhD; Arun C. Nachiappan, MD, Hospital of the
University of Pennsylvania, Philadelphia, PA (arun.nachiappan@uphs.
upenn.edu)

PURPOSE: There is an opportunity to enhance musculoskeletal
anatomy education for first-year medical students. The purpose of our
study is to assess novel round robin sessions using MRI, radiographs,
ultrasound and physical exam skills as a new educational method.

METHOD AND MATERIALS: Initial survey data was collected from
clinical faculty (n=50) and medical students at our institution (second,
third and fourth year students, n=630), as well as medical gross anat-
omy course directors nationwide (n=176). New teaching methods were
developed from survey results for the 2016 gross anatomy course
MSK block, specifically round robin sessions focused on the knee and
shoulder joints. Each was formatted into four thirty-minute sections:
radiology, ultrasound, physical exam and injuries. The radiology section
introduced students to X-rays and MRIs, and students spent hands-on
time scrolling through cases on OSIRIX. Physician preceptors from
various specialties proctored each session. Retrospective first-year
medical student (n=149) satisfaction surveys were conducted upon
completion of the course.

RESULTS: The non-cadaveric, non-lecture teaching modalities most
commonly used by gross anatomy courses nationwide (response
rate 30.7%, n=54/176) were in-person radiology sessions (64.8% of
programs) and physical exam demonstrations (46.3%). Our institu-
tional faculty (response rate 48%, n=24/50) reported poor student
performance in interpreting MSK radiology (mean 2.42 on a 1-5 scale,
sd 0.84). MSK-specific first-year medical student surveys (response
rate 26.2%, n=39/149) showed an average overall satisfaction with the
MSK block of 3.58 (sd 0.98) compared to the average of 3.36 (sd 0.98)
reported by medical students who had taken anatomy in prior years
(response rate 20%, n=126/630). This slight increase was not statisti-
cally significant (one tailed p=0.12). The shoulder and knee round rob-
ins received a mean satisfaction score of 4.59 (sd 0.74) and 4.62 (sd
0.68), respectively.

CONCLUSION: Novel round robin sessions that include MRI, radi-
ographs, ultrasound and physical exam skills are an effective new
educational method to teach musculoskeletal anatomy and radiology to
first-year medical students in the gross anatomy course.

(E-020) Wednesday • 7:00–8:00 AM • Hard-copy poster
The Modified Barium Swallow: Assessment of Radiology Resident and Speech Language Pathologist Attitudes
about an Increasingly Common Fluoroscopic Study
John Hohenberger, MD, Medical University of South Carolina, Charles-
ton, SC; Jonathan Poirier, DO; Kendrea Garand, PhD; Madeleine C.
Lewis, MD; Kate Humphries, MS; Douglas H. Sheafor, MD*; et al
(sheafor@musc.edu)

PURPOSE: The purpose of this study was to evaluate attitudes of Ra-
diology residents and Speech Language Pathologist (SLP’s) about the
clinical and educational value of the modified barium swallow (MBSS)
at a tertiary referral center.

METHOD AND MATERIALS: Using an anonymized survey, 36 radiol-
ogy residents (PGY2-5) and 13 SLPs were surveyed about perfor-
mance of MBSS in clinical practice and during residency training.
No resident had formal MBSS instruction prior to study inclusion.
Surveys were performed at the beginning of the academic year thus limiting
PGY2 resident practical experience as well. MBSS was performed
using a standardized 17 component protocol (MBSImP), including an
esophageal sweep. Exams were performed collaboratively with an SLP
and Radiology resident.

RESULTS: SLPs are least comfortable interpreting the ES and most
(84%) desire radiologist input in its interpretation. Residents are also
least comfortable interpreting the ES. Compared to upper level resi-
dents, PGY2s reported lower comfort levels performing and interpret-
ming MBSS, including diagnosing esophageal abnormalities (p <0.01).
Compared to PGY2s, PGY3-5 residents (regardless of desired fel-
lowship) reported less value of radiologist participation in MBSS, less
educational value of MBSS, and less desire to perform future MBSS (p
< 0.0005). 100% of the PGY2 residents thought MBSS important for
future practice, compared to 19% of PGY3-5 residents (p < 0.00001).
While residents at all experience levels valued the clinical relevance of
MBSS, importance was rated 33% lower than their SLP counterparts
(p < 0.005). Confidence in performing MBSS, interpreting findings
(including diagnosis of esophageal abnormalities), and ratings of clin-
cal importance of MBSS did not vary significantly among SLP’s, re-
gardless experience level.

CONCLUSION: Current MBSS practice at our tertiary referral center
leaves significant room for improvement if the goal is to educate radi-
ologists who view the MBSS as a valuable residency learning tool and
a rewarding exam for future practice. Additional studies designed to
find meaningful ways to add educational value for Radiology residents who perform MBSS are needed given the broad clinical impact and increasing use of MBSS.

**E-024** Monday • 7:00–8:00 AM • Hard-copy poster

**The New Interventional Radiology Recruiting Paradigm:**

**Interventional Radiology Master Craftsmen Seek to Engage the Medical Apprentice, While Continuing to Train and Recruit the Diagnostic Radiology Journeyman**

Allene S. Burdette, MD; Penn State University Hospital/Hershey Medical Center, Hershey, PA; Janet Neutze, MD

**LEARNING OBJECTIVES:** Describe the three Interventional Radiology training pathways. Recognize factors medical students consider while selecting their future specialty. Identify processes and implement educational experiences that capitalize on these factors to attract medical students to Interventional Radiology.

**CONTENT DESCRIPTION:** Interventional Radiology (IR) was recognized as a specialty by the American Board of Medical Specialties in 2012. With this change came three new pathways for training the Interventional Radiologist: the Integrated IR Residency, Early Specialization in IR (ESIR), and the Independent IR Residency. These pathways require Masters of the Interventional Radiology Guild to begin recruiting the Medical Student Apprentice who brings basic medical skills, limited Radiology experience and a desire to learn, while continuing to recruit the Journeyman Diagnostic Radiology resident. Research indicates that familiarity with a specialty early in medical school increases the likelihood a student will choose it as their future career. Medical students (MS) consider various factors as they select their specialty. It is critical to utilize these factors as we expose students to IR. These factors include early exposure to the specialty, working with specialty-specific mentors and positive training experiences. Because IR is so subspecialized, most students do not learn about it until their clinical rotations. Initial efforts required the establishment of an identity distinct, but not separate from Diagnostic Radiology. This included the creation of an IR Medical Student Interest Group for early exposure and IR-focused electives to provide in-depth experiences. Moving forward, by refining existing educational and outreach offerings as well as creating new ones, we will introduce IR to MS early in the education and career decision-making process. Thereafter, providing opportunities throughout the medical school for mentorship, research and positive educational and training experiences, will encourage the pursuit of IR as a career. This presentation will show the existing, recently established and future endeavors for exposing medical students to Interventional Radiology early and often.
student concerns regarding applying to radiology. The purpose of this study was to describe medical student radiology-related posts on AM and SDN to better understand the medical student perspective on the application and Match process.

**METHOD AND MATERIALS:** We reviewed all posts made on the AM and SDN online forums dedicated to medical students over 5 consecutive application cycles from July 2012 to July 2017. Each thread was organized into 1 of 6 major categories. We quantified the forum utilization over the past 5 years by total number of threads posted and the most frequently posted and viewed thread topics.

**RESULTS:** We reviewed 2683 threads with 5,723,909 views. The total number of threads posted and viewed fell by 46% and 63% during 2013-2014, after which they returned near baseline, along with concomitant increase in interventional radiology (IR)-related posts between 2012-2013 (13%) and 2016-2017 (32%). The most common application-related topics were pre-application and program ranking advice (approximately 20% of all threads and views). Surprisingly, many posts were related to post-interview communication with residency programs (2% of all posts and views). Two peaks in viewership and thread posting activity were observed in September and March of each year, coinciding with the residency application submission and Match rank list submission deadlines, respectively.

**CONCLUSION:** Apart from a drop in 2013-2014, utilization of AM and SDN has steadily increased over the past 2 years, concomitant with increased interest in IR. Addressing the concerns identified in our study, especially in preparing residency applications and ranking programs, as well as navigating difficult situations such as post-interview program communication, may help improve the radiology application process for future medical students.

(E-026) *Wednesday • 7:00–8:00 AM • Hard-copy poster* Radiology Residency Interview Invitations and Dates: What Should a Medical Student Expect? Paul H. Yi, MD, Johns Hopkins University School of Medicine, Baltimore, MD; Ross Liao, Patrick Young; Andrew Lee; Ferdinando K. Hui, MD* (pyi10@jhmi.edu)

**PURPOSE:** To describe medical student radiology-related posts on AM and SDN to better understand the medical student perspective on the application and Match process.

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for both Midwest and Northeast vs. 18.2 for West) [p<0.01]. There was no significant difference in website comprehensiveness between programs in different Doximity ranking quartiles (p = 0.062).

**CONCLUSION:** DR residency websites are inadequately comprehensive, with roughly half of criteria assessed present on each website. Few websites included information about resident academic and research interests, a Chief Residents’ Message, or international educational opportunities, factors known to be important to medical students applying to DR. Addressing these gaps in website content may help DR residencies better inform and recruit medical students into both their programs and DR as a whole.

(E-106) Wednesday • 7:20–7:35 AM • E-poster Station #4 Pre-reading Templates: Improving Medical Student Learning in the Reading Room

Natalie Y. Ring, Geisel School of Medicine at Dartmouth, Hanover, NH; Robert B. Percarpio, MD; Ellen Chang, Petra J. Lewis, MD (natalie.y.ring@med.dartmouth.edu)

**LEARNING OBJECTIVES:** • Outline the process of and rationale for students pre-reading studies • Identify barriers to students pre-reading studies during their radiology rotation • Synthesize a basic template to facilitate pre-reading for students

**CONTENT DESCRIPTION:** Pre-reading entails medical students independently reviewing films before receiving feedback from a radiologist. AMSER National Medical Student Curriculum in Radiology recommends that medical students pre-read studies, however, more commonly students only “shadow” radiologists while in the reading room, even when there is a free workstation available. Advantages of pre-reading over shadowing include generative rather than passive learning, improved metacognition with more opportunities for constructive feedback, and increased desirable difficulty for more durable learning. An advantage to the radiologist may be an improved workflow, as pre-reading studies largely work independently. Barriers to pre-reading include students having inadequate image search algorithms, or not being able to read fast enough for the radiologist’s workflow. This exhibit describes how simple paper templates for chest radiographs, and abdominal CTs help facilitate students to independently pre-read studies. The templates describe what structures students should identify as well as key evaluation points, allowing students with minimal training to actively read exams and record their observations. Effective templates may help reinforce a search pattern students are already familiar with (e.g. ABCDE pattern for chest radiographs), enabling elaboration of current knowledge. Templates then may be adjusted as the rotation progresses to contain less prompting information and encourage more active knowledge retrieval. Lastly, we describe how these templates may be integrated into resident and attending workflows.

(E-109) Tuesday • 7:00–7:15 AM • E-poster Station #3 Innovations in #FOAMed: Using G-Suite to Teach Radiology to Medical Students through Interactive Academic Writing

Frederic J. Bertino, MD, Emory University, Atlanta, GA; Dexter Mendzoa, MD; Hernan R. Bello Velez, MD; Ryan B. Peterson, MD; Brent P. Little, MD; Stefan Tigges, MD* (fberthin@emory.edu)

**LEARNING OBJECTIVES:** The reader will: 1) Utilize the Google office suite as a free, widely available, browser-based tool that allows for the creation of documents, presentation slides, spreadsheets, and survey forms that can be adapted for the teaching of radiology to medical students. 2) Create high-quality teaching files in radiology that provide real-time feedback to radiology students through direct, remote and real-time resident mentorship. 3) Build a radiology simulator with minimal resources with the ability to track student progress and learning depth.

**CONTENT DESCRIPTION:** The Google office suite (G-suite) is a free, lightweight, browser-based tool that can be used to create a high-quality teaching file for free open-access medical (radiology) education (#FOAMed/#FOAMrad). We have created a curriculum centered on this tool to encourage medical students to become anatomic investigators by introducing them to academic writing of case reports and medical literature reviews. Student’s work created through G-suite is edited by an assigned radiology resident mentor in real time and in tandem with the student via chat and video communication. It is then published to a website teaching file as a chapter in the first radiology simulator virtual textbook. In our paper, we detail the methodology of how G-suite can provide a web-based system of real-time remote writing feedback, evidence based case report generation, and web-publication for our student authors. Finally, we provide satisfaction and impact survey results from our student authors detailing their experience. Results of our authors survey shows satisfaction in the writing exercise and publication experience, with a greater appreciation of the radiologist’s thought process, early interest in pursuit of the field, and appreciation for the role of radiology in the health care system.

(E-110) Tuesday • 7:00–7:15 AM • E-poster Station #4 Developing a Radiology Subinternship

Kristen A. Bishop, MD*, University of Texas Southwestern, Dallas, TX; Julie Champine, MD; Carlos L. Perez, MD, BS (kristen.bishop@utsouthwestern.edu)

**LEARNING OBJECTIVES:** 1) Define the purpose of the radiology subinternship 2) List the expectations of the radiology subintern 3) Describe the difficulties in hosting radiology subinterns 4) Learn the steps to implement the radiology subinternship

**CONTENT DESCRIPTION:** In many medical schools, the subinternship is a senior rotation for the student to fulfill an advanced medical student role similar to that of a beginner level resident. The student has the opportunity to participate in the daily clinical workload during the subinternship and show a true representation of his/her skills. The student works in a collaborative role with residents and faculty, allowing the supervising faculty member to realistically assess the student’s work ethic and aptitude for the purposes of writing a recommendation letter for the student’s residency application. The diagnostic radiology subintern is expected to be familiar with general diagnostic radiology after having completed a pre-requisite general diagnostic radiology clerkship. During the subinternship, the student works more in depth with one subspecialty division and is assimilated into that divisional team. The subintern will review diagnostic images on a PACS workstation, check out with faculty, and create draft reports in the voice recognition dictation system. The student attends radiology resident teaching conferences, interdisciplinary conferences, journal clubs, and grand rounds. At the end of the month, the student gives an oral presentation to the subspecialty division. Developing such a rotation requires cooperation with the medical school leadership, hospital leadership, radiology departmental leadership, billing compliance, and information technology components of the academic radiology department. We will describe our experience implementing a radiology subinternship rotation, review steps taken, and discuss lessons learned.

(E-112) Tuesday • 7:00–7:15 AM • E-poster Station #9 Integration of Radiology Education and Core Entrustable Professional Activities (EPAs) Can Significantly Impact Patient Care: A Study Quantifying the Ordering and Interpretation of Radiological Studies by PGY-1 Residents

Daniel K. Cook, MD, West Virginia University, Morgantown, WV; Michael Cousar, MD, Benjamin J. Crowder, MD, Andrew J. Lu, MD, Prashanth Sompalli, MD; Layla Nasr, MD, et al (jhogh@hsc.wvu.edu)

**LEARNING OBJECTIVES:** • Quantify the number of radiology-related tasks that post-graduate year 1 (PGY-1) residents complete while on an inpatient medicine service • Gain perspective on the need and importance of medical school radiology education on patient care through data accumulation and analysis

**CONTENT DESCRIPTION:** Our purpose was to quantify the radiology-related tasks that PGY-1 residents (interns) complete while on an inpatient medicine service to gain a data-grounded perspective on the

* Faculty financial disclosures are located in the Faculty Index.
need for and importance of medical school level radiology education on patient care. We hypothesized the number of radiology-related tasks is high, indicating need for inclusion of required radiology instruction in medical school curricula. Interns representing four different medical schools were enrolled in this IRB-approved prospective study. All participants completed a survey about prior radiology education in their respective medical school. Another survey regarding the interns' confidence in performing the designated radiology-related tasks they would face as interns was administered before and after the study period. Interns also completed daily surveys during the study period addressing the number of times they completed several pre-defined radiology-related tasks including: selecting and ordering appropriate radiological studies, independently interpreting imaging studies, consulting with radiologists, and performing bedside ultrasound procedures. Interns ordered radiology studies in approximately 31% of patients. They reported making an attempt to initially interpret approximately 73% of the ordered studies. Only one third of the enrolled interns reported a required radiology clerkship in medical school. None reported feeling confident in selecting appropriate imaging at the beginning of the study period. Our data indicate that interns on inpatient medicine services are involved in a large number of radiology-related tasks. We believe larger organized studies may help influence inclusion of medical school level radiology instruction in curricula to achieve the core Entrustable Professional Activities (EPAs) for entering residency.

**RESULTS:** 90% of the total of 163 students considered the interactive Radiology hands-on sessions as an excellent, very good or good experience. 89% of all students indicated helpful to understand radiology and anatomy and to achieve the Radiology learning objectives in the 1st year. 89% of all students indicated they would like more such sessions while the individual time slot was considered appropriate by 52% of the participants. The interaction occurs during the end-of-course evaluation of physical exam and ultrasound skills. **CONCLUSION:** Integrating interactive Radiology with hands-on experience in small group sessions under guidance is very much appreciated by 86% of the participants. The interaction is high, indicating need for inclusion of required radiology instruction in medical school curricula.

**CONCLUSION:** Integrating interactive Radiology with hands-on experience in small group sessions under guidance is very much appreciated by 86% of the participants. The interaction is high, indicating need for inclusion of required radiology instruction in medical school curricula.

**CONTENT DESCRIPTION:** **Introduction:** Hands-on, small group sessions integrated into the preclinical curriculum allow students to develop the skills and knowledge required for basic ultrasound performance and interpretation and act as an adjunct to the teaching of anatomy, physiology and the physical exam. Ongoing training during the clinical clerkships reinforces previously-acquired skills by placing them in a relevant clinical context. **Curriculum Goals:** Understand ultrasound physics and technology. Acquire, annotate and archive images to perform and interpret basic ultrasound exams. Correlate normal and pathologic ultrasound findings with expected findings from physical exam. Appreciate limitations of ultrasound and its place within the ACR appropriateness criteria. **Curriculum Development and Implementation:** Interdisciplinary faculty includes members from Radiology, Emergency Medicine, Cardiology, Critical Care, OB- GYN, Internal Medicine, Rheumatology, and Science Education. Skills sessions are integrated into the classroom, anatomy lab, and clinical rotations. **Student Assessment and Outcomes Measures:** Knowledge assessment is included in summative assessment during end-of-course exams. Formative assessment occurs during the end-of-course evaluation of physical exam and ultrasound skills. **Summary:** In our 6-year experience with the curriculum, ultrasound has been integrated into most courses and clinical rotations. Initial evaluation suggests enhanced medical education and increased student satisfaction. Further work is in progress to assess impact on future clinical practice of students.

**Education, Other**

**SONICS: A Model of Integrated Ultrasound Education for Medical Students**

Ruth Sarmiento, MD, Hofstra Northwell School of Medicine, Manhasset, NY; William Rennie, Ali Noor, MD; Maria-Louise Barilla-Labarca, MD; Daniel J. Ohngemach, MD; John S. Pellerito, MD; et al (rsarmiento@northwell.edu)

**LEARNING OBJECTIVES:** An essential tool in clinical practice, ultrasound has recently gained traction as a tool for teaching medical students in both the preclinical and clinical arenas. We present an integrated 4 year longitudinal ultrasound curriculum, SONICS (SO-Nographic Integration of Clinical skills and Structure), implemented at the Hofstra Northwell School of Medicine in 2011. The curriculum is designed to adhere to the ACGME mandated competency-based model of learning and satisfy core medical student clinical point-of-care ultrasound milestones.

**RESULTS:** Using Survey Monkey, a survey was sent to the EVMs radiology residents and attendings. Questions consisted of the Epworth Sleepiness Scale, level of training, frequency of overnight call, as well as frequency and type of stimulant and sleep aid use. **RESULTS:** There were 33 responses, 25 take overnight call and 8 do not. The overnight call group was then divided based on the Epworth Sleepiness Scale as Group 1 (N=17, unlikely to be abnormally sleepy) and Group 2 (N=8, average sleepiness and possibly excessive sleepi-
ness depending on the situation). There was no statistically significant difference between the amount of overnight call taken by either group, with both groups taking an average of 6-10 overnight call shifts over the last 2 months. For Group 1, 88% use stimulants and 24% use sleep aids. For Group 2, 75% use stimulants and 25% use sleep aids. There was no statistically significant difference between the prevalence of use of stimulants and sleep aids between both groups. The most frequently used stimulants were coffee/caffeinated beverages, and the most frequently used sleep aids were over the counter agents (such as antihistamines).

CONCLUSION: There was no difference between the prevalence of stimulant or sleep aid usage between those who were unlikely to be excessively sleepy and those who had average or possibly excessively sleepiness depending on the situation. The amount of overnight call was also similar in both groups. Among all participants who take overnight call, 75-88% use stimulants to combat fatigue during their shift and 24-25% use sleep aids after their shift.

(E-033) Tuesday • 7:00–8:00 AM • Hard-copy poster Getting a Feel for Radiology: Kinesthetic Approaches to Radiology Education

Samuel J. Pevzner, MD, PhD, Vanderbilt University, Nashville, TN; Jared Grice, PhD, Edwin F. Donnelly, MD, PhD (samuel.pevzner@vanderbilt.edu)

LEARNING OBJECTIVES: - Gain awareness of kinesthetic approaches to teaching the traditionally visual field of radiology. - Describe and experience visual-tactile sensory augmentation with 3D printed examples. - Leverage crossmodal perception to better understand contrast and noise.

CONTENT DESCRIPTION: The interpretation of radiological images is beset by the iniquities of noisy images and challenging to understand processing techniques. To help shepherd others through this treacherous terrain, we propose that kinesthetic approaches may aid in the understanding of traditionally visual phenomena. We have developed methods for translating visual information into three dimensional models and are rapidly prototyping with 3D printing. Just as topographical relief is represented by contour maps, we transform pixel values into printed textures. As demonstrative examples, we have prepared uniform segments of ACR phantom based images from three tomographic modalities, SPECT, CT, and MRI. Side by side comparisons, as well as additional demonstrative educational examples, invite learners to literally grasp contrast and noise in a more profound manner. By integrating such tactile elements into an educational poster, we demonstrate the utility of this new radiology learning experience.

(E-034) Wednesday • 7:00–8:00 AM • Hard-copy poster Imaging Findings of Intravenous Opioid Abuse Complications

Michael B. Burch, MD, University of Cincinnati Medical Center, Cincinnati, OH; Lily L. Wang, MBBS, MPH; Carl C. Flink, MD, RTifat A. Wahab, DO (burchmb@mail.uc.edu)

LEARNING OBJECTIVES: 1. Identify the complications of IV opioid abuse that can be diagnosed by imaging. 2. Describe radiologic findings of IV opioid abuse across a broad range of imaging modalities and organ systems.

CONTENT DESCRIPTION: Opioid abuse in the United States has reached epidemic proportions in recent years. According to the Department of Health and Human Services, over 21 million Americans misused opioids for the first time in 2015. Demands on the medical system have increased accordingly with opioid-related ED visits having doubled nationwide between 2005 and 2014. The escalation of intravenous opioid abuse (namely heroin and other synthetic morphine derivatives) is particularly alarming with deaths related to heroin now exceeding those attributable to gun homicides. Medical complications of intravenous opioid misuse include the direct neurotoxic action of the drugs, adverse effects of contaminants or filler agents, retained needle fragments, and hematogenous seeding of microorganisms. These can affect nearly any organ including the musculoskeletal, cardiopulmonary, and nervous systems. Imaging often plays a critical role in both the diagnosis and management of IV-drug related pathology. The clandestine nature of opioid abuse use can present a diagnostic challenge to clinicians as patients may not be forthcoming about their substance abuse history. Imaging findings can be the first clue to suggest underlying drug use, and identification of one complication on imaging should lead to a search for others. Radiologists should be familiar with the full range of imaging abnormalities associated with intravenous opioid abuse. In this exhibit, we present a number of case examples with characteristic findings related to opioid abuse across multiple imaging modalities and organ systems.

(E-035) Tuesday • 7:00–8:00 AM • Hard-copy poster IR Residency Selection Process: What We’ve Learned So Far

Minhaj S. Khaja, MD, MBA, University of Michigan Health System, Ann Arbor, MI; Janet E. Bailey, MD, Wael E. Saad, Corrie M. Yablon, MD, David P. Fessell, MD, N. Reed Dunnick, MD (mkhaja@umich.edu)

LEARNING OBJECTIVES: Review criteria for selection of high-quality Interventional Radiology (IR) residents. Highlight the importance of collaboration between Diagnostic Radiology (DR) and IR selection committees. Illustrate changes made at a single institution over the course of 3 selection cycles with sample interview schedule.

CONTENT DESCRIPTION: Although IR and DR have much in common, including residency training, the complexity of IR procedures and non-procedural patient care has increased such that IR has become distinct from DR. The new training paradigm requires medical students with little or no experience in IR to decide to enter IR and to select an IR residency. Selection of high-quality students for IR residency is therefore a complex process. For IR residency programs and students to succeed, selection committees must look beyond board scores and class rank to match the best applicants. Participation in IR rotations, student interest groups, research, and IR-related organizations can help identify the interested students. Selection committees for DR and IR must coordinate their efforts to recruit the highest-quality trainees to both programs, which remain closely related. It is imperative to collaborate throughout the process: review of applications, selection of interview candidates, and ranking of candidates. Leadership from the Chair and Program Directors is essential to success. For candidates, the interview is critical to determine if the DR and IR programs are aligned, with the trainee’s best interests at the forefront. Programs should organize the interview day to allow candidates exposure to DR and IR faculty and residents and DR and IR facilities. Structuring DR and IR interview days together, so candidates for both programs are in the department together, allows trainees more flexibility and reduces their travel costs. The authors will illustrate their experience with a sample interview schedule and how their selection process has evolved over 3 years.

(E-114) Tuesday • 7:20–7:35 AM • E-poster Station #10 An RVU-Based System for Quantifying Physician Academic Productivity in an Academic Radiology Department

Kedar Jambhekar, MD, University of Arkansas for Medical Sciences, Little Rock, AR; Linda A. Deloney, EdD, William C. Culp, MD (K.Jambhekar@uams.edu)

LEARNING OBJECTIVES: To share a customizable RVU based methodology to quantify physician efforts in the educational arena.

CONTENT DESCRIPTION: In Radiology, as in other medical specialties, clinical productivity is measured using relative value units (RVUs). The RVU system assigns a numeric value to a clinical activity based on its complexity and the degree of physician work required. Teaching tasks also have different levels of complexity and can be placed on a comparable value scale. There are no metrics available, however, to

* Faculty financial disclosures are located in the Faculty Index.
assess the totality of academic activities or gauge different teaching activities relative to each other. We suggest that academic RVUs can be used to determine how academic time should be allocated among the faculty. In our department, a faculty member’s allocation of non-clinical time is determined by the section chief and overseen by the Vice-Chair for Research. Assessments of faculty member’s academic productivity are made during semi-annual reviews using an academic “relative value system” (RVU) that was formulated as a method of quantifying productivity using teaching value multipliers (TVMs). The TVM is the ratio of the value of a unit of time spent on teaching tasks and scholarly activity based on their educational value and complexity. Weights assigned to the various activities are arbitrary but were chosen to align faculty activities with department and the college expectations. Expected typical scores for faculty on the tenure track are expected to total 25 to 50 RVUs. As a pilot project, academic RVUs for 2014–17 educational activities were analyzed. Our initial experience confirms that expected totals were feasible and that the model appears to discriminate higher versus lower academic producers.

**E-117** Wednesday • 7:00–7:15 AM • E-poster Station #1

**Factors Associated With Diagnostic Radiology as a Career Choice: A Study of Resident Physicians**

Darya Kurovecki, MA, MD, McMaster University, Hamilton, ON; Stephanie Y. Lee, MD, Sandra Monteiro, PhD; Karen Finlay, MD

**PURPOSE:** A cause for the steady decline in interest in diagnostic radiology as a career remains elusive. The purpose of this study was to survey resident physicians of all training levels to identify attitudes towards radiology that could account for the declining interest.

**METHOD AND MATERIALS:** An online retrospective survey was distributed to residents participating at a single academic center between July and August 2017. Respondents were asked to evaluate their level of agreement with statements regarding radiology using 5-point Likert scales. Higher scores indicated stronger agreement. Participants also identified factors affecting career choice. Data were described using group means and frequencies. Comparisons were made between radiology and other specialties, and between training levels. Participants were categorized as junior (PGY1-2), intermediate (PGY3-4), and senior (PGY5 or higher).

**RESULTS:** A total of 151 medical residents completed the survey: 20 from radiology, 18 from a surgical discipline, 102 from a non-surgical discipline, and 9 unspecified. Fifty percent were junior residents, 34% intermediate and 17% senior. There were no notable differences between training levels. Among radiology residents, there was general agreement that radiologists have high job satisfaction. Additionally, diversity of pathology (mean=4.5) and positive interactions with staff/residents (mean=4.4) were the top attractors. For non-radiology residents, positive clinical experiences influenced their choice of career. Moreover, 70.5% believed that radiologists have little patient contact outside of interventional radiology and identified lack of patient contact (mean=3.9) and dark work environment (mean=3.6) as top deterrents. Some trainees considered radiology, but changed their mind due to lack of a mentor (52%) and becoming interested too late during training (16%).

**CONCLUSION:** The results indicate that exposure to positive experiences in radiology should occur earlier in training. More interactive clerkship experiences are being explored at our institute to address this issue. Finally, additional qualitative exploration of trainees’ perceptions may identify key interventions that can be introduced early in training.

**AUR Trainee Prize: 2nd Place**

**E-118** Wednesday • 7:00–7:15 AM • E-poster Station #3

**Factors and Resources Affecting Ranking of Diagnostic Radiology Residency Programs by Medical Students in 2016-2017**

Mary D. Maher, MD, Columbia University, New York, NY; Lydon Luk, MD, Elise Desperto, MD, Joshua L. Weitnraub, Sheik Amin, BA; Rama Ayyala, MD (mdm9013@nymh.org)

**PURPOSE:** To evaluate demographics of medical students that applied to our radiology residency program in the 2016-2017 academic year, determine which factors applicants valued most highly when ranking radiology programs and identify the major resources used to learn about residency programs during the interview process.

**METHOD AND MATERIALS:** A questionnaire of 19 questions was sent to 622 applicants to our diagnostic radiology (DR) and combined diagnostic/interventional radiology (DR/IR) residency program tracks. Survey results were anonymized and collected after both candidates and residency programs submitted rank lists to the National Resident Matching Program (NRMP) and before Match Day to ensure that the selection process was not biased. Applicants ranked thirty-five unique factors that may influence their residency rank list order from 1 (not important at all) to 5 (very important), listed their top five “very important” factors, and ranked various sources of information used to learn about residency programs.

**RESULTS:** 117 of 622 applicants (18.8%) replied to the survey, 65.8% (73/111) male and 34.2% (38/111) female. The five most important ranked factors in determining the applicant’s rank list were perceived happiness of the residents and faculty (4.69), fellowship and job placement of recent graduates (4.34), interactions with the program’s current residents (4.33), stability of the department and residency program (4.29) and geographic location of the program (4.27). Of the factors deemed very important, the top three factors were geographic location of the program (26.4%, 29/110), academic reputation of the program (25.4%, 28/110) and perceived happiness of the residents and faculty (17.3%, 19/110). The top four resources for learning about residency programs were current residents at the program (4.47), program director(s) at the program (3.87), faculty that interviewed at the program (3.64) and the residency program website (3.64).

**CONCLUSION:** Medical students consider a large number of factors and resources in determining their rank lists, with factors encountered during the interview day playing a significant role in shaping the applicants’ view of a residency program.

**Education of Residents**

**E-037** Tuesday • 7:00–8:00 AM • Hard-copy poster

**Laboratory Values: A Radiologist’s Forgotten Best Friend**

Jesse Chen, MD, Staten Island University Hospital, Staten Island, NY; David S. Sarkany, MD

**LEARNING OBJECTIVES:** An overarching theme in radiology is the effort to make an imaging study’s dictation clinically meaningful. But all too often, radiologists work in a vacuum, forgetting the wealth of information readily available at their workstations. There are specific laboratory values that are both commonly used and particularly important for all radiologists to be familiar with. A quick glance at a patient’s laboratory values can often help the radiologist rule in or rule out a specific diagnosis, and attention to the patient’s laboratory history can help the radiologist generate a report that fits within the greater clinical picture. This poster breaks down an array of helpful laboratory values by radiological subspecialty, and discusses their meaning and application for radiologists. Relevant images are provided as examples of what the radiologist might encounter given a specific laboratory derangement.
CONTENT DESCRIPTION: General Laboratory values to check prior to imaging. • eGFR for IV contrast for CT and MRI. Subspecialties of Radiology: • Abdominal imaging • Tumor Markers (CEA, CA19-9, PSA, CA125) • Lactate • LFT (AST, ALT, Albumin, GGTT) • Bilirubin labs (Direct bilirubin, Indirect bilirubin) • Pancreas labs (Amylase, Lipase) • Renal labs (BUN, Creatinine) • GU (B/HCG, urinalysis) • Breast Imaging • Cardiac Imaging • Troponin levels • Lipid panel (Total cholesterol, HDL, LDL, Triglycerides) • Emergency Radiology • BCG, Chemistry • Musculoskeletal Imaging • ESR/CRP • Neuroradiology • CSF analysis • Nuclear Medicine • Thyroid function testing. • Thoracic Imaging • DDimer • Vascular Interventional Radiology • Platelet • Coagulation profile • BNP in PE lysis

(E-038) Wednesday • 7:00–8:00 AM • Hard-copy poster Radioactive Iodine Residency Training and Health Care Disparities

Amit Ramjit, MD, Staten Island University Hospital, Staten Island, NY; Lisa Americo; Michelle Wu, MD; Mark Raden, MD; David S. Sarkany, MD (aramjit@gmail.com)

LEARNING OBJECTIVES: 1. Define health care disparities and their relationship to radiology and practicing radiologists. 2. Summarize and classify existing research published on radiology specific health care disparities. 3. Provide a framework for education on health care disparities for radiology residency programs.

CONTENT DESCRIPTION: The population of the United States grows increasingly diverse, creating the need for innovations in patient-physician communication and accessibility. As a result, residency education must strive to meet these varied needs and to combat the formation of health disparities. Especially prevalent in underserved communities, these disparities are differences in the presence of disease, health outcomes or access to healthcare. Radiology curricula must reflect radiologists’ role as not only consultants, but vital members of public health care improvement. Currently, there are no standardized models for teaching health care to radiology residents and our poster aims to not only identify examples of health care inadequacies within radiology, but also provide a possible framework for ACGME accredited radiology residency programs. Topics to be discussed are the new ACGME guidelines on education and health care disparities as well as define concepts such as health care disparities, cultural competency and unconscious bias. Examples of healthcare disparity in the radiology literature will be cited and discussed. Finally, an educational framework for teaching our radiology residents will be presented. A literature review was performed using a Pub Med and Google Scholar search for publications addressing health care disparities and education in radiology.

(E-039) Tuesday • 7:00–8:00 AM • Hard-copy poster Teaching Residents to Be Authorized Users for Radioactive Iodine Treatment

Tram H. Schroeder, MD, Indiana University School of Medicine, Indianapolis, IN; Vasanthana D. Aaron

PURPOSE: Radioactive iodine therapy for hyperthyroidism is not without risks, and patient instructions are extensive. Residents should understand hyperthyroidism, possible treatments, and risks and benefits of radioidine therapy prior to graduating as authorized users. In addition, they must learn how to counsel patients effectively. The purpose of this study was to evaluate whether a video reviewing radioidine ablation improves their knowledge base and makes residents more comfortable with the process.

METHOD AND MATERIALS: A video was created detailing the process of undergoing radioactive iodine therapy for hyperthyroidism with pre- and post-treatment instructions. Residents were asked to complete a short test about radiiodine thyroid ablation, as well as a ten-question “feelings” survey about their comfort level regarding the treatment process prior to and one day after watching the video. The knowledge survey questions were derived from material directly discussed in the educational video. The feelings survey included questions such as, “How knowledgeable do you feel about the purpose/goal of radioactive iodine therapy?” and “How knowledgeable do you feel about care instructions after receiving radioactive iodine therapy?” Residents answered the latter survey with a numerical score between 1 and 5 inclusive with 1 being the least and 5 being the most knowledgeable/comfortable.

RESULTS: A total of 11 first year residents participated. Ten residents had not yet rotated through nuclear medicine or had prior experience with radioactive iodine therapy. There was statistically significant improvement in knowledge and feelings scores (in total as well as for each question within the survey) after watching the video. There was an average improvement of 3.5 points on the knowledge survey (p = 0.00002) and an average improvement of 8.8 points on the feelings survey (p = 0.0001).

CONCLUSION: Our study demonstrates that an educational video detailing the radioactive iodine treatment process for hyperthyroidism improves residents’ knowledge base and their comfort level with performing thyroid ablations. We plan to continue recruiting first year residents and may expand the study to include more senior residents.

(E-040) Wednesday • 7:00–8:00 AM • Hard-copy poster Effect of Formal MRI Foreign Body Clearance Training on Radiology Resident Knowledge

Elias P. Taxakis, MD, University of Michigan, Ann Arbor, MI; Kara D. Gaetke-Udager, MD; Hemant A. Parmar, MD; Matthew S. Davenport, MD

PURPOSE: Screening for retained or implanted foreign bodies is required for all patients undergoing an MRI examination at our institution. The evaluation of patient radiographs for these items is commonly performed by radiology residents. Many residents felt uncomfortable when responsible for “clearance” of foreign bodies prior to MRI, especially in the on-call setting. The aim of this study is to determine the effectiveness of MRI foreign body clearance training.

METHOD AND MATERIALS: A one-hour didactic training session using PowerPoint slides with example images was created by a senior radiology resident and presented at a resident conference. A twelve question, pre- and posttest was administered to the residents in attendance. One question regarded year of training, one question regarded subjective comfort level with foreign body clearance, and ten questions were knowledge based. Scoring was done on a 25-point scale. Residents completed the pretest before and the posttest immediately after the training session. The results were analyzed using paired t-sample tests to evaluate for statistical significance.

RESULTS: 7 first-year, 8 second-year, 5 third-year, and 6 fourth-year residents completed the pre- and posttest. There was a 42% improvement (P = 0.0004) for first year, 17% improvement (P = 0.04) for second year, 12.5% improvement (P = 0.01) for third year, 18% improvement (P = 0.01) for fourth year, and a 22% improvement (P = < 0.0001) for all residents combined. The majority of residents self-reported feeling between “somewhat uncomfortable” to “neither comfortable nor uncomfortable” on the pre-test regarding MRI foreign body safety clearance, but the majority of residents felt “somewhat comfortable” (P < 0.0001) on the post test.

CONCLUSION: Formal training for MRI foreign body safety clearance is important for residents of all levels. After a one-hour didactic session on this topic, junior and senior residents have increased understanding of the concepts necessary to deem a patient safe for MRI examination as well as improved self-reported comfort levels with MRI safety “clearance.” Other institutions may benefit from implementing a similar training course, especially for junior residents prior to beginning call.

(E-041) Tuesday • 7:00–8:00 AM • Hard-copy poster Establishing and Implementing a Surgical Preliminary Year in the IR Residency: Keys to Success

Minhaj S. Khaja, MD, MBA, University of Michigan Health System, Ann Arbor, MI; Bill Majdalany; David Hughes; Paul Gauger; Janet E. Bailey, MD, Wael E. Saad (mikhaja@umich.edu)

LEARNING OBJECTIVES: Review the basis for the clinical model of the Interventional Radiology (IR) residency. Highlight the importance of...
establishing strong interdepartmental relationships with an educational and clinical focus. Outline the process and collaborative method for obtaining institutional approval and ACGME accreditation.

CONTENT DESCRIPTION: IR is historically a Diagnostic Radiology (DR) subspecialty and image interpretation continues to be a critical component of IR practice. The complexity of IR has increased with development of therapeutic procedures. The role of IR in non-procedural patient care has increased, such that IR has become more distinct from DR, which motivated development of the IR residency. IR physicians conduct physical examinations, obtain patient histories, formulate plans of evaluation and treatment, perform treatments, and provide post-procedural care. IR patient care now requires assumption of longitudinal inpatient and outpatient management by the IR physician. IR clinical responsibilities have increased to the point that it became difficult or impossible to prepare IR trainees to be competent in both the clinical care of IR patients and the performance of IR procedures within the confines of a traditional one year VIR fellowship. The new IR training paradigm is designed to ensure that interventional radiologists are prepared to provide excellent clinical care for patients undergoing image-guided procedures, to perform IR procedures, and to interpret DR imaging which remains critical to successful practice. To develop competence in non-procedural patient care IR residencies have sought innovative educational opportunities. We describe how to partner with colleagues in General Surgery to offer a one-year surgical internship specifically designed for IR trainees, designed to establish a surgically-oriented foundation in clinical care. We will highlight specific objectives of this partnership and potential benefits for both surgical and IR programs. The authors aim to illustrate the pathway to establishing and implementing a surgical preliminary year in a flow diagram including an example timeline of events and key decision making points.

(E-042) Wednesday • 7:00–8:00 AM • Hard-copy poster
Proposed Core Medical Student Radiology Curriculum for All Graduating Medical Students: The Canadian Experience

Elise Nguyen, MD, Toronto General Hospital, Toronto, ON; Alexandre Menard, MD, FRCP; Christopher M. Straus, MD* (elsie.nguyen@uhn.ca)

PURPOSE: To generate a core radiologist-led imaging curriculum to be implemented across all Canadian medical schools.

METHOD AND MATERIALS: Background: In 2012, a revised medical student radiology curriculum was published representing an "overarching compendium of possible topics and resources from which educators can pick and choose those portions that best suit their needs". While useful and comprehensive, it contains many learning objectives that are not achievable for the majority of medical schools due to limitations both in time and resources. Topics were also not ranked in order of importance.

Method and Materials: In order to identify a condensed core series of learning objectives, education leads across Canada were solicited for content working from known accepted resources, student needs and the AMSER endorsed curriculum. This national curriculum went through a modified Delphi process to vet the content and achieve national consensus. We aimed to formulate a more realistic national curriculum to be implemented by a radiologist-led initiative nationwide. Validation included acceptance by all undergraduate educational leads across Canada (n=141), and subsequent endorsement by the Canadian Heads of Academic Radiology (CHAR) and the Canadian Association of Radiologists (CAR).

RESULTS: This curriculum includes twelve major content areas targeting core competencies and skills that medical students should master by graduation. Thus the list evolved into the expected minimum competencies for medical students irrespective of their future specialty training. These core competencies purposefully overlap with expectations set by the Accreditation Council for Graduate Medical Education (ACGME) competencies and AMSER learning objectives.

CONCLUSION: As radiologists are challenged by medical imaging that is taught extensively by non-radiologists, it is critically important for radiologists to lead medical student education. Implementing our core medical imaging curriculum has helped us achieve uniform expectations across a national network of educators, and has supported radiologists negotiating for more time in medical student education.

(E-043) Tuesday • 7:00–8:00 AM • Hard-copy poster
Radiology Resident Resilience: Strategies for Wellness in the Workplace

Sarah Elades, MD, New York Presbyterian-Weill Cornell Medical College, New York, NY; Lily M. Belfi, MD (sab2041@nyup.org)

LEARNING OBJECTIVES: 1. Define resilience and understand its impact on the overall wellness of physicians in training. 2. Recognize the importance of resident resilience in radiology. 3. Identify features of radiology resident burnout and/or physical strain. 4. Gain insight into novel strategies to enhance radiology resident wellness. 5. Apply wellness techniques to one’s own residency experience.

CONTENT DESCRIPTION: Resident wellness is a topic of growing interest in the medical community. However, within radiology, there is a relative paucity of data regarding resident wellness and discussion of techniques to reduce physical strain secondary to the sedentary nature of radiology as well as emotional burnout. Our educational poster will discuss the concept of resilience as it relates to radiology residents, examine emotional and physical signs of resident burnout and strain, and review barriers to achieving wellness. We will introduce strategies and techniques to enhance radiology resident wellness and explore potential opportunities for implementation in the workplace.

(E-044) Wednesday • 7:00–8:00 AM • Hard-copy poster
Quality by Committee: Implementing an Enduring Residency-Wide Quality Improvement Program

Kelly W. Capel, MD, UW Health Hospitals and Clinics, Madison, WI; Matthew W. Shore, MD, Nathan Y. Kim, MD, John-Paul J. Yu, MD, PhD, Richard J. Bruce, MD*, Stephen Tang, MD (kcapel@uwhealth.org)

PURPOSE: To create an enduring practice quality improvement program for diagnostic radiology residency programs.

METHOD AND MATERIALS: At the beginning of the academic year (July 1, 2017), our program launched a residency-wide practice quality improvement initiative. This new program is designed to meet five important criteria meeting including objectives and outcomes as outlined by the ACGME and the Milestones Project. Residents are expected to (1) describe current departmental QI initiatives; (2) incorporate QI into clinical practice; (3) participate in a QI project; (4) become familiar with national radiology quality programs; and (5) design and implement a QI project. Every year, the program is led by a Chief Resident and two lead representatives from each residency class who as a committee propose, research, design, and execute a residency-wide QI project under the auspices of a faculty mentor. Each residency class is charged with following through and executing one portion of the QI project (led by the class representatives) ensuring participation of all residents across the residency program. Future projects are proposed and designed on a yearly rotating basis, always commencing at the beginning of each academic year.

RESULTS: Only first quarter results are available for review (July 2017-September 2017). We currently have 100% engagement across our residency program with all residents currently participating in a radiation dose QI project. At this early stage, residents have already met 4 of the 5 objectives outlined at the outset of the program, with residents just beginning to incorporate QI into our academic clinical practice. As our project progresses, we will highlight our methods and techniques for establishing this project across our residency and to encourage ongoing resident engagement.

CONCLUSION: We have created an innovative framework for a residency-wide quality improvement program that achieves early and high level resident engagement and participation. By utilizing our formula, concepts will easily translate across radiology residency programs nationwide assisting them to better systematically and routinely incorporate quality projects throughout their residency education.

* Faculty financial disclosures are located in the Faculty Index.
(E-045) Tuesday • 7:00–8:00 AM • Hard-copy poster
Research Production for the Clinical Educator: Extracting Objectivity from Educational Interventions
Alexander Dabrowiecki, MD, Emory University Hospital, Atlanta, GA; Frederic J. Bertino, MD; Patricia Balthazar, MD; Ryan B. Peterson, MD; Elizabeth A. Krupinski, PhD (adabrowie@emory.edu)
LEARNING OBJECTIVES: 1) Design educational interventions with the capability of generating data for scientific publication. 2) Recognizing which data metrics are appropriate for various types of educational interventions. 3) Understand potential outcome measures for education-centered research.

CONTENT DESCRIPTION: A problem that exists in radiology education lies in the inability of many educational interventions to generate objective data to demonstrate benefit. Because of this, many educational methods often go underreported to the academic community, and subsequently lack the benefit of reproducibility that is needed to justify positive change in how educators instruct radiologists in training. We present key steps in gathering relevant data with the goal of publication and dissemination of our methods for educators to implement into their own practice. As with most robust and relevant research, initial steps include clearly defining the goal and core questions to be answered. Particularly relevant data to educators are decisions about what task is under investigation (diagnosis vs recommendation), what is being measured (diagnostic accuracy vs time to interpretation), and how best to compare groups after intervention (same group of subjects pre- and post- intervention or control vs intervention group).

Once defining the intervention and developing relevant hardware/software, study implementation considerations include: number of cases, location of abnormalities, subtlety, number of subjects, and importantly how will the relevant data be obtained given the metrics to measure success objectively? Educational studies should utilize learning theory and, specifically for radiology, focusing on a specific cognitive or perceptual aspect of image interpretation to generalize to other trainees can ultimately improve the educators’ efficiency in disseminating relevant material. Approaching an educational intervention with scientific methodology results in testable educational hypotheses with objective outcomes amenable to reproducibility for evaluating the extent of benefit. Sharing successful educational intervention is crucial to the advancement of radiology education.

(E-046) Wednesday • 7:00–8:00 AM • Hard-copy poster
The Role of Educators in Radiology Residents Well-being: The Case of UTHealth Diagnostic and Interventional Imaging Department
Raya H. Alhalawanì, MD, UTHSC Houston, Houston, TX; Latifa L. Sanhaji, MD (raya.h.alhalawan@uth.tmc.edu)
LEARNING OBJECTIVES: As burnout and resilience are increasing in popularity in the academic medical journals and conferences, we propose to review the literature, compare our institutions’ data and discuss various management methods using individual, departmental and organizational resources targeted to residents. The learning objectives include: - Analyze the components of burnout, resilience and well-being specific to residents, and particularly radiology residents. - Review of the literature and comparison with our department demographics - Learn about individual, organizational and departmental means to build resilience, promote well-being and the role of radiologists educators.

CONTENT DESCRIPTION: UTHealth and the Diagnostic and Interventional Imaging (DII) Department are aware of the growing burnout and are taking the appropriate measures to address it. We have recently assessed our residents’ wellbeing, resilience, challenges and stress relief mechanisms in an informal 18-question survey. With more than 30% response rate, the extracted data was analyzed and compared to residents on the national level using different resources (including Medscape resident lifestyle and well-being 2017 and Well-being Index by Mayo Clinic). The Institutional contribution through the

Residents and Fellows Assistance Program involves several fields: - Educational, management and leadership seminars. - Financial, legal and work life referral resources. - Wellness tools are also offered such as a recreation center, nutritional programs and yoga/meditation sessions. - Mental Health Counselors are available 24/7 at no out of pocket expense. The departmental contribution includes currently - Educational resources - Opportunity to volunteer - Monthly meeting with the chair - Monthly social meetings - Dedicated study/relaxation lounge - And more... The limitation of these efforts lies in the difficulty to reach out to busy residents. Limited funding is also a hurdle to take into consideration. However ongoing improvements are planned, as dictated by feedbacks and regular evaluation.

(E-047) Tuesday • 7:00–8:00 AM • Hard-copy poster
Utilizing Focus Groups to Evaluate Radiology Resident Rotations
Hasnain Hasham, MD, University of Kansas, Kansas City, KS; Kaley J. Pippin, MD; Shelby J. Fishback, MD; Sarah M. Hartman; Lacy Bernboom; Jacqueline Hill, MPH; et al
PURPOSE: Resident evaluations of staff and rotations are a critical component of radiology training. Not only are they required by ACGME, but they can help improve the quality of resident education. Traditionally, our institution, radiology residents complete electronic Likert scale evaluations, which limits information that can be gleaned from the evaluation. This evaluation style does not engage the reviewer, builds complacency in the review process, and limits constructive criticism. Most importantly, feedback rarely results in meaningful change. The goal of this study was to evaluate if interactive focus groups, frequently used in marketing and social research, could improve the resident evaluation process and provide more meaningful feedback to guide change.

METHOD AND MATERIALS: We developed focus groups for each of our 13 radiology rotations, to be performed over 8 months starting in August 2017. Each group is moderated and recorded by two non-clinical program coordinators and observed by a chief resident. Two representatives from each radiology class, who have completed at least one block in the rotation being evaluated, participate in each group. All residents are excused from clinical duties during the session to keep the review process anonymous. Six general, open-ended questions are posed in each session with 1-2 additional section-specific questions. Anonymized feedback from the focus groups is consolidated by the program coordinators and delivered quarterly.

RESULTS: Focus groups will be completed in March 2018, with 3 sessions completed to date. Initial feedback from 20 participating residents has been different from previous electronic feedback, with suggestions leading to improvements in rotation orientation, instruction on using different image viewers, and staff feedback mechanisms. At completion, staff and residents will be surveyed to determine if they found the focus group feedback helpful and if it resulted in meaningful improvements to each rotation.

CONCLUSION: Focus groups have been found to be a beneficial tool in a variety of professions. Our goal is to determine if focus groups can be utilized to more effectively evaluate and improve radiology resident education at our institution.

(E-048) Wednesday • 7:00–8:00 AM • Hard-copy poster
Welcome to Radiology: Navigating the Start of Residency
Brendan McCleary, Lahey Hospital & Medical Center, Burlington, MA; Jalal Afzan, MD (Brendan.Mccleary@lahey.org)
LEARNING OBJECTIVES: 1. Facilitate the transition of new trainees to a Radiology residency program with structured exercises and formal departmental and systems based orientation. 2. Test baseline resident knowledge of safe clinical practice, and hazards within a Radiology department. Re-test following specific education in safety protocols and quality assurance processes.

* Faculty financial disclosures are located in the Faculty Index.
CONTENT DESCRIPTION: Background: The outset of Radiology residency training is typically an abrupt transition from internship, the lasting memory of which, for most, is an interminable list of mundane tasks and administrative duties. This provides little training for, or exposure to the daily practice of radiology, despite most residents finding themselves in a reading room within their first week. A resident poll revealed deficiencies in early IT training (PACS, Dictation, EHR, and an Integrated Departmental workflow tool used for reading lists, protocolling and communication), understanding of image acquisition/artifacts, safety protocols and the role of technologists and ancillary staff. Method: A series of exercises was planned to formally orient the new residents with the Department, including subspecialty image acquisition areas and common artifacts, interaction with technologists/managers, review safety protocols, typical patient interactions, and expected communication of urgent/critical results with referring physicians. A pre-and post test was administered to evaluate the residents baseline knowledge and relative improvement, with Likert scale responses. Results: A significant improvement in knowledge and relative comfort was demonstrated for each resident following the formal training process. The technologists and other staff provided positive feedback of departmental orientation, identification of emergency equipment and improved understanding of resident roles and expectations. Conclusion: The exercises provided a clear and structured foundation for the outset of residency training, enhancing resident confidence and accuracy in providing higher quality work at an earlier stage. Other residency programs will likely benefit from this early intervention.

(E-108) Tuesday • 7:00–7:15 AM • E-poster Station #2 Review of Current Radiology Consultation Models and Experience with Resident Driven Services
Hernan R, Bello Velez, MD, Emory University, Atlanta, GA; Dexter Mendoza, MD, Frederic J. Bertino, MD; David M. Theriot, MD, Ryan B. Peterson, MD (hbellov@emory.edu)
LEARNING OBJECTIVES: 1) Review the models of radiology consultation services reported in the literature 2) Explore the published experience with resident-driven radiology consult services in academic centers 3) Describe the opportunities, challenges, and triumphs in implementing radiology consultation services.

CONTENT DESCRIPTION: Referring physicians often seek the radiologists’ guidance not only in selecting appropriate imaging and in determining diagnosis, but also in directing patient management and treatment. With the threat of radiology commoditization and with the national shift towards value-based-care, preserving our reputation as imaging experts and reminding our patients and colleagues of the value we add to care have become more important than ever. One way of doing so is through the consultation services we provide. Multiple models exploring how to best serve the role of imaging consultants have been described and have been published since at least the 1970s. Academic institutions have been at the forefront of these creative efforts to find a model that is both valued by clinicians and efficient for the radiologist, often times with initiatives led by radiology residents. Models ranging from utilizing technology to implement virtual radiology rounds, to physically embedding the reading rooms within clinics have shown promise. More novel ideas include radiology clinics with direct consultation with patients, and “concierge radiology” where radiologists decrypt imaging reports into layman’s terms geared towards patient understanding have also been described. Besides providing a valuable service to referring clinician and patients, these strategies have also been used to enhance resident education. These resident-focused and resident-driven interventions allow for greater visibility for radiology to other clinicians and patients, while fostering training radiologists to take on the role of consultant, healthcare team member, and leader. In this educational exhibit, we explore the evolution of radiology consultation services and explore the unique opportunities and challenges in implementing such services with residents taking lead.

(E-111) Tuesday • 7:00–7:15 AM • E-poster Station #8 Overview of the Emergencies in the Radiology Department
Iris Chen, BS, MS, Mount Sinai, New York, NY; Nolan J. Kagetsu, MD
LEARNING OBJECTIVES: - Learners will appreciate the importance of reviewing management of emergencies in the radiology department as they are uncommon but are associated with high risk. - Learners will be able to identify and effectively manage common emergencies in the radiology department.

CONTENT DESCRIPTION: While medical emergencies are not common in the radiology department, they are important to review as these situations can be life-threatening for patients when they do occur. Patients who visit the radiology department may be particularly at risk for adverse events as those who need diagnostic imaging may have more comorbidities than the average patient in the hospital. Furthermore, there are less resources, equipment, and staff for emergency care in the radiology department. The poster provides a compilation of emergency cases that can occur in the radiology department, including anaphylactoid reaction, vasovagal syncope, pulmonary edema, seizure, contrast media extravasation, retinal artery occlusion, and chest wall rigidity syndrome. The poster will review the pathophysiology, clinical manifestations, risk factors, and initial management of each emergency. Sample case: A 71-year-old man with lung cancer presents for a mediport placement and receives conscious sedation with fentanyl and midazolam. He subsequently becomes restless then unconscious. Physical exam is notable for clenched hands and jaw, a rigid chest, and apnea. This is chest wall rigidity syndrome, also known as “stone chest”, which is caused by the use of fentanyl, and is attenuated by midazolam. Symptoms include a loss of consciousness, chest wall rigidity causing apnea and desaturation, and bradycardia. This syndrome is dependent on the dose and rate administered, although it has also been shown in patients receiving fentanyl patches. Other risk factors include extremes of age, patients with comorbidities, and antidepressant use. Management involves a neuromuscular blockade and intubation to secure the airway. The effects of fentanyl can be reversed with 0.2 mg IV of naloxone.

(E-115) Tuesday • 7:40–7:55 AM • E-poster Station #2 Precision Radiology Training: Special Distinction Tracks for Non-Interpretive Professional Development
Elizabeth J. Snyder, MD; Karen M. Horton, MD; Pamela T. Johnson, MD, Johns Hopkins Hospital, Baltimore, MD (psnyder55a@jhmi.edu)
LEARNING OBJECTIVES: The role of radiologist has expanded beyond the tripartite mission of patient care, education and research to include cross-specialty consultation for patient management, innovative solutions to improve healthcare quality and safety, device design, and policy advocacy. As such, residency programs should include formalized training to prepare residents for these various professional roles. Since the 2015-2016 academic year, 5 special distinction tracks focused on non-interpretive skills have been integrated into our residency program: Clinician Educator, Quality Improvement, Entrepreneurship/Innovation, Policy Advocacy and High-Value Care. Each of these tracks is longitudinal, with a set of metrics throughout the residents’ training required to achieve certification. In addition to developing important skills, these tracks enrich training by facilitating residents’ ability to make meaningful contributions to the department and institution during their 4 years and disseminate successful initiatives through presentation at national meetings or publication. Learning objectives: 1) Viewers of this exhibit will learn about the unique requirements for each special distinction track and the resources used to support each program. 2) Residents in each of the special distinction tracks have implemented successful initiatives related to the focus area, which will also be described.

* Faculty financial disclosures are located in the Faculty Index.
CONTENT DESCRIPTION: Introduction Requirements for each professional development track (number of graduates) • Clinician Educator (3 residents) • Quality Improvement (3 residents) • Health Care Policy (3 residents) • High-Value Healthcare (1 resident) • Entrepreneur/Innovator (1 resident) Resources developed by residents participating in these programs • Body CT lab for medical students • Online teaching modules for CT and MR protocol design and ACR Appropriateness Criteria • Creation of Resident and Fellow Section in ACR branch. • Annual lobbying events in Washington, DC • Senior resident consultant who staffs PACs in medical step-down unit • Provisional patent application for interventional radiology IT solution Future directions

(E-116) Tuesday • 7:40–7:55 AM • E-poster Station #10
The Thinking Radiologist: A Novel Method of Teaching Emergency Radiology to First-Year Residents Before Independent Call
Sanjaya Viswamitra, Rohan Samant, MD; Linda A. Deloney, EdD; Kedar Jambhekar, MD, University of Arkansas for Medical Sciences, Little Rock, AR
LEARNING OBJECTIVES: To introduce a unique and innovative approach, the Thinking Radiologist, to teaching R1s emergency radiology.
CONTENT DESCRIPTION: There is no requirement by the ACGME or ABR for a subspecialty emergency radiology curriculum. Nor is there a standardized process to assess a radiology resident’s preparedness to take call. Most programs expect R1s to learn sufficiently on core rotations and by observing a senior resident on call during the first 12 months. A 10-hour Emergency Radiology course based on the ASER core curriculum was prepared for residents starting call. Combined workshops and lectures were given during protected teaching time. Before clinical duties each morning, each R1 was given a PACS station and a list of 10 to15 anonymized cases to review. Normal cases were included. Each study was exactly as the resident would see it on call. The resident had an hour to give preliminary readings for all cases. The cases were reviewed in the afternoon with some didactic teaching. A new term – “thinking radiologist” – was coined to emphasize efficient and accurate imaging evaluation in high stress situations. The R1s were taught to use a 30 second ‘time-out’ before beginning image review as well as to review a mental check list - clinical diagnosis, complications and relevant findings. This was practiced for each case during the review and residents were encouraged to develop their own check lists during the independent morning workshop. It was a unique and innovative component of the course. The course has been given twice (2016 and 2017) in January, the mid-academic year. This also allowed 3 months for reflection/remediation before call. All R1s were required to attend. Residents were highly satisfied as their weaknesses were identified and corrective methods offered to improve their confidence and skill in the emergency setting. In an unexpected response, 50% thought the course was too short. Perhaps this indicates course excellence as the residents desire to see a broader scope of teaching. Four months post-course, we used a computer-based simulation test to provide formal documentation of each resident’s competence for independent call.

(E-119) Wednesday • 7:00–7:15 AM • E-poster Station #9
Leveling the Playing Field: Boot-Camp Style Use of MedU Core Cases and Workshops for Incoming Radiology Residents
Lee A. Myers, MD, University of Southern California, Los Angeles, CA; Srevasanthi Reddy, MD; Jeffery Hogg, MD, Carl R. Fuhrman, MD; Petra J. Lewis, MD
LEARNING OBJECTIVES: • Describe existing disparities in medical schools’ provision of basic radiology instruction • Describe how using widely available, peer-reviewed instructional resources can teach consistent basic radiology concepts to new residents, remediating disparity • Discuss how engaging 2nd-4th year radiology residents as workshop facilitators helps them form bonds with new residents • Describe accreditation requirements fulfilled by engaging residents as teachers • Reflect on effects of creating multilevel teaching-learning communities in training programs to focus and engage stakeholders in the mission of education
CONTENT DESCRIPTION: Authors from four University residencies describe their similar use of MedU CORE cases and Flipped Classroom Workshops for initial Boot-camp style instruction of new R1 residents. Details and differences of methods are presented, including the use of: • Peer-to-peer teaching to promote teacher/learner community • A single faculty to standardize teaching from year to year • A combination of both faculty and residents. Beneficial effects of this Boot-camp curriculum early in the R1 year on the “learner” residents, the “teacher” residents, and the overall program are the focus of this poster. The outcomes exceed simply remediating a disparity in provision of radiology education among different medical schools. Several additional beneficial effects are described, including: • Create communities of teaching-learning partnerships among teacher-learner of different levels • Provide potent substrate for cultivation of positive relationships among program personnel • Lower barriers for becoming engaged in teaching activity • Make and sustain ongoing atmosphere of co-equal primacy of education with patient care in our academic health centers • Opportunities for laddered mentorship

(E-121) Wednesday • 7:20–7:35 AM • E-poster Station #6
Best Practices for Resident Missed Case Conference (MCC)
Udit Rawat, MD, University of Virginia Health System, Charlottesville, VA; Arun Krishnaraj, MD; Jason N. Itri, MD, PhD (uditrawat1087@gmail.com)
LEARNING OBJECTIVES: 1. Describe best practices for effective resident missed case conference (MCC) 2. Develop didactic content regarding diagnostic error and peer review to enhance resident MCCs 3. List interventions that can reduce cognitive biases and diagnostic errors among residents 4. Explain how the principles of a Just Culture can be applied to resident misses and MCCs
CONTENT DESCRIPTION: 1. Didactic content regarding diagnostic error and peer review with learning objectives 2. Methods to identify resident missed cases 3. Methods to present resident missed cases emphasizing contributing factors and systematic causes of errors 4. Principles of Just Culture

(E-122) Wednesday • 7:40–7:55 AM • E-poster Station #2
Flipping the Classroom: An Alternative Approach to Radiology Resident Education
Madeleine Sertic, University of Toronto, Toronto, ON; Laila Alshafai; Luis Guimaraes, Linda J. Probyn, MD, Nasir Jaffer
LEARNING OBJECTIVES: 1) Briefly revisit current formal resident teaching rounds 2) Define Flipped Classroom, the new concept of learning 3) Learn how Flipped Classroom pedagogy can be applied to formal teaching rounds to increase active learning and improve retention among residents
CONTENT DESCRIPTION: Historically, radiology resident education relied on didactic, passive teaching methods. Classic viewbox rounds involve selected resident taking cases while the rest observe. Increasing understanding of adult learning strategies has revealed the importance of active learning. “Flipped Classroom” is an active pedagogy, which inverts traditional rounds. We use 3 approaches: 1) 7-10 cases e-mailed to residents in PDF format prior to rounds, residents submit responses (diagnosis or key findings). Facilitator reviews responses and adjusts the rounds presentation to address weaknesses. 2) Comprehensive review articles distributed prior to rounds. Related cases are taken by residents during rounds. 3) Combination of approaches 1 and 2. Cases and related articles are e-mailed to residents prior to rounds. Flipped Classroom has been discussed in various iterations in the radiology resident education literature since the 1970’s. However, it has yet to be widely adopted

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over traditional rounds. Our experience demonstrates multiple benefits to Flipped Classroom rounds, which correlate with findings in the literature. In traditional rounds, residents taking cases receive the most benefit. In Flipped Classroom, every resident takes every case, eliminating the passive “audience member” effect. Elimination of the “hot-seat” decreases pressure on individuals, positive learning environments correlate with higher rates of information retention. Forcing residents to commit to diagnoses also improves retention. More cases can be covered during one conference. Having the instructor preview responses allows for recognition of gaps in detection and knowledge. The rounds presentation can then be modified to focus on these relative weaknesses. Following the conference, the presentation PDF, which contains detailed discussions, extra images, and references, can be distributed to the residents for self-directed study.

(E-123) Wednesday • 7:40–7:55 AM • E-poster Station #3
Unintended Benefit of the Integrated IR Residency: Enhancing Diagnostic Imaging Interpretation through Clinical Correlation

Nishant Patel, MD, University of Michigan, Ann Arbor, MI; William Sherk, MD, Michael R. Cline, MD, Minhaj S. Khaja, MD, MBA (nshchant@med.umich.edu)

LEARNING OBJECTIVES: Demonstrate the value of clinically-based rotations in enhancing residents’ ability to interpret diagnostic radiology studies. Learn ways to use clinical correlation in daily imaging interpretation to increase the value of radiology to clinicians. Propose a curriculum change to enhance clinical prowess of diagnostic radiologists.

CONTENT DESCRIPTION: The IR integrated residency mandates clinically-based rotations in the longitudinal residency curriculum, including vascular surgery, surgical ICU, hepatology, transplant, and others. All DR residents complete a one-year internship following medical school prior to obtaining radiological prowess. While some radiologists emphasize integration of clinical knowledge in daily imaging interpretation, high volumes of imaging and pressure for report turnaround has moved radiology away from the clinical realm. IR residents rotate on clinical rotations after years of training in DR and are valuable to their clinical colleagues “on the floors”. However, the benefit of direct clinical correlation upon the ability to interpret diagnostic imaging is not well-known. We aim to give examples of specific patient cases in which the proper interpretation of diagnostic imaging was achieved because the resident on clinical rotation knew the clinical context of the patient. Several of the cases presented will demonstrate significant changes to the official radiology report, realized from direct clinical correlation. Examples include: hypventilation resulting in pulmonary opacity in the setting of decreased ventilator settings (pneumonia versus atelectasis), the identification of a foreign body in the setting of recent operation resulting in infection, the diagnosis of deep venous thrombosis in a thrombopholic patient. This presentation will also review “quick and easy” ways to clinically correlate in order to increase the value of the radiologic report to referring clinicians. Finally, this presentation will propose a curriculum change to diagnostic radiology such that clinical rotations are included in the later years, possibly deferring such rotations from the clinical realm.

(E-059) Tuesday • 7:00–8:00 AM • Hard-copy poster
Quality Improvement (QI) Project to Ensure Appropriate Placement for Patients Post Inferior Vena Cava Filter (IVCF) Placement

Stephen Bracewell, MD, Medical University of South Carolina, Charleston, SC; Taylor Kuhlman, BS; Marcelo S. Guimaraes, MD; Ming Lim; Heather Hartung, Shannon Shuler; et al (bracewell@musc.edu)

PURPOSE: A Quality Improvement (QI) project at an academic institution was designed to ensure appropriate follow up after IVCF placement by the Division of Vascular and Interventional Radiology (VIR).

METHOD AND MATERIALS: Initial retrospective review was performed on all patients who had an IVCF placed by VIR between July 2014 and December 2015. This was followed by implementation of a QI project including a task-force composed by 1 radiology technician, 3 registered nurses, 2 radiology residents and 1 attending physician, from July 2016 to June 2017. Major problems identified were high number of patients without established follow-up regarding the IVCF, low retrieval rate, lack of standardized follow-up protocol, absence of dedicated personnel, and inadequate patient education. An action plan was implemented, including creation of a shared database including pertinent patient information, standardization of follow-up protocol (3 attempts to contact the patient by phone call, followed by mailed letter, all documented in electronic medical records), creation of educational brochure to be given to the patient or family member when obtaining informed consent, and monthly analysis of the data. The goal was to assure appropriate follow-up for at least 80% of the patients.

RESULTS: Initial retrospective review demonstrated that 180 IVCF were placed from July 2014 to December 2015, 26 were permanent and 154 were retrievable devices. A total of 29 filters were removed, with overall retrieval rate of 18% and 22% retrieval rate in eligible patients. During implementation of the QI project, from June 2016 to June 2017, 97 IVCF were placed, all of them retrievable. Of those, 29 devices were removed, with overall retrieval rate of 30% and 50% retrieval rate in eligible patients. Using the newly established protocol, follow-up was obtained in 99% of the patients.

(E-124) Wednesday • 7:40–7:55 AM • E-poster Station #10
ACGME Core Didactic Curriculum Requirements for Diagnostic Radiology: Excel in an Era of Change

Joshua A. Wallace, MD, University of North Carolina-Chapel Hill, Chapel Hill, NC; David M. Mauro, MD; Andrew Barnes, MD; Sheryl G. Jordan, MD; Paul L. Molina, MD (jwallace1500@gmail.com)

PURPOSE: Radiology residencies’ didactic curricula are again undergoing change involving method and content. Long gone (or should be) are the days when an attending speaks from a slide tray for sixty minutes uninterrupted on a narrow topic of expertise or interest in a darkened room to an audience of multilevel learners who may or may not be listening, or learning. We must fulfill changing curriculum requirements of the ACGME Program Requirements while we adequately prepare our residents for the new format of board certification. Additionally there is millennial and educator demand for collaborative active learning, use of technology, and shorter sessions. We describe successful overhaul and the subsequent tracking of our residency’s formal didactic curriculum.

METHOD AND MATERIALS: IRB–exempted, the study collates recent prior and current ACGME core didactic curriculum requirements, describes use of technology and analytics to shepherd our formal residency curriculum, comprises a two year July 2015–June 2017 period of dramatic change for our residency, and assesses scores pre- and post-intervention of mandated curricular change. The new curriculum relies on weaving (and branding) focused curricula within the overall didactic curriculum, use of technology, and frequent feedback from the learners regarding efficacy. Example focused curricula include Physics, Fundamentals, Core, Call, and ACGME Milestones. Business intelligence tools provide structure and foundation for data-keeping of our implemented change and this data informs educational liaisons of their division’s lecture titles, curricula, and feedback. ACGME national publications and notification letters, ACGME annual surveys, E*Value resident and faculty assessment scores are analyzed as to effectiveness.

RESULTS: Pre-intervention results indicate low resident (and ACGME) satisfaction. Postintervention scores are significantly improved.

CONCLUSION: Eliciting feedback and employing detailed analyses using business intelligence tools have combined with motivated core faculty to yield significant improvement. The development of synchronous curricula within the formal curriculum has both met governing body mandate and achieved resident/faculty approval.

Health Services for Radiology
CONCLUSION: This QI project demonstrated that creation of a standardized protocol, assignment of dedicated personnel, periodic data analysis, and appropriate patient education can improve follow-up care for patients with IVCF.

(E-060) Wednesday • 7:00–8:00 AM • Hard-copy poster How a CT Becomes a Dollar: A Health Economics Primer for Radiologists and Trainees

Naim Ali, MD, University of Vermont Medical Center, Burlington, VT; Robert D’Agostino, MD, James B. Allison, MD (naim.ali.md@gmail.com)

LEARNING OBJECTIVES: - Gain an understanding of basic terminology used in American healthcare economics - Be able to describe the process of payment from performance of study to reimbursement for both government and private payors - Appreciate the history of the reimbursement methods under Medicare and Medicaid and its impacts on the current and anticipated future payment processes

CONTENT DESCRIPTION: Healthcare economics can be a confusing topic not only for radiology trainees but also experienced radiologists. Government legislation and insurance company policies are constantly evolving, sometimes on a day to day basis. A foundational knowledge of healthcare economics is essential to understand these changing nuances. This educational exhibit will outline the essential foundations needed to gain a general understanding of healthcare economics particularly as it relates to radiology. An example claims process for a non-contrast CT head examination will serve as the vehicle for exploring various aspects of clinically relevant healthcare economics. A glossary of terms needed to understand the process will be provided. Since the current American system has been built sequentially, the historical background for Medicare and insurance claims processes will be reviewed. The layers of this system such as the Current Procedural Terminology (CPT) coding system and Relative Value Unit (RVU) scale and how they fit into the claims process will be outlined. The evolving mechanisms of healthcare payments including provisions of the Affordable Care Act (ACA) and Medicare Access and CHIP Re-authorization Act (MACRA) will be discussed.

(E-061) Tuesday • 7:00–8:00 AM • Hard-copy poster Advanced Payment Models Under the Medicare Access and CHIP Reauthorization Act: Where Does Radiology Fit In?

Naim Ali, MD, University of Vermont Medical Center, Burlington, VT; James B. Allison, MD, Robert D’Agostino, MD (naim.ali.md@gmail.com)

LEARNING OBJECTIVES: - Describe the provisions of the Alternative Payment Model under the Medicare Access and CHIP Re-authorization Act (MACRA) - Understand the role of radiologists in currently existing and future population health model. - Explore the controversy surrounding the potential impact of Alternative Payment Models on the practice of radiology

CONTENT DESCRIPTION: On April 16, 2015, Congress passed the Medicare Access and CHIP Re-authorization Act (MACRA) establishing two payment schemes: the Merit Based Incentive Payment System (MIPS) and the Alternative Payment Model (APM). For many large multi-specialty practices, including those at academic centers, APMs may be an attractive option. APMs offer a guaranteed bonus in reimbursements, the ability for the practice to determine payments as they see fit, and the opportunity for centralized billing. Many academic radiologists may find themselves part of an APM in the near-future. This educational exhibit will explore the various types of APMs that have been proposed including the Advanced Alternative Payment Model and the Patient-Focused Payment Model. The role of radiologists in existing population based health models such as Accountable Care Organizations, the Bundled Payment for Care Initiative, Comprehensive Care for Joint Replacement, and Oncology Care Model will be assessed. The benefits and drawbacks of radiologist participation in such programs will be evaluated. The implementation of APMs for radiology remains uncertain. Some hypothesize that a radiologist’s contribution to efficiently making a diagnosis early in a patient’s care will lead to cost-savings, thus providing radiologists with a central role. Others believe the radiology department, which in many instances serves as a revenue generator in fee-for-service models, will become a significant cost burden in a population health model and thus may be subject to significant cuts. The exhibit will explore this emerging controversy around the impact of APMs on the future practice of radiology.

(E-129) Tuesday • 7:00–7:15 AM • E-poster Station #10 Frequency of Imaging Findings Indeterminate or Suspicious for Malignancy at Three Hospital Types within an Academic Health System

Lauren Comisar, MD; Hanna M. Zafar, MD; Darco Lallevic; Charles E. Kahn, Jr, MD, MS; Mitchell D. Schnall, MD, PhD; Tessa S. Cook, MD, PhD, Hospital of the University of Pennsylvania, Philadelphia, PA (tessa.cook@uphs.upenn.edu)

PURPOSE: Imaging rates have risen over the past two decades. Imaging findings representing possible cancer are commonly found on these exams and require follow-up. Our objective was to quantify how often imaging findings of possible cancer are found on abdominal and pelvic imaging exams across our health system.

METHOD AND MATERIALS: Our health system uses a coding assessment scheme similar to the Breast Imaging Reporting and Data System (BI-RADS) to classify masses as benign, indeterminate, or suspicious for cancer on all abdominal and pelvic imaging exams. A database was created to study the distribution of these findings at the university hospital, the community hospital, and the Level 1 trauma center within our academic health system.

RESULTS: Masses indeterminate or suspicious for cancer were found in at least one organ in 12% of all abdomen and pelvic computed CT, MRI, and ultrasound exams conducted over the course of a year. Indeterminate and suspicious masses were most commonly found in the liver, pancreas, kidneys, adrenal glands, uterus, and ovaries/adnexa. Scoring patterns for these organs differed across the three hospitals. In five out of the six organs, imaging studies at the community hospital were more likely to identify indeterminate masses than those at the other hospitals. For example, indeterminate lesions were found on 2.9% of all liver exams at the community hospital, compared to 1.9% and 1.8% at the university hospital and the Level 1 trauma center, respectively. Conversely, imaging studies at the community hospital were less likely to show suspicious masses. For example, 0.6% of liver exams assigned at the community hospital identified suspicious lesions, compared to 1.7% and 0.9% at the university hospital and the Level 1 trauma center, respectively.

CONCLUSION: Masses indeterminate or suspicious for cancer occur in 12% of abdominal and pelvic imaging exams. In many organs, imaging studies at the community hospital are more likely to show indeterminate lesions and less likely to show suspicious lesions. Further investigation will be needed to determine the influence of patient case mix, referral patterns, and radiologist characteristics that contribute to these differences.

Informatics

(E-064) Wednesday • 7:00–8:00 AM • Hard-copy poster Readability of Patient Education Materials From RadiologyInfo.org: Has There Been Progress Over the Past 5 Years?

Paul H. Yi, MD, Johns Hopkins University School of Medicine, Baltimore, MD; Eric Huh; Ferdinand K. Hui, MD (pyi10@jhmi.edu)

PURPOSE: As patients increasingly turn to the Internet for healthcare information, it is imperative that patient educational materials be written at an appropriate readability level. Although RadiologyInfo.org, a patient education library sponsored by the American College of Radiology (ACR) and Radiological Society of North America, was shown in 2012 to be written at levels too high for the average patient to adequately

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interest in pursuing IR as a career, however, it is unclear if it has been widely adopted. The purpose of this study was to quantify the prevalence of IR sympsis advertised on two popular medical student online forums dedicated to IR and to describe the characteristics of these sympsis.

METHOD AND MATERIALS: We reviewed all postings made from 2012 to 2016 on the “Interventional Radiology” sections of the Aunt Minnie and Student Doctor Network online forums for posts advertising IR sympsis geared towards medical students. For each sympsis, we noted sponsoring institution(s), cost, length, and offerings of lectures, hands-on IR demonstration stations, Q&A sessions, and networking opportunities. We also noted the number of faculty and institutions represented.

RESULTS: We identified 37 advertised IR medical student sympsis with a yearly increase; 1 symposium was identified in 2012, 3 in 2013, 7 in 2014, and 13 sympsis in both 2015 and 2016. There were 22 unique sympsis (several sympsis were held multiple years) from 23 sponsoring institutions, including Brown, Mount Sinai, and the Massachusetts General Hospital who sponsored 5, 4, and 3 sympsis, respectively. All sympsis were free and open to any interested medical student. All sympsis lasted 1 day except one which lasted 2 days. Regarding course offerings, >75% explicitly offered lectures and hands-on IR stations. Half of sympsis offered Q&A sessions, as well as networking opportunities with residents, fellows, and/or faculty. An average of 11 faculty members were present at each symposium (range 6 to 29), representing an average of 3 institutions.

CONCLUSION: The IR Symposium for medical students has been increasingly adopted for medical student outreach over the past several years. These sympsis are open to all interested medical students at no cost. Additionally, the sympsis offer a variety of educational and mentoring experiences and facilitate inter-institutional interaction. With the advent of integrated IR residencies, the IR Symposium may prove to play a larger role in IR medical student outreach and recruitment.

(E-130) Tuesday • 7:00–7:15 AM • E-poster Station #7 Management Algorithm of Acute Pulmonary Embolism in a Community-Based Hospital Setting
Jesse Chen, MD, Staten Island University Hospital, Staten Island, NY, Dan Shilo

LEARNING OBJECTIVES: The purpose of this educational exhibit is to outline the effective management algorithm used at our community-based hospital for the endovascular treatment of acute pulmonary embolism. Presenting the data of all patients treated with catheter-directed PE thrombolysis from the past 2 years (n=21), we describe the experience of our community based Interventional Radiology department. Ultrasound-facilitated, catheter-directed thrombolytic therapy (CDT) has been demonstrated to improve RV function, decrease pulmonary artery hypertension, and minimize the risk for major bleeding in acute PE. To date, however, there remains no standardized algorithm for risk stratification/inclusion criteria, thrombolytic treatment, and long term follow up in this critical setting. This presentation will allow viewers to: • gain an understanding of the successful pre-procedural assessment and the risk stratification used in our community based hospital • gain knowledge about how CDT is performed, including operator and patient-preferred techniques (e.g. Jugular Vein access) • gain an understanding of the management and duration of thrombolytic infusion, and longitudinal out-patient follow up.

CONTENT DESCRIPTION: The educational exhibit will discuss the following topics: A.) The proper pre-procedural assessment, critical for risk stratification, including: 1. CT of the chest and possible bedside echo, with specific evaluation for right heart strain 2. Laboratory evaluation 3. Vital signs with specific assessment of hemodynamic stability 4. Assessment of bleeding risk. B.) The management decision tree will then be presented, including how do we then decide if patient is a candidate for catheter directed PE thrombolysis. C.) Intra-procedural steps during CDT, including discussion and review of specific catheters and equipment. D.) The rationale for the patient specific thrombolytic intra
sion, post-procedural monitoring including repeat echocardiogram, pulmonary artery pressure monitoring, and timing of thrombolytic catheter removal. E. Post intervention plan including outpatient follow up.

(E-131) Tuesday • 7:40–7:55 AM • E-poster Station #3
The Role of a Medical Physics Consult in Interventional Radiology?

Anouva Kalra-Lall, Case Western Reserve University, Cleveland, OH; Kevin Wunderle, Charles Martin III, MD* (kak603@case.edu)

PURPOSE: The Medical Physics Consult is deeply embedded into Radiation Oncology practices but is rarely utilized in Interventional Radiology (IR), by comparison. Additionally, depending on location, this service may not be readily available to Interventional Radiologists.

METHOD AND MATERIALS: Here we review three common indications for a medical physics consult in Interventional Radiology, to obtain 1) an evaluation of radiation delivery to a fetus (pre and post intervention), 2) an analysis of prior radiation exposures before an elective fluoroscopy-guided intervention (FGI) in patients having multiple or staged interventions and 3) a systematic review of technical fluoroscope parameters to optimize image quality and patient radiation dose.

RESULTS: This review will provide detailed information in the form of classic clinical scenarios. In the setting where a medical physics consult may not be readily available, the presented scenarios can serve as benchmark examples.

CONCLUSION: Incorporating this material, in addition to knowledge from the American College of Radiology Practice Guidelines, into the mainstay of conversations with our patients can be of great utility. Discussion of these cases will not only provide reassurance and help inform a patient’s decision to pursue an FGI but also contribute in helping to determine the most efficient and effective utilization of imaging techniques to maximize patient benefit and reduce radiation risk. Medical physics is essential in delivering the appropriate radiation dose and image quality at the right time.

(E-132) Tuesday • 7:40–7:55 AM • E-poster Station #6
Transitional From the VIR Fellowship to the IR Residency: More than Just a Numbers Game

Bill Majdalany, University of Michigan, Ann Arbor, MI; Minhaj S. Khaja, MD, MBA; Nishant Patel, MD; Michael R. Cline, MD; Janet E. Bailey, MD; Wael E. Saad (bmadalany@umich.edu)

LEARNING OBJECTIVES: Review the timeline of the VIR Fellowship to IR Residency transition. Discuss the importance of pre-planning with respect to clinical service and educational objectives. Highlight methods to optimize trainee capacity on the IR service.

CONTENT DESCRIPTION: Interventional Radiology (IR) training is undergoing a paradigm shift. VIR Fellowship training programs continue soon, the final fellowship match to commence in 2018. Across the country VIR fellowship programs are transitioning into three pathways for trainees: Integrated IR residency (five years combined with DR residency), Independent IR residency (two years following DR residency), and Early Specialization in IR (one year of IR completed during DR residency followed by one-year training in an Independent IR residency). Most IR training programs will utilize a combination of training approaches. Pre-planning of funding sources/budget, interdisciplinary cooperation to arrange required clinical rotations, and recruiting appropriate trainees is necessary for a seamless transition. While superficially comparing the number of graduating VIR fellows nationally (approximately 220 per year) with the trainees entering IR Residency per year (approximately 150 per year) would suggest a drop off in trainee equivalents, using the alternative pathways should help maintain the staffing of IR training programs and a steady state of graduates to fulfill clinical needs in IR nationally. We will describe our program’s methods to manage the transition from 2014-2018, including funding models, rotation schedules, clinic experiences, close coordination between the IR and DR residency programs, and the importance of thoughtful leadership.

(E-133) Wednesday • 7:40–7:55 AM • E-poster Station #7
Peripheral Arterial Vascular Imaging Interpretation: A Multimodality Review

Mark A. Sultenfuss, MD*, Houston Methodist Hospital, Houston, TX (msultenfuss@houstonmethodist.org)

LEARNING OBJECTIVES: 1. Describe normal arterial anatomy and common anatomic variants involving the lower extremities. 2. Identify normal arterial US-doppler waveforms and pulse volume recordings, and how they are affected by arterial disease. 3. Understand guidelines for interpreting ankle-brachial indices. 4. Correlate arterial disease changes between imaging modalities. 5. Provide a meaningful interpretation of findings for referring physicians.

CONTENT DESCRIPTION: A. Introduction. B. Lower Extremity Arterial Anatomy and Common Variants. C. Overview of Lower Extremity Imaging Studies, including Doppler US, Non-invasive physiologic exams (i.e. PVR, ABI, and Segemental pressures), CTA, and MRA. D. Examples of Peripheral arterial disease using US, Noninvasive physiologic exams, CTA, and MRA, emphasizing key features the help provide meaningful interpretation to referring physician. E. Conclusion.

Musculoskeletal Radiology

(E-068) Wednesday • 7:00–8:00 AM • Hard-copy poster
A Pictorial Overview of Soft Tissue Calcifications

Matthew J. Miller, MD, West Virginia University, Morgantown, WV; Jennifer Koay, MD (mn filed@wvu.edu)

LEARNING OBJECTIVES: This educational exhibit provides a review of the different causes and types of soft tissue calcifications. The approach is based on the official ABR Core Exam study guide and is organized by etiology, highlighting imaging findings, while also providing a review of the epidemiology, clinical course, and pathology.

CONTENT DESCRIPTION: This educational exhibit is based upon a teaching file of pathologically and clinically proven cases, encountered at a tertiary referral center. High quality radiographs, computed tomography, and magnetic resonance images illustrate the findings and complement a succinct review of each disease, as outlined by the official ABR Core Exam study guide. The exhibit spans subject matter including more common disorders such as myositis ossificans and chondrocalcinosis, while also including more rare disorders such as dermatomyositis and neoplasms such as synovial osteochondromatosis.

(E-069) Tuesday • 7:00–8:00 AM • Hard-copy poster
Intrascosseous Hydroxyapatite Deposition: A Mimicker to Remember

Megan Albertson, MD, University of Nebraska Medical Center, Omaha, NE; Jeffrey Klug, MD; Melissa Manzer, MD

LEARNING OBJECTIVES: 1. Identify x-ray, CT, MRI, and scintigraphic appearances of intrascosseeous hydroxyapatite deposition. 2. Summarize the expected clinical course and treatment options for hydroxyapatite deposition disease. 3. Apply understanding of hydroxyapatite deposition to other regions in the body.

CONTENT DESCRIPTION: Hydroxyapatite deposition disease (HADD): - HADD most commonly occurs in the tendons (termed calcific tendinosis) or bursae (termed calcific bursitis) with the most common location involving the rotator cuff. However, the hydroxyapatite can migrate into adjacent bone marrow to become “intrascosseous”. - HADD can occur as a primary process or secondary to systemic metabolic disorders including end-stage renal disease, collagen vascular disease, or idiopathic calcinosis. - In its early phase, tendinous HADD can be detected on plain radiograph or CT as a hazy globular calcification which eventually evolves into a more solid, well-defined calcification. After a period of months, the calcification may completely resolve. If HADD undergoes intrascosses migration, it can have a variable, yet aggressive appearance in the acute phase. CT may reveal cortical erosion and/or

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a sclerotic intra-medullary lesion. MR often shows cortical irregularity, prominent bone marrow edema, and enhancement. - Treatment may be simple pain control since it is often self-limited. However, 50% of patients reportedly find relief from a steroid injection or needle aspiration with lavage. HADD in other areas of the body will also be shown and discussed. For example: **HADD of the longus colli muscles**: - HADD of the longus colli is nearly exclusive to the CT-3 region and most often occurs in middle-aged patients 30-60 years old. - Patients may present with pain, neck stiffness, or dysphagia. - On CT, HADD of the longus colli may be accompanied by retropharyngeal edema, which can be confused for retropharyngeal abscess. However, the edema associated with HADD can usually be distinguished by a lack of rim enhancement or adjacent fat stranding.

(EM-070) Wednesday • 7:00–8:00 AM • Hard-copy poster

**Preoperative Computed Tomography Angiography (CTA) for Fibular Free Flap Reconstructions**

Gaurav Synghal, University of Texas MD Anderson Cancer Center, Houston, TX; Colleen M. Costelloe, MD, Behrang Amini, MD, PhD; Tamara M. Haygood, MD, John E. Madewell, MD; Bilal Mujtaba, MD (BMujtaba@mdanderson.org)

**LEARNING OBJECTIVES:**
- Review the relevant normal and variant vascular anatomy of the fibular free flap.
- Describe the methods of computed tomography angiography (CTA) image acquisition. Describe how to report the locations of the fibular perforating arteries that the surgeon must consider for flap harvesting.

**CONTENT DESCRIPTION:**

**Introduction:** The vascularized osteocutaneous fibular free flap is used for reconstruction of complex mandibular, maxillary, and soft tissue defects. Fibular free flap consist of the fibula, the peroneal artery, perforating arteries, and skin islands. **Normal and variant vascular anatomy of the fibular free flap:** There are 10 branching patterns of the popliteal artery, and there are 3 types of perforating arteries (septocutaneous, musculocutaneous, and septomusculocutaneous) that arise from the peroneal artery. Without the knowledge of the peroneal artery course and the location of the perforating arteries, this procedure can be challenging to the surgeons.

**CTA Imaging Technique/Reporting:** CTA is a non-invasive and effective tool in preoperative imaging for fibular free flap procedures. There is optimal visualization of the related vascular anatomy and their variants. We will discuss the parameters of the CTA and discuss the important findings to include in the official report.

**Computer Assisted Design and Manufacturing (CAD/CAM):** The information obtained from CTA can also be used in CAD/CAM, which can create patient-specific 3D cutting guides that assist the surgeon during the operation. **Limitations:** CTA requires the patient tolerate intravenous contrast administration and exposes patients to ionizing radiation. **Conclusion:** The fibular free flap is used for reconstructive surgery for the head and neck region. Signifi-cant variation occurs between individuals for the origin of the peroneal artery and perforating arteries. Our method of performing and reporting CTA for patients undergoing a fibular free flap procedure provides a reproducible method of identifying perforating vessels and effectively communicating their locations. Accurate communication can maximize the success of flap harvesting and preoperative manufacture of custom fibular cutting guides.

(EM-077) Tuesday • 7:00–8:00 AM • Hard-copy poster

**Chronic Non-Bacterial Osteitis (CNO) Imaging Review and Management Implications**

Gaurav Synghal, University of Texas MD Anderson Cancer Center, Houston, TX; Bilal Mujtaba, MD (BMujtaba@mdanderson.org)

**LEARNING OBJECTIVES:**
- Discuss the etiology, pathophysiology, and clinical features of CNO.
- Discuss the key imaging findings for this disease.
- Discuss treatment and prognosis.

**CONTENT DESCRIPTION:**

**Introduction:** Chronic Non-Bacterial Osteitis (CNO) is a relatively rare bone disease with one study showing an incidence of 0.4/100,000 children. Currently, the pathophysiology of CNO is not well understood, but some recent studies have shown a derange-ment on inflammatory markers (such as IL-10, IL-6, IL-12, RANTES).

**Clinical features/Labs:** Patients are usually young (~7-12 years old), female and present with localized pain +/- swelling. Since this presentation is common in other conditions like bacterial osteomyelitis, bone malignancies, fibrous displaysia, or Langerhans cell histiocytosis, a delay in diagnosis and appropriate treatment may occur. Initial workup shows that patients have negative bone cultures. Inflammatory markers like ESR and CRP may be normal or moderately increased.

**Imaging Findings:** Initial imaging usually consists of radiographs at symptomatic
Ultrasound-guided calcific lavage is a therapeutic option. It is fast, cost-effective, safe, and may provide significant relief in the shoulder. However, to date, little attention has been paid to the possibility of ultrasound-guided calcific lavage at other sites, though this procedure is fast, cost-effective, safe, and may provide significant relief for patients. This exhibit will provide a survey of imaging features of HADD in atypical locations throughout the body across multiple imaging modalities, including radiographs, ultrasound, and magnetic resonance imaging. It will discuss typical imaging features, locations, and diagnostic pitfalls. Case examples will be used to highlight our experience with ultrasound-guided calcific lavage treating calcific tendinitis outside the shoulder and describe our intervention techniques at these various locations.

**RESULTS:** To date there has been little discussion of the use of calcific lavage to treat calcific tendinitis at sites other than the shoulder. We illustrate HADD findings in different locations across multiple modalities and demonstrate successful use of ultrasound-guided lavage at several sites throughout the body in order to familiarize providers with this therapeutic option.

**CONCLUSION:** Ultrasound-guided calcific lavage for calcific tendinitis is an underutilized therapeutic intervention despite being safe, effective, and relatively inexpensive. It may be used in sites outside the shoulder by providers familiar with the imaging findings and intervention technique.

**Complications of Shoulder Arthroplasty**

Joseph M. Limback, MD, Florida Hospital, Orlando, FL; Andrew Cibulas, Laura W. Bianco, MD*, Brandon Runyan, Christopher W. Wasyliw, MD, Kurt F. Scherer, MD (joseph.limback.md@flhosp.org)

**PURPOSE:** To demonstrate the incidence and breadth of complications that accompany shoulder arthroplasty.

**METHOD AND MATERIALS:** Increasing number of shoulder arthroplasties are being performed all over the world. However, this results in a greater number and breadth of complications, with a complication rate ranging from 1.9-6.2%. Complication rates are affected by patient risk factors, type of arthroplasty (partial, total, reverse total), and surgical approach. Retrospectively collected images of both common and rare complications that can occur during and after shoulder arthroplasty are presented.

**RESULTS:** We demonstrate multiple cases of post-shoulder arthroplasty complications, ranging from more common complications to rare complications. Examples include pneumothorax, cutaneous fistula, metaglene screw failure, and spacer dislocation, amongst others.

**CONCLUSION:** While very safe, there are a number of complications to watch for after shoulder arthroplasty.

**Opportunistic Screening for Sarcopenia: Novel Approach Using Computed Tomography of the Thigh**

Kyler Harden, Wake Forest School of Medicine, Winston-Salem, NC; Jos Tan, MS, Bahram Kiani, MD, Robert D. Boutin, MD, Leon Lenchik, MD (lenchik@wakehealth.edu)

**LEARNING OBJECTIVES:** 1. Review approaches to opportunistic screening for sarcopenia using CT examinations of the chest, abdomen, and pelvis. 2. Review lower extremity CT protocols used for planning of robotic-assisted knee replacement surgery. 3. Present a novel approach for opportunistic screening for sarcopenia based on pre-operative thigh CT exams. 4. Present common pitfalls of muscle measurement encountered on thigh CT exams.

**CONTENT DESCRIPTION:** Opportunistically measuring muscle metrics on CT examinations obtained for other reasons is becoming more common. CT-based diagnosis of sarcopenia is usually made based on

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*Faculty financial disclosures are located in the Faculty Index.*
cross-sectional muscle area and/or muscle attenuation. In the five years, the use of preoperative CT to help guide robotic-assisted knee replacement surgery has been rapidly increasing. In this exhibit, we present a novel approach for opportunistic screening for sarcopenia based on the pre-operative CT exams of the thigh. Specifically, we discuss the appropriate selection of measurement locations in the proximal thigh and distal thigh, present a validated approach to muscle thresholding and muscle segmentation, describe clinically relevant output variables including cross-sectional area, skeletal muscle index, and muscle attenuation. In addition, we show examples of common pitfalls of muscle measurement on thigh CT exams. Sarcopenia has been associated with many adverse health outcomes including falls, physical disability, longer hospital stays, postoperative complications, decreased survival. Helping orthopedic surgeons recognize sarcopenia on thigh CT exams obtained for pre-operative planning may lead to improved patient care.

**CONTENT DESCRIPTION:**

1. Focal digit masses are frequently encountered in daily practice and pose a great challenge to the radiologist to arrive at a definitive diagnosis based on the imaging features. 2. MRI is the imaging modality of choice. MR features of various digit masses are well described in the literature, however, they are very non-specific. Therefore, it is crucial to determine the morphology and extent of the lesion based on the MR imaging features and narrow down the differential diagnosis. The definitive diagnosis is almost always arrived at after pathological examination. 3. We present various pathology proven benign and malignant digit masses encountered at our institution with relevant imaging and formulate the most reliable differential diagnosis to help aid the clinical management.

**LEARNING OBJECTIVES:**

1. Classification of digit masses
2. To review the imaging findings on conventional MRI
3. To provide sample cases for each entity and describe the common mimics encountered with similar imaging characteristics.
4. Importance of formulating the most reliable differential diagnosis for each entity.
5. Histological examination of each entity.

**LEARNING OBJECTIVES:**

1. Review the diagnostic approach to the patient with a painful shoulder and the utility of available imaging modalities.
2. Discuss the appropriate utilization of shoulder ultrasound, including its technical and anatomic advantages and limitations.
3. Use a case-based approach to review many different etiologies of shoulder pain that are inadequately evaluated on shoulder sonography, their typical clinical presentation, and review their appearance on radiographs and MRI.

**CONTENT DESCRIPTION:**

- **Purpose/Aim:** Review the diagnostic approach to the patient with a painful shoulder.
- **Review:** The utility of available imaging modalities.
- **Focus:** On appropriate utilization of shoulder ultrasound, advantages and limitations.
- **Case based:** Illustration of causes of shoulder pain commonly missed on ultrasound such as:
  - Osteoarthritis
  - Distal clavicular osteolysis
  - Labral tear
  - Biceps pulley lesion
  - Tumor/metastasis
  - Neurovascular pathology
  - For each case/etiology: Discuss common clinical presentation; Why ultrasound is an excellent tool for rotator cuff pathology evaluation, many entities may coexist or cause similar symptoms that are better evaluated with radiographs and MRI. It is important for the clinician to be aware of the benefits/limitations of these modalities to prevent misdiagnosis and treatment delay.

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2. Discuss the appropriate utilization of shoulder ultrasound, including its technical and anatomic advantages and limitations.
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**LEARNING OBJECTIVES:**

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2. Discuss the appropriate utilization of shoulder ultrasound, advantages and limitations.
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Ankle and Foot: achilles tendon tear, Morton neuroma and lateral epicondylitis, biceps tendon tear, ulnar nerve dislocation, sound. A few examples, grouped by anatomic location, are listed as musculoskeletal pathologies that can easily be diagnosed with ultrasound.

Recognize normal imaging features of the ACL. 3.) Recognize direct and indirect signs of ACL tear on both radiography and MR.

LEARNING OBJECTIVES:
- Identify hardware failure and its predisposing conditions
- Formulate an accurate radiologic report, which is clinically useful

CONTENT DESCRIPTION:
- The exhibit will elucidate the basics of spinal fixation with pictorial representation and gross imaging
- The various modalities of imaging used in the evaluation of spine hardware will be demonstrated i.e. plain radiography, CT and MRI
- Multiple spinal hardware complications will be demonstrated. Detailed cross-sectional imaging will be provided to augment plain radiography.
- Pitfalls and teaching points will be highlighted
- Reporting template and model reports will be provided with an emphasis on clinical detail

Inflammatory Arthropathies: Beyond Rheumatoid Arthritis
Samuel R. Key, MD, Emory University, Atlanta, GA; Adam D. Singer, MD; Felix Gonzalez; Yara Younan (srkey@emory.edu)

LEARNING OBJECTIVES:
1. Inflammatory arthropathies are commonly encountered in radiology. This exhibit will review the patient demographics, clinical presentations, and imaging features of these diseases.
2. There are several types of inflammatory arthropathies. Imaging features classically associated with specific inflammatory arthropathies will be discussed.
3. Radiography is the standard modality used in imaging these diseases, with MRI and ultrasound providing further characterization in certain cases. The reader will become familiar with the utility of these imaging modalities in the evaluation of inflammatory arthropathies.

CONTENT DESCRIPTION:
- Patient demographics and clinical presentation of inflammatory arthropathies.
- Imaging features indicative of specific inflammatory arthropathies.
- The utility of MRI and ultrasound in the evaluation of inflammatory arthropathies.

Follow-up of Proximal Femur Fractures: What the Radiologist Needs to Know
Manickam Kumaravel, MD, University of Texas Houston, Houston, TX (manickam.kumaravel@uth.tmc.edu)

LEARNING OBJECTIVES:
- Formulate an accurate radiographic report, which is clinically useful
- Be comfortable diagnosing key musculoskeletal pathologies

CONTENT DESCRIPTION:
- Imaging with ultrasound is highly operator dependent and requires a unique understanding of ultrasound technique, including image optimization and patient positioning, which will be covered in this exhibit. Additionally, normal cases will be shown to highlight key anatomic relationships and normal sonographic appearance of various tissues, including muscles, fat, tendons, ligaments, nerves, and osseous structures. Finally, this exhibit will present key musculoskeletal pathologies that can easily be diagnosed with ultrasound.
- A few examples, grouped by anatomic location, are listed as follows:
  - Shoulder: rotator cuff tear, calcific tendinosis
  - Elbow: medial and lateral epicondylitis, biceps tendon tear, ulnar nerve dislocation, snapping triceps syndrome
  - Wrist and Hand: carpal tunnel syndrome, gamekeeper thumb, intersection syndrome
  - Hip and Knee: greater trochanteric bursitis, snapping hip syndrome, iliotibial band syndrome.
  - Ankle and Foot: achilles tendon tear, Morton neuroma

Imaging Indicators for Frailty Syndrome: What the Radiologist Needs to Know
Sava Shukla, MD, MHA, Aventura Hospital and Medical Center, Aventura, FL; Edward Missinne, MD, Miriam Zylberglait Lisigurski; Kristina A. Siddall, MD (sava@quietihealthcare.com)

LEARNING OBJECTIVES:
1. Define frailty syndrome and associations (adiposity, decreased muscle mass and strength) and list negative health outcomes associated with frailty.
2. Summarize the use of imaging (DEXA, US, CT and MRI) in the evaluation of sarcopenia and frailty.
3. Describe the radiologic measurement techniques used to determine sarcopenia and other indicators of frailty syndrome.

CONTENT DESCRIPTION:
- We define frailty syndrome and sarcopenia and their association with negative health outcomes including mortality after trauma, cancer prognosis, and post-operative complications.
- We provide an overview of imaging modalities utilized in the characterization of frail patients with examples including: CT measurement of psoas and masseter muscle areas, DEXA measurements of BMD and SI, MRI measurements of thigh and abdomen, and ultrasound measurements of upper and lower extremities.
- We discuss the reliability, validity and limitations of the techniques and new approaches to the evaluation of frailty syndrome.

Follow-up of Proximal Femur Fractures: What the Radiologist Needs to Know
David W. Robinson, MD, Wake Forest School of Medicine, Winston-Salem, NC; Scott D. Wurtzer, MD (dwrobins@wakehealth.edu)

LEARNING OBJECTIVES:
1. Review the radiographic findings of femoral head, femoral neck, intertrochanteric, and subtrochanteric fractures.
2. Review the treatment of these fractures, including indications and contraindications for different types of hardware.
3. Present an approach to the follow-up radiographs based on the fracture pattern, location, and hardware.
4. Apply this approach to case examples to identify normal healing, abnormal healing, and hardware complications.

CONTENT DESCRIPTION:
- An accurate assessment of the post-operative radiograph for proximal femur fractures requires knowledge of typical fracture patterns and locations. These factors, combined with the patient’s age and pre-injury walking status, will dictate management of the patient. In this exhibit, we will review the different types of hardware used for operative management as well as the indications and contraindications for using this hardware. Specifically, we will focus on cannulated screws, dynamic hip screws, and cephalomedullary nails.
- We will discuss the expected radiographic appearance of this hardware and the expected healing response of the bone. We will then provide a systematic approach that incorporates these concepts to case examples. Recognizing normal healing, abnormal healing, and hardware complications will allow the radiologist to effectively...
With a general knowledge of fixation hardware, the expected type of healing, and potential complications of healing, junior radiology residents will improve their evaluation of fracture follow-up.

**LEARNING OBJECTIVES:**
1. Review the spectrum of osseous healing from primary to secondary bone healing.
2. Review the different types of fracture fixation from relative to absolute and their role in healing along the spectrum.
3. Review the common definitions and radiographic appearance of union, malunion, and nonunion.
4. Improve interpretive skills of fracture healing by applying the first 3 objectives to case examples.

**CONTENT DESCRIPTION:**
Most fractures heal through a combination of primary (direct) healing and secondary (indirect) healing. The ratio of primary to secondary healing at a fracture site depends on the initial fracture pattern combined with the method of fixation. Absolute stability at a fracture site requires rigid internal fixation to promote primary healing through intact cortical bone. Simple fracture patterns are more amenable to this type of repair that produces minimal callus. Relative stability at a fracture site can be achieved through more flexible means such as a cast. Complex fracture patterns will respond better to a more flexible fixation that produces more callus. Through case examples, we will review different types of healing based on fracture patterns and hardware. We will review the different types of hardware, discuss their role in promoting absolute or relative stability, and present examples of normal and abnormal healing (nonunion and malunion). With a general knowledge of fixation hardware, the expected type of healing, and potential complications of healing, junior radiology residents will improve their evaluation of fracture follow-up.

**Nuclear Medicine**

**E-080 Tuesday • 7:00–8:00 AM • Hard-copy poster**

**The Role of 18F-Fluciclovine PET in Recurrent Prostate Cancer: From Acquisition and Interpretation to Future Directions**

Anthony Andres DePalma, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ; Levi Sokol; Jeffrey S. Kempf, MD (JKempf@unvirad.com)

**LEARNING OBJECTIVES:**
1. To learn the role of 18F-Fluciclovine PET/CT in patients with recurrent Prostate Cancer.
2. To understand how to acquire and interpret 18F-Fluciclovine PET scans.
3. To learn future directions of 18F-Fluciclovine imaging as well as the evolving role of PSMA PET.

**CONTENT DESCRIPTION:** In this educational exhibit we will review the current role of the recently FDA approved amino acid labeled PET tracer 18F-Fluciclovine for patients with biochemical recurrence of prostate cancer. We will review acquisition parameters and present normal as well as abnormal examples, potential pitfalls, as well as comparison with other imaging modalities. In addition potential future directions of 18F-Fluciclovine will be presented along with the developing role of PSMA PET imaging in Prostate Cancer.
various imaging appearances of the reconstructed breast on PET-CT. 2) Describe complications that may occur in the reconstructed breast, and their appearance on PET-CT. 3) Demonstrate the PET-CT appearance of recurrence in the reconstructed breast.

CONTENT DESCRIPTION: Breast reconstruction is often performed in breast cancer patients after mastectomy to restore symmetry. The reconstructed breast is not routinely imaged mammographically, but patients may present with clinical symptoms prompting dedicated breast imaging. Depending on the extent of their disease, many of these patients undergo slaging or restaging PET-CT, which can reveal benign complications, expected post-surgical changes associated with uptake, and recurrent/metastatic disease. It is important for the radiologist to be familiar with both normal, expected, and abnormal appearances of the reconstructed breast for accurate imaging interpretation on PET-CT. Reconstruction techniques may utilize implants, autologous tissue flaps, or both. Implant reconstruction may be performed immediately after a skin-sparing mastectomy, or as a two-step approach, with a soft tissue expander and subsequent placement of a permanent implant. The most common types of flap reconstruction include the transversus rectus abdominis myocutaneous flap, latissimus dorsi flap, deep inferior epigastric perforator flap, superficial inferior epigastric artery flap, and gluteal flap, all of which will be described in this poster. Common benign findings in autologous flap reconstruction include edema, seromas, hematomas, and fibrosis, which are generally not FDG-avid. Radiation therapy may lead to trabecular changes and skin thickening. Fat necrosis may also occur after reconstruction and can be FDG-avid, a potential pitfall when evaluating for recurrence. Local recurrence is often FDG-avid and predominately occurs at the medial aspect of the flap due to lymphatic drainage to the internal mammary node, which is not dissected at the time of reconstruction. Recurrences may also occur within the subcutaneous tissue within the flap or from the chest wall.

PET/CT imaging studies. 3) To review advantages of 68 Ga-Dotatate PET/CT imaging over 111 In-octreotide SPECT imaging. 4) To highlight potential pitfalls in 68 Ga-Dotatate PET/CT including uncinate process focal uptake 4. Representative case examples of incidental 68 Ga-Dotatate-avid non-pathological and NET mimickers including: Meningioma • Uterine fibroid • Carotid body paraganglioma • Fibroadenoma

Neuroradiology

(C-082) Wednesday • 7:00–8:00 AM • Hard-copy poster Cerebrovascular Emergencies and Their Mimics: What On-call Residents Need to Know
Jacqueline Junn, MD, Emory University School of Medicine, Atlanta, GA; Tarek N. Hanna, MD, Amanda S. Corey, MD, Matthew E. Zygmont, MD; Ryan B. Peterson, MD
LEARNING OBJECTIVES: 1. Review cerebrovascular anatomy with a focus on clinically important anatomic variants and mimics of pathology. 2. Be able to identify common cerebrovascular emergencies on multimodality imaging. 3. Understand complications and appropriate grading criteria for these findings.
CONTENT DESCRIPTION: Cerebrovascular emergencies require a timely diagnosis for prompt and appropriate intervention. It is important for on-call residents to understand the neurovascular anatomy to accurately describe and relay the location and findings to the clinicians. We shall first provide a basic overview of arterial and venous anatomy of the brain and cervical spine, focusing on clinically important variants and highlighting anatomic details which residents may not be familiar. We shall then review both traumatic and non-traumatic vascular emergencies. The following traumatic and non-traumatic entities will be covered: Carotid/Vertebral artery dissection, Pseudoaneurysm, ruptured intracranial aneurysm (SAH Hunt-Hess grading system), Denver grading system for blunt cerebrovascular injury. Mimickers include carotid webs or shelves following endarterectomy. Imaging will primarily entail CTA. However, in certain cases findings will be reviewed on non-contrast CT, ultrasound, and MRI/MRA. Recommendations for follow-up imaging will be detailed.

(C-147) Wednesday • 7:20–7:35 AM • E-poster Station #8 Ga-68 DOTATATE: Beyond Neuroendocrine Tumors
Timothy J. Waits, MD, University of Kentucky, Lexington, KY; Ravi Jaya-varapu, MD; Lowell B. Anthony, MD; Aman Chauhan, MD; M. Elizabeth Oates, MD, Rham El Khouli, MBBS, MD (timothy.waits@uky.edu)
LEARNING OBJECTIVES: 1. To understand the physical and biological characteristics of 68-Ga-DOTATATE for the evaluation of neuroendocrine tumors (NET). 2. To recognize the physiological biodistribution patterns of 68-Ga-DOTATATE. 3. To identify different 68-Ga-DOTATATE patterns that can potentially result in false-positive interpretations. 4. To describe 68-Ga-DOTATATE-avid non-pathological and NET mimickers.
CONTENT DESCRIPTION: 1. Introduction to 68-Ga-DOTATATE • Physical and biological characteristics • Principles underscoring its value as first-line radiopharmaceutical for NET 2. Physiological biodistribution patterns of 68-Ga-DOTATATE 3. Potential interpretative pitfalls in 68-Ga-DOTATATE PET/CT including uncinate process focal uptake 4. Representative case examples of incidental 68-Ga-DOTATATE-avid non-pathological and NET mimickers including: Meningioma • Uterine fibroid • Carotid body paraganglioma • Fibroadenoma
CONTENT DESCRIPTION: Functional magnetic resonance imaging (fMRI) is a neuroimaging technique using MRI technology that measures brain activity by detecting blood oxygenation and flow that occur in response to neural activity when performing an explicit task. Resting state functional MRI (RS-fMRI) is a method for evaluating regional interactions that occur when a subject is not performing an explicit task. Human brains form an integrative network in which information is continuously processed and transferred between structurally and functionally linked brain regions. Using resting state fMRI, pioneering studies have shown that a high level of functional connectivity existing between regions of functional networks. Graph theory is concerned with the relationships of nodes and lines. Functional brain networks can be defined as a graph with the collection of nodes reflecting the brain regions, and lines reflecting the connections between these brain regions. A graph representation of the functional brain network allows for the examination of its organization using graph theory. This tutorial presents some important concepts of graph theory as applicable to the understanding of resting state fMRI, hence the understanding of brain networks. The reader will learn basic properties of graph theory needed for the characterization of brain networks. Important concepts for the understanding of fMRI functional connectivity such as clustering-coefficient, characteristic path length, node degree and degree distribution, centrality and modularity will be explained in details.

(E-084) Wednesday • 7:00–8:00 AM • Hard-copy poster Common Sellar and Parasellar Pathology: A Pictorial Review
Cory A. Smith, DO, West Virginia University, Morgantown, WV
LEARNING OBJECTIVES: 1. Review and be able to diagnose common sellar and parasellar pathology in adults. 2. Review and be able to diagnose common sellar and parasellar pathology in children. 3. Understand the specific MRI sequences utilized when evaluating the sellar region.
CONTENT DESCRIPTION: To begin, a short summary of the commonly used MRI sequences to evaluate the sella will be provided. A pictorial review of the common imaging features of meningioma, adenoma, Rathke cleft cyst, and internal carotid artery aneurysm will be reviewed for adults to include pathologically proven MRI cases. A pictorial review of the common imaging features of craniopharyngioma and hypothalamic hamartoma for pediatrics will also be provided. Discussion of common imaging features will include a current review of the literature.

(E-085) Tuesday • 7:00–8:00 AM • Hard-copy poster Multinodular and Vacuolizing Neuronal Tumor: A Newly Described WHO Grade 1 Seizure Related Brain Tumor
Jeffrey Klug, MD, University of Nebraska Medical Center, Omaha, NE; Jason T. Helvey, MD
LEARNING OBJECTIVES: 1. Identify common MRI characteristics of a multinodular vacuolizing neuronal tumor (MVNT). 2. Differentiate a MVNT from other more common and similar appearing brain tumors.
CONTENT DESCRIPTION: - MVNT is a newly described benign grade 1 brain tumor in the 2016 WHO classification. It was first described in 2013 with approximately 15 described cases in the literature since then. It typically presents with seizures and/or headaches in adults. - The typical appearance on MRI is a slightly expansile lesion containing multiple cystic spaces which are hyper-intense on T2 and T2-FLAIR weighted imaging. It is typically within the temporal lobe and characteristically demonstrates a transmantle component spanning from the periventricular white matter to the juxta cortical u-fibers. It is most commonly hypo-intense on T1 weighted imaging and typically does not demonstrate post-gadolinium enhancement or restricted diffusion. - Imaging characteristics typically allow for a narrow differential with definitive diagnosis provided by pathologic specimen. Other lesions which are commonly included in the differential include dysembryoplastic neuroepithelial tumors (DNET), focal cortical dysplasia, and low grade glioma. Specific ways to differentiate these lesions will be described. - The long term growth potential of this tumor is not yet known.

(E-086) Wednesday • 7:00–8:00 AM • Hard-copy poster Extramedullary Hematopoiesis: Imaging and Clinical Implications
Mille Yu, BS, MS; Juan S. Gomez, MD; Enrique Palacios, MD; Jeremy B. Nguyen, MD, MS; Tulane University Hospital and Clinics, New Orleans, LA; Lorena Garza Garcia, MD (jnguye2@tulane.edu)
LEARNING OBJECTIVES: 1. Describe the process of hematopoiesis. 2. Discuss the etiology and pathophysiology of extramedullary hematopoiesis (EMH). 3. Describe the characteristic imaging appearance of EMH. 4. Discuss the multiple clinical presentations of EMH. 5. Provide the different types of management for treatment.
CONTENT DESCRIPTION: Extramedullary Hematopoiesis is the production of blood cells outside of the normal location of the bone marrow. In the fetus, the primary sites of hematopoiesis are the yolk sac, liver, spleen, and bone marrow. After birth, hematopoiesis should occur only in the bone marrow and any extramedullary location is considered abnormal. EMH occurs when bone marrow is no longer able to support normal hematopoiesis. EMH can occur under conditions of local production of hematopoietic factors that maintain and induce differentiation of the stem and progenitor cells, when there are supporting cells, and when there is accommodation of hematopoietic progenitors. The cascade begins with displacement and mobilization of stem and progenitor cells. Consequently, hematopoietic stem and progenitor cells occupy other locations as alternative sites of hematopoiesis. EMH mostly occurs in the liver and spleen, with the remaining of cases occurring in almost every tissue in the human body, including the adrenal gland, thymus, kidney, pleura, lung, breast, skin, and gastrointestinal tract. Very rarely, EMH can develop in the CNS, head and neck, and spine. Symptoms for the majority of patients with non-hepatosplenic EMH (63%) will be site-specific. EMH has high risk for hemorrhage complications and paraspinal lesions may affect the spinal cord and peripheral nerves, causing symptoms such as weakness and radiculopathy. The treatment for EMH depends on a number of factors, including the size of the mass, severity of symptoms, the clinical condition of the patient, and previous treatment methods. Excisional biopsy, radiation therapy, and frequent blood transfusions to limit hematopoietic stimulus are some treatment options. Therapy may be required in cases such as EMH manifestations in the spinal canal causing spinal cord compression, and asymptomatic cases may require no therapy.

(E-087) Tuesday • 7:00–8:00 AM • Hard-copy poster Catastrophic Cervical Spine Injuries in Low-Energy Trauma
Ross T. Christopher, MD, Emory University School of Medicine, Atlanta, GA; Jacqueline Junn, MD, Tarek N. Hanna, MD; Amanda S. Corey, MD; Matthew E. Zygmunt, MD; Ryan B. Peterson, MD
LEARNING OBJECTIVES: 1. Understand the spectrum and mechanisms of cervical spine injury. Learn to use the verbiage of the Subaxial Injury and Classification (SLIC) and severity score where appropriate. 2. Review changes to the osseous and ligamentous cervical spine that can occur with a spectrum of chronic diseases. 3. Discussion of disease entities that predispose to catastrophic cervical spine injury with low energy trauma.
CONTENT DESCRIPTION: Cervical spine trauma is common with injuries ranging from minor ligamentous disruption to detrimental cord injuries. When patients have an underlying disease that affects the intrinsic flexibility or shock-resistance of the cervical spine, even a minor impact trauma can have devastating consequences. It is important for clinicians to be more cognizant of possible severe cervical spine injury when patients present with these conditions. We shall first briefly review common mechanisms and patterns of cervical spine injuries. Subsequently, we will focus our attention on conditions that affect the cervical spine that predispose patients to catastrophic injury with low energy trauma. These following conditions will be discussed in detail with examples of post traumatic injuries in the setting of low mechanism trauma: Ankylosing spondylitis, diffuse idiopathic skeletal hyperostosis, rheumatoid arthritis, Gorham syndrome, malignant involvement of
the cervical spine, congenitally or degeneratively narrowed spinal canal, osteogenesis imperfecta, and osteopetrosis.

(E-088) WITHDRAWN

(E-089) Tuesday • 7:00–8:00 AM • Hard-copy poster Cranial Foramina: A Concise Cross-sectional Pictorial Review
Ryan Kuhnlein, MD; Charles Marcus, MD, West Virginia University, Morgantown, WV; Rashi Mehta, MD; Jeffery Hogg, MD (charles.marcus@hsc.wvu.edu)

LEARNING OBJECTIVES: 1. The main objective of this poster is to re-view the cross-sectional anatomy of the skull base foramina and neurovascular structures that pass through each. 2. Review the relationship of the structures passing through each foramen. 3. Present few examples of pathology and imaging characteristics that can occur related to the foramina. 4. Assist learners identify pathology based on the clinical symptoms and accurate anatomic localization of the structures affected.

CONTENT DESCRIPTION: The request for many radiological tests in Neuroradiology is to rule out cranial nerve pathology and the exhaustive knowledge of the anatomy in the form of pictorial representations can be very helpful to practising radiologists and residents. Radiologists play a critical role in the evaluation of pathology related to these structures. This poster reviews the numerous skull base foramina in a systematic and concise format with labelled cross-sectional (CT and MRI) images to assist prompt identification. The structures passing through the cranial foramina and their associated anatomic relationships will be depict-ed in these images. Case examples of pathology that can occur in these structures will be illustrated. For example the jugular foramen is a large aperture in the base of the skull located behind the carotid canal (green arrow) and is formed by the petrous portion of the temporal bone and the occipital bone, posteriorly. The foramen is divided by the jugular spine (yellow arrow) into an anteromedial pars nervosa (blue arrow), containing the inferior petrosal sinus and cranial nerve IX and postero-lateral pars vascularis (red arrow), containing the jugular bulb, cranial nerves X and XI. G1omus jugulare is a paraganglioma of the head and neck that is confined to the jugular fossa (orange arrow) adjacent to the foramen and the clinical presentation depends on the degree of middle ear involvement (Figure1). In addition, potential pitfalls in the identification of structures related to the foramen will be depicted.

(E-090) Wednesday • 7:00–8:00 AM • Hard-copy poster Don’t Forget This Amnesia (Transient Global Amnesia): A Diagnosis You Can Suggest to a Clinician
Manav Bhalla, MD, Medical College of Wisconsin, Milwaukee, WI; John Ulmer, MD*; Andrew P. Klein, MD; Leighton P. Mark, MD, Stephen A. Quinet, MD, Namrata Bhalla, MD (mbhalla@mcw.edu)

LEARNING OBJECTIVES: 1. Neuroanatomy and Neurophysiology of memory circuit, and locations involved in Transient Global Amnesia (TGA). 2. Applicable information for a Radiologist - Clinical entity of TGA, its diagnostic criteria, epidemiology, review of postulated pathophysiology, and association with various risk factors. 3. Optimal DWI imaging protocol. 4. Imaging key points that can differentiate TGA from its top mimickers (e.g., TIA, epilepsy). 5. Clarifying myths related to TGA.

CONTENT DESCRIPTION: 1. Neuroanatomy and Neurophysiology of memory. Why and which areas of hippocampus are vulnerable. 2. TGA and other amnestic disorders. 3. Diagnostic criteria for TGA – understanding clinician’s perspective and concerns. 4. Epidemiology and clinical presentation of TGA. 6. TGA Mimicking conditions: transient ischemic attack, transient epileptic amnesia, and psychogenic amnesia. 5. Imaging TGA (DWI, PET, SPECT). 6. DWI imaging characteristics of TGA lesions. 7. Communicating information that a clinician would want to know.

(E-148) Tuesday • 7:00–7:15 AM • E-poster Station #1 Ecchordosis Physaliphora and Other Foes of the Clivus
Megan Albertson, MD, University of Nebraska Medical Center, Omaha, NE; Mark Keiper, MD, Jason T. Helvey, MD

LEARNING OBJECTIVES: 1. The learner will understand the origin and prognosis of Ecchordosis Physaliphora. 2. The learner will be able to recognize the MRI and CT characteristics of Ecchordosis Physaliphora. 3. The learner will become familiar with the differential diagnoses of clival lesions.

CONTENT DESCRIPTION: What is Ecchordosis Physaliphora (EP)? EP is a benign intradural nodule found in the retroclival preoptine cistern with histologic features very similar to a chordoma. It can technically occur anywhere along the axial skeleton from the dorsal sella to the coccyx. What is the typical imaging appearance? The dural nodule may not be seen on CT since it has similar attenuation levels to CSF. However, most will produce scalloping of the clivus with a thin sclerotic rim. Sometimes there is also an ossified stalk projecting from the clivus. When present, this calcified stalk is a hallmark of EP since this finding is not present in other differential diagnoses of the clivus. On MRI, the lesion will demonstrate homogeneous T2 signal hyperintensity, no contrast enhancement, and sometimes restricted diffusion. The calcified stalk is not visible in all MR cases, but is best demonstrated on sagittal T2WI. What is the prognosis of EP? EP lesions are almost always incidental (found in 2% of autopsies) with very little growth over time. Surgical intervention is usually only considered in cases of brainstem compression (as in our case). What is the differential for clival lesions? Metastasis, chordoma, chondrosarcoma, epidermoid, and others (examples will be shown and explained). What should radiologists remember about EP? 1) Include EP in your differential when there is a nodule in the preoptine cistern with homogenous high T2 signal and no enhancement. 2) If there is an ossified stalk arising from the posteri midline clivus on CT, favor a diagnosis of EP. 3) EP has similar MR characteristics of an epidermoid cyst and could look like a chordoma, EXCEPT midline retroclival epidermoids are rare and a chordoma will usually enhance.

(E-149) Tuesday • 7:20–7:35 AM • E-poster Station #5 CNS Imaging Related to Pediatric Neurointerventional Radiology
William C. Goodman, DO, Virginia Commonwealth University Health System, Richmond, VA; Yang Tang, MD, PhD

LEARNING OBJECTIVES: The objective of this electronic exhibit is, first, to introduce the learner to various pediatric neurological disorders that can benefit from neurointerventional radiology. The classic radiographic appearance of will be shown of several neurological disorders that are amenable to endovascular treatment. Finally, typical endovascular treatments for these lesions will be explained through a case format. The goal of the presentation is to form a clearer understanding of these pathologies, their imaging characteristics, potential methods of treatment, and other findings that are important for the neurointerventionalist to know.

CONTENT DESCRIPTION: This exhibit will cover the pathophysiology of numerous pediatric neurological disorders such as neurovascular diseases, hypervascular brain and head/neck tumors, facial hemangiom as and other vascular lesions. Understanding the imaging characteristics of these conditions is critical to the clinical practice of neurointerventionalists, surgeons and neurologists. This presentation will focus on the MRI/CT appearance of a variety of pediatric neurological disorders that are amenable to endovascular treatment, as well as other conditions that are pertinent to the neurointerventionalist.

* Faculty financial disclosures are located in the Faculty Index.
**CONTENT DESCRIPTION:** With advent of high quality imaging techniques like CT and MRI, expectation to accurately localize brain lesions has significantly increased. This is especially challenging when it comes to presurgical planning. To meet these expectations, in depth knowledge of various signs to localize sulci and gyri is warranted. These signs include SFS-Pre SC sign, sigmoid hook sign, thin post central gyrus sign, para bracket sign, Macdonald sign, etc. Careful evaluation and identification of these signs can help accurately localize intracranial lesions.

**LEARNING OBJECTIVES:**
1. Identify everyday pathologies in Radiology- the Aunt Minnie’s and the near Aunt Minnie’s. 2. Instantaneously recognize each MRI sequence, their significance and the pathology they highlight. 3. Understand the physics behind each sequence, which will enable each resident to troubleshoot and optimize sequences. 4. Avoiding pitfalls such as hypoplastic sinuses and arachnoid granulations. 5. When to recommend MR or CT venogram. 6. Signs of brain parenchymal changes from delayed diagnosis such as venous infarct and hemorrhage.

**Pediatric Radiology**

**CONTENT DESCRIPTION:** Often symptoms of cerebral venous thrombosis are non-specific and the clinicians are unsuspecting. Undiagnosed and untreated cerebral venous thrombosis may lead to severe morbidity and mortality. It is therefore paramount that radiologists be keen at making the diagnosis and look for signs of cerebral venous thrombosis on every routine CT head and MRI brain study performed. MR or CT venogram can then be recommended for indeterminate findings to increase diagnostic yield in some cases. The following topics will be covered: 1. Clinical manifestations of cerebral venous thrombosis. 2. Signs of cerebral venous thrombosis on non-contrast head CT, such as hyperdense clot or vasogenic edema. 3. Signs of cerebral venous thrombosis on routine brain MRI sequences such as absent flow on T2-weighted imaging, hyperintense clot on unenhanced T1-weighted imaging, filling defects on enhanced gradient echo imaging, restricted diffusion on diffusion weighted imaging, and blooming artifact on T2* imaging. 4. Avoiding pitfalls such as hypoplastic sinuses and arachnoid granulations. 5. When to recommend MR or CT venogram. 6. Signs of brain parenchymal changes from delayed diagnosis such as venous infarct and hemorrhage.

**LEARNING OBJECTIVES:**
1. To increase resident comfort level in Neuroradiology with an interactive and fun filled exhibit that will enable each resident to troubleshoot and optimize sequences.
2. Familiarize with cerebral cortical anatomy on axial MRI. 3. To impart the trainee radiologist with the skill to identify and interpret these appropriate diagrammatic representation of the physics contributing to the formation of the image. The exhibit will cover: 1. Routine sequences such as T1, T2, FLAIR, DWI, ADC, pre and post contrast T1. 2. Custom built sequences such as CISS or SWI. 3. Angiographic techniques such as time of flight (TOF), phase contrast (PC), and contrast MRA and advanced sequences such as functional imaging. After reviewing the exhibit the reviewer will be confident in the basics of MRI and specifically with Neuroradiology.

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Making a Convenient, Low-Cost Phantom with a Previously Unreported Material for Practicing Ultrasound-Guided Breast Procedures

Xiaojin J. Wang, MD, University of Kentucky, Lexington, KY; Angie Xiao; Richard Gibbs, BS, MD; Margaret Szabuno, MD (xiaojin.wang@uky.edu)

PURPOSE: Ultrasound-guided breast procedures, which would include core biopsy and needle localization, require excellent hand-eye coordination. Residents should gain this important skill with a phantom before performing the procedures on a patient to reduce potential complications. Alternatives currently include commercial phantoms, which are expensive, or homemade phantoms, which may have technical limitations. We propose a method for making an easily made, inexpensive, long lasting, tissue-like ultrasound biopsy phantom using a previously unreported material. The sonographic appearance of the needle within the new phantom will be compared with breast tissue, a gelatin phantom, a turkey breast, and a commercial phantom. The target lesions will be produced with a variety of readily available materials.

METHOD AND MATERIALS: The new phantom is prepared using only one low-cost material (mung bean starch) which is commonly available. The starch and water ratio is 1.6 or 1.9. The texture and opacity of the phantom can be modified by changing the starch and water ratio in the mixture. Targets to mimic lesions can be created with gummy bears, peanuts, olive, or grapes. Heat and stir the starch and water mixture till it boils. Then, pour it into a bowl and place the mimics in the desired locations.

RESULTS: This simple phantom can be made quickly (in less than 10 minutes) at very low cost with a single material. The echotexture of the phantom simulates a commercial phantom. The sonographic conspicuity of the needle in our new phantom is comparable in both the breast parenchyma and the commercial phantom. The phantom has an appropriate, realistic, texture for easy target lesion placement at any desired location or depth without further preparation. Examples include a grape to mimic a complex cystic mass or cyst, a gummy bear with calcium supplement to mimic a calcified lesion, or a peanut to mimic a shadowing mass. These targets remain immobile during biopsy.

CONCLUSION: This new easily-produced and low-cost homemade ultrasound phantom can be utilized for practicing ultrasound guided breast procedures, including core biopsies and needle localizations.

What Lies Beneath: An Insidious Case of Primary Angiosarcoma with Breast Implants

Mariam Vigar, DO, Mount Sinai Medical Center, Miami Beach, FL; Ahsan Khan, DO

PURPOSE: After completion of this exhibit, the learner should be able to: 1. Comprehend and explain the technology of the SAVI SCOUT® preoperative localization device for surgical excision of a non-palpable breast lesion. 2. Understand and discuss the similarities and differences between the SAVI SCOUT® device and other current methods of preoperative localization of lesions, including wire and radioactive seed placement. 3. Understand and describe the image-guidance methods for placement of the SAVI SCOUT® device.

CONTENT DESCRIPTION: 1. Background: Pre-operative needle localization with wire deployment for non-palpable breast lesions has been used for almost 40 years in clinical practice, but has limitations. Consequently, other methods of lesion localization continue to be developed. 2. Introduction: SAVI SCOUT® radar technology, a non-radioactive alternative. 3. Pros and cons of the available methods of breast lesion localization, including wire and radioactive seed placement. 4. Image-guided technique for placement of the SAVI SCOUT® device with helpful hints and tricks: Case examples. 5. Initial experience with the new technology.
(E-156) Wednesday • 7:20–7:35 AM • E-poster Station #2
Troubleshooting on Combined 2D/3D Stereotactic/Tomosynthesis Breast Biopsy Units
Miral Patel, MD, University of Texas M.D. Anderson Cancer Center, Houston, TX; Debora Dawson, RT; Beatriz Adrada, MD; Deanna L. Lane, MD; Lumarie Santiago, MD (mpatel6@mdanderson.org)
LEARNING OBJECTIVES: 1. Recognize the appearance of various guidance errors on combined 2D/3D upright biopsy units 2. Manual correction of x-errors, y-errors and z-errors 3. Understand the method to retarget as well as benefits and drawbacks of retargeting
CONTENT DESCRIPTION: The traditionally taught principles for recognition and correction of guidance errors on the prone stereotactic biopsy unit are not directly applicable to the new combined 2D/3D upright breast biopsy units. As combined 2D/3D upright biopsy units become increasingly utilized, it is important to recognize the different appearance of targeting errors (x-errors, y-errors and z-errors) using this technique and to know methods to manually correct for these errors. A review of how to recognize these errors during a biopsy procedure with step-by-step instructions on manual correction of x-error, y-errors and z-errors will be discussed. Additionally, the basic approach to retargeting, along with the benefits and drawbacks of retargeting, will be reviewed with sample cases from clinical experience.

(E-157) Wednesday • 7:40–7:55 AM • E-poster Station #1
Breaking Bad News in the Breast Imaging Setting: A Guide for Radiologists
Samia Sayegh, DO, NSUJJ, Scarsdale, NY; Priya Shah; Monica M. Sheth, MD (ssayegh@northwell.edu)
LEARNING OBJECTIVES: The subspecialty of breast imaging is unique in that radiologists frequently interact with patients and their families. The task of delivering bad news to patients regarding their exam or biopsy results, including cancer, is increasingly performed by breast imaging radiologists. Unfortunately most radiologists have little if any formal training on how to deliver difficult news to patients. Studies have shown a direct relationship between the ability of a woman with breast cancer to adjust to illness 6 months after diagnosis and the perception of how the bad news was delivered. We must therefore choose our words carefully as they have a considerable impact on the patient’s future quality of life. The purpose of this educational exhibit is to review and provide examples of useful communication techniques and tips for delivering challenging news to patients. Educational Goals/Teaching Points include: 1. Review various methods on how to appropriately prepare a patient for bad news. 2. Recognize techniques to gauge the mental and emotional ability of a patient to process bad news upfront versus the need to deliver a “warning shot”. 3. Review the Do’s & Don’ts of giving bad news to patients. 4. Discussing the BREAKS protocol and how to use this approach during bad news delivery. 5. Understanding patient responses and appropriate ways to ease the situation/comfort them.
CONTENT DESCRIPTION: Patients are often unable to process the full details of a difficult diagnosis or suspicious finding after the first few sentences. Specifically, the word cancer can cause shock and a cognitive disruption. The radiologists approach, choice in words, and how these words are said can have considerable impact on a patient’s emotions, as well as their perception of patient care. Careful choice of language, ability to understand a patient’s emotional response and ability to digest difficult news is a key to conducting a successful empathetic dialogue. Breaking bad news in the breast imaging setting although challenging, and at times uncomfortable, for both the patient and physician, is a learned skill.

(E-158) Wednesday • 7:40–7:55 AM • E-poster Station #5
Stereotactic Breast Biopsy Practicum for Residents
Prapti Y. Shingala, MD, Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ; Te-Jung Tsai, MD; Lina F. Paster, MD, Jeffrey S. Kempf, MD (prapti.shingala@unirad.com)
LEARNING OBJECTIVES: The purpose of this exhibit is: 1. To educate the viewer on how to set up a breast biopsy practicum for residents using bologna with gravel to simulate calcifications as a breast phantom. 2. To review the principles and indications of stereotactic biopsies. 3. To review how to troubleshoot needle position errors. 4. Explain the usefulness of educating residents to perform stereotactic-guided biopsies using phantoms made of bologna and gravel.
CONTENT DESCRIPTION: Becoming proficient in performing stereotactic breast biopsies requires hands-on experience. Our breast-imaging department has developed an annual stereotactic breast biopsy practicum, which aids in the development of procedural skills and knowledge regarding stereotactic biopsy equipment. The practicum is a half-day training session with 2-3 residents per session. Each resident group works with a breast imaging attending and an ultrasound technician. This setup provides residents with the opportunity to learn about stereotactic biopsies in a setting, which is both relaxed and conducive to learning. The materials and methods used to teach residents will be discussed. Bologna and gravel are used to simulate breast calcifications in a breast phantom. Also, targeting techniques and recognizing and correcting for x, y, and z-axis errors will be reviewed. Post-survey results demonstrated that 100% of residents strongly agreed or agreed that they felt more confident with stereotactic-guided biopsies. This practicum is a useful educational which provides residents with hands-on instruction.

(E-159) Wednesday • 7:40–7:55 AM • E-poster Station #8
Breast Imaging in the Pediatric and Adolescent Patient
Sheila Venkatesh, MD, Rochester General Hospital, Rochester, NY; Donnette A. Dabydeen, MD, PhD (sheila.venkatesh@rochesterregional.org)
LEARNING OBJECTIVES: To apply current recommendations for screening and diagnostic examinations in the pediatric and adolescent patient. To review imaging modalities and indications for imaging. To understand normal breast development and benign and malignant processes of the breast with clinical presentation, treatment and management, radiological examples, and pathological correlation.
CONTENT DESCRIPTION: Ultrasound is the imaging modality of choice in the pediatric and adolescent patient. Ultrasound has a 99.5% negative predictive value in distinguishing between benign and malignant masses. Mammography is less sensitive due to increased breast density. For radiation exposure to be as low as reasonably achievable, mammography is only used when absolutely necessary. Routine screening mammograms are not recommended. In patients with chest irradiation, genetic mutations, or strong family history, screening with mammogram and breast MRI is recommended. The clinical indications for breast imaging are pain, palpable mass, nipple discharge, and breast infection. Normal breast development and physiologic processes will be discussed. There will be a review of benign and malignant processes of the breast with clinical presentation, treatment and management, radiological examples, and pathological correlation. Benign breast processes, such as gynecomastia, fibroadenoma, pseudoangiomatous stromal hyperplasia, breast cyst, traumatic lesion, abscess, galactocele, intraductal papilloma, and juvenile papillomatosis will be covered. Malignant breast processes, such as phyllodes tumor, metastatic disease, and primary breast carcinoma will be reviewed. Phyllodes tumor is a rare, rapidly enlarging fibroepithelial tumor. Metastatic disease is more common than primary breast cancer, and the most common primaries are lymphoma, leukemia, and rhabdomyosarcoma. Primary breast carcinoma is extremely rare and accounts for less than 1% of childhood cancers. Knowledge of the various diagnoses, the imaging modalities, and radiological features will aid in treatment of patients and provide the best outcome for patients.

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Brett W. Carter, MD*
Teresa Chapman, MD, MA
Avneesh Chhabra, MD*
Jonathan H. Chung, MD
Tessa S. Cook, MD, PhD
Robert D’Agostino, MD
Carolynn M. DeBenedectis, MD
Lori A. Deitte, MD
Eric B. England, MD
Jan Fritz, MD*
Kara D. Gaetke-Udager, MD
Carol P. Geer, MD
Richard B. Gunderman, MD, PhD
Martin L. Gunn, MBChB*
Ajay Gupta, MD
Jay A. Harold, MD
Marta E. Heilbrun, MD
Stephanie Howard, MD
Oluwayemisi Ibraheem, MD
Leif E. Jensen, MD
Annette J. Johnson, MD, MS
Jeffrey S. Kemph, MD
Tabassum A. Kennedy, MD
Bhasker R. Koppula, MBBS
Arun Krishnaraj, MD
Christoph I. Lee, MD
Ana P. Lourenco, MD
David C. Madoff, MD*
Martha B. Mainiero, MD
Katherine E. Maturen, MD
J. Mark McKinney, MD
Mariam Moshiro, MD*
Mark E. Mullins, MD, PhD
David M. Naeger, MD
Alexander Norbash, MD
Jack A. Porrino, Jr, MD
Annemarie Relyea-Chew, JD, MS
Jessica B. Robbins, MD
Lumarie Santiago, MD
Erik Soloff, MD
Lucy Spalluto, MD
Sarah E. Stiwiill, MD
Dharshan R. Vummidi, MD, FRCR
Ashish P. Wasnik, MD
Emily M. Webb, MD
Shane A. Wells, MD*
Nicole S. Winkler, MD
Corrie M. Yablon, MD

Trainee Award Selection Committee

Janet E. Bailey, MD (Chair)
Aine M. Kelly, MS, MS
Peter S. Liu, MD
Mark E. Mullins, MD, PhD

Liaison Representatives

AAMC Council of Faculty Academic Societies (CFAS)
Carolyn C. Meltzer, MD (Senior Representative)
Lily M. Belfi, MD (Junior Representative)

AAMC Women’s Liaison
Jocelyn D. Chertoff, MD, MS

ABR Representative
Cheri L. Canon, MD

ACR Councilor
TBD

AMA Representative
Stephen Chan, MD

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Robert K. Zeman, MD

AMA-RUC Advisor
Stephen Chan, MD

ARLM
Yoshimi Anzai, MD, MPH

NCRP
Kimberly E. Applegate, MD, MS

* Faculty financial disclosures are located in the Faculty Index.
## Past Meetings of the AUR

<table>
<thead>
<tr>
<th>Year</th>
<th>Institution and Location</th>
</tr>
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<td>Johns Hopkins University, Baltimore, Maryland</td>
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<td>1959</td>
<td>Emory University, Atlanta, Georgia</td>
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<td>1960</td>
<td>Southwestern Medical School, Dallas, Texas</td>
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<td>1961</td>
<td>Stanford University, Palo Alto, California</td>
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<td>1962</td>
<td>Indiana University, Indianapolis, Indiana</td>
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<td>Yale University, New Haven, Connecticut</td>
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<td>University of Chicago, Chicago, Illinois</td>
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<td>1965</td>
<td>University of Washington, Seattle, Washington</td>
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<td>1966</td>
<td>University of Arkansas, Little Rock, Arkansas</td>
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<td>1967</td>
<td>Temple University, Philadelphia, Pennsylvania</td>
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<td>1968</td>
<td>Ohio State University, Columbus, Ohio</td>
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<td>University of California, San Francisco, California</td>
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<td>1970</td>
<td>University of Kentucky, Lexington, Kentucky</td>
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<td>1971</td>
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<td>1972</td>
<td>University of New Mexico, Albuquerque, New Mexico</td>
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<td>1973</td>
<td>University of British Columbia, Vancouver, British Columbia</td>
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<td>1974</td>
<td>New York University Medical Center, New York, New York</td>
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<td>1975</td>
<td>University of California, San Diego, San Diego, California</td>
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<td>1976</td>
<td>Harvard University, Boston, Massachusetts</td>
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<td>1977</td>
<td>University of Kansas Medical Center, Kansas City, Kansas</td>
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<td>1978</td>
<td>University of Texas Health Science Center, San Antonio, Texas</td>
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<td>1979</td>
<td>University of Rochester School of Medicine &amp; Dentistry, Rochester, New York</td>
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<td>1980</td>
<td>University of Arizona College of Medicine, Tucson, Arizona</td>
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<td>1981</td>
<td>Tulane University/Louisiana State University, New Orleans, Louisiana</td>
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<td>1982</td>
<td>Johns Hopkins University/University of Maryland, Baltimore, Maryland</td>
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<td>1983</td>
<td>University of South Alabama, Mobile, Alabama</td>
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<td>1984</td>
<td>University of California, Irvine, Newport Beach, California</td>
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<td>Vanderbilt University, Nashville, Tennessee</td>
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<td>1986</td>
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<td>1987</td>
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<td>University of Alabama, Birmingham, Alabama</td>
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<td>1997</td>
<td>University of Texas Southwestern Medical School/Baylor University Medical Center, Dallas, Texas</td>
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<td>1998</td>
<td>Louisiana State University Medical Center/Tulane University Medical Center, New Orleans, Louisiana</td>
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<td>1999</td>
<td>Sheraton San Diego, San Diego, California</td>
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<td>2000</td>
<td>Renaissance Orlando Resort and Hotel, Orlando, Florida</td>
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<td>Fairmont Royal York Hotel, Toronto, Ontario, Canada</td>
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<td>2002</td>
<td>Pointe South Mountain Resort, Phoenix, Arizona</td>
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<td>2003</td>
<td>Fontainebleau Hilton Resort Miami, Florida</td>
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<td>2004</td>
<td>San Francisco Marriott, San Francisco, California</td>
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<td>Fairmont The Queen Elizabeth Hotel Montréal, Québec, Canada</td>
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<td>Sheraton Seattle Hotel, Seattle, Washington</td>
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<td>2009</td>
<td>Crystal Gateway Marriott, Arlington, Virginia</td>
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<td>JW Marriott San Antonio Hill Country, San Antonio, Texas</td>
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<td>2016</td>
<td>Manchester Grand Hyatt, San Diego, California</td>
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<td>2017</td>
<td>The Diplomat Beach Resort Hollywood, Florida</td>
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<td>2018</td>
<td>Omni Orlando Resort ChampionsGate, Florida</td>
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</table>

### 2019 AUR Annual Meeting

**April 9–12 (Tuesday–Friday)**  
**Hilton Baltimore**  
**Baltimore, Maryland**

### 2020 AUR Annual Meeting

**April 21–24 (Tuesday–Friday)**  
**Philadelphia Marriott Downtown**  
**Philadelphia, Pennsylvania**
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<th>Year</th>
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<th>Institution</th>
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<tr>
<td>1953</td>
<td>Russell H. Morgan, MD</td>
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<td>1954</td>
<td>Henry S. Kaplan, MD</td>
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<td>1955</td>
<td>William B. Seaman, MD</td>
<td>Washington University</td>
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<td>1956</td>
<td>Robert Harvey, MD</td>
<td>University of Illinois</td>
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<td>1957</td>
<td>John F. Holt, MD</td>
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<td>1958</td>
<td>David M. Gould, MD</td>
<td>University of Arkansas</td>
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<td>1959</td>
<td>Ernest H. Wood, MD</td>
<td>University of North Carolina</td>
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<tr>
<td>1960</td>
<td>Paul A. Riemschneider, MD*</td>
<td>State University of New York, Syracuse</td>
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<td>1961</td>
<td>Robert D. Moseley, Jr, MD*</td>
<td>University of Chicago</td>
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<td>1962</td>
<td>Melvin M. Figley, MD</td>
<td>University of Washington</td>
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<td>1963</td>
<td>Herbert F. Stauffer, MD*</td>
<td>Temple University</td>
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<td>1964</td>
<td>John A. Campbell, MD</td>
<td>Indiana University</td>
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<td>1965</td>
<td>Sidney W. Nelson, MD</td>
<td>Ohio State University</td>
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<td>1966</td>
<td>Alexander R. Margulis, MD</td>
<td>University of California, San Francisco</td>
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<td>1967</td>
<td>Morton M. Kligerman, MD, MSc*</td>
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<td>1968</td>
<td>Stanley M. Rogoff, MD</td>
<td>University of Rochester</td>
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<td>1969</td>
<td>Harry Z. Mellins, MD</td>
<td>State University of New York, Brooklyn</td>
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<td>1970</td>
<td>Alexander Gottschalk, MD*</td>
<td>University of Chicago</td>
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<td>1971</td>
<td>James H. Scatiff, MD</td>
<td>University of North Carolina</td>
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<td>1972</td>
<td>Elliott C. Lasser, MD</td>
<td>University of California, San Diego</td>
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<td>1973</td>
<td>Byron G. Brogdon, MD</td>
<td>University of New Mexico</td>
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<td>1974</td>
<td>Melvyn S. Schreiber, MD</td>
<td>University of Texas, Galveston</td>
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<tr>
<td>1975</td>
<td>Richard H. Greenspan, MD*</td>
<td>Yale University</td>
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<td>1976</td>
<td>Mark M. Mishkin, MD</td>
<td>University of Pennsylvania</td>
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<td>1977</td>
<td>Arch W. Templeton, MD*</td>
<td>University of Kansas Medical Center</td>
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<td>1978</td>
<td>Gerald T. Scanlon, MD*</td>
<td>Medical College of Wisconsin</td>
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<td>Joseph E. Whitley, MD*</td>
<td>University of Maryland</td>
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<td>John R. Thornbury, MD*</td>
<td>University of New Mexico</td>
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<td>David G. Bragg, MD</td>
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<td>Lee F. Rogers, MD</td>
<td>Northwestern University</td>
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<td>Thomas S. Harle, MD</td>
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<td>1984</td>
<td>Charles E. Putman, MD*</td>
<td>Duke University</td>
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<td>Harry K. Genant, MD</td>
<td>University of California, San Francisco</td>
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<td>Arvin E. Robinson, MD</td>
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<td>A. Everette James, Jr, MD*</td>
<td>Vanderbilt University</td>
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<td>1988</td>
<td>Ronald G. Evans, MD</td>
<td>Washington University Medical Center</td>
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<td>1989</td>
<td>William M. Thompson, MD</td>
<td>New Mexico VA Health Care System</td>
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<td>Joseph F. Sackett, MD</td>
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<td>Kay H. Vydareny, MD</td>
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<td>Donald R. Kirks, MD</td>
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<td>Richard W. Katzberg, MD*</td>
<td>University of California Davis, Sacramento</td>
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<td>Wilbur L. Smith, Jr, MD</td>
<td>Wayne State University</td>
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<td>Philip O. Alderson, MD</td>
<td>St Louis University</td>
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<td>1997</td>
<td>Bruce J. Hillman, MD</td>
<td>University of Virginia</td>
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<td>1998</td>
<td>Robert F. Mattrey, MD</td>
<td>University of California San Diego Medical Center</td>
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<td>Laurie L. Fajardo, MD, MBA</td>
<td>University of Iowa</td>
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<td>2000</td>
<td>Steven E. Seltzer, MD</td>
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<td>H. Dirk Sostman, MD</td>
<td>Weill Medical College of Cornell University</td>
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<td>Ella A. Kazerooni, MD, MS</td>
<td>University of Michigan</td>
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<td>Etta D. Pisano, MD</td>
<td>Medical University of South Carolina</td>
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<td>2004</td>
<td>G. Scott Gazelle, MD, MPH, PhD</td>
<td>MGH Institute for Technology Assessment</td>
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<td>Jannette Collins, MD, MEd</td>
<td>University of Cincinnati Medical Center</td>
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<td>N. Reed Dunnick, MD</td>
<td>University of Michigan</td>
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<td>Ronald L. Arenson, MD</td>
<td>University of California, San Francisco</td>
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<td>Kimberly E. Applegate, MD, MS</td>
<td>Emory University</td>
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<td>2009</td>
<td>Felix S. Chew, MD, MBA</td>
<td>University of Washington</td>
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<td>2010</td>
<td>John Eng, MD</td>
<td>Johns Hopkins Hospital</td>
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<td>2011</td>
<td>Robert A. Novelline, MD</td>
<td>Harvard Medical School, Massachusetts General Hospital</td>
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<td>Ruth C. Carolos, MD, MS</td>
<td>University of Michigan</td>
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<td>Jocelyn D. Chertoff, MD, MS</td>
<td>Dartmouth-Hitchcock Medical Center</td>
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<td>2014</td>
<td>Jonathan S. Lewin, MD</td>
<td>Johns Hopkins Medicine</td>
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<td>2015</td>
<td>Gary J. Whitman, MD</td>
<td>MD Anderson Cancer Center</td>
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<td>2016</td>
<td>Yoshimi Anzai, MD, MPH</td>
<td>University of Utah</td>
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<tr>
<td>2017</td>
<td>Martha B. Mainiero, MD</td>
<td>Brown University</td>
</tr>
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</table>

*Deceased.
American Alliance of Academic Chief Residents in Radiology (A³CR²)

The American Alliance of Academic Chief Residents in Radiology (A³CR²) meets each year in conjunction with the AUR Annual Meeting. This meeting is a popular forum for chief residents to develop leadership skills, discuss matters of mutual interest, hold appropriate interchange with residents from other departments, and engage in problem solving with their peers and teachers. Under the guidance of faculty advisors, the A³CR² each year selects officers and a steering committee to lead the organization, plan the Annual Meeting program, provide appropriate representation to other radiologic and medical societies, and coordinate an annual survey. The A³CR² continues to play a vital role in the AUR Annual Meeting program, providing invaluable educational activities and networking opportunities to chief residents in radiology.

2017–2018 A³CR² Steering Committee

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Dexter Mendoza, MD

**Secretary**
Daniella Asch, MD

**Treasurer**
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**Senior Faculty Advisor**
Peter S. Liu, MD

**Faculty Advisors**
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Darel E. Heitkamp, MD
Ramesh S. Iyer, MD
Tan-Lucien H. Mohammed, MD, MS
Charles S. Resnik, MD
Richard B. Ruchman, MD
Shane A. Wells, MD

**Awards Committee**
Anand R. Patel, MD

**Elections Committee**
Matthew Manganaro, MD
Elaine Pigman, MD

**Electronic Communications Committee**
Varun Sethi, MD

**Membership Committee**
W. Tania Rahman, MD
Michael J. Magnetta, MD
Guangzu Gao, MD

**Program Committee**
Julie C. Birch, MD
Nisha Swaminathan, MD

**Problem Solving**
Matthew P. Kiczek, DO
Benjamin L. Triche, MD

**Case Review**
Katherine E. Barton, MD
Michael T. Bayona, MD

**Idea Forum**
Carson A. Kisner, MD
Kaley Pippin, MD
Adam W. Jaster, MD

**Brogdon Panel**
Naiim Ali, MD
Daniel Adamo, MD

**Publications Committee**
Michael T. Kassin, MD

**Survey Committee**
Andrew B. Wallace, MD

**AAPM Liaison**
Hafez S. Khalili, MD
Andrew Matthews, MD

**ABR Liaison**
Chad Klockho, MD
Valerie E. Stine, MD

**ACGME Liaison**
Kristin A. Kinsman, MD
Selwan B. Abdullah, MD
Brian Bussey, MD, MS
Ryan C. Sieve, MD

**ACR Liaison**
Shannon Kim, MD

**AMA Liaison**
Sammy A. Yacob, DO

**APDR Liaisons**
Brian Lee, MD
Joss Wertz, DO
Stuart Deaderick, MD
Ilyas Chiali, MD

* Faculty financial disclosures are located in the Faculty Index.
Alliance of Clinician-Educators in Radiology (ACER)

The Alliance of Clinician-Educators in Radiology works to advance the interests and efforts of this large and growing segment of academic radiology faculty. ACER’s mission is (1) to provide a formal organization and forum for clinician-educators to meet, exchange ideas, and learn new skills that promote and advance the careers of clinician-educators; (2) to provide programming at the AUR Annual Meeting that is targeted toward the needs of clinician-educators; (3) to develop and maintain an information and networking database for the benefit, awareness, and nurturing of clinician-educators; (4) to promote and develop educational research activities relevant to clinician-educators; and (5) to encourage excellence in radiology education at a local, national, and international level.

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Priscilla J. Slanetz, MD, MPH
President-elect
Paul P. Cronin, MBBCh
Secretary
Puneet Bhargava, MD
Treasurer
Katherine A. Klein, MD
Immediate Past President
Aine M. Kelly, MD, MS
Past President
Mark E. Mullins, MD, PhD

2017–2018 ACER Committee Chairs

Awards Committee
Angelisa M. Paladin, MD
Education Committee
Katherine A. Klein, MD
Electronic Communications Committee
Jessica B. Robbins, MD
Finance Committee
Katherine A. Klein, MD
Long-Range Planning Committee
Eric J. Stern, MD
Membership Committee
Jessica B. Robbins, MD
Nominating Committee
Aine M. Kelly, MD, MS
Program Committee
Paul P. Cronin, MBBCh (Co-Chair)
Puneet Bhargava, MD (Co-Chair)
Publications Committee
Matthew T. Heller, MD (Co-Chair)
Ana P. Lourenco, MD (Co-Chair)
Rules Committee
Syed A. Bokhari, MD
Member-at-Large
Theresa C. McLeod, MD
APDR President
Lori A. Deitte, MD
SCARD President
Jonathan S. Lewin, MD
AMSER President
Emily M. Webb, MD

* Faculty financial disclosures are located in the Faculty Index.
Alliance of Medical Student Educators in Radiology (AMSER)

The Alliance of Medical Student Educators in Radiology (AMSER) is an organization of radiologists who are responsible for, or who have special interest in, the radiology education of medical students. The purposes of the organization are (1) to encourage excellence in radiology education of medical students at a local, national, and international level; (2) to promote radiology as an essential component of the medical student curriculum; and (3) to stimulate interest in academic radiology as a medical career. AMSER meets annually as part of the AUR Annual Meeting. AMSER sessions cover a variety of topics on medical student radiology education and are open to all registrants of the AUR meeting.

2017–2018 AMSER Executive Committee

President
Emily M. Webb, MD

Vice President
Aine M. Kelly, MD, MS

Vice President-elect
David M. Naeger, MD

Secretary-Treasurer
C. Alexander Greico, MD

Immediate Past President
Kimi L. Kondo, DO

AUR President
Martha B. Mainiero, MD

Member-at-Large
Lili M. Belfi, MD

Member-at-Large
Alison L. Chetlen, DO

Member-at-Large
Marc H. Willis, DO

AMSER Committee Chairs

Awards Committee
Kimi L. Kondo, DO

Curricular and Educational Resources Committee
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3. To provide a forum for discussion of problems and mutual interests among radiology department chairs.
4. To develop policies and initiatives essential for the success of the clinical, research, and educational missions of radiology and the imaging sciences.

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<table>
<thead>
<tr>
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<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967–68</td>
<td>William B. Seaman, MD*</td>
</tr>
<tr>
<td>1968–69</td>
<td>Alexander R. Margulis, MD</td>
</tr>
<tr>
<td>1969–70</td>
<td>Sidney W. Nelson, MD*</td>
</tr>
<tr>
<td>1970–71</td>
<td>Herbert L. Abrams, MD*</td>
</tr>
<tr>
<td>1971–72</td>
<td>James E. Youker, MD</td>
</tr>
<tr>
<td>1972–73</td>
<td>Eugene C. Klatte, MD</td>
</tr>
<tr>
<td>1973–74</td>
<td>Harold G. Jacobson, MD*</td>
</tr>
<tr>
<td>1974–75</td>
<td>Luther W. Brady, MD</td>
</tr>
<tr>
<td>1975–76</td>
<td>Walter W. Whitehouse, MD*</td>
</tr>
<tr>
<td>1976–77</td>
<td>Douglas W. MacEwan, MD</td>
</tr>
<tr>
<td>1977–78</td>
<td>M. Paul Capp, MD</td>
</tr>
<tr>
<td>1978–79</td>
<td>Richard M. Friedenberg, MD*</td>
</tr>
<tr>
<td>1979–80</td>
<td>Ronald G. Evens, MD</td>
</tr>
<tr>
<td>1980–81</td>
<td>David G. Bragg, MD</td>
</tr>
<tr>
<td>1981–82</td>
<td>A. Everette James, Jr, MD*</td>
</tr>
<tr>
<td>1982–83</td>
<td>Richard E. Buenger, MD*</td>
</tr>
<tr>
<td>1983–84</td>
<td>Charles E. Putman, MD*</td>
</tr>
<tr>
<td>1984–85</td>
<td>Lee F. Rogers, MD</td>
</tr>
<tr>
<td>1985–86</td>
<td>Melvin H. Schreiber, MD</td>
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<tr>
<td>1986–87</td>
<td>Stanley Baum, MD</td>
</tr>
<tr>
<td>1987–88</td>
<td>Joseph E. Whitley, MD*</td>
</tr>
<tr>
<td>1988–89</td>
<td>C. Douglas Maynard, MD</td>
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<tr>
<td>1989–90</td>
<td>Ernest J. Ferris, MD</td>
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<td>1990–91</td>
<td>Robert J. Stanley, MD</td>
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<td>1991–92</td>
<td>Joseph F. Sackett, MD</td>
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<td>1992–93</td>
<td>William J. Casarella, MD</td>
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<td>1993–94</td>
<td>Albert A. Moss, MD</td>
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<tr>
<td>1994–95</td>
<td>Philip O. Alderson, MD</td>
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<td>1995–96</td>
<td>David C. Levin, MD</td>
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<tr>
<td>1996–97</td>
<td>Michael Manco-Johnson, MD</td>
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<td>1997–98</td>
<td>William M. Thompson, MD</td>
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<td>1998–99</td>
<td>N. Reed Dunnick, MD</td>
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<td>1999–2000</td>
<td>Joseph K. T. Lee, MD</td>
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<td>2000–01</td>
<td>Carl E. Ravin, MD</td>
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<td>2001–02</td>
<td>Ronald L. Arenson, MD</td>
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<tr>
<td>2002–04</td>
<td>Theron W. Ovitt, MD</td>
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<td>2004–06</td>
<td>Donald P. Harrington, MD</td>
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<td>2006–08</td>
<td>Stephen R. Baker, MD</td>
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<td>2008–10</td>
<td>Dieter R. Enzmann, MD</td>
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<td>2010–12</td>
<td>Steven E. Seltzer, MD</td>
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<td>2012–14</td>
<td>Valerie P. Jackson, MD</td>
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<tr>
<td>2014–16</td>
<td>Norman J. Beauchamp, Jr, MD, MHS</td>
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The Association of Program Directors in Radiology is an organization of residency and fellowship program directors and coordinators with the common goal of optimizing the educational experience for our trainees. Through an annual meeting, periodic communications, and material on its website, APDR enhances the professional capabilities of its members, provides them with the tools necessary to flourish in a rapidly changing health care environment and to be in compliance with regulatory requirements of the Residency Review Committee and the American Board of Radiology, and facilitates effective communication with those organizations and others with common interests.

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<th>Position</th>
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<tr>
<td>President</td>
<td>Lori A. Deitte, MD</td>
<td>2017–2018</td>
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<tr>
<td>President-elect</td>
<td>Mark E. Mullins, MD, PhD</td>
<td>2017–2018</td>
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<tr>
<td>Secretary-Treasurer</td>
<td>Richard B. Ruchman, MD</td>
<td>2017–2018</td>
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<td>First Director-at-Large</td>
<td>M. Victoria Marx, MD</td>
<td>2017–2018</td>
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<tr>
<td>Second Director-at-Large</td>
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<td>2017–2018</td>
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<tr>
<td>Third Director-at-Large</td>
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<td>2017–2018</td>
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<tr>
<td>Immediate Past President</td>
<td>Deborah L. Reede, MD</td>
<td>2017–2018</td>
</tr>
<tr>
<td>AUR President</td>
<td>Martha B. Mainiero, MD</td>
<td>2017–2018</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>President</th>
</tr>
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<tbody>
<tr>
<td>1992–1994</td>
<td>Jerome H. Arndt, MD*</td>
</tr>
<tr>
<td>1994–1995</td>
<td>Lee B. Talner, MD</td>
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<td>1995–1996</td>
<td>William M. Thompson, MD</td>
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<tr>
<td>1996–1997</td>
<td>Ingrid M. Peterson, MD</td>
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<td>1997–1998</td>
<td>Ronald J. Zagoria, MD</td>
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<td>1998–1999</td>
<td>Philip O. Alderson, MD</td>
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<tr>
<td>1999–2000</td>
<td>Murray L. Janower, MD</td>
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<td>2000–2001</td>
<td>Coraile Shaw, MD</td>
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<td>2001–2002</td>
<td>Jay A. Harolds, MD</td>
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<td>2002–2003</td>
<td>Vijay M. Rao, MD</td>
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<tr>
<td>2003–2004</td>
<td>Janet L. Strife, MD</td>
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<tr>
<td>2004–2005</td>
<td>Michael J. Shortsleeve, MD</td>
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<tr>
<td>2005–2006</td>
<td>Spencer B. Gay, MD</td>
</tr>
<tr>
<td>2006–2007</td>
<td>Jannette Collins, MD, MDed</td>
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<tr>
<td>2007–2008</td>
<td>Duane G. Mezwa, MD</td>
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<td>2008–2009</td>
<td>Charles S. Resnik, MD</td>
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<td>2009–2010</td>
<td>Charles F. Lanzieri, MD</td>
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<tr>
<td>2010–2011</td>
<td>Lawrence P. Davis, MD</td>
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<tr>
<td>2011–2012</td>
<td>Martha B. Mainiero, MD</td>
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<tr>
<td>2012–2013</td>
<td>Jocelyn D. Chertoff, MD, MS</td>
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<td>2013–2014</td>
<td>J. Mark McKinney, MD</td>
</tr>
<tr>
<td>2014–2015</td>
<td>Janet E. Bailey, MD</td>
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<td>2015–2016</td>
<td>Kristen K. DeStigter, MD</td>
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<tr>
<td>2016–2017</td>
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Christopher P. Ho, MD
Hyewon Hyun, MD
Jeannie K. Kwon, MD
Theresa C. McCloud, MD
Rachel F. Oser, MD
Sabah Servaes, MD
Ernest Wiggins, MD

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Ann K. Jay, MD
Madeleine C. Lewis, MD
Tan-Lucien H. Mohammed, MD, MS
William T. O’Brien, Sr, DO
Charles S. Resnik, MD
Jessica B. Robbins, MD
Johanna Schubert, MD
Kristina A. Siddall, MD

**Global Health Initiative for Residents Task Force**
Priscilla J. Stanetz, MD, MPH (Chair)
Lori A. Deitte, MD
Ernest Wiggins, MD
Sallab Servaes, MD

**APDR Liaisons to Other Societies**
Alliance of Medical Student Educators in Radiology (AMSER) Representative
Kim K. Kondo, DO
American Alliance of Academic Chief Residents in Radiology (A|CR| Representative
Charles S. Resnik, MD
American College of Radiology (ACR) Council Representative
Lori A. Deitte, MD – Councilor

* Faculty financial disclosures are located in the Faculty Index.
Association of Program Coordinators in Radiology (APCR)

The mission of the Association of Program Coordinators in Radiology is to promote excellence in the administration of radiology residency and fellowship programs, to provide educational opportunities in the field of graduate medical education and program administration, and to provide forums for professional growth and exchange of information.

2017–2018 APCR Board of Directors

President Sylvia Zavatchen
President-elect Joseph Stuckelman
Secretary-Treasurer Jacqueline Williams
Board Member-at-Large Janet Palmer

Board Member-at-Large Amanda Easton
Board Member-at-Large Tina Rapstine
Board Member-at-Large Rose Alden
Immediate Past President Sally Jones

APCR Past Presidents

2000–2002 Dianna Otterstad
2002–2003 Sherry Bucholz
2003–2004 Pauline Marek
2004–2005 Julia Burks
2005–2006 Janet Birkmann
2006–2007 Lois Shuman
2007–2008 Amy Richgels
2008–2009 Gloria Jorge

2009–2010 Mary Ellen Hobler
2010–2011 Madeline Mateo
2011–2012 Tammi Teelers-McDade
2012–2013 Katherine Dixon
2013–2014 Lynn Lammers
2014–2015 Mandy Velligan
2015–2016 Marleen Viola
2016–2017 Sally Jones

APCR Standing and Ad Hoc Committees

Archives
Tina Rapstine (Chair)
Barbara Barnett
Vanessa Brown
Kim Christman
Linda Galante
Dianna Otterstad
LaToya Wright

Awards
Amanda Easton (Chair)
Vanessa Brown
Kim Christman
Glena Clark
Terri Clayson
Linda Galante
Denise Graham
Amy Ice-Gipson
Kellyn Mahan
Madeline Mateo
Bridge Wakefield
LaToya Wright

Electronic Communications
Joseph Stuckelman (Chair)
Jasmine Allen
Mark Bolden
Cassie Bruggerman
Angela Butler
Angela Combs

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Joseph Stuckelman (Chair)
Janet Palmer
Tina Rapstine
Sylvia Zavatchen

Gloria Jorge
Susan Lamey
Rosa Moran
Basia Nowakowski
Janet Palmer
Melinda Parangan-Chu
Tina Rapstine

Fellowship Ad Hoc
Melinda Parangan-Chu (Chair)
Kelly Aronson
Jane Choura
Linda Dagys
Tosha Feldkamp
Sally Jones
Gloria Jorge
Debbie Kenneybrew
Susan Lamey
Heidi Merkin
Ashley Thurston
Mirna Valenzuela
Sandria Wong

Long-Range Planning
Sylvia Zavatchen (Chair)
Teresa Lalli
Jill Philp
Jacqueline Williams

Monica Bailey
Sandra Baum
Clara Bright
Cassie Bruggerman
Glena Clarke
Terri Clayson
Linda Galante
Jackie Hansen
Tina Hunter
Debbie Kenneybrew
Jennifer Rabiega
Linda Schomer
Diane Slosser
Tammy Sorenson
Mirna Valenzuela
Jacqueline Williams
Elaine Wymer

Membership
Sylvia Zavatchen (Chair)

Nominating
Marleen Viola (Chair)
Sally Jones
Lynn Lammers
Sylvia Zavatchen
Jacqueline Williams

Professional Development
Jacqueline Williams (Chair)
Shey Anderson
Mark Bolden
Clara Bright
Amy Ice-Gipson
Anne Jones
Susan Lamey
Ranitta McDowell
Tomata Meadows
Beth Parker
Jill Philp
Linda Schomer
Kelli VanNesdall
Elaine Wymer

Mentoring
Marleen Viola (Chair)
Sheik Amin
Sally Jones

* Faculty financial disclosures are located in the Faculty Index.
APCR Standing and Ad Hoc Committees (continued)

Program Planning
Sylvia Zavatchen (Chair)*
Sally Jones
Janet Palmer
Joseph Stuckelman*
Marleen Viola

RRC
Sally Jones (Chair)
Kelly Aronson
Cassie Bruggerman
Glena Clarke
Kathy Dixon
Gayle Gaddis
Jan Hemma
Gloria Jorge
Debbie Kenneybrew
Susan Lamey
Madeline Mateo
Janet Palmer
Cynthia Patena
Jennifer Rabiega
Amy Romandine
Joseph Stuckelman
Kelli VanNosdall
Angie White

Scholarship
Rose Alden (Chair)
Sherry Bucholz
Glena Clarke
Kathy Dixon
Pam Krayewski
Madeline Mateo
Hollie Medina
Angie White
LaToya Wright

Survey
Sally Jones (Chair)
Rose Alden
Marte Bergman
Kim Christman
Gloria Jorge
Pam Krayewski
Hollie Medina
Linda Schomer
Mirma Valenzuela

TAGME Certification
Kathy Dixon (Chair)
Rose Alden
Marte Bergman
Mary Botero
Sherry Bucholz
Glena Clarke
Camille Dykas
Linda Erickson
Patti Horvath
Tina Hunter
Shari Johnston
Sally Jones
Gloria Jorge
Lynn Lammers
Karen Penater
Tina Rapstine
Amy Romandine
Lois Shuman
Joseph Stuckelman
Ashley Thurston
Bridget Wakefield
Shane Wong

Winners of APCR Outstanding Coordinator Award
2002 Award: Ralene Coble
University of Texas Medical Branch Hospital
2003 Award: Janet Birkmann
Albert Einstein Medical Center
2004 Award: Margaret Romero
University of New Mexico
2005 Award: Amy Richgels
University of Wisconsin
2006 Award: Dianna Otterstad
University of Texas Southwestern Medical Center
2007 Award: Mary Ellen Hobler
UMDNJ-Robert Wood Johnson Medical School
2008 Award: Dora Miller
Cedars-Sinai Medical Center
2009 Award: Gloria Jorge
Beth Israel Medical Center
2010 Award: Sandy Sees
Wayne State University
2011 Award: Lois Shuman
Indiana University School of Medicine
2012 Award: Pauline Marek
Texas A&M College of Medicine–Scott & White Program
2013 Award: Mandy Velligan
University of Chicago
2014 Award: Kathy Dixon
Ochsner Medical Center
2015 Award: Sherry Bucholz
Providence Sacred Heart Medical Center and Children’s Hospital
2016 Award: Joseph Stuckelman
Cedars-Sinai Medical Center

* Faculty financial disclosures are located in the Faculty Index.
Awards Archive

AUR Gold Medal Award Recipients

The Gold Medal is awarded in recognition of unusually distinguished service or contributions to the Association of University Radiologists, Academic Radiology, or the field of radiology in general.

1978  Paul C. Hodges, MD*  Hugh M. Wilson, MD*  
1979  Henry S. Kaplan, MD*  Russell H. Morgan, MD*  William B. Seaman, MD*  
1980  Robert D. Moseley, Jr, MD*  Sidney W. Nelson, MD*  
1981  Harry W. Fischer, MD*  Harvey Picker, MD*  Elliott C. Lasser, MD  Jean Picker, MD*  
1982  Harold G. Jacobson, MD*  Alexander R. Margulis, MD  
1983  Robert C. Cooley, MD*  Melvin M. Figley, MD*  
1984  Herbert L. Abrams, MD  Richard H. Greenspan, MD*  
1985  Byron G. Brogdon, MD*  Juan M. Taveras, MD*  
1986  Harry Z. Mellins, MD*  Lucy Frank Squire, MD*  
1987  Alexander Gottschalk, MD*  Henry H. Jones, MD*  
1988  M. Paul Capp, MD  
1989  Eugene C. Klatte, MD  Joseph E. Whitely, MD*  
1990  John A. Campbell, MD*  John H. Juhl, MD*  
1991  John F. Holt, MD*  Charles E. Putman, MD*  
1992  Malcolm D. Jones, MD*  
1993  Melvyn H. Schreiber, MD  Frederic N. Silverman, MD*  
1994  John A. Kirkpatrick, MD*  Nancy O’Neil Whitley, MD*  
1995  David G. Bragg, MD  George R. Leopold, MD  
1996  Ronald G. Evens, MD  Thomas S. Harle, MD  
1997  C. Douglas Maynard, MD  James E. Youker, MD  
1998  B. Leonard Holman, MD*  James H. Sclafli, MD*  
1999  Jerome H. Arndt, MD*  Robert W. Holden, MD  
2000  Arvin E. Robinson, MD  Lee F. Rogers, MD  
2001  Edmund A. Franken, MD  William M. Thompson, MD  
2002  John R. Thornbury, MD  Albert A. Moss, MD  
2003  Stanley Baum, MD  A. Everett James, Jr, MD*  
2004  Steven E. Seltzer, MD  
2005  Philip O. Alderson, MD  Bruce J. Hillman, MD  
2006  Wilbur L. Smith, Jr, MD  Kay H. Vydareny, MD  
2007  Hedvig Hricak, MD, PhD  Robert F. Mattrey, MD  
2008  Laurie L. Fajardo, MD, MBA  David C. Levin, MD  
2009  Ella A. Kazerooni, MD, MS  Daniel C. Sullivan, MD  
2010  Etta D. Pisano, MD  James H. Thrall, MD  
2011  G. Scott Gazelle, MD, MPH, PhD  Gary M. Glazer, MD*  
2012  N. Reed Dunnick, MD  Beverly P. Wood, MD, PhD, MSeD  
2013  Ronald L. Arenson, MD  
2014  Jannette Collins, MD, MEd  Vijay M. Rao, MD  
2015  Kimberly E. Applegate, MD, MS  Robert A. Novelline, MD  
2016  Ruth C. Carlos, MD, MS  John Eng, MD  
2017  William G. Bradley, Jr, MD, PhD  Jocelyn D. Chertoff, MD, MS  

*Deceased.

APDR Achievement Award Recipients

The APDR Achievement Award is presented annually to up to two individuals who have made a significant contribution to the advancement of education in radiology or have given outstanding service to the APDR.

1997  Jerome H. Arndt, MD*  
1998  No award  
1999  David S. Hartman, MD  
2000  Spencer B. Gay, MD  
2001  William M. Thompson, MD  
2002  Michael B. Love, MD  
2003  Charles S. Resnik, MD  
2004  Jannette Collins, MD, MEd  Robert A. Novelline, MD  
2005  Coralie Shaw, MD  
2006  Vijay M. Rao, MD  
2007  Janet L. Strife, MD  
2008  Philip O. Alderson, MD  
2009  Murray L. Janower, MD  
2010  Jay A. Harold, MD  Lee B. Talner, MD  
2011  William Herring, MD, FACR  
2012  Duane G. Mezwa, MD  
2013  Michael J. Shortsleeve, MD, FACR  
2014  Lawrence P. Davis, MD  
2015  Valerie P. Jackson, MD  
2016:  Martha B. Mainiero, MD  Theresa C. McLoud, MD  
2017:  Jocelyn D. Chertoff, MD, MS, FACR  Petra J. Lewis, MBBS  

*Deceased.
SCARD Visionary Leadership Award Recipients

The SCARD Visionary Leadership Award recognizes an individual who has contributed to the field of academic radiology by exhibiting extraordinary leadership abilities.

2015 | James H. Thrall, MD | 2017 | Ronald L. Arenson, MD, FCR
2016 | N. Reed Dunnick, MD |

AUR Memorial Award Recipients

<table>
<thead>
<tr>
<th>Year</th>
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<tr>
<td>1962</td>
<td>Sadek K. Hilal, MD</td>
</tr>
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<td>1963</td>
<td>Harold L. Kundel, MD</td>
</tr>
<tr>
<td>1964</td>
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<tr>
<td>1965</td>
<td>Richard Arkless, MD</td>
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<tr>
<td>1966</td>
<td>Edgar L. Suprenant, MD</td>
</tr>
<tr>
<td>1967</td>
<td>E. Leon Kier, MD</td>
</tr>
<tr>
<td>1968</td>
<td>Paul B. Hoffer, MD</td>
</tr>
<tr>
<td>1969</td>
<td>Richard O. Danford, MD</td>
</tr>
<tr>
<td>1970</td>
<td>No Award</td>
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<tr>
<td>1971</td>
<td>Melvin T. Korobkin, MD</td>
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<td>1971</td>
<td>C. Richard Dunn, MD</td>
</tr>
<tr>
<td>1972</td>
<td>Norman H. Boyer, MD</td>
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<td>1973</td>
<td>Joseph F. Phillips, MD</td>
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<td>1974</td>
<td>Peter J. Julien, MD</td>
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<tr>
<td>1975</td>
<td>William V. Glenn, MD</td>
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<tr>
<td>1976</td>
<td>Robert C. Brasch, MD</td>
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<tr>
<td>1977</td>
<td>Richard W. Katzberg, MD</td>
</tr>
<tr>
<td>1978</td>
<td>Jonathan M. Rubin, MD, PhD</td>
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<td>1979</td>
<td>Harvey J. Berger, MD</td>
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<tr>
<td>1980</td>
<td>John D. Newell, MD</td>
</tr>
<tr>
<td>1981</td>
<td>Peter L. Davis, MD</td>
</tr>
<tr>
<td>1982</td>
<td>Robert F. Mattrey, MD</td>
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<tr>
<td>1983</td>
<td>Fred H. Burbank, MD</td>
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<tr>
<td>1984</td>
<td>Mark R. Mitchell, MD</td>
</tr>
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<td>1984</td>
<td>George E. Wesbey, MD</td>
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<td>1984</td>
<td>Michael E. Moseley, MD</td>
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<td>1985</td>
<td>Alan S. Brody, MD</td>
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<td>1986</td>
<td>Alexander S. Mark, MD</td>
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<td>1987</td>
<td>Laurie L. Fajardo, MD, MBA</td>
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<td>1988</td>
<td>Alan D. Eisenberg, MD</td>
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<td>1989</td>
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<td>1990</td>
<td>Brian D. Coley, MD</td>
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<td>1991</td>
<td>Alexander B. Baxter, MD</td>
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<td>1992</td>
<td>D. James Schumacher, MD</td>
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<td>1993</td>
<td>Ralph Weisleder, MD, PhD</td>
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<td>1994</td>
<td>J. F. Geschwind, MD</td>
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<td>1995</td>
<td>Reed A. Ornay, MD, MS</td>
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<td>1996</td>
<td>Carl M. Black, MD</td>
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<td>1997</td>
<td>Peter Drescher, MD, MS</td>
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<td>1998</td>
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<td>1999</td>
<td>Nirmish Lal, MD</td>
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<td>2000</td>
<td>Robert T. Harvey, MD</td>
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<td>2001</td>
<td>Jennifer H. Park, MD</td>
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<td>2002</td>
<td>No Award</td>
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<td>2003</td>
<td>Jingbo Zhang, MD</td>
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<td>2004</td>
<td>Jonathan Wood, MD</td>
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<td>2005</td>
<td>Dhawal Goradia, MD</td>
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<tr>
<td>2006</td>
<td>David T. Fetzer, BS</td>
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<tr>
<td>2007</td>
<td>Douglas R. Kitchin, MD</td>
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<tr>
<td>2008</td>
<td>No Award</td>
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<tr>
<td>2009</td>
<td>Lily Y. Zou, BA</td>
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<td>2010</td>
<td>Matthew S. Davenport, MD</td>
</tr>
<tr>
<td>2011</td>
<td>Sotirios Bisdas, MD</td>
</tr>
<tr>
<td>2012</td>
<td>Nicholas A. Koontz, MD</td>
</tr>
<tr>
<td>2013</td>
<td>Dania Daye, BS</td>
</tr>
<tr>
<td>2014</td>
<td>Jared Bailey, MD</td>
</tr>
<tr>
<td>2015</td>
<td>Austin R. Faulkner, MD</td>
</tr>
<tr>
<td>2016</td>
<td>Huan Dong, MD</td>
</tr>
<tr>
<td>2017</td>
<td>Cory M. Pfeifer, MD</td>
</tr>
</tbody>
</table>

(awardees listed in italics)
Joseph E. and Nancy O. Whitley Award Recipients

1991  William E. Erkonen, MD
1992  William E. Erkonen, MD
1993  Spencer B. Gay, MD
1994  Felix S. Chew, MD
1995  David S. Channin, MD
1996  Jannette Collins, MD, MEd
1997  Jannette Collins, MD, MEd
1998  Bruce R. Baumgartner, MD
1999  Amit Mehta, MD
2000  Scott A. Mirowitz, MD
2001  Jannette Collins, MD, MEd
2002  Felix S. Chew, MD, MBA (Annemarie Relyea-Chew)
2003  Richard B. Gunderman, MD, PhD (Darel E. Heitkamp; H. D. Kipfer; Mark S. Frank; Valerie P. Jackson; Kenneth B. Williamson)
2004  Kitt Shaffer, MD, PhD (Juan E. Small)
2005  Felix S. Chew, MD, MBA (Annemarie Relyea-Chew; E. R. Ochoa, Jr)
2006  Suvaranu Ganguli, MD (Ivan Pedrosa; Chun-Shan Yam; Herbert Y. Kressel)
2007  David S. Feigin, MD (Donna Magid; James G. Smirniotopoulos; Susan J. Carbognin)
        Annemarie Relyea-Chew, JD, MS (Felix S. Chew)
2008  Chris L. Sistrom, MD, MPH (Lori Deitte)
2009  Kitt Shaffer, MD, PhD (Joshua Ng)
2010  Johanne E. Dillon, MD
        Priscilla J. Slanetz, MD, MPH
2011  Andrea Donovan, MD
2012  Andrew T. Trout, MD (Richard H. Cohen; James H. Ellis; Shokoufeh Khalatbari)
2013  Michael F. McNeeley, MD (Francisco A. Perez; Felix S. Chew, MD)
2014  Jannette Collins, MD, MEd (Larry D. Gruppen; Janet E. Bailey; Syed A. Bokhari; Angelisa M. Paladino; Jessica B. Robbins; et al)
2015  Eric B. England, MD (Jannette Collins; Richard D. White; F. J. Seagull; John Deledda)
2016  Donna Magid, MD, MEd (Fiona E. Grispen)
2017  Lucy Spalluto, MD (Stephanie E. Spottswood; Lori A. Deitte; Alexander Chern; Charlene Dewey)

A³CR² Outstanding Teacher Award Recipients

2011  Peter S. Liu, MD
2012  Stefan Tigges, MD
2013  Carl S. Fuhrman, MD
2014  Pedro J. Diaz-Marchan, MD
2015  Judith K. Amorosa, MD
2016  M. Craig Morriss, MD
2017  Mark E. Mullins, MD, PhD
A^3CR^2 Research Award Recipients

1995 Scott E. Campbell, MD
University of Virginia

1996 David M. Kuehn, MD
University of Iowa

1997 Safiyun S. Miller, MD
University of Wisconsin

1998 Karen L. Kleen, MD
Medical College of Virginia

1999 Peter L. Vance
University of Virginia

2000 Richard Kim, MD
University of Chicago

2001 Tedric D. Boyse, MD
University of Michigan
(Richard H. Cohan; Stephanie K. Patterson; Melvyn T. Korobkin; James T. Fitzgerald; Mary Oh)

2002 Edwin Y. Yang, MD
University of Michigan
(Donna L. Hoff; Steven Kronick; Janet E. Bailey; Katherine A. Klein; Elaine M. Caolicl)

2003 Karen M. Ayotte, MD
Wilford Hall Medical Center
(Thomas M. Dykes; Ralph B. Evans)

2004 Shawn E. Parnell, MD
University of Washington
(Bridget Mikysa; Emily L. Albrecht; Lee B. Talner; Frederick A. Mann)

2005 Whitney J. Goodwin, MD
University of Arkansas for Medical Sciences
(Eric D. Sale; Linda A. Deloney; Heather L. Smith; John P. Livoni; S. G. Klein)

2006 Sabrina Covert, MD
Dalhousie University
(Mohammed Abdullet; Leslie Flemming; Cupido Daniels)

2007 Lina Nayak
Washington University
(Joseph P. Erinjeri)

2008 No Award

2009 Asef B. Khwaja, MD
University of Maryland
(Jigar B. Patel; S. Umran Ashraf)

2010 No Award

2011 Akash P. Kansagra, MD, MS
University of California, San Francisco
(Christine B. Miller; Anne C. Roberts)

2012 Hannu T. Huhtanpaa, MD, MSc
University of Minnesota
(Christopher Douville; Binu Enchakolody; Sven Holcombe; Venkataramu N. Krishnamurthy; Stewart C. Wang; et al)

2013 Ricky Tong, MD, PhD
University of California
(K. Pallav Kolli; Maythem Saeed; Viola Rieke; Leland Evans; Steven W. Hetts; et al)

2014 No Award

2015 Nicholas Masse, MD, MS
University of Chicago
(Martin Greenwald; Brent Greenberg; Christopher M. Straus)

2016 Ji Buethe, MD
University Hospitals Case Medical Center
(Nicholas Fulton; Jon Davidson; Indravaden J. Patel; Jayakrishna Gollamudi; Mark R. Robbins)

2017 Andrew Lee, MD
Loma Linda University Medical Center
(Paggie Kim; Jaspree Singh; Geoffrey Delizo)

ACER Achievement Award Recipients

2011 Eric J. Stern, MD

2012 Jocelyn D. Chertoff, MD, MS

2013 Jannette Collins, MD, MEd

2014 Petra J. Lewis, MB.BS

2015 Gautham P. Reddy, MD, MPH

2016 Angelisa M. Paladin, MD

2017 Mahesh M. Thapa, MD

AMSER Excellence in Education Award Recipients

2012 Robert A. Novelline, MD

2013 Petra J. Lewis, MB.BS

2014 Christopher M. Straus, MD

2015 William Herring, MD

2016 Judith K. Amorosa, MD

2017 Nancy J. McNulty, MD
### AMSER Henry Goldberg Medical Student Award Recipients

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Institutions</th>
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<tr>
<td>2008</td>
<td>Jeffrey J. Gronkiewicz, BA</td>
<td>Humberto O. Martinez</td>
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<td>2009</td>
<td>Danielle M. Chan, BS</td>
<td>Matthew S. Chan, Eva Y. Yeung, Wilbur L. Smith, Jr, Anna J. Knisely, Sung Eun LoGerfo, Yoshimi Anzai</td>
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<tr>
<td>2010</td>
<td>Elizabeth T. Chorney, BS</td>
<td>Petra J. Lewis</td>
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<tr>
<td>2011</td>
<td>Jeffrey D. Poot, BA</td>
<td>Matthew S. Hartman</td>
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<td>2012</td>
<td>Dana J. Lin, BA</td>
<td>Nancy J. McNulty, Petra J. Lewis</td>
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<td>2013</td>
<td>Andrew W. Phillips, BA</td>
<td>Sandy G. Smith, Christopher M. Straus</td>
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<td>2014</td>
<td>Thomas McLaren, BS</td>
<td>Austin C. Bourgeois, Austin R. Faulkner, Kathleen T. Hudson, Alexander S. Pasciak</td>
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<td>2015</td>
<td>Nikita Lakomkin</td>
<td>Hakmook Kang, Michael S. Hutson, Bennett Landman, Richard G. Abramson</td>
</tr>
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<td>2016</td>
<td>John Renfrew, BS</td>
<td>Jason W. Stephenson, Andrew Schemmel, Daryn Beldon, Richard J. Bruce, Shane A. Wells</td>
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</table>

### RAHSR Achievement Award Recipients

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<tr>
<td>2014</td>
<td>Bruce J. Hillman, MD</td>
<td>Katherine Tansavatdi, Felix S. Chew</td>
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<td>2015</td>
<td>Jeffrey G. Jarvik, MD, MPH</td>
<td>Moira Kapral, Jiming Fang, Alan Moody, Murray Krahn, Andreas Laupacis</td>
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<td>2016</td>
<td>Curtis P. Langlotz, MD, PhD</td>
<td>Moira Kapral, Jiming Fang, Alan Moody, Murray Krahn, Andreas Laupacis</td>
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<td>2017</td>
<td>Curtis P. Langlotz, MD, PhD</td>
<td>Moira Kapral, Jiming Fang, Alan Moody, Murray Krahn, Andreas Laupacis</td>
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### RAHSR Harvey L. Nieman Award Recipients

<table>
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<tr>
<td>2005</td>
<td>Marta E. Heilbrun, MD</td>
<td>Katherine Tansavatdi, Felix S. Chew</td>
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<td>2007</td>
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<td>2008</td>
<td>Asako Miyakoshi, MD</td>
<td>Quynh T. Nguyen, Wendy Cohen, Martin Gunn, Lee B. Talner, Yoshimi Anzai</td>
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<td>2009</td>
<td>Kathleen R. Tozer, MD</td>
<td>William Hollingworth, Jeffrey G. Jarvik</td>
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<td>2010</td>
<td>Bahman S. Roudsari, MD, PhD</td>
<td>Daniel S. Moore, Jeffrey G. Jarvik</td>
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<td>2011</td>
<td>Hansel J. Otero, MD</td>
<td>Maki S. Kamae, James D. Chambers, Edgar K. Yucel, Peter J. Neumann</td>
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<td>2012</td>
<td>Bahman Roudsari, MD, PhD</td>
<td>Kevin J. Psoter, Gerald Palagallo, Jeffrey G. Jarvik</td>
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<td>2013</td>
<td>Jana Ivanidze, MD, PhD</td>
<td>Ajay Gupta, Alan Segal, Pina C. Sanelli</td>
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<td>2014</td>
<td>Gelareh Sadigh, MD</td>
<td>Sadhna Nandwana, Courtney A. Coursey, Kelly Cox, Deborah A. Baumgarten, Tiffany Easter, et al</td>
</tr>
<tr>
<td>2015</td>
<td>Kirsteen R. Burton, MD, PhD</td>
<td>Moira Kapral, Jiming Fang, Alan Moody, Murray Krahn, Andreas Laupacis</td>
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<td>2016</td>
<td>Gelareh Sadigh, MD</td>
<td>Kush Singh, Kirven Gilbert IV, Ramsha Khan, Abigail M. Duszak, Richard Duszak, Jr</td>
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<tr>
<td>2017</td>
<td>Geraldine Liao, MD</td>
<td>Joshua M. Liao, Darco Lalevic, Hanna M. Zafar, Tessa S. Cook</td>
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<td>N. Reed Dunnick, MD</td>
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<td>2014</td>
<td>Donald P. Harrington, MD, MA</td>
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<td>2015</td>
<td>Robert F. Mattrey, MD</td>
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<td>2016</td>
<td>Ronald L. Arenson, MD, FACR</td>
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<tr>
<td>2017</td>
<td>Jonathan S. Lewin, MD, FACR</td>
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<th>Year</th>
<th>Name</th>
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<tr>
<td>2006</td>
<td>Heike E. Daldrup-Link, MD</td>
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<td>2007</td>
<td>Claude B. Sirlin, MD</td>
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<tr>
<td>2009</td>
<td>Miriam A. Bredella, MD</td>
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<td>2010</td>
<td>Rathan M. Subramaniam, MD, PhD</td>
<td>Petra J. Lewis</td>
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<td>2011</td>
<td>Srinidhi Tridandapani, MD, PhD</td>
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<td>2013</td>
<td>Gary D. Luker, MD</td>
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<td>2014</td>
<td>Donald M. Schuster, MD</td>
<td>Vikas Gulani, MD, PhD</td>
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<td>2015</td>
<td>Andrew B. Rosenkrantz, MD</td>
<td>Christoph I. Lee, MD</td>
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<td>Andrew B. Rosenkrantz, MD</td>
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<td>Andrew B. Rosenkrantz, MD</td>
<td>Christoph I. Lee, MD</td>
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<td>Year</td>
<td>Paper</td>
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<td>2013</td>
<td>Katherine C. Frederick-Dyer, MD</td>
<td>Nabeel U. Ali, BS</td>
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<td>(Ted Chang, Steven P. Knight, Alexander S. Pasick; Austin R. Faulkner)</td>
<td>(Gary Liew, Synho Do; Milena Petranovic; Ricardo Curry; Thomas Brady; et al)</td>
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<td>2014</td>
<td>Andrew K. Moriarity, MD</td>
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<td>(Manuel L. Brown)</td>
<td>(Nicole E. Curci, MD)</td>
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<td>(Timothy P. Kasprzak)</td>
<td>(Salam Abdou, MD)</td>
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<td>(Andrew K. Moriarity, MD)</td>
<td>(Tayyan Y. Patel; Dean Nakanoto; Jeffrey Goetz; Nami R. Azar)</td>
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<td>(Swati Deshmukh, MD)</td>
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<td>(Laura M. Fayad)</td>
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<td>2015</td>
<td>Atul Padole, MD</td>
<td>Poster or Exhibit</td>
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<td>(Diego Lira; Nisha Sainani; Roberto La Gulla; Ranish D. Khawaja; Mannudeep Kalra; et al)</td>
<td>(Sarah M. Deraney, MD)</td>
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<td>(Flavio D. Rascal; Edward Escott)</td>
<td>(Michael Triche, MD)</td>
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<td>(Michael G. Rodriguez; Charles B. Smith)</td>
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<td>Poster or Exhibit</td>
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<td>(Alison L. Chetlen)</td>
<td>(Paul B. Stoddard, MD)</td>
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<td>(Melina Pectasides; Zin Farhat; Jade J Wong You Cheong; Mohammad M. Siddiqui)</td>
<td>(Mariam Hamid, BA)</td>
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<td>(Kelli Hall; Giselle Kolenic; Jessica Dozier; Vanessa Dalton; Ruth C. Carlos)</td>
<td>(Philip Murillo, MD)</td>
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<td>(Sara Venezia; Jeffrey Kempf; Vyacheslav Gendel; Murray Becker; Lisa Fletcher; et al)</td>
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<td>2017</td>
<td>Arpan V. Prabhu, BS</td>
<td>Poster or Exhibit</td>
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<tr>
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<td>(Tudo Crihalmeanu; David R. Hansberry; Nitin Agarwal; Hirshikesh Kale; Matthew T. Heller)</td>
<td>(Maia VanDyke, BS)</td>
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<td>(Anil Pillai; Jon A. Anderson; Ali Pirasteh)</td>
<td>(Karthik M. Sundaram, MD)</td>
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<td>(Patrick M. Couture; Meaghan A. Magarik; Reed A. Omary; Edwin F. Donnelly)</td>
<td>(Shanna Matalon, MD)</td>
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<td>(Oren Johnson; Glenn C. Gaviola)</td>
<td>(Melissa P. Couture; Meghan A. Magarik; Reed A. Omary; Edwin F. Donnelly)</td>
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<td>(Oren Johnson; Glenn C. Gaviola)</td>
</tr>
</tbody>
</table>
The following is an alphabetical list of GERRAF Fellows, the year of their award, and sponsoring institution.

Ritu R. Gill, MBBS (2010)  
Brigham and Women’s Hospital

Orit A. Glenn, MD (2004)  
University of California, San Francisco

Eva C. Gombos, MD (2008)  
Brigham and Women’s Hospital

Lars J. Grimm, MD, MHS (2015)  
Duke University Medical Center

Thomas M. Grist, MD (1992)  
University of Wisconsin, Madison

Richard B. Gunderman, MD, PhD (1998)  
Indiana University

Ajay Gupta, MD (2012)  
New York-Presbyterian Hospital/Weill Cornell Medical College

Ethan J. Halpern, MD (1994)  
Thomas Jefferson University

Mukesh G. Harisinghani, MD (2003)  
Massachusetts General Hospital

Marta E. Heilbrun, MD (2007)  
University of Utah

Daniel N. D. Heller, MD, MS (1999)  
University of California, San Francisco

Christopher P. Hess, MD, PhD (2010)  
University of California, San Francisco

J. Paul Jacobson, MD (2004)  
Loma Linda University

Rajan Jain, MD (2008)  
Henry Ford Hospital

Jeffrey G. Jarvik, MD (1995)  
University of Washington

Saurabh Jha, MD (2009)  
University of Pennsylvania School of Medicine

Annette J. Johnson, MD (2002)  
Indiana University

R. Santiago Medina, MD, MPH (1999)  
University of California, San Francisco

Elizabeth G. McFarland, MD (1997)  
University of Michigan

Katherine M. Krajewski, MD (2012)  
Brigham and Women’s Hospital

Arun Krishnanaraj, MD, MPH (2011)  
Massachusetts General Hospital

Janet E. Kuhlman, MD (1992)  
Johns Hopkins University

Curtis P. Langlotz, MD, PhD (1993)  
University of Pennsylvania

Christoph I. Lee, MD, MS, HS (2012)  
University of Washington

Harvard University

Janie M. Lee, MD (2005)  
Massachusetts General Hospital

Meghan G. Lubner, MD (2011)  
University of Wisconsin

Matthew P. Lungren (2016)  
Stanford University School of Medicine

Daniel M. Mandell, MD (2012)  
Toronto Western Hospital

Katherine E. Maren, MD (2013)  
University of Michigan

Elizabeth G. McFarland, MD (1997)  
Washington University

S. Santiago Medina, MD, MPH (1999)  
Cincinnati Children’s Hospital Medical Center

Martina M. Morrin, MD (2003)  
Beth Israel Deaconess Medical Center

Mahmud Mossa-Basha, MD (2015)  
University of Michigan

Robert C. Orth, MD, PhD (2013)  
Texas Children’s Hospital

Susan B. Peterman, MD (1993)  
Emory University

Janice M. Lee, MD (2005)  
University of Maryland

Paggie Kim, MD (2016)  
Loma Linda University

Michael S. Satz, MD (1992)  
University of California, San Diego

Pauline H. Satz, MD (1992)  
University of Utah

Richard B. Gunderman, MD, PhD (1998)  
Indiana University

Curtis P. Langlotz, MD, PhD (1993)  
Massachusetts General Hospital

Janet E. Kuhlman, MD (1992)  
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University of Washington

Harvard University

Janie M. Lee, MD (2005)  
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Matthew P. Lungren (2016)  
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Daniel M. Mandell, MD (2012)  
Toronto Western Hospital

Katherine E. Maren, MD (2013)  
University of Michigan

Elizabeth G. McFarland, MD (1997)  
Washington University

L. Santiago Medina, MD, MPH (1999)  
Cincinnati Children’s Hospital Medical Center

Martina M. Morrin, MD (2003)  
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University of Maryland

Paggie Kim, MD (2016)  
Loma Linda University

Michael S. Satz, MD (1992)  
University of California, San Diego

Pauline H. Satz, MD (1992)  
University of Utah
Previous GERRAF Fellows (continued)

Peter E. Shile, MD (1995)
Washington University

Dorothy A. Sippo, MD, MPH (2017)
Massachusetts General Hospital

Christopher L. Sistrom, MD (2001)
University of Florida

Jadranka Stojanovska, MD, MS (2011)
University of Michigan

Rathan M. Subramaniam, MD, PhD, MPH (2009)
Boston Medical Center

J. Shannon Swan, MD (1995)
University of Wisconsin, Madison

Tina Tailor, MD (2017)
Duke University Medical Center

Adam Talenfeld, MD (2014)
Weill Cornell Medical College/New York-Presbyterian Hospital

Clare M. C. Tempany-Afdhal, MD (1994)
Brigham and Women’s Hospital

Karen A. Tong, MD (2001)
Loma Linda University

Heidi R. Umphrey, MD (2014)
University of Alabama at Birmingham

Katie D. Vo, MD (1999)
Washington University

Valerie L. Ward, MD (2002)
Children’s Hospital, Boston

Elysa Widjaja, MD, MBBS (2011)
Hospital for Sick Children

Max Wintermark, MD (2006)
University of California, San Francisco

Dulcy E. Wolverton, MD (1997)
University of Chicago

Kyle K. Yu, MD (1997)
University of California, San Francisco

Esther Yuh, MD, PhD (2008)
University of California, San Francisco

Hanna M. Zafar, MD, MHS (2007)
University of Pennsylvania

Michael E. Zalis, MD (2000)
Massachusetts General Hospital

Jingbo Zhang, MD (2006)
Memorial Sloan-Kettering Cancer Center
AUR 2018 Faculty Index and Financial Disclosure Report

This faculty index includes an alphabetical listing of faculty (ie, Board members, committee members, program planners, presenters, and authors) with direct influence on the educational content of this program. Faculty who have or have had within the previous 12 months (or at the time the research was conducted) an affiliation with any commercial interest are noted with a ★ after their name in the program book (pages 12–127). Financial disclosure statements for individuals are reported after each individual’s name in the faculty index below. All other faculty have indicated they have nothing to disclose.

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Desperito, Elise E-118
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Flanders, Adam R-125
Flemming, Donald J. 109B
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Frank, Mark S. SS04-06
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Frigni, L. Alexandre 112D
Fritz, Jan
Research Grant, Siemens AG; Scientific Advisor, Siemens AG; Scientific Advisor, Alexion Pharmaceuticals, Inc; Speaker, Siemens AG
Fuentes, Victor 400A
Jambhekar, Kedar E-114, E-116
Jarvik, Jeffrey G. 116C, 306A, 306E, 422C, 422D
Co-founder, PhysioSonics, Inc; Stockholder, PhysioSonics, Inc; Patent holder, PhysioSonics, Inc; Consultant, HealthHelp, LLC; Consultant, UpToDate, Inc; Editor, UpToDate, Inc; Co-editor, Springer Nature
Jaster, Adam W. 119, 211
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Jensen, Leif E.
Johnson, Annette J.
Johnson, Elizabeth M. 112A
Johnson, Karen S. SS04-02
Johnson, Pamela T. R-029, R-049, E-115
Johnson Schulz, Brittany E-022
Jones, Sally A. 404, 404F
Jorge, Gloria 404A
Joshi, Ganesh E-100
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Junn, Jacqueline E-082, E-087
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Kachnic, Lisa 109C
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