RSNA News™

April 2017 Volume 27, Issue 4

Image courtesy of the Mount Sinai Hospital Department of Radiology and the Rapid Prototyping Center

3-D Model of Girl's Scoliotic Spine Aids Pre-Surgery

ALSO INSIDE:

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FEATURES

RSNA MISSION

The RSNA promotes excellence in patient care and healthcare delivery through education, research and technologic innovation.

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SIR Announces 2017 Gold Medal Honorees


Krol


LaBerge


Tang

Gold medals were awarded to **Katharine L. Krol, MD, Jeanne M. LaBerge, MD, PhD,** and **Gao-Jun Tang, MD**, at the Society of Interventional Radiology (SIR) annual meeting held recently in Washington, DC.

A past president of SIR, Dr. Krol has been a devoted proponent in economics and in health policy for the society. Dr. Krol is a former member of the RSNA Public Information Advisors Network and served on the RSNA Technical Exhibits Committee.

Dr. LaBerge is a professor in residence at the University of California, San Francisco (UCSF), and chief of interventional radiology at UCSF's Mount Zion Campus. She is a past manuscript reviewer for *Radiology* and former chair of the RSNA Vascular/Interventional Radiology Education Exhibit Subcommittee for the annual meeting.

Dr. Teng is chair of radiology at Zhongda Hospital, Southeast University, China, and president of Zhongda Hospital.

In Memoriam

MRI Pioneer Sir Peter Mansfield Dies


Mansfield

MRI pioneer and Nobel laureate Sir Peter Mansfield, PhD, died Feb. 8 at the age of 83. Dr. Mansfield was awarded the Nobel Prize in physiology or medicine in 2003 for his work developing MRI, a technique that changed the face of modern medicine.

Dr. Mansfield, a physicist, shared the Nobel Prize with Paul C. Lauterbur, PhD, a chemist from the University of Illinois, Urbana, who died in 2007. Dr. Lauterbur is credited with inventing the MRI technique as part of Dr. Mansfield's team at the University of Nottingham in England in the 1970s.

Dr. Mansfield, an emeritus professor of physics at Nottingham since 1994, further developed MRI with his invention of echo-planar imaging, which dramatically reduced scan times. In 1978, Dr. Mansfield became the first person to step inside a whole-body MRI scanner so it could be tested on a human subject.

Born Oct. 9, 1933, in London, Dr. Mansfield left school at 15 to become a printer's assistant. Eventually he returned to school and obtained a physics degree and his doctorate from Queen Mary College, University of London.

Dr. Mansfield began his professional career in 1962 as an appointed research assistant in the physics department at the University of Illinois in Urbana, the same institution where Dr. Lauterbur worked, though 20 years apart. Dr. Mansfield joined the University of Nottingham as a physics lecturer in 1964 and remained there until his retirement 30 years ago.

The Sir Peter Mansfield Imaging Centre at the University of Nottingham was named in his honor. In January 2017, Dr. Mansfield was on hand for the 25th anniversary celebration of the center's opening.

Dr. Mansfield was knighted by Queen Elizabeth II in 1993. Among his many other accolades, Dr. Mansfield was awarded gold medals by the Royal Society Wellcome Foundation, the International Society of Magnetic Resonance in Medicine and the European Society of Radiology.

Technology Forum

Two Inaugural Events Highlight the 2017 IHE® Connectathon

Nearly 70 organizations and 450 individuals participated in the 19th annual Integrating the Healthcare Enterprise (IHE®) North American Connectathon, held Jan. 23 to 27 in Cleveland. In addition, 99 systems were tested by some of the top vendors in health information technology (HIT).

The IHE Connectathon is a live, cross-vendor, supervised and structured testing event where industry leaders test implementations of IHE Profiles to advance health IT interoperability. This year's event featured two new sessions: the mHealth Plug-a-Thon and Devices on FHIR®.

The mHealth Plug-a-Thon provided an opportunity for the health apps community to technically interact with the application programming interfaces (APIs) of HIT product solutions. The main objective was to establish an apps-API testing opportunity distinct from the Connectathon for maturing the connectivity between apps and legacy HIT products.

Devices on FHIR was a collaborative effort to ensure semantically consistent device information exchange using current patient-care devices, Health Level Seven (HL7) version 2-based messaging or HL7 fast healthcare interoperability resources (FHIR)-based resources and profiles.

RSNA and the Health Information and Management System Society (HIMSS®) have sponsored the Connectathon since its inception in 1999. For more information, visit *RSNA.org/IHE.aspx* or *IHEUSA.org/Connectathon.aspx.*

IHE USA Integrating the Healthcare Enterprise

RSNA 2016 Annual Report Now Entirely Digital

RSNA has always been at the forefront of radiology. Now, the Society is expanding its leadership position on the digital frontier as well. For the first time since the Society began publishing an annual report, the 2016 installment is presented entirely online.

In addition to content detailing vital financial data, the annul report spotlights the 102nd Scientific Assembly & Annual Meeting, research, education and more. Turn to Page 25 to read more details from the RSNA 2016 Annual Report or access the entire report at *RSNA.org/Annual-Report*.

Apply by May 1 for RSNA Eyler Fellowship

Applications are being accepted for the RSNA William R. Eyler Editorial Fellowship.

The three-week Eyler fellowship offers the opportunity to work with *Radiology* Editor Herbert Y. Kressel, MD, in Boston and *RadioGraphics* Editor Jeffrey S. Klein, MD, in Burlington, VT. The fellow will visit the RSNA Publications Department at RSNA headquarters in Oak Brook, IL, and will work with the *RadioGraphics* editorial team at RSNA 2017. The fellowship lasts one month.

Apply by May 1 to be considered for the William R. Eyler Editorial Fellowship.

To learn more and to apply, go to: *RSNA.org/RSNA_Editorial_Fellowships.aspx.*

Radiology
RadioGraphics

Nominate *Radiology* Articles for the 2017 Margulis Award

Deadline for Nominations
June 10

The Nominating Committee for the Alexander R. Margulis Award for Scientific Excellence is accepting nominations from readers for *Radiology* articles published between July 2016 and June 2017. The main selection criteria are scientific quality and originality. Please send your nomination, including the article citation and a brief note highlighting the reasons for the nomination, to Pamela Lepkowski, assistant to the editor, *plepkowski@rsna.org.*

WCIO Establishes Society of Interventional Oncology


Geschwind

In response to rapid growth in the field of interventional oncology (IO), the World Conference of Interventional Oncology (WCIO) recently established the Society of Interventional Oncology (SIO).

Interest in IO has grown exponentially since the inception of the WCIO meeting more than 10 years ago, according to WCIO chair **Jeff H. Geschwind, MD,** the society's first president.

"We realized there was a real and urgent need to create a society dedicated to interventional oncology," said Dr. Geschwind, chair of the Department of Radiology and Biomedical Imaging and professor of radiology and oncology at Yale School of Medicine in New Haven, CT. He serves as chair of the interventional oncology track on the RSNA Scientific Program and Refresher Course committees. His RSNA involvement includes serving on the RSNA Refresher Course Committee and on the *Radiology* Editorial Board. In 2000, Dr. Geschwind received an RSNA Research Seed Grant.

The society will serve interventional radiologists who specialize in oncology, post-doctoral scientists and related medical professionals. It will offer four membership categories: active, affiliate, resident/fellow and student.

"The society will represent interventional oncology as a whole. It will serve as the only membership-based organization dedicated entirely to the emerging field of interventional oncology, working to further promote the mission originally put forth by WCIO — to establish, nurture and support interventional oncology as the fourth pillar of cancer therapy alongside medical, surgical and radiation oncology worldwide," Dr. Geschwind said.

The society's annual IO conference will maintain the name WCIO. The conference will be held June 8–11 in Boston.

Read the story, "The Roots and Growth of Interventional Radiology," at *RSNA.org/News*.

For more information on SIO, go to *www.io-central.org.*

Numbers in the News

10

Approximate number of hours needed to create a 3-D printed model of a young girl's scoliotic spine, which surgeons used to guide a complex procedure. Read about radiology's role in the multi-department collaboration on Page 6.

5,089

Number of academic radiologists included in a study analyzing gender differences in academic radiology. Read what reseachers found on Page 9.

54,000

Approximate number of registrants at RSNA 2016, one of the many highlights outlined in the RSNA 2016 Annual Report. Read more on Page 25.

THIS MONTH IN THE *RSNA NEWS* ONLINE VERSION

View a video of Ricarda Hinzpeter, MD, discussing her research analyzing repeated CT scans and the reasons for duplication at *RSNA.org/News.*

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LETTERS TO THE EDITOR
rsnanews@rsna.org
1-630-571-7837 fax

SUBSCRIPTIONS
subscribe@rsna.org
1-888-600-0064
1-630-590-7770

REPRINTS AND PERMISSIONS
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1-630-590-7724 fax

ADVERTISING
llazzaretto@rsna.org
Lisa Lazzaretto
Assistant Director: Corporate Relations
1-630-571-7818

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My Turn

Increasing Public Awareness about Radiology is Central to RSNA's Public Information Committee

RSNA's Public Information Committee (PIC) is responsible for developing and overseeing the public information activities, programs and position statements of the RSNA, evaluating current public information programs and making appropriate modifications to ensure effectiveness, and reporting to the Society's Board of Directors.


Wintermark

Media Relations

The PIC works in collaboration with the consumer and trade media to increase public awareness about what we radiologists do and the essential role we play in the patient care continuum through our clinical care, our research, and our education and leadership activities. This increase in public awareness is accomplished through the *Radiology* press release program, which highlights approximately 25 radiology studies per year from the journal, and the RSNA Annual Meeting Newsroom, which highlights 15–20 scientific studies presented at the meeting. Throughout the year members of RSNA's Public Information Advisors Network work with the PIC to act as second opinion experts on press releases and to assist in ad hoc media inquiries. In 2016, through the monthly *Radiology* press release program and the annual meeting newsroom, as well as personal contacts with media outlets, more than 57,000 print, broadcast and online media placements were tracked, with a potential 38 billion audience members reading, viewing or listening to stories about radiology and radiologists.

The PIC also develops position statements on topics of high interest in the press or with potential for controversy. The statements, posted online in the media section of *RSNA.org*, are designed to be used by RSNA members when talking with patients or the press.

Patient-Centered Radiology

The Public Information Committee manages RSNA's Radiology Cares (*RadiologyCares.org*) program, which provides resources and information to our colleagues to help them put the concept of patient-centered care into practice. PIC members are now working with *RSNA News* editor, Gary Whitman, MD, to produce compelling content for the magazine's Patient Focus department. The PIC also organizes educational courses during the RSNA meeting that propose strategies and practical tips to practice patient-centered radiology and to improve communication with patients and referring physicians, including using social media.

Patient-directed Activities

A critical component of RSNA's patient-focused activities is the *RadiologyInfo.org* website. *RadiologyInfo.org* explains who radiologists are and what we do. The website, produced jointly with ACR, tells patients and referring physicians how various radiology procedures are performed and addresses what patients may experience and how they can prepare for their imaging studies. The website contains descriptions for over 200 procedures, exams and diseases and is updated frequently with new information. The website also explains to patients how to read their radiology reports.

These activities are conducted by the PIC on behalf of the RSNA members to enhance patient awareness of the important role of their radiologists.

Max Wintermark, MD, is chair of RSNA's Public Information Committee and a professor of radiology and chief of neuroradiology at Stanford University Medical Center, Palo Alto, Calif. Dr. Wintermark serves as co-chair of the Research Committee of the American Society of Neuroradiology and chair of the imaging working group of the Stroke Trials Network of the National Institute of Neurological Disorders and Stroke.

3-D Scoliotic Spine Model Aids Pre-Surgical Planning in 8-Year-Old Girl

BY ELIZABETH GARDNER

A 3-D model of an 8-year-old girl's scoliotic spine proved so helpful in pre-surgical planning that surgeons used it in the operating room to help guide a complex — and ultimately successful — multi-stage procedure.

NEXT MONTH:
***RSNA NEWS* LAUNCHES 3-D PRINTING SERIES**

RSNA News will begin a series on the 3-D printing explosion in radiology starting in May.

The patient, an orphan from Armenia — a country lacking such advanced medical care — had a severe rotatory kyphoscoliosis, multi-level malsegmentation of the vertebrae and ribs and Type I diastematomyelia, or "split cord syndrome."

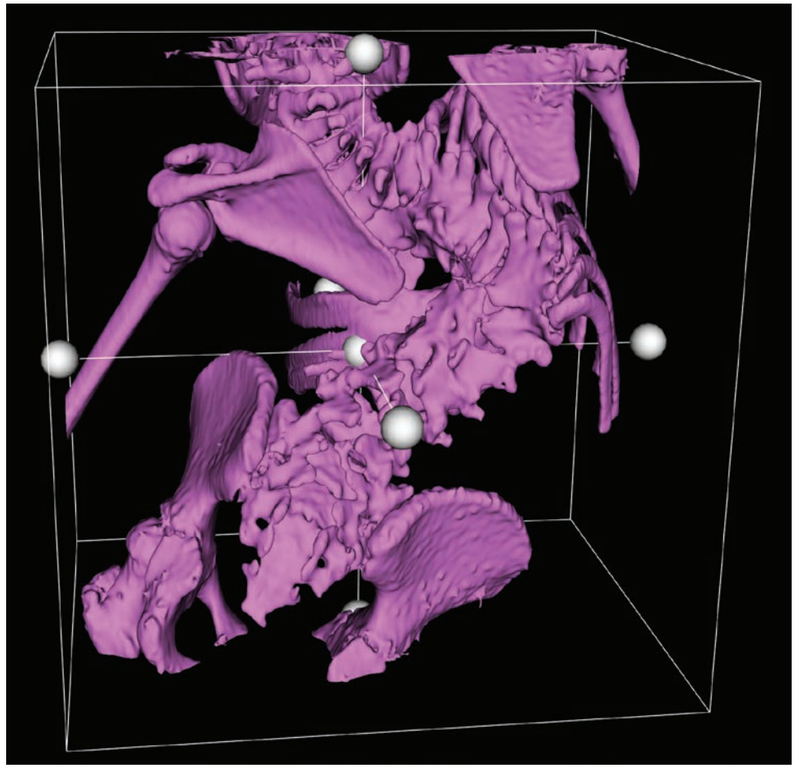
While routine 3-D reconstruction could not adequately display all of the anomalies, diagnostic radiologist Javin Schefflein, MD, outlined production methods for 3-D printed models created at New York's Mount Sinai Hospital during an RSNA 2016 presentation. Researchers worked closely with Mount Sinai's Neurosurgical Simulation Core.

"We contacted the neurosurgery team who were excited at the prospect of generating a precise physical model to help visualize the pathology and plan surgery," Dr. Schefflein said.

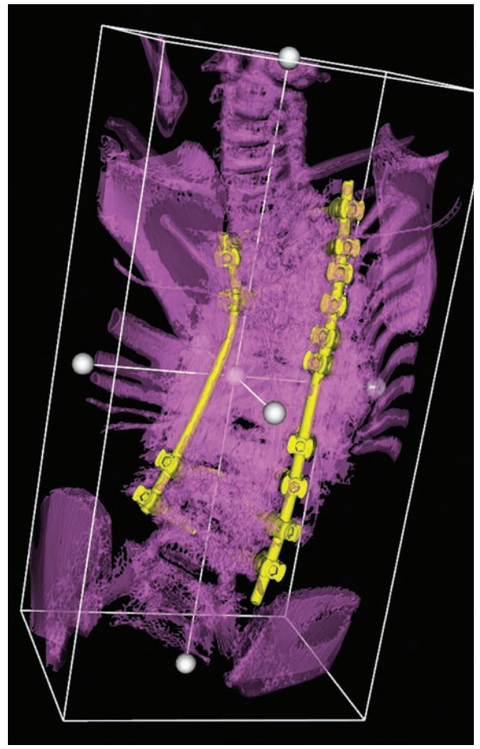
Onsite 3-D printing can be a boon for numerous medical applications, but producing complex models needs to be a group effort among radiologists, engineers, surgeons and computer scientists.

"The collaborative nature of this endeavor cannot be overstated," Dr. Schefflein said. "Each team member contributes to every pre-operative 3-D printing project we work on. The uses for this technology are boundless, and every time we have added a different discipline to our modeling collective, a new purpose has emerged."

The model was used to plan a two-stage surgery involving T12-L2 laminectomy, resection of the midline bony spur at L1, intradural exploration to de-tether the spinal cord, asymmetric pedicle subtraction osteotomy at T1-L1 to straighten the curvatures, and long-segment posterior fusion with instrumentation from T2-L5. The model was also used during the surgery to help surgeons visualize steps in the procedure.



Pre-operative computer-generated 3-D segmentation of severe scoliosis created by the Mount Sinai Hospital Neurosurgery Simulation Core.
Pre- and post-operative images courtesy of the Mount Sinai Hospital Department of Radiology and Dr. Anthony Costa, head of the Mount Sinai Neurosurgery Simulation Core.



Post-operative computer-generated 3-D segmentation following two-stage corrective surgery, depicting spinal alignment of long-segment posterior fusion.

> *"We contacted the neurosurgery team who were excited at the prospect of generating a precise physical model to help visualize the pathology and plan surgery."*
>
> JAVIN SCHEFFLEIN, MD

Schefflein

In Mount Sinai's onsite dedicated 3-D printing lab, the first step was to obtain CT images of the full spinal column and proximal ribs. Initial seeding for the segmentation was completed via high-contrast thresholding of the image. A connected component growth model with origins from the seed mask completed the rough mask of all the bony components.

The model was refined using a low-propagation level-set model. Geometry-preserving Taubin smoothing followed by quadratic edge collapse decimation yielded the final model, which was printed life size with a gypsum powder-based 3-D printer. The finished model exhibited weight and texture very similar to bone.

Final Model a Joint Effort

Even with advanced software, some human intervention was needed to tweak the instructions for producing the final model, Dr. Schefflein said.

"Our neuroradiologists worked hand-in-hand with the neurosurgery department to define what should be included in the print, which was then explained to the computer engineering arm of the modeling group," he said.

Surgeons planned the procedure by physically rotating the printed model to see the interconnections among fused ribs, fused vertebrae and anterior and posterior attachments of the bone spur, as well as the relationships of all the spinal curves to the plane of the pelvis.

As the child underwent the two-stage surgery, a member of the surgical staff held up and manipulated the model so the surgeon could "visualize" the portions of the spinal anatomy that weren't visible at a given point in the procedure.

The operation, according to Dr. Schefflein, was a complete success. In terms of creating the model itself, the process took more than 10 hours including scanning (10 minutes), segmenting (three hours), printing (five hours) and drying/hardening time (two to three hours), at a cost of about $710.

"The materials and labor were cheaper than we expected, though the start-up cost for accurate modeling can be daunting," Dr. Schefflein said, adding that Mount Sinai's printer alone cost about $60,000.

Finding a workable payment policy is key, Dr. Schefflein said. So far, surgery teams pay for the models generated at Mount Sinai, which is not a sustainable option.

Paradoxically, there are already billing codes covering models produced by outside contractors. Dr. Schefflein urges radiologists to press for a code for in-house models. "It is not a drastic change," he said.

***On the cover:* 3-D printed severe thoracolumbar scoliosis with multilevel malsegmentations and Type I diastematomyelia for use in pre-surgical planning and intraoperative visualization.**

Women Radiology Leaders Discuss Strategies for Overcoming Gender Challenges, Barriers

BY FELICIA DECHTER

Women seeking to move into radiology leadership positions need to embrace strategies designed to overcome barriers that still exist in shattering the glass ceiling, according to four radiology leaders.

There are a number of reasons women still face challenges in radiology, often beginning at the residency level where some residency programs tend to pick men over women, said presenter Carol Rumack, MD, professor of radiology and pediatrics at the University of Colorado Medical School in Aurora.

Because the definition of success is specific to the individual, women should start at the beginning of their career by defining their purpose and goals, said Rebecca Leddy, MD, an associate professor of radiology and assistant director of Breast Imaging in the Department of Radiology at the Medical University of South Carolina in Charleston.

It's important to think positive, said Dr. Leddy, during an RSNA 2016 presentation on women in leadership. "Most people spend their lives looking at their weaknesses," Dr. Leddy said. "Find your strengths."

Common barriers include a lack of purpose or direction, mentorship and support, time and personal and professional life balance, Dr. Leddy said.

She encourages women to define their purpose and goals, determine their core strengths and value, to be innovative and proactive, stay open to opportunity, be willing to ask for what they want, find mentors and sponsors, and get out there and do some networking, she said.

Dr. Rumack also stressed the importance of taking a direct approach.

For example, many women adhere to a cultural expectation that they should wait to be asked, which can hold them back, said Dr. Rumack. She encourages women radiologists to ask for what they want in areas including their salaries and in securing research support. She stressed that radiology leaders need to encourage women to participate in leadership roles.

"Both women radiologists and radiology leaders need to strongly support the inclusion of women at the highest levels of radiology organizations so that diversity will be a positive force for change," said Dr. Rumack, a former chair of RSNA's *Daily Bulletin* and a past president of the American College of Radiology who also served as the first president of the American Association for Women Radiologists.

Tackling Challenges Head-on

Identifying the challenges that exist and tackling them in a systematic way is also critical, said presenter Meryle Eklund, MD, assistant professor of pediatric radiology at the Medical University of South Carolina in Charleston.

"A man may easily lay out his strengths and potentially overestimate his worth to an institution, but women may have a harder time with self-promotion and asking for what they want," Dr. Eklund said. "Becoming aware of these differences can help junior female radiologists be well equipped for success from the very beginning of their careers."

Dr. Eklund suggests finding a mentor who can give advice on navigating the system and setting achievable short- and long-term goals.

In terms of moving up the career ladder, presenter Elizabeth Oates, MD, chairman of the Department of Radiology and chief of the Division of Nuclear Medicine and Molecular Imaging at the University of Kentucky College of Medicine in Lexington, suggested a number of approaches women can take in radiology.


Rumack


Leddy


Eklund


Oates

Look around your department or workplace, said Dr. Oates, who founded Women in Medicine and Science at the University of Kentucky. Look at specialty and subspecialty organizations for volunteer positions, she said.

"Be willing to do what needs to be done, even if unpleasant," Dr. Oates said. "Show zest and initiative; share and execute innovative ideas; complete assignments on time; do a good job; maintain a current CV ready at a moment's notice; be willing to travel, speak and write."

> "Both women radiologists and radiology leaders need to strongly support the inclusion of women at the highest levels of radiology organizations so that diversity will be a positive force for change."
>
> CAROL RUMACK, MD

Women as Likely as Men to be Full Radiology Professors, Research Shows

BY RICHARD DARGAN

Although a gender gap still exists on the radiology research front, radiology is one of the few medical specialties in which men and women have a similar likelihood of being a full professor, according to recent *Radiology* research.

Researchers at Brigham and Women's Hospital in Boston compared full professorship rates between male and female radiologists using a unique physician database provided by Doximity, an online networking service for U.S. physicians. The study was published online in *Radiology* and will appear in the April 2017 print issue.

"Doximity has cultivated information on all U.S. academic radiologists, both members and non-members of Doximity," said lead author Neena Kapoor, MD, a diagnostic radiologist in the Department of Radiology at Brigham and Women's Hospital. "With information on over 5,000 academic radiologists, we believe this database offers a new and more comprehensive way to look at gender differences in promotion in academic radiology."

The study comprised 5,089 academic radiologists representing approximately 11.3 percent of all U.S. radiologists in 2014. Of that number, 3,638, or 71.5 percent, were men. The average age for male and female radiologists was 52 and 49 years, respectively.

Overall, 16.5 percent of the women radiologists and 26.1 percent of the men were full professors, Dr. Kapoor said. After taking into account several factors known to influence academic promotion (age, years since residency, research productivity and medical school ranking among them), researchers determined that among radiologists with U.S. medical school faculty appointments in 2014, men and women were similarly likely to be full professors.

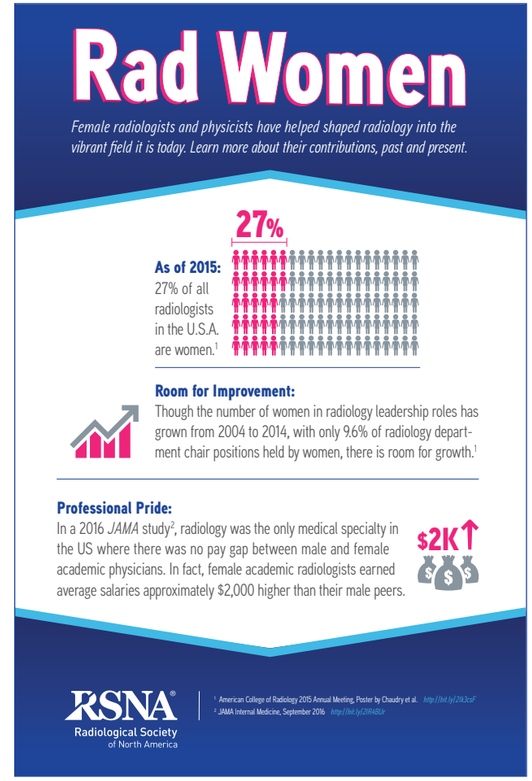

Kapoor

Although policies to reduce inequality based on gender are warranted, according to Dr. Kapoor, the findings show that radiology remains one of the few specialties in which the likelihood of being full professor is equal among men and women.

"Overall, I think the study represents good news," Dr. Kapoor said. "Once factors known to affect research and clinical productivity are taken into account, female radiologists are just as likely to be full professors as male radiologists. This is unlike almost any other medical specialty, including psychiatry, pathology, and obstetrics and gynecology."

WEB EXTRAS

Access the *Radiology* study, "Sex Differences in Academic Rank of Radiologists in U.S. Medical Schools," at *RSNA.org/Radiology*.



Closing the Research Gap

Nevertheless, researchers determined that a gender gap persists on the research side of the profession. When they analyzed factors including National Institutes of Health (NIH) funding, scientific publications, clinical trial investigation and clinical volume measured according to 2013 Medicare reimbursement, they found evidence that female radiologists may lack equal opportunities. Women had fewer total and first or last author publications than men, were less likely than men to have NIH funding and generated less annual Medicare revenue.

"We need to work on getting male and female radiologists on an equal playing field — not just in terms of having equal promotional criteria," Dr. Kapoor said.

While the study did not assess reasons for the gap in research opportunities, Dr. Kapoor pointed to several possibilities.

"Women may be more likely to choose clinical or educational tracks which have different promotional criteria and research requirements," she said. "Also, more women work part-time and take time off for maternity leave. Differences in childcare and household responsibilities may make it harder for female physicians to work full-time and publish at the same rate as men."

The study shows that the rate of female first and senior authorship in radiology has increased over time, which means that women are already starting to close that gap, according to Dr. Kapoor.

"In order to make further improvements, radiology departments should continue to offer flexible work environments and work hours, which could encourage more women to work full-time," she said. "Finally, the value of a good research mentor cannot be understated. Women should be encouraged to enter research tracks early in their careers and to find supportive mentors."

Resident Performance Benefits from 24/7 Attending Coverage

BY FELICIA DECHTER

Radiology residency programs that have shifted to a learning model that includes 24/7 in-house radiology attending coverage are seeing positive results in terms of resident performance, efficiency and patient care, new research shows.


Behbahani

"As with all academic medical centers, our radiology residency program has experienced the transition towards more direct supervision with an onsite radiology attending presence," said Siavash Behbahani, MD, MS, a third-year radiology resident at Winthrop-University Hospital in Mineola, NY, during an RSNA 2016 presentation. "While multiple economic and legal forces have fueled this movement, it challenges traditional learning models for radiology residents."

In assessing the impact of 24/7 in-house radiology attending coverage on radiology resident performance at Winthrop, Dr. Behbahani and principal project investigator, A. Orlando Ortiz, MD, MBA, chairman of the Radiology Residency Program at Winthrop, retrospectively reviewed radiology resident reports on emergent diagnostic radiology procedures conducted between November 2015 and March 2016.

In all, 29,636 studies were preliminarily interpreted by 17 radiology residents on call under 24/7 supervision by an in-house radiology attending who was available for questions during the shift.

The analysis demonstrated that the resident-faculty rate of missed findings for radiographs was 0.8 percent compared to a higher rate reported in the literature of 1.4 percent without 24/7 direct attending supervision, Dr. Behbahani said.

Results also demonstrated a decrease in the rate of resident-faculty discrepancy for cross-sectional studies: CT — 0.5 percent vs. 2.4 percent, ultrasound — 0.1 percent vs. 0.6 percent, and MR — 1.1 percent vs. 3.7 percent. The first number relates to residents under 24/7 direct attending supervision, while the second number relates to independent resident calls in his study, Dr. Behbahani said.

As the year of resident training increased, missed findings decreased, he said.

"We also observed that the rates of minor and major discrepancies substantially decreased with the increasing resident year of training," Dr. Behbahani said. "Finally, the turn-around time for generating radiology resident preliminary reports decreased as compared to turn-around times previously reported in the literature."

Ultimately, results demonstrated that radiology resident on-call performance — with respect to diagnostic radiology interpretations — improves with the presence of 24/7 in-house radiology attending coverage.

And in-house radiology attending coverage and supervision ultimately improves patient care, emergency room management/discharge time, and appropriateness of management, according to researchers.

Communication Key to Reducing Miss Rates

Missed radiologic findings are not uncommon in general, Dr. Behbahani said. A plethora of studies — including research on single radiologist interpretations — have shown miss rates as high as 19 percent, he said.

Keeping the rate of missed findings as low as possible benefits radiology on a number of fronts — from economics to patient care to the quality of resident education, Dr. Behbahani said.

"At the critical level of resident education, this 24/7 in-house attending approach reinforces communication as a key driver in enhancing the call experience as a true learning platform," he said. "The intrinsic value of this coverage model is founded on the concept of multidirectional proactive communication."

Along with adopting the 24/7 attending supervision model, Dr. Behbahani suggests that institutions embrace strategies that optimize the interpretation experience and environment. This approach could range from using standardized imaging protocols and search patterns to adopting reading stations that offer optimal lighting, proper ergonomic conditions and controlled interruptions, he said.

> *"At the critical level of resident education, this 24/7 in-house attending approach reinforces communication as a key driver in enhancing the call experience as a true learning platform."*
>
> SIAVASH BEHBAHANI, MD, MS

System Inefficiencies Lead to Duplicate CT Studies

BY MIKE BASSETT

Acute trauma patients who receive imaging before being referred to a trauma center are likely to receive duplicate CT studies, leading to added radiation dose for patients and increased costs to the healthcare system, according to new research.

Ricarda Hinzpeter, MD, of the University Hospital Zurich, Switzerland, retrospectively examined all adult trauma patients transferred from other hospitals to a level-1 trauma center at University Hospital Zurich in 2014.

"CT is the modality of choice in the early imaging work-up of severely injured patients," said Dr. Hinzpeter during an RSNA 2016 presentation. She added that severely-injured patients are often transferred from regional hospitals to level-1 trauma centers and are re-scanned.

Dr. Hinzpeter and her colleagues analyzed repeated CT scans and categorized them according to the reasons for duplication, including inadequate CT image data transfer, poor image quality, repetition of head CT after head injury with completion to whole-body CT (WBCT), and follow-up of injury known from previous CT.

They also calculated the cumulative radiation dose and costs associated with potentially preventable duplicative CT exams, which they defined as scans that were repeated because of inadequate image data transfer or poor image quality.

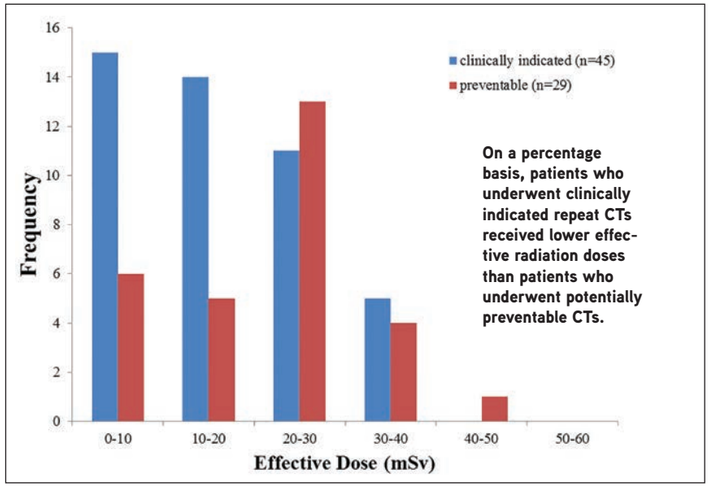
Reasons for Repeat CT Scans

In this study, 68 out of 298 patients whose conditions were not manageable in the referring hospital were transferred to the trauma center because of either severe head injury (n=45) or major body trauma (n=23). Seventeen other patients were transferred because they were being repatriated from a foreign country (n=14) or because there was no ICU capacity (n=3).

Of these 85 transferred patients, 74 (87.1 percent) had repeated CT scans. The reasons included:

- Inadequate CT image data transfer (n=29; 39.2 percent)
- Repetition of head CT with completion to WBCT (n=24; 32.4 percent)
- Follow-up of known injury (n=21; 28.4 percent).

None of the repeated CT studies were performed because of poor image quality.




Hinzpeter

Dr. Hinzpeter and colleagues determined that the cumulative dose-length product of all of the repeated CT scans was 1,383 mSv or 18.7 mSv per patient, while patients who underwent potentially preventable repeat CT scans (those due to inadequate CT data transfer) received an overall additional effective radiation dose of 631 mSv, or 21.8 mSv per patient.

The additional costs associated with all of the repeated CT exams was $70,433, while the additional costs of potentially preventable CT exams was $38,961.

On a percentage basis, patients who underwent clinically indicated repeat CTs received lower effective radiation doses than patients who underwent potentially preventable CTs.

WEB EXTRAS

View a video of Ricarda Hinzpeter, MD, discussing her research on duplicate CT studies at *RSNA.org/News*.

"A considerable number of transferred trauma patients undergo potentially preventable repeated CTs, adding radiation dose to the patients, and costs to the healthcare system," Dr. Hinzpeter said.

"Future efforts should be made for improving and accelerating image data transfer, allowing for timely and complete availability of CT image data, even in thesetting of acute trauma," she said.

Co-author Hatem Alkadhi, MD, of the University Hospital Zurich, mentioned several effective digital initiatives for sharing adiologic images.

The use of a DICOM-email protocol is a potential solution for fast and secure connections between hospitals causing minimal problems with existing firewall policies, he said. Another solution is streaming, which allows physicians at the trauma center to electronically access the images obtained in the regional hospital's emergency department, allowing trauma surgeons to review and evaluate CT images well ahead of patient arrival at the trauma center.

Spiral-based 3-D MR Heat Mapping May Improve MR-guided Focused Ultrasound

BY EVONNE ACEVEDO

A promising 3-D spiral-based MR thermometry technique can help guide focused ultrasound (US) treatment for neuro soft tissue ablation, providing more accuracy and faster procedure times than the standard 2-D technique, according to new research.

Researcher Matthew G. Geeslin, MD, MS, with scientific advisor Max Wintermark, MD, MS.

"We anticipate that spiral-based 3-D MR thermometry will have applications for temperature monitoring of any static brain or extra-cranial soft tissue ablation procedure," said Matthew Geeslin, MD, MS, a radiology fellow at the University of Virginia Health System, in Charlottesville, whose project was funded through a 2014 Toshiba America Medical Systems/RSNA Research Resident Grant.

The current clinical standard for planning and monitoring MR-guided focused ultrasound (MRgFUS) for brain applications — 2-D MR thermometry — has limitations including accuracy of temperature mapping, monitoring near-field heating and lengthy procedure time. In his research, Dr. Geeslin and his advisor sought evaluate a spiral-based 3-D MR thermometry technique that addresses those limitations and improves on the standard technique.

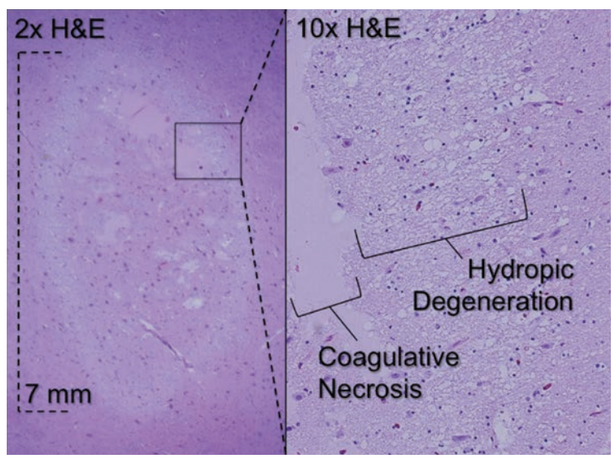
All MR acquisition techniques are subject to artifacts induced by off-resonance, Dr. Geeslin explained. Typical methods for acquiring thermal image maps, such as echo-planar imaging or spin-warp imaging, rely on a Cartesian trajectory, which is subject to geometric distortions.

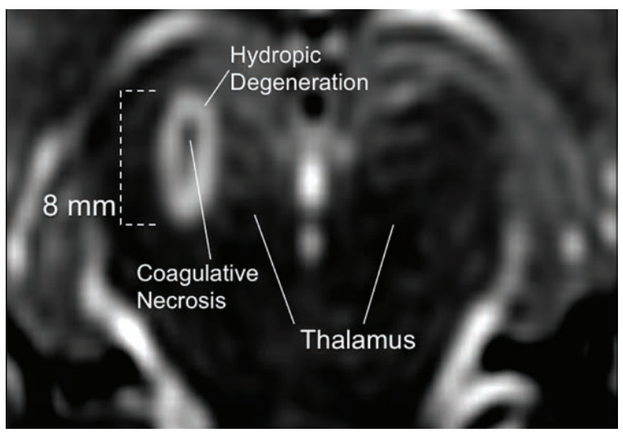
Spiral imaging offers an advantage over echo-planar imaging because off-resonance does not shift the position of the "hot spot," Dr. Geeslin said.

"Image blur from off-resonance effects can be a concern with spiral scanning, but our lab group had already developed a reliable set of image construction methods for minimizing off-resonance effects from both main field inhomogeneity and concomitant gradient fields," he said.

There are many ways to sample the data in k-space, including spiral, Cartesian, radial and zig-zag acquisitions. Each sampling method has pitfalls related to magnetic field inhomogeneity, Dr. Geeslin said. In spiral acquisitions, off-resonance from field inhomogeneity manifests as image blur.

"The techniques for reducing image blur are particularly beneficial in spiral-based MR thermometry because spiral, rather than Cartesian, sampling of k-space trades shifting of the hot spot for image blur," he said. "This has safety advantages during both procedure planning and completion."





The image at left demonstrates 2X and 10X magnified histologic sections through a MR-guided focused ultrasound (MRgFUS) lesion in porcine thalamus, with correlative (*right image*) T2 weighted acute post-ablation MRI.

INNOVATE

GRANTS IN ACTION

NAME:
Matthew Geeslin, MD, MS

GRANTS RECEIVED:
2014 Toshiba America Medical Systems/RSNA Research Resident Grant.

STUDY:
"Evaluation of Spiral-based 3-D MR Thermometry for Brain Applications of MR-guided Focused Ultrasound in a Porcine Model."

CAREER IMPACT:
"Prior to notification of the RSNA research award, I considered myself committed to a career as a physician scientist. Assuming the role of primary investigator in this research project absolutely strengthened my resolve to pursue such a career, but more importantly, perhaps, it significantly increases the likelihood that I will succeed in such a capacity."

CLINICAL IMPLICATION:
"Our technique eliminates one of the main issues associated with Cartesian 2-D thermometry, which is hot-spot shift. The absence of this artifact, which leads to inaccurate positional temperature mapping, will ultimately allow our 3-D method to significantly reduce the time required for intra-procedural treatment planning. It will also help to eliminate uncertainty with regard to the position of the hot-spot."

Comparing 2-D and 3-D Applications

Under the guidance of project advisor Max Wintermark, MD, MS, a professor of radiology and chief of neuroradiology at Stanford University Medical Center, in Palo Alto, CA, Dr. Geeslin and colleagues evaluated their techniques in the brains of pigs. They began by performing focused sonication in two phases in order to gather as much thermometry data as possible from each animal.

The first phase of sonication was non-ablative, depositing energy high enough to cause a temperature rise but low enough to avoid forming a durable lesion. The technique used both high- and low-power sonication parameters to generate non-ablative temperature profiles.

"This also increased the number of data points for comparison of 2-D and 3-D techniques and helped evaluate our 3-D spiral sequence over a range of temperatures," Dr. Geeslin said.

The second phase aimed at creating the type of lesion formed during a focused US procedure for essential tremor.

"Essential tremor was our most immediate clinical target, given the then-ongoing focused ultrasound trial and the availability of an established animal model for brain applications," Dr. Geeslin said, noting that MR-guided focused ultrasound treatment of essential tremor is now approved by the U.S. Food and Drug Administration (FDA). The researchers then used both a commercial 2-D thermometry sequence and their own spiral-based 3-D sequence to generate temperature maps.

> *"We anticipate that spiral-based 3-D MR thermometry will have applications for temperature monitoring of any static neuro soft tissue ablation procedure."*
>
> MATTHEW GEESLIN, MD, MS

The researchers determined that while the 3-D temperature maps displayed greater noise than the 2-D maps, the 3-D maps did not suffer from distortion. In addition, the availability of a new, smaller surface coil provided a better signal-to-noise ratio when compared to their usual body coil, improving the temperature resolution.

Ultimately, Dr. Geeslin concluded that a single spiral-based 3-D acquisition could lead to "reduced procedure time and a more comfortable experience for the patient."

RSNA Research Leads to Further Funding

Data from Dr. Geeslin's RSNA research led to a 2015 grant from the Wallace Coulter Foundation, which the research group is using to continue investigating the 3-D spiral-based MR thermometry technique.

"The next phase involves implementing the use of Kalman filtering to further improve the accuracy of temperature and thermal dose calculation in spiral-based MR thermometry," he said.

Dr. Wintermark, chair of RSNA's Public Information Committee, noted that supporting research for residents like Dr. Geeslin often has a significant impact on their pursuit of academic careers.

"These researchers also become role models for their co-residents," Dr. Wintermark said. "RSNA grants like the Resident Research Grant foster a research and academically-oriented culture in radiology departments."

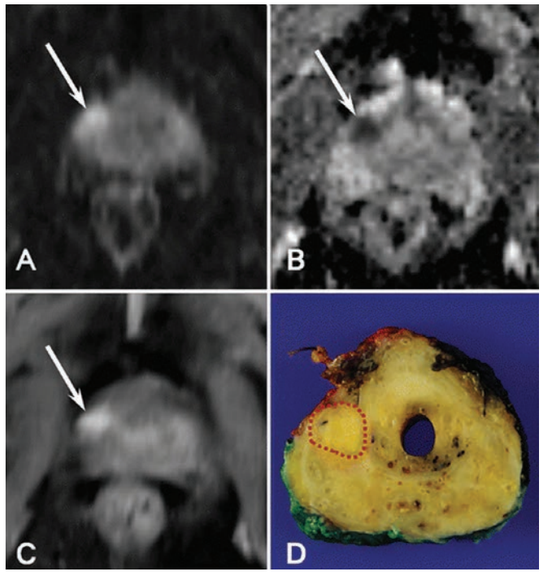
In terms of pursuing research, Dr. Geeslin says that it is important to choose a topic that will be a sustaining source of motivation.

"Additionally, it is helpful to both your field and your future funding prospects to be engaged in research that progressively builds on itself through your training and early career," Dr. Geeslin said. "And an excellent and experienced mentor, like Dr. Wintermark, can be a window into your future."

PI-RADS v2 Effective in Predicting Prostate Cancer

BY PAUL LaTOUR

The second version of the Prostate Imaging Reporting and Data System (PI-RADS) is proving to be an effective tool for preoperatively predicting clinically significant prostate cancers.



Images in a 74-year-old man with clinically significant prostate cancer. A, DW image and, B,ADC map show a focal area of diffusion restriction, measuring 1.1 cm in the longest diameter, in the right peripheral zone (arrow). The PI-RADS version 2 score of the ADC map was 4 according to both readers. C, DCE image also shows a focal area of early enhancement at the same site. The PI-RADS score of DCE imaging was positive according to both readers. Therefore, the overall PI-RADS score according to both readers was 4, which is suggestive of a high probability of clinically significant cancer. D, On the surgical specimen, clinically significant cancer (Gleason score = 7; tumor volume = 1.4 cm3; no extracapsular extension) is seen in the right peripheral zone (red dotted area).

The first version of PI-RADS was developed by the European Society of Urogenital Radiology (ESUR) in 2012, prompted by a recommenation from the AdMe Tech Foundation's International Postate MRI Working Group in 2010.

When limitations emerged, several other groups joined to form a PI-RADS v2 Steering Committee to update and build on the initial system.

The second version of PI-RADS was developed by the American College of Radiology (ACR), ESUR and the ADmeTech Foundation in 2014 as a tool to standardize the interpretation and systematic reporting of muliparametric MRI (mpMRI), which has shown great promise for diagnosing psotate cancer.

Introduced at RSNA 2014, PI-RADS v2 offers a simplified scoring system that focuses on the detection and exclusion of clinically significant prostate cancer. In coordination with RSNA's RadLex® Steering Committee, which coordinates the development of a comprehensive lexicon for standardized indexing and retrieval of radiology information resources, PI-RADS v2 set standards for communicating the risk and location of aggressive prostate cancer.

Research is demonstrating the effectiveness of PI-RADS v2. In a July 2016 *Radiology* study, lead author Sung Yoon Park, MD, PhD, of the Department of Radiology and Research Institute of Radiological Science at Yonsei University College of Medicine, Seoul, and colleagues showed that PI-RADS v2 may help diagnose clinically significant prostate cancer before surgery, which would aid in clinical decisions regarding upfront treatment or active surveillance of prostate tumors.

Experts say the findings help validate PI-RADS v2 at a time when mpMRI is expanding considerably as a tool for detecting prostate cancer.

"It's exciting to see research such as this that really demonstrates the widespread application of PI-RADS v2 and shows how useful this can be in clinical practice," said Clare M. Tempany-Afdhal, MD, a member of the PI-RADS v2 Steering Committee.

In the *Radiology* study, Dr. Park and colleagues analyzed 425 patients with prostate cancer who had undergone MRI and radical prostatectomy.

> *"Our data suggest PI-RADS v2 has potential to be a preoperative tool for risk stratification of prostate cancer."*
>
> SUNG YOON PARK, MD, PHD

Tempany

Park

Several parameters were investigated, including the prostate-specific antigen (PSA) level, the biopsy Gleason score and PI-RADS v2 scoring. Two independent readers performed the PI-RADS scoring.

"Our data suggest PI-RADS v2 has the potential to be a preoperative tool for risk stratification of prostate cancer," Dr. Park said. "In addition, PI-RADS v2 may play a role as a parameter of various preoperative nomograms, which may also aid in treatment planning."

Among other changes, PI-RADS v2 streamlined the scoring system that was used for the original version. PI-RADS v2 uses a 1-5 scale to categorize the likelihood of a clinically significant cancer being present. Dr. Park and colleagues sought to test the utility of the scale.

Dr. Tempany-Afdhal and colleagues were pleased that the *Radiology* results validated the updated guidelines.

"When we introduced PI-RADS v2 at RSNA 2014 and subsequently published that version in 2015, we really had no idea how well it would be accepted or validated," said Dr. Tempany-Afdhal, professor of radiology at Harvard Medical School, the Ferenc Jolesz Chair of Radiology Research at Brigham & Women's Hospital in Boston, and a member of the RSNA Committee on Scientific Affairs.

Two things stood out to Dr. Tempany-Afdhal about the *Radiology* results. First, by using a surgical population for the study, the researchers identified every patient who had a suspicious lesion as well as a biopsy-proven prostate cancer that required surgery.

She also pointed to the close inter-reader agreement demonstrated in the study. The readers' weighted Kappa (k) score, which is used to measure statistical agreement, was 0.801 for PI-RADs v2 scores of 4 or better. A weighted k score of 1 equals total agreement.

"Results show really good agreement that has not been reproduced in most other U.S. studies I have seen," Dr. Tempany-Afdhal said.

PI-RADS is a Living Document

The effectiveness of PI-RADS v2 has helped spur the prostate imaging boom by providing standardized guidelines for radiologists across the globe, said Jelle Barentsz, MD, PhD, co-chair of the ACR/PI-RADS v2 Steering Committee.

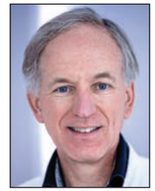
"Now we all speak the same language all over the world — and both radiologists and urologists are willing to learn this language," said Dr. Barentsz, a professor of radiology and chair of the Radboud Prostate MR-Reference Center of Radboud University Medical Center, the Netherlands.

Because PI-RADS v2 is meant to be a living document, the steering committee's work is ongoing. Dr. Tempany-Afdhal said the committee wants to see more research like the study conducted by the Korean researchers to help guide them.

"We want feedback from the community about where it's working and where it isn't working. PI-RADS is a living document, so it will definitely evolve over time," Dr. Tempany-Afdhal said.

Demand for PI-RADS Training is Booming

BY PAUL LaTOUR



Barentsz

Interest in prostate imaging has been booming since the second version of the Prostate Imaging Reporting and Data System (PI-RADS v2) was introduced at RSNA 2014. The effectiveness of multiparametric MRI (mpMRI) in diagnosing prostate cancer has increased the need for radiologists to be trained on the technique, said Jelle Barentsz, MD, PhD.

"Radiologists must now perform a technique they did not learn during their radiology education, since mpMRI of the prostate to detect significant cancers was not part of their training," said Dr. Barentsz, professor of radiology and chair of the Radboud Prostate MR-Reference Center of Radboud University Medical Center, the Netherlands.

To meet the demand in the Netherlands and other countries, Dr. Barentsz's center offers a two-week intensive course to technicians and radiologists that features one-on-one training. But more training is needed in Europe and North America.

"More and more hands-on training is needed. We need to establish centers of excellence where there is a guaranteed high quality of mpMRI of the prostate. These centers then can educate others," said Dr. Barentsz, co-chair of the American College of Radiology PI-RADS Steering Committee and chair of the European Society of Urogenital Radiology Prostate MRI Subcommittee that developed the guidelines.

If attendance at the hands-on prostrate MRI course at RSNA 2016 is any indication, the desire for training is high. As co-organizer of the course, Dr Barentsz said the room exceeded its capacity of 100 participants the first day. The next three days, eager participants lined up outside the room an hour before class to claim a seat for the course, which focused mainly on PI-RADS v2, a tool to standardize interpretation and systematic reporting of mpMRI. The course, organized by Dr. Barentsz and a team of international experts, will be offered again at RSNA 2017.

WEB EXTRAS

Access the *Radiology* study, "PI-RADS Version 2 Helps Preoperatively Predict Clinically Significant Cancers," at *RSNA.org/Radiology*.

Access a *Radiology* podcast discussion of the research with *Radiology* Editor Herbert Y. Kressel, MD, and lead author Sung Yoon Park, MD, PhD, at *RSNA.org/Radiology*.

The demand continues for PI-RADs v2 training. *Above*: a prostate MRI session at RSNA 2016 drew a capacity crowd.

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Research Targets Sickle Cell Disease Crisis in Nigeria

Kofoworola O. Soyebi, MBChB

With her 2016 Derek Harwood-Nash Education Scholar Grant, **Kofoworola O. Soyebi, MBChB,** University of Lagos, Idi-Araba in Lagos, Nigeria, is addressing a major health crisis in Nigeria, home to the largest number of children with sickle cell disease (SCD). One devastating complication of SCD, stroke, is largely preventable by early risk detection with transcranial doppler (TCD) screening and timely intervention. Unfortunately, only one TCD facility is available for the entire country. Through her research, Dr. Soyebi seeks to increase the number of available TCD centers, trainers and sonographers through capacity building and equipment provision in order to facilitate the integration of TCD screening into routine management of children with SCD.

First-awarded in 2009, the Derek Harwood-Nash Education Scholar Grant was made possible by an individual donor endowment from Paul E. Berger, MD. The grant focuses on opportunities for international educators and investigators.

Make an inspired investment in innovation. Support the Campaign for Funding Radiology's Future® today.

Member Spotlight

Phan T. Huynh, MD

Huynh

Dr. Huynh completed his radiology residency at the University of Virginia, followed by a fellowship in breast imaging at the University of Virginia and Medical College of Virginia. He is Medical Director of the Women's Center at Baylor St. Luke's Medical Center in Houston, TX. Dr. Huynh is the chairman of the RSNA Research & Education (R&E) Foundation Fund Development Committee and a Platinum Centennial Pathfinder Campaign donor.

What or who sparked your interest in radiology?
As a medical student, I was fascinated with the advances of interventional radiology. I have been so blessed to have so many mentors and role models. Dr. Charles J. Tegtmeyer was an innovator and skilled clinician who taught me the importance of quality imaging. Dr. Ellen Shaw de Paredes was instrumental in my development as a teacher and a breast imager. Dr. Bruce Hillman emphasized the critical relevance of imaging research in the evolution of our specialty. They all share a burning passion for our profession.

What would you describe as the biggest professional challenge you face today?
Consolidation of radiology practices is underway in many communities across the country. It is difficult to recruit and retain young, talented colleagues in the face of uncertainty in our healthcare system.

What is the biggest reward?
This is an easy one. Breast imaging allows radiologists to be at the center of care for patients with breast concerns. The answer begins and ends with my ongoing relationship with my patients.

How does volunteering for RSNA help you in your daily practice?
Reviewing manuscripts for *Radiology* and *RadioGraphics* helps me keep up with the continuing evolution of our specialty. Volunteering for the R&E Foundation provides me a concrete avenue to give back and move radiology forward.

How do you like to spend your free time?
There is no greater joy than spending time with my two boys, Ethan and Adrian. I recently picked up running and I just finished my first half-marathon.

Education and Funding Opportunities

Last Call

RSNA/ASNR Comparative Effectiveness Research Training Program

Application Deadline
April 30

Applications are now being accepted for an interactive course in comparative effectiveness research (CER) training jointly sponsored by RSNA and the American Society of Neuroradiology (ASNR). The course, beginning in July, is targeted to junior faculty and senior trainees in the imaging sciences.

Led by a faculty of well-established leaders in the field, the CER training program includes a combination of online modules, a 1 ½-day, in-person workshop (Sept. 28–29), web-based didactic lectures and small group web-based grant proposal review discussions, over the course of a year.

The in-person workshop will be held at RSNA headquarters in Oak Brook, IL.

Accepted participants are responsible for travel expenses and hotel accommodations. There is no fee for this course. For more information and to apply, visit *RSNA.org/CERT.*

RSNA Hosts Second Spotlight Course in Bogotá

May 18–20
Bogotá, Colombia

RSNA is proud to host its second RSNA Spotlight Course: MSK Interactivo con Casos (MSK Interactive with Cases) in Bogotá, Colombia, from May 18 to 20. The course will be presented in Spanish.

The highly interactive 2 ½-day course features leaders in musculoskeletal radiology who will share their expertise as attendees explore this important topic in daily practice. All course sessions will utilize RSNA Diagnosis Live™ technology, making this a one-of-a-kind course in Latin America. Attendees will also take part in diagnosing the popular Cases of the Day, interact with distinguished speakers and network with colleagues.

For more information and to register visit *RSNA.org/Spotlight.*

RSNA SPOTLIGHT COURSE

RSNA Clinical Trials Methodology Workshop

Application Deadline
June 15

Over the course of the 6 ½-day workshop, participants will learn how to develop protocols for the clinical evaluation of imaging modalities. Each trainee will be expected to develop a protocol for a clinical study, ready to include in an application for external funding.

The workshop will be held at the Marriott Resort in Coronado, CA, Jan. 6–12, 2018.

Applicants will undergo a competitive selection process for course entrance. Accepted participants are responsible for all travel expenses and hotel accommodations. There are no fees associated with the workshop. Online applications and additional information can be found at *RSNA.org/CTMW.*

Introduction to Academic Radiology for Scientists (ITARSc)

Application Deadline
July 1

RSNA has expanded its Introduction to Academic Radiology (ITAR) program to include postdoctoral fellows in the imaging sciences and biomedical engineering. Postdoctoral fellows and early-stage researchers in these specialties who received their degrees within the past six years are invited to apply for this opportunity to participate in a dynamic program held during RSNA 2017.

The program consists of a combination of dedicated programming for ITARSc participants and shared sessions with participants of the ITAR program. Selected participants will receive a $1,000 stipend to offset travel and hotel costs as well as free registration for the RSNA annual meeting. Application forms are available at *RSNA.org/ITARSc.*

Advanced Course in Grant Writing

Application Deadline
July 1

Applications are now being accepted for this course designed to assist participants – generally junior faculty members in radiology, radiation oncology or nuclear medicine programs — prepare and submit a National Institutes of Health, National Science Foundation, or equivalent, grant application. The course, held at RSNA headquarters in Oak Brook, IL, will consist of four 1 ½-day sessions:

- Session I: Oct. 6–7
- Session II: Nov. 10–11
- Session III: Feb. 9–10, 2018
- Session IV: April 20–21, 2018

Accepted participants are responsible for travel expenses for each session. Hotel accommodations will be provided by RSNA. There are no fees associated with this course. For more information and an application, go to *RSNA.org/AGW.*

RSNA/AUR/ARRS Introduction to Academic Radiology

Application Deadline
July 15

Sponsored by RSNA, the American Roentgen Ray Society (ARRS) and Association of University Radiologists (AUR), the Introduction to Academic Radiology program:

- Exposes second-year residents to academic radiology
- Demonstrates the importance of research in radiologic sciences
- Illustrates the excitement of research careers
- Introduces residents to successful clinical radiology researchers

Successful applicants will be assigned to a seminar held either during the RSNA annual meeting in Chicago, Nov. 26–Dec. 1, or the ARRS annual meeting in Washington, DC, April 22–27, 2018.

A $1,000 award will be made to the departments of accepted applicants to be used to help advance the applicants' academic careers. There are no fees associated with this program.

For more information and to download an application form, go to *RSNA.org/ITAR.*

Registration Underway for CORE Workshop

Register by August 15

Registration is underway for the 2017 Creating and Optimizing the Research Enterprise (CORE) workshop to be held from Oct. 20 to 21 at RSNA headquarters in Oak Brook, IL. The free workshop focuses on strategies for developing and advancing imaging research programs in radiology, radiation oncology and nuclear medicine departments.

New sessions include "Big Data and AI; the Role for Radiology and How to Get Involved" and "Developing Clinician Scientists in Radiology." The CORE program features a combination of presentations, case studies and group discussions. For more information, go to *RSNA.org/CORE.*

Modules on Comparative Effectiveness Research (CER)

Stemming from an original initiative with funding from a Philips Healthcare/RSNA Education Scholar Grant, modules on comparative effectiveness research (CER) are now available. These free modules offer *AMA PRA Category 1 Credit™.*

The modules provide a solid foundation for the evaluation of diagnostic imaging interventions and their value in comparison to patient outcomes and financial expenditures. They provide an introduction to the world of CER, and will set the scene for an evolving discussion on health services research and health economics.

Authored by CER subject matter experts, the modules were reviewed by the Comparative Effectiveness Research Training Committee. A CME test is included. Participants must earn an 80 percent or better score to earn CME credit, but tests may be retaken.

Access the CER modules at *RSNA.org/eLearn.*

For Your Calendar

MAY 4–7
Jornada Paulista de Radiologia (JPR)
São Paulo, Brazil
Visit the RSNA booth
• *JPR2017.org.br/en*

MAY 18–20
RSNA Spotlight Course: MSK Interactivo con Casos
Bogotá, Colombia
• *RSNA.org/Spotlight*

JUNE 8–10
InterAmerican College of Radiology (CIR) Refresher Course
Cancun, Mexico
Visit the RSNA booth
• *webcir.org*

FIND MORE EVENTS AT *RSNA.org/Calendar.aspx.*

Journal Highlights

The following are highlights from the current issues of RSNA's two peer-reviewed journals.

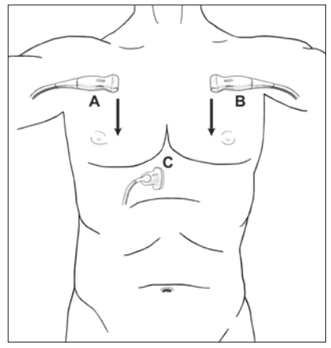
Focused Assessment with Sonography in Trauma (FAST) in 2017

The advent of focused assessment with sonography in trauma (FAST) three decades ago enabled clinicians to rapidly screen for injury at the bedside of patients, especially those patients too hemodynamically unstable for transport to the CT suite.

In the April issue of *Radiology* (*RSNA.org/Radiology*), John R. Richards, MD, and John P. McGahan, MD, from the University of California-Davis Medical Center, discuss the evolution of the FAST examination to its current state in 2017 and evaluate its evolving role in the acute management of the trauma patient.

The authors also report on the utility of FAST in special patient populations, such as pediatric and pregnant trauma patients, and the potential for future research, applications and portions of this examination that may be applicable to radiology-based practice.

"The most effective use of focused assessment with sonography in trauma has been rapid triage of hemodynamically unstable trauma patients to definitive intervention, leading to reduced time to appropriate intervention, shortened hospital stays and lower costs," the authors write.



Views that may be helpful in the trauma patient: A = right parasagittal view of the lung for pneumothorax, B = left parasagittal view of the lung for pneumothorax, C = a longitudinal view of the inferior vena cava (IVC). (*Radiology* 2017;283;1:30-:48) © RSNA 2017. All rights reserved. Printed with permission.

This article meets the criteria for *AMA PRA Category 1 Credit*™. SA-CME is available online only.

Multidetector CT of Surgically Proven Blunt Bowel and Mesenteric Injury

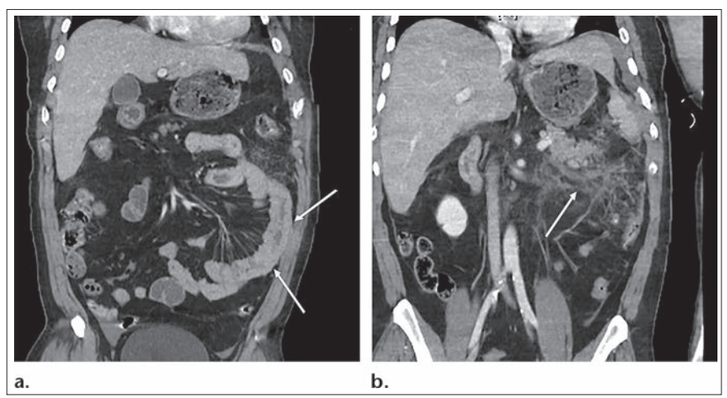
Blunt bowel and mesenteric injury is relatively uncommon in the setting of blunt abdominal trauma. However, a timely diagnosis is paramount to the proper triage and management of trauma patients.

In the March-April issue of *RadioGraphics (RSNA.org/RadioGraphics)*, David D. B. Bates, MD, of Boston University Medical Center, and colleagues identify and describe three mechanisms of blunt bowel and mesenteric injury; discuss the sensitivity and specificity of various CT findings of blunt bowel and mesenteric injury; and discuss ways to recognize potential pitfalls in the evaluation of patients who are suspected of having blunt bowel and mesenteric injury.

Despite the relatively low rate of blunt bowel and mesenteric injury in patients with abdominal and pelvic trauma, delays in diagnosis are associated with increased rates of sepsis, a prolonged course in the intensive care unit and increased mortality.

"Once radiologists are familiar with the spectrum of findings of blunt bowel and mesenteric injury, they will be able to make timely diagnoses that will lead to improved patient outcomes," the authors write.

This article has an Invited Commentaryby Michael N. Patlas, MD, Department of Radiology, Hamilton General Hospital, Hamilton, Ontario, Canada."



Focal bowel wall thickening in a 51-year-old male pedestrian who was struck by a motor vehicle. Coronal multidetector CT images (*a obtained more anterior than b*) show a short segment of focal bowel wall thickening (*arrows on a*) and mesenteric stranding (*arrow on b*). Hepatic and splenic lacerations were also seen (not shown). At surgery, tears of the small-bowel mesentery were encountered, as well as tears of the transverse and descending colon. (*RadioGraphics* 2017;37;2:613-627) © RSNA 2017. All rights reserved. Printed with permission.

This article meets the criteria for *AMA PRA Category 1 Credit*™. SA-CME is available online only.

Listen to *Radiology* Editor Herbert Y. Kressel, MD, deputy editors and authors discuss the following articles in the February issue of *Radiology* at *RSNA.org/Radiology-Podcasts.*

Radiology PODCASTS

- "Impact of Medicare Shared Savings Program Accountable Care Organizations at Screening Mammography: A Retrospective Cohort Study," Anand K. Narayan, MD, and colleagues.
- "Lesion Topography and Microscopic White Matter Tract Damage Contribute to Cognitive Impairment in Symptomatic Carotid Artery Disease," Dewen Meng, MSc, and colleagues.

Listen to *RadioGraphics* Editor Jeffrey S. Klein, MD, and authors discuss the following article in the March-April 2017 issue of *RadioGraphics* at *pubs.RSNA.org/Page/RadioGraphics/Views.*

RadioGraphics PODCASTS

- "Multidetector CT of Surgically Proven Blunt Bowel and Mesenteric Injury," by David D.B. Bates, MD, and colleagues

Radiology in Public Focus

Press releases were sent to the medical news media for the following articles appearing in recent issues of *Radiology.*

Novel Breast Tomosynthesis Technique Reduces Screening Recall Rate

Screening with combined digital breast tomosynthesis (DBT) and synthesized two-dimensional (s2D) mammography in a large community-based practice improved recall rate and positive predictive values without loss of cancer detection rate when compared with combined DBT and full-field digital mammography (FFDM) and FFDM alone, according to new research.

Mireille P. Aujero, MD, from the Christiana Care Health System, Newark, DE, and colleagues retrospectively collected 78,810 screening mammograms from Oct. 11, 2011, to June 30, 2016. Of these, 32,076 were FFDM, 30,561 were DBT-FFDM and 16,173 were DBT-s2D mammograms. Diagnostic performance of FFDM, DBT-FFDM and DBT-s2D mammography was compared.

The researchers found that recall rates were significantly lower with DBT-s2D mammography when compared with DBT-FFDM (4.3 percent vs. 5.8 percent, respectively) and when compared with FFDM alone (4.3 percent vs. 8.7 percent). The cancer detection rate was similar among FFDM alone (5.3 cancers per 1,000 screenings), DBT-FFDM (6.4 cancers per 1,000 screenings), and DBT-s2D mammography (6.1 cancers per 1,000 screenings) with no significant difference.

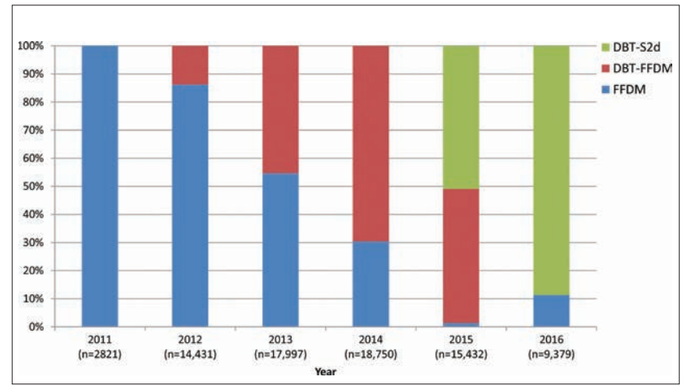


Figure 1: Graph shows percentage of screening breast examinations of each modality per year included in the study period. Note gradual decrease in percentage of FFDM studies from 2011 to 2015 and corresponding increase in percentage of DBT studies. Sample size (n) refers to number of breast examinations.

The percentage of invasive cancers detected was significantly higher with DBT-s2D mammography (76.5 percent) than with DBT-FFDM (61.3 percent), and positive predictive values with DBT-s2D mammography (40.8 percent) were significantly higher than those with DBT-FFDM (28.5 percent).

"The adoption of s2D mammography combined with DBT into screening programs would limit radiation exposure to the patient, and, on the basis of our results, may improve clinical performance compared with that of DBT-FFDM," the authors write.

Radiology in Public Focus

Supplemental Breast MR Imaging Screening of Women with Average Risk of Breast Cancer

In women at average risk for breast cancer, MRI screening improves early diagnosis of prognostically relevant breast cancer, new research shows.

Christiane K. Kuhl, MD, chair of the Department of Radiology at RWTH Aachen University, Aachen, Germany, and colleagues conducted the study at two academic breast centers in women aged 40 to 70 years without breast cancer-associated risk factors.

Between January 2005 and December 2013, women with at least minimal residual breast tissue and normal conventional imaging findings were invited to undergo supplemental MRI screening. A total of 2,120 women were recruited and underwent 3,861 screening MRI studies.

Breast MRI detected 60 additional breast cancers, including 40 invasive cancers, for an overall supplemental detection rate of 15.5 per 1,000 women. Of the 60 cancers detected in the study group over the observation period, 59 were found using only MRI, one was also found by mammography, and none were found by mammography or ultrasound alone.

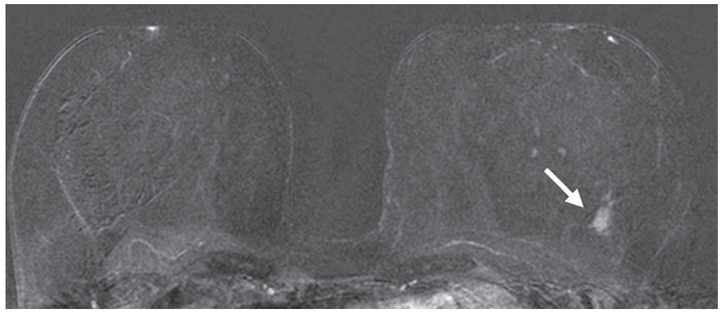


Image in a 55-year-old screening participant. MR-guided biopsy enabled researchers to confirm the presence of an invasive high-grade triple-negative cancer (no special type [NST], pT1b, N0, M0). Breast MR image shows a suspicious enhancing mass (*arrow*) in the left breast (BI-RADS category 5). (*Radiology* 2017;283;2:InPress) © RSNA 2017. All rights reserved. Printed with permission.

"When compared with supplemental ultrasound for screening, MRI offers a substantially higher cancer detection rate and greater sensitivity and, when compared with previously published results, it also offers a higher specificity and positive predictive value," the authors write.

Radiology

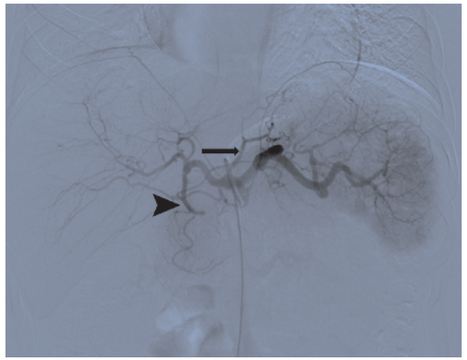
Clinical Safety of Bariatric Arterial Embolization: Preliminary Results of the BEAT Obesity Trial

Bariatric embolization could represent a nonsurgical approach for the treatment of severely obese patients, according to new preliminary research.

In the study, Clifford R. Weiss, MD, of the Johns Hopkins University School of Medicine, and colleagues presented preliminary findings from the Bariatric Embolization of Arteries for the Treatment of Obesity (BEAT Obesity) trial, a prospective single-arm study to evaluate the feasibility and safety of bariatric embolization for the treatment of severe obesity.

Researchers enrolled five severely obese patients (four women, one man) without clinically important comorbidities. Following bariatric embolization, subjects' mean excess weight loss of 5.9 percent and 9.0 percent was noted at one month and three months, respectively. Mean change in serum ghrelin – a hunger-inducing hormone – was 8.7 percent and minus 17.5 percent at one month and three months, respectively. Hunger/appetite scores decreased in the first two weeks after the procedure and there was also a trend toward improvement in quality of life parameters.

"As we continue recruitment for the next trial phase, we anticipate that, with a larger study population, the resultant data will further enhance our understanding of the procedure's long-term safety and efficacy and its potential mechanism of action," the authors write.

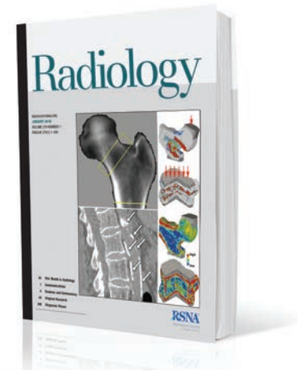


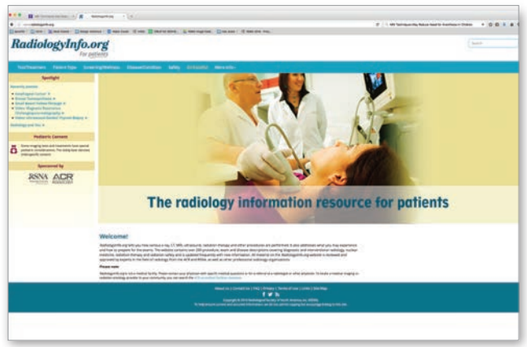
Example of bariatric embolization in a 32-year-old African American woman with a starting weight of 253 lbs and a starting BMI of 47.8 kg/m2. She demonstrated an 8.8-lb weight loss from the 1-week baseline, a 12-lb weight loss from baseline two weeks after bariatric embolization, and an 18.2-lb weight loss from baseline at 12 weeks. This represents a 12.3 percent of loss of excess body weight at 12 weeks and a 12-week BMI of 44.4 kg/m2. Celiac angiogram obtained before bariatric embolization shows classic LGA anatomy, with the LGA arising from the proximal celiac artery (*arrow*). The gastroduodenal artery (*arrowhead*) is also seen. (*Radiology* 2017;283;InPress) © RSNA 2017. All rights reserved. Printed with permission.

Media Coverage of RSNA

In December, 8,610 RSNA-related news stories were tracked in the media. These stories reached an estimated 7.8 billion people.

Coverage included *The Huffington Post*, *USA Today*, *Los Angeles Times*, *TIME*, *Newsweek*, *The Washington Post*, *Daily Mail*, *The Telegraph*, *The Baltimore Sun*, *Orlando Sentinel*, *BBC.com*, *FOXNews.com*, *NBCNews.com*, *SPACE.com*, *ABCNews.com*, KCBS-TV (Los Angeles), KUSA-TV (Denver), WebMD, *Philly.com*, *MSN.com*, *Forbes.com* and HealthDay.





New on *RadiologyInfo.org*

Visit *RadiologyInfo.org*, the public information website produced by the RSNA and ACR, to read new patient information on esophageal cancer.

RadiologyInfo.org
For patients

April Public Information Outreach Activity

In April, RSNA is distributing the "60-Second Checkup" audio program to nearly 65 radio stations across the U.S. The segments focus on breast density and how it impacts a woman's screening options.

The Value of Membership

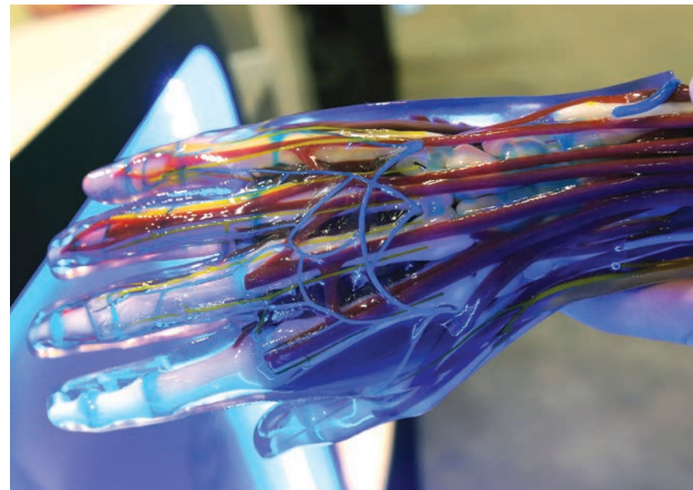
RSNA Members Can Join 3-D Printing Special Interest Group

In response to breakthrough 3-D printing technology and its implications for radiology, RSNA recently launched a new 3-D Printing Special Interest Group (SIG) to promote the highest quality 3-D printing for medical applications via education, research and collaboration.

The 3-D Printing SIG, chaired by Jonathan M. Morris, MD, will focus on maintaining a prominent role for radiologists in this diverse and growing specialty and will strive to provide physicians and allied health scientists with optimized education and research programs.

RSNA members in good standing may add SIG participation to their membership for a fee of $40 per year. Call the Membership Department at 1-877-776-2636 to learn more or apply online at *RSNA.org/Apply*.

For more information on the 3-D Printing SIG, go to *RSNA.org/3D-Printing-SIG*.



Annual Meeting Watch

RSNA 2017 Online Abstract Submission Now Open

The online system to submit abstracts for RSNA 2017 is open. The submission deadline is noon Central Time (CT) on Wednesday, April 12. Abstracts are required for scientific presentations, education exhibits, applied science, quality storyboards and quantitative imaging reading room showcases.

To submit an abstract, go to *RSNA.org/Abstracts*. The easy-to-use online system helps the Scientific Program Committee and Education Exhibits Committee evaluate submissions efficiently. For more information about abstract submissions, contact the RSNA Program Services Department at 1-877-776-2227 within the U.S., or 1-630-590-7774 outside the U.S.

The top neuroradiology scientific paper as selected by the Scientific Program Committee will receive a $3,000 award at RSNA 2017.

Students, clinical trainees and post-doctoral trainees are eligible to receive $500 travel awards for top-rated abstracts accepted for presentation at RSNA 2017. Trainees are also eligible to receive a $1,000 research prize.

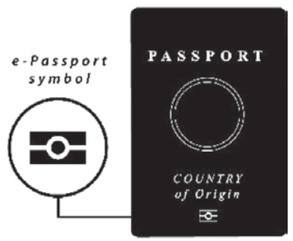
Full eligibility requirements for all awards are available with the 2017 Call for Abstracts.

For the most up-to-date information and rates concerning RSNA 2017, go to *RSNA.org/AnnualMeeting*.

International Visitors — *Act Now* For Visa

If you must apply for a temporary non-immigrant visa to attend the annual meeting, you are advised to apply as soon as travel to the U.S. is decided and no later than three to four months in advance of the travel date. RSNA offers a personalized official letter of invitation for RSNA 2017 attendees. Information is available at *RSNA.org/Visas*.

Travelers using the Visa Waiver Program (VWP) must now have an e-Passport, which includes an embedded electronic chip. Although the letter of invitation is not required for the visa application, it can assist as a supporting document. Present this letter of invitation from RSNA to the Consular Officer during the visa interview. International travelers should also be aware of a change in policy regarding travel under the VWP. For more information on the policy change, go to *cbp.gov/travel/international-visitors/visa-waiver-program*.



Important Dates for RSNA 2017

Wednesday, May 3
Member Registration and Housing Open
10:30 a.m. CT

Wednesday, June 7
Non-member Registration and Housing Open at
10:30 a.m. CT

November 26–December 1
103rd Scientific Assembly & Annual Meeting

RSNA.org

2016 Annual Report Available Online

From unveiling innovative new features at the RSNA 2016 Annual Meeting to fostering important informatics, quantitative imaging and patient-centered care initiatives — RSNA enjoyed a remarkable year in 2016. This year, for the first time, the entire 2016 RSNA Annual Report is available exclusively online at *RSNA.org/Annual-Report*.

Highlights of the RSNA 2016 Annual Report include:

102nd Scientific Assembly and Annual Meeting — More than 54,000 registrants participated in RSNA 2016, "Beyond Imaging." The Virtual Meeting continued to gain momentum, offering attendees and non-attendees 25 percent more content, extended access and CME credit for live sessions.

Connections Center
Another highlight of RSNA 2016 was the all-new Connections Center, an information hub helmed by RSNA staff members. The Discovery Theater featured presentations and musical performances throughout the week.

Membership Remains Strong
As of December 2016, RSNA membership stood at 54,000 members from 143 countries across the globe. More than 20 percent have been members for at least 25 years.

RSNA Diagnosis Live™ Widens Its Reach — The Diagnosis Live interactive response system was featured in 80 courses at RSNA 2016, while to date, 81 radiology residency programs worldwide are using the technology.

Inspire-Innovate-Invest: The Campaign for Funding Radiology's Future® — Launched at RSNA 2014 the Campaign is making steady progress toward its $17.5 million goal. In 2016 the Research & Education Foundation awarded more than 100 research and education projects with the support of Campaign donors.

RSNA Image Share Validation Program — RSNA and the Sequoia Project announced the first seven vendors to successfully complete the RSNA Image Share Validation Program that rigorously tests the compliance of vendors' systems to accurately and efficiently exchange medical images.

Federal Cancer Moonshot Initiative Includes RSNA QIBA Profiles — Two of RSNA's Quantitative Imaging Biomarkers Alliance (QIBA) Profiles were included in the federal Cancer Moonshot Initiative to encourage patients, doctors, researchers and industry innovators to fight cancer more effectively.

***RadiologyInfo.org* Expands Offerings** — The award-winning website added a new "Radiology and You" section designed to empower patients to be more active in their own healthcare.

RSNA Introduces Spotlight Course to Latin America — RSNA's inaugural Spotlight Course, Radiología de Urgencias: Curso Interactivo con Casos (Emergency Radiology: Interactive Course with Cases), held in Cancun, Mexico, in June, drew 200 attendees from 17 countries.

RSNA Introduces 3-D Printing Special Interest Group — RSNA launched a new 3-D Printing Special Interest Group devoted to promoting the highest quality 3-D printing for medical applications via education, research and collaboration.

COMING NEXT MONTH

Next month, we report on *Radiology* research on a novel strategy for diagnosing and treating auditory verbal hallucinations in schizophrenic patients.

INTERESTED IN DEVELOPING A PROTOCOL FOR YOUR IMAGING CLINICAL TRIAL?

Now accepting applications for the RSNA 2018 Clinical Trials Methodology Workshop!

Coronado Island Marriott Resort & Spa, Coronado, CA | January 6-12, 2018

▸ Learning objectives

Acquire the tools and expertise to develop a protocol and become a funded principal investigator for imaging clinical trials.

Topics include:

- Principles of clinical study design
- Statistical methods for imaging studies
- Practicalities of running a clinical trial
- Sponsorship and economics of imaging trials
- Regulatory processes

This live activity has been approved for *AMA PRA Category 1 Credit™*.

▸ Application deadline:

June 15, 2017 (acceptance based on competitive selection process)

▸ Prerequisites:

Applicant must be familiar with basic concepts and techniques of statistics and study design.

Candidate's department must commit to providing financial support for transportation and hotel (onsite stay required).

This 6-1/2 day workshop is intended for MD and PhD investigators who are faculty members in radiology, radiation oncology or nuclear medicine departments.




For more information contact Fiona Miller 1-630-590-7741 or *fmiller@rsna.org*

Learn more and apply at ***RSNA.org/CTMW***

RSNA Education™

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