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FEATURES

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(From left) **Mauro, Mahoney, Langlotz, Rao, Borgstede, Haffty, Jackson, Mahmood**

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Rao Elected RSNA President

Vijay M. Rao, MD, is RSNA president for 2018. A global authority on head and neck imaging, and also recognized for her health services research in radiology, Dr. Rao is the David C. Levin Professor and Chair of Radiology at Sidney Kimmel Medical College of Thomas Jefferson University and senior vice president and chair of Enterprise Radiology and Imaging at Jefferson Health in Philadelphia.

Dr. Rao is a graduate of the All India Institute of Medical Sciences, India's premier medical school. She has been on the faculty at Thomas Jefferson University Hospital since completing her radiology residency in 1978. She served as residency program director, associate chair and then vice chair for education and co-director of the Neuroradiology/ENT division.

In 2002, she was appointed chair of Jefferson's Department of Radiology, becoming the first female chair of a clinical department in Jefferson's history. In 2016, she was named senior vice president of Enterprise Radiology and Imaging at Jefferson Health. She is also a trustee of the Thomas Jefferson University Hospitals board.

Dr. Rao has published over 220 peer reviewed articles, a dozen book chapters and 275 abstracts in medical literature, and has edited a popular atlas textbook on MRI and CT of the head and neck. She has given 300 presentations at national and international radiology meetings, including invited talks at other academic institutions, and several named lectures. An RSNA member since 1981, Dr. Rao has led numerous courses and sessions at RSNA annual meetings and served on the Health Services Policy & Research subcommittee of the RSNA Scientific Program Committee.

Dr. Rao has served as president of the American Society of Head and Neck Radiology, the Association of Program Directors in Radiology (APDR) and the American Association for Women Radiologists (AAWR). She has served the RSNA Research & Education (R&E) Foundation in a number of roles, including as a member of the Board of Trustees from 2008 to 2011, and from 2016 to present. In 2011, she was named to the RSNA Board of Directors. In 2017, she served as president-elect of RSNA. She is also a member of the board of the Academy for Radiology & Biomedical Imaging Research and the Pennsylvania Radiologic Society. She has served on the editorial boards of multiple prestigious radiology journals.

In 2005, she was honored by the Philadelphia Business Journal as one of 25 Women of Distinction throughout the region. In 2006, she received the APDR Achievement Award for her outstanding contributions to radiology education nationally. In 2010, she received the Distinguished Radiologist Award from the American Association of Radiologists of Indian Origin. In 2014, she received the gold medal of the Association of University Radiologists. In 2014, she was also honored with the Marie Curie Award of the AAWR. She was recognized in 2017 by the Israel Radiological Society with honorary membership.

Rao

Borgstede Named RSNA Board Chairman

Borgstede

James P. Borgstede, MD, was named chairman of the RSNA Board of Directors for 2018. Dr. Borgstede is the vice chair of professional services, clinical operations and quality for the Department of Radiology at the University of Colorado.

An RSNA member since 1976, Dr. Borgstede has served as a member of the Quality Committee and joined the Board in 2013 as the liaison for international affairs. Dr. Borgstede has been active on many committees of the RSNA Research & Education (R&E) Foundation. He served on the R&E Foundation Board of Trustees from 2008 to 2014, the Corporate Giving Subcommittee from 2009 to 2012, the Finance Committee from 2012 to 2014, and was chair of the R&E Foundation from 2012 to 2014.

Dr. Borgstede co-presented a 2005 special focus session, "The Diffusion of Imaging and Peril of Inappropriate Utilization," and delivered an Opening Plenary Session at RSNA 2007.

He has served on the editorial board for the *Journal of the American College of Radiology*, where he currently serves as a reviewer. Since 2004, he has served on the editorial advisory board for *American Family Physician*.

Dr. Borgstede has held committee or leadership positions in organizations including the International Society of Radiology and the Society of Radiologists in Ultrasound (SRU). He served as the American College of Radiology (ACR) chairman of the Board of Chancellors from 2004 through 2006 and president from 2006 through 2007. As a member of ACR he traveled multiple times to Grace Children's Hospital Port-au-Prince where he worked as part of the Haiti Radiology Project.

He is past president of the International Society of Radiology.

Dr. Borgstede has received the gold medal and the William T. Thorwarth Award for Excellence in Economics and Health Policy from ACR. He received the University of Colorado Hospital President's Award for Leadership.

Dr. Borgstede received his medical degree in 1974 from the University of Illinois, Chicago, and completed his residency in 1978 at the University of Colorado Health Sciences Center in Denver. He has been professor of radiology at the University of Colorado in Denver since 2008.

Jackson Named RSNA President-Elect

Jackson

Valerie P. Jackson, MD, is president-elect for 2018. An expert in the field of breast imaging, Dr. Jackson is the executive director of the American Board of Radiology (ABR), a position she has held since 2014. She previously served on ABR's board of trustees from 2001 to 2010.

Dr. Jackson received her medical degree in 1978 from the Indiana University School of Medicine, and completed her residency at the Indiana University Medical Center in 1982. She is the Eugene C. Klatte Professor Emeritus and has held numerous academic appointments at Indiana University School of Medicine.

Dr. Jackson has published more than 100 peer-reviewed articles and 20 books and book chapters with an emphasis on breast imaging and radiologic education.

She has served on the editorial boards and as a manuscript reviewer of multiple journals and served as associate editor and consultant to the editor for *Radiology*.

An RSNA member since 1982, Dr. Jackson has served the Society in numerous roles, including as chair of the Refresher Course Committee and chair of the Breast Imaging Subcommittee of the Scientific Program Committee.

She served as a member of the *RSNA News* Editorial Board from 2005 to 2008 and was a member of the Public Information Advisors Network from 1997 to 2017. She served RSNA as first vice president from 2008 to 2009 and was a member of the RSNA Centennial Committee. She served on the Research and Education (R&E) Foundation Board of Trustees from 2009 to 2015 and joined the RSNA Board of Directors in 2012.

She has held committee or leadership positions in radiologic organizations including the American Roentgen Ray Society, Association of University Radiologists, Academy of Radiology Research, Society of Breast Imaging (SBI) and the American College of Radiology (ACR).

Dr. Jackson is a fellow of the ACR and has received the gold medals of the SBI and ACR. The Valerie P. Jackson Education Fellowship also recognizes her work with ACR. Dr. Jackson delivered the Annual Oration in Diagnostic Radiology at RSNA 2002.

Mahmood Named to RSNA Board

Mahmood

Umar Mahmood, MD, PhD, a leading researcher and sought-after mentor, joins the RSNA Board of Directors as the liaison for international affairs.

Dr. Mahmood is vice chair for precision imaging in the Department of Radiology at Massachusetts General Hospital (MGH) and professor of radiology at Harvard Medical School. An accomplished researcher, he has received more than $20 million in grant funding as principal investigator, primarily from the National Institutes of Health.

Dr. Mahmood has guided more than 60 research trainees, many of whom have become academic medical faculty, and a number who have received their own research funding as principal investigator under his direct mentorship.

He is a past chair of the RSNA Research & Education (R&E) Foundation Grant Program Committee and serves as a member of the R&E Foundation Board of Trustees. He has also served as vice chair of RSNA's Committee on Scientific Affairs and as an associate editor of *Radiology*, among other RSNA activities. Dr. Mahmood received an RSNA R&E Foundation Research Resident grant in 2000.

Dr. Mahmood is chair of the Board of Scientific Counselors of the Clinical Center of the National Institutes of Health, a Fellow of the American College of Radiology, a member of the Board of Directors of the Society of Nuclear Medicine and Molecular Imaging (SNMMI), and chair of the SNMMI Scientific Program Committee.
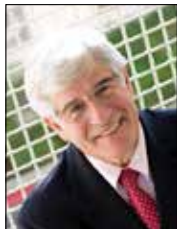
Dr. Mahmood did his postdoctoral work at Memorial Sloan Kettering Cancer Center focused on tumor energetics and membrane physiology, studied using 31P nuclear MR (NMR) spectroscopy.

In Memoriam

William G. Bradley Jr., MD, PhD, renowned for his work in clinical MRI, died Nov. 20 in La Jolla, CA. He was 69.

A distinguished professor emeritus and past chair of the Department of Radiology at the University of California San Diego (UCSD) School of Medicine, Dr. Bradley authored *Magnetic Resonance Imaging*, the first general text in the field of MRI, and published over 200 papers, 54 chapters and 20 additional textbooks.

Dr. Bradley was known for his exuberant personality as well as his solid body of work as a clinician, researcher and leader. As chair of the Department of Radiology at UCSD from 2002-2015, he is credited with building a formidable research program.

Highly recognized for his contributions particularly to MRI research and practice, Dr. Bradley was awarded the gold medals of the RSNA, the American College of Radiology (ACR), the International Society of Magnetic Resonance in Medicine (ISMRM), the American Roentgen Ray Society (ARRS) and the Association of University Radiologists (AUR). He was also awarded honorary membership by ISMRM.

In addition to his career contributions to the science of MRI, Dr. Bradley was a fervent leader in organized radiology. He served as president of ISMRM and as a member and vice president of the ACR Board of Chancellors. Over the years he also volunteered his time and expertise to the boards of the ARRS, AUR, International Society for Strategic Studies in Radiology and Academy of Radiology Leadership and Management.

Dr. Bradley was trustee of the RSNA Research & Education (R&E) Foundation and chairman of RSNA's R&E Fund Development Committee. Most recently he co-chaired the R&E Foundation's Inspire-Innovate-Invest Campaign, working tirelessly in support of a five-year fundraising effort that will close at the end of 2017.

A native of California, Dr. Bradley earned his bachelor's degree from the California Institute of Technology and his master's and doctorate degrees from Princeton, all in chemical engineering. He completed his medical degree and training at the University of California, San Francisco (UCSF). While at UCSF his work focused on "translating" the physics of MRI for other radiologists. His research later focused on MRI of flow phenomena, hemorrhage, stroke, multiple sclerosis and MRI of hydrocephalus.

A memorial service will take place on Sunday, January 21, at 2 p.m. at the Robert Paine Scripps Forum at UCSD.

Donations in memory and celebration of William G. Bradley Jr., MD, PhD, can be sent to the RSNA R&E Foundation, 820 Jorie Boulevard, Oak Brook, IL 60523, online at *RSNA.org/Donate* or by calling 1-877-776-2636.

Seymour "Sey" Levitt, MD, DSc

Former RSNA president and an international leader in cancer treatment — particularly in radiation oncology for breast and prostate cancer — Seymour "Sey" Levitt, MD, DSc, died on Sept. 30, in Minnesota. He was 89.

Dr. Levitt completed his medical degree at the University of Colorado, Denver, in 1954. Following military service as a captain in the U.S. Army from 1955 to 1957, he completed his residencies in internal medicine and radiology at the University of California, San Francisco. He began his career at the University of Michigan, Ann Arbor, and the University of Rochester Medical Center, Rochester, NY, until he was appointed chief of the division of radiation therapy at the University of Oklahoma Medical Center, Oklahoma City. In 1970, Dr. Levitt was named professor of radiation oncology at the University of Minnesota, Minneapolis, and head and clinical chief of the Department of Therapeutic Radiology at the University of Minnesota Hospital (now the University of Minnesota Health). He retired from both positions in 1999. He served as foreign adjunct professor at the Karolinska Institutet, Stockholm, Sweden, from 2002 to 2014.

He served as president of the American Society for Therapeutic Radiation Oncologists (ASTRO) and the American Radium Society (ARS). His contributions to the specialty were recognized with gold medals from both organizations.

Dr. Levitt served as RSNA president in 1999 and as chair of the Research & Education (R&E) Foundation Board of Trustees in 2002. He was a manuscript reviewer for *RadioGraphics* and the author of more than 250 articles, books and chapters. He gave the Annual Oration in Radiation Oncology during the 1985 RSNA annual meeting and was honored with the RSNA Gold Medal in 2004.

Numbers in the News

77
Percentage of Americans who say they own a smartphone. Read about the importance of social media in radiology on Page 8.

230
Number of procedure descriptions offered on *RadiologyInfo.org*. Read more about becoming a reviewer for the website on Page 22.

3
Number of MarCom awards earned by RSNA in 2017. Read more Page 23.

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Three Things on My Mind

BY VIJAY M. RAO, MD

As I start my term as RSNA president, there is much to be excited about in our profession. Three things in particular are on my mind.

First is health services research. This has been a personal interest of mine for years, and I believe it has now become a major frontier in radiology research. It is critically important that policymakers (and radiologists) become aware of trends in utilization and costs of imaging, patterns of use, quality of imaging, how imaging influences patient care and how our quality improvement efforts affect outcomes. Radiologists should explore ways to add value and help reduce waste in healthcare, thereby reducing costs. These topics need to be the focus of even more research in upcoming years.

Also on my mind is artificial intelligence (AI). There are many diverse opinions about AI. Some have predicted it will replace radiologists. I don't agree. On the contrary, I foresee exciting potential applications of AI that will make us more effective, quantitative and precise, and allow us to make a more meaningful contribution to personalized medicine. AI will become a welcome adjunct to radiology practice, potentially easing the global manpower shortage and burnout among radiologists, and becoming a crucial aspect of research and education at RSNA for years to come. Appropo to this, next year RSNA will launch a new online journal dedicated to research in machine learning and AI.

The third thing on my mind is patient-centered radiology. A lot has been written about patient-centered radiology, which requires us to be directly involved in the patients' care, holistically from scheduling through reporting. Some ways to do this include spending more time talking with patients, making imaging facilities friendlier, tailoring each study to their specific clinical circumstances beforehand and taking over the scheduling and management of their imaging care. Interventional radiologists and breast imagers are already doing this to some extent. It also means collaborating with our physician colleagues who are providing direct clinical care of patients. We need to better educate them about appropriateness and the capabilities of imaging and to be more readily available to them as consultants. This is especially true as primary care is increasingly being provided by physician assistants and nurse practitioners, who are not as familiar with imaging guidelines as experienced clinicians. Maybe we'll eventually see subspecialty radiologists embedded directly within the corresponding clinical departments and talking with the patients along with those clinical specialists. Or maybe we'll see radiologists making rounds on hospital patients along with the clinical services. Since AI will provide tools to make us more efficient, it could free up time for radiologists to become more visible and patient-centered.

I applaud RSNA for staying true to its mission of promoting excellence in patient care and healthcare delivery through education, research and technologic innovation. RSNA's digital roadmap will provide an innovative platform to promote education worldwide. RSNA is blessed with outstanding leadership, dedicated staff and committed volunteers who selflessly make invaluable contributions. I will do everything I can to ensure that RSNA continues to enlighten the radiology community and the rest of the medical world about these and other things throughout the year.

RSNA President Vijay M. Rao, MD, is the David C. Levin Professor and Chair of Radiology at Sidney Kimmel Medical College of Thomas Jefferson University and senior vice president and chair of Enterprise Radiology and Imaging at Jefferson Health in Philadelphia.

Research Linking Blood-Brain Barrier Leakage to Alzheimer's Captures Margulis Award

BY BETH BURMAHL

In the battle against Alzheimer's disease (AD), preclinical detection represents the holy grail of AD research.

Backes

By the time patients exhibit symptoms of AD — the most common form of dementia — most have already experienced substantial neuro-degeneration, diminishing the hope for treatment. Detecting biomarkers of AD before the brain reaches a point where it can no longer overcome the damage is a critical goal of researchers.

To that end, Walter H. Backes, PhD, a professor of Medical Physics in the Department of Radiology at the Maastricht University Medical Center in Maastricht, the Netherlands, and colleagues have identified a connection between leakage of the blood-brain barrier (BBB) and AD pathology, shedding new light on the vascular contribution of dementia.

"Our results suggest that BBB impairment may be a contributing factor in the early pathophysiology of AD and might be part of a cascade of events eventually leading to cognitive decline and dementia," Dr. Backes said.

At RSNA 2017, Dr. Backes was presented with the Alexander R. Margulis Award for Scientific Excellence, which recognizes the top study published in *Radiology* in a given year.

In the study, Dr. Backes and colleagues used contrast-enhanced MRI to compare 16 early AD patients with 17 healthy age-matched controls. Researchers measured BBB leakage rates and generated a histogram to help determine the amount of leaking brain tissue.

The BBB is a collection of cells and subcellular structures in the cerebrovascular wall that separates the circulating blood from the brain and is essential to keeping brain tissue healthy. It also regulates the delivery of important nutrients and blocks neurotoxins and removes surplus substances from the brain.

The BBB leakage rate was significantly higher in AD patients compared with controls and the leakage was distributed throughout the cerebrum. AD patients had a significantly stronger leakage rate in the gray matter, including the cortex, the brain's outer layer. The researchers also determined that measurements derived from the histogram showed very subtle BBB impairment in the brain's white matter.

"Our research shows that the BBB breakdown in Alzheimer's disease can now be investigated with medical imaging, in a non-invasive way, without relying on postmortem tissue or spinal tap samples," Dr. Backes said.

The key advantage of detecting BBB leakage with contrast MRI is that it can detect early microvascular changes in AD even in cases where no directly visible cerebrovascular abnormalities can be observed.

The connection between BBB impairment and AD pathology was strengthened by the fact that the addition of diabetes and other non-cerebral vascular diseases to the analysis model did not change the results.

And because the clearance of amyloid-beta protein present in AD patients relies on a well-functioning BBB, leakage of the BBB may help to provide a biomarker for early diagnosis, or at least a marker indicating vulnerability for the development of dementia, Dr. Backes said.

Margulis Award Incentive for Continued Research

The study by Dr. Backes and colleagues breaks new ground in critical areas of Alzheimer's research, according to former *Radiology* Editor Herbert Y. Kressel, MD.

"We used to think that vascular dementia and Alzheimer's disease were

> **"***Our research shows that the BBB breakdown in Alzheimer's disease can now be investigated with medical imaging, in a non-invasive way.***"**

<div align="right">WALTER H. BACKES, PHD</div>

two totally distinct entities — one characterized by the accumulation of abnormal proteins and the other by vasculopathy," Dr. Kressel said. "The study is important in that the method they developed to assess BBB leakage, previously felt to be a hallmark of vascular dementia, can be seen in patients with mild cognitive impairment due to Alzheimer's, as well as those with advanced AD, but not in normal individuals."

Dr. Backes, who has been at Maastricht University Medical Center for almost 19 years, primarily focuses his research on novel MRI techniques of brain function, vascular pathology and the vessel-brain interaction. The honor of receiving the Margulis Award is further incentive for continuing his research in these areas, he said.

"The award is a strong stimulus for the particular topic we are working on and also for the further development and evaluation of such a new application of MRI to perform brain leakage measurements," Dr. Backes said.

Along with his co-authors, Dr. Backes credits the collaboration between the Maastricht and Leiden University Medical Center in the Netherlands with aiding the integration of advanced MRI knowledge on brain microvascular imaging techniques. Alzheimer's centers that aided with the study were also pivotal to the research, he said.

Dr. Backes and colleagues are building on the research with new trials investigating a larger population of memory clinic patients and extending the scope to full brain coverage vs. the center section of the brain.

"Recently, we have also shown that the technique is very well reproducible, which is important to study progression and clinical treatment evaluation," he added.
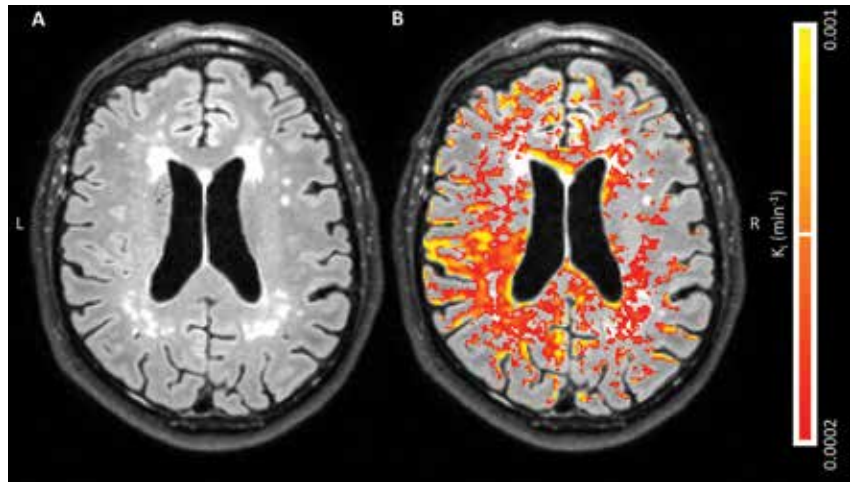
A, Axial fluid-attenuated inversion recovery image in a 68-year-old man with, B, corresponding blood-brain barrier leakage rate (Ki) maps superimposed. Leakage rate values appear diffusely distributed on both images, with some periventricular hot spots. Leakage manifests in normal-appearing white matter, white matter hyperintensities and gray matter. Voxels with low signal-to-noise ratio in MRI signal intensity were removed, and leakage rate map was masked to cerebrum.
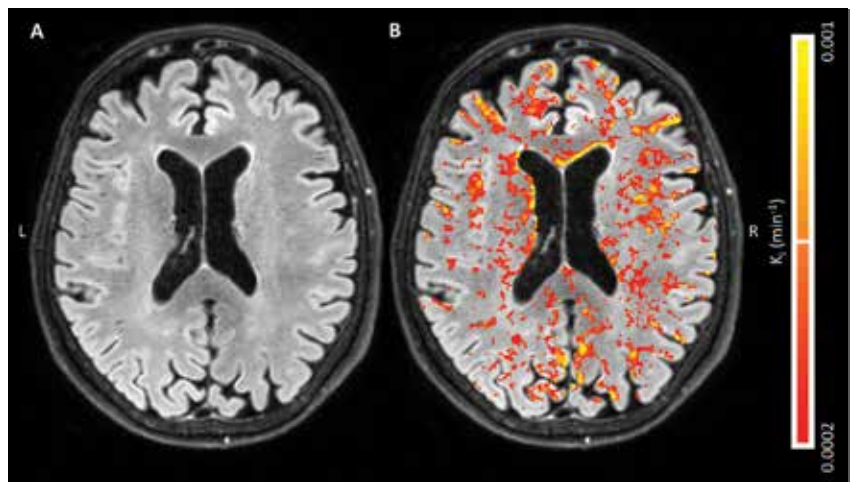
A, Axial fluid-attenuated inversion recovery image in an 80-year-old woman healthy control subject with, B, corresponding blood-brain barrier leakage rate (Ki) maps superimposed. Voxels with low signal-to-noise ratio in MRI signal intensity were removed, and leakage rate map was masked to cerebrum.

A Digital Footprint Helps Radiologists Reach Patients

BY LYNN ANTONOPOULOS

Radiologists can become an active force in promoting public understanding of their role in healthcare and in increasing the power of their patient advocacy through both social and traditional media and digital technology.

Wendy Sue Swanson, MD, MBE, Chief of Digital Innovation and author of the Seattle Mama Doc Blog for Seattle Children's Hospital, urged radiologists to "be a willow, not an oak" in the digital landscape, during an RSNA 2017 session.

The session highlighted the value of leveraging digital communication tools to allow for deeper and more far reaching networks. "It is the opportunity of our time to be more connected to ideas and to each other than ever before," said Dr. Swanson, adding, "We should use every channel available to tell the public what we know and what we are accomplishing."

Today's patients have access to an over-abundance of information related to health-care, and radiologists and other physicians must compete to provide accurate and relevant information. Referring to data from a recent FACTANK poll conducted through Pew Research Center, Dr. Swanson noted that 77 percent of Americans own a smart-phone. Of those polled, one-third admitted to self-diagnosing a medical condition by performing an online search. "Forty percent of the online diagnoses were actually successful," she said.

Influential Advocates

Radiologists can learn from celebrities like talk show hosts, Jenny McCarthy and Jimmy Kimmel, who have, in effect, joined the healthcare arena by using their strong voices, public exposure and digital reach to talk about medical issues personal to them. In 2004, McCarthy created distrust about thimerosol in the measles, mumps, rubella (MMR) vaccine when she claimed it was responsible for her son's autism.

This year, Kimmel told his viewers about his newborn son's heart defect and used the emotionally charged situation to make a statement about politics and the Affordable

Care Act (ACA). Dr. Swanson cited these examples to stress their impact and said, "Social media is no longer irrelevant. Translate what you think patients and families should know about, and let them know what care you can provide."

Many Methods, One Goal

Dr. Swanson referred to herself as an early adopter of Facebook, and today she reaches people with her online blog, Facebook and Instagram posts, Tweets and weekly podcasts. Moving beyond a digital footprint, she said physicians should focus on creating a digital fingerprint.

To get started, she said radiologists should first identify a problem they would like to solve and then find a good channel to solve it. "Use social media to pose an important question," Dr. Swanson said. "Create a rich profile that defines who you are not only online but in real life. Use pictures and provide links to important journal articles. Socialize what you do to make it more accessible."

For hesitant adopters, regardless of comfort level, a well-crafted LinkedIn account is a must, she said.

Accessibility and transparency are increasingly important as patients demand more from healthcare providers, but Dr. Swanson also recommended following "Elevator Rules" when sharing information online. "Remember everybody is watching, be nice, never be anonymous and never discuss patient-specific information."

Swanson

> "We should use every channel available to tell the public what we know and what we are accomplishing."
>
> WENDY SUE SWANSON
> MD, MBE

WEB EXTRAS

📹 View a video of Wendy Sue Swanson, MD, MBE, discussing how establishing a social media presence can benefit radiology professionals at *RSNA.org/News.*

Daily Bulletin coverage of RSNA 2017 is available at *RSNA.org/ Bulletin.*

Why it's Time for @Radiology to Like #Social Media

BY NICK KLENSKE

Whether or not they think about it, many physicians — including radiologists — are involved in marketing in some form.

"Doctors are always publishing academic papers and presenting at conferences, both of which are a type of marketing," said Alex Towbin, MD, a radiologist and medical imaging associate chief, Clinical Operations and Information, at Cincinnati Children's Memorial Hospital. "Social media should be viewed as an extension of these traditional marketing methods."

During an RSNA 2017 session on growing your business with social media, Dr. Towbin and Saad Ranginwala, MD, also a radiologist at Cincinnati Children's Hospital, shared how their department uses social media to drive engagement with patients, families and the professional community.

"Radiologists often struggle with communicating, especially with patients and the general medical community," Dr. Towbin said. "Thanks to its massive user base, social media makes communicating easier."

With over 80 percent of healthcare consumers perceiving a hospital with an active online presence as being more cutting edge, radiologists cannot afford to ignore this influential marketing tool.

"Social media lets you control your image," explained Dr. Ranginwala. "If you don't control it, rest assured somebody else will."

For example, when a patient Googles a doctor's name, the search results usually focus on rating services. However, if the doctor is using social media, the search results will feature their hospital and department, LinkedIn profile, image and publications.

Where to Start?

Facebook, Twitter, Instagram, Figure 1, LinkedIn, WordPress, YouTube, Pinterest, hashtags, shares and likes ... with so many options, where does a radiologist begin?

"Before you even consider posting, you first need to have a conversation with your hospital's legal and marketing teams," Dr. Towbin said. "Every social media strategy must adhere to hospital policies and keep in mind such things as branding guidelines, patient consent and copyright law."

Even with approval from legal and marketing, it is still too early to start posting, Dr. Towbin said.

"All successful social media campaigns begin with planning — and lots of it," he said. "This includes deciding who your audiences are, what type of content you want to share, how often you will be posting and who is in charge of creating the content."

Because each social media platform attracts a different audience, content should be tailored to the individual platform. For example, Cincinnati Children's uses Facebook to communicate with patients and Twitter with the radiologic community.

Of all the available platforms, Dr. Ranginwala noted that Instagram is particularly well-suited for radiology.

"We are a sector based on images and Instagram is all about sharing images," he said. "It's a great tool for teaching and, as a result, is by far our most popular channel."

At Cincinnati Children's, the radiology department posts a Case of the Day based on a particular theme, such as #MSKMonday and #NeuroWednesday.

Seeking the Big Payoff

Needless to say, all of this takes time. Dr. Ranginwala said his department uses an editorial team for planning and requires everyone to provide content for the blog. Running the Instagram account alone involves one hour of scheduling and one hour of content creation every week.

But if you put in the time and the effort, the payoff can be big. "Our department has seen a major impact from using social media," Dr. Towbin said. "With over 30 million impressions since 2014, we have developed a reputation as a respected source for medical education – a reputation that has led to numerous new opportunities."

Towbin

Ranginwala

3-D MRI Fetal Images Superior in Quality to 3-D US

BY JENNIFER ALLYN

When there is a question of findings during 3-D ultrasound (US) in the third trimester of pregnancy, many radiologists are turning to 3-D MRI for anatomy exploration of the fetus and to support diagnostic decisions.

While not routinely used during prenatal care, 3-D MRI does offer excellent tissue contrast as a second evaluation in difficult cases or to reinforce an US diagnosis, according to Heron Werner, MD, PhD, at Clínica de Diagnóstico por Imagem in Rio de Janeiro.

US scanning over the past several decades has opened a new window into the study of the fetus, because it is patient-friendly, cost-effective and safe. MRI for fetal imaging has been in use since the 1980s and offers high-resolution images with excellent tissue contrast. It provides additional information about fetal abnormalities and conditions in situations where US cannot provide high-quality images, such as advanced gestational age, reduction of the amniotic fluid and maternal obesity.

"Ultrasound examination is the primary method of fetal assessment, while MRI is complementary in that it is a diagnostic technique that can provide sharp images of the human body," Dr. Werner said. "The large field of view from MRI offers the 3-D reconstruction of the whole fetal body, allowing radiologists to identify some phenotypes of different syndromes." These syndromes can include craniosynostosis, cleft lip, limb reduction, Beckwith-Wiedemann syndrome, conjoined twins and club feet.

From September 2009 to December 2016, 52 fetuses were selected from cases evaluated for external malformations. Morphological abnormalities were first imaged by 3-D US, with 3-D MRI reinforcing the preliminary findings. 3-D US scans were performed transabdominally using high-resolution US probes with harmonic images, while the MRI was a 1.5-T scanner with body coil.

The 3-D images were post-processed. Maximum intensity projection images were reconstructed and the gestational sac was manually segmented. The images were then volume rendered and the amniotic fluid was removed by threshold techniques.

Despite recent improvements in 3-D US, the results obtained from 3-D MRI were superior in the third trimester, even with fetal movements being one of the principal difficulties in capturing the images.

"For rare genetic conditions, complex malformations or even in the case of twins

Werner

3-D MRI showing a 27-week fetus with brachycephaly, low ear implantation, syndromic profile and vestigial tail.

or triplets, 3-D MRI helps physicians understand fetal anatomical characteristics," Dr. Werner said. "3-D MRI also assists during multidisciplinary discussions among physicians who may initially differ on diagnosis or the urgency of the condition."

Ultimately, Dr. Werner foresees that 3-D MRI will be most beneficial to parents in helping them visualize their unborn baby

Daily Bulletin **coverage of RSNA 2017 is available at** *RSNA.org/ Bulletin.*

and the challenges that the baby may face after it's born. "It is one thing to tell a parent that their baby has a tumor or serious abnormality, but it is another thing to show them," Dr. Werner summarized. "3-D MRI can help both physician and parents understand the prognosis of fetal abnormalities and help facilitate treatment decisions."

Real-time Virtual Sonography Shows Promise for Assessing Fetal Brain Pathologies

BY ELIZABETH GARDNER

Real-time virtual sonography (RVS), also called fusion imaging, combines ultrasound (US) and MR images and could someday offer clinicians a clearer picture of fetal brain anomalies than either technique used alone, according to researchers.

RVS, a new technique that uses magnetic navigation and computer software for the synchronized display of real-time US and multiplanar reconstruction MRI images, is already used for US-MR guided biopsies, but RVS fusion imaging is feasible even in the field of prenatal imaging, said co-investigator Silvia Bernardo, MD. The principal investigator on the study was Lucia Manganaro, MD.

Study author Amanda Antonelli, MD, from Sapienza Università di Roma, Italy, presented findings at RSNA 2017 from a preliminary study of 35 patients who had undergone fetal MRI after US examinations showed possible cerebral pathology. RVS combines the two sets of images by synchronizing them during an US examination, using a small magnetic field generator and a magnetic sensor attached to the US probe. In 25 out of the 35 cases, RVS yielded better information than either MRI or US alone.

Although both US and MRI studies are often used in such evaluations, they are used as single modalities and most often are performed by different specialists.

"RVS allows better identification of the different fetal pathologies and could improve the performance of ultrasound examinations," Dr. Antonelli said.

The principal application of RVS in this study was to examine midline, cerebral gyration and vascular malformations.

Patients underwent fetal MRI on a 1.5-T magnet using a multi-channel phased array coil according to a standard fetal MR protocol with a duration of 20 to 30 minutes. Subsequently, they had an US examination in a room equipped with a small magnetic field generator that powered a magnetic sensor on the US probe. The sensor allowed the synchronization of the MR images and the US images in real time.

The MRI image dataset was loaded into the machine and images were displayed together with the US image on the same dual display monitor.

In all 35 cases, RVS was technically possible, with a 100 percent match between MR and US images. Data registration, matching and RVS could be completed within half an hour of the end of the exam, and sometimes in as little as 15 minutes.

RVS helped clarify the diagnosis in 25 percent of the cases. In 25 out of 35 cases of encephalic pathology, RVS allowed a more thorough diagnosis. In the remaining cases, MRI alone was superior to both US and RVS.

MRI was superior to US alone in four cases. In one case of an encephalic lesion seen on US, MRI was able to detect the extra-axial nature of the lesion and to identify the presence of blood components. In a study of the encephalus in a fetus affected by cardiac rhabdomyomas, MRI showed multiple cortical brain lesions, not detectable on US even with the use of RVS.

In a cortical gray-white matter blurring case, MRI depicted the poor neuronal migration toward the cortical layers while US was able to identify the ventriculomegaly but not the cortical anomalies. In the last case, MRI was able to detect the split spinal cord in the vertebral canal in a case of diastematomyelia, while US pointed out interpeduncular distance augmentation alone.

This research was awarded an RSNA Student Travel Stipend Award.

Antonelli
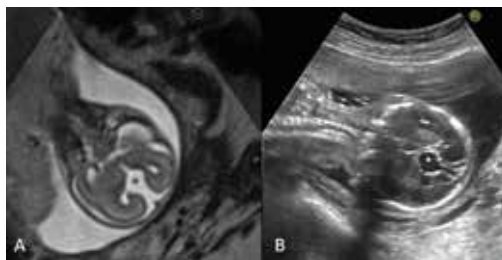
Fetus at 21 GW. Coronal T2 WI of the fetal head (A) with the corresponding US plane (B) synchronized on the biparietal diameter. Fetal movement at the moment of synchronization but the coronal plane for the fusion image is preserved. Diagnosis of agenesis of the corpus callosum with the typical "moose head sign" and the visualization of a pseudocystic image on the midline.
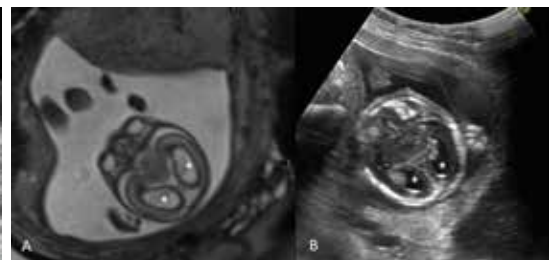
Fetus at 18 SG + 3 gg with a diagnosis hydrocephalus. Axial T2 WI of the fetal head (A) with the corresponding US plane (B) synchronized on the occipital plane. Good synchronization with optimal anatomical visualization of fetal lateral ventricules.

RSNA 2017

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November 26 to December 1

The first Diagnosis Live™ Meeting Madness session featured teams from four residency programs in a head-to-head competition. The University of Cincinnati team took home the trophy.

The Fast 5 Session featuring five topics by five speakers for five minutes each made its debut at RSNA 2017.

Kicking off RSNA 2017, RSNA President Richard L. Ehman, MD, captivated the capacity crowd with his President's Address, "Is it Time to Reinvent Radiology?" on Sunday in the Arie Crown Theater. Dr. Ehman discussed the role of radiology in leading and embracing the extraordinary period of change underway in the specialty, a theme that was dominant throughout the meeting.

Early morning runners turned out for the annual 5K Fun Run along Lake Michigan to benefit the RSNA Research and Education (R&E) Foundation.

Artists painted two vibrant murals onsite during the meeting.

A popular new feature in the Technical Exhibits, the Machine Learning Showcase was a destination point for attendees eager to learn as much as possible about this fast-moving technology.

The 3-D Printing Showcase was a huge draw among attendees who accessed theater poster presentations, a demo area and a virtual reality demonstration of this remarkable technology.

Alternatives to Gadolinium-Based Contrast Agents Show Potential

Schellenberger

Wild

BY MIKE BASSETT

Gadolinium-based contrast agents have been used for diagnosis and treatment guidance on more than 100 million patients worldwide over the past 25 years.

And for good reason, said Eyk Schellenberger, MD, professor of imaging and head of the Molecular Imaging Group, Institute of Radiology, Charitė — Univerisitätsmedizin Berlin, Germany. Gadolinium-based contrast agents possess a unique electronic structure that make them strongly paramagnetic, and therefore extraordinarily useful as an MR contrast agent.

But over the years concerns have arisen about the safety of gadolinium-based contrast agents. And recently, several preliminary studies showed the presence of residual gadolinium concentrations in brains of patients who had no history of kidney disease.

In July 2017, the European Medicines Agency (EMA) confirmed its previous conclusion that there is convincing evidence of gadolinium deposition in brain tissues following the use of gadolinium contrast agents. The agency recommended restrictions on the use of linear gadolinium agents.

In September 2017, the FDA Medical Imaging Drugs Advisory Committee (MIDAC) recommended adding a warning to labels about gadolinium retention for gadolinium-based contrast agents used during MRI.

Shortly after the FDA's recommendation, RSNA issued a statement explaining that patients should not be unnecessarily deprived of crucial, sometimes life-saving medical data from gadolinium contrast-enhanced MRI.

"At the same time, the potential risk associated with residual gadolinium concentrations in the brain should be taken into consideration," RSNA advised in a position statement. "This risk must be weighed against the clinical benefit of the diagnostic information or treatment results that MRI or [magnetic resonance angiography] may provide for each patient."

"Whether these accumulations are dangerous or not is not clear yet," Dr. Schellenberger said. "Consequently more research is necessary and potentially safer alternatives are desirable."

Iron-Based Contrast Shows Potential

Researchers such as Dr. Schellenberger are investigating the possibility of alternatives to gadolinium-based contrast agents.

In a recent *Radiology* study published online, Dr. Schellenberger and colleagues studied iron-based contrast agents as a possible alternative. While gadolinium is a trace element that does not occur in the body in relevant amounts, ferric iron (Fe^{3+}) — which also has a relatively high paramagnetism — is a substance known — and needed — by the body, Dr. Schellenberger explained.

"The body has a dedicated system for safe uptake, transport and storage," he said. "Moreover, the stabilities of chelates of iron are generally several orders of magnitude higher than those

> " . . . the stabilities of chelates of iron are generally several orders of magnitude higher than those of gadolinium."
>
> EYK SCHELLENBERGER, MD
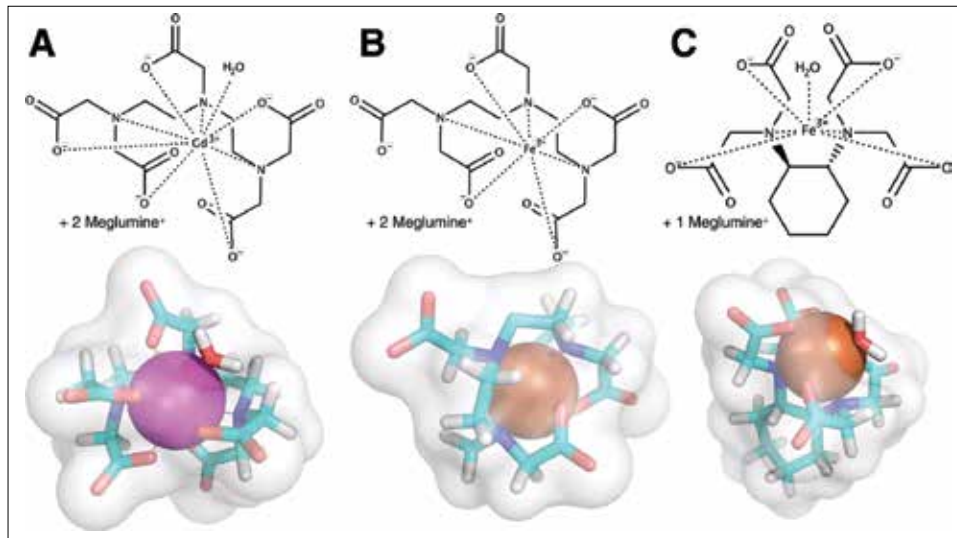
Illustrations in the study, "Low-Molecular-Weight Iron Chelates May Be an Alternative to Gadolinium-based Contrast Agents for T1-weighted Contrast-enhanced MR Imaging," show molecular structures and three-dimensional models of, A, the investigated Gd-DTPA, B, Fe-DTPA, and, C, Fe-tCDTA. Structures show nine coordination sides of Gd^{3+} and seven of Fe^{3+}. A, Gd-DTPA (11) and, C, Fe-tCDTA (12) leave one side available for water coordination, which explains relatively high relaxivity. B, Fe-DTPA (13) has lower relaxivity; all seven coordination sides of Fe^{3+} are occupied. Magenta = gadolinium, brown = iron, cyan = carbon, red and orange = oxygen, blue = nitrogen, gray = hydrogen.

of gadolinium. Thus, the amounts of iron potentially released from low molecular weight iron-based contrast agents (IBCA) should be similar or even lower than those released from gadolinium-based contrast agents."

The researchers synthesized low-molecular-weight iron chelates of trans-cyclohexane diamine tetraacetic acid and pentetic acid and compared their T1 contrast effects to the commercial gadolinium-based contrast agent, Magnevist, in a breast cancer mouse model.

"The study showed that two different iron chelates, when dosed slightly higher — two- and five-fold — deliver the same results in typical applications such as DCE-MRI or MR angiography as Magnevist can," Dr. Schellenberger said.

Xenon Gas Shows Promise

Another recent development for imaging tissue perfusion with MRI without the use of gadolinium, is inhaled xenon gas, which was the focus of another study recently published in *Radiology* online.

In the study, the team of Jim M. Wild, PhD, professor of MR physics, POLARIS group, Academic Radiology, University of Sheffield, Sheffield, U.K., performed in vivo imaging with inhaled hyperpolarized xenon 129 (^{129}Xe) MRI, an injection-free means of imaging the perfusion of cerebral tissue in healthy participants.

"Xenon is a noble gas that can be safely inhaled," Dr. Wild said. "And we can boost the MRI signal from ^{129}Xe using a laser hyperpolarization process, which means that with small quantities of inhaled gas we get a large MR signal."

The Sheffield team also demonstrated that they could image the uptake of inhaled xenon gas from the air spaces in the lungs, in to the bloodstream and then into the brain tissue itself across the intact blood-brain barrier.

"Existing MRI contrast agents don't do this — they stay in the intravascular space," Dr. Wild said. "So, we have a new way of looking at brain tissue perfusion and blood-brain barrier gas exchange with inhaled xenon brain MRI."

This method has obvious clinical implications, since it involves a means of imaging brain perfusion without having to inject any contrast agent. The contrast comes from an inert gas inhaled in a modest dose of approximately a liter, which is cleared from the body by breathing out.

"More interesting, from a scientific perspective and to understand brain disease, is the ability to look at blood-brain permeability and tissue-blood physiology in the brain," he added. "Short of PET tracers like oxygen-15 and xenon-ehnahced brain CT, I don't think there is an MRI contrast agent out there that can do that."

As for image quality, Dr. Wild and colleagues were able to capture images that were on a par with PET scans, but not of a gadolinium-enhanced brain perfusion MR image.

"That is not to say we can't get there," he said. ⬛

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Researcher Investigates New Modality for Treating Hepatocellular Carcinoma

2017 RSNA Research Scholar Grant recipient **Rahul Sheth, MD,** will investigate a novel molecularly targeted photothermal ablation (MTPA) modality for the treatment of hepatocellular carcinoma (HCC).

Building on the research he conducted with his 2013 Cook Medical Cesare Gianturco/RSNA Research Resident Grant, Dr. Sheth, along with his scientific advisor Erik Cressman, MD, PhD, hopes to catalyze an adaptive immune response to HCC.

Dr. Sheth also anticipates that MTPA, due to its tumor specificity, will avoid damage to adjacent critical structures such as bile ducts. "If successful, MTPA could be combined synergistically with immunotherapies to provide a potent systemic treatment for patients with HCC," said Dr. Sheth, assistant professor at the University of Texas MD Anderson Cancer Center, in Houston.

Rahul Sheth, MD

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Journal Highlights

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

Evidence Supporting LI-RADS Major Features for the CT and MR Imaging–based Diagnosis of Hepatocellular Carcinoma: A Systematic Review

Unlike other cancers, the definitive diagnosis and staging of hepatocellular carcinoma (HCC) is frequently based on imaging without mandatory histopathologic confirmation. This literature review of the Liver Imaging Reporting and Data System (LI-RADS) considered the major imaging criteria and evaluated the strength of the recommendations.

In an article published online in *Radiology* (*RSNA.org/Radiology*), An Tang, MD, MSc, University of Montréal, Montréal, QC, Canada, and colleagues evaluated the major LI-RADS criteria including arterial phase hyperenhancement (APHE), observation diameter, washout appearance, capsule appearance and threshold growth. The authors summarized and assessed the quality of evidence supporting each LI-RADS major feature for the diagnosis of HCC, as well as of the LI-RADS imaging features suggesting malignancy other than HCC.

Threshold growth should be a major criteria for diagnosis of HCC, even
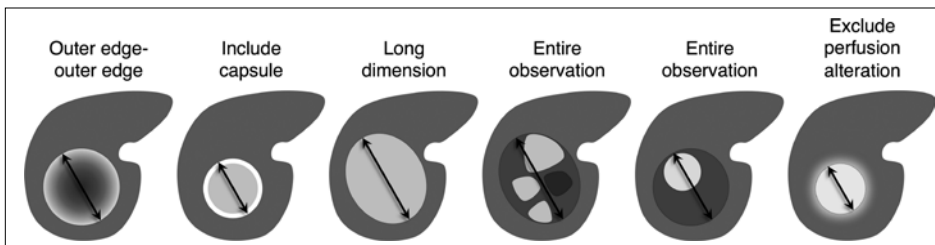
Schematic of observation diameter indicating measurement conventions recommended in LI-RADS (arrows). LI-RADS schematic reproduced with permission from the American College of Radiology. (*Radiology* 2018;286(1):42–61) © RSNA 2018. All rights reserved. Printed with permission.

though indirect evidence and biologic plausibility indicate that growth is a feature of malignancy and helps to differentiate HCC from benign entities, according to the authors.

For observational thresholds, the authors noted that it should be measured on the sequence or phase in which the margins are most sharply demarcated and in which there is no anatomic distortion and that it should not be measured in the arterial phase if the margins are clearly visualized on another phase or sequence.

"While the selection of five major features was based on expert opinion, the literature review was performed to ensure that imaging-based diagnostic criteria were able to achieve near-100 percent specificity for the noninvasive diagnosis of HCC," the authors write.


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Journal Highlights

MR Imaging of Muscle Trauma: Anatomy, Biomechanics, Pathophysiology, and Imaging Appearance

MRI is widely used for assessment of muscle injuries, including acute, subacute and chronic traumatic lesions, and can help illustrate how the injury relates to biomechanics, pathophysiology and the anatomy of the muscle. New grading systems for muscle injury, developed particularly for injured athletes, incorporate MRI assessment regarding injury and potential rehabilitation.

In an article in the January issue of *RadioGraphics* (*RSNA.org/RadioGraphics*), Dyan V. Flores, MD, Philippine Orthopedic Center, Manila, and colleagues review the MRI features of muscle injuries and explain how the new comprehensive grading systems differ from the previous versions, especially for injured athletes.

New guidelines include the Munich Muscle Injury Classification, the Italian Society of Muscles, Ligaments and
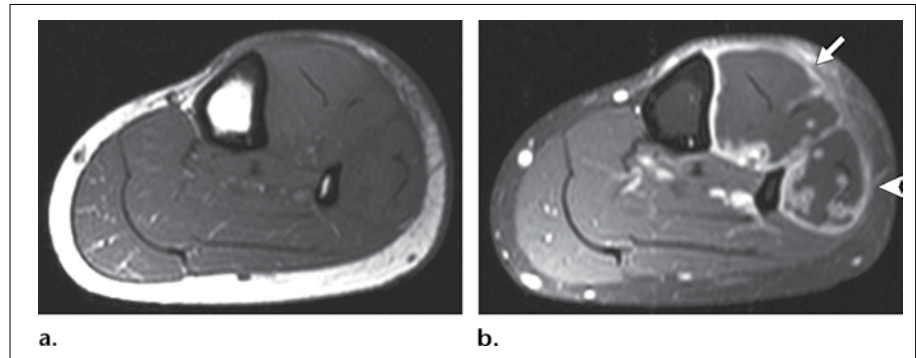
Unrecognized compartment syndrome in a 33-year-old woman with foot drop and continuous pain after a fall 1 month earlier. (a) Axial T1-weighted MR image of the left calf shows mild bulging and minimal signal intensity increase in the anterior muscle compartment and effacement of intramuscular fat in the lateral compartment. (b) Axial T1-weighted fat-suppressed image after injection of intravenous contrast material shows disordered enhancement, with intense peripheral enhancement of the anterior (arrow) and lateral (arrowhead) compartments and large areas of central nonenhancement related to hypoperfusion and myonecrosis. The patient was treated with fasciotomy and débridement. *(RadioGraphics* 2018; 38;1:InPress)

Tendons classification, the British Athletics Muscle Injury Classification and the MLG-R Classification created by Aspetar, an orthopedic and sports medicine hospital in Doha, Qatar, in cooperation with Futbol Club Barcelona, the Barcelona soccer team.

"Grading systems for muscle injury are evolving rapidly and radiologists should be familiar with these newer systems, as imaging plays an increasingly important role in the diagnosis and management of the injured athlete," the authors conclude.

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

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

- "Intravenous Corticosteroid Premedication Administered 5 Hours before CT Compared with a Traditional 13-Hour Oral Regimen," Benjamin M. Mervak, MD, and colleagues.
- "Association between Testicular Microlithiasis and Testicular Neoplasia: Large Multicenter Study in a Pediatric Population," Andrew T. Trout, MD, and colleagues.
- "Diffusion and Intravoxel Incoherent Motion MR Imaging–based Virtual Elastography: A Hypothesis-generating Study in the Liver," Denis Le Bihan, MD, PhD, and colleagues.

Listen to *RadioGraphics* Editor Jeffrey S. Klein, MD, and authors discuss the following articles in recent issues of *RadioGraphics* at *RSNA.org/RG-Podcasts*.

- "2017 Version of LI-RADS for CT and MR Imaging: An Update," Khaled M. Elsayes, MD, and colleagues.
- "Adventures and Misadventures in Plastic Surgery and Soft-Tissue Implants," Dana J. Lin, MD, and colleagues.
- "Contrast-enhanced US Assessment of Focal Liver Lesions in Children," Sudha A. Anupindi, 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*.

MRI May Predict Neurological Outcomes for Cardiac Arrest Survivors

MRI-based measurements of the functional connections in the brain can help predict long-term recovery in patients who suffer neurological disability after cardiac arrest, according to a new study in *Radiology*.

"Current methods to predict future levels of function for survivors of cardiac arrest have limited accuracy," said lead author Robert D. Stevens, MD, from Johns Hopkins University School of Medicine in Baltimore. "We need better methods to understand the magnitude of these injuries and make more accurate predictions on recovery, thereby enabling more informed decision-making."

The researchers assessed the brain's functional connectivity in 46 patients who were in a coma following cardiac arrest. The imaging, performed within two weeks of cardiac arrest, included studies of brain structure and function using diffusion tensor imaging and resting-state functional MRI (fMRI). Functional imaging focused on four well-characterized networks in the brain, including the default mode network (DMN), the executive control network (ECN) and the salience network (SN).

One year after the patients' cardiac arrests, the researchers assessed the patients with the Cerebral Performance Category
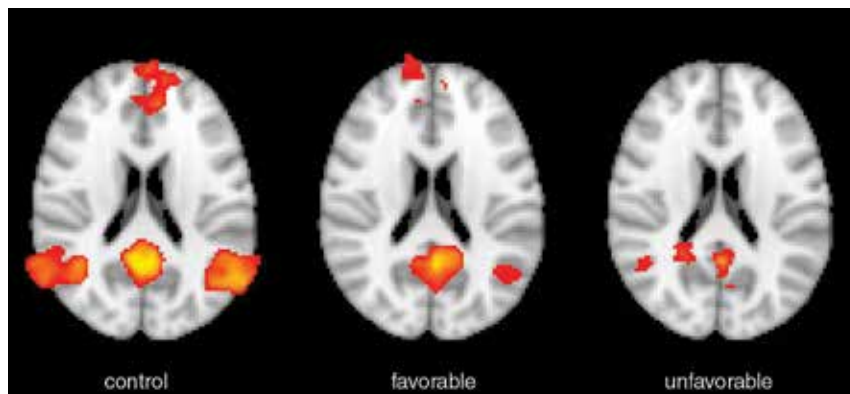
Functional MRI activation (shown as red-orange) as seen in a representative healthy control subject (left), a cardiac arrest patient who had a good functional outcome (middle), and a cardiac arrest patient who had a poor functional outcome (right). The formation shown here, called the default mode network, loses internal coherence (connectivity) in cardiac arrest patients, and the magnitude of that loss is inversely proportional to probability of recovery.

Scale. Eleven patients had favorable outcomes. Functional connectivity was stronger in those who achieved higher levels of independence at one year compared with those who were heavily dependent.

A key predictor of outcomes was the interaction between the default mode and the salience networks, which are normally anti-correlated. When researchers compared the brain imaging results of patients who had favorable outcomes with those who did not, they noticed a stark difference.

Within-network connectivity was higher in all networks of patients with favorable outcomes, but only the DMN remained significant after correction. Between-network connectivity (i.e., the anti-correlation) of DMN-SN and of the ECN-SN were significantly higher in the favorable outcomes group after correction. The higher within-network connectivity in the DMN in patients with a favorable outcome remained significant after

adjusting for age, sex and sedation status. Similarly, the higher between-network connectivity of DMN-SN and of ECN-SN in patients with favorable outcomes remained significant after this adjustment.

The results demonstrate that abnormalities in long-range connectivity occur within and between canonical brain networks in the acute phase of anoxic brain injury, and these abnormalities are associated with long-term functional outcome.

Collectively, these observations support a model in which connectivity of the salience network and its ability to regulate other networks could represent a biomarker of recovery potential and increase the confidence that clinicians have in communicating with patients' families in the wake of cardiac arrest. Additionally, fMRI could aid in the development of therapeutic interventions for neurologically disabled patients.

WEB EXTRAS

Access the *Radiology* study, "Early Functional Connectome Integrity and 1-Year Recovery in Comatose Survivors of Cardiac Arrest," at *RSNA.org/Radiology*.

Become a Reviewer for *RadiologyInfo.org*

RadiologyInfo.org, produced by RSNA and the American College of Radiology (ACR), is dedicated to being the public's trusted source of information about radiology and the unique and vital role of radiologists in healthcare. The website, which offers more than 230 procedure descriptions, disease/condition, screening/wellness and safety topics, receives over a million visits each month.

Each year, beginning in January, *RadiologyInfo.org*'s content is reviewed by physicians to ensure the public has access to the most up-to-date and accurate radiologic information. These physicians are then recognized on the *RadiologyInfo.org* Medical Advisors page.

Are you interested in serving as a *RadiologyInfo.org* reviewer and using your expertise to create patient-friendly

RadiologyInfo.org
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content? Send your curriculum vitae to Joshauna Nash at *jnash@rsna.org*, noting your area of expertise and interest.

Machine Learning Identifies Breast Lesions Likely to Become Cancer

A machine learning (ML) tool can help identify which high-risk breast lesions are likely to become cancerous and has the potential to reduce unnecessary surgeries, according to new *Radiology* research.

Researchers from Massachusetts General Hospital (MGH) and Harvard Medical School, both in Boston, and the Massachusetts Institute of Technology's Computer Science and Artificial Intelligence Laboratory in Cambridge, MA, trained the model on a group of patients with biopsy-proven high-risk lesions who had surgery or at least two-year imaging follow-up. The model analyzed traditional risk factors for breast lesions, such as patient age and lesion histology, along with words that appear in the text from the biopsy pathology report. Of the 1,006 high-risk lesions identified, 115, or 11 percent, were upgraded to cancer.

After training the ML model, the researchers tested it on the remaining 335 lesions. The model correctly predicted 37 of the 38 lesions, or 97 percent, that were upgraded to cancer. The ML model identified the terms "severely" and "severely atypical" in the text of the pathology reports as associated with a greater risk of upgrade to cancer. The researchers found 30.6 percent, or 91 of 297, surgeries of benign lesions could be avoided.

"Our goal is to apply the tool in clinical settings to help make more informed decisions as to which patients will be surveilled and which will go on to surgery," said study author Manisha Bahl, MD, MPH, from MGH and Harvard. "I believe we can capitalize on machine learning to inform clinical decision making and ultimately improve patient care."

Future work in this area could include incorporating mammographic images and histopathologic slides into the ML model to help decrease unnecessary surgery, according to the authors.
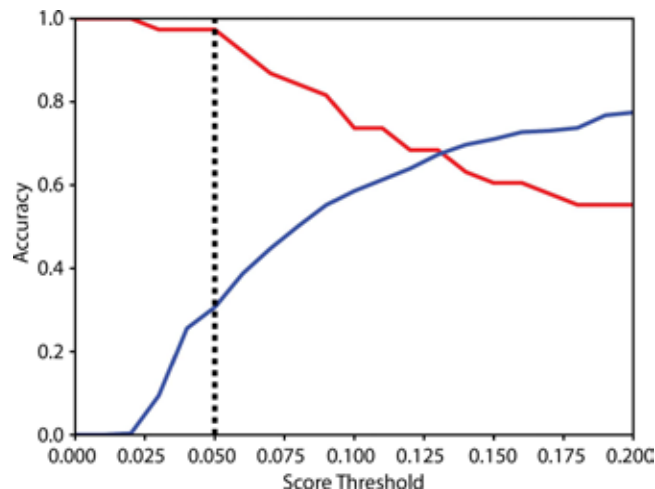

Graph shows accuracy achieved with ML model for independent test set as a function of model output score, both for patients with malignancy (red line) and for patients without malignancy (blue line), in independent test set. Vertical dotted line indicates 5 percent threshold. © RSNA 2018. All rights reserved. Printed with permission.

WEB EXTRAS

Access the *Radiology* study, "High-Risk Breast Lesions: A Machine Learning Model to Predict Pathologic Upgrade and Reduce Unnecessary Surgical Excision," at *RSNA.org/Radiology*.

Media Coverage of RSNA

In August and September, 2,023 RSNA-related news stories were tracked in the media. These stories had an estimated audience reach of over 1 billion. Coverage included *The Huffington Post, U.S. News & World Report, TIME,* Yahoo! Finance, *Daily Mail*, WMAQ-TV (Chicago), KPRC-TV (Houston), *CNN.com*, WebMD, *Philly.com, Drugs.com*, HealthDay, ScienceDaily, *Health.com, Diagnostic Imaging, Auntminnie.com, Medical Daily* and *DOTmed Business News.*
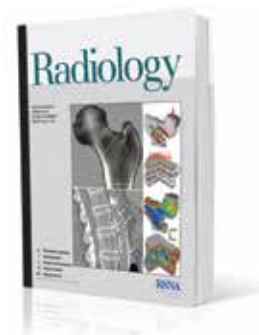
RSNA Wins Three 2017 MarCom Awards

RSNA received three 2017 MarCom Awards from the Association of Marketing & Communication Professionals, a prestigious international awards competition that recognizes excellence in marketing and communications.

RSNA received a Platinum Award, the top honor, for its Oct. 26, 2016 placement on Today, "Is Football Safe for Kids? Study Looks at Brain Changes." The story was based on *Radiology* research on subconcussive head impact exposure and white matter tract changes over a single season of youth football. RSNA also received a Platinum Award for its 2016 Annual Meeting press kit.

RSNA received a Gold Award for its placement in *Newsweek* of "3-D Fetus Images Could Spot Abnormalities Early in Pregnancy."

RSNA competed against approximately 6,000 entries from around the world to receive its awards.

Annual Meeting Watch

RSNA 2018 Online Abstract Submission Opens mid-January

The online system to submit abstracts for RSNA 2018 will be activated in mid-January. The submission deadline is noon Central Time (CT) on Wednesday, April 11, 2018. Abstracts are required for scientific presentations, education exhibits, applied science, quality improvement reports and quantitative imaging reading room showcases.

To submit an abstract online, 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 2018.

Students, clinical trainees and post-doctoral trainees are eligible to receive $500 travel awards for top-rated abstracts accepted for presentation at RSNA 2018. Trainees are also eligible to receive a $1,000 research prize.

Full eligibility requirements for all awards will be available with the 2018 Call for Abstracts in mid-January.

RSNA® 2018

November 25-30
104th Scientific Assembly & Annual Meeting

Reserve your RSNA 2018 Hotel Now!
RSNA 2017 attendees enjoy exclusive access to reserve hotel rooms at discounted rates until January 14. Hotel reservations with discounted rates for all RSNA 2018 attendees will open January 15. Visit *RSNA.org/Annual-Meeting*.

GET NOTICED

Present at RSNA 2018:

▶ Scientific Presentations
▶ Applied Science
▶ Education Exhibits

▶ Quality Improvement Reports
▶ Quantitative Imaging Reading Room

Virtual RSNA 2017
Explore. Invent. Transform.
November 25 to February 28

Experience RSNA 2017 with the Virtual Meeting

Access the RSNA 2017 Virtual Meeting Through Feb. 28

Whether or not you attended RSNA 2017, members will still have access to all Virtual Meeting programming on demand through February 28 at 4 p.m. Central Time (CT). If you have not already done so, register now at *RSNA.org/Register* to access over 100 on-demand courses and 23 CME-eligible courses on demand.

Education and Funding Opportunities

ISMRM-RSNA Co-provided Workshop on High-Value MRI

February 18-20
Capital Hilton
Washington, D.C.

Registration is open for the International Society for Magnetic Resonance in Medicine (ISMRM)/RSNA co-provided High-Value MRI Workshop. Participants will discuss the economics and value of MRI in healthcare, how to maximize the impact of their MR research and/or how to improve the efficiency of MR operations. For more information and registration, visit *http://www.ismrm.org/workshops/18HighValue/*. Contact *info@ismrm.org* with questions.

The Value of Membership

RSNA 2018 International Travel Stipend Program Application Opens in January

RSNA members have the power to vastly improve local healthcare through the knowledge and experience gained at the RSNA annual meeting. In recognition of the financial costs associated with travel to the annual meeting, RSNA has created the International Travel Stipend Program to support attendees from developing or low-resource nations.

The program aids eligible members in partially defraying travel expenses related to attending the RSNA annual meeting. Beginning in 2018, up to 50 awards of $500 and complimentary registration to the annual meeting will be available for eligible candidates.

The application process begins in January. For more information and to apply, visit *RSNA.org/Annual-Meeting-International-Travel-Stipend*.
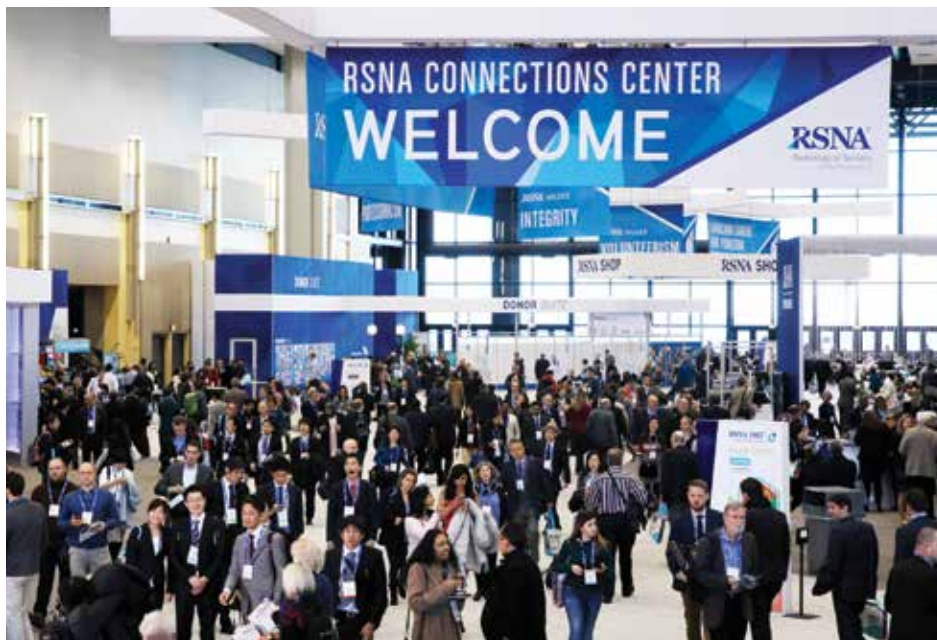
The RSNA International Travel Stipend Program supports attendees from developing or low-resource nations in defraying costs associated with travel to the RSNA annual meeting.

Next RSNA Spotlight Course Coming to Argentina in June 2018

The third annual RSNA Spotlight Course, "Últimas Tendencias en Imágenes Abdominal," focusing on the latest trends in abdominal imaging, will be held from June 8 to 9, 2018, in Buenos Aries, Argentina. The course will be presented entirely in Spanish.

The course will be presented by global abdominal imaging experts and leaders in the radiology specialty. Registration and early bird pricing will be available starting on Feb. 12, 2018.

For more information visit: *RSNA.org/Spotlight*.

COMING NEXT MONTH

RSNA News will feature a story on the winner of the RSNA Image Contest including spectacular photos of the top entries.

William R. Eyler Editorial Fellowship

Experience radiologic journalism firsthand...

The Eyler Editorial Fellowship provides an opportunity for radiologists in mid-career to further their experience in radiologic journalism. Learn about manuscript preparation, peer review, manuscript editing, journal production, printing, and electronic publishing by working with the...

- Editor of *Radiology*
  Madison, Wisconsin,
  for 2 weeks

- Editor of *RadioGraphics*
  Burlington, Vermont,
  for 2 days

- RSNA Publications Department
  Oak Brook, Illinois,
  for 2 days

The fellow will also assist the editors and attend editorial meetings during the RSNA annual meeting.

Award

One fellow will be selected each year and will be awarded a stipend of $10,000 to cover travel, lodging, and expenses.

Eligibility

Candidate must:
- Be an RSNA member
- Have accomplished at least 3 years of attending-level work at an academic institution
- Have served as a reviewer for a major imaging journal
- Be affiliated with a national radiologic society in his or her country

Applications

Visit *RSNA.org/Eyler_Fellow* or email *editfellowships@rsna.org* to learn more and download an application. Deadline for applications is May 1, 2018.

The Fellowship Experience

Fellows prepare evaluations and follow-up reports on their experiences during and as a result of the fellowship.

See firsthand accounts at *RSNA.org/Eyler_Fellow*

RSNA®
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of North America

- Deadline for applications is May 1, 2018.