

ANNUAL MEETING PREVIEW

BEYOND IMAGING
RSNA® 2016
NOVEMBER 27 - DECEMBER 2



ALSO INSIDE:

The Dramatic Evolution of RSNA's Diagnosis Live™
QIBA® Expands at RSNA 2016 and Internationally
The Evolving Role of RAs, RTs in Patient Care
Exploring Chicago on a Budget

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RSNA MISSION

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



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INTERNATIONAL DAY OF RADIOLOGY

NOVEMBER 8, 2016

BREAST IMAGING

Build greater awareness of radiology and its contribution to patient care. Help spread the word and build support with ready-to-use promotional materials available at RSNA.org/IDoR.

Let's celebrate together!

WWW.IDOR2016.COM



AN INITIATIVE OF THE ESR, ACR AND RSNA



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Strategic Radiology Donates \$800,000 for RSNA R&E Research Seed Grants

Strategic Radiology (SR), a consortium of 26 practice groups from around the nation representing more than 1,400 radiologists, has committed \$800,000 to fund 20 Strategic Radiology Research Seed Grants through the RSNA Research & Education (R&E) Foundation. SR is the second Visionaries in Practice donor to fund a named grant award via the Foundation's Inspire-Innovate-Invest: The Campaign for Funding Radiology's Future®.

SR's commitment will be funded by annual donations from its practice group members.

The award is due in large part to the efforts of Gregory C. Karnaze, MD, who brought the idea of the named grant award to SR practice groups and the board of governors. Dr. Karnaze is treasurer for the Foundation's Board of Trustees and also president of Austin Radiological Association (ARA), a member group of SR.

"The creation of a Strategic Radiology Research Seed Grant is another step in investing directly in the future of our profession and we couldn't be happier to be associated with

RSNA and the R&E Foundation," said SR chairman Arl Van Moore Jr., MD. "They share our commitment to innovation, to what is best for our patients and to being a positive example in our profession. We are proud of our partnership and look forward to future collaborations."

Formed in 2009, Strategic Radiology was established when like-minded practice groups realized they shared many of the same visions, values and goals. SR member groups use a common data sharing and analytics platform to share radiology best practices. By demonstrating the technical capabilities to move imaging studies among members, SR is in the process of creating a reading network. SR has also embarked on centralized purchasing of certain supplies, medical malpractice insurance and equipment maintenance contracting.

For more information on the R&E Foundation, go to RSNA.org/Foundation.



Numbers in the News

101

Number of projects funded by the RSNA R&E Foundation which provided more than \$4 million for grant funding in 2016 – a record level for the Foundation. Read about R&E funded grant projects in 2016 starting on [Page 41](#).

550

Approximate number of print, broadcast and online media stories tracked in the first 24 hours of the August release of a special *Radiology* report on the Zika virus. Read more on [Page 51](#).

800

Number of members in RSNA's Quantitative Imaging Biomarker Alliance (QIBA®), which has grown dramatically since forming in 2007. Read more on [Page 19](#).

3,298

Number of trees saved during RSNA 2015. Read more about recycling plans for RSNA 2016 and how you can help on [Page 16](#).

RSNA President-Elect Ehman Receives AOSR Gold Medal

Richard L. Ehman, MD, RSNA president-elect was awarded an Asian Oceanian Society of Radiology (AOSR) gold medal during the recent Asian Oceanian Congress of Radiology (AOCR) in Beijing, China.

Gold medals were also awarded to **Bernd Karl-Heinz Dieter Hamm, MD**, and **Byung Ihn Choi, MD, PhD**.

Dr. Choi received RSNA honorary membership in 2007. He served on the RSNA Assembly Faculty and is a former chair of the RSNA International Advisory Committee.

Dr. Ehman received the RSNA Outstanding Researcher Award in 2006. Other RSNA involvement includes serving on the *Radiology* Editorial Board and the RSNA Research & Education (R&E) Foundation Board of Trustees. He was elected to the RSNA Board of Directors in 2010 and served as Board chair in 2015.

Dr. Hamm is first vice president of the European Society of Radiology and chair of the Department of Radiology at Charité Humboldt Universitaet in Berlin.



Ehman



Hamm



Choi

The AOCR also spotlighted the first RSNA/AOSR Symposium, "The Role of Imaging in Transplantation," featuring speakers from each society discussing the role of imaging in liver transplantation.

The symposium will be repeated at RSNA 2016 on Wednesday, Nov. 30. To register, go to RSNA.org/Register.

2017 R&E Grant Application Process Opens This Month

Individuals interested in obtaining RSNA Research & Education (R&E) Foundation grants for 2017 can begin submitting their applications in October. For more information, go to RSNA.org/Foundation or contact Scott A. Walter, MS, Assistant Director, Grant Administration, at 1-630-571-7816 or swalter@rsna.org.

Education Grants

Deadline — Jan. 10

- Education Scholar Grant
- RSNA/AUR/APDR/SCARD Radiology Education Research Development Grant

Research Medical Student Grant

Deadline — Feb. 1

Research Grants

Deadline — Jan. 17

- Research Scholar Grant
- Research Seed Grant
- Research Resident/Fellow Grants

Learn about the 2016 R&E Foundation grant recipients and their projects starting on [Page 41](#).



Annual International Day of Radiology

Breast imaging and the essential role that radiologists play in the detection, diagnosis and management of diseases of the breast is the focus of this year's International Day of Radiology (IDoR) set for Nov. 8.

IDoR is sponsored by RSNA, the European Society of Radiology (ESR) and the American College of Radiology (ACR), with a dedicated website (IDoR2016.com) and social media activities.

Visit RSNA.org/IDoR for more information.



Writing a Competitive Grant Proposal Workshop

March 10 – 11, 2017
RSNA Headquarters
Oak Brook, IL

Registration is open for the Writing a Competitive Grant Proposal workshop, designed

for researchers in radiology, radiation oncology, nuclear medicine and related sciences

who are interested in actively pursuing funding from the federal government, societies or foundations. The course fee is \$225. Register online at RSNA.org/CGP. Contact Fiona Miller at dor@rsna.org or 1-630-590-7741 for more information.

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Have You Renewed Your RSNA Membership?

RSNA Membership renewal for 2017 is currently underway. Renew online at RSNA.org/Renew or by mail with the invoice sent in early October.

Renewing members also have the option of

signing up for automatic membership renewal, which guarantees that membership benefits don't lapse. For questions about automatic membership renewal, please contact membership@rsna.org.

ANNUAL MEETING PREVIEW

Medical imaging science, education and technology — RSNA 2016 offers it all. Use this overview of the myriad educational and scientific offerings, technical exhibits and courses to plan your ultimate meeting experience.



PLENARY SESSIONS

RSNA 2016 will feature plenary session lectures on a spectrum of healthcare topics.



OPENING SESSION LECTURES

Sunday, Nov. 27, 8:30 a.m. — Arie Crown Theater



Dreyer



Wachter

Digital Revolution in Radiology — the Good and the Bad

In this two-part Opening Session lecture, **Keith J. Dreyer, DO, PhD**, and **Robert M. Wachter, MD**, will each address topics related to the digital revolution underway in radiology.

Dr. Dreyer's presentation, "When Machines Think: Radiology's Next Frontier," will explore the state of clinical data science in medical imaging and its potential to improve the quality and relevance of radiology as well as the lives of patients.

Dr. Dreyer is vice chair of radiology and director of the Center for Clinical Data Science at Massachusetts General Hospital and associate professor of radiology at the Harvard Medical School.

An internationally renowned informatics expert, Dr. Dreyer served as a member of the RSNA Radiology Informatics Committee and the RadLex® Steering Committee and chaired the RSNA Scientific Program Committee's Radiology Informatics Subcommittee. Dr. Dreyer presented the New Horizons Lecture at RSNA 2012 and has served as a faculty member at many RSNA annual meetings. He served on the *RadioGraphics* Editorial Board and as associate editor on the *Radiology* Editorial Board.

Dr. Dreyer has authored hundreds of scientific papers, presentations, chapters, articles and books. He has lectured worldwide on clinical data science, cognitive computing, clinical decision support, clinical language understudying, digital imaging standards, and implications of technology on the quality of healthcare and payment reform initiatives.

In his lecture, "Hope, Hype, and Harm as Medicine Enters the Digital Age: Lessons From (and For) Radiology," Dr. Wachter will describe what radiologists got right — and wrong — in their computerization journey, and why radiology was, to a large degree, a canary in the digital coal mine.

Dr. Wachter spent a year studying the digitization of healthcare in researching his 2015 *New York Times* best-selling book, *The Digital Doctor: Hope, Hype and Harm at the Dawn of Medicine's Computer Age*, which he says is ultimately a hopeful story. The experiences of other industries demonstrate that it often takes a decade or more to obtain the promised benefits from automation — and that these improvements emerge only after the technology improves and the work has been reimagined for a digital environment.

Dr. Wachter is professor and interim chair of the Department of Medicine at the University of California, San Francisco, where he also directs the division of hospital medicine. Author of 250 articles and six books, he coined the term "hospitalist" in 1996 and is generally considered the father of the hospitalist field, one of the fastest growing specialties in the history of modern medicine. He is past president of the Society of Hospital Medicine and past chair of the American Board of Internal Medicine. In 2015, *Modern Healthcare* magazine ranked him as the most influential physician-executive in the U.S., his eighth consecutive year in the top 50.

ANNUAL ORATION IN DIAGNOSTIC RADIOLOGY

Monday, Nov. 28, 1:30 p.m. — Arie Crown Theater

Healthcare Transformation: Driving Value through Imaging

In the evolution from fee-for-service healthcare to value-driven population health, healthcare systems must learn to embrace patient-centered, value-focused practices, and the leaders of these systems must be committed to building these cultures, says **Vivian S. Lee, MD, PhD, MBA**.

As a centralized core of experts informing care pathways and practices, radiology must play a key role in both understanding and defining value for providers and their patients. At the University of Utah and elsewhere, engaged radiologists are tapping into their health systems' culture of value to evolve the way providers engage with imaging specialists to improve patient expectations, and create real and measurable cost efficiencies. The transformation of healthcare requires engaged radiologists to produce more cost effective, quality outcomes.

Dr. Lee is professor of radiology, senior vice president for health sciences, dean of the school of medicine and CEO of University of Utah Health Care. She oversees an integrated academic health sciences campus that is committed to healthcare transformation through a value-driven precision medicine and population health strategy.

A recognized leader in academic medicine and health sci-

ences, Dr. Lee serves on the Council of Councils of the National Institutes of Health (NIH), the Administrative Board of the Council of Deans for the Association of American Medical Colleges (AAMC), the *Journal of the American Medical Association* Journal Oversight Committee, the Health Care Delivery System Reform Advisory Committee of The Commonwealth Fund, and the Scientific Advisory Board of Massachusetts General Hospital. She also serves on the board of directors of the American Association of Rhodes Scholars.

Dr. Lee has authored more than 150 peer-reviewed research publications and a popular textbook on cardiovascular MRI. She chaired the medical imaging NIH study section and is a past president of the International Society for Magnetic Resonance in Medicine (ISMRM). Dr. Lee received the Outstanding Teacher Award and delivered the ISMRM keynote Lauterbur Lecture in 2012.

Dr. Lee served on the RSNA Refresher Course Committee as cardiac chair and cardiovascular chair. She received the *Radiology* Editor's Recognition Award for reviewing with distinction in 2003, 2005 and 2007.



Lee

NEW HORIZONS LECTURE

Tuesday, Nov. 29, 1:30 p.m. — Arie Crown Theater

Beyond Imaging – Radiology of Tomorrow

Cancer care — along with imaging — is on the brink of profound change, according to **Hedvig Hricak, MD, PhD, Dr (hc)**. Over the last quarter century, researchers have been assembling the biological syntax and lexicon that are now starting to shape modern oncology. Shifting public expectations and technological innovations are also intensifying progress toward precision medicine. In the next 10 years, radiologists will be able to take advantage of new molecular imaging probes and techniques as well as computer tools for pattern recognition, deep learning and artificial intelligence (AI). These new techniques and tools will put imaging at the center of the evolving paradigm of precision oncology, offering an unprecedented opportunity to once again reshape and enhance the specialty.

As a specialty of technical innovations, radiologists have always embraced new technologies. But radiologists are also key participants in patient-centered care. In the last 50 years, the specialty has gone through a number of transformations, always emerging as more

clinically essential than before. In the years ahead, radiologists must and will continue to evolve — becoming not only stewards of the ever-increasing demand for imaging and image-guided therapies, but highly valued clinical consultants and innovators in the era of precision medicine.

Dr. Hricak is chair of the Department of Radiology at Memorial Sloan-Kettering Cancer Center, professor of radiology at Weill Cornell College of Medicine, and Professor at Gerstner Sloan-Kettering Graduate School of Biomedical Sciences, all in New York. She is a renowned genitourinary imaging authority who helped develop the use of MRI and CT for gynecological cancers and the use of MRI for prostate cancer. Dr. Hricak is a member of the National Academy of Medicine and has received numerous honors for her research and her efforts to promote international education and collaboration in radiology. She received the RSNA Gold Medal in 2015 and served as RSNA president in 2010.



Hricak

ANNUAL ORATION IN RADIATION ONCOLOGY

Wednesday, Nov. 30, 1:30 p.m. — Room E450A

Prostate Cancer: Improving the Flow of Research

As with breast cancer for women, prostate cancer for men is the second-leading cause of cancer death in the U.S. This fact alone should cause nationwide concern and result in a push for improved screening and treatment for men plagued with this disease. **Colleen A. Lawton, MD**, says. For example, over the past three decades, we have seen screening with prostate-specific antigen (PSA) come and go, and treatment for localized disease improve — but at a relative snail's pace, Dr. Lawton adds. Treatment for locally advanced disease has seen progress, but the tempo is generally sluggish and adoption of the advances not universal. Recently there has been a large influx of treatment options for metastatic patients, which is progress, but in the end these patients will likely die of their disease, she says.

In her lecture, Dr. Lawton will review what radiologists have learned from prostate cancer research over the past three decades, including a review of the research on imaging for accurate staging along with research on screening and treatment options. She will examine where radiology has succeeded and where much work is still needed. Finally, Dr. Lawton will explore opportunities to

increase the flow of research so as to brighten the future for prostate cancer patients.

Dr. Lawton is professor and vice chair in the Department of Radiation Oncology and the associate director of the Radiation Oncology Medical Residency Program at the Medical College of Wisconsin in Milwaukee. A former president and chairman of the board of the American Society for Radiation Oncology (ASTRO), Dr. Lawton is also director of clinical operations in radiation oncology at Froedtert Memorial Lutheran Hospital & Medical College Clinical Cancer Center.

Dr. Lawton was one of the original faculty for the RSNA Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) Program. She has also served on the Refresher Course Committee and as a member of the RSNA Scientific Program Committee Radiation Oncology Subcommittee.

In 2015, Dr. Lawton received the Lifetime Service Award from the American Board of Radiology (ABR).



Lawton

RSNA/AAPM Symposium

Thursday, Dec. 1, 1:30 p.m. — Room E450A

Precision Imaging in Medicine

In this symposium presented in conjunction with the American Association of Physicists in Medicine (AAPM), **Maryellen L. Giger, PhD**, and **Daniel C. Sullivan, MD**, will help radiologists and medical physicists further understand what their roles will be within the precision-medicine initiative (PMI), which was introduced by President Obama in his 2015 State of the Union address. Dr. Giger will review the methods needed to adapt to the PMI from a research-based perspective, while Dr. Sullivan will speak on what the PMI means to radiology and the medical imaging physics fields.

Dr. Giger is the A.N. Pritzker Professor of Radiology, the Committee on Medical Physics, and the College at the University of Chicago (UC). A pioneer in the development of computer-aided diagnosis (CAD), Dr. Giger has conducted research on CAD and quantitative radiomics in the areas of breast cancer, lung cancer, prostate cancer and bone diseases for 30 years. Her research in computational image-based analyses of breast cancer for risk assessment, diagnosis, prognosis and response to therapy has yielded various translated components, and she is now using these image-based phenotypes in radiomics-genomics association studies for cancer discovery and implementation through the development of digital virtual biopsies.



Giger

A past-president of AAPM, Dr. Giger is a former RSNA third vice president and served as chair of the RSNA Research & Education (R&E) Foundation Research Study Section. She is a member of RSNA's Public Information Advisors Network. Dr. Giger is a PI in the NCI Quantitative Imaging Network and co-leader of the TCGA Breast Phenotype Research Group.

Dr. Sullivan is professor emeritus at the Department of Radiology at Duke University

Medical Center in Durham, N.C. His areas of clinical and research expertise are in nuclear medicine and oncologic imaging, in particular focusing on improving the use of imaging as a biomarker in clinical trials and facilitating translational research involving new and established imaging methods. While at the National Cancer Institute (NCI) from 1997 to 2007, Dr. Sullivan had key roles in designing and implementing the National Lung Screening Trial and the Digital Mammography Imaging Screening Trial.

Dr. Sullivan founded and chaired RSNA's Quantitative Imaging Biomarkers Alliance (QIBA), and served as RSNA science advisor from 2007 to 2015. He currently serves as the QIBA external relations liaison. In 2014, he was appointed to a three-year term on the National Advisory Council for Biomedical Imaging and Bioengineering at National Institutes of Health.



Sullivan

RSNA 2016 Dedications

Herbert L. Abrams, MD – The Meeting Program of the 102nd Annual Meeting and Scientific Assembly will be dedicated to the memory of Dr. Abrams, a pioneer and renowned authority on cardiovascular imaging, a devoted teacher and a passionate advocate for peace.

Gerald D. Dodd Jr., MD – The New Horizons Lecture will be dedicated to the memory of Dr. Dodd, a revered leader in the field of diagnostic imaging whose efforts to standardize mammography as a diagnostic tool earned him international acclaim.

Edward B. Singleton, MD – The Annual Oration in Diagnostic Radiology will be dedicated to the memory of Dr. Singleton, a beloved teacher and luminary radiologist known for his extensive research of rare pediatric disorders.



Abrams



Dodd



Singleton

EDUCATIONAL COURSES

RSNA 2016 offers educational courses in a variety of formats across all career levels and subspecialties. Here are just a few courses that you might want to include in your meeting agenda for the week.

Saturday

AAPM/RSNA Physics Tutorial (Sessions 1 and 2)

The tutorial sessions will focus on fundamentals of CT, including emerging technologies and dose management.

NIH Grantsmanship Workshop

This workshop walks through the NIH grants process including the elements of a competitive grant application, insight into the review process and a mock study section.

RSNA/ARR Study Section Reviewers Workshop — What it Takes to be an Expert Reviewer for the NIH: The Peer Review Process Demystified

This workshop will review the NIH study section review process. The workshop includes a panel discussion for questions and answers, and a mock study section.

Monday

The Netherlands Presents

Advances in Neuro-degenerative and Neuro-vascular Diseases

Presenters will discuss developments in the detection and treatment of neurological disease. Topics include prediction of stroke and dementia based on population imaging, hemodynamic contributions to age-related cognitive decline, high-resolution brain imaging in old age, and treatment of acute ischemic stroke.



CIR@RSNA 2016

Quantitative Imaging and Biomarkers in Clinical Practice: Session of the Interamerican College of Radiology (CIR). Presented in Spanish with English translation.

Special Interest Sessions

The RSNA Board of Directors has determined these courses to be of particular importance, and increased audience interest is expected.

- Global Medical Radiation Campaigns: Image Gently, Image Wisely and EuroSafe: Is All This Still Necessary?
- A New Model of Patient Care: Value over Volume—a RAD Talk
- Imaging Cognition 2016: Psychosis
- Translating Quantitative Imaging from Academia to the Practice of Precision Medicine

- Quality, Clinical Care and Effectiveness in Image-Guided Therapy: Do It Right, First Time, Every Time
- How Radiologists Can Improve Mammography Screening in the U.S.—Get Organized
- Preparing Radiologists to Jump into the “Shark Tank”

New Special Interest Session: High Impact Clinical Trials

Three late-breaking clinical trials were selected for their significant contributions to radiology research:

- Impact of Repeat Injections on Outcomes Following Epidural Injection of Either Corticosteroid and Lidocaine Versus Lidocaine Alone
- AMACING-A Maastricht Contrast Induced Nephropathy Guideline Study: Prophylactic Intravenous Hydration Obsolete?
- A Randomized Trial Comparing Coronary Computed Tomography Angiography and Stress Echocardiography in Low-to-Intermediate Risk Emergency Department Patients with Chest Pain

Tuesday

Turkey Presents

The Meaning of Evolution for Radiology and Advances in Neuroradiology

Presentations will cover the evolution of medicine and implications for radiology education. A neuroradiology session will focus on underlying hemodynamic factors leading to aneurysm formation and the biochemical definition of endovascular aneurysm treatment.



Wednesday

RSNA/AOSR Joint Symposium:

The Role of Imaging in Liver Transplantation

A special symposium presented by RSNA and the Asian Oceanian Society of Radiology (AOSR).

Friday

Novel Concepts in Hepatobiliary Tumor Imaging Symposium

An all-day symposium focused on imaging liver tumors, presented in collaboration with the Society of Abdominal Radiology (SAR), Japanese Society of Abdominal Radiology (JSAR), Korean Society of Abdominal Radiology (KSAR), and French Society of Abdominal Radiology (SIAD).

Throughout the week

Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) Program

Leaders in radiation oncology, diagnostic radiology, biology and physics provide three days (Monday through Wednesday) of concentrated courses focusing on specific diseases.

Case-based Interactive Series

Each interactive series comprises multiple sessions intended to aid self-assessment and increase knowledge. Topics include abdomen, breast, cardiac CT, MR, musculoskeletal, nuclear medicine, neuroradiology, pediatric radiology, thoracic imaging and ultrasound.

Controversy Sessions

Topics that are particularly controversial are identified as Controversy Sessions, and high audience participation is expected. Topics include machine learning, emergency medicine, radiation and sedation risk in children and screening mammography, among others. Read the Trending Topics, beginning on Page 9, for more information.

NEW Sponsored Education

Attend sponsored educational programming provided by RSNA 2016 exhibitors onsite at McCormick Place during the annual meeting. Symposium sessions can be found in the print and online meeting programs. CME may be provided through an organization other than RSNA.

Hands-on Workshops

In these 1 1/2-hour workshops participants learn proper use of medical equipment through demonstrations. Topics include MR imaging-guided breast biopsy, techniques for interventional sonography and thermal ablation, and 3-D printing.



Hot Topics Sessions

Sessions are identified across all subspecialties that cover late-breaking discoveries. Many of these sessions, including a Hot Topic Session on the Zika Virus, are highlighted in the Trending Topics, beginning on page 9.

RSNA's Diagnosis Live™

Expert-moderated sessions feature a series of interactive case studies to challenge radiologists' diagnostic skills. Participants submit and discuss responses in a fast-paced game format. Bring your own charged mobile device to compete. Read more about RSNA's Diagnosis Live on Page 17.



TRENDING TOPICS

Considering the size and scope of the RSNA 2016 program, attendees might need guidance planning their schedules at this year's annual meeting. To that end, RSNA's esteemed roster of scientific and education program committee and subcommittee chairs offer a preview of some of the latest trends, hot topics and cutting-edge research in each of the subspecialties at RSNA 2016. With full participation in the meeting, each physician can earn up to 100.25 AMA PRA Category 1 Credits™.

BY PAUL LaTOUR

Overall, the RSNA 2016 scientific program reflects a growing interest in dual-energy CT, dose reduction, high-intensity focused ultrasound (HIFU), image segmentation, emerging targeted radiotracers and artificial intelligence (AI), according to Jon A. Jacobson, MD, chair of the RSNA Scientific Program Committee.

"The RSNA 2016 Scientific Program offers a diverse selection of innovative and cutting-edge research from around the world," Dr. Jacobson said. "The quality of this year's presentations is exceptional, representing submissions from the national and international scientific community."

Sanjeev Bhalla, MD, chair of the RSNA Education Exhibits Committee, said the debut of the CME Learning Checkpoint will be an exciting addition to the education program. The interactive checkpoint features 11 award-winning hard copy exhibits from RSNA 2015 that attendees can study and then access the corresponding quiz on their mobile device or laptop. Attendees receive 0.5 AMA PRA Category 1 Credits™ for each completed quiz.

Dr. Bhalla noticed an increasing emphasis on algorithms among presentations. "In an era of widespread internet access, a specific image can easily be found, but the approach or algorithm to findings seems to have resonance in our education exhibits," he said.

And because it can be difficult to apply standards such as LI-RADS and PI-RADS, many of the exhibits explore the value and challenges of implementing these standards in daily use, he added.

In response to continuing positive feedback from annual meeting attendees, many of the educational courses feature audience engagement enhancements such as RSNA's Diagnosis Live™, self-assessment module (SAM) questions and audience-response technology, said John Eng, MD, chair of the Refresher Course Committee. Many courses are also available through the RSNA Virtual Meeting.

"This year's exciting educational course program reflects the enthusiasm and expertise of the Refresher Course Committee and is made possible by the tireless organizational efforts of RSNA staff," Dr. Eng said.

Controversy sessions throughout the week will highlight current debates in residency training, machine learning (ML), contrast media, sedation, imaging for chest pain, brain irradiation for metastases, head and neck imaging, pelvic imaging in the emergency department (ED), and screening mammography. The Friday Imaging Symposium will address practical clinical topics in head and neck imaging using a symptom-based approach.

Breast Imaging

Machine learning is by far the newest and most important topic to emerge in breast imaging at this year's meeting, said Linda Moy, MD, the Scientific Program Breast Subcommittee chair.

"The concept is that machine learning can be trained to assess images very quickly. This artificial intelligence is used widely and is beginning to be adopted into medical imaging," Dr. Moy said.

Other trends in breast imaging include continued interest in a shorter MRI exam, the use of digital breast tomosynthesis (DBT) in a diagnostic setting, incorporating DBT and breast ultrasound (US) into the screening and diagnostic workflow, and the role of automated breast US.

This year's education exhibits include a multiple modality approach to breast cancer management as well as case-based and pictorial reviews of benign and malignant entities of the breast, according to Susan J. Ackerman, MD, Education Exhibits Breast Subcommittee chair.

Dr. Ackerman added that other topics of interest include indications, obstacles and outcomes of radioactive seed localizations, and analysis of breast tumor vascularity using various techniques such as contrast-enhanced US.

Cardiac Radiology

Diagnosis techniques of adult cardiovascular disease — especially coronary artery disease — including dual-energy CT, remains a common theme, according to Robert M. Steiner, MD, the Scientific Program Cardiac Subcommittee chair.

Topics generating the most interest include myocardial strain analysis, quantitative imaging, T1 and T2 mapping for extracellular myocardial volume, spectral imaging and estimation of fractional flow reserve analysis. The Hot Topic Session on Tuesday morning will cover multi-spectral imaging and the cardiac series.

CT fractional flow reserve in coronary artery assessment is one of several new and developing subjects in the education exhibits, said Jared D. Christensen, MD, the Education Exhibits Cardiac Subcommittee chair.

Other interesting exhibits include CT and MRI evaluation of transcatheter pulmonic valve replacement (TPVR) and expanded applications of cardiac MRI—specifically 4-D flow and stress dynamics, Dr. Christensen added.

Chest Radiology

Dual energy and radiomics applications in the thorax is one of the newest trends for chest radiology, according to Reginald F. Munden, MD, DMD, the Scientific Program Chest Subcommittee chair. Utilization of dual energy and radiomics is progressing in chest imaging with examples in vascular, malignancy/nodule and MRI, he said.

"The most exciting increase in presentations are those in advanced MRI application, radiomics and genomic correlation — all of which are scattered throughout the nodule, malignancy and vascular categories," Dr. Munden said.

Thursday afternoon's Hot Topic Session, "Dual Energy Chest CT: Ready for Prime Time?" will address dual-energy applications in the thorax in three main areas: lung parenchyma, oncology and vascular.

Lung cancer topics have increased, according to Andrew Bierhals, MD, MPH, chair of the Education Exhibits Chest Subcommittee, particularly covering lung cancer screening and the new lung cancer staging recommendations.

Emergency Radiology

Dual-energy CT will also be a popular topic in emergency radiology presentations, according to Martin L. Gunn, MBChB, Scientific Program Emergency Radiology Subcommittee chair. Whole-body CT (WBCT) for trauma will also factor prominently.

"Given the widespread adoption of this technique clinically, it is reassuring to see the science catch up, and evaluate the efficacy of WBCT techniques," he said.

Another topic to watch for is research on the potential overutilization of imaging in the ED, which he said is important due to the current trends in healthcare expenditure management. That will be the subject of a Hot Topic Session on Thursday, "Using Data to Improve Efficiency and Quality in Emergency Radiology."

Gastrointestinal Radiology

The adoption of dual-energy CT (DECT) techniques in clinical practice and high-intensity ultrasound (US) technique to palliate pancreatic cancer are among the most important topics of the gastrointestinal presentations, said Dushyant V. Sahani, MD, chair of the Scientific Program Gastrointestinal Radiology Subcommittee.

Dr. Sahani also cited newer quantitative approaches with MRI as image biomarkers for disease severity and response in patients with Crohn's disease; radiomics and radiogenomics;



Jacobson



Bhalla



Eng

functional imaging with hepatobiliary CM; and the role of computer-aided detection (CAD) in enabling detection of flat colon lesion in CT colonography as noteworthy topics.

Attendees will find exhibits on liver elastography, dual-energy and spectral CT, and further evolution of the LI-RADS classification system, said Kevin J. Chang, MD, chair of the Education Exhibits Gastrointestinal Subcommittee.

A new full-day liver symposium will be offered on Friday. The symposium, an international collaboration of abdominal imaging societies, will look at screening and diagnosis guidelines and review state-of-the-art imaging techniques.

Genitourinary Radiology/ Uroradiology

Multiparametric prostate MRI, prostate imaging reporting and data system version 2 (PI-RADS2) performance, and prostate intervention and outcome are all hot topics in 2016, said Zhen J. Wang, MD, chair of the Scientific Program Genitourinary Radiology Subcommittee. As with several other subspecialties, Dr. Wang said DECT remains a popular topic.

"There are a significant number of presentations on DECT material decomposition and spectral imaging," she said. "A new topic related to DECT is imaging with photon-counting CT with research reporting on initial human studies."

Look for presentations about using texture analysis to grade tumors and predict treatment response and MRI with advanced quantitative techniques such as diffusion and perfusion for renal tumor and gynecological tumor evaluation.

Education exhibits will highlight neoplasm prostate, according to Sheila Sheth, MD, chair of the Education Exhibits Uroradiology Subcommittee.

"This reflects the continuous growth in prostate MRI," she said, adding that other high-profile exhibits focus on penile imaging and contrast US.

Research of prostate cancer screening and treatment will also be the focus of the Annual Oration in Radiation Oncology, presented Wednesday by Colleen A. Lawton, MD.

Health Service, Policy and Research/Policy and Practice

Education continues to be a popular topic, said Paul Cronin, MD, MS, chair of the Scientific Program Health Service, Policy and Research Subcommittee, who said many presentations focus on medical student, resident, clinician and patient education.

There is an emphasis on quality in medical and practice management, he said, which likely reflects the changing landscape of healthcare implementation and radiology practice as the specialty transitions from a quantity- to a quality-based system.

Delivering value through patient-centered care will be the focus of the Quality Improvement Symposium presented on Tuesday. The three-part series will tackle defining and measuring value as well as learning from mistakes to improve patient care.

Other popular topics include socioeconomic disparities in radiology and healthcare issues in developing nations.

Rachna Madan, MD, chair of the Education Exhibits Policy and Practice Subcommittee, said that the policy and practice

RSNA 2016 Highlights

BREAST IMAGING

- ◆ Could 'Deep Learning' Reduce Unnecessary Biopsies of Mammographic Microcalcifications? — SSE02-03
- ◆ High Risk Breast Cancer Screening with an Ultrafast High Spatiotemporal Resolution MRI Sequence; Less Costly and as Reliable as a Full Diagnostic MRI Protocol. — RC315-04

CARDIAC RADIOLOGY

- ◆ Multicenter Study of Utility of Left and Right Ventricular Strain Analysis for Diagnosis of Arrhythmogenic Right Ventricular Dysplasia (ARVD/C). — RC303-03
- ◆ The Extracellular Volume Fraction using Contrast-enhanced T1 Mapping Cardiac Magnetic Resonance Imaging is Constant with Hematocrit Change: Evaluation with an Anemic Rat Model. — RC303-12

CHEST RADIOLOGY

- ◆ Dual Energy CT Pulmonary Angiography (CTPA) in 1,120 Patients with Suspected Pulmonary Embolism: Why Things Go Wrong? — SSA05-01
- ◆ Fourier Decomposition Based Non-Contrast Enhanced Functional Lung MRI for Quantitative Ventilation Assessment in Patients with Cystic Fibrosis. — SSJ05-01

EMERGENCY RADIOLOGY

- ◆ Role of a Novel Material Decomposition Algorithm in Detection of Acute Infarction. — SSJ06-01
- ◆ Accuracy of Outside Radiologists; Reports of Computed Tomography Exams of Emergently Transferred Patients. — SSA06-01

GASTROINTESTINAL RADIOLOGY

- ◆ CT Radiogenomic Characterization of ATRX and DAXX Alterations in Primary Pancreatic Neuroendocrine Tumors. — SSM08-06
- ◆ Shear Wave Elastography: The Painless Liver 'Biopsy'. — GI235-ED-X

GENITOURINARY/OBSTETRICS/GYNECOLOGY

- ◆ 24 Months Follow-Up Results of MRI-Guided Transurethral Ultrasound Ablation for Localized Prostate Cancer. — SSK09-06
- ◆ Atypical Sites of Deeply Infiltrative Endometriosis: Clinical Characteristics and Imaging Findings. — OB105-ED-MOB1

HEALTH SERVICE, POLICY AND RESEARCH/POLICY AND PRACTICE

- ◆ A Shiny New World: Creating Your Own Radiology Decision Support Webapps Using R. — IN102-ED-SUB6
- ◆ A Cross-Functional Team Approach to Performance Improvement: The Radiology Operational Excellence Initiative. — HP102-ED-X

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sessions cover hot topics and trends in education, healthcare economics, quality improvement and practice management.

"Errors in radiology, components of successful root cause analysis and quality improvement relating to contrast reactions, contrast-induced nephropathy, and CT and MR safety are popular topics and of continued interest," Dr. Madan said.

One of this year's interesting exhibits focuses on the use of big data analytics to explore the most frequent reason for patient no-shows in a large multicenter academic radiology institution, he said.

Informatics

Image segmentation and measurement is a popular topic in 2016, said Rasu Shrestha, MD, MBA, chair of the Scientific Program Radiology Informatics Subcommittee.

"This encouraging trend is reflective of the overall increased interest and work being done in the space of image segmentation and leveraging newer technologies to analyze imaging data," he said.

Other topics of high interest are quantitative imaging, computer-aided diagnosis (CAD), 3-D printing and machine learning (ML). Sunday's Opening Session will address, "The Digital Revolution in Radiology," and presenters of a Controversy Session on Wednesday will also discuss the role of computer-aided diagnosis and ML in radiology.

Key topics in education exhibits include creating unique radiology decision support web apps, using original graphic illustrations in medical education, and methods for advanced 3-D printing using freeware and low-cost printers, according to Marc D. Kohli, MD, chair of the Education Exhibits Radiology Informatics Subcommittee.

A new 3-D printing theater in the Learning Center will house posters on the topic as well as demonstrations throughout the week.

Dr. Kohli also noted topics related to ML, or deep learning, including a primer on deep learning for radiologists, deep learning-based electronic cleansing for single- and dual-energy CT colonography, and a ML algorithm for image analysis in radiology.

Molecular Imaging

Multimodal imaging will figure prominently in molecular imaging presentations, said Alexander Drzezga, MD, the Scientific Program and Educational Exhibits Molecular Imaging Subcommittee chair.

"To unfold the full potential of these technologies, new concepts by means of application of multimodal tracers would be of utmost value," Dr. Drzezga said.

He added that many new studies concerning nanoparticle imaging in atherosclerosis will also be featured.

"This also represents a field of interest with currently still unresolved diagnostic issues, regarding early diagnosis/prediction of endovascular damage," he said.

Education exhibits of interest include expanding the spectrum of successful applications of peptide receptor radionuclide therapy (PRRT) to thyroid cancers, understanding how the blockbuster new procedure of PMSA/PET imaging can aid detection of vital prostate cancer tissue, and addressing the new options and methods in utilizing the ventilation-perfusion (VQ) scan for molecular imaging of the chest.

Those topics and more will also be covered in Monday's Molecular Imaging Symposium.

Multisystem/Special Interest

Education exhibits this year reflect the maturation of newer imaging techniques, including clinical applications of dual-energy and spectral CT and the evaluation of fibrosis with ultrasound, CT and MRI, according to David M. Paushter, MD, chair of the Education Exhibits Multisystem/Special Interest Subcommittee.

He noted exhibits will cover emerging topics including genetic and immunologic components of disease. In addition, less targeted applications of advanced imaging such as CT screening and whole-body MRI for evaluation of malignancy are gaining traction due to the progressing scientific underpinnings as well as Medicare's recognition of efficacy.

The growing body of imaging information related to radiomics, particularly as it applies to oncology, is of particular interest in this category, which encompasses not only diseases with imaging correlates throughout the body, but also includes technical advances in equipment and cutting-edge post-processing techniques.

"Improving the understanding of complex genetic relationships resulting in recognizable syndromes and opening the door for newer techniques in diagnosis and therapy of genetically modulated disease is very exciting and portends well for the future," Dr. Paushter said.

RSNA 2016 Highlights

INFORMATICS

- ◆ Radiogenomic Analysis of The Cancer Genome Atlas (TCGA)/The Cancer Imaging Archive (TCIA) Head and Neck Squamous Cell Cancer (HNSCC) Cohort: Correlations between Genomic Features and Quantitative Imaging Features. — SSC08-01
- ◆ Man vs Machines: How to Use Machine Learning and Medical Images (Hands on) — RCA13

MOLECULAR IMAGING

- ◆ Whole-body Assessment of Fat Content and Insulin Sensitivity in Different Tissues of Healthy Volunteers and T2D Patients using a Fully Integrated PET/MR System. — SSJ14-01
- ◆ 68Ga-RM2 PET/MRI in Biochemically Recurrent Prostate Cancer: A Comparison with Conventional Imaging. — SSM13-01

MULTISYSTEM/SPECIAL INTEREST

- ◆ White Matter Lesions and Cardiovascular Risk Factors in Adults. — NR370-SD-TUA2
- ◆ Cancer Immunotherapy and Pseudoprogression: Spectrum of Imaging Findings. — MS001-EB-WEB

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Musculoskeletal Radiology

This year's presentations trend away from simple sports medicine and clinical series and toward more presentations on quantitative imaging using dual-energy CT and US and MRI techniques, said Christine B. Chung, MD, the Scientific Program Musculoskeletal Radiology Subcommittee chair.

"A number of presentations will address nerve evaluation from brachial plexus to peripheral nerve, and intervention with imaging guidance," Dr. Chung said.

Other musculoskeletal topics of interest include MRI neurography-guided intervention, the use of imaging as a surrogate for nerve electrodiagnostic testing, 4-D musculoskeletal imaging and metal artifact reduction techniques.

An impressive array of pathologic-radiologic correlations will appear in presentations in all musculoskeletal subcategories, but particularly in tumor imaging and arthritis, according to Kambiz Motamedi, MD, chair of the Education Exhibits Musculoskeletal Radiology Subcommittee.

"There are excellent exhibits on imaging of joint internal derangements and pathology as a road map for arthroscopy," Dr. Motamedi said, adding topics also include the utility of mesenchymal stem cells in regeneration of joints and tendons.

Neuroradiology

Advanced MR imaging — such as chemical exchange saturation transfer MRI — that can enable assessment of substantia nigra in Parkinson's disease is among the hot neuroradiology topics for 2016, according to Ashok Srinivasan, MD, chair of the Scientific Program Neuroradiology Subcommittee.

Studies of particular interest include using CT perfusion-based wavelet transformed angiography to predict response to IV thrombolysis in acute stroke, measuring vestibular effects after 7T scanning, white matter structure revealed by correlation-time diffusion synthetic MRI, and diagnostic performance of American Thyroid Association and the Society of Radiologists in Ultrasound thyroid nodule classification algorithms.

Popular topics in the education exhibits include 4-D CT parathyroid imaging, arterial spin labeling, perfusion, iterative reconstruction and diffusion-tensor imaging, said Valerie L. Jewells, DO, chair of the Education Exhibits Neuroradiology Subcommittee.

A large percentage of exhibits continue to come from the international community, including research on the Zika virus, Dr. Jewells said.

"The international submissions are often a good source of infectious disease studies. Noteworthy exhibits will focus on the Zika virus outbreak and its effects upon the developing fetal brain," she said.

The Hot Topic Session, "Zika — What the Radiologist Needs to Know," (SPSH21) will be moderated by Deborah Levine, MD.

Nuclear Medicine

A hot topic in nuclear medicine is PET imaging of Gallium-68-labeled compounds for imaging neuroendocrine tumors and prostate cancer as well as other emerging targeted radiotracers, said Chadwick L. Wright, MD, PhD, the Scientific Program Nuclear Medicine Subcommittee chair.

"Given that such agents are not yet FDA-approved for clinical use and there are relatively few U.S. sites participating in the related clinical trials, the majority of this work is performed outside of the U.S.," Dr. Wright said. "Such human clinical studies using novel targeted radiotracers have the potential for advancing precision/personalized medicine, which is very exciting for nuclear medicine."

He added that the category is PET-centric, likely because PET is now a hybrid modality coupled with CT or MRI.



Education exhibits are increasingly focusing on PET/MRI, according to Vani Vijayakumar, MD, chair of the Education Exhibits Nuclear Medicine Subcommittee. Exhibits cover new tracers of dementia and prostate-specific membrane antigens.

"Other exhibits include integrating fusion of functional and structural imaging," he said.

He added that a new subsection on pediatric nuclear medicine was added this year and there are a number of very good exhibits in that category.

Obstetric/Gynecologic Radiology

Courtney A. Woodfield, MD, chair of the Education Exhibits Obstetrics/Gynecology Subcommittee encouraged attendees of all experience levels to review exhibits covering core topics commonly encountered across subspecialties, particularly in the emergency room setting, including imaging first trimester pregnancy complications, ectopic pregnancies, adnexal torsion, and post-partum complications.

Attendees should also pay special attention to novel exhibits on detecting, characterizing and staging the spectrum of gynecologic malignancies with the latest classification systems and advanced imaging techniques including PET/MRI, MR with DWI and dynamic contrast enhancement, imaging fetal complications with both US and MRI, imaging placental complications with US and MRI, and the use of 3-D US in the female pelvis, she said.

Pediatric Radiology

Dose-reduction strategies continues to be an important topic in pediatric radiology, according to Robert Orth, MD, PhD, the Scientific Program Pediatric Radiology Subcommittee chair.

"The most common factors investigated were various automated tube current techniques, reconstruction techniques and methods for lowering tube voltage," Dr. Orth said.

He pointed to several high-interest topics including the association between Vitamin D levels and fractures — particularly relating to suspected child abuse — the limitations of US for

genitourinary imaging in infants, and football-related brain injuries.

"The issue of decreasing sedation in pediatric imaging is increasingly becoming a hot topic," Dr. Orth said. It will be the subject of a Controversy Session on Tuesday.

Sonography topics in education exhibits have increased and include novel color Doppler techniques, contrast use in the liver and urinary tract, and dynamic studies, according to Kate A. Feinstein, MD, chair of the Education Exhibits Pediatric Radiology Subcommittee.

"All attendees should be able to find interesting exhibits," she said. "There is something for residents, practicing radiologists, and academic experts."

RSNA 2016 Highlights

MUSCULOSKELETAL RADIOLOGY

- ◆ Selective 3-Tesla MR Neurography-guided Retroperitoneal Genitofemoral Nerve Blocks for the Diagnosis of Genitofemoral Neuralgia. — SST06-05
- ◆ Musculoskeletal Applications of Bone Marrow Derived Mesenchymal Stem Cells. — MK142-ED-X

NEURORADIOLOGY

- ◆ White Matter Structure Revealed by Correlation-Time Diffusion Synthetic MRI: Age Effect. — SSC12-01
- ◆ Standing Cone Beam CT Myelography of the Spine. — NR144-ED-MOB9
- ◆ Hot Topic Session: Zika — What the Radiologist Needs to Know. — Moderated by Deborah Levine, MD — SPSH21

NUCLEAR MEDICINE

- ◆ Evaluation of a Fast 68Ga-DOTATOC PET/MRI Protocol for Whole-Body Staging of Neuroendocrine Tumors: A comparison with 68Ga-DOTATOC PET/CT. — SSC10-02
- ◆ Additional Role of Gallium 68 DOTANOC Positron Emission Tomography/Computed Tomography Enterography (PET/CTE) in Diagnosis and Staging of Gastro Entero Pancreatic Neuro Endocrine Tumors(GEP-NETs) Lesions. — SSC10-07

PEDIATRIC RADIOLOGY

- ◆ Major indicators of dose development in pediatric chest computed tomography - An analysis of 2138 CT scans. — SSQ16-02
- ◆ Utility of Contrast Enhanced Ultrasound for Assessment of Pediatric Focal Liver Lesions. — PD134-ED-THA7

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Physics

As with other subspecialties, DECT continues to be a popular area for physics, according to Chris C. Shaw, PhD, chair of the Scientific Program Physics Subcommittee.

He described an increased focus on physics related to MRI, diagnostic x-rays and nuclear imaging.

"There is also an interesting emergence of the use of photon-counting detector technology in CT, which may help improve image quality and reduce patient dose in CT and mammography," Dr. Shaw said.

Radiation Oncology and Radiobiology

Using imaging to identify targets for radiation dose escalation or sparing is one of the consistent themes this year, said Edward Y. Kim, MD, chair of the Scientific Program Radiation Oncology and Radiobiology Subcommittee.

Another popular theme is examining the use of radiotherapy in combination with immune therapies, including both pre-clinical and clinical presentations, Dr. Kim said.

Some provocative new ideas this year include a model of cognitive and neuroinflammatory consequences of radiation and immunotherapy, a study of radiation dose-dependent changes in the hippocampus and the effect of tumor contouring on the predictive performance of using radiomics.

A Hot Topic Session on Thursday will look at challenges posed by radiation and immune therapy.

Vascular/Interventional Radiology

Attendees can look for two primary topics of interest in this section — interventional oncology and CT angiography — according to Charles T. Burke, MD, chair of the Scientific Program Vascular and Interventional Subcommittee.

"Within interventional oncology, there is an emphasis on ablation technology, both in and out of the liver. This is very similar to previous years in which interventional oncology and non-invasive imaging have been the primary focus," Dr. Burke said.

Bariatric embolization is a popular topic in the category, he said, specifically drawing attention to a presentation of one-year data from the gastric artery embolization trial for lessening appetite non-surgically (GET LEAN) exploring left gastric artery embolization as a strategy for weight loss.

Other topics of interest include the use of autologous bone marrow stem cell infusion to treat patients with critical limb ischemia and a multicenter clinical trial in which patients with Stage 2 or Stage 3 colorectal cancer were treated with pre-operative hepatic arterial chemotherapy.

RSNA 2016 Highlights

PHYSICS

- ◆ An Image-Domain, Contrast Material Extraction Method for Dual-energy CT. — SSC13-05
- ◆ Physical Principles of Photon-counting CT. — PH124-ED-X

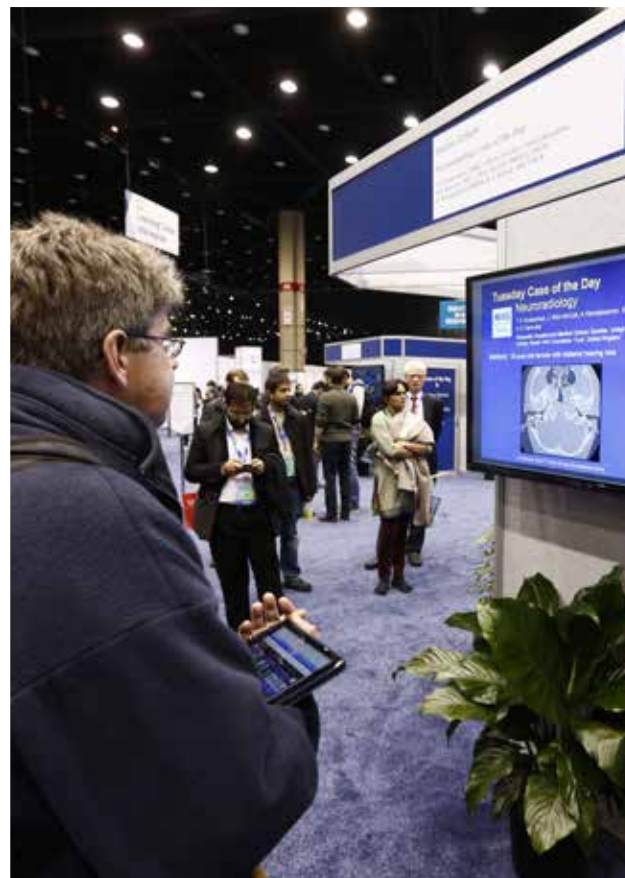
RADIATION ONCOLOGY AND RADIOBIOLOGY

- ◆ A Novel Pre-Clinical Model of Cognitive and Neuro-Inflammatory Consequences of Precision Radiation and Immunotherapy. — SSA23-09
- ◆ Radiology Collaboration-ECG Gated CT and Radiation Therapy; Saving Coronary Arteries One Heart Beat at a Time. — RO107-ED-SUA5

VASCULAR INTERVENTIONAL RADIOLOGY

- ◆ Thermal Ablation: Induction of Tumorigenesis Factors by in Vitro Hyperthermia. — VSIO41-01
- ◆ Minimally Invasive Low Voltage Pulsed Electric Fields of the Fundus of the Stomach as a Weight-loss Intervention. — SSM23-01

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Don't Waste This Opportunity — Think Green at RSNA 2016

Building on momentum from last year, RSNA, McCormick Place, SAVOR...Chicago catering and the City of Chicago are committed to making RSNA 2016 cleaner and greener than ever with help from attendees, vendors and volunteers.

What RSNA 2016 Attendees Can Do

- ◆ Recycle paper, bottles, cans and general waste in receptacles throughout McCormick Place.
- ◆ Use QR codes, apps and mobile-optimized tools as an alternative to printed materials.
- ◆ Ride the complimentary Metra train and shuttle buses to/from McCormick Place or share a cab with fellow attendees. Use the discounted airport shuttle service via Go Airport Express.
- ◆ Bring your own refillable coffee mug or beverage bottle and receive 25 cents off any fresh brewed drip coffee or fountain beverage purchase at food outlets in McCormick Place (excluding Connie's Pizza and McDonald's).
- ◆ Fill your water bottle at McCormick Place EZH2O filling stations, which minimize plastic bottle waste. Stations have a Green Ticker display that counts the quantity of bottles saved from waste.

What RSNA Vendors are Doing

- ◆ Minimizing energy by reducing lights, power, escalators and HVAC (heating, ventilating and air conditioning) during move-in/move-out in the exhibit halls and meeting rooms.
- ◆ Utilizing ECA (Electro-Chemical Activation) devices which allow the convention center to produce its own detergents and sanitizers using only tap water, salt and electricity.
- ◆ Implementing a green purchasing policy.
- ◆ Creating a massive rooftop garden at McCormick Place — the largest in the Midwest — to provide six to eight thousand pounds of produce. The vegetables are incorporated into dishes served in catering and restaurants.
- ◆ Reserving five percent of parking in McCormick Place Lot A for low-emitting and fuel-efficient vehicles.
- ◆ Sorting garbage into compost, recycling and landfill.
- ◆ Donating food to local charities.

Together, We Made a Difference at RSNA 2015

Thanks to a joint effort, RSNA 2015 recycling initiatives created a facility diversion rate of 64 percent. The diversion rate — the percentage of waste that is diverted from landfill for recycling — is a key indicator in a successful recycling program. Other 2015 data is outlined below.



Diversion Rate

64.3%



Trees Saved

3,298



Water Conserved

1,357,860

Gallons



Oil Conserved

15,324

Gallons



Electricity Saved

775,920

kWh/Ton



Total Pounds Recycled

387,960

Total
301.7 tons

Landfilled
107.7 tons

Recycled
194 tons

Tracking the Dramatic Evolution of RSNA's Diagnosis Live™

BY LYNN ANTONOPOULOS

Since the first, large-audience, rapid-fire gaming sessions at RSNA 2011, RSNA's Diagnosis Live™ (RDL) has undergone many changes in design, infrastructure and scale. However, RSNA's primary goal — to create a mobile-based, audience response technology specifically designed to meet, and evolve with, the unique needs of radiologists — has remained the same. Through RDL's ever-improving functionality and expansion into the global community, the application has become an invaluable educational tool and an increasingly popular draw at RSNA annual meetings. And Diagnosis Live is just getting started.



Flanders



Chang



A popular draw at past RSNA annual meetings, Diagnosis Live will support RSNA 2016 courses including seven rapid-fire sessions conducted by Adam Flanders, MD, Paul Chang, MD, and colleagues.

"We have barely scratched the surface of what Diagnosis Live can do," said Adam Flanders, MD, chair of RSNA's Radiology Informatics Committee (RIC), and an early collaborator on Diagnosis Live who continues to play a key role in its evolution. "It has enormous potential for transforming radiology education as we know it."

Making Learning Interactive

RSNA staff began developing the Diagnosis Live concept under the guidance of Paul Chang, MD, a professor of radiology and vice chair of radiology informatics at the University of Chicago School of Medicine, who serves as a consultant to RSNA's RadSCOPE and myRSNA initiatives developed through the RIC.

Looking to experts in education theory, the team sought to leverage RSNA's information technology resources to create a product that would move beyond passive learning and make radiology education more engaging and long-lasting. With this in mind, the team designed Diagnosis Live as a gaming application that would encourage active engagement through competition, thereby improving retention.

"Through Diagnosis Live, we sought to move people to participate and to create an instrument to evaluate learners objectively using deep analytics so that areas for improvement could be identified and addressed," said Dr. Chang, also a member of RSNA's Public Information Advisors Network.

In 2012, after the success of the first large-audience gaming sessions, the team began exploring RDL as a radiology residency training tool. The program's analytics provided an objective measure of resident performance and could be used to

address gaps in learning. The RDL team initiated a two-year beta test in three residency programs at institutions including Thomas Jefferson University Hospital (TJUH). Dr. Flanders, a professor of radiology and vice chair of imaging informatics at TJUH, recalls his institution's role in the early days.

"We helped with rapid development by putting our residents through entire sessions even if we hit snags with the software's performance," Dr. Flanders said. "We took copious notes during these early sessions and sent them back to the developers, and they absorbed it all and addressed all of our concerns. It was a fun and rewarding iterative process."

Early adopters like TJUH dealt with obstacles including RDL's consumption of significant Wi-Fi resources and difficulties scaling to suit larger audiences.

"As an early adopter, you have to appreciate the greater vision and be willing to accept and work through the flaws," Dr. Flanders said. "Our residents and some faculty were tremendous early supporters of the project because they could see the potential of the software even very early."

In response to early testing results, the team had to think bigger and dedicate resources to completely re-work the



Beckett



Mulugeta

architecture. Over the next two years, the team focused on improved functionality and greater ease-of-use in institutional settings.

The test sites helped shape the software's evolution. Further updates included simplified controls for classroom projection, adding dashboard analytics optimized for user/teacher consumption, tools to make authoring games easier and a highly-scalable cloud-based architecture.

Residency Programs Adopt RSNA's Diagnosis Live

When the beta test ended in July 2014, the team released a new Institution Management account tool designed for radiology residency programs. RSNA began providing complimentary licenses for RDL to residency programs, and by the end of 2014, 16 residency programs had adopted the software. Additional updates in early 2015 included new features to copy games and export analytics to better support residency training and conference event goals.

Philipose Mulugeta, MD, a fourth-year resident at the University of Pennsylvania School of Medicine, regularly uses RDL for teaching surgical clerkship medical students. "Using RDL, lectures have become more lively as students can answer pre- and post-test questions as well as perform group answers of cases," he said. "Diagnosis Live has made the old hot seat case conference feel antiquated. Residents now expect an element of audience response in every lecture."

Brooke Beckett, MD, a radiologist at Oregon Health & Science University, says the majority of the faculty at her institution uses RDL for daily resident teaching conferences. "We've moved to a more consistent use of the program as part of a larger restructuring/revision of our didactic curriculum," she said.

While primarily distributed to educational institutions, RDL is also available to other radiology organizations interested in using it for education conferences or annual meetings.

Continued on Next Page

WEB EXTRAS

[To request a complimentary license for RSNA's Diagnosis Live for a residency program, contact the Diagnosis Live team at \[diagnosislive@rsna.org\]\(mailto:diagnosislive@rsna.org\).](#)



RSNA's Diagnosis Live is available for other radiology education conferences or annual meetings. Above: More than 545 radiologists participated in four Diagnosis Live-supported sessions at the Deutsche Röntgengesellschaft's 97th Röntgen Congress held in May in Leipzig, Germany.

QIBA® Expands at RSNA 2016 and Internationally

BY RICHARD DARGAN

The push to develop quantitative imaging biomarkers has gained momentum in recent years thanks to an expanding and increasingly international alliance of researchers, industry partners and other stakeholders.

RSNA has had a critical role in that expansion through its Quantitative Imaging Biomarker Alliance (QIBA®), which has grown considerably since forming in 2007 with the goal of advancing quantitative imaging and the use of imaging biomarkers in clinical trials and clinical practice.

The growth is also reflected at the RSNA annual meeting, where QIBA hosts a kiosk (see sidebar, next page) and a mid-week working meeting that last year was attended by more than 150 key researchers from around the globe.

Quantitative imaging refers to the extraction of quantifiable features from medical images for assessment of disease, injury or chronic conditions. Clinical



Attendees are invited to drop by the QIBA Kiosk at RSNA 2016 to learn about QIBA activities and projects and meet colleagues.

radiology has been slow to embrace advanced quantitative measures. A 2012 study from Vanderbilt University found that only two percent of 761 CT and MRI reports contained an advanced quantitative metric, defined as a “numerical parameter reporting on lesion function or composition, excluding simple size and distance measurements.”

“Over the history of radiology, quantitative measures have not been commonly reported, despite the fact that quantitative imaging can provide a consistent measure of a patient’s disease and response to treatment over time,” said QIBA Chair Edward F. Jackson, PhD, chair of the Department of Medical Physics at the University of Wisconsin School of Medicine and Public Health in Madison.

Daniel C. Sullivan, MD, Dr. Jackson’s predecessor as QIBA chair, first brought the idea of forming QIBA to RSNA while working at the National Institutes of

Health, where in the late 1990s attention was shifting to personalized medicine — now also known as precision medicine.

“We knew that if radiology was going to be relevant in precision medicine, the results from imaging scans had to be more quantitative,” Dr. Sullivan recalled.

With support from the RSNA and the National Institute of Biomedical Imaging and Bioengineering (NIBIB), the alliance grew swiftly, from approximately 50 people and three committees in 2007 to more than 800 participants and 12 Biomarker Committees today.

QIBA Garners Industry Support

Further evidence of QIBA’s expansion can be found in industry support, which was initially lukewarm, according to Dr. Jackson, but grew over time.

“Now there is strong interest and increasing participation in QIBA committees from representatives of device

QIBA Hosts Meet-the-Expert Sessions at RSNA 2016

Location: Learning Center,
Lakeside Center East, Level 3

◆ Visit the QIBA Kiosk poster area to interact with colleagues, learn about QIBA projects and activities and share ideas.

◆ Posters will be on display all day; Meet-the-Experts sessions will be held during lunch hour:

Sunday, Nov. 27 12:30 – 1:30 p.m.

Monday - Thursday 12:15 – 1:15 p.m.
Nov. 28-Dec. 3



Sullivan



Jackson

vendors,” Dr. Jackson said. “Recently, we presented an update on QIBA to NIBIB leadership and representatives were there from radiology, oncology, imaging device manufacturers, image analysis software companies, imaging contract research organizations and regulatory agencies.”

As QIBA has grown, it has inspired the formation of similar groups outside of North America. A formal collaboration between QIBA and the European Society of Radiology (ESR) was achieved through the establishment of a European Imaging Biomarker Alliance (EIBALL) subcommittee of the ESR Research Committee.

Japanese radiology leaders are crafting their own alliance based on QIBA structure and processes. A special QIBA symposium was held in April 2016 at the 75th Annual Meeting of the Japan Radiological Society (JRS), where Dr. Jackson was joined by Kevin O’Donnell, senior manager at Toshiba Medical Research Institute USA and chair of QIBA’s Process Committee.

“QIBA reflects a need for systems to integrate standards better,” said O’Donnell, who worked in Japan for five years. “The Japanese researchers were seeing a similar chasm and were interested to see what QIBA is doing to bridge that gap.”

“As globalization proceeds, patients,

industries and imaging devices must move beyond national boundaries,” added Tomio Inoue, MD, PhD, a JRS member from the Yokohama City University School of Medicine in Japan. “Internationally-harmonized clinical trials using objective indexes derived from imaging technology are helpful for efficient new drug and treatment development.”

Advancing Biomarker Research

QIBA’s structure includes a steering committee and four modality-specific coordinating committees, with leadership drawn from academia and industry, including imaging science, radiology, equipment vendors, pharmaceutical companies and software developers. Each modality has several biomarker committees and task forces with different areas of focus.

For example, one of the CT committees is investigating volumetry as a more accurate way to assess treatment — especially in tumors with unusual shapes — while one of the MR committees is focused on elastography to assess liver disease.

“It’s important to have something quantitative that can help us categorize disease as mild, moderate or severe,” O’Donnell said. “These biomarkers can also guide whether or not to treat and if so, how aggressively, and evaluate the success of different treatments.”

The biomarkers under study are expected to improve upon existing criteria like the Response Evaluation Criteria in Solid Tumors (RECIST) technique, which involves formalized rules for measuring single-dimension tumor response using x-ray, CT or MRI.

“Each of the quantitative imaging biomarkers we are addressing goes beyond what RECIST measurements can assess,” Dr. Jackson said. “Functional methods like diffusion MRI or FDG-PET can assess changes that occur much earlier than changes in lesion size or volume.”

Biomarkers Must Fit Criteria

The QIBA committees focus on developing Profiles — documents used to organize and record the results of collaborative work by QIBA members. A QIBA Profile includes one or more performance claims that tell users what quantitative results can be achieved. For instance, the performance claim for CT volumetry states that a measured volume change of more than 30 percent for a tumor provides at least a 95 percent probability that there is a true volume change.

“When you send blood samples out, the labs are certified, there are quality control procedures in place and the numbers generated are reliable and consistent,”



O’Donnell said. “In imaging, we’re aspiring to achieve the same kind of system.”

To be included under the QIBA umbrella, imaging biomarkers must satisfy five criteria: they must be transformative, translational, feasible, practical and collaborative. The QIBA Profile advances through several steps including a public release and comment period followed by agreement on a consensus version. The Profile requirements must then be successfully implemented in at least two different centers and on two different platforms in order to be considered Technically Confirmed. The Profile can then be demonstrated to achieve the Claim Confirmed stage through small-scale studies by at least two different groups.

The final Profile stage, Clinically Confirmed, requires a much larger clinical study.

“The chief obstacle to the translation of QIBA efforts to clinical care is the last step of the process,” Dr. Jackson said. “That’s where it becomes challenging, because the funds we have are insufficient for the necessary clinical trials and can’t currently be used for human subject studies.”

Several QIBA Profiles have made it through the public release and comment stage and are entering the Technically Confirmed and Claim Confirmed steps of the process. To advance through the Clinically Confirmed stage, QIBA leaders are considering various options, including collaboration with clinical trials groups.

Developing Clinical Data Takes Time

Other QIBA projects include developing the Quantitative Imaging Data Warehouse, a publicly available online data bank to further research and develop physical test objects (phantoms) and digital reference objects.

QIBA leaders agree that the dissemination and implementation of quantitative measures in the clinical area will be vital to their mission’s success in the future.

“Radiology tends to be conservative, with groups that are slow to change until either they’re pressured by consumers or they see compelling data,” Dr. Sullivan said. “It takes time to develop clinical data and for referring physicians to become aware of it.”

“The engine is running, but right now I can’t predict when we’ll cross the finish line,” Dr. Jackson added.

Tracking the Dramatic Evolution of RSNA’s Diagnosis Live™

Continued from Previous Page

Dr. Chang conducted four Diagnosis Live sessions at the 2015 Royal Australian and New Zealand College of Radiologists’ annual meeting, marking the beginning of the application’s international expansion. As of May 2016, Diagnosis Live was used in select sessions at radiology conferences held by Deutsche Röntgengesellschaft (DRG), the Society of Abdominal Radiology, the Society of Pediatric Radiology and the Association of University Radiologists.

And the role of RDL at RSNA annual meetings has expanded each year. Diagnosis Live will support courses at RSNA 2016 including seven rapid-fire sessions conducted by Drs. Chang, Flanders and colleagues. Dr. Flanders said the response has been incredible. “We were shocked that our 7 a.m. rapid-fire sessions played to packed houses,” he said. “RSNA attendees want interactive participation and in response, Diagnosis Live is peppered throughout more RSNA event lectures than ever before.”

Diagnosis Live Has Boundless Potential

Though it began modestly, RDL has evolved into a fully-scalable, sophisticated application with cutting-edge, big data architecture. Today’s version is cloud-based, hosted on Amazon Web Services™ and can be used anywhere in the world where internet access is found. How-to guides posted on YouTube help new users better understand RDL’s various modules.

Despite its enormous progress in a short span of time, Diagnosis Live still has great potential for the future, Dr. Flanders said.

“As more institutions adopt it, program directors can use it as a regular mechanism to assess residents in key areas and benchmark them against their peers in-house and at other institutions.”

At time of printing, 68 residency programs worldwide hold RDL licenses including six non-North American institutions.

Radiologist Assistants, Radiologic Technologists Aid Patient-Centered Care

BY MARY HENDERSON

As radiology continues on the path to a value-based, patient-centered care model, the roles of the imaging professionals who are a vital part of that process — including the radiologist assistant (RA) and radiologic technologist (RT) — are evolving right along with the specialty.

While still an up-and-coming field, the RA — a mid-level professional between the technologist and radiologist — has considerable potential in extending the reach of radiologists and filling a need in working closely with patients to provide the best care possible. Although there are fewer than 700 RAs practicing across the country, radiology departments and private practice radiology groups that are hiring RAs — experienced, registered radiographers who have obtained additional education and certification — are yielding numerous benefits.

“Having RAs as part of the radiology team can be a real asset to our profession,” said Keith Hentel, MD, executive vice chair in the Department of Radiology at New York-Presbyterian Hospital-Weill Cornell Medical Center. “Radiologist assistants save time, make radiologists more efficient and play a big role in facilitating patient-centered care.”

Through the critical role they play with patients, RAs also help to raise awareness about the radiologist and the role radiology plays in healthcare, said Jennifer Kemp, MD, a body imaging specialist at Diversified Radiology of Colorado, Denver, which employs RAs.

“As an extension of the radiologist, the RA might be less rushed and can potentially spend more time with the patient than the radiologist would have had the luxury of doing,” Dr. Kemp said. “RAs can extend the services of the radiologist by being more readily available for scheduled examinations.”

Along with certification as a radiologic technologist, the RA has typically completed a bachelor's or a master's degree. The term RA includes both the registered radiologist assistant (RRA) and the radiology practitioner assistant (RPA), which



are similarly advanced level radiography professionals certified by different organizations.

The American College of Radiology (ACR), the American Registry of Radiologic Technologists (ARRT), the American Society of Radiologic Technologists (ASRT) and the Society of Radiology Physician Extenders are currently working to obtain Medicare reimbursement for RA-performed procedures.

The RA complements other radiology team members, including the RT. Under a radiologist's supervision, the RA performs patient assessment, patient management and selected exams including interventional radiology, fluoroscopy and 3-D reconstruction post-processing. RAs are often trained to perform upper and lower GI image scans as well as needle localizations, and have training in radiation safety as well as technical knowledge of imaging procedures. RAs do not interpret medical images at Weill Cornell, Dr. Hentel said.

“We use RAs to augment the expertise of the radiologist, not to replace the radiologist,” Dr. Hentel said.

Adds Dr. Kemp: “Our RAs consistently

make our patients aware that their images will be interpreted by a radiologist and the final report will be sent to their ordering physician.”

RAs Connect With Patients

Working with patients is central to the job of an RA. In addition to doing venous access insertions, Wes Shay, RRA, RT(R) (ARRT), a registered radiologist assistant in interventional radiology (IR) at Memorial Sloan Kettering Cancer Center, New York, spends his workday evaluating, educating and consulting with patients prior to and following their IR procedures.

“Along with technologist training, we have more pharmacology-based education, patient assessment duties and some imaging pattern recognition,” Shay said. After earning his radiography credentials, Shay earned his bachelor's degree in diagnostic imaging and his radiologist assistant master's degree from Quinnipiac University in Connecticut.

At Weill Cornell Medical Center, there are five RAs on staff whose duties range from doing patient consultations to performing advanced imaging post-process-



Hentel

Kemp

Shay

Sullivan

Odgren

ing under a radiologist's supervision.

“The radiologists here have been so supportive,” said Courtney Sullivan, MS, RRA, a registered radiologist assistant at Weill Cornell. “We are trained for IR and fluoroscopy, but we can serve so many more roles, from consultations to establishing protocols for exams in the ER.”

Sullivan administers one of the hospital's major patient-centered care efforts — the Weill Cornell Imaging Consultation and Radiologic Expertise (WiCare) program — which, as one of its functions, facilitates reporting and follow-up imaging for women identified as having dense breast tissue.

As a main contact point for patients, Sullivan answers questions, synthesizes clinical information and imaging history, and facilitates consultations with radiologists.

In a recent survey of WiCare patients, 80 percent said they felt they had the support and information necessary to make imaging decisions.

“The quality of patient interaction is higher once the RA has consulted with the patient and done the preliminary work, as that is less time we need to devote in that area,” Dr. Hentel said. “It's helpful to have someone with a medical background speaking to the patients and referring physicians. It makes the radiologist's job that much easier.”

Along with improving patient interaction and building relationships with referring physicians, RAs also play a pivotal role in the transition to value-based care, Dr. Kemp said.

“If the radiologist is doing most of the fluoro procedures, the patients and hospital staff might be kept waiting for an unpredictable amount of time,” Dr. Kemp said. “With the focus on value, we realize our patients' time is valuable. The RA also works closely with the radiology technologists to stay on schedule and keep things running smoothly.”

RTs Play Front-line Role with Patients

A critical member of the medical imaging team, the RT — who performs diagnostic imaging examinations and administers radiation therapy treatments — also continues to evolve with the specialty on a number of fronts.

Along with staying up to speed on advancing technology and being vigilant about continuing education and training, RTs are often the first point-of-contact for patients and play a central role in communicating with the radiologist.

“As the speed of delivery and quality of care are both increasing rapidly, and with reimbursements tied to patient satisfaction, the role of the RT is now more important and complex than ever,” said Michael Odgren, BS, RPA, RT (R)(CT) (ARRT), a radiology practitioner assistant for Diversified Radiology of Colorado, Denver, and speaker of the House of Delegates for ASRT. “Radiologists count on us to provide accurate patient histories to help guide them in making their diagnoses, and patients are counting on us to ensure their exams are performed properly and with the minimum radiation dose necessary.”

Odgren believes that communication between the radiologist and RT is a critical component of patient-centered care and that asking the radiologist questions is central to the RT's job.

“If a technologist is empowered to ask questions and communicate and a radiologist is able to provide information and feedback, it will lead to not just a better educated technologist, but also higher quality exams, better patient outcomes and potentially better patient satisfaction as well,” Odgren said.

First Radiologist Assistant Program Launched in Mid 1990s

The concept for the Radiologist Assistant (RA), originally conceived in the 1970s, began to gain traction in the 1990s when the U.S. Department of Defense (DOD) and Weber State University in Ogden, Utah, began discussing the creation of a program to educate advanced clinical practice radiologic technologists (RTs.)

The DOD ended its participation in the program, but Weber State moved forward with the idea and introduced a radiologic technology advanced level educational program in the mid-1990s. Soon after, the American College of Radiology (ACR), concerned with a shortage of radiologists and growing demand for imaging services, and the American Society of Radiologic Technologists (ASRT), which was looking for ways to extend the career path of radiologic technologists, found a common solution in the RA. The American Registry of Radiologic Technologists — a certifying organization not affiliated with ASRT — began offering certifica-

ASRT@RSNA 2016 Courses Spotlight Issues Critical to Radiologic Technologists

The American Society of Radiologic Technologists (ASRT) is sponsoring a number of sessions at RSNA 2016, including:

- A Team Approach to Patient-centered Imaging
Wednesday, Nov. 30 | MSRT41
- MRI Guidance for Prostate Cancer: A Radiation Therapist Perspective
Wednesday, Nov. 30 | MSRT46
- Education, Qualification, Certification: What's Next?
Thursday, Dec. 1 | MSRT51

Go to My Agenda at Meeting.RSNA.org.

“Having RAs as part of the radiology team can be a real asset to our profession.”

KEITH HENTEL, MD





Tight Budget?

Experience Chicago at Low — or No — Cost

BY STEPHANIE EWING

Chicago is a global city, but its world-class dining, transportation and entertainment need not come at a high cost. Opportunities abound for RSNA Annual Meeting attendees to experience the best of Chicago on a budget.

“In countries like mine, working in a public hospital, we cover most of the expenses ourselves. There is no institutional budget for international training,” said Cesar Caldas, MD, attending physician in the Nuclear Medicine Department at Guillermo Almenara Hospital in Lima, Peru.

Similarly, travel expenses can overwhelm the budgets of residents and fellows.

“Money is tight on a fellow’s salary,” said Ichiro Ikuta, MD, MMSc, neuroradiology fellow at Yale-New Haven Hospital in New Haven, Conn. “Medical school loans and rent are expensive, so every penny counts.”

Fortunately, Chicago has many less expensive and free options to help stretch tight budgets further.

RSNA polled its social media followers to learn how they save money on food, entertainment and transportation while attending the annual meeting. Thirty-two people responded to the poll, which included a ranking of their top expenses, excluding lodging and transportation to the meeting. Following are some of their ideas for getting the most for your money.

“If you travel with someone, you can split cabs. And it’s a good way to network.”

ICHIRO IKUTA, MD, MMSc

Dining, Entertainment on the Cheap

Eighty-two percent of respondents said that food is their top expense while in Chicago for the RSNA annual meeting.

The good news is that Chicago’s world-renowned restaurant scene has enough dining options to meet the needs of every pocketbook.

Thirty-eight percent of respondents saved money by choosing restaurants off the beaten path in Chicago’s diverse array of neighborhoods.

When exploring restaurants, it can pay to do some research before heading out.

“Restaurant prices can be high, so check out their menus online beforehand,” Dr. Ikuta recommended. “Sometimes you can find a bar or restaurant with a happy hour, which certainly makes it less expensive.”

Other respondents recommend searching discount sites like Groupon for deals at pricier establishments.

But for RSNA 2016 attendees with busy

schedules, finding time to sit down at a restaurant may be difficult.

Grocery stores such as Jewel-Osco, Mariano’s or Trader Joe’s, or convenience stores like Walgreen’s or 7-Eleven can be a big money-saver. One poll respondent purchases fruit and cereal bars to bring along for snacks or lunch. Some stores have robust delis and even seating areas to enjoy an economical meal.

For trainees, RSNA’s Resident and Fellow Lounge offers free coffee, snacks and lunch.

“As a resident and fellow, the complimentary food in the Resident and Fellow Lounge at the RSNA meeting has been great, and it’s a good way to meet other trainees from all over the country — and world,” Dr. Ikuta said.

Poll respondents ranked entertainment as their second largest cost, but as in dining, inexpensive options abound.

“The Bean” is free and is always a fun photo opportunity,” said Dr. Ikuta, referring to the famous mirrored Cloud Gate sculpture in Millennium Park, nicknamed “The Bean.” The sculpture was



named the favorite free attraction of 45 percent of poll respondents.

Dr. Caldas enjoys strolling through the free, outdoor German-inspired Christkindlmarket in Daley Plaza.

Garfield Park Conservatory, Lincoln Park Zoo, Navy Pier and many performances at the Chicago Cultural Center are also free.

Several respondents said their favorite free activity is simply walking around downtown and enjoying the outstanding architecture. For the winter holidays, many stores along the Magnificent Mile have elaborate Christmas displays.

Interested in a guided tour? RSNA offers \$35 guided walking tours. And if arranged online in advance, services like Chicago Greeters can provide free or low-cost walking tours, including free drop-in tours of the Loop and Millennium Park on Fridays, Saturdays and Sundays.

Transportation

With many free and low-cost transportation options, travel within Chicago was the top budgetary concern for just nine percent of respondents.

“Chicago has excellent transportation systems to visit all areas of the city. At the RSNA annual meeting, there are free shuttle buses from your hotel to the event,” Dr. Caldas said.

Attendees also receive complimentary passes for the Metra train, which has stations at McCormick Place and around the city. Chicago’s other bus and train lines are also affordable.

Of course walking is free and a great way to see the sights. “Chicago is a very walkable city in reasonable weather,” wrote one respondent.

Ride-sharing services like Uber or Lyft may be cheaper than cabs. Reduce costs further by riding with other attendees. “If you travel with someone, you can split cabs,” Dr. Ikuta said. “And it’s a good way to network.”

Because cab transportation from the airport to the Loop, and vice-versa, can be expensive, one respondent recommends making the trip to O’Hare or Midway airports by either the Blue or Orange Line trains, respectively. Besides being inexpensive, “They are clean, safe and timely, regardless of the weather.”

The best resource for money-saving tips at RSNA 2016 may be other attendees, Dr. Ikuta added. “Talk to people who have been to the RSNA conference before. Everyone has money-saving tips and advice.”

Explore More Free Things to Do in Chicago

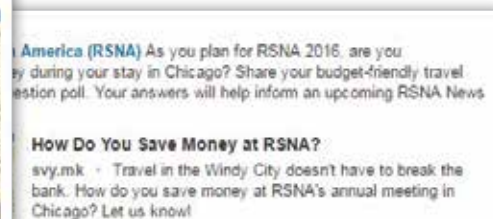
- Choose Chicago (ChooseChicago.com) has a page devoted to free Chicago attractions.
- Chicago Greeter Visits (Chicagogreeter.com)
- Free Tours by Foot (Freetourbyfoot.com/Chicago-tours)
- Free Things to do in Chicago (Chicago.thelocaltourist.com/freethingstodo)
- Things to Do in Chicago (Thrillist.com)

RSNA Tours and Attractions

RSNA has teamed up with Hosts Chicago, a Hosts Global Alliance Member, and Bloomingdale’s, to offer exciting ways to experience Chicago during your stay for RSNA 2016. Registered RSNA 2016 attendees can sign up for tours, performances and more at RSNA.org/Tours-and-Events.

RSNA Reservations Desk

Attendees are invited to visit the Restaurant Reservations Desk in the Grand Concourse for restaurant recommendations, reservations and concierge services.



MEETING EXPERIENCE

BEYOND IMAGING RSNA 2016 NOVEMBER 27 - DECEMBER 2

NEW Onsite Registration/Badge Pickup

All attendees, professional or exhibitor personnel that registered in advance can print badges at any of the three designated registration locations. New registrants can also complete their registration at these locations – save time and register online at Meeting.RSNA.org and simply stop at one of these locations to pick up your badge. A valid photo ID is required.

South Building – Level 1

Sunday - Thursday 7:30 a.m. – 5 p.m.

Lakeside Center East – Level 2

Saturday 11:30 a.m. – 5 p.m.

Sunday - Thursday 7:30 a.m. – 5 p.m.

Friday 7:30 a.m. – noon

North Building – Level 2

Sunday - Thursday 7:30 a.m. – 5 p.m.

Reserve Your Room Now

We've secured over 90 hotels in downtown Chicago offering discounted rates. Hotel rooms are only available to RSNA-registered participants.

Save Up to 10 Percent on Airfare Through Exclusive Discounts

United Airlines

United offers discounts from 2 to 10 percent off applicable fares. Discounts apply on United Airlines and flights operated by United or other airlines branded United Express. International discounts are allowed on flights operated and/or marketed on the following carriers, provided such flights are booked by a travel agency or United Reservations.

- Flights via the Atlantic: Air Canada, Austrian Airlines, Tyrolean Airways, Brussels Airlines, Lufthansa Airlines, Swiss International Airlines.

- Flights via the Pacific: United codeshare flights operated by All Nippon Airways. Applicable terms and restrictions apply.

Book online at United.com, enter offer code ZVQ6520692, or call United at 1-800-426-1122 and provide the offer code. Service fee applies for phone reservations.

Delta Air Lines

Delta offers special discounts off most fares. Applicable restrictions may apply. Discounts are applicable to U.S./Canada originating passengers. Book online at Delta.com and enter Meeting Event Code NMNG3, or call Delta at 1-800-328-1111 and provide the event code. Service fee applies for phone reservations.

International Services

International services and special signage featuring images will be placed in key areas at McCormick Place. Although the annual meeting is officially in English, RSNA offers translation services in Chinese, Dutch, French, German, Italian, Japanese and Spanish, available at the Information Desks.

International Invitation Letter

RSNA offers an official letter of invitation for RSNA 2016 attendees. The letter of invitation, although not required for the visa application, can assist as a supporting document. Present this letter of invitation from RSNA to the Consular Officer during the visa interview.

- Request a customized letter during online registration or by visiting RSNA.org/Visas.
- All visa applicants are advised to apply for their visas as soon as travel to the U.S. is contemplated.

NEW Changes to Visa Waiver Program

Travelers using the Visa Waiver Program (VWP) must now have an e-Passport, which includes an embedded electronic chip. The letter of invitation, although not required for the visa application, 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.

REGISTRATION CATEGORIES AND RATES

Attendee Rate (on or before 11/4)			Exhibits Only Daily Rate	Registration Categories and Codes
<i>Includes admission to RSNA educational sessions and exhibit halls for the duration of the meeting. † Virtual includes Virtual program live and on-demand.</i>			<i>Includes admission only to the exhibit halls.</i>	
RSNA MEMBERS				
ANNUAL + VIRTUAL MEETING PACKAGE†	ANNUAL MEETING ONLY	VIRTUAL MEETING ONLY		
\$100	Free	\$100	*	11 RSNA Active Member RSNA Active Member Presenter
\$100	Free	\$100	*	10 RSNA Associate Member RSNA Associate Member Presenter
\$25	Free	\$25	*	12 RSNA Member-in-Training
\$25	Free	\$25	*	17 RSNA Medical Student Member†
NON-MEMBERS				
\$1200	\$900	\$300	\$325	14 Non-Member Physician A. radiologist B. radiologic scientist C. non-radiologist physician
\$500	\$200	\$300	*	15 Non-Member Resident/Trainee — <i>verification required</i>
\$300	Free	\$300	*	18 Non-Member Student† — <i>verification required</i>
MEDICAL PHYSICISTS				
\$100	Free	\$100	*	21 AAPM Member
\$1200	\$900	\$300	\$325	22 Non-Member Physicist
HEALTHCARE PROFESSIONALS				
\$500	\$200	\$300	*	23 Radiology Support Personnel — <i>verification required</i> A. technologist G. architect B. engineer H. gov. employee (non-physician) C. radiology business manager I. information technology/system support D. radiology administrator J. telemedicine/communications specialist E. nurse/nurse practitioner K. facility manager F. educator L. assistant (physician/radiologist)
\$1200	\$900	\$300	\$325	24 Hospital or Facility Executive A. hospital or facility administrator D. purchasing B. legal (in-house counsel) E. other senior-level personnel C. officer (CEO, CFO, CIO, COO)
INDUSTRY PERSONNEL				
\$1200	\$900	\$300	\$325	25 Commercial Research and Development Personnel
\$1200	\$900	\$300	\$325	27 Industry Personnel A. distributor B. manufacturer C. prospective exhibitor D. other
\$1200	\$900	\$300	\$325	31 Healthcare Consultant A. attorney C. financial analyst E. staffing/recruitment B. computer analyst D. purchasing F. other

SAVE TIME:
REGISTER
ONLINE AT
Meeting.RSNA.org

Verification Required

Registration categories 15, 18, and 23 require verification in order to be processed. These categories require a business card, a letter from hospital administration stating your role in radiology, a valid RT license, or student ID copy. Upload during online registration or email RSNAverify@experient-inc.com.

Badge classification is subject to RSNA approval and category or rate change. If verification qualifies for a different registration category, the registration will automatically be reclassified and charged the appropriate fee. Registration is subject to cancellation if verification is not provided within 5 business days after registration.

Note: Registrations processed after November 4 will reflect a \$150 increase over annual meeting only advance registration rates.

* Exhibits Only registration is not applicable for this registration category – annual meeting registration is required (includes access to Technical Exhibits). See corresponding annual meeting only rate column.

† CME/CE credit is not tracked or awarded.

‡ Register for the RSNA Annual + Virtual Meeting Package and get access to both the physical meeting at McCormick Place and the Virtual Meeting. This package gives you the maximum flexibility by providing live access to sessions at RSNA 2016, plus 90 Virtual sessions available either live or on-demand. Earn CME credit for all live sessions you attend in-person or through the Virtual Meeting!

VIRTUAL MEETING ENHANCES THE RSNA 2016 EXPERIENCE

The RSNA 2016 Virtual Meeting now features expanded content, longer availability, CME credit for live sessions — plus a select number of CME-eligible courses on demand. Both RSNA 2016 in-person attendees and medical professionals around the globe can participate in the Virtual Meeting. The Virtual Meeting is available 24 hours a day beginning at 8 a.m. Central Time (CT) on Saturday, Nov. 26. Live programming will run simultaneous to the RSNA 2016 annual meeting, which ends Friday, Dec. 2. After that date, all Virtual Meeting programming will be available on demand through Friday, Dec. 23, at 4 p.m. CT.

Expanded Content, Extended Access

Enjoy 90 courses — a 25 percent increase since 2015 — available for viewing live and on demand. Watch programming live or on demand during the annual meeting, then continue to access courses on demand beyond the meeting dates.

Visit RSNA.org/Virtual to:

- View the complete Virtual Meeting course listing.
- Access live and on-demand courses during and after the meeting.

Live Content Available for CME Credit

RSNA is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The RSNA designates this live activity for a maximum of 83.75 *AMA PRA Category 1 Credits™*. Physicians should claim only credit commensurate with the extent of their participation in the activity. Throughout the meeting, participants can earn credit for live or remote participation in Plenary Sessions, Educational Courses, Scientific Sessions and for correctly diagnosing Cases of the Day.

CME credit is awarded for participation in sessions only on an hour-for-hour basis. In order to receive credit, participants must attend the entire session. The virtual session will automatically track your attendance.

AMA defines a live activity as one that occurs at a specific time, and a participant may be in person or remote. Live activity provides the opportunity for formal interaction between faculty and audience.

NEW Select CME Courses on Demand

Select courses have been designated for CME credit when consumed on demand following the live session. This Enduring Material has been approved for *AMA PRA Category 1 Credit™*. Courses will be awarded 1.50 *AMA PRA Category 1 Credits™* when viewed on demand through Friday, Dec. 23, 4 p.m. CT, and upon successful completion of a test and course evaluation.

Other courses may be viewed on demand without credit.

RSNA extends its appreciation to instructors who have provided questions and references for these courses, making on-demand CME possible. AMA considers on-demand programming as an Enduring Material and requires assessment of the learner by patient management case studies, a post test, and/or application of new concepts in response to simulated problems.

Cases of the Day and More

Virtual Meeting participants may submit answers for Cases of the Day by midnight CT on the day the case is presented at the annual meeting. Correct answers will be revealed the following morning. Access scientific presentations and educational exhibits. Virtual Meeting participants who submit the correct answer will receive 0.5 *AMA PRA Category 1 Credits™*.

Virtual Meeting Viewing Lounge

Space in the Learning Center has been set aside for attendees to experience the Virtual Meeting. This area will offer comfortable seating, device charging opportunities, computers and headphones for registered attendees to view live or on demand virtual sessions at their leisure.

Virtual Meeting Cost

- RSNA/AAPM Member — \$100
- Non-member — \$300
- Member-in-Training or Medical Student Member — \$25
- Retired RSNA Member — FREE
- Price is the same whether or not you attend RSNA 2016 in person.

Onsite Help

For information or help concerning the Virtual Meeting, go to the Digital Support Booth in the Connections Center or in the North Hall, or the Membership & Resources Booth in the Connections Center.

More Information

Contact virtual@rsna.org, or call 1-630-571-2670 or toll-free 1-800-381-6660 from the United States or Canada, between the hours of 8 a.m. and 4 p.m. CT Monday through Friday.

TECHNICAL EXHIBIT SPOTLIGHTS WORLD'S NEWEST INNOVATIONS

A First-Time Exhibitors Pavilion is one of the new offerings in this year's Technical Exhibits, one of the world's largest medical exhibitions featuring nearly 700 exhibitors from across the globe. Shop and compare equipment supplies, devices and software demonstrated by leading manufacturers, suppliers and developers of medical information technology in two halls: Hall A in the South Building and Hall B in the North Building.

NEW Live Ultrasound Demonstrations

Companies will conduct live ultrasound scanning on human models to better demonstrate the benefits of their product solutions for meeting attendees.

NEW First-Time Exhibitor Pavilion

A new showcase area inside the North Hall will feature first-time exhibitors demonstrating new products and services. Other first-time exhibitors located throughout exhibit hall will be identified with a First Time Exhibitor logo.

Vendor Workshops

Vendors provide hands-on tutorials of commercial software systems in a classroom setting.

RSNA/IHE® Image Sharing Demonstration

See daily demonstrations by care sites and commercial vendors featuring RSNA's Image Share and Integrating the Healthcare Enterprise (IHE®) methods for sharing image-enabled electronic health records and radiation dose information.

International Pavillions

Visit exhibitors from Canada, China, France, Germany, Korea and the Netherlands.

Publishers Row

Visit top medical publishers that will display their educational materials from across all areas of medical imaging.

Bistro RSNA—Lunch

With an extensive gourmet menu and ample seating, Bistro RSNA is a convenient option to sit down to a comfortable lunch and network with colleagues.

Purchase your tickets in advance for \$22 per meal. For more information, visit bistroticket.com/rsna.

**Sunday, Nov. 27 to Thursday, Dec. 1
11 a.m. to 2:30 p.m.**

Technical Exhibits, North & South Buildings

NEW Special Brunch

**Thursday, Dec. 1
10:30 a.m. to 1:30 p.m.**

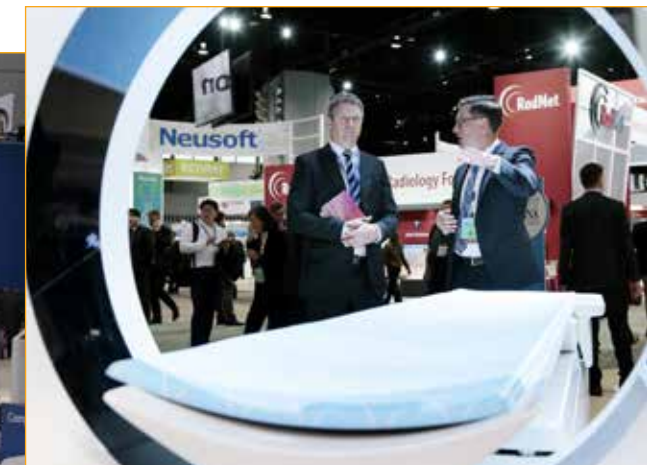
Technical Exhibits, North & South Buildings only

Enjoy this hearty Special Brunch featuring an optional Bloody Mary bar for an additional fee.

TECHNICAL EXHIBITS HOURS

**Sunday, Nov. 27 to Wednesday, Nov. 30
10 a.m. to 5 p.m.**

**Thursday, Dec. 1
10 a.m. to 2 p.m.**





VISIT THE RSNA CONNECTIONS CENTER

The all-new RSNA Connections Center was redesigned with RSNA attendees in mind. The expanded lounge seating offers a spot to network, recharge your phone and enjoy new beverage options including gourmet coffee, wine and beer for purchase.

NEW Membership & Resources

Staff will be available to answer questions about RSNA services including:

- **Career Connect**
Assistance if you're looking for a job or need to fill one.
- **Education**
Get answers about available products and resources.
- **Image Wisely®**
Take the pledge to Image Wisely using optimal radiation dose in medical imaging.
- **International Affairs**
Learn about RSNA's international outreach programs.
- **Journals and News**
Check out all of RSNA's print, online and mobile publication applications and learn about journal subscriptions.
- **Membership**
Get answers to your questions about membership, dues payments and maximizing your benefits.
- **Radiology Cares®: The Art of Patient-centered Practice**
Access RSNA patient-centered practice resources.
- **RadiologyInfo.org®**
Learn about this comprehensive patient information website.
- **Virtual Meeting**
Information about the expanded Virtual Meeting and how to add it to your meeting experience.

Information Desk

Visit RSNA staff at the Information Desk for answers to all your questions about all things related to RSNA 2016.

Digital Support

RSNA technology experts are available to provide one-on-one digital help with Meeting Central, the RSNA Meeting App or the Virtual Meeting.

RSNA Shop

The newly redesigned RSNA Shop is your go-to resource for CME Refresher Course USBs, *Radiology Select* issues, *RadioGraphics* journal samples and RSNA-branded merchandise and apparel. New this year: Branded items including cashmere scarves and pashminas, leather notebooks, power banks and plush teddy bears for the kids.

Attendees can also access RSNA educational resources including online refresher courses, cases, ethics and professionalism courses and RSNA/AAPM Physics Modules.



NEW Discovery Theater Features Music, Performance Acts

Stop by the new Discovery Theater throughout the week for special musical and performance acts as well as discussions on RSNA programs. Attendees can view the full schedule and add the events to My Agenda at Meeting.RSNA.org. Events include:

Performances:

- Callaloo* (Caribbean steel drum band)
- Chicago Diamond Trio* (jazz band)
- Musicality Vocal Ensemble*
- Hilary Butler Quartet*

Presentations:

- Navigating RSNA*
- Quality Certificate Programs*
- Research Courses and Workshops*
- Resident and Fellow Tweet Up*



Back by Popular Demand: RSNA Image Contest

The RSNA community is once again invited to submit entries to the RSNA Image Contest in three categories: Radiology Art, Best Photo, Most Unusual Case and Best Medical Image. Votes will be taken between Oct. 1-31 and winners will be notified through social media on Nov. 4. Drop by the Discovery Theater at RSNA 2016 to view the top 25 entries. Images will also be available at RSNA.org/Image-Contest and at #RSNA16.

R&E Donor Suite

Learn more about the Research and Education (R&E) Foundation activities, including the Inspire-Innovate-Invest Campaign. Read about current grant and award recipients, as well as individual, private practice and corporate donors. Attendees who received a donor ribbon and those who contribute at least \$300 onsite enjoy exclusive access to the newly remodeled Donor Suite, which features computers, a coat room, comfortable furniture and light refreshments.



LEARNING CENTER FEATURES THOUSANDS OF POSTERS AND EXHIBITS

Located in Lakeside Center East, Level 3, the newly redesigned Learning Center houses thousands of education exhibits and scientific posters covering a range of specialties. New this year, scientific posters will be displayed within each learning community. During the lunch hour, authors will be present for Poster Discussions (consult the RSNA Meeting Program for days/times).

CME Learning Checkpoint

New this year in the Learning Center, CME Learning Checkpoints will highlight up to 11 award-winning hard-copy exhibits from RSNA 2015. Attendees can study an exhibit and take the corresponding quiz on their mobile devices or laptops. Attendees receive 0.5 *AMA PRA Category 1 Credit™* for each completed quiz.

QI Storyboard Poster Walks

Join David Larson, MD, and Paul Nagy, PhD, experts in quality improvement in radiology, as they walk through the QI storyboards, highlighting examples of great work and sound methodology. Bring your walking shoes and come prepared for an interactive session. Those who are interested in leading and publishing QI projects in the coming months and years will find this especially valuable.

Monday, Nov. 28, 3 - 4 p.m., Quality Storyboard Section

Quantitative Imaging Reading Room

Explore products that integrate quantitative analysis into image interpretation. Exhibits feature informational posters, computer-based demonstrations, and "Meet the Experts" presentations.

CONTINUING EDUCATION CREDITS AVAILABLE

RSNA is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

RSNA designates this live activity for a maximum of *100.25 AMA PRA Category 1 Credits™*. Physicians should claim only credit commensurate with the extent of their participation in the activity. Attendees can evaluate CME courses and claim credit electronically. As the meeting approaches, RSNA will send information on how to claim CME instantly from the courses attendees take.

The Commission on Accreditation of Medical Physics Education Programs (CAMPEP) has approved the direct transfer of *AMA PRA Category 1 Credits™* to Medical Physics Education Programs (MPCEP) on a credit-for-credit basis for medical physicists.

RSNA is an American Registry of Radiologic Technologists (ARRT)-approved Recognized Continuing Education Evaluation Mechanism Plus (RCEEM+) and will provide Category A+/A continuing education credits for radiologic technologists and radiologist assistants.

Self-Assessment Modules (SAMs)

Various times

Select RSNA courses have been approved for SAMs. Each RSNA in-person SAM is available for up to 1.50 SAM credits and 1.50 *AMA PRA Category 1 Credits™*. RSNA annual meeting in-person SAMs are accredited by the MOC program of the Royal College of Physicians and Surgeons of Canada and approved by the Canadian Association of Radiologists.

3-D Printing Demonstration and Showcase

In addition to many hands-on courses related to 3-D printing, the Learning Center will include theater poster presentations on 3-D printing throughout the week and a demo area with additional information.

NCI Image Perception Research

Researchers supported by the National Cancer Institute (NCI) will be conducting studies on radiologic image perception at RSNA 2016. RSNA meeting attendees will be able to learn about this important area of research and, if they wish, participate in the studies as volunteers in this lab environment.

Machine Learning Demonstration

Attendees can observe real-time machine learning processing of cases and gain insight into the computer's cognitive capabilities for image interpretation. The demonstration is designed to educate attendees about advances in machine learning and the opportunities it provides to enhance clinical assistance and workflow efficiency for radiology departments.

Academy of Radiology Leadership and Management

The Academy of Radiology Leadership Management (ARLM), sponsored by five participating radiology education societies including RSNA, allows radiologists to enhance their careers and develop professional skills. Receive an ARLM Certificate of Achievement by earning 50 education credits across a spectrum of core learning domains including financial skills, human resources, professionalism, legal/contracting and more.

MEETING ESSENTIALS

Meeting Materials

Name Badge

Your meeting badge serves as a virtual business card and is encoded with the name, institution, title, address, email address, phone/fax numbers and demographic information you supplied during registration. You can scan it to leave information with exhibitors.

Your meeting badge is also encoded with radio frequency identification (RFID). Technology is deployed throughout the Technical Exhibits to help monitor traffic patterns and enhance customer service. Your institution, title, city, state, country and subspecialty are captured when you enter an area with RFID technology in use. To opt out of RFID, visit one of the Information Desks throughout McCormick Place.

Ribbon Pick Up

This year, RSNA will award 11,397 special recognition ribbons recognizing long-term members.

Eligible attendees can pick up recognition ribbons that they did not receive in advance of the meeting at the Membership & Resources booth in the Connections Center, Lakeside Center East, Level 3.

RSNA Program in Brief, Official Meeting Bag, Lanyard and Pocket Guide

The printed RSNA 2016 Program in Brief, official meeting bag, lanyard and Pocket Guide are available at the self-serve distribution areas located in the Lakeside Center East, Level 2, the North Building Level 2, and the South Building Level 1.

In addition to the printed RSNA 2016 Program in Brief, RSNA offers an online program at *Meeting.RSNA.org* with a user-friendly search engine to find presentations and build your My Agenda. Available onsite, the RSNA 2016 Pocket Guide is an easy-to-use reference guide to course and event information, floors plans at McCormick Place, transportation and dining.

Technical Exhibits Guide

Available at McCormick Place, the Technical Exhibits Guide includes floor plans, exhibitor list, food service and other exhibit floor activities. The guide is distributed in bins located at exhibit hall entrances.

Online Resources

Meeting Central

Optimized for tablets and mobile devices, the Meeting Central site at *Meeting.RSNA.org* is an essential resource for navigating RSNA 2016. Explore a host of valuable information, including:

- RSNA Meeting Program — Browse the listings of educational courses, scientific presentations and more. Search for courses, sessions and events by keyword, title or name of presenter, using helpful filters by day, session type and subspecialty.

- Technical exhibitors list — Learn about the companies unveiling the latest equipment and technology.
- Virtual Meeting program — Browse virtual sessions available live or on demand either onsite or virtually from anywhere across the globe.
- My Agenda — Build your calendar and stay organized with a handy schedule personalized to your needs — perfect for planning ahead—and access Credit Eval (see below).

Credit Eval

Click My Agenda to access Credit Eval to evaluate RSNA 2016 courses and claim credits online via your laptop or mobile device, or at any Internet Station in McCormick Place. You can begin your evaluations as early as 10 minutes after courses start, claim your credits onsite, and walk away with printed certificates.

For RSNA members, credits are automatically added to the RSNA CME Repository. Assistance is available in the Connections Center.

RSNA 2016 Meeting App

Download the RSNA 2016 Meeting App for iPhone, iPad and Android smartphones to access and explore the Meeting Program even when you're offline. Browse the technical exhibitor list, access maps to navigate McCormick Place and customize your daily meeting schedule with My Agenda. Available via the App Store and Google Play, the RSNA 2016 Meeting App is sponsored by Siemens Healthineers.

Stay Connected

Internet Stations

Computers will be available at internet stations throughout McCormick Place for use in accessing Meeting Central and Credit Eval.

Free Wifi

Free wireless connectivity is available throughout McCormick Place. Note: these wireless networks are not secure and should not be used for sending sensitive information.

Charging Stations

Charge your laptop, phone or other mobile device at one of the Charging Stations located throughout McCormick Place.

Professional Portrait Studio

Visit the North Lobby, Level 3 for this popular RSNA attraction to get a free professional headshot to use for CVs, passports and social media profiles. Photos are immediately e-mailed to you.



Keeping Attendees Informed Social Media Connection

Join — or start — the conversation on social media at RSNA 2016. Follow RSNA at #RSNA16 on Facebook, Twitter, Instagram and LinkedIn to get the latest updates, connect with colleagues and share your favorite meeting moments.



Daily Bulletin


Stay connected to all things RSNA 2016 through the print and online versions of the *Daily Bulletin*, the official newspaper of the annual meeting. Featuring overnight news from the meeting, the *Daily Bulletin* is available in bins throughout McCormick Place. Each day's issue is available on the RSNA 2016 Mobile app and online at RSNA.org/Bulletin.

The *Daily Bulletin* also includes a Technical Exhibits Focus section Sunday-Wednesday featuring new radiologic technology and services demonstrated by technical exhibitors at the meeting.

Get alerts on *Daily Bulletin* stories through social media at #RSNA16 on Facebook ([facebook.com/RSNAfans](https://www.facebook.com/RSNAfans)), Instagram (RSNAgram) or Twitter (@RSNA).

Get Help — Onsite and Online

RSNA offers physical and virtual Information Desks to aid attendees throughout the Annual Meeting.

Throughout McCormick Place, look for the icon  to find help. Visit one of the RSNA Information Desks in the Grand Concourse, Level 3, or in the Lakeside Center East, Level 3, where RSNA staff can assist with general information.

Explore an Expanded Menu of Dining, Drinking Options

Attendees looking to sample Chicago's diverse array of eateries can visit the Restaurant Reservation Desk in the Grand Concourse for restaurant recommendations, reservations and concierge services. Visit the Dining Guide at Meeting.RSNA.org.

Inside McCormick Place, patrons can choose from a variety of options:

Bistro RSNA — Eat, Meet and Network

With an extensive gourmet menu and ample seating, Bistro RSNA is a convenient option to sit down to a comfortable lunch and network with colleagues.

Attendees can choose from three convenient locations: Enjoy a sit-down lunch in the Technical Exhibits, South Building & North Building and in the Learning Center, Lakeside Center East. Bistro RSNA is open Sunday, Nov. 27, through Thursday, Dec. 1, from 11 a.m. to 2:30 p.m.

NEW Special Brunch

- A Special Brunch will be offered Thursday, Dec. 1, from 10:30 a.m. to 1:30 p.m., in the North & South Exhibit halls.
- A Bloody Mary bar will be offered on Thursday, Dec. 1, for an additional fee.

Save by purchasing your tickets online in advance for just \$22/ticket. Tickets purchased onsite are \$24. For daily menu options and to purchase tickets in advance, visit BistroRSNA.com/attendee.php.

NEW Beverage Carts

Visitors to the Connections Center and Grand Concourse North Lobby can keep an eye out for beverage carts serving:

- Metropolis Third Coast Roast Coffee
- Wine and beer

McCormick Place Eateries

Along with favorites including Starbucks, Jamba Juice, Connie's Pizza, McDonalds, Ambrosia Café, Kosher Express, 23rd Street Café, Lakeside Café, Market Cart and more, new dining options have been added to the menu this year at McCormick Place:

- Chicago Beef Sandwich
- Grinders Toasted Subs
- Heartland Burger Company
- Luzita's Street Style Tacos
- Midwest Melt Grilled Cheese

RESIDENT AND FELLOW SESSIONS, NETWORKING OPPORTUNITIES

Highlighted by the annual RSNA Resident and Fellow Symposium, RSNA 2016 offers a full roster of programming geared toward residents and fellows, along with networking opportunities. RSNA annual meeting registration is free for members-in-training.

RSNA Resident and Fellow Symposium

The RSNA Resident and Fellow Symposium will be held Tuesday, Nov. 29, during RSNA 2016. Go to My Agenda at Meeting.RSNA.org.

Topics include:

Career 101: Contract Negotiation

- Academics — David Yousem, MD
- Private Practice — Raym Geis, MD
- Leadership Skills for Trainees — Jonathan Flug, MD

Career 102: Financial Planning

- Personal Financial Planning — Greg Wikelius, MD
- Insurance (Rad-to-Rad on Personal Finance) — David Feiler
- Physician's Perspective — Amanda Liu, MD
- What RSNA Has to Offer Members-in-Training — Nancy J. Benedetti, MD

Other programming geared toward residents and fellows includes interactive Diagnosis Live™ sessions, strategies for American Board

of Radiology exam preparation, case-based interactive review sessions, a four-part cardiac CT mentored case review and a course on international radiology outreach.

Residents Lounge

RSNA members-in-training and non-member residents are offered a place to relax and network while enjoying complimentary refreshments. The lounge is open Sunday – Thursday, 8 a.m.–6 p.m.

Residents Reception

Offered in conjunction with the American College of Radiology, the reception gives residents a chance to eat, mix and mingle and network with longtime RSNA members and radiology leaders. The reception will be held Monday, Nov. 28, from 4 to 5 p.m., in the Hyatt Regency McCormick Place.

Resident and Fellow Tweet Up

The event will be held in the Discovery Center from 3:30 to 4:30 p.m., Tuesday, Nov. 29.

EXPLORE CHICAGO AT RSNA 2016

Make the most of your meeting experience by joining your peers for RSNA Tours and Attractions — your pass to the most interesting, exciting and historic sites in Chicago.

Choose from the Lyric Opera, Blue Man Group, an Architectural Walking Tour, the Willis Tower Skydeck, Chicago-style pizza, the Frank Lloyd Wright Experience, and much more.

Information is available at RSNA.org/Tours-and-Events. During the meeting, attendees are invited to visit these locations (at right).

Tour Desks

McCormick Place, Grand Concourse

Saturday, Nov. 26
11:30 a.m. – 5:30 p.m.

Sunday, Nov. 27 – Wednesday, Nov. 30
7:30 a.m. – 4 p.m.

Palmer House Hilton Hotel

Saturday, Nov. 26 – Wednesday, Nov. 30
8 a.m. – 6 p.m.

Thursday, Dec. 1
8 a.m. – Noon



5k Fun Run

Tuesday, Nov. 29, 6:30 a.m.

Arvey Field, South Grant Park, Chicago

Get in an early run along Chicago's beautiful lakeshore and support critical funding for radiologic research and education. The annual 5K Fun Run benefits the RSNA Research & Education (R&E) Foundation through the fully tax-deductible \$40 registration donation. Runners also receive a commemorative T-shirt.

Add the Fun Run to your meeting registration or sign up onsite at the Fun Run desk at McCormick Place (Grand Concourse, Level 2.5)



2016 Honorees

RSNA will pay tribute to a number of distinguished physicians during the 102nd Scientific Assembly and Annual Meeting. All presentations will take place in the Arie Crown Theater.

HONORARY MEMBERS — Presented Monday, Nov. 28 • 1:30 P.M.

Honorary Membership in RSNA is presented for significant achievement in the field of radiology. At RSNA 2016, Honorary Membership will be given to Luis Donoso-Bach, MD, PhD, of Barcelona, Spain, Carlo Bartolozzi, MD, of Pisa, Italy, and Osamu Matsui, MD, PhD, of Kanazawa, Japan.

Luis Donoso-Bach, MD, PhD

A celebrated diagnostic radiologist, researcher and inventor, Luis Donoso-Bach, MD, PhD, has earned an international reputation as a leader in building relationships with radiologic societies across the globe and as a pioneer in creating the virtual radiology conference.

"I'm very grateful to receive this honorary membership from RSNA," Dr. Donoso-Bach said. "I would like to express my sincere thanks to the Board of Directors for choosing me for this honor. I have the utmost respect for RSNA. Probably no other organization in the world does as good a job of promoting its profession as RSNA does for radiology."

Born in Sabadell (Barcelona), Spain, Dr. Donoso-Bach earned his medical degree in 1981 from the School of Medicine of the Autonomous University of Barcelona and his doctorate degree at the university in 1992. After working as a staff radiologist for several years at Hospital de la Santa Creu i Sant Pau, Barcelona, Dr. Donoso-Bach was appointed chair of the Department of Radiology at the UDIAT Centre Diagnostic, Sabadell, Spain, in 1992, and became executive director in 1998.

Currently, Dr. Donoso-Bach serves as the director of the Diagnostic Imaging Department at the Hospital Clinic of Barcelona and as professor of radiology at the University of Barcelona — positions he has held since 2006.

Dr. Donoso-Bach began his research career focusing mainly on abdominal imaging related to liver disease before shifting his emphasis to digital imaging and the development and implementation of IT in diagnostic radiology. He led the creation of a research and development team at UDIAT that resulted in several patents and products now widely used in Spain.

Throughout his career, Dr. Donoso-Bach has been active in professional societies from the national to the international level. He served as vice president of the Spanish Society for Diagnostic Radiology (SERAM) from 1998 to 2002 and as president from 2002 to 2006. As SERAM president, Dr. Donoso-Bach realized Spain's unique position in building bridges between Europe and the U.S., and focused on strengthening relationships between radiologic societies.

Since 2000, he has served the European Society of Radiology (ESR) in various capacities and is the current ESR immediate past president. In that role, Dr. Donoso-Bach has directed ESR's



focus on medical radiation protection, imaging biomarkers and biobanks, ESRIguide CDS product implementation, and in 2016 worked with other European medical associations to develop a strategic research agenda for medical radiation protection.

A pioneer in the virtual radiology education concept, Dr. Donoso-Bach worked with Ricardo Garcia-Mónaco, MD, PhD, of Argentina to develop a Spanish-language virtual congress in 2008 that was adopted by the InterAmerican College of Radiology. As a leader with the International Society of Radiology (ISR), Dr. Donoso-Bach helped develop the first ISR Virtual Congress in 2008 and served as secretary general of the ISR from 2012-2014.

He has published more than 90 research articles, seven book chapters and has lectured at prestigious universities and conferences across the globe.

Among his many honors, Dr. Donoso-Bach received the gold medal of SERAM and honorary fellowship in the American College of Radiology. He received honorary memberships in the Mexican Federation of Radiology and the Argentinean, Chilean, Italian, French, German and Serbian radiological societies.

Carlo Bartolozzi, MD

A preeminent researcher, educator and innovator, Carlo Bartolozzi, MD, has made invaluable contributions to gastrointestinal and abdominal radiology, and shaped the careers of a generation of radiologists in his native Italy and beyond.

"It's for me a great honor and source of pride to be awarded honorary membership in RSNA because I think that in the career of every radiologist this represents the most significant and desirable achievement," Dr. Bartolozzi said. "I would like to thank the president and the Board of Directors of RSNA for such recognition which I want to share with the many collaborators who have accompanied me in my forty years of academic life."

Born in Venice, Italy, Dr. Bartolozzi earned his medical degree from the University of Padua in 1972 and completed his residency in 1977. He quickly ascended the ranks, rising to the



position of associate professor of radiology at the University of Florence in 1980 and to radiology professor and chair of the Department of Radiology at the University Hospital of Pisa in 1990 — a position he held until his retirement in 2015.

Also at the University Hospital of Pisa, Dr. Bartolozzi served as director of the Department of Diagnostic and Interventional Radiology and Nuclear Medicine from 2004 to 2015 and as the director of the Department of Oncology, Transplants and Advanced Technologies in Medicine from 1999 to 2007.

As a researcher, Dr. Bartolozzi has contributed enormously to gastrointestinal and abdominal radiology by advancing innovative techniques such as microbubbles in ultrasound, perfusion imaging in multi-slice CT, and MR elastography for liver imaging. A prolific writer, he has authored or co-authored more than 270 scientific papers and published 20 monographs.

Dr. Bartolozzi is also widely recognized for his devotion to educating and mentoring the next generation of radiologists. As chairman of the Department of Radiology at the University of Pisa since 1990, he has taught hundreds of residents and fellows, consistently emphasizing the importance of competent clinical involvement and the need for continued technological innovation. He has led the development of one of the leading academic radiology departments in Italy and mentored successive generations of faculty, who have also become leaders in international radiology.

Throughout his career, Dr. Bartolozzi has been a leader for radiologic societies around the world. He served as president of the European Society of Magnetic Resonance in Medicine and Biology in 2000 and president of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) in 2005. As Programme Committee Chair for ESGAR in 2008 and 2009, Dr. Bartolozzi guided the scientific content and initiated successful ESGAR workshops on image-guided ablation and liver imaging.

He is a founding member of the European Institute for Biomedical Imaging Research project and of the Erasmus Project Course on MRI.

Along with serving as a visiting professor, Dr. Bartolozzi has been an honorary lecturer at the European Congress of Radiology, the European Conference of Interventional Oncology and ESGAR, and has served as an invited lecturer in 35 countries.

His international reputation has earned Dr. Bartolozzi honorary membership in the Belgian Radiological Society and Austrian Radiological Society, as well as corresponding membership in the Swiss Radiological Society and Turkish Radiological Society. Dr. Bartolozzi was awarded the ESGAR gold medal in 2009 and received the highest recognition of the University of Pisa — the Ordine del Cherubino (the Order of the Cherubim) — in 2011.

Osamu Matsui, MD, PhD

In his nearly four decades in radiology, Osamu Matsui, MD, PhD, has earned an international reputation as a world-renowned researcher, educator and innovator who has significantly advanced the detection and treatment of liver cancer. He has also forged a unique path in publishing, serving as the first editor-in-chief of the Japanese Journal of Radiology.

Dr. Matsui earned his medical degree from Kanazawa University Faculty of Medicine, Japan, in 1972, and



his doctorate degree from the university in 1986. He spent his entire career at Kanazawa, beginning as an assistant professor and holding the positions of associate professor, full professor and chair of the Department of Radiology, Kanazawa University Hospital and Faculty of Medicine. He served as vice president of Kanazawa University Hospital and dean of Kanazawa University Graduate School of Medical Sciences before officially retiring in 2013. He remains on staff as a professor emeritus and a research professor in the Department of Advanced Medical Imaging at Kanazawa University.

Throughout his research career, Dr. Matsui focused primarily on diagnostic imaging and interventional radiology, with an emphasis on liver cancer. His accomplishments include developing revolutionary techniques — CT arterial portography (CTAP) and multi-step hepatocarcinogenesis — which broke new ground in detecting and treating liver cancer. His 1993 radiology research on subsegmental transarterial chemoembolization (TACE) for hepatocellular carcinoma with Lipiodol using a microcatheter system contributed to the technique becoming the standard for treatment throughout the world today.

His extensive accomplishments as an educator include training and educating more than 200 young radiologists in the Hokuriku region of Japan where radiology was practically nonexistent as a specialty even three decades ago.

Dr. Matsui has published more than 400 original articles in English-language scientific journals including *Radiology*, the *American Journal of Roentgenology* and *European Radiology*. He has served as an associate editor of *Radiology* since 2012, and served as an associate editor for *Hepatology Research* from 2000 to 2006.

Serving from 2006 to 2010 as the first editor-in-chief of the *Japanese Journal of Radiology* (the official journal of the Japan Radiological Society (JRS)), Dr. Matsui oversaw the journal's transition to an English-language publication, significantly increasing readership. Dr. Matsui has also contributed to several highly influential guidelines on hepatocellular carcinoma and interventional radiology published in Japan and throughout Asia.

His extensive professional involvement includes serving as JRS president in 2007, as president of the annual meeting for the Japanese Society of Interventional Radiology in 2007, as president of the Japanese Society of Abdominal Radiology from 2003 to 2013, and as the first president of the Asian Society of Abdominal Radiology. Dr. Matsui served on the RSNA International Advisory Committee from 2007 to 2011 and on the RSNA Education Exhibit Committee from 2014 to 2015.

Dr. Matsui's awards include gold medals from the Japanese Society of Abdominal Imaging, Asian Society of Abdominal Radiology and Asian Pacific Society of Cardiovascular and Interventional Radiology. He received honorary membership in the Asian Society of Abdominal Radiology, the Korean Society of Radiology, the Japanese Society of Interventional Radiology, the Chinese Society of Interventional Radiology and the Balkan Society of Radiology. He was named an Honorary Fellow of the European Society of Gastrointestinal and Abdominal Radiology. Dr. Matsui was awarded the *Radiology* Editor's Recognition Award in 1997, 2008 and 2011.

In 2009, Dr. Matsui received the Commendation for Science and Technology from the Japanese Ministry of Education, Culture, Sports, Science and Technology for developing new technology for the early diagnosis and interventional treatment of liver cancers — a prestigious honor for scientists in Japan.

GOLD MEDALISTS — Presented Tuesday, Nov. 29 • 1:30 PM

RSNA will award three individuals its Gold Medal — RSNA's highest honor — at the 102nd Scientific Assembly and Annual Meeting. They are Paul J. Chang, MD, Burton P. Drayer, MD, and Robert J. Stanley, MD.

Paul J. Chang, MD

An internationally recognized expert in the field of imaging informatics, Paul J. Chang, MD, was a pioneer in creating rapid methods of moving digital radiology images and spearheaded numerous research and development projects related to imaging informatics and enterprise-wide informatics challenges.



"Dr. Chang's impact in leading changes in PACS and other informatics tools is unmatched," said RSNA President Richard L. Baron, MD. "I know of very few radiologists who have given so freely of their time to support new initiatives and informatics developments for national radiology organizations."

Dr. Chang's early work in workstation design has resulted in presentation and navigation models that are widely used by the majority of picture archiving and communication systems (PACS). While at the University of Iowa, he established and evaluated one of the first ultrasound rural teleradiology networks to provide primary interpretation. Dr. Chang co-invented a novel lossless wavelet-based image distribution mechanism, dynamic transfer syntax (DTS); this technology was subsequently commercialized by the creation of Stentor PACS, which was later acquired by Philips Medical Systems. Several hundred hospitals worldwide use this PACS system.

Dr. Chang was an early advocate for deep and granular information technology (IT) system interoperability to support data-driven informatics workflow orchestration in radiology. He has led the development of one of the world's first service-oriented architecture (SOA) implementations within a healthcare enterprise at the University of Chicago. Dr. Chang has demonstrated that this SOA approach can be leveraged to improve efficiency and quality in image acquisition, interpretation and results communication.

Active in the application of informatics approaches to radiology education, Dr. Chang's research group was one of the first to describe, implement and evaluate the use of simulation in radiology resident education. Under his leadership and in collaboration with RSNA, RSNA Diagnosis Live™, a novel cloud-based interactive educational platform featuring gamification and deep analytics was developed. Diagnosis Live continues to be a very popular part of the RSNA annual meeting and is being used in residency programs worldwide.

Dr. Chang is professor and vice chairman of radiology informatics at the University of Chicago School of Medicine. He also serves as medical director of enterprise imaging and of SOA infrastructure at University of Chicago Hospitals.

He received his undergraduate degree from Harvard University and his medical degree from Stanford University. Concurrent with his medical school training, he also received his Master of

Science degree in engineering-economic systems from Stanford. Dr. Chang completed his residency and fellowship training in diagnostic radiology at Stanford University Hospital.

Dr. Chang has been a member of the RSNA Radiology Informatics Committee (RIC), American College of Radiology (ACR) Informatics Committee, and the ACR Commission on Clinical Research and Information Technology. He has served as a member of the ACR Council Steering Committee and Editorial Board of the *Journal of the American College of Radiology (JACR)*.

He serves as an informatics consultant to the RSNA for the RadSCOPE electronic education initiative. Dr. Chang has published more than 70 peer-reviewed articles, 11 book chapters, 99 abstracts and has been awarded six patents. He has given more than 500 invited lectures worldwide and has served as course director and/or faculty for more than 200 courses for RSNA and for the Society for Imaging Informatics in Medicine (SIIM) in PACS and radiology informatics. He presented the 2012 New Horizons Lecture at the RSNA annual meeting.

In 2002, Dr. Chang was named as one of the "Top 20 Most Influential People in Radiology" by *Diagnostic Imaging*. In 2005, he was inducted as a Fellow to the College of the Society for Computer Applications in Radiology (SCAR/SIIM). In 2010, he was named as one of the "25 Most Influential People in Imaging" by *RT Image*.

Burton P. Drayer, MD

A distinguished leader in healthcare delivery and medical education, Burton P. Drayer, MD, is internationally known for his research using anatomic, physiologic and functional imaging of the aging brain. He was the first to define the normal and abnormal presence of brain iron using MRI. His research interests also include neurodegenerative disorders, brain infarction, xenon-enhanced CT for measuring regional cerebral blood flow, MR angiography, multiple sclerosis and intrathecal contrast media toxicity.



Dr. Drayer is CEO of the Mount Sinai Doctors Faculty Practice and Dean for Clinical Affairs, the Icahn School of Medicine at Mount Sinai Medical Center in New York City. Dr. Drayer also serves as the Dr. Charles M. and Marilyn Newman Professor and system chair of the Department of Radiology, Icahn School of Medicine, and as executive vice president for Risk, the Mount Sinai Medical Center. He served as president of the Mount Sinai Hospital from November 2003 to September 2008.

"He has not only been extremely productive and successful as a leading academic radiologist," said Dr. Baron, "but he has admirably represented the field of radiology through his visible leadership roles, both in radiology and throughout the Mount Sinai Medical Center."

Dr. Drayer, who served as RSNA president in 2011, received his undergraduate degree in political science from the University of Pennsylvania in Philadelphia. In 1971, he received his medical degree from Chicago Medical School and went on to complete a medical internship and neurology residency at the University of Vermont in Burlington. Dr. Drayer completed his radiology residency followed by a neuroradiology fellowship at the University of Pittsburgh Medical Center.

Dr. Drayer's academic appointments began in 1977 at the University of Pittsburgh Health Center. From 1979 to 1986, Dr. Drayer was at Duke University Medical Center in Durham, N.C., where he became professor of radiology and assistant professor of medicine (neurology). In 1986, he was appointed chairman of the Division of Neuroimaging Research-Education at the Barrow Neurological Institute in Phoenix, Ariz., where he remained until 1995. Dr. Drayer then moved to The Mount Sinai Medical Center where he practices today.

Since 1979, Dr. Drayer has reviewed manuscripts for nine medical journals, including *Radiology*, and was editor of *Neuroimaging Clinics of North America* from 1991 to 2005. He has authored or coauthored nearly 200 journal articles, 41 book chapters and two books. He is also a sought-after lecturer both nationally and internationally, having given more than 300 invited lectures and speeches.

Dr. Drayer's many accolades include the Cornelius G. Dyke Award from the American Society of Neuroradiology (ASNR) and the Distinguished Service Award from the American Board of Radiology (ABR). He received the ASNR gold medal in 2011.

An RSNA member since 1980, Dr. Drayer currently serves as chair of the RSNA Research & Education (R&E) Foundation Board of Trustees. He served as RSNA first vice president in 2003. Dr. Drayer has been an active volunteer, serving as chair of the Public Information Committee, and a member of the Public Information Advisors Network and the R&E Foundation's Public Relations Committee. He moderated the RSNA Image Interpretation Session in 2004.

Dr. Drayer was elected to the RSNA Board of Directors in December 2003, was liaison for the annual meeting and technology until 2008, and served as Chairman of the Board and president-elect in 2009 and 2010 respectively.

Dr. Drayer is a past president of the ASNR, as well as a founder of the Neuroradiology Education and Research Foundation of ASNR. Dr. Drayer is a fellow of both the American College of Radiology (ACR) and American Academy of Neurology, and a past president of the New York Roentgen Society. He is an active member in many neurology and radiology organizations, including the ACR, where he was chair of the Committee on Appropriateness Criteria's Panel on Neurological Imaging from 1994 to 2003.

Robert J. Stanley, MD

A world-renowned abdominal radiologist, Robert J. Stanley, MD, became a leading authority in the early development of body CT imaging and has been a mentor to future generations of radiologists.



Dr. Stanley grew up in New Jersey, where he earned his undergraduate degree at St. Peter's College in Jersey City, New Jersey. He then headed west and earned his medical degree at St. Louis University, where he also completed a medicine internship and a year of surgery residency before completing his radiology residency. More recently, he received a Master of Science degree in health administration at the University of Alabama at Birmingham (UAB), where he is professor emeritus in the Department of Radiology.

Dr. Stanley got his start in academic radiology at the Mallinckrodt Institute of Radiology (MIR), Washington University, St. Louis, Mo., and he joined the faculty after completing his radiology residency. He spent the next 11 years at MIR as director of the abdominal radiology section before leaving to serve as professor and chair of the Department of Radiology at the University of Alabama School of Medicine in Birmingham.

Dr. Stanley's involvement with whole-body CT began in earnest in the fall of 1975 when EMI Corp. collaborated with Washington University and the Mayo Clinic in Rochester, Minn., for the implementation and evaluation of its first two whole body CT scanners in the United States. Given the opportunity, along with Stuart S. Sagel, MD, to head up the newly created body CT facility, Dr. Stanley soon became an authority in the new imaging field.

Just prior to leaving MIR, Dr. Stanley and his co-authors, Dr. Sagel and Joseph K. T. Lee, MD, completed the first edition of their landmark CT textbook, *Computed Body Tomography with MRI Correlation*, currently in its fourth edition.

Over his 32-year tenure as chair of the Department of Radiology at UAB, Dr. Stanley saw the department grow in size and stature. During this time, he remained active in all aspects of abdominal radiology, and also served as a member of the Board of Chancellors of the American College of Radiology (ACR) for seven years, chairing the Commission on Standards and Accreditation, as well as being elected vice president of ACR. Under his chairmanship, 55 standards (now called practice guidelines) were created.

"His greatest legacy has been his mentoring of multiple generations of younger radiologists, which has produced many national leaders and chairs of major radiology departments," said Dr. Baron.

A prolific author of more than 180 scientific publications, Dr. Stanley also served as editor-in-chief of the *American Journal of Roentgenology (AJR)*.

Dr. Stanley continued to serve on the clinical faculty at UAB, primarily working with residents in their body CT education until July 2014, when he retired from the clinical faculty.

Dr. Stanley has served in a leadership role in numerous radiology organizations. He is a founder of both the Society of Uroradiology and the Society of Computed Body Tomography and Magnetic Resonance (SCBT-MR) and served as president of both societies.

In 2014, he was awarded the Walter B. Cannon Medal for distinguished contributions to GI radiology by the Society of Abdominal Radiology. And in 2014, he was awarded the first SCBT-MR gold medal for significant contributions to CT imaging.

Dr. Stanley was an advisory editor and associate editor on the *Radiology* Editorial Board, and has also served on the RSNA Public Information Advisors Network.

OUTSTANDING RESEARCHER AND EDUCATOR

— Presented Sunday, Nov. 27 • 8:30 a.m.

RSNA will honor two individuals at RSNA 2016 for their contributions to research and education. They are Clifford R. Jack, Jr., MD, of Rochester, Minn., and Kristen K. DeStigter, MD, of Burlington, Vt.

OUTSTANDING RESEARCHER

Clifford R. Jack Jr., MD

A pioneer in Alzheimer's disease (AD) research, Clifford R. Jack Jr., MD, has devoted his career to investigating cognitive aging and dementia imaging/biomarkers.

Dr. Jack, the Alexander Family Professor of Alzheimer's Disease Research and clinician investigator at the Mayo Clinic, Rochester, Minn., guides a research group that serves as the central MRI lab for national and international observational and therapeutic studies in AD. His group heads the MRI section for the Alzheimer's Disease Neuroimaging Initiative.

Dr. Jack has introduced imaging methods to help identify aspects of AD in the brain, determine its severity and measure and predict disease progression. His research group develops and validates anatomic MRI, resting fMRI, DTI, amyloid PET, fluorodeoxyglucose PET and tau PET quantitative methods for diagnosing and measuring progression of AD and related disorders.

His early work focused on anatomic and functional MRI in epilepsy. In the early 1990s he began to focus on Alzheimer's disease and cognitive aging research. His group published many of the early studies in the Alzheimer's field on quantitative MRI, diffusion imaging, functional MRI, and high-field microimaging. In the past decade his group has focused on multi-modality imaging, combining various MR modalities with FDG PET, amyloid PET and most recently tau PET. He has also focused on modeling biomarker progression in Alzheimer's. The National Institute of Aging and Alzheimer's Association criteria for presymptomatic Alzheimer's are based largely on his model. He currently is chair of the group that is updating the National Institute of Aging and Alzheimer's Association research criteria for Alzheimer's disease.

Dr. Jack earned his medical degree from Wayne State University in 1979 and completed his radiology residency at Henry Ford Hospital, both in Detroit, in 1983. He served as a senior staff member, Division of Radiology, at Henry Ford Hospital from 1984 to 1985. After completing his fellowship in neuroradiology in the Department of Diagnostic Radiology at the Mayo Clinic, Dr. Jack joined the clinic as an assistant professor of radiology in 1985. He was appointed a clinician investigator at Mayo in 2002. His research has been continuously funded by the National Institutes of Health since 1991.

Dr. Jack was elected to the inaugural Council of Distinguished Investigators of the Academy of Radiology Research. Other awards include the 2007 American Society of Neuroradiology for Outstanding Contributions in Research; the 2008 Potamkin Prize from the American Academy of Neurology for research in Pick's, AD and related diseases; and the 2012 International Society of Magnetic Resonance in Medicine gold medal. Also in 2012,



he was honored with a MetLife Foundation Award for Medical Research in Alzheimer's disease, considered one of the highest honors in the field of Alzheimer's research. He received the Mayo Clinic Distinguished Investigator award in 2013.

He is a member of the National Academy of Medicine and the Association of American Physicians.

Dr. Jack has published more than 600 peer-reviewed journal articles. In 2014, Thomson Reuters included him on their list of "Highly Cited Researchers — World's Most Influential Scientific Minds."

OUTSTANDING EDUCATOR

Kristen K. DeStigter, MD

A dedicated educator and mentor, Kristen K. DeStigter, MD, has earned an international reputation for innovation in education, leadership, and ultrasound outreach. Dr. DeStigter is the John P. and Kathryn H. Tampas Green & Gold Professor and Interim Chair of Radiology at the University of Vermont College of Medicine. Prior to being selected as interim chair, she served as vice chair for 10 years. She has extensive leadership experience and long-standing service to local and national committees, boards and professional societies. Additionally, she is the co-founder and president of Imaging the World (ITW), a nonprofit organization currently operating in Uganda that integrates ultrasound diagnosis into systems of care in rural health facilities.

With a career focused on education, Dr. DeStigter is the past program director of the diagnostic radiology residency at the University of Vermont. During her tenure, Dr. DeStigter received three University of Vermont residency teaching awards. Prior to serving as program director, she served as the radiology director of Medical Student Education for three years. She has taught, mentored, and sponsored trainees at various levels of their education as well as mentored faculty in their professional development. She is the immediate past president of the Association of Program Directors in Radiology (APDR) and sits on the Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee for Radiology. She is vice president of the Vermont Radiological Society, after serving as president for five years. Recently she served as a member of the New England Roentgen Ray Society Executive Committee.

Dr. DeStigter's scholarly interests and accomplishments include unique applications of ultrasound in rural medicine, the provision of integrated medical imaging services in under-served communities, medical education in diagnostic radiology, and global advances in women's health care. She is a champion of many projects for safety and quality of care in clinical radiology.



In the international community, Dr. DeStigter leveraged her knowledge and experience through her participation as a member of the World Health Organization Referral Guidelines Development Group as part of the International Radiology Quality Network. Currently, Dr. DeStigter is chair of the RSNA Committee on International Radiology Education (CIRE) and a member of the RSNA Education Committee. She has served on the RSNA Annual Assembly Faculty. Dr. DeStigter serves on the American College of Radiology (ACR) Foundation's International Outreach Committee.

As co-founder and president of ITW, Dr. DeStigter is changing global medicine through a revolutionary concept that combines technology, a teach-the-teacher program, community engagement, quality assurance, and government advocacy to bring medical expertise and improved health care service delivery. For over

six years, as part of Dr. DeStigter's efforts, formal ultrasound education in community health clinics and referral facilities has enabled staff to provide obstetrical ultrasound services to over 50,000 women per year. Through her work, and in conjunction with successful industry partnerships, sustainable, high-quality, affordable ultrasound service has been integrated into clinical facilities throughout rural Uganda. Dr. DeStigter has received several grant awards, including from the Bill & Melinda Gates Foundation. She received the American College of Radiology (ACR) Foundation 2016 Global Humanitarian Award for her work improving medical imaging and access to care.

Dr. DeStigter completed her undergraduate training at Calvin College, her medical training at Case Western Reserve University, and her diagnostic radiology residency and body imaging fellowship at University Hospitals of Cleveland, Ohio.

2016 HONORED EDUCATOR AWARD

RSNA congratulates the 2016 Honored Educator Award recipients for their dedication to furthering educational scholarship in the field of radiology. Award recipients will be recognized at the 2016 RSNA Annual Meeting.

This year's recipients are:

Laura L. Avery, MD	Christine O. Menias, MD
Sanjeev Bhalla, MD	Pardeep K. Mittal, MD
Matthew J. Budak, MD, FRCR	Courtney A. Coursey Moreno, MD
Juan C. Camacho, MD	Rahul D. Renapurkar, MD
Felix S. Chew, MD	Neil M. Rofsky, MD
Asim F. Choudhri, MD	Michael H. Rosenthal, MD, PhD
Harris L. Cohen, MD	Howard A. Rowley, MD
Kassa Darge, MD, PhD	Frank J. Rybicki III, MD, PhD
Jonathan R. Dillman, MD	Dushyant V. Sahani, MD
Michael A. DiPietro, MD	Kumaresan Sandrasegaran, MD
Richard L. Ehman, MD	Akram M. Shaaban, MBCh
Elliot K. Fishman, MD	Ethan A. Smith, MD
Lana H. Gimber, MD	Thiru A. Sudarshan, DMRD
Daniel Ginat, MD	Mihra S. Taljanovic, MD
Matthew S. Hartman, MD	Sreeharsha Tirumani, MBBS, MD
Travis S. Henry, MD	Terri J. Vrtiska, MD
Mindy M. Horrow, MD	Jonathan Weir-McCall, MBCh, FRCR
Pamela T. Johnson, MD	Phey M. Yeap, MBChB, FRCR
Anne M. Kennedy, MD	Ian A. Zealley, MD
Jonathan B. Kruskal, MD, PhD	
Vincent M. Mellnick, MD	

Established in 2011, the RSNA Honored Educator Award recognizes RSNA members who have produced an array of RSNA educational resources in the past calendar year. In order to be eligible, RSNA members may participate in a number of qualifying educational activities, including:

- Delivering an invited lecture at one or more in-person educational meetings or workshops sponsored by RSNA
- Serving as a visiting professor in RSNA's International Visiting Professor Program
- Coordinating a Case of the Day subspecialty track for the RSNA Annual Meeting
- Donating an Annual Meeting refresher course presentation for online repurposing, including CME test questions
- Authoring educational articles, or providing invited commentary, best cases, or guest editing in RSNA's premier journals, *Radiology* or *RadioGraphics*
- Authoring online education modules including CME test questions
- Authoring an online professionalism vignette
- Authoring an education exhibit or Quality Storyboard

Eligible candidates contribute in at least two educational categories to be considered for the award, and may not earn credit for more than two activities in any given category. Based on the number of qualifying activities completed, the most active RSNA members are presented with the Honored Educator Award in recognition of their contributions.

Trainee Research Prize, Neuroradiology Research Award

RSNA awards the Trainee Research Prize to honor an outstanding scientific presentation in each subspecialty presented by a resident/physician trainee, fellow or medical student. One trainee research prize in breast imaging is endowed by Tapan K. Chaudhuri, M.D. A list of Trainee Research Prize recipients can be viewed in the Arie Crown Theater lobby.

Funded with a donation from Kuo York Chynn, MD, the Kuo York Chynn Neuroradiology Research Award will be presented annually to the top neuroradiology research paper presented at the RSNA annual meeting. RSNA 2016 is the first year the award is being given.

Travel Award

The Travel Awards for young investigators support candidates invited to present high-quality science. To be eligible, abstract presenters or poster exhibitors must be pre-doctoral students or have been awarded their doctoral degrees no more than three years prior to submission. A list of the Travel Awards can be viewed in the Learning Center.

Alexander R. Margulis Award for Scientific Excellence

The annual award recognizing the best original scientific articles published in *Radiology* is named for Alexander R. Margulis, MD, a distinguished investigator and inspiring visionary in the science of radiology. The honoree will be revealed at the beginning of the Tuesday Plenary Session. After the award is presented, reprints of the honored article will be available for free at the Membership & Resources Booth in the Connections Center at RSNA 2016.

RSNA R&E Foundation Announces 2016 Grant Recipients

The RSNA Research & Education (R&E) Foundation funded 101 grants totaling \$4 million. The Foundation's Board of Trustees thanks the Vanguard companies, individuals and private practices whose generous contributions have made the following grants possible.



Research Scholar Grant

Jalal B. Andre, MD

University of Washington

RSNA Research Scholar Grant

Evaluating the Prevalence, Temporal Etiology, and Cost of Patient Motion During Clinical MR Examinations

Rivka Rachel Colen, MD

The University of Texas
MD Anderson Cancer Center

Agfa HealthCare/RSNA

Research Scholar Grant
Radiome Sequencing of Glioblastoma: Decoding the Imaging Genomic Landscape and Heterogeneity

David Dreizin, MD

University of Maryland School of Medicine and
R Adams Cowley Shock Trauma Center

RSNA Research Scholar Grant

Development and Validation of an MDCT-based Decision Support and Outcome Prediction Tool for Bleeding Pelvic Fractures Using Semi-automated Volumetric Hematoma Analysis and Probabilistic Modeling

Michael David Farwell, MD, MA

Hospital of the University of Pennsylvania

RSNA Research Scholar Grant

Development of a Reporter Gene for In Vivo PET Imaging of Chimeric Antigen Receptor (CAR) T Cells Directed at Solid Tumors

Gregory N. Gan, MD, PhD

University of New Mexico Cancer Center

RSNA Research Scholar Grant

Mechanism of Hedgehog Pathway-mediated Radiation-induced Tumor Repopulation

Manu Shri Goyal, MD, MSc

Washington University School of Medicine

ASNR/RSNA Research Scholar Grant

Integrating Brain Imaging and Metabolomics in Malnourished Children

Richard S. Ha, MD

Columbia University

RSNA Research Scholar Grant

The Effect of Ulipristal Acetate (UPA) on Breast Cell Proliferation Measured by Ki-67 and Breast MRI BPE and its Potential as a Chemoprevention Agent

Kathy Han, MD, MSc

Princess Margaret Cancer Center,
University of Toronto

RSNA Research Scholar Grant

The Potential for Metformin to Improve Tumor Oxygenation in Locally Advanced Cervix Cancer: A Phase II Randomized Trial

Kate Hanneman, MD

University of Toronto

GE Healthcare/RSNA

Research Scholar Grant

Exploring the Relationship Between Left Ventricular Outflow Tract Obstruction, Exercise-induced Troponin Release and Myocardial Fibrosis in Hypertrophic Cardiomyopathy Using Molecular and Imaging Biomarkers

Jeremy Josef Heit, MD, PhD

Stanford University

Bracco Diagnostics Inc./RSNA

Research Scholar Grant

Resting State Spontaneous Fluctuations of the BOLD Signal for Penumbra Assessment in Endovascular Stroke Candidates

Michael Iv, MD

Stanford University Medical Center

RSNA Research Scholar Grant

Using Ferumoxytol-enhanced MRI to Assess Tumor-associated Macrophages in Human Glioblastoma Multiforme

Austin Kirschner, MD, PhD

Vanderbilt University

RSNA Research Scholar Grant

Mechanism of PIM1 Kinase-mediated Radiosensitization for Prostate Cancer Treatment

Pejman Jabehdar Maralani, MD, FRCP

Sunnybrook Research Institute,
University of Toronto

RSNA Research Scholar Grant

Quantitative Blood Oxygenation Level Dependent (qBOLD) MRI for Assessment of Tumor Hypoxia in Glioblastoma Multiforme: Validation with Intra-operative and Histological Correlation

Daniele Marin, MD

Duke University Medical Center

RSNA Research Scholar Grant

Decreased Variability for Robust Imaging-based Quantification of Tumor Heterogeneity

Rajni Natesan, MD, MBA

The University of Texas
MD Anderson Cancer Center

Carestream Health/RSNA

Research Scholar Grant

Impact of the Updated 2015 American Cancer Society and 2016 United States Preventive Services Task Force Breast Cancer Screening Guidelines on Screening Mammography Utilization Rates and Screen-detected Breast Cancer Across Demographic Groups in the Greater Houston Area

Matthew J. Nyflot, PhD

University of Washington

RSNA Research Scholar Grant

Quantitative Sulfur Colloid SPECT/CT Radiomics to Guide Precision Radiotherapy for Patients with Hepatocellular Carcinoma

Elizabeth J. Sutton, MD

Memorial Sloan Kettering Cancer Center

Guerbet/RSNA Research Scholar Grant

Percutaneous Breast MRI Biopsy as an Alternative to Surgery in Diagnosing a Complete Pathologic Response Post Neoadjuvant Chemotherapy

Leo L. Tsai, MD, PhD, MSc

Beth Israel Deaconess Medical Center

Agfa HealthCare/RSNA

Research Scholar Grant

Regional Variations in Tumor Metabolism and Proliferation Reflecting a Non-uniform Tumor Micro-environment: In Vivo Assessment with Hyperpolarized ¹³C MRI

Shandong Wu, PhD, MSc

University of Pittsburgh

GE Healthcare/RSNA

Research Scholar Grant

Breast DCE-MRI Contrast Enhancement Heterogeneity and Breast Cancer Risk

Hooman Yarmohammadi, MD

Memorial Sloan Kettering Cancer Center

RSNA Research Scholar Grant

Combined Blocking of Aerobic and Anaerobic Glycolytic Metabolism Pathways in Improving Treatment Response Following Transarterial Embolization of Hepatocellular Carcinoma

Takeshi Yokoo, MD, PhD

UT Southwestern Medical Center

Siemens Healthineers/RSNA

Research Scholar Grant

Validation of Optimized Dixon-based MRI Techniques for Noninvasive Evaluation of Renal Steatosis

Stefan L. Zimmerman, MD

Johns Hopkins University School of Medicine

RSNA Research Scholar Grant

Dual Energy Extracellular Volume Mapping for Optimized Detection of Focal Myocardial Fibrosis with Cardiac Computed Tomography

Research Seed Grant

Anil Chauhan, MD

University of Pennsylvania

RSNA Research Seed Grant

Acoustic Radiation Forced Impulse Shear Wave Velocity of Abdominal Wall Musculature for Clinical Hernia Risk Prediction

Thank you to our donors

The Foundation wants to provide special acknowledgment for the distinguished individuals and the Visionaries in Practice (VIP) program donors who have established endowments and awards in their names or in the names of those honored.

Austin Radiological Association

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The Foundation is grateful for the major contributions from corporate donors through the Vanguard program.



GE Healthcare



Derik L. Davis, MD

University of Maryland School of Medicine

Hitachi Medical Systems/RSNA

Research Seed Grant

Quantitative MRI of the Shoulder in Older Adults: A Pilot Study to Evaluate the Association of Intramuscular Fatty Infiltration, Functional Outcome and Re-tear Rate Following Surgical Repair of Rotator Cuff Tears

Priyanka Jha, MBBS

University of California, San Francisco

RSNA Research Seed Grant

Noninvasive In Vivo Hyperpolarized [¹³C] Pyruvate Magnetic Resonance Imaging to Detect Alterations in Placental Metabolism in Gestational Hypertensive Disorders in a Small Animal Model

Avinash Ramesh Kambadakone, MD

Massachusetts General Hospital

Toshiba America Medical Systems/RSNA

Research Seed Grant

Multi-parametric DECT Assessment of Therapeutic Response to Neo-adjuvant Chemo Radiation in Pancreatic Cancer Patients to Determine Surgical Resectability

Alexander Lerner, MD

University of Southern California

Philips/RSNA Research Seed Grant

Utility of Contrast Enhanced Ultrasound and 4DCT for Preoperative Detection and Localization of Parathyroid Adenomas

Sara Lewis, MD

Mount Sinai Medical Center

RSNA Research Seed Grant

MRI-based Surrogate Imaging Markers of Transcriptome Subclasses and Signatures in Hepatocellular Carcinoma

Timur Mitin, MD, PhD

Oregon Health & Science University

Toshiba America Medical Systems/RSNA

Research Seed Grant

Novel Imaging of Lymph Nodes in Patients with Rectal Cancer Using Ferumoxytol-enhanced MRI

Nima Nabavizadeh, MD

Oregon Health & Science University

RSNA Research Seed Grant

Circulating Tumor DNA in Plasma of Patients Undergoing Trimodality Therapy for Esophageal Cancer: A Potential Tool for Neoadjuvant Treatment Response Assessment

Thanh Binh Nguyen, MD

The Ottawa Hospital, University of Ottawa

Bayer HealthCare/RSNA

Research Seed Grant

Preoperative Identification of Isocitrate Dehydrogenase Mutation in Gliomas using MR Spectroscopy, Diffusion-weighted and Perfusion-weighted Imaging

O. Kenechi Nwawka, MD

Hospital for Special Surgery, New York

RSNA Research Seed Grant

Use of Elastography to Quantify Change in Upper Extremity Muscle Spasticity Following Botox Injection in Children with Spastic Cerebral Palsy

Prashant Raghavan, MD

University of Maryland

RSNA Research Seed Grant

Neural Network Disruption in Perinatal Hypoxic Ischemic Injury as a Predictor of Neurodevelopmental Outcome

Ty Kanyon Subhawong, MD

University of Miami

Toshiba America Medical Systems/RSNA

Research Seed Grant

Semi-automated qMRI to Assess Desmoid Tumor Volumetric and Stromal Changes Induced by Systemic Therapy

Mubin Isaac Syed, MD

Dayton Interventional Radiology

Cook Medical Cesare Gianturco/RSNA

Research Seed Grant

Gastric Artery Embolization Trial for Lessening Appetite Nonsurgically Part 2 (GET LEAN II)

Aradhana Mukherjee Venkatesan, MD

The University of Texas

MD Anderson Cancer Center

Toshiba America Medical

Systems/RSNA Research Seed Grant

Functional and Metabolic Imaging Biomarkers of Radiation Response in High Risk HPV+ Tumors

Etay Ziv, MD, PhD

Memorial Sloan Kettering Cancer Center

RSNA Research Seed Grant

Signaling Pathways Predictive of Response to Radioembolization of Colorectal Liver Metastases

Research Resident/Fellow Grant

Allen Ardestani, MD, PhD

Cedars-Sinai Medical Center

RSNA Research Resident Grant

Near-infrared Spectroscopy of the Resting Brain for Predicting Neurologic Outcomes in the Comatose Patient

Divya S. Bolar, MD, PhD*Massachusetts General Hospital***Bracco Diagnostics Inc./RSNA Research Resident Grant**

Using Novel MRI Techniques to Identify Hemodynamic and Metabolic Parameters Predictive of Cognitive Outcome after Carotid Endarterectomy

Paco E. Bravo, MD*Brigham and Women's Hospital***RSNA Research Fellow Grant**

Somatostatin Receptor-targeted Imaging in Patients with Suspected Cardiac Sarcoidosis

Baocheng Chu, MD, PhD*University of Washington***RSNA Research Fellow Grant**

A High-resolution 3D Isotropic MR Sequence for Combined MRA and Vessel Wall Assessment of Intracranial Vascular Diseases

Neal Corson, MD, PhD*University of California, San Diego***RSNA Research Resident Grant**

MRI-derived Cellularity Index as a Potential Noninvasive Imaging Biomarker for Renal Cell Carcinoma

Pippa Cosper, MD, PhD*Washington University in St. Louis***RSNA Research Resident Grant**

Identifying Human and Viral Transcriptional Profiles in Cervical Tumors During Chemoradiation that Can Predict for Treatment Response

Jamal J. Derakhshan, MD, PhD*University of Pennsylvania***Siemens Healthineers/RSNA Research Fellow Grant**

Feasibility Assessment and Technical Development of Noninvasive Globe Temperature Measurement and Mapping Using DWI-thermometry MRI

Rahul S. Desikan, MD, PhD*University of California, San Francisco***Ralph Schlaeger Charitable Foundation Research Fellow Grant**

An Automated Atlas of the Human Brainstem and Cerebellum

Rebecca A. Dumont Walter, MD*University of California, San Francisco***RSNA Research Fellow Grant**

Exploiting Bacterial Iron Metabolism for Spinal Infection Imaging with Positron Emission Tomography

Laura Burns Eisenmenger, MD*University of Utah***RSNA Research Resident Grant**

Development of an MRI-compatible Vessel Wall Inflammation Animal Model

Christine Elissa Eyler, MD, PhD*Dana Farber Cancer Institute***Varian Medical Systems/RSNA Research Resident Grant**

Integrated Epigenomic Analysis to Identify Determinants of Radiation Response in Mouse Lung Tumors Treated with Image-guided Conformal Radiotherapy

Erin Gillespie, MD*University of California, San Diego***RSNA Research Resident Grant**

Develop and Test a Novel Interactive Contouring Atlas for Radiation Oncology

George Daniel Grass, MD, PhD*University of South Florida/H. Lee Moffitt Cancer Center & Research Institute***RSNA Research Resident Grant**

Targeting Metabolic Complexes in Small Cell Lung Cancer to Augment Radiosensitivity

Aaron Joseph Grossberg, MD, PhD*The University of Texas MD Anderson Cancer Center***RSNA Research Resident Grant**

The Role of Orexin Signaling in Brain Radiation-induced Fatigue

Pedram Heidari, MD*Massachusetts General Hospital***RSNA Research Resident Grant**

Redifferentiation of Neuroendocrine Carcinomas for Improved Efficacy of Molecularly Targeted Radiotherapy

Wen Jiang, MD, PhD*The University of Texas MD Anderson Cancer Center***RSNA Research Resident Grant**

Combining Radiation with Phosphatidylserine Blockade Promotes Immunogenic Phagocytosis and Generates Long-lasting Anti-tumor Immunity

Sarah N. Khan, MD*University of California, Los Angeles***Philips/RSNA Research Resident Grant**

Tumor MicroRNA Expression Profiles as Biomarkers for Predicting Hepatocellular Carcinoma Tumor Response to Y90 Radioembolization

Benjamin H. Lok, MD*Memorial Sloan Kettering Cancer Center***Philips/RSNA Research Resident Grant**Utilizing a Novel [¹⁸F]PARPi PET Radiotracer to Predict the Efficacy of PARP Inhibitor Radiosensitization in Small Cell Lung Cancer**Jonathon Kirk Maffie, MD, PhD***Columbia University***Prince Research Resident Grant**

Anatomical Covariance of Fetal Brain Regions as a Tool to Identify Early Developmental Pathology of Intrinsic Brain Networks

Hugh C.J. McGregor, MD*University of California, San Francisco***RSNA Research Fellow Grant**

In Vivo Endothelial Cell Gene Expression Analysis of Venous Outflow Stenoses in Hemodialysis Arteriovenous Fistulas Utilizing a Novel Endovascular Sampling Technique

Amanda M. Murphy, MD, PhD*University of Toronto***RSNA Research Fellow Grant**

VIPER-DCI: Vascular-Perfusion Imaging for Prediction and Early Recognition of DCI and Relationship to Clinical Outcome

Michael F. Regner, MD*University of Colorado***Hitachi Medical Systems/RSNA Research Resident Grant**

Insular Inhibitory Neuromodulation to Reduce Cigarette Craving and Alter Brain fMRI Connectivity and Activity Patterns in Smokers

Pavel Rodriguez, MD*The University of Texas Health Science Center at San Antonio***RSNA Presidents Circle Research Resident Grant**

Pilot Phase II Clinical Trial: Efficacy of Methylene Blue in Mild Cognitive Impairment

Ashley Sekhon, MD*The Ohio State University***FUJIFILM Medical Systems/RSNA Research Resident Grant**

Feasibility of Creating a Cosmetic Image Analysis Objective (CIAO) Scoring Tool for Evaluation of Cosmetic Results From Breast Conserving Therapy

Mark Anthony Sellmyer, MD, PhD*University of Pennsylvania***Philips/RSNA Research Resident Grant**

Multifunctional PET Radiotracers for Quantitative Reporter Gene and Bacterial Imaging

Sina Tavakoli, MD*University of Washington***RSNA Research Fellow Grant**

MR Spectroscopy of Carotid Artery: An NMR Metabolomics Approach to Characterize Bioenergetic Divergence of Macrophages in Vulnerable Atherosclerotic Plaques

Michael C. Veronesi, MD, PhD*The University of Chicago***Silver Anniversary Campaign Pacesetters Research Fellow Grant**

Validation of PET/CT Radiolabeled Nanoparticle Imaging for Intranasal Drug Delivery to the Brain

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Inhibiting Isocitrate Dehydrogenase 1-mediated Reductive Biosynthesis to Augment Glioblastoma Therapy

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The Foundation reached record levels for grant funding in 2016, providing more than \$4 million for 101 projects, or 30 percent of the applications received.

R&E Foundation grants advance radiologic research and education across multiple subspecialties and provide opportunities for investigators at any level in their careers. Innovations by RSNA grantees have led to today's practice and, ultimately, benefited patients.

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Journal Highlights

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

Imaging of Athletic Injuries of Knee Ligaments and Menisci



A subsequent sagittal T2-weighted fat-suppressed MR image confirms a complete tear of the anterior cruciate ligament (arrow).
(*Radiology* 2016;281:1:23-40)

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Acute knee injuries are a common source of morbidity in athletes and if overlooked may result in chronic functional impairment. MRI of the knee has become the most commonly performed musculoskeletal MR examination and is an indispensable tool in the appropriate management of the injured athlete.

In this Sports Imaging Series article in the October issue of *Radiology* (RSNA.org/Radiology), Ali M. Naraghi, FRCR, and Lawrence M. White, MD, FRCPC, of the University of Toronto, review the pertinent anatomy, biomechanical function of ligamentous structures, mechanisms of injury, and the imaging appearances of the specific ligamentous and meniscal injuries in the preoperative setting.

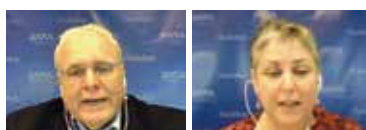
Radiology

Essentials from the article include:

- Acute anterior cruciate ligament (ACL) tears are one of the most common causes of an acute large hemarthrosis in the athletic population, and 41 percent to 75 percent of acute knee injuries with a hemarthrosis have an ACL tear.
- MRI assessment of chronic posterior cruciate ligament (PCL) injuries is less reliable than assessment of acute injury, as continuity of PCL fibers in chronic injuries can be mistaken for a partial tear or even a normal PCL, particularly if prior imaging or accurate clinical information is lacking.
- Features that affect decision making with regard to treatment of medial ligamentous injuries include grade of injury, involvement of the posteromedial corner or cruciate ligaments, presence of osseous avulsive injury, degree of ligament retraction, entrapment of the deep medial collateral ligament (MCL) within the medial joint, and presence of a Stener lesion of the MCL.

"An understanding of the complex anatomy and biomechanics of the knee is integral to the accurate diagnosis of sports injuries of the knee. An appreciation of the limitations and pitfalls of imaging tests is important in reducing interpretive errors," the authors write

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



Radiology
EXTRA
PODCASTS

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

- "Impact of Breast Density Notification Legislation on Radiologists' Practices of Reporting Breast Density: A Multi-State Study," Manisha Bahl, MD, MPH, and colleagues.
- "Radiomic Profiling of Glioblastoma: Identifying an Imaging Predictor of Patient Survival with Improved Performance over Established Clinical and Radiologic Risk Models," Philipp Kickingereder, MD, and colleagues.

RadioGraphics Content Aids Residents, Fellows

RadioGraphics features content tailored specifically to trainees: image-rich, interactive presentations designed to give viewers a thorough understanding of important topics in radiologic imaging. Each presentation is accompanied by an extended abstract that provides additional contextual information. Access articles at RSNA.org/RadioGraphics.

Comprehensive Shoulder US Examination: A Standardized Approach with Multimodality Correlation for Common Shoulder Disease

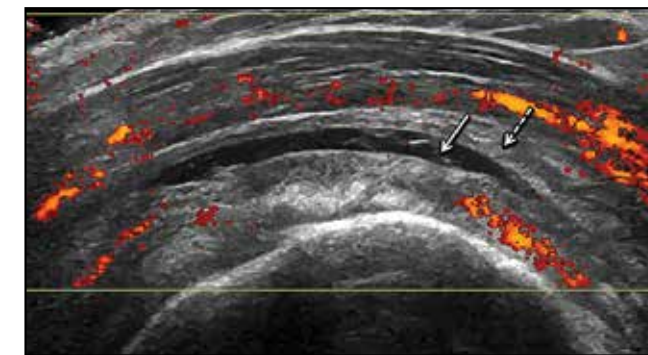
Although MRI is typically the modality of choice for evaluating the soft-tissue structures of the shoulder, ultrasonography (US) is becoming an important complementary imaging tool in the evaluation of superficial soft-tissue structures such as the rotator cuff, subacromial-subdeltoid bursa, and biceps tendon.

In an article in the October Special Issue of *RadioGraphics* (RSNA.org/RadioGraphics), Matthew H. Lee, MD, of the University of Wisconsin School of Medicine and Public Health in Madison, and colleagues describe a standardized approach to the shoulder US examination with a review of the basic technique of this examination, normal anatomy of the shoulder, common indications for shoulder US, and characteristic US findings of common shoulder diseases — with select MRI and arthroscopic correlation.

RadioGraphics

Teaching points in the article include:

- Real-time diagnostic US of the shoulder should be performed in a logical and systematic fashion by using an approach that is accessible and easy to understand and thus facilitates coherent reproducibility and implementation in daily practice.
- Real-time US examination of all of the shoulder tendons should be performed with gentle toggling (i.e., rocking and angling) of the transducer to eliminate the anisotropy artifact that may mimic tendinopathy or a tear.



Infectious subacromial-subdeltoid (SASD) bursitis in a 35-year-old woman with a history of renal transplantation who presented with bacteremia, left shoulder pain and swelling. Short-axis color Doppler US image shows a complex SASD bursal fluid collection with septa (solid arrow) and associated bursal thickening (dashed arrow). Pronounced hyperemia is seen at the margins of the SASD bursa and in the adjacent deltoid muscle.

(*RadioGraphics* 2016;36:6:1606-1627) ©RSNA 2016 All rights reserved. Printed with permission.

- US is accurate and reliable for evaluating the extracapsular long head of the biceps tendon — particularly in the setting of potential tendon rupture and subluxation or dislocation. "As more radiologists are looking to implement shoulder US into their clinical practices, comfort in performing standardized shoulder US examinations and familiarity with the types of diseases that are best evaluated using US are imperative for the delivery of high-quality patient care," the authors write.

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

RSNA Journals Focus of RSNA 2016 Session

"Becoming a Reviewer for the RSNA Journals (Sponsored by the RSNA Publications Council)," will be held Wed., Nov. 30 from 8:30 – 10:30 a.m. at RSNA 2016.

Radiology Editor Herbert Y. Kressel, MD, and *RadioGraphics* Editor Jeffrey S. Klein, MD, will give their perspective on RSNA's peer-reviewed journals, discussing the peer-review process, the functions of the reviewer and how a reviewer can receive *AMA PRA Category 1 CME* credit for manuscript review.

Add courses to My Agenda at Meeting.RSNA.org.



Learn About RSNA Journals at RSNA 2016

Check out RSNA's print, online and mobile publications and learn about unique online features at the new Membership & Resources booth in the Connections Center at RSNA 2016. Staff is also available to assist attendees with any journal-related customer service inquiries such as opting out of print or changing a mailing address.



Radiology in Public Focus

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

Congenital Brain Abnormalities and Zika Virus: What the Radiologist Can Expect to See

Prenatally and Postnatally

A spectrum of imaging findings revealing brain abnormalities associated with the congenital Zika virus infection will aid the radiologist in identifying the virus infection at imaging, according to new research.

In a special report in *Radiology*, Fernanda Tovar-Moll, MD, PhD, vice president of the D'Or Institute for Research and Education and professor at the Federal University of Rio de Janeiro, in Rio de Janeiro, Brazil, and colleagues performed a retrospective review of imaging and autopsy findings associated with the congenital Zika virus infection in women referred to the Instituto de Pesquisa in Campina Grande (IPESQ), Northeastern Brazil — where the infection has been severe.

From June 2015 to May 2016, 438 patients were referred to the IPESQ due to rash during pregnancy or suspected central nervous system abnormality. From this group, the researchers identified 17 fetuses or neonates of women who had imaging at IPESQ, as well as documented Zika infection in fluid or tissue (“confirmed cohort”), and 28 fetuses or neonates with brain findings suspicious for Zika infection with intracranial calcifications (“presumed cohort”). Imaging exams included fetal MRI, postnatal brain CT, postnatal brain MRI and, in some cases, longitudinal prenatal ultrasound.

The brain abnormalities seen in confirmed and presumed Zika groups were very similar. Nearly all of the babies in each group had ventriculomegaly, a gross enlargement of lateral ventricles in the brain. Although most fetuses had at least one exam showing abnormally small head circumference, the researchers discovered that head circumference was normal in three fetuses with severe ventriculomegaly.

Ninety-four percent of the confirmed Zika group and 79 percent of the presumed Zika group had abnormalities of the corpus callosum. All but one had cortical migrational abnormalities.

Intracranial calcifications were present in 88 percent of the confirmed Zika group and 100 percent of the presumed Zika group — most commonly found at the gray-white junction of the brain. All of the babies exhibited reduced tissue volume in their brains. All patients showed varying abnormalities in cortical development.

The severity of the cortical malformation and associated tissue changes, and the localization of the calcifications at the grey-white matter junction were the most surprising findings, according to researchers.

“There are a variety of brain abnormalities that can be found in fetuses exposed to intrauterine Zika virus infection,” the authors write. “It is important for radiologists to understand the type of abnormalities associated with congenital Zika virus infection to aid in recognition of disease and appropriate counseling of patients.”

Radiologists Do Not Face Elevated Risk of Radiation-related Mortality

No evidence of excess radiation-related mortality was found in U.S.-based radiologists who graduated from medical school after 1940, possibly due to increased radiation protection and/or lifestyle changes, according to new research.

Amy Berrington de González, DPhil, of the National Cancer Institute (NCI), Bethesda, Md., and colleagues, used the American Medical Association Physician Masterfile to construct a cohort of 43,763 radiologists and 64,990 psychiatrists (control group) who graduated from medical school between 1916 and 2006. Researchers sought to assess whether differences between radiologists and psychiatrists are consistent with known risks of radiation exposure and the changes in radiation exposure exhibited in radiologists over time.

Vital status was obtained from record linkages with the Social Security Administration and commercial databases, and cause of death was obtained from the National Death Index.

In the radiologists who graduated before 1940, researchers discovered an increased risk of mortality from leukemia and/or myelodysplastic syndrome that was likely related to occupational radiation exposure. Results also showed an increased mortality from melanoma, non-Hodgkin lymphoma and cerebrovascular disease in those who graduated before 1940, and this is possibly due to occupational radiation exposure.

“There have been dramatic improvements in radiation protection since the earliest radiologists started practicing, including general lead shielding of equipment, personal use of lead aprons and glasses, and use of room shields,” the authors write.

Radiology's Zika Research Captures World's Attention

A special *Radiology* report on the Zika virus (see study, left) released in August captured the attention of media across the globe, including the *New York Times*, which devoted a front-page article to the research.

Other high-profile coverage of the *Radiology* research included NBC Nightly News, ABC World News Tonight, NPR, Voice of America, *The Washington Post*, *The Boston Globe*, *TIME* and *Popular Science*. More than 550 print, broadcast and online placements were tracked in these outlets in the first 24 hours.

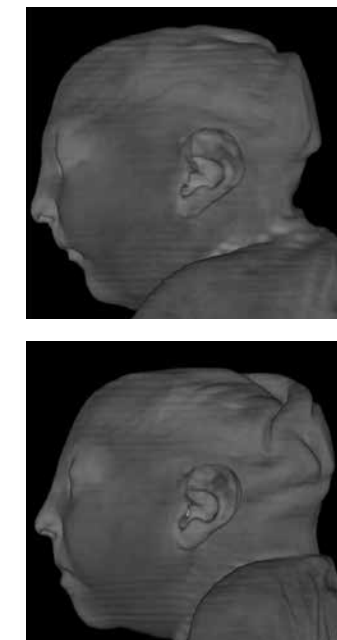
Additional outlets include *Newsday*, *the Huffington Post*, Fox News Channel, CNBC, *The Daily Beast*, *Globe and Mail*,

Calgary Herald, *Toronto Star*, *Daily Mail*, *San Francisco Chronicle*, and *The Philadelphia Inquirer*.

This coverage reached an estimated audience of 1 billion, and continues to climb.

Zika Research Featured at RSNA 2016

The Hot Topic Session: Zika — What the Radiologist Needs to Know (SPSH21) — Moderated by Deborah Levine, MD, will be featured at RSNA 2016. Go to My Agenda at Meeting.RSNA.org.



Surface reconstruction postnatal CT images obtained in the case of a 24-year-old woman pregnant with twins, with characteristic rash at 9 weeks of pregnancy and confirmed Zika virus infection. (*Radiology* 2016;281:1:203–218 ©RSNA 2016. All rights reserved. Printed with permission.)

RSNA Newsroom Promotes RSNA Annual Meeting to Media

The RSNA newsroom is responsible for all media relations activities associated with the RSNA annual meeting.

Among their duties, the newsroom staff develops the RSNA press kit and online press releases, fields inquiries and interview requests, assists members of the press onsite and promotes research presented at the annual meeting to national and international consumer and trade media.

More than 100 reporters attended last year's annual meeting and nearly 22,000 stories about RSNA 2015 have been carried by print, broadcast and online media outlets.

New Content on *RadiologyInfo.org*

Visit *RadiologyInfo.org*, the public information website produced by RSNA and ACR, to read new content posted to the site on Intravascular Ultrasound and Pediatric MRI. Be sure to check out the new “Your Radiologist Explains” video on Pediatric MRI as well.

October and November Public Information Activities Focus on Breast and Lung Cancer Awareness

In recognition of Breast Cancer Awareness Month in October and Lung Cancer Awareness Month in November, RSNA is distributing public service announcements (PSAs) that focus on the importance of screening and the symptoms, risk factors and possible treatment options related to these cancers.

In addition, the RSNA “60-Second Checkup” audio program focusing on breast cancer for October and lung cancer for November will be distributed to 65 radio stations across the country.

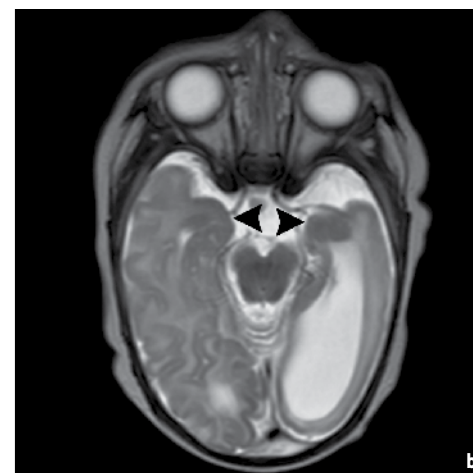
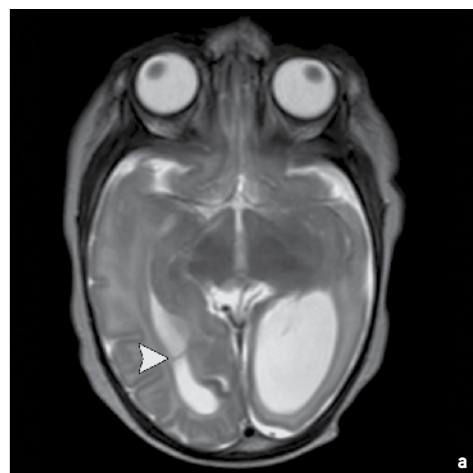
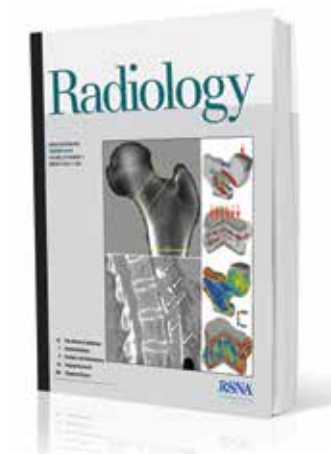
Media Coverage of RSNA

In June, 809 RSNA-related news stories were tracked in the media. These stories reached an estimated 472 million people.

Coverage included KCBS-TV (Los Angeles), KCAL-TV (Los Angeles), WCPO-TV (Cincinnati), *WebMD*, *Philly.com*, *HealthDay*, *Health.com*, *Boston.com*, *CNBC.com*, *ScienceDaily* and *Medical News Today*.

In July, 869 RSNA-related news stories were tracked in the media. These stories reached an estimated 476 million people.

Coverage included *U.S. News & World Report*, Yahoo! Finance, Fox News Channel, *San Francisco Chronicle*, *Philly.com*, *WebMD*, *ScienceDaily*, *MedPage Today*, *HealthDay*, *Houston Chronicle*, *Diagnostic Imaging* and *Auntminnie.com*.



Figures a & b: T2-weighted MR images obtained in the neonate at 26 days (a-b) show septation in the ventricle (arrowhead on a). The right ventricle has relatively decreased in size compared with the prenatal image, whereas the left ventricle has increased in size. Under-rotation of the hippocampus (arrowheads on b) is demonstrated.

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