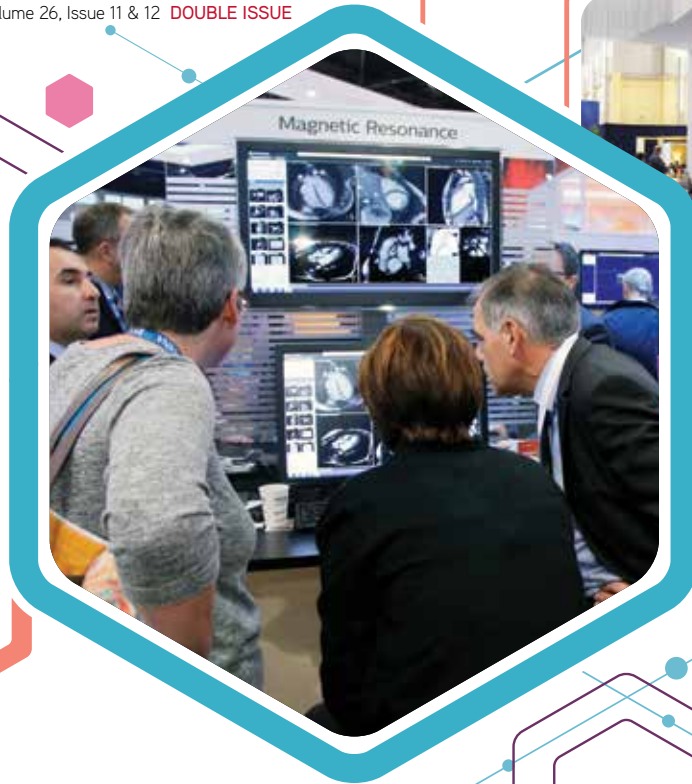


RSNA News™

November–December 2017 Volume 26, Issue 11 & 12 **DOUBLE ISSUE**



RSNA® 2017
Explore. Invent. Transform.
November 26 to December 1

Annual Meeting Preview

ALSO INSIDE:

- Explore Machine Learning at RSNA 2017
- Volunteers Drive RSNA's Abstract Process
- Country Presents Spotlights Colombia, Israel
- The Critical Role of Emergency Radiology
- Tips for First-Time Annual Meeting Attendees

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

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Follow us for exclusive news, annual meeting offers and more!



Emergency Radiology Focus of Annual International Day of Radiology

Emergency radiology and the essential role that radiologists play to increase the quality of care and treatment of patients in the emergency room 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 and the American College of Radiology with social media activities and a dedicated website (IDoR2017.com).

Visit RSNA.org/IDoR for customizable promotional materials and more information.

(See Page 22 for a full report on the role emergency radiology played in treating victims of the Manchester bombing).



Numbers in the News

3

Number of teams to receive awards at RSNA 2017 for submitting the most accurate algorithms in the Machine Learning (ML) Challenge. Read more about this and other ML offerings at this year's meeting on [Page 12](#).

425

Number of RSNA volunteers who reviewed abstracts for RSNA 2017 as part of a lengthy process that begins each January with a "Call for Abstracts." Read more on [Page 20](#).

54

Number of courses approved for self-assessment module (SAM) credit at RSNA 2017. Read more about continuing education opportunities on [Page 31](#).

2018 R&E Foundation Grant Application Process is Open

Individuals interested in obtaining RSNA Research & Education (R&E) Foundation grants for 2018 can submit their applications now. 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

Note: Applicants are encouraged to submit Education Scholar Grant applications for education projects in their specific areas of interest and expertise. In addition, the Foundation's Board of Trustees has expressed an interest in applications targeting the following topics: machine learning, precision medicine, leadership development, informatics, molecular diagnostics and patient education.

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

Research Grants Deadline – Jan. 16

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

Research Medical Student Grant Deadline – Feb. 1

Learn about the 2017 R&E Foundation grant recipients and their projects starting on [Page 42](#).

RSNA NEWS

November-December 2017
Volume 27, Issue 11-12
Published monthly by the Radiological Society of North America, Inc.
820 Jorie Blvd., Oak Brook, IL
60523-2251. Printed in the USA.

POSTMASTER: Send address corrections or changes to: *RSNA News*, 820 Jorie Blvd., Oak Brook, IL 60523-2251

Non-member subscription rate is \$20 per year; \$10 of active members' dues is allocated to a subscription of *RSNA News*.

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ABR Issues First IR/DR Board Certificates

Qualified interventional radiologists were issued the first Interventional/Diagnostic Radiology (IR/DR) board certificates on Oct. 15. The new American Board of Radiology (ABR) certificate recognizes interventional radiology as a unique specialty.

Those with subspecialty certification in vascular and interventional radiology (VIR) were eligible to receive the new IR/DR certificate. Those certified in IR/DR have demonstrated competency to practice in the full scope of interventional radiology, as well as in diagnostic radiology. ABR offered VIR diplomates a choice of whether they wanted to opt in for the new IR/DR certificate. Those who did not respond by Oct. 15 were automatically converted to the IR/DR certificate.

The new IR/DR certificate joins diagnostic radiology, radiation oncology and medical physics as one of four primary certificates offered by the ABR.

For more information, visit theabr.org.

ISMRM/RSNA Co-Provided Workshop on High-Value MRI

February 18-20, 2018
Capital Hilton
Washington, DC

Last Chance to Register

Register now for the International Society for Magnetic Resonance in Medicine (ISMRM)/RSNA High-Value MRI Workshop. The economics and value of MRI in healthcare will be the topic of discussion. Those who want to maximize the impact of their MR research or improve the efficiency of MR operations are invited to attend. For more information and registration, visit <http://www.ismrm.org/workshops/18HighValue/>. The deadline for abstract submission is Dec. 8, 2017.

Writing a Competitive Grant Proposal Workshop

March 16-17, 2018
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 federal funding. This 1½-day program is guided by a faculty of leading researchers with extensive experience in all aspects of grant applications and funding. The program will focus on

developing specific aims to be included in a grant application. Participants will be provided tools for getting started in the grant writing process and developing realistic expectations. The registration fee is \$225.

To register online visit RSNA.org/CGP; for more information, contact the RSNA Department of Research at DORA@rsna.org or 1-630-368-3742.

In Memoriam

George F. Schuyler



Former RSNA director of scientific meetings, George F. Schuyler, died June 27 in Wisconsin. He was 89.

Schuyler served in the U.S. Navy as an electrician on the U.S.S. Norfolk from 1946 to 1948. After discharge, Schuyler earned his civil engineering degree from the University of Iowa, Iowa City. He worked in Chicago as a construction superintendent eventually overseeing the development of buildings designed by architect Ludwig Mies van der Rohe. He joined the staff of the American Hospital Association as a building supervisor and meeting planner after he supervised the construction of its headquarters.

In 1975, Schuyler became RSNA's director of scientific meetings and educational materials. During his tenure with RSNA, he managed the annual meeting's move from the Palmer House in Chicago to McCormick Place and oversaw the growth of the annual meeting to become the world's premier medical imaging meeting. In 1978, he worked with RSNA leadership to move the organization's headquarters from Syracuse,

NY, to Oak Brook, IL. For his efforts in helping RSNA grow and recognize the new opportunities that technology was bringing to radiology, he received the RSNA Gold Medal in 1988. He retired from RSNA in 1989.

Schuyler also served as managing director of the American Society of Neuroradiology and worked with international medical personnel to establish the European Congress of Radiology (ECR). The ECR honored him with its Distinguished Service Award in 2004.

He served as past president of the Professional Convention Management Association, Major American Trade Show Organizers and the Trade Show Bureau. He was honored for his leadership in meeting management with a portrait hanging at McCormick Place and bronze bust of his likeness in the Meeting Managers Hall of Fame in Washington, D.C.

My Turn:

Focusing on Professionalism is Valuable for the Image of Radiology and Radiologists

BY STEPHEN CHAN, MD

In every situation, healthcare workers need to comport themselves with the greatest degree of professionalism. Changes in imaging technology, medical knowledge, electronic communications, and the social and healthcare needs of patients have required radiology professionals to adapt their practices in order to provide optimal care as patients navigate the healthcare system.



Chan

Since its inception, the RSNA Professionalism Committee has provided educational courses on current issues in professionalism that are relevant to today's radiology practice. More recently, the Committee has widened its scope to develop and maintain enduring educational material on medical professionalism. As professional standards evolve, and as the field of radiology adapts to changes both inside and outside the healthcare environment, the Committee focuses on helping our colleagues stay aware of salient changes in medical professionalism.

RSNA 2017 Educational Courses

At RSNA 2017, the Committee is presenting four educational courses:

- “Developing Competency in Non-Clinical Professional Roles in Radiology and Medicine” covers non-clinical roles for radiologists including leadership in radiology societies and serving as a study section reviewer.
- “The Newly Hired Radiologist: Lessons for Aspiring, New and Experienced Radiologists” addresses needs and challenges facing the beginning radiologist, as well as ways to assist new radiologists transitioning out of training. The development of social media in private practice, including patient portals, will also be covered.
- “Authorship in Radiology” discusses the recent developments in publishing as to what truly constitutes authorship, and will describe the International Committee of Medical Journal Editors (ICMJE) criteria in detail.
- “Medicolegal Issues for Radiologists;

To Divulge or Not to Divulge: Diagnostic Misses and Errors” will examine the expectations and challenges diagnostic radiologists face when they encounter a difference regarding the assessment of a prior imaging study.

Enduring Online Educational Material

The Committee fosters the development of enduring online educational material in several ways. Educational vignettes demonstrate important points in medical professionalism, using scenarios that simulate real-life situations. A format that is similar to the familiar clinical vignette allows readers to delve quickly into a sticky professional situation and choose among various alternatives to arrive at an appropriate assessment and create a reasonable solution. Each multiple-choice question is followed by an explanation of the correct and incorrect responses, with description of the relevant principles and facts. The vignettes are relatively brief, allowing readers to complete one or more during short breaks at work, or they could be expanded for discussion in a classroom setting. Several additional vignettes will be released in 2018, with topics including patient privacy, physician burnout and humor in the workplace.

The Professionalism Educational Toolkit references a variety of educational materials and is continually reviewed and updated.

The Committee also maintains and recertifies the Ethics and Professionalism online courses that were initiated by the American Board of Radiology Foundation.

This series of 11 online courses covers important topics in medical professionalism including conflict of interest, human subject research, relationships with vendors and ethics in graduate and resident education.

Professionalism as a Team Endeavor

Professional standards and behaviors develop as a function of many complex interactions within the broader healthcare community, often making it difficult for individuals to ascertain where professional boundaries lie. The RSNA Professionalism Committee provides a forum for members to explore and expound upon specific topics and learn from one another. My participation and service on this committee for nearly a decade has been rewarding both professionally and personally, given the array of remarkable opportunities for networking and intellectual contributions. Committee members have a role in informing healthcare professionals and influencing public opinion on various issues in medical professionalism. I would certainly encourage all interested radiologists to volunteer their time and efforts to one of the many RSNA committees.

Stephen Chan, MD, is a neuroradiologist and associate professor of radiology at Columbia University in New York City. Dr. Chan serves as chairman of the RSNA Professionalism Committee and as a member of the Research & Education (R&E) Research Trainee Grant Study Section and the R&E Education Study Section.

Kressel Steps Down as *Radiology* Editor

After a decade at the helm of *Radiology*, Herbert Y. Kressel, MD, will step down from his position as editor of RSNA's prestigious scientific journal at the end of 2017.

Dr. Kressel, who became *Radiology* editor in 2008, earned a reputation for setting the highest standards for scientific integrity while continually seeking new ways to advance the journal in the digital age and improve the experience for authors, reviewers and researchers.

As *Radiology* editor, he charted an ambitious course for the journal that annually ranked among the highest impact factors in scientific publishing. The impact factor for *Radiology* increased each year in the decade Dr. Kressel served as editor, culminating in 2016 when the journal scored an impact factor of 7.296 — the second highest among the 126 journals that comprise the radiology, nuclear medicine and imaging category.

"We are sad to see Dr. Kressel step down as the editor of *Radiology*," said Valerie Jackson, MD, chair of the RSNA Board of Directors. "While *Radiology* has been the premier journal for our specialty for many years, Dr. Kressel truly elevated the quality to new heights. His extraordinary vision, innovation and leadership have been instrumental in the success of the journal."

Dr. Kressel began his editorial career

as the author or coauthor of hundreds of scientific reports, books, book chapters and invited papers — many published in *Radiology*. He served on the *Radiology* Editorial Board from 1985 to 1991.

Throughout his tenure, Dr. Kressel guided *Radiology* through the digital revolution by quickly embracing the online tools that represent the future of scientific publishing.

Realizing the need to publish timely research as fast as possible, Dr. Kressel developed a fast-track option for researchers designed to expedite the online publication of articles in areas such as molecular imaging, PET/CT and PET/MR. Fast-track articles are published online within two months of manuscript submission.

Readers accessing *Radiology* online or via mobile were introduced to features including *Radiology* Podcasts with study authors, the How I Do It video series, online reader comments and the *Radiology* online poll. In 2012, Dr. Kressel introduced *Radiology* Select, a continuing series of selected *Radiology* articles that highlight developments in imaging science, techniques and clinical practice. By 2017, eight volumes of *Radiology* Select had been published.

To help authors improve the quality of research and increase likelihood of getting published in *Radiology*, Dr. Kressel imple-

mented reporting guidelines and checklists to ensure that authors include key information to demonstrate that their conclusions are reproducible and generalizable.

In 2013, Dr. Kressel introduced the Alexander R. Margulis Award for Scientific Excellence, which recognizes the best original scientific article published in *Radiology* for a given year. In 2014, he joined RSNA's two-year-long centennial celebration through the historical insights provided by the Golden Oldies articles and the dedicated centennial supplement. He established an initiative to screen submitted manuscripts for plagiarism and/or redundancy by using a dedicated software package.

While stepping down from *Radiology*, Dr. Kressel remains the Miriam H. Stoneman Professor of Radiology at Harvard Medical School in Boston, a position to which he was appointed in 1993. He is Emeritus Radiologist-in-Chief of the Department of Radiology at Beth Israel Deaconess Medical Center in Boston, where he also served as president and chief executive officer from 1998 to 2000.

Dr. Kressel is the seventh editor of *Radiology* since its founding in 1923. David A. Bluemke, MD, PhD, will become *Radiology* editor in January 2018.



Kressel

RSNA Retirement

Kolleen Klein, 23 years

After more than a decade of working in the association industry, Kolleen Klein did not hesitate to join RSNA staff in 1994 when the opportunity occurred. Klein's commitment to member needs and the imaging community at large led to her promotion to director of membership in 1999.

"Kolleen embodies the RSNA spirit of teamwork and has a thoughtful, steady approach to solving any problem, large or small," said Sally Nikkel, assistant executive director, RSNA finance and administration. "Her co-workers, executive staff leaders and the members have benefited from her steadfast expertise, guidance and encouragement. She will leave behind a legacy of warmth, achievement and a work ethic that will be difficult to replace."

Drawing on her vast knowledge of associations and experience bolstering

membership, Klein oversaw a dramatic growth in RSNA membership, from 29,000 in 1999 to more than 54,000 in 2016.

As technology changed, so did the needs of the membership department. Seeking an easier way to process member renewals, which were handled by check, Klein managed the implementation of the online dues renewal process, which grew to include auto renewal and group billing.

Recognizing that early career radiologists are the future of the Society and the specialty, Klein was influential in establishing the RSNA Resident and Fellow Committee in 2010, creating opportunities for resident members to volunteer for RSNA committees.

When RSNA combined the RSNA Membership and Information Management departments, Klein's title changed to director of customer service and membership

management in 2016.

In 2015, when RSNA commemorated the 100th anniversary of the Society and its annual meeting, Klein was part of a team devoted to gathering information on the history and growth of RSNA. She uncovered and shared stories about the volunteers who successfully founded the Society, as well as spotlighted many member "families" with second and third generations of radiologists.

Klein cites a wide array of colleagues, including the late executive director Delmar J. Stauffer and a diverse roster of RSNA executive staff leaders, as strong influences on her career. The impact she has had on RSNA volunteers, staff and the Society as a whole is equally indelible. Klein will retire in December.



Klein

Annual Meeting Preview

Medical imaging science, education and technology — RSNA 2017 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 2017 will feature plenary session lectures on a spectrum of healthcare topics.

RSNA 2017 President's Address

Sunday, Nov. 26, 8:30 a.m.— Arie Crown Theater

Is It Time to Reinvent Radiology?

Richard L. Ehman, MD

RSNA is a powerful force for advancing the science and practice of medical imaging for the benefit of patients worldwide, according to RSNA President Richard L. Ehman, MD.

"I am awed by the amazing opportunities that lie ahead in our field," Dr. Ehman says. "The extraordinary advances in medical imaging technology of the last decades have improved diagnostic medicine so profoundly that most physicians could scarcely imagine taking care of patients without them."

In his President's Address, "Is it Time to Reinvent Radiology?" Dr. Ehman will explore how innovations in medical imaging have often been the product of unique multidisciplinary efforts, harnessing biomedical science with physical science and engineering. Over the years, innovation in radiology usually focused on addressing practical problems and the resulting solutions have been quickly translated to improve patient care.

Perhaps the most important opportunity before the specialty today is to reinvent radiology practice to optimize value, according to Dr. Ehman. He stresses the urgency for the radiology community to lead this change through innovation. Radiology, he says, should also harness the unique multidisciplinary union of biological and physical sciences that created the field in the first place to expand radiologists' ability to employ the most powerful technologies to better serve patients.

Dr. Ehman is president of the RSNA and has served as a member of the RSNA Board of Directors since 2010. He is a professor of radiology and the Blanche R. & Richard J. Erlanger Professor of Medical Research at the Mayo Clinic in Rochester, MN.



Ehman



Dr. Ehman earned his medical degree from the University of Saskatchewan in Saskatoon, Canada. His internship at Foothills Hospital in Calgary, Alberta, was followed by a residency in diagnostic radiology at the University of Calgary. He completed a year-long research fellowship at the University of California, San Francisco, followed by a clinical fellowship and his appointment to the staff of the Mayo Clinic in 1985.

Dr. Ehman served on the Mayo Clinic Board of Governors and in 2014 was elected as an emeritus member of the Mayo Clinic Board of Trustees. He is past president of several organizations, including the International Society for Magnetic Resonance in Medicine (ISMRM), Academy of Radiology Research, and the Society for Body Computed Tomography and Magnetic Resonance. He served on the RSNA Research & Education Foundation Board of Trustees from 2009 to 2015.

A widely respected leader in radiology research, Dr. Ehman has served as chair of the Radiology and Nuclear Medicine Study Section of the National Institutes of Health (NIH), where he has also served terms on the Advisory Council of the National Institute of Biomedical Imaging and Bioengineering and on the Council of Councils. An NIH-funded clinician-scientist and inventor, Dr. Ehman holds more than 70 U.S. and foreign patents. He was awarded the ISMRM gold medal, the RSNA Outstanding Researcher Award, an RSNA Honored Educator Award and the gold medal of the Asian Oceanian Society of Radiology. He was named the Mayo Clinic Distinguished Investigator in 2014, and is a Fellow of the American College of Radiology. In 2010, Dr. Ehman was elected as a member of the Institute of Medicine of the National Academies of Science.

Opening Session Lectures

Sunday, Nov. 26, 8:30 a.m. — Arie Crown Theater

Tomorrow's Radiology

Roderic I. Pettigrew, PhD, MD

The overarching goal of the healthcare enterprise, one even being pursued by the National Academy of Medicine, says Roderic I. Pettigrew, PhD, MD, can be summarized in two words — healthy longevity. The vision is straightforward: to be born healthy, acquire no significant disease, live a long and satisfying life, and to reach the end of life without pain or suffering from disease.

In his Opening Session Lecture, “Tomorrow’s Radiology,” Dr. Pettigrew will discuss the role of biomedical imaging in reaching that goal. In fact, he says, modern medicine and the medicine of tomorrow is unthinkable without biomedical imaging.

“As we look toward the goal of healthy longevity,” Dr. Pettigrew says, “the radiology of tomorrow will be central in the transformation of the international medical ecosystem from one centered on disease treatment to one focused on health management.”

Founding director of the National Institute of Biomedical Imaging and Bioengineering (NIBIB), Dr. Pettigrew is a pioneer in biomedical imaging who has implemented multiple innovative programs and is helping create a new era in medicine.

Among his accomplishments at NIBIB, Dr. Pettigrew jointly led a national effort with the Howard Hughes Medical Institute to create new interdisciplinary graduate training programs. In 2008, he established the Quantum Grants program to achieve “medical moon shots” designed to solve major healthcare problems. Recently he championed a broad-based effort of academic, industry and government leaders to advance technologies that can restore notable motor and autonomic function after paralysis from spinal cord injury. He called for and established an Indo-U.S. partnership to invent new technologies for passive, cuffless blood

pressure monitoring. In addition, he was an early advocate of a national system for patient-controlled sharing of medical images which became the RSNA Image Share project. He helped establish and has co-chaired the congressionally requested Federal Inter-Agency Working Group on Medical Imaging.



Pettigrew

At the time of his NIBIB appointment, Dr. Pettigrew was serving as professor of radiology and medicine at Emory University School of Medicine, and professor of bioengineering at the Georgia Institute of Technology, both in Atlanta. During this time, Dr. Pettigrew became known for pioneering work developing 4-D imaging of the cardiovascular system using MRI, which was the topic of his RSNA 75th Anniversary Diamond Jubilee New Horizons Lecture.

A graduate of Morehouse College in Atlanta, Dr. Pettigrew earned his PhD in applied radiation physics from the Massachusetts Institute of Technology, Cambridge, and his medical degree from the University of Miami School of Medicine. He completed his residency in nuclear medicine at UC San Diego in 1983. Dr. Pettigrew spent a year as a clinical research scientist with Picker International, the first manufacturer of MRI equipment.

In 1985, he joined Emory University School of Medicine in Atlanta as a Robert Wood Johnson Foundation Fellow with an interest in non-invasive cardiac imaging. He remained at Emory and also served as a professor of biomedical engineering at the Georgia Institute of Technology until his 2002 appointment to the NIBIB.

In addition to his duties as NIBIB director, Dr. Pettigrew serves as the NIH Liaison to NASA and the U.S. Department of Energy, and co-leads a joint effort with the Bill and Melinda Gates Foundation to develop a cell phone-based platform to test for influenza and other diseases at home.

Sunday, Nov. 26, 8:30 a.m. — Arie Crown Theater

Imaging Innovation in 21st Century Biomedicine — Challenges and Opportunities

Elias A. Zerhouni, MD

Recent scientific advances have revealed the enormous complexity of biological systems in health and disease. The daunting prospect of unraveling these complexities and understanding human disease evolution with greater precision is a fundamental public health challenge, according to Elias A. Zerhouni, MD.

Imaging is central to that process on a number of key fronts, according to Dr. Zerhouni, who will present the Opening Session Lecture, “Imaging Innovation in 21st Century Biomedicine — Challenges and Opportunities.” He will discuss the role imaging plays in biomedicine and in realizing the core goal of personalized medicine: intervening before deterioration of function by predicting which patients will most likely benefit from novel therapeutics.

“Imaging has played — and will continue to play — a critical and increasingly important role in biomedicine from preclinical to clinical applications as they uniquely enable the precise, three-dimensional localization of biological information and their evolution over time at molecular as well as full body and population scales,” Dr. Zerhouni said.

A world-renowned leader in radiology and medicine, Dr. Zerhouni serves as president of Global Research & Development, and as a member of the executive committee at Sanofi, a Paris-based global leader in diversified healthcare solutions.

From 2002 to 2008, Dr. Zerhouni served as director of the National Institutes of Health (NIH), where his achievements include launching the NIH Roadmap for Medical Research, a collection of initiatives designed to transform the nation’s medical research capabilities and improve the translation of research into practice. He also developed a new office to change the way NIH finds and funds cutting-edge research.

Dr. Zerhouni spent his academic career at Johns Hopkins University, Baltimore, where he served as chair of the Russell H. Morgan Department of Radiology and Radiological Science as well as executive vice dean of the School of Medicine, from 1996 to 2002.

In November 2009, former President Obama appointed Dr. Zerhouni as one of the first presidential U.S. science envoys.



Zerhouni

Continued on next page

Continued from previous page

As a researcher, he is credited with developing imaging methods used for diagnosing cancer and cardiovascular disease. Dr. Zerhouni is one of the world's premier experts in MRI, extending the role of MRI from taking snapshots of gross anatomy to visualizing how the body works at the molecular level.

Dr. Zerhouni has founded or co-founded five start-up

companies, authored more than 200 publications and holds eight patents.

Among his numerous honors, Dr. Zerhouni was elected to the U.S. National Academy of Medicine, the U.S. National Academy of Engineering and the Institute of Medicine of the National Academy of Sciences. RSNA awarded him a Gold Medal in 2010.

New Horizons Lecture

Monday, Nov. 27, 1:30 p.m. — Arie Crown Theater

A New Light: The Birth, and Rebirth, of Imaging

Daniel K. Sodickson, MD, PhD

Imaging began as an effort to match or exceed the capabilities of the human eye and now is on the verge of emulating the workings of the human brain, according to Daniel K. Sodickson, MD, PhD. A renaissance of technological and methodological developments is circumventing previous limits on imaging speed, spatial resolution, information content, and ultimately, value. These developments are catalyzing a fundamental shift from the traditional series of snapshots to a new paradigm of streaming information that strengthens radiologists' ability to see what lies beneath.

A revolution in physical modeling is changing the way radiologists interpret image information and connect organ-level maps to underlying cellular architecture and molecular composition. At the same time, the latest generation of artificial intelligence (AI) is entering into the business of image interpretation and has the potential to change the way imaging devices are designed in the future, according to Dr. Sodickson. In fact, recent implementations of AI for image reconstruction have begun to resemble the neural processing of complex, continuous sensory data streams.

This rebirth of imaging also gives pause to revisit the history of imaging. In his lecture, Dr. Sodickson will review the history of biomedical imaging and explore its evolving role in our

rapidly changing world. Radiologists who embrace emerging paradigms of technology and information will play a critical role in leading imaging through what promises to be an extraordinary period of growth and change.

Dr. Sodickson is the vice chair for research in the Department of Radiology, director of the Bernard and Irene Schwartz Center for Biomedical Imaging, and a professor of radiology, physiology and neuroscience at NYU School of Medicine, in the NYU Langone Health system in New York City. He also serves as chair of the National Institutes of Health study section on biomedical imaging technology. Dr. Sodickson is credited with founding the field of parallel imaging, which allows distributed arrays of detectors to gather MR images at previously inaccessible speeds. As a result of his discovery, most modern MR scanners are now equipped with parallel imaging hardware and software, and parallel imaging acceleration is being used routinely in clinical MRI examinations and research imaging studies around the world. For his work in parallel imaging, Dr. Sodickson was awarded the gold medal of the International Society for Magnetic Resonance in Medicine (ISMRM) in 2006. He is the current president of ISMRM.



Sodickson

RSNA/AAPM Symposium

Tuesday, Nov. 28, 10:30 a.m. — Room E451B

Machine Learning in Radiology: Why and How?

Machine learning (ML) and how it is changing radiology is the topic of this symposium presented in conjunction with the American Association of Physicists in Medicine (AAPM). Keith J. Dreyer, DO, PhD, and Antonio Criminisi, PhD, will help radiologists and medical physicists further understand the current and potential impacts of ML and artificial intelligence (AI) on radiology.

Dr. Dreyer will discuss how radiology can utilize ML and AI to improve the quality and relevance of imaging as well as benefit patients, while Dr. Criminisi will speak on the potential of assistive AI for cancer treatment. The session will be moderated by Paul E. Kinahan, PhD.

Dr. Dreyer is vice chair of radiology and director of the Center for Clinical Data Science at Massachusetts General Hospital, in Boston, and associate professor of radiology at Harvard Medical School. He is a renowned informatics expert and has conducted research in clinical data science, cognitive computing, clinical decision support, clinical language understudying and digital imaging standards. He is particularly interested in the

implications of technology on the quality of healthcare and payment reform initiatives.

He has served on the RSNA RadLex Steering Committee, the Imaging Informatics Coalition and as an annual meeting session and plenary moderator. He currently serves on the board of chancellors of the American College of Radiology (ACR) and is the chair of the commission on informatics. Dr. Dreyer has served on numerous committees of the Society of Imaging Informatics in Medicine (SIIM).

Dr. Criminisi is a principal researcher at Microsoft in Cambridge, United Kingdom. His areas of research include artificial intelligence, machine learning, computer vision and medical image analysis. Dr. Criminisi is leading Microsoft's InnerEye project that uses state of the art AI to build innovative image analysis tools to help doctors treat diseases such as cancer in a more targeted and effective way. He is the author of numerous scientific papers and books and in 2015, he was the recipient of the David Marr Best Paper Prize by the International Conference on Computer Vision for his co-authored paper on deep neural decision forests.



Dreyer



Criminisi

RSNA 2017 DEDICATIONS

Richard L. Baron, MD – The Meeting Program of the 103rd Annual Meeting and Scientific Assembly will be dedicated to Dr. Baron, an internationally renowned diagnostic radiologist with a passion for radiologic research and education and a talent for building bridges between radiologists across the globe.

A posthumous Gold Medal will be presented to Dr. Shirley Baron at the meeting. Read more about Dr. Richard Baron's contributions to radiology on Page 39.

Sir Peter Mansfield, PhD — The 2017 New Horizons Lecture will be dedicated to the memory of Dr. Mansfield, whose contributions to the development of MRI earned him worldwide acclaim and changed the face of modern medicine.

Morton A. Bosniak, MD — The 2017 Annual Oration in Diagnostic Radiology will be dedicated to the memory of Dr. Bosniak, a passionate educator who pioneered the field of visceral angiography and developed the Bosniak classification.



Baron



Mansfield



Bosniak

Annual Oration in Diagnostic Radiology

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

Strategies for Radiology to Thrive in the Value Era

Jonathan B. Kruskal, MD, PhD

In the current value-driven population healthcare environment, radiology must play a key role in both understanding and defining value for providers and their patients

Yet radiology faces challenges in defining the term “value” in the context of medical imaging and finding metrics with relevance to both the patient and the radiologist, said Jonathan B. Kruskal, MD, PhD. As an essential first step, radiology must create a roadmap for providing the evidence-based, outcomes-focused, appropriate, and effective clinical care that each patient deserves, he said.

“To thrive in the world that only rewards value contributions, we need to reassess and reorganize our roles in effectively managing health imaging information and become realistic about how we currently measure and manage our performance in healthcare delivery,” Dr. Kruskal said.

Dr. Kruskal received his medical degree (MB, ChB) from the University of Cape Town (UCT) in South Africa in 1982. After completing an internship in medicine and surgery at Groote Schuur Hospital, he joined the South African Liver Research Center at UCT as a research scholar, where he earned a PhD

degree in hepatic molecular physiology and developed an assay for the newly identified protein D-dimer. After a post-doctoral fellowship at Vanderbilt University, Dr. Kruskal completed his radiology residency at Harvard Medical School's New England Deaconess Hospital in Boston in 1994.

With the support of a 1998 GE Healthcare/RSNA Research Scholar Grant, Dr. Kruskal developed intravital optical methodology for imaging gene expression, angiogenesis and metastatic pathways in a solid tumor mouse model.

He joined the faculty specializing in abdominal imaging, and in 2001, Dr. Kruskal was appointed chief of abdominal imaging, then rose to radiology chair at Beth Israel Deaconess Medical Center and professor of radiology at Harvard Medical School in 2008, positions he still holds today.

As an expert on quality improvement in medical imaging, Dr. Kruskal serves as deputy editor of *RadioGraphics*, editing the Practice, Policy and Quality Initiatives section. He currently serves as chair of the American College of Radiology (ACR) Intersociety Committee Executive Committee and is a former chair of the RSNA Quality Improvement Committee.



Kruskal

Annual Oration in Radiation Oncology

Wednesday, Nov. 29, 1:30 p.m. — Room E450A

Personalized Medicine and Radiation Oncology

Daphne Haas-Kogan, MD

Personalized medicine offers opportunities and challenges for radiologists and radiation oncologists alike. If harnessed thoughtfully, personalized medicine can increase the significance, relevance and value of radiation for cancer patients, especially in the areas of disease imaging, focused radiation and radiation therapy delivery, says Daphne Haas-Kogan, MD.

In her lecture, Dr. Haas-Kogan will focus on how personalized medicine has already changed radiation oncology and how it will change the specialty in the future. This includes the promise of radiomic imaging, which is successfully defining imaging biomarkers based on quantitative descriptions of tumor phenotypes to improve predictions of treatment response and prognosis while reducing radiation doses to organs at risk and maximizing doses to cancerous lesions. In addition, Dr. Haas-Kogan will discuss the commitment needed from radiation oncologists to engineer drugs and design approaches that target a tumor specifically and spare a patient's normal tissues. Finally, she will explore the new class of MRI devices that is creating a paradigm shift in radiation therapy delivery. These high-precision radiation therapy techniques can deliver high doses of radiation to tumors with sub-millimeter accuracy all while providing higher soft tissue resolution, functional imaging and continuous imaging without exposing patients to ionizing radiation.

Dr. Haas-Kogan is chair of the Department of Radiation Oncology at Dana-Farber Cancer Institute, Brigham and Women's Hospital and Boston Children's Hospital. She holds the



Haas-Kogan

Radiation Oncology Endowed Professorship at Harvard Medical School and is a member of the Association of American Physicians.

Dr. Haas-Kogan received her undergraduate degree in biochemistry and molecular biology, magna cum laude, from Harvard University. While in medical school at the University of California, San Francisco (UCSF), she was an HHMI Medical Fellow in the laboratory of Dr. J. Michael Bishop. She received her MD from UCSF and also completed a radiation oncology residency and post-doctoral fellowship in molecular neuro-oncology. She received a 1997 RSNA Research Scholar Grant for her work in molecular determinants of the cellular response to ionizing radiation. While at UCSF she served as vice chair for research and as educational program director.

She has received several teaching awards including the Henry J. Kaiser Award for Excellence in Teaching from UCSF School of Medicine and the prestigious Joseph L. Barrett Award for Teaching at Harvard University.

Throughout, Dr. Haas-Kogan has maintained a productive, well-funded basic science laboratory in which she investigates signaling aberrations in human cancers, including adult and pediatric brain tumors. She has been the principal investigator on many grants funded by NIH/NCI, philanthropic organizations, and industry collaborations.

Dr. Haas-Kogan is a member of the Blue Ribbon Panel appointed to inform the scientific direction and goals of the National Cancer Institute's Cancer Moonshot.

Plenary Session

Thursday, Nov. 30, 2:00 p.m. — Arie Crown Theater

Fast Forward and Focused

Robert Herjavec

Technology is constantly transforming, creating new possibilities and risks in the business world. In his presentation, "Fast Forward and Focused," Robert Herjavec will explore evolving technology trends and the rising cyber security threats medical professionals face personally and professionally on a daily basis. He will reveal a few secrets from inside the Shark Tank and inspire anyone willing to keep up in a fast moving world.

Robert Herjavec is an information technology entrepreneur and a leading Shark on the U.S. television show, "Shark Tank." Born in Eastern Europe, he arrived in North America on a boat with his parents after escaping Communism in the former Yugoslavia.



Herjavec

From delivering newspapers and waiting tables to launching a computer company from his basement, his drive to achieve has led him to create a better life for himself and his family.

Herjavec has built and sold several IT companies to large corporations such as AT&T. In 2003, he founded Herjavec Group, and it quickly became one of North America's fastest growing technology companies. Today, Herjavec Group is recognized as a global leader in information security specializing in managed security services, compliance, incident response and remediation efforts for enterprise level organizations.

Educational Courses



RSNA 2017 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.

Monday

Special Interest Sessions

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

- Experiencing Radiology: Patients' Perspectives
- The Imaging of Cognition — Dementia (Part of a full day of programming on imaging of dementia; see below)
- Translation of Quantitative Imaging from Clinical Research to Clinical Practice: Why and How?
- How Focal and Local are Our Interventions? Systemic and Immunologic Effects of Interventional Oncology
- Integration of CEUS into Radiology Practice
- High Impact Clinical Trials

Dementia-Related Sessions

A full day of sessions will be devoted to the latest advances in imaging of dementia. Sessions include Emerging Technology: Imaging of Dementias; Neuroradiology; White Matter Diseases: Do They Matter? and PET/CT and SPECT/CT in Movement Disorders, Epilepsy and Dementia.

Molecular Imaging (MI) Symposium

Experts in MI will present a full day of sessions focusing on the basics of MI and oncologic, neurology and cardiovascular MI applications.

COLOMBIA PRESENTS

Diagnostic Imaging in Tropical and Infectious Diseases

Presenters will discuss radiologic advancements in treating infectious diseases such as malaria, leishmaniasis, schistosomiasis, onchocerciasis, lymphatic filariasis, Chagas Disease, African trypanosomiasis and dengue, among other diseases.

Tuesday

Quality Improvement Symposium

Developed by the RSNA Quality

Improvement Committee, these sessions help advance the science of quality value proposition to radiologists. Participants can earn a Quality Essentials Certificate for each session by scoring 80 percent or higher on the related test.

- The IOM Report on Improving Diagnosis
- Understanding Error and Improvement in Diagnosis
- Organizational Learning in Radiology

ISRAEL PRESENTS

Radiology in Israel — Experience from the Land of Innovation

Presentations will highlight developments in video capsule endoscopy, deep learning algorithms, interventional radiology, MR-guided focused ultrasound technology, 3-D printing and hyperbaric oxygen therapy for traumatic brain injury patients.

Wednesday

RSNA/ESR Hybrid Imaging Symposium

RSNA and the European Society of Radiology (ESR) are sponsoring a full day of interactive sessions spotlighting hybrid imaging advances.

Thursday

New in 2017 — Fast 5 Session

RSNA will debut its new Fast 5 Session, a lively presentation of transformational ideas, on Thursday, Nov. 30, at 1:30 p.m. Sessions feature five speakers who will each give a five-minute presentation on member-selected topics. Sessions focus on ways to explore, invent and transform radiology.

Follow the conversation on social media at #RSNAFast5.

Throughout the Week

Sponsored Education Sessions

Attend educational programming provided by RSNA 2017 exhibitors onsite at McCormick Place during the annual

meeting. Access corporate symposium session details at Meeting.RSNA.org, in the RSNA meeting program and on signage outside of the meeting room. CME credit, if provided, will be through a third party provider rather than RSNA.

Hot Topic Sessions

Sessions are identified across all subspecialties that cover late-breaking discoveries. Highlights include, Machine Learning and Artificial Intelligence in Lung Imaging, Abbreviated Abdomen MRI Protocols and New and Emerging Theranostic Agents for Prostate Cancer.

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.

Bolstering OnRoradiologic and Onconoradiotherapeutic Skills for Tomorrow (BOOST) Program

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

Hands-On Workshops

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

RSNA 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.

MACHINE LEARNING PLAYS CENTRAL ROLE AT RSNA 2017

BY MIKE BASSETT

Machine Learning (ML) and the role it will play in the future of radiology will be central to a broad scope of programming at RSNA 2017.

Along with numerous educational and scientific sessions exploring the revolutionary technology from every angle, RSNA is featuring a Machine Learning Community in the Learning Center and a Machine Learning Showcase in the Technical Exhibits hall.

Despite the technology's growing presence in health-care, there are still obstacles to overcome before ML is fully embraced by radiology, said Curtis Langlotz, MD, the RSNA Board of Directors liaison for information technology and annual meeting.

"No question — machine learning will change the way radiologists practice in the years ahead, sometimes dramatically," said Dr. Langlotz, a professor of radiology and biomedical informatics and associate chair for Information Systems in the Department of Radiology at Stanford University. "But there is much work to be done before ML becomes commonplace."

Along with facing regulatory issues, ML requires large, labeled image data sets for big data processing. But while most radiology practices have millions of imaging studies, most are not labeled, he said.

"There is a major research focus right now on how to automate, or at least partially automate, the image labeling process using information from the radiology report or the medical record," Dr. Langlotz said. "We also need a trained labor force to build these algorithms."

While hundreds of graduate students at Stanford are learning such techniques, this type of training needs to be developed across the specialty, he said.

"Truly mastering the problem solving requires mentorship from those who have done it before at a high level," Dr. Langlotz said. "We have some great resources in Silicon Valley, but that's not yet true across the board."



Langlotz

Machine Learning Community

To that end, RSNA 2017 is featuring a Machine Learning Community with many ML educational opportunities.

The RSNA Deep Learning Classroom presented by NVIDIA DLI will give attendees a range of hands-on courses to engage with ML tools, write algorithms and improve their understanding of ML technology.

A National Cancer Institute (NCI)-sponsored exhibit, "Crowds Cure Cancer: Help Annotate Data from The Cancer Imaging Archive" offers RSNA attendees the opportunity to use annotation tools to label data sets in NCI's cancer imaging archive for use in ML research.

The Machine Learning Community will also include ML Hardcopy Backboard posters, select posters from Research & Education (R&E) Foundation grant recipients and authors of ML articles published in *Radiology* as well as posters from the organizing committee and winners of the RSNA Pediatric Bone Age Challenge.

Visit the Machine Learning Community in the Learning Center, Lakeside Center East, Level 3. Exhibits are open throughout the week.

An Expert Defines the Terms

Because of the rapid growth of the technology, there may be confusion over the terms machine learning (ML), Artificial Intelligence (AI) and deep learning, said Paul E. Kinahan, PhD, who will moderate the 2017 RSNA/AAPM American Association of Physicists in Medicine (AAPM) Symposium.

"Artificial Intelligence and machine learning are not exactly the same thing, but there is a large overlap," Dr. Kinahan said.

AI is essentially the simulation of intelligent behavior in computers while ML refers to the algorithm or method used in AI, he said. "ML algorithms can be used for many different tasks, one of which is supporting AI. AI, however, can use methods other than ML," Dr. Kinahan said. "Further confusing

the issue is the emergence of deep learning which is like the Godzilla of machine learning — much larger and slower to get going, but much more effective it seems." Deep learning is an area of ML research with the objective of moving ML closer to AI, he added.



Kinahan

Read more about the RSNA/AAPM Symposium on Page 8.

Machine Learning Sessions at RSNA 2017

Visit Meeting.RSNA.org for a complete schedule of sessions.

- Deep Learning & Machine Intelligence in Radiology — RC153
- Hot Topic Session: Machine Learning and Artificial Intelligence in Lung Imaging — SPSH20
- Introduction to Machine Learning and Texture Analysis for Lesion Characterization (Hands-on) — RCA25
- Neuroradiology (Machine Learning and Deep Learning) — SSJ19
- Platforms and Infrastructures for Accelerated Discoveries in Machine Learning and Radiomics — RCC42
- Leveraging Machine Learning Techniques and Predictive Analytics for Knowledge Discovery in Radiology (Hands-on) — RCA53
- Deep Learning — An Imaging Roadmap — RCC45
- Machine Learning Techniques for Automated Accurate Organ Segmentation and Their Applications to Diagnosis Assistance — ML001-EX-B; Hardcopy Backboard
- What Was Changed in Machine Learning in Medical Image Analysis After the Introduction of Deep Learning? — ML-106-ED-X; Digital Education Exhibit
- RSNA Deep Learning Classroom, presented by NVIDIA DLI — ML001-EX-B

Machine Learning Showcase

A focal point of the Technical Exhibits, North Exhibit Hall, the Machine Learning (ML) Showcase gives attendees an opportunity to learn about the latest ML technology and network with companies on the forefront of ML advancements.

The showcase will feature a Machine Learning Theater, offering ML presentations daily between 11 a.m. and 2 p.m. Search the RSNA Meeting Program for a full lineup of theater presentations.

The Machine Learning Showcase is sponsored by Carestream Health, Google Cloud and Zebra Medical Vision.



Accurate Algorithms Focus of RSNA Machine Learning Challenge

New this year, RSNA introduced a Machine Learning (ML) Challenge designed to showcase methods for creating algorithms to address clinical problems in radiology, in this case automating the assessment of pediatric bone age based on hand radiographs.

The RSNA Pediatric Bone Age Challenge is an online competition that was held from August through October. Three teams submitting the most accurate algorithms will receive awards Monday, Nov. 27, in the Machine Learning Showcase in the Technical Exhibits Hall.

Launched by the RSNA Radiology Informatics Committee, the competition used skeletal data sets from Stanford Children's Hospital, Colorado Children's Hospital and the University of California, Los Angeles. Participants were given a training set of hand radiographs and corresponding skeletal ages. The more than 250 participants who entered the challenge worked in 29 teams to submit algorithms.

The challenge was hosted on the MedICI platform for medical image computer challenges built by Jayashree Kalpathy-Cramer, PhD, an assistant professor of radiology at Harvard Medical School and Massachusetts General Hospital, and colleagues.

"Challenges can be an effective means to comprehensively assess the performance of algorithms by comparing them on common, sufficiently large and diverse datasets using realistic tasks and valid evaluation metrics," said Dr. Kalpathy-Cramer, who served on the ML Challenge Organizing Committee.

Submissions to the ML Challenge will be exhibited in the Machine Learning Showcase and the Machine Learning Community at RSNA 2017.

Trending Topics

BY JENNIFER ALLYN

Radiologists seeking a roadmap to the future of radiology need look no further than RSNA 2017. In keeping with this year's theme, "Explore. Invent. Transform." attendees will discover myriad scientific presentations and education exhibits that are shaping the future of imaging.

To help attendees plan their schedules, RSNA's Scientific Program, Refresher Course and Education Exhibits Committees and Subcommittee chairs offer a preview of the trends, hot topics and cutting-edge research in each of the subspecialties available at RSNA 2017.

With full participation in the meeting, each physician can earn up to *98.50 AMA PRA Category 1 Credits*™.

This year, machine learning (ML) is a common theme across all subspecialties, according to David H. Kim, MD, chair of the RSNA Scientific Program Committee. "RSNA 2017 is the place to learn about machine learning and its potential applications, ranging from aiding the radiologist in diagnosing a specific condition to improving ancillary activities that leverage the radiologist's capabilities."

"Attendees will be pleased with the quality as well as the wide range of education exhibits at this year's annual meeting," said Sanjeev Bhalla, MD, chair of the Education Exhibits Committee. "Not only are there exhibits showcasing new technologies, like deep learning, 3-D printing and artificial intelligence (AI), there are also unique opportunities to learn

about alternative agents in PET/CT, dual-energy CT, diffusion in MR and a wide variety of updates on the use of standardized reporting algorithms."

Refresher courses contain educational content from a comprehensive array of anatomic and imaging modalities, said John Eng, MD, chair of the Refresher Course Committee. This year, many courses will feature shorter presentations with more topics and many course tracks will include sessions that combine scientific and educational content, Dr Eng said.

"In addition, RSNA's own Diagnosis Live™ audience engagement technology is finding its way into a greater number of courses," Dr. Eng said. "Case-based and 'Essentials of' courses always draw large audiences and we expect the same this year."

Other common themes across all subspecialties include 3-D printing, contrast media, precision medicine and radiomics. A full day of sessions is devoted to imaging techniques for diagnosing dementia including dynamic susceptibility contrast MR, arterial spin labeling and resting state functional connectivity MRI.



Breast Imaging

Many of the 2017 breast imaging sessions focus on how deep learning, quantitative imaging and big data affect screening and diagnostic workflow, including the Hot Topic Session, "Deep Learning for Mammography."

Multiparametric breast MRI, digital breast tomosynthesis in a diagnostic setting and multimodality imaging for dense breast tissue are also popular topics. Hands-on opportunities are available during sessions on MRI-guided breast biopsy and ultrasound (US)-guided interventional breast procedures. In addition, "Abbreviated MRI Exam: Breast MRI in 5 Minutes" will be a Hot Topic Session.

Education exhibits include a number on patient-centered care and the radiology pathology correlation of common and not-so-common disorders of the breast. Several exhibits are case-based with pictorial reviews of benign and malignant entities of the breast.

Cardiac Radiology

Attendees interested in integrating technology with medicine can attend the two-part hands-on scientific sessions on 3-D printing in heart disease, "Teaching Congenital Heart Disease with 3-D Printed Models." The first session focuses on double outlet right ventricle, while the second session addresses twisted heart and other related conditions.

New and developing trends in cardiovascular education exhibits include CT fractional flow reserve in coronary artery assessment and expanded applications of cardiac MRI 4-D flow, strain and stress dynamics.

Chest Radiology

Lung-related sessions are a popular topic in 2017. Along with the Hot Topic Session, "Machine Learning and Artificial Intelligence in Lung Imaging," sessions focusing on lung nodules, sarcopenia in lung malignancy and in asthma, as well as interstitial lung disease via lung US surface wave elastography are of particular interest.

An interactive session invites attendees to read cases of diffuse lung disease. Attendees should also look for new sessions on quantum particle swarm optimization and lung density analysis on quantitative chest CT.

Updates will also be presented in radiomics, radiation dose reduction and thoracic malignancy.



Kim



Bhalla



Eng

Emergency Radiology

Topics of interest include chest and forensic radiology, neuroradiology and updates on whole-body CT for trauma in emergency radiology (ER).

The Hot Topic Session, "Dual-Energy CT (DE-CT) in the Emergency Department," focuses on the use of DE-CT for abdominal and pelvic trauma, neuro trauma and pulmonary embolism.

Imaging of cardiothoracic emergencies, including acute coronary syndrome, thoracic trauma and pulmonary embolism, are high-interest sessions. Treating injuries in young athletes continues to be a hot topic, with sessions focusing on imaging for shoulder trauma, meniscal tears and the rotator cuff.

Gastrointestinal Radiology

Liver-related sessions are among the trending topics, including presentations on elastography and updates on LI-RADS.

Advances in abdominal CT, including low kV scanning and oral and IV contrast considerations are also key topics. Other sessions focus on non-alcoholic fatty liver disease and incidental pancreatic cystic lesions and a revival in fluoroscopy. Gastrointestinal radiology joins with genitourinary radiology for a joint Hot Topic Session, "Abbreviated Abdomen MRI Protocols."

Education exhibits focus on contrast-enhanced US and dual-energy CT for liver disease diagnosis. Other highlights include deep learning imaging for the diagnosis of serrated polyps in CT colonography, imaging of long-term sequelae in hepatopancreaticobiliary IgG-4 related diseases and novel MRI techniques for incidental and genetically predisposed paraneoplasms.

Genitourinary Radiology/ Uroradiology

Emerging technologies for prostate imaging, including multiparametric prostate MRI, are among this year's highlights. Attendees are invited to review cases and use PI-RADS v2 category assessment to detect and localize cancer.

There are two Controversy Sessions in genitourinary radiology: "Controversies in Intravenous Contrast Media" and "Imaging of the Pelvis: When is Ultrasound Enough?"

A joint Hot Topic Session focuses on gastrointestinal radiology on abbreviated abdomen MRI protocols, primarily for the pancreas, uterus and cervix. The two subspecialties will also join for a Pediatric Series that features sessions on imaging for abdominal wall defects and urinary tract dilation. Attendees should also look for an update on PI-RADS.

Health Service, Policy and Research/Policy and Practice

A number of sessions focus on the future of radiology in the changing healthcare landscape, including how the scale-up phases of Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) and Merit-Based Incentive Payment System (MIPS) and various alternative payment models will affect radiology.

Several education exhibits describe how the MIPS performance categories are used to create value-based reimbursement in radiology and how radiologists can determine the pace of change while participating in MIPS.

The session “Value-based Imaging in the ACO Model,” offers an update on how imaging and radiology currently relate to new value-based care models. Exploring how federal policy can be applied in breast imaging, interventional radiology and quality and safety in radiology is the focus of one physician payment reform session. Another session tackles emerging topics in patient-centered research and care and the role comparative effectiveness research plays in patient engagement.

Informatics

Machine learning and data science, 3-D printing, AI and radio-mics continue to be popular topics in informatics. A session on AI and deep learning will feature an IT security keynote speech related to the recent cyberattacks on healthcare infrastructure. A 3-D printing hands-on, open-source session will demonstrate the basics of 3-D printing, including how to segment a medical imaging scan with free and open-source software and export that image into a digital 3-D printable model.

The 3-D Printing Showcase in the Learning Center will include theater poster presentations on 3-D printing throughout the week, including a demo area with additional information.

Molecular Imaging

The Molecular Imaging Symposium begins with the basics and moves on to oncology, neurology and cardiovascular applications. Other sessions focus on emerging technologies in prostate MRI, including hyperpolarized C-13 MR molecular imaging, theranostics and immune imaging probes. Education exhibits of interest include imaging for infection, acute inflammation and chronic inflammation. A special invited poster exhibit highlighting molecular imaging programs can be viewed near the MI Classroom (South Level 5).

RSNA 2017 Highlights

BREAST IMAGING

- ◆ Hot Topic Session: Deep Learning for Mammography — SPSH40
- ◆ Hot Topic Session: Abbreviated MRI Exam: Breast MRI in 5 Minutes. — SPSH50

CARDIAC RADIOLOGY

- ◆ Teaching Congenital Heart Disease with 3-D Printed Models. — RCB24
- ◆ Cardiac (Coronary Artery Disease: Outcomes and Risk Stratification) — SSJ04

CHEST RADIOLOGY

- ◆ Hot Topic Session: Machine Learning and AI in Lung Imaging. — SPSH20
- ◆ HRCT Texture Feature Selection and Imaging Pattern Prediction of IPF using Quantum Particle Swarm Optimization — SSK05-04

EMERGENCY RADIOLOGY

- ◆ Hot Topic Session: Dual-Energy CT in the Emergency Department — SPSH53
- ◆ Essential of Trauma Imaging: MRI of Meniscal Tears — MSES51B

GASTROINTESTINAL RADIOLOGY

- ◆ Science Session with Keynote: Gastrointestinal (HCC Screening and LIRADS) — SSA08
- ◆ Deep-Learning Super-Resolution Imaging for Enhancing the Diagnosis of Serrated Polyps in CT Colonography — GI274-ED-X

GENITOURINARY/OBSTETRICS/GYNECOLOGY

- ◆ Controversies in Intravenous Contrast Media 2017: Getting Your Questions Answered — RC407
- ◆ Hot Topic Session: Abbreviated Abdomen MRI Protocols — SPSH30

HEALTH SERVICE, POLICY AND RESEARCH/POLICY AND PRACTICE

- ◆ Value-based Imaging in the ACO Model — RC253
- ◆ Comparative Effectiveness Research: Translating Science into Health Policy and Practice — RC727

Go to My Agenda at Meeting.RSNA.org

Multisystem/Special Interest

One area of interest focuses on how oncologic imaging is evolving with new therapies, imaging techniques and methods to measure disease response. Several sessions discuss the role of immunotherapy in treating cancer and the imaging findings associated with immune modulation therapy.

Common themes in education exhibits include the genetics of malignancies and imaging of diffuse infections and syndromes with numerous imaging manifestations. Other sessions focus on the need for understanding regional anatomy to properly staging pelvic cancers and providing updates in the imaging of implantables and foreign bodies and their complications.

Musculoskeletal Radiology

Machine Learning is a trending topic in musculoskeletal (MSK) radiology.

One session will focus on ML's clinical applications in MSK imaging, while the Hot Topic Session, "3-D Imaging in Musculoskeletal: Acquisitions, Printing and Applications," will explain how 3-D models can be used in musculoskeletal imaging and how to tailor CT and MR protocols to render MSK anatomy.

Attendees with a competitive spirit will not want to miss the two Diagnosis Live™ sessions: "Game of Bones: Radiology in the Seven Kingdoms," that will review imaging features and complications of a variety of common and uncommon injuries, and a joint Diagnosis Live™ session with neuroradiology.

Education exhibits include fast MRI for knee imaging, MRI and high-intensity focused US to ablate osteoid osteoma and CT structural analysis to predict bone failure.

Neuroradiology

On Monday, a full day of programming will focus on dementia starting with, "Emerging Technology: Imaging of Dementia," which will cover applications of dynamic susceptibility contrast MR, arterial spin labelling and resting state functional connectivity MRI.

Other dementia-related sessions include the Special Interest Session, "The Imaging of Cognition – Dementia," focusing on emerging technologies including FDG use in PET, amyloid PET/CT for detecting plaques, MRI and tau PET/CT.

Big data in neuroradiology, including how it affects clinical practice and clinical trials is another series topic. Gadolinium deposition in human tissues, including the brain, and its potential clinical implications is a new topic this year.

Education exhibits include deep learning and ML techniques for improving diagnostic confidence, intracranial vessel wall MRI, arterial spin labeling, astrophotography imaging of tumors and intraoperative ultrasound in spine surgery.

Nuclear Medicine

A session on neurodegenerative disease imaging will coincide with Monday's full day of sessions on imaging dementia. Other sessions of interest focus on head and neck cancer imaging and oncology PET.

The Hot Topic Session, "New and Emerging Theranostic Agents for Prostate Cancer," will address the various PET

radiotracers for imaging prostate cancer as well as the evolving opportunity for new treatments to be used as radiotherapeutic drugs.

Education exhibits focus on PET/MRI and emerging technology platforms associated with PET/CT oncology, including its uses in infection identification. New exhibits cover PET radiotracers, pediatric thyroid imaging, cardiac amyloidosis and gallium-68.

Obstetric/Gynecologic Radiology

Fetal and neonatal imaging are topics of interest this year. Sessions focus on imaging of diaphragmatic hernia and bowel obstructions as well as fallopian tube catheterization using uterine models and experts demonstrating the use of fluoroscopic guidance techniques.

Obstetrical imaging in the ER continues to be a trending topic. Look for sessions on US for first trimester pregnancy complications, ectopic pregnancies, adnexal torsion and post-partum complications.

Attendees may want to pay special attention to exhibits on 3-D US in the female pelvis, detecting, characterizing and staging the spectrum of gynecologic malignancies with the latest classification systems and advanced imaging techniques including PET/MRI.

RSNA 2017 Highlights

INFORMATICS

- ◆ Deep Learning & Machine Intelligence in Radiology — RC153
- ◆ 3-D Printing Hands-on with Open Source Software: Introduction (Hands-on) — RCA21

MOLECULAR IMAGING

- ◆ Theranostics: Tracking Stem Cell Transplants in Femoral Osteonecrosis of Pediatric Patients — SSQ12-02
- ◆ Infection and Inflammation — SSK12

MULTISYSTEM/SPECIAL INTEREST

- ◆ Safety of MRI in Patients with Conditional or Non-Conditional Pacemaker or Other Implantable Cardiac Electronic Devices (ICED): A Systematic Review — SSK04-01
- ◆ Understanding Tumor Response Criteria: RECIST 1.1, irRC and irRECIST: Radiologists and Oncologists Perspective — MS153-ED-WEA1

Go to My Agenda at Meeting.RSNA.org

Pediatric Radiology

This year's sessions cover a broad spectrum of issues, from neonatal to gastrointestinal imaging, with a focus on the increasing need for integration of novel contrast agents. The Pediatric Series session, "Pediatric Safety and Quality," focuses on the use of intravascular contrast material in children and dose reduction strategies. A session on pre- and post-natal imaging of anorectal and ambiguous genitalia will include a self-assessment module (SAM) for immediate credit.

Education exhibits cover a range of new topics including the use of augmented reality in pediatric tumor resection, US of the thorax for pneumothorax, pediatric brain tumor genetics, MR elastography and contrast-enhanced US.

Physics

Radiomics and quantitative imaging are popular physics topics, with sessions focusing on measurement and quantification of quality in value-based care and mini-courses to be held throughout the meeting. Those concerned about cyberattacks can learn more at the "Cybersecurity for Imaging Department and Imagers" session.

Attendees should look for updates on photon-counting during a symposium that will cover pencil-beam scanning and motion management. There is also a variety of sessions on image quality in digital radiography from the basics to specific anatomical imaging.

Radiation Oncology and Radiobiology

Tailoring cancer therapy to each patient's unique clinical experience, or precision medicine, is a common theme. Numerous sessions cover radiation oncology at specific disease sites.

Also trending is an update on the cutting-edge discipline of immuno-oncology and how these techniques can be combined with percutaneous and transcatheter interventional oncologic therapies in a clinical setting.



Look for a Hot Topic Session on the role of proton and heavy ion therapy in solid tumors, such as thoracic cancers and lymphoma.

Educational exhibits of interest include 3-D printing in head and neck cancers, multiparametric MRI for prostatic carcinoma and post-radiation mimics of malignancy.

Vascular/Interventional Radiology

New this year in vascular radiology is the application of 4-D flow, including how it can be used in the chest, abdomen and throughout the cerebrovascular system. This session and a session on thoracic aortic emergency are self-assessment sessions.

MR angiography (MRA) and CT angiography (CTA) are also topics of interest this year.

One session covers biomarkers for vascular disease and MRA at 3T or higher, while another covers dual-energy and kVp CTA and contrast vs. radiation dose in CTA.

Hands-on opportunities are offered in the session on using Doppler US during carotid and abdominal examinations.



RSNA Subcommittee Chairs

Information for this preview was provided by the RSNA Scientific Program and Education Exhibits Subcommittee Chairs:

Scientific Program Subcommittees

Donna J. Cross, PhD, Molecular Imaging
Patricia M. de Groot, MD, Chest
Martin L. Gunn, MBChB, Emergency Radiology
Marta E. Heilbrun, MD, Health Services Policy & Research
Andrew Karellas, PhD, Physics
Edward Y. Kim, MD, Radiation Oncology and Radiobiology
Gordon McLennan, MD, Vascular and Interventional
Linda Moy, MD, Breast
Robert Orth, MD, PhD, Pediatric Radiology
Gautham P. Reddy, MD, Cardiac
Dushyant V. Sahani, MD, Gastrointestinal Radiology
George L. Shih, MD, MS, Radiology Informatics
Ashok Srinivasan, MD, Neuroradiology
Martin Torriani, MD, Musculoskeletal Radiology
Zhen J. Wang, MD, Genitourinary Radiology
Chadwick L. Wright, MD, Nuclear Medicine

Education Exhibits Subcommittees

Timothy J. Amrhein, MD, Neuroradiology
Andrew Bierhals, MD, MPH, Chest
Gustav A. Blomquist, MD, Musculoskeletal
Kevin J. Chang, MD, Gastrointestinal Radiology
Jared D. Christensen, MD, Cardiac
Jesse L. Courtier, MD, Pediatrics
Donna J. Cross, PhD, Molecular Imaging
Stamatia Destounis, MD, Breast
Matthew A. Frick, MD, Emergency Radiology
Rebecca M. Howell, PhD, Physics
Edward Y. Kim, MD, Radiation Oncology and Radiobiology
Marc D. Kohli, MD, Radiology Informatics
Rachna Madan, MD, Policy and Practice
Karen Y. Oh, MD, Obstetrics/Gynecology
Stephen Thomas, MD, Multisystem/Special Interest
Kirubahara R. Vaheesan, MD, Vascular/Interventional
Sadhna Verma, MD, Uroradiology
Vani Vijayakumar, MD, Nuclear Medicine

RSNA 2017 Highlights

MUSCULOSKELETAL RADIOLOGY

- ◆ Hot Topic Session: 3D Imaging in Musculoskeletal: Acquisitions, Printing, and Applications — SPSH51
- ◆ Game of Bones: Radiology in the Seven Kingdoms (Diagnosis Live Case-based Competition) — SPDL40

NEURORADIOLOGY

- ◆ Neuroradiology Series: Big Data in Neuroradiology — RC205
- ◆ Gadolinium Deposition — SSM16

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NUCLEAR MEDICINE

- ◆ Controversy Session: PET/MR: Is There Added Value in Oncology? — SPSC20
- ◆ RSNA/ESR Hybrid Imaging Symposium: Hybrid Imaging in the Female (An Interactive Session) — MSSR42

OBSTETRIC/GYNECOLOGIC RADIOLOGY

- ◆ Emergency Obstetrical Ultrasound — RC310
- ◆ Malignant Lesions of Fallopian Tube: Imaging Pathologic Correlation — OB002-EB-X

PEDIATRIC RADIOLOGY

- ◆ Intravascular Contrast Material Use in Children: Safety Update — RC613-01
- ◆ Focused Thoracic Ultrasonography for the Elucidation of Radiolucent Areas in Critically Ill Neonates and Pediatric Patients' Chest X-Ray — PD119-ED-TUB6

RSNA'S "CALL FOR ABSTRACTS" CREATES A BUZZ AROUND THE WORLD

BY MARY HENDERSON

The road to the RSNA's Annual Meeting is a long and arduous path for authors vying for their research to become part of the RSNA Meeting Program — a prestigious accomplishment for researchers across the globe.

Shaping the scientific and educational content of each RSNA annual meeting is an 11-month process that involves thousands of researchers, volunteer reviewers and committee members — all supported by dedicated RSNA staff members.

The process begins in early January when RSNA issues the annual "Call for Abstracts."

Researchers are encouraged to submit abstracts on projects they worked on during the previous year. RSNA accepts submissions electronically, which allows authors to use a template to create and edit their proposals and provide supporting data.

Abstracts are submitted in four different categories: Science and Applied Science Research, Educational Exhibits, Quality Improvement Storyboards and Quantitative Imaging Reading Room Demonstrations.

During the winter, submissions tend to trickle into RSNA. But that changes as the April deadline for submissions approaches, when thousands of abstracts begin to flood the website. This year, the majority of the nearly 12,000 submissions was uploaded in the two days prior to the deadline.

A group of 425 volunteer radiologists is tasked with reviewing the submissions to identify the abstracts that will best help attendees build their knowledge, competence and performance with the ultimate goal of improving patient care. Volunteers serve on the Scientific Program Committee, the Education Exhibits Committee and the Quality Improvement Committee.

"The contribution of the RSNA volunteer reviewers cannot be overstated," said David H. Kim, MD, professor of radiology, University of Wisconsin School of Medicine and Public Health, Madison, and chairman of the RSNA Scientific Program Committee. "They provide critical and reasoned assessments for the submitted abstracts."



Kim



Moy

The volunteer reviewers have a little over a month to complete their assessments before the highest-ranking abstracts are sent to section chairs to finalize the selections. Next, committees discuss the meeting program as a whole and finalize their selections.

Over the summer, letters are issued to the authors of accepted submissions, launching several months of preparation for researchers working to develop and polish their presentations.

"It takes effort to present all of the pertinent results in an efficient, clear manner with logical, reasoned conclusions," Dr. Kim said. "Anticipating potential questions and comments from the audience is very helpful to promote a lively, interactive discussion."

Frequent presenters say presenting peer-reviewed abstracts at the RSNA annual meeting is highly prestigious and an invaluable career asset.

"It's wonderful and exciting to present in this arena," said Linda Moy, MD, a diagnostic radiologist at NYU

Langone Health, New York, who has presented regularly at RSNA for 15 years. "The level of research is very high and it is fascinating to hear about the innovative research that other institutions, both nationally and internationally, are performing."

Although the time commitment and effort involved in the abstract application process are considerable, the work of reviewers and presenters has a lasting impact.

"The overall scientific impact from the meeting derives from the quality and content of the accepted abstracts," Dr. Kim said. "As a result, volunteer reviewers ultimately play a central role in shaping the scientific program for the meeting."

Presenting a peer-reviewed, accepted abstract at the RSNA annual meeting is a true honor that provides exposure to other preeminent researchers in the field." ❧

"Presenting a peer-reviewed, accepted abstract at the RSNA Annual Meeting is a true honor that provides exposure to other preeminent researchers in the field."

DAVID H. KIM, MD



RSNA 2017 COUNTRY PRESENTS SESSIONS RECOGNIZE COLOMBIA, ISRAEL

BY ELIZABETH GARDNER

This year, at RSNA's 103rd Scientific Assembly and Annual Meeting, the Society honors Colombia and Israel with its Country Presents series, acknowledging the nations that are helping shape the global future of radiology. The sessions will be held Monday, Nov. 27, and Tuesday, Nov. 28, respectively, and can also be viewed live or on-demand through the RSNA 2017 Virtual Meeting.

Colombia Spotlights Tropical and Infectious Diseases

In the RSNA 2017 session, "Colombia Presents: Diagnostic Imaging in Tropical and Infectious Diseases," presenters will discuss advances in diagnostic imaging in treating infectious diseases such as malaria, leishmaniasis, schistosomiasis, onchocerciasis, lymphatic filariasis, Chagas Disease, African trypanosomiasis and dengue, among other diseases.

A huge area geographically, the tropics include 134 nations and territories with a growing population comprising some of the world's poorest and most vulnerable communities, said Juan M. Lozano, MD, MSc, president of the Colombian Association of Radiology, who will present the introduction at the session.

"As regions become more suitable to insects such as mosquitoes and ticks, the prevalence of insect-borne diseases could rise," Dr. Lozano said. "Radiologists throughout the world must be aware of the diseases of this region, which, due to the constant migration of the population, are diagnosed and treated in hospitals around the world, whether in tropical areas or not."

Juan Gutierrez, MD, of Medellin, Colombia, will present the session, "Imaging of the Tropical and Infectious Diseases of the Head, Neck and Spine," covering how several common tropical diseases manifest in the brain and central nervous system, how to recognize those manifestations from imaging findings, and the risk factors, prevalence and incidence of the most common diseases.

Monica Ocampo, MD, and Diego Aguirre MD, of Bucaramanga and Bogota, Colombia, respectively, will present sessions on Chagas Disease and a session about tropical diseases of the abdomen. A question session and video presentation, "Colombia, Magical Realism," is another highlight.

Closing remarks for both Country Presents sessions will be given by RSNA President Richard L. Ehman, MD.

Add these and all RSNA 2017 courses to My Agenda at Meeting.RSNA.org.



Israel, Colombia at RSNA 2017

RSNA 2017 attendees are invited to learn more about radiology in Israel and Colombia by visiting the Israel Radiological Association booth (#1019) and the Asociación Colombiana de Radiología booth (#1018) throughout the week.

Attendees from Israel and Colombia will be recognized with badge ribbons during these special courses.


Israel Highlights Tech Innovations

The RSNA 2017 session, "Israel Presents: Radiology in Israel — Experience from the Land of Innovation," will highlight developments, advanced technologies for bowel imaging, deep learning algorithms, interventional radiology, MR-guided focused ultrasound (US) technology, 3-D printing and hyperbaric oxygen therapy for traumatic brain injury patients. Presenters will also discuss Israel's innovative National Image Sharing initiative.

"As Israel is a start-up nation in terms of technology, the proximity to local companies makes it easy for radiologists and companies to collaborate," said Jacob Sosna, MD, president of the Israel Radiological Association and chair of the radiology department at Hadassah Hebrew University Medical Center, Jerusalem, who will give an overview of radiology in Israel in the introductory session.

Israel's tech sector abounds with start-up companies that are developing imaging-related hardware and software, notably high-intensity-focused US and advanced image analysis algorithms, Dr. Sosna said.

Israel's National Image Sharing initiative will be discussed by presenter Arnon Makori, MD, director of imaging informatics at Clalit Health Services in Tel Aviv, who will review the current status, describe technological challenges and possible solutions, and discuss policies and best practices in deploying an image-sharing system.

Other sessions include, "Advanced Technologies for the Evaluation of Crohn's Disease: Video Capsule Endoscopy, DWI in MRE and Biological Biomarkers," "Medical Computer Vision Applications Using Deep Learning Algorithms" and "Cutting-Edge Interventional Oncology." 



Sosna



Lozano



IMAGING IN THE ER:

FROM TERRORIST INCIDENTS TO DAILY TRAUMAS, EMERGENCY RADIOLOGY PLAYS VITAL ROLE

BY RICHARD DARGAN

Shortly after 10:30 p.m. on Monday, May 22, 2017, a suicide bomber detonated an improvised explosive device outside Manchester Arena in the city of Manchester, England, as fans were leaving a concert by American pop star Ariana Grande. Scores were injured, many of them children or teenagers.

Pediatric radiologist Rui Santos, MD, of Royal Manchester Children's Hospital, got the call to come in just as he was getting ready for bed. He hurried to the hospital and, as is his habit, visited the resuscitation area next to the radiology department to check on the injured. The first victim he saw was a child.

Pediatric radiologists are sometimes reluctant to order full-body CTs due to concerns about radiation dose, but after seeing the desperate condition of the victims and consulting with his colleague, Rachel Jenner, MD, Emergency Department (ED) clinical lead, Dr. Santos knew what had to be done.

"When there are mass casualties, with patients coming through every 15 minutes, the 'As Low as Reasonably Achievable' dose principle has to be carefully balanced with the need for crucial and immediate information regarding life-threatening injuries," Dr. Santos said. "Any delay in making a decision puts radiology at risk of becoming a bottleneck for patient flow. Dr. Jenner and I agreed that with the number of mass casualties expected, including unconscious victims and unknown injuries, we should proceed to obtain the best information and full-body CT would be the main form of imaging for most of the severely injured children."

Pediatric Radiology Team Relies on One CT Scanner

With that, the pediatric radiology team began a long night of work based around the department's sole CT scanner. One after another, the victims arrived with secondary blast injuries or injuries related to flying objects from the explosion. The bomber had packed the explosive device with nuts, bolts and screws, transforming the small pieces of metal into deadly projectiles that punctured flesh and lacerated organs.

With so many shrapnel injuries, Dr. Santos and his team used a low-dose full-body scan known as a scout CT to refine their imaging approach.

"On the scout CT, we might see shrapnel in the neck that would cause us to change the subsequent head CT to a head-and-neck CT," he said. "Or a patient would come in for an abdominal CT, and the scout CT would show shrapnel in the chest, so we'd change the abdominal CT to an abdominal-and-chest scan."

Dr. Santos worked nonstop until 4 a.m., took a 20-minute nap and then continued his shift as a total of 29 victims (24 children and five adults) came through the children's hospital ED. He finally left at 9 a.m. By then, the news was everywhere: 23 people, including the bomber, had died in the attack, and 250 were injured.

"Emergency radiologists must walk in the shoes of emergency physicians and do the work as quickly and carefully as possible."

EDWARD J. ZARAGOZA, MD

During the night, eight children underwent full-body CT's, six had CT's of multiple anatomic regions and all required x-rays of multiple areas of concern for shrapnel injuries.

"I was overwhelmed by the images going through my mind," Dr. Santos said. "There was no anger — just sadness about what I had seen and concerns about what was going to happen with the injured."

New MRI Guidelines for Shrapnel Injuries

In the following days, Dr. Santos and his colleagues worked closely to ensure that each patient received proper care. The teams, including nursing, surgery, pediatrics, anesthetic, microbiology and radiology staff, held debriefing sessions twice daily to discuss patient management and surgical needs. Psychological support for families and staff members was also offered, beginning the day after the bombing.

The tragedy inspired Dr. Santos to develop guidelines for better record keeping of shrapnel injuries in the event that MRIs are ordered for patients anesthetic at a later date. Shrapnel retained in the body can heat up and dislodge during an MRI, creating a potentially dangerous situation.

"There hasn't been much published on the risks of doing MRI in patients with retained shrapnel," Dr. Santos said. "Information about shrapnel should go in the patient's record, just like information on allergies."

Emergency Radiology Central to Patient Care

Manchester Children's Hospital is just one example of the increasingly crucial role emergency radiology is playing in health-care facilities around the world. Emergency radiology — the focus of the sixth annual International Day of Radiology (IDoR) on Nov. 8 (see sidebar) — is a unique discipline in which radiologists must adapt their work to the high-intensity environment of the ED.

Along with being prepared to handle mass casualty incidents, emergency radiologists play a central role on the clinical teams facing serious incidents in the ED every day.

“The time pressure incentivizes you to be extremely focused,” said Edward J. Zaragoza, MD, a diagnostic radiologist and chief of acute care imaging at the University of California in Los Angeles. “Emergency radiologists must walk in the shoes of emergency physicians and do the work as quickly and carefully as possible.”

At UCLA, Dr. Zaragoza has seen emergency radiology grow from the minimally-staffed graveyard shifts of the 1990s to a critical component of healthcare. Information technology has helped drive the expansion through the development of tools to integrate different PACS and improve computerized decision-making.

Key to the growth has been UCLA’s aggressive expansion of imaging services in the community — an expansion that has paid dividends in revenue to the hospital system and in healthcare, including emergency services, for the people of greater Los Angeles, said Dr. Zaragoza, a member of RSNA’s Public Information Advisory Network.

Nowhere is the need for emergency services more evident than at Martin Luther King (MLK) Jr. Community Hospital in southern Los Angeles, near the city of Compton. The Los Angeles County Department of Health Services closed the hospital in 2007, leaving a void in terms of emergency services for residents.


“A mother with an asthmatic son would have to make five bus transfers to get from Compton to Children’s Hospital in Los Angeles,” Dr. Zaragoza said. “Meanwhile, her kid is coughing the whole way and she doesn’t know if they’re going to make it in time.”

UCLA collaborated with MLK Hospital on the facility’s reopening in 2015 and offered to provide physician services for the area’s underserved population. The partnership has been so successful that hospital officials expect to see 75,000 patients this year, up from 35,000 in 2016.

Many of those patients are in dire health, Dr. Zaragoza said, like the 25-year-old woman who recently came to the MLK Hospital ED with abdominal bloating and pain. Upon further examination, physicians discovered that she had advanced ovarian cancer.

“Because the hospital was open, because the ED team was there, and because that team had the backing of a radiology department committed to giving care 24/7, the patient was able to get diagnosed and get the treatment she needed,” Dr. Zaragoza said.

These kind of opportunities make the pressure-packed job immensely satisfying, he said.

“I never finish a shift feeling that I didn’t matter,” he said. 



Santos



Zaragoza



When victims in the Manchester bombing poured into Manchester Children’s Hospital, Rui Santos, MD, and his team used a low-dose full-body scan known as a scout CT to refine their imaging approach. *Image courtesy of Manchester Children’s Hospital.*

Emergency Radiology at RSNA 2017

RSNA 2017 will offer more than 100 emergency radiology sessions including:

- Keynote Speaker: Machine Learning in Emergency Neuroradiology – SSA06-01
- Emergency Radiology Series: Contemporary Topics in Imaging of Trauma – RC208
- Hot Topic: Dual-Energy CT in the Emergency Department – SPSH53
- Incidence of Pulmonary Hypertension in Blast Injury Patients – ER211-SD-MOA5
- CT Angiogram of the Head and Neck: What the ED Radiologist Must Know – ER178-ED-X



Manchester Children’s Hospital (above), was one of the hospitals where victims of the terrorist bombing were treated. *Image courtesy of Manchester Children’s Hospital.*

International Day of Radiology (IDoR) Focuses on Emergency Radiology

On Nov. 8, the sixth annual International Day of Radiology (IDoR) will be dedicated to emergency radiology and the essential role that radiologists play in the emergency room, increasing the quality of care and treatment of patients.

IDoR joint sponsors — RSNA, the European Society of Radiology and the American College of Radiology — will host international activities to mark the event, together with more than 100 medical societies in 57 countries. Visit IDoR2017.com for information and social media activities.

Visit RSNA.org/IDoR for promotional materials you can customize for your practice or organization.

NAVIGATING YOUR FIRST VETERAN ATTENDEES OFFER SOME TIPS

BY FELICIA DECHTER

For those attending their first RSNA annual meeting, three-time meeting attendee David Gimarc, MD, has an analogy for your consideration.

“Someone once told me that attending RSNA for the first time is like trying to take a drink from a fire hydrant,” said Dr. Gimarc, chief radiology resident at the University of Colorado Hospital, Denver, and a member of the RSNA Resident & Fellow Committee. “As the largest medical imaging meeting in the world, it’s very easy to feel overwhelmed.”

That is not far off the mark. For the uninitiated, just learning to navigate the massive structure that is McCormick Place is a challenge in itself. Then there is deciding what sessions to attend, what clothes to bring for the unpredictable Windy City weather, where to stay and even where to play.

But what can first-time attendees do to make the experience go as smoothly as possible? Lots of things, according to attendees who have learned from experience.

Planning ahead — long before you get to Chicago — is critical. To save costs, travel with a colleague, suggests two-time meeting attendee Gerald Drocton III, MD, a neuroradiology fellow at Ohio State University Wexner Medical Center in Columbus.

Find out if a co-worker is planning to attend and room together if you feel comfortable. Book your hotel room in advance through the RSNA website to receive reduced rates for meeting attendees and free convention shuttle rides, Dr. Drocton said.

Once onsite, newbies should start by soaking up the environment, said Adam Flanders, MD, a professor of radiology and rehabilitation medicine and director of informatics at Thomas Jefferson University Hospital in Philadelphia. Walk around and get distracted. Give yourself plenty of time to explore the exhibit halls and talk to the vendors, he said.

“Wander around all of those immense buildings and explore everything RSNA has to offer,” said Dr. Flanders, a 30-plus-year attendee who attended his first annual meeting as a first-year radiology resident. “Don’t try to box yourself into a tight schedule of events initially.”

It’s important to dress professionally but comfortably, suggested Courtney Tomblinson, MD, chief resident in diagnostic radiology at the Mayo Clinic in Phoenix and chair of the RSNA Resident & Fellow Committee.

“Dressing in layers can keep you flexible from room to room where the temperatures may fluctuate,” said Dr. Tomblinson, who

“Dressing in layers can keep you flexible from room to room where the temperatures may fluctuate.”



Courtney Tomblinson, MD

has attended the annual meeting twice.

Putting insoles inside your shoes is a good idea. Adds Dr. Flanders: “Wear comfortable shoes and don’t carry a lot of stuff you don’t need — no more than a tablet/PC, water bottle, snacks ... otherwise you will be exhausted before lunchtime.”

Tap into RSNA Tools

Along with virtual and physical Information Desks, RSNA offers a number of electronic tools to aid attendees. Download the RSNA meeting app on your smartphone and use the “What’s Happening Now?” feature, Dr. Flanders suggested. Refer to the RSNA meeting program and Pocket Guide frequently — or constantly.

When creating your schedule, consider exploring a wide range of session formats, said Christian Zumkley, MD, a radiologist at Mathias-Spital, a hospital in Rheine, Germany, who will be attending the RSNA annual meeting for the 17th time this year.

She recommended taking refresher courses, as “they are very good, especially for beginners. Also, the hands-on courses are often good to get some experience,” Dr. Zumkley said.

“Go over to the Lakeside Center and view some exhibits: traditional poster and digital presentations as well as 3-D models,” Dr. Flanders said. “You will gravitate to the things that interest you most and the venues that you like the best. If you’re a trainee, make a point of taking advantage of the Residents Lounge where you can network and grab a snack. Duck into a few lectures that sound interesting to you.”

“Wander around all of those immense buildings and explore everything RSNA has to offer.”



Adam Flanders, MD

“I’ve gotten the best headshots I have ever had during the RSNA annual meeting.”



Gelareh Sadigh, MD

RSNA ANNUAL MEETING?

Also for trainees, Gelareh Sadigh, MD, a neuroradiology fellow in the Department of Radiology and Imaging Sciences at Emory University School of Medicine in Atlanta, highly recommends attending the RSNA Resident and Fellow Symposium. This year's symposium on Nov. 28 offers sessions on landing the job you want and how to build a successful career.

For international members who might find the meeting especially daunting, RSNA offers courses on navigating RSNA 2017 presented in English, Portuguese, French and Spanish. (See sidebar). Translation services in Chinese, Dutch, German, Italian, Japanese and Spanish are offered at Information Desks throughout McCormick Place.

And RSNA can help with another important part of your career: getting a professional headshot. RSNA will once again offer a free professional portrait studio that has been enormously popular with attendees, Dr. Sadigh said.

"I've gotten the best headshots I have ever had during the RSNA annual meeting," said Dr. Sadigh, who attended her first meeting in 2010 and has been there every year since.

"Chicago is a wonderful city with many great restaurants, museums and activities."



Gerald Drocton III, MD

"The hands-on courses are often good to get some experience."



Christian Zumkley, MD

Have Some Fun Out There

You're here to learn, but don't forget to have some fun and sample the eclectic variety of food and attractions Chicago has to offer.

"Chicago is a wonderful city with many great restaurants, museums and activities," Dr. Drocton said. "Whether it be a Chicago Bulls basketball game, a visit to the Field Museum, the Shedd Aquarium or the Art Institute of Chicago, the city has something for everyone."

Swing by downtown's Christkindlmarket, stroll down the Magnificent Mile or go see a show.

"Make sure to plan at least a little bit of time to enjoy Chicago," Dr. Gimarc said. "While it can be quite chilly in late November — depending on where you're coming from — the city is decorated for the holidays and can be really beautiful."

"Make sure to plan at least a little bit of time to enjoy Chicago."



David Gimarc, MD

RSNA Resources Aid First-Time Attendees

Meeting Central: Optimized for tablets and mobile devices, Meeting Central at Meeting.RSNA.org is an essential resource for navigating RSNA 2017. Browse course listings, the technical exhibitors list, build your schedule on My Agenda and more.

RSNA 2017 Meeting App: Download the App for iPhone, iPad and Android smartphones to access and explore the RSNA meeting program even when you are offline.

Social Media: Follow RSNA on Facebook, Twitter, Instagram and LinkedIn to get the latest news, connect with colleagues and share your favorite meeting moments (#RSNA17).



First-Time Attendee Orientation

Saturday, Nov. 25 and Sunday, Nov. 26

Led by an RSNA staff member, this is the opportunity for attendees who have never been to an RSNA annual meeting to network with their peers and learn how to maximize the annual meeting. Go to Meeting.RSNA.org.

Navigating RSNA in Portuguese, French and Spanish

Sunday, Nov. 26

Gain insight into the meeting program, networking opportunities and insider tips for navigating the annual meeting and exploring the city of Chicago. Individual sessions are presented entirely in Portuguese, French and Spanish.

Go to Meeting.RSNA.org.

Navigating RSNA on a Dime

Wednesday, Nov. 29

This session will provide attendees tips on how to attend the RSNA annual meeting and enjoy Chicago on a tight budget. Go to Meeting.RSNA.org.



Meeting Experience

NEW Onsite Registration/Badge Pickup

Name badges will not be mailed in advance. All attendees must pick up badges, lanyards and meeting materials at designated registration areas throughout McCormick Place, or at the Inter-Continental Hotel Chicago and the Hyatt Regency Chicago on Wacker Drive.

New registrants can also complete their registration at these locations – save time and register online at RSNA.org/Register and simply stop at one of these locations to pick up your badge. A valid photo ID is required.

North Building – Level 2

Saturday - Thursday 7:00 a.m. – 5:00 p.m.

South Building – Level 1 Lakeside Center East Building – Level 2

Saturday 11:30 a.m. – 5:00 p.m.

Sunday - Thursday 7:00 a.m. – 5:00 p.m.

Friday 7:00 a.m. – 12:00 p.m.*

* (Lakeside Information Desk Only)

Reserve Your Room Now

We have secured more than 85 hotels in downtown Chicago offering discounted rates. Hotel rooms are only available to RSNA-registered participants. Register through RSNA.org/Register to view hotel rates and availability. Attendees reserving through RSNA can access great benefits including exclusive amenities and free transportation between hotels and McCormick Place.

Exclusive Airfare Discounts

United Airlines

United Airlines offers discounts from 2 percent 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 and enter offer code ZNX941696, 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 applicable to U.S./Canada originating passengers. Book online at Delta.com/Meetings and enter Meeting Event Code NMPES, 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 translations services in Chinese, Dutch, French, German, Italian, Japanese and Spanish at the Information Desks.

International Invitation Letter

RSNA offers an official letter of invitation for RSNA 2017 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.

Book Hotel Reservations for Next Year

New this year, RSNA will accept hotel reservations for RSNA 2018 at this year's annual meeting. Attendees will have the opportunity take advantage of the lower rates RSNA negotiates to get their choice of the best hotels in downtown Chicago. Attendees can stop by any of the four kiosks in McCormick Place to book a hotel for next year.

Registration Packages

RSNA Members

Code Category

		RECOMMENDED PACKAGE	STANDARD	DELUXE	PREMIUM LIMITED AVAILABILITY	VIRTUAL ONLY	EXECUTIVE LIMITED AVAILABILITY	TECHNICAL EXHIBITS ONLY (PRICE PER DAY)
10	Associate Member	Deluxe	\$150	\$300	\$450	\$150	N/A	N/A
11	Active Member	Deluxe	\$150	\$300	\$450	\$150	N/A	N/A
12	Member-in-Training	Deluxe	\$0	\$25	N/A	\$25	N/A	N/A
17	Student Member <i>(CME/CE credit not tracked or awarded)</i>	Deluxe	\$0	\$25	N/A	\$25	N/A	N/A
21	AAPM Member	Deluxe	\$150	\$300	\$450	\$150	N/A	N/A

Non-Members

Code Category

14	Non-Member Physician a. radiologist b. radiologic scientist c. non-radiologist physician	Premium	\$1,100	\$1,450	\$1,600	\$600	N/A	\$325
15	Non-Member Resident/Trainee <i>(Verification required)</i>	Deluxe	\$400	\$750	N/A	\$600	N/A	\$325
18	Non-Member Student <i>(Verification required)</i> <i>(CME/CE credit not tracked or awarded)</i>	Deluxe	\$0	\$600	N/A	\$600	N/A	N/A
22	Non-Member Physicist	Premium	\$1,100	\$1,450	\$1,600	\$600	N/A	\$325
23	Radiology Support Personnel <i>(Verification required)</i> a. technologist b. engineer c. radiology business manager d. radiology administrator e. radiology/nurse practitioner f. educator g. architect h. government employee (non-physician) i. information technology/system support j. telemedicine/communications specialist k. facility manager l. assistant (physician/radiologist)	Standard	\$400	\$750	\$900	\$600	N/A	\$325
24	Hospital or Facility Executive a. hospital or facility administrator b. legal (in-house counsel) c. officer (CEO, CFO, CIO, COO) d. purchasing e. other senior-level personnel	Executive	\$1,100	\$1,450	\$1,600	\$600	\$1,200	\$325
25	Commercial Research & Development	Standard	\$1,100	\$1,450	\$1,600	\$600	\$1,200	\$325
27	Industry Personnel a. distributor b. manufacturer c. prospective exhibitor d. other	Standard	\$1,100	\$1,450	\$1,600	\$600	\$1,200	\$325
31	Healthcare Consultant a. attorney b. computer analyst c. financial analyst d. purchasing e. staffing/recruitment f. other	Standard	\$1,100	\$1,450	\$1,600	\$600	\$1,200	\$325

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.

Badges are now equipped with beacon technology that eliminates the need to verify attendance, simplifies the CME process and links users to Meeting Central (Meeting.RSNA.org) for an enhanced meeting experience. While RSNA will never share, rent or sell the information collected on your badge, you can opt out of this technology by visiting any registration location.

Ribbon Pick Up

All badge ribbons for committee, council or group work will be distributed onsite at RSNA 2017. Ribbons will be available at a self-serve ribbon wall located in Membership Resources in the Connections Center. Staff will be onsite to assist members.

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

The printed RSNA 2017 Program in Brief, official meeting bag 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 2017 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. Please note 2017 will be the last edition of the printed Program in Brief. Available onsite, the RSNA 2017 Pocket Guide is an easy-to-use reference guide to course and event information, floor plans at McCormick Place, transportation and dining.

Technical Exhibits Guide

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 2017. 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. New this year, you can search the exhibitor listing by product category or name to find the companies you are looking for and add them to your agenda. You can also schedule an appointment with

exhibitors that upgraded their listings. They are noted with the Featured Exhibitor icon.

- 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 2017 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 at the Digital Support desk in the Connections Center.

RSNA 2017 Meeting App

Download the RSNA 2017 Meeting App for iPhone, iPad and Android smartphones to access and explore the Meeting Program even when you are 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 2017 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 emailed to you.



Keeping Attendees Informed

Social Media Connection

Join — or start — the conversation on social media at RSNA 2017. Follow RSNA on Facebook, Twitter, Instagram and LinkedIn to get the latest news, connect with colleagues and share your favorite meeting moments. Use hashtag #RSNA17.

Throughout the meeting, RSNA will be sharing updates from select sessions on Twitter and video interviews and tours on Facebook Live. Trainees can connect with their fellow Twitter users in-person at the RFC Tweetup on Tuesday, Nov. 28 at 4:30 p.m. in the Residents and Fellows Lounge.

Daily Bulletin

Stay connected to all things RSNA 2017 through the print and online versions of the *Daily Bulletin*, the official newspaper of the annual meeting. Featuring news from the meeting, the *Daily Bulletin* is available in bins throughout McCormick Place.


The digital *Daily Bulletin* is available on the RSNA 2017 mobile app and online at RSNA.org/Bulletin. New this year, more articles will be available online ahead of print, and additional features include interactive quizzes and polls.

The Technical Exhibits Focus section, published Sunday through Wednesday in the *Daily Bulletin*, features new radiologic technology and services demonstrated by technical exhibitors at the meeting.

Get alerts on *Daily Bulletin* stories through social media at #RSNA17 on Facebook (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. 26, through Wednesday, Nov. 29, 11 a.m. to 2:30 p.m.

A brunch menu will be offered Thursday, Nov. 30, from 10:30 a.m. to 1:30 p.m., in all three locations.

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 bistroticket.com/rsna.

McCormick Place Eateries

Favorite dining options include Starbucks, Jamba Juice, Connie's Pizza, McDonald's, Ambrosia Café, Kosher Express, 23rd Street Café, Lakeside Café, Dunkin' Donuts, Garrets Popcorn, Luzita's Street Style Tacos, Market Cart, Midwest Grilled Cheese and more.

LEARNING CENTER FEATURES THOUSANDS OF POSTERS AND EXHIBITS

Located in Lakeside Center East, Level 3, the Learning Center houses thousands of education exhibits and scientific posters covering a range of subspecialties. Scientific posters will be displayed within each learning community. During the lunch hour, authors will be present for Poster Discussions. Visit Meeting Central for days/times.

CME Learning Checkpoint

This interactive activity will allow attendees to check out nine award-winning hard-copy exhibits from RSNA 2016. 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.

Quantitative Imaging Biomarkers Alliance (QIBA)

The QIBA Kiosk will provide information about the ongoing coalition efforts among clinicians, researchers, government agencies, industry and RSNA to advance the practice of radiology from image interpretation to quantitation. Meet the Experts presentations will be held throughout the week.

Quality Improvement (QI) Storyboard Walks

Join 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. The poster walks will be held Monday and Tuesday, Nov. 27 and 28, at 3 p.m. and 4 p.m. respectively, in the 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.

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. A virtual reality demonstration provides a glimpse of the research and clinical potential made possible with newly affordable and remarkably compelling virtual reality technology.

The exhibit features demonstration of medical virtual reality tools including instructive clinical examples of using virtual reality for radiology exams, education, surgical planning and networked collaboration. Visitors will have the opportunity to experience 3-D medical models in virtual reality, travel inside a virtual colonoscopy with a CT roadmap and interact with medical models and scan set images in re-imagined, intuitive and exciting ways.

NCI Image Perception Research

For the second year, the National Cancer Institute (NCI) will be conducting studies on radiologic image perception at RSNA's annual meeting. Attendees will be able to learn about this important area of research and, if they wish, participate in the studies as volunteers in a lab environment. The NCI Image Perception Lab is located near the Residents' Lounge.

NEW Ask a Graphic Media Expert

Attendees looking for assistance with graphic arts for presentations or publications can visit the Learning Center and speak with a graphic media expert. Experts will be on hand to answer questions on topics such as preparing images for publication, working in a PowerPoint template and adding videos to a presentation.

NEW Machine Learning Community

A destination point for machine learning (ML)-related activities, the Machine Learning Community will be anchored by the RSNA Deep Learning Classroom presented by NVIDIA DLI. Attendees will have a hands-on opportunity to engage with ML learning tools, write algorithms and improve their understanding of emerging ML technology.

The Machine Learning Community will also feature backboard posters and a National Cancer Institute Exhibit. Read a full report on the growth of ML at RSNA 2017 and related activities on Page 12.



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 98.50 *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 (MPCEC) 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)

Fifty-four courses have been approved for SAMs during RSNA 2017. Each RSNA in-person SAM is available for 1.5 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.

New in 2017: All courses designated for SAM credit at RSNA 2017 will require attendees to use their personal device to complete the required test questions during the live session.

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.

Radiology Leadership Institute course credit will also be available for select courses at RSNA 2017.



TECHNICAL EXHIBITS SPOTLIGHT WORLD'S LATEST INNOVATIONS

More than 650 leading manufacturers, suppliers and developers of medical information and technology help make the RSNA Technical Exhibit halls the ideal setting to engage with industry experts and discover the latest medical imaging products and support services designed to streamline operations and enhance patient care. Shop and compare equipment supplies, devices and software in two halls: Hall A in the South Building and Hall B in the North Building.

NEW Machine Learning Showcase

The new Machine Learning Showcase offers attendees the chance to learn more about this emerging area and network directly with companies at the forefront of the latest technology. Presentations will take place each day. The showcase is located in the North Building.

Sponsored by: Carestream Health, Google Cloud and Zebra Medical Vision.

NEW Start-up Showcase

Visit the Start-up Showcase in the North Building to explore the latest medical imaging innovations and connect with emerging companies positioned to bring new products and services to market.

First-Time Exhibitor Pavilion

First-time exhibitors demonstrating new products and services will be featured in a showcase area inside the North Hall. Other first-time exhibitors located throughout the Exhibit Halls will be identified with a First-Time Exhibitor logo.

Vendor Workshops

Vendors provide hands-on tutorials of commercial software systems in a classroom setting. Refer to the online program for a complete list of Vendor Workshops.

International Pavilions

Exhibitors from 27 countries are on display at RSNA 2017. Canada (Ontario, specifically), China, France, Germany and Korea have dedicated pavilions to showcase technology and services from their countries.

TECHNICAL EXHIBITS HOURS

Sunday, Nov. 26 to
Wednesday, Nov. 29
10 a.m. to 5 p.m.

Thursday, Nov. 30
10 a.m. to 2 p.m.

Publisher's Row

Visit with top medical publishers for a look at the latest releases in educational materials across all areas of medical imaging.

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.

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



Sunday, Nov. 26, to Wednesday, Nov. 29

11 a.m. – 2:30 p.m.

Technical Exhibits, North & South Buildings and in the Learning Center, Lakeside Center East.

Special Brunch

Thursday, Nov. 30

10:30 a.m. – 1:30 p.m.

Technical Exhibit Halls, North & South Building and in the Learning Center, Lakeside Center East.

Bistro RSNA is again offering this hearty brunch menu on Thursday only.



RSNA 2017 VIRTUAL MEETING

Experience the Meeting from Virtually Anywhere

For those who want to access content from anywhere in the world — or who want to see more while attending RSNA 2017 — the Virtual Meeting is the answer. This year's meeting features an incredible array of expanded content, longer availability, CME credit for live sessions, and a select number of CME-eligible courses on demand.

Valuable Content

With over 100 live-streamed and on-demand courses, the Virtual Meeting gives you access to educational courses, plenary sessions and additional meeting content.

CME Credit

RSNA 2017 Virtual Meeting offers CME credit for all live-viewed sessions upon completion of a course evaluation or submitting correct diagnoses for Cases of the Day and select on-demand sessions upon successful completion of a test and course evaluation.

- Live sessions must be viewed at the time of the course to be eligible for CME credit.
- Content captured during live sessions will be made available for on-demand viewing within 24 hours of the live session, and will remain available through February 28, 2018.
- Only those courses designated as CME-eligible on demand will qualify for CME credit when viewed on demand following successful completion of a test and course evaluation.

Your Time, Your Place, Your Meeting, Your Community

With the Virtual Meeting, you have the power to maximize your meeting experience—when and where you choose! What's more, join the virtual community with live chat capabilities allowing you to discuss course content with colleagues from across the globe. Register now to get the most from RSNA 2017.

Dates and Hours — Extended Access

The Virtual Meeting is available beginning at 8 a.m. CT on Saturday, Nov. 25, with sessions beginning that afternoon. Live programming will run simultaneous to the

RSNA 2017 annual meeting, which ends on Friday, Dec. 1. After that date, RSNA will offer extended access to all Virtual Meeting programming on demand through Feb. 28, 2018, at 4 p.m. CT.

Cost

Flexible pricing allows you to attend the RSNA 2017 Virtual Meeting in conjunction with the live annual meeting or as a stand-alone product. Visit RSNA.org/Registration-Packages to learn more. Retired RSNA members receive free access.

Live Content Available for CME Credit

RSNA designates this live activity for a maximum of 85.50 *AMA PRA Category 1 Credits™*. Physicians should claim only credit commensurate with the extent of their participation in the activity.

To qualify for CME credit for live (virtual) participation, document your attendance by evaluating the courses in which you participate; then, claim credit online using CreditEval. In order to receive credit, you must attend the entire session.

The virtual session will automatically track your attendance. For each course in which you participate virtually, a link will be made available at the conclusion of the course. Claim credit through the posted credit evaluation deadline, which is typically one week after the end of RSNA 2017.

Once you have evaluated all eligible courses, follow the prompt to print your CME certificate for your live Virtual Meeting courses. For RSNA members, credits will automatically be applied to the RSNA CME Repository.

CME-Eligible Content On Demand

Participants that watch CME-eligible on-demand courses will be prompted to

complete a test on the material after viewing. After achieving a score of 80 percent or better, you will be asked to complete a course evaluation. Once these two requirements are met, you will receive an email with your on-demand CME certificate attached. One on-demand CME certificate is sent for each on-demand course completed. You may also view your certificates in the CME Repository for RSNA members.

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

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. Virtual Meeting participants who submit the correct answer will receive 0.5 *AMA PRA Category 1 Credits™*.

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.

Virtual Meeting registration runs concurrent to RSNA 2017 registration and will continue through Feb. 28, 2018. Register at RSNA.org/Register.



VISIT THE RSNA CONNECTIONS CENTER

The RSNA Connections Center offers a wide range of resources to enhance your meeting experience. Whether you have questions about your membership, are interested in donating to the Research & Education (R&E) Foundation, or need a place to charge your phone, the Connections Center has you covered.

Membership & Resources

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

NEW Ribbon Pick-Up

Volunteer recognition ribbons will no longer be mailed to attendees. Ribbons will be available at a self-serve ribbon wall in the Connections Center. Instructions will be emailed to ribbon recipients.

• **RSNA Online Learning Center**

Check out the newly-upgraded online education platform, RSNA Online Learning Center, featuring more than 600 online SAM-CME activities and an enhanced, mobile-friendly user interface.

• **Career Connect**

Seek assistance if you're looking for a job or need to fill one.

• **Image Wisely®**

Take the pledge with Image Wisely® to use 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 publications 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.

Information Desk

Visit RSNA staff at the Information Desk for answers to all your questions about RSNA 2017.

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 RSNA Shop is your go-to resource for RSNA-branded merchandise and apparel. New this year: adult coloring books and photo frames, as well as a special edition Research & Education (R&E) coffee mug, with proceeds benefitting the Foundation.





Discovery Theater Features Music, Performance Acts, Interactive Discussions

Stop by the Discovery Theater throughout the week for unique discussions on RSNA programs and special musical and performance acts. New this year: the Diagnosis Live™ Resident Competition will feature four residency programs in a head-to-head challenge for the ultimate residency program bragging rights. View the full schedule and add events to My Agenda at Meetings.RSNA.org. Events include:

Performances:

- Milwaukee Hot Club (French Jazz)*
- Laura Bretan (Opera)*
- Rio Bamba (Latin)*
- Chicago Kingsnakes (Chicago Blues)*
- Martin Metzger Flamenco Ensemble*

Presentations include:

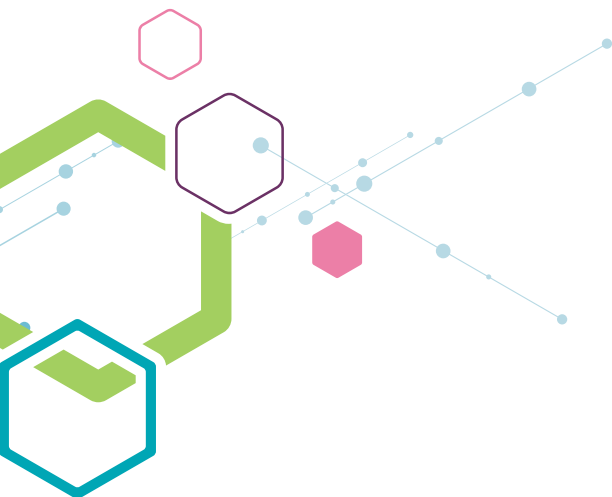
- First-Time Attendee Orientation*
- Navigating RSNA (in Portuguese, French, Spanish)*
- Image Wisely®*
- RSNA 3-D Printing SIG*

RSNA Image Contest

The RSNA Image Contest allows medical imaging specialists a chance to share their artistic flair with their peers from around the globe. You can vote for your favorites at RSNA.org/Image-Contest from Oct. 1-31. The top five images for this year's categories – Radiology Art, Radiology Hobbies and Best Photo – will receive recognition at RSNA.org/Image-Contest and in the RSNA Connections Center.

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 with a donor ribbon and those who contribute at least \$300 onsite enjoy exclusive access to the Donor Suite, which features computers, a coat room, comfortable furniture and light refreshments.



RESIDENT AND FELLOW SESSIONS, NETWORKING OPPORTUNITIES

Highlighted by the annual RSNA Resident and Fellow Symposium, RSNA 2017 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. 28, during RSNA 2017. Go to Meeting.RSNA.org to add the symposium to My Agenda.

Topics include:

Session 1: Finding Your Career Path

- “What RSNA Has to Offer Members-in-Training”
- “Panel Discussion: Academic, Private Practice, Hybrid Model, Telerad, Interventionalist”

Session 2: Landing the Job You Want

- “Interview to Win — How to Land the Job You Want”
- “Contract Negotiations”

Session 3: Tips for a Successful Career

- “Challenging Conventional Wisdom,”
- “Tips for Successful Leadership: What I Wish I Knew Back Then”
- Q & A

Other programming geared toward residents and fellows includes interactive Diagnosis Live™ sessions, what’s new from the American Board of Radiology (ABR), case-based interactive competition and review sessions and an RSNA Professionalism Committee-sponsored session, “The Newly Hired Radiologist: Lessons for Aspiring, New and Experienced Radiologists.”



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 through Thursday, 8 a.m. to 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 with their peers and network with longtime RSNA members and leaders in radiology. The reception will be held Monday, Nov. 27, from 4 to 5 p.m., in the Hyatt Regency McCormick Place.

Resident and Fellow Tweetup

The event will be held Tuesday, Nov. 28, at 4:30 p.m. in the Resident and Fellow Lounge.

Diagnosis Live™ Resident Competition

NEW On Monday, the Discovery Theater in the Connections Center will host the Diagnosis Live™ Resident Competition, which will feature four residency programs in a head-to-head challenge for the ultimate residency program bragging rights.

5K FUN RUN TO SUPPORT THE RSNA R&E FOUNDATION

Nov. 28 at 6:30 a.m.

Run, jog or walk in the 2017 Fun Run to support education and radiology research. All proceeds benefit the RSNA R&E Foundation, so enjoy a run with your colleagues for a good cause. Add the Fun Run to your RSNA 2017 registration. Participants receive a commemorative T-shirt, while supplies last, and the fully tax-deductible donation benefits the RSNA R&E Foundation. In case of inclement weather, the Fun Run may be canceled. All Fun Run fees are non-refundable. *Sponsored by Konica Minolta Healthcare.*



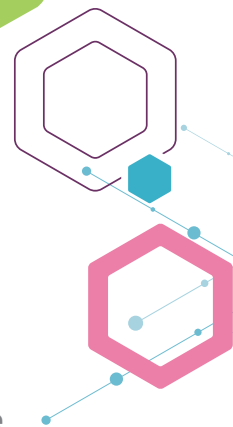
EXPLORE CHICAGO AT RSNA 2017

Make sure to schedule some time to explore the amazing sights and sounds of Chicago through RSNA’s Tours and Events.

Highlights include a Holiday Lights Trolley Tour, Behind the Scenes at the Field Museum Lunch, Create your Own Deep Dish Pizza at Lou Malnati’s, The Pearl Fishers at the Lyric Opera, a Millennium Park Walking Tour and much more.

Information is available at RSNA.org/Tours-and-Events. During the meeting, attendees can visit the tour desk in the Grand Concourse Saturday through Wednesday.

2017 Honorees



RSNA will pay tribute to a number of distinguished physicians during the 103rd Scientific Assembly and Annual Meeting. All presentations will take place in the Arie Crown Theater.

Outstanding Researcher and Educator — Presented Sunday, Nov. 26 • 8:30 a.m.

RSNA will honor two individuals at RSNA 2017 for their contributions to research and education. They are Mitchell D. Schnall, MD, PhD, and Dorothy Bulas, MD.

Outstanding Researcher

Mitchell D. Schnall, MD, PhD

An international leader in translational biomedical imaging research, Mitchell D. Schnall, MD, PhD, bridges the interface between basic imaging science and clinical medicine. His work on MRI methodology has led to fundamental changes in the imaging approaches to breast and prostate cancer. His work has significantly influenced emerging technologies such as optical imaging.



Schnall

“Dr. Schnall is an outstanding clinician-scientist and leader who has devoted his career to developing and applying medical imaging technologies,” said RSNA President Richard L. Ehman, MD. “As a leading proponent and authority on high-quality multicenter clinical trials for evaluation of the efficacy of advanced imaging technologies, Dr. Schnall’s work has benefitted countless patients worldwide.”

Currently the Eugene P. Pendergrass Professor of Radiology and the chair of the Department of Radiology at the Perelman School of Medicine at the University of Pennsylvania in Philadelphia, Dr. Schnall has been a faculty member since 1991, and a full professor since 2002. He earned his undergraduate, medical and doctorate degrees and also completed his residency at the University of Pennsylvania.

Since receiving a GE Healthcare/RSNA Research Scholar Grant to investigate MRI of rectal cancer in 1992, Dr. Schnall has been the principal investigator of numerous research teams. Over his career he has secured \$125 million as principal investigator from federal, industry and foundation sources. He has published over 370 studies.

Dr. Schnall led efforts to organize clinical and translational cancer imaging research in the U.S. He served as deputy chair of the American College of Radiology Imaging Network (ACRIN) from 1999 to 2007, and became chair in 2008. Among the groundbreaking trials under his leadership at ACRIN is the landmark National Lung Cancer Screening trial that demonstrated the ability of low-dose lung cancer screening to reduce lung cancer mortality by 20 percent in high-risk patients. Dr. Schnall was one of the architects of the merger of ECOG and ACRIN to form the new Eastern Cooperative Oncology Group (ECOG)-ACRIN Cancer Research Group, which he now co-chairs.

Dr. Schnall was awarded a gold medal from the International Society for Magnetic Resonance Imaging in Medicine (ISMR) in 2013. He is a current member of the RSNA Research & Education (R&E) Foundation Board of Trustees and is chair of the ACR Research Commission.

Outstanding Educator

Dorothy Bulas, MD

Throughout her career, Dorothy Bulas, MD, has focused on education and international outreach. She is a professor of pediatrics and radiology at the George Washington University School of Medicine and Health Sciences, and serves as vice chief of academic affairs, program director of pediatric radiology and section head of ultrasound and fetal imaging at Children’s National Medical Center in Washington, DC.



Bulas

“In addition to being a talented clinician and an accomplished researcher, Dr. Bulas is an extraordinary teacher who has made tireless contributions to the educational programs of RSNA,” said RSNA President Richard L. Ehman, MD. “For more than three decades, she has been a passionate and effective advocate for improving pediatric radiology worldwide by participating in educational outreach.”

Dr. Bulas has delivered over 120 national and international invited lectures and has helped plan pediatric radiology conferences across the globe.

A founding member of the World Federation of Pediatric Imaging (WFPI), Dr. Bulas is past secretary of WFPI and past chair of the WFPI Education Committee. She currently serves as chair of the American College of Radiology (ACR) Foundation’s international outreach committee. As a past president of the Society for Pediatric Radiology (SPR), she helped organize the combined European Society of Paediatric Radiology/SPR 2011 International Pediatric Radiology meeting in London.

Dr. Bulas has served on the ACR Pediatric Radiology Practice Guidelines Committee and as section chair for certificate of qualification in pediatrics for the American Board of Radiology.

She has served as faculty for numerous RSNA annual meetings and also as a track chair on the Refresher Course Committee. She is a member of the RSNA Public Information Committee and the Public Information Advisors Network and traveled with the RSNA International Visiting Professors program in 2016 to Ghana. An advocate for safety in pediatric radiology, Dr. Bulas served as a member of the Image Gently® alliance steering committee.

Dr. Bulas completed her medical degree at the Medical College of Pennsylvania in Philadelphia. She went on to complete a pediatric residency at New York Hospital and her radiology residency at the Albert Einstein School of Medicine in New York City. She is a fellow of the American Institute of Ultrasound in Medicine (AIUM), ACR, the Society of Radiologists in Ultrasound and the American Academy of Pediatrics.

Honorary Members — Presented Monday, Nov. 27 • 1:30 p.m.

Honorary Membership in RSNA is presented for significant achievement in the field of radiology. At RSNA 2017, Honorary Membership will be given to Hassen A. Gharbi, MD, PhD, Renato Adam Mendonça, MD, PhD, and Katrine Riklund, MD, PhD.

Hassen A. Gharbi, MD, PhD

Dr. Gharbi earned his medical degree in 1967 from the Université Paris Medical School, where he subsequently received degrees in radiology, aeronautic medicine and medical electronics. He received a post-doctoral degree in optic physiology from the Faculty of Science at the Orsay campus of the Université Paris and a degree in management of radiation accidents from Oak Ridge Associated Universities, Oak Ridge, TN.



Gharbi

He began his career as an assistant professor in the biophysics department at the Université Paris Medical School. When he returned to Tunisia in 1970, he founded and served as head of the first department of radiology at the Tunis Children's Hospital, where he remained until 1989. Simultaneously, Dr. Gharbi served as head of the medical biophysics department at the Medical School of Tunis from 1970 to 1985 and as vice dean from 1971 to 1973. He served as president of the Radiological National Commission in the Ministry of Public Health, Tunis, from 1975 to 1985. Now retired, Dr. Gharbi remains active in radiology teaching programs in Tunisia and other developing countries.

"Dr. Gharbi was a pioneering pediatric radiologist in North Africa," RSNA President Richard L. Ehman, MD, said, "and in that role he helped provide access to modern pediatric radiology in his home country of Tunisia and throughout the region."

Credited with introducing ultrasonography in Tunisia in 1978, Dr. Gharbi's research on ultrasound classification of the hydatid cyst was published in *Radiology* in 1981 and remains an important resource to radiologists around the world. He has authored or co-authored more than 20 books on pediatric radiology and tropical and infectious diseases and has published more than 130 articles in national and international journals.

Dr. Gharbi founded the Tunisian National Centre of Radiation Protection in 1971 and served as director for nearly 20 years. He is a founding member of numerous medical associations, including the Mediterranean and African Society of Ultrasound and the Tunisian Society of Ultrasound and Biology, serving as president of those organizations.

He is the immediate past president of the World Federation for Ultrasound in Medicine and Biology and served as president of the Tunisian Society of Medical Sciences and the Tunisian Society of Radiology.

Dr. Gharbi currently serves on RSNA's International Advisory Committee, the Regional Committee for Middle East/Africa and the Education Exhibits Obstetrics/Gynecology Subcommittee.

His numerous accolades include the prestigious Antoine Béchère Medal from the International Society of Radiology (ISR) and honorary memberships in the European Society of Radiology (ESR), the Society for Pediatric Radiology (SPR) and the American Institute of Ultrasound in Medicine (AIUM).

Renato Adam Mendonça, MD, PhD

Renowned leader in radiology education Renato Adam Mendonça, MD, PhD, is the chief of the Department of Neuroradiology at Delboni Auriemo, São Paulo.



Mendonça

"Dr. Mendonça is a preeminent educator and advocate for strong relationships between international radiologic organizations," RSNA President Richard L. Ehman, MD, said. "Through his devotion to education in radiology, he made invaluable contributions to the field of radiology and helped shaped the careers of the next generation of radiologists throughout South America."

Dr. Mendonça is the current treasurer of the International Society of Radiology. He is a former president of the Radiological and Diagnostic Imaging Society of São Paulo and is the scientific director and current chair of the Educational Committee. As the scientific director, Dr. Mendonça has been instrumental in the continued partnership with RSNA to host the Jornada Paulista de Radiologia in Brazil every two years.

His professional involvement also includes serving as a member and past vice president of the Brazilian College of Radiology and Digital Imaging and as a founding member of LATINSAFE, an alliance of radiologists in Latin America that advocates for radiation protection for patients. Dr. Mendonça is the vice chair of RSNA's International Advisory Committee and a member of the Regional Committee for Latin America. He lectures throughout Brazil on radiology and neuroradiology.

Dr. Mendonça authored a chapter in Dr. Scott Atlas' *Magnetic Resonance Imaging of the Brain and Spine*, a leading textbook on imaging. He was co-editor of the *Encéfalo* (Encephalon) book and received the Jabuti award, the most prestigious literary award in Brazil.

Dr. Mendonça earned his medical degree in 1976 from the Medical School of Federal University of Paraná in Curitiba, Brazil. He completed his residency in radiology at the Hospital das Clínicas da Universidade Federal do Paraná, Brazil, and an additional neuroradiology residency at the Hospital Sírio-Libanês, São Paulo. In the interest of expanding his knowledge of international radiology, Dr. Mendonça spent a year as a visiting fellow in the neuroradiology department of the University of Pennsylvania, Philadelphia, before returning to Brazil to earn his PhD in medical sciences at the Federal University of São Paulo.

He began his medical career in the radiology department at the Hospital Beneficência Portuguesa, (now Hospital BP) in São Paulo and eventually became head of the neuroradiology section. During his 30 years at Hospital BP, Dr. Mendonça was an advocate for the development of the radiology residents training program, which has become one of the most prestigious in the country. From 2010 to 2015, he was the medical director of Diagnósticos da América.

Katrine Riklund, MD, PhD

A respected leader in diagnostic radiology and nuclear medicine, Katrine Riklund, MD, PhD, has devoted her career to collaboration between the two disciplines, laying the groundwork for the dramatic growth of hybrid imaging. As the founding president of the European Society of Hybrid Medical Imaging (ESHI), Dr. Riklund is working to provide better education and training in hybrid imaging for both specialties.



Riklund

“Dr. Riklund is a renowned leader in radiology, with a brilliant career that has included important research contributions at the interface of molecular imaging with neuroscience, oncology and many other areas,” RSNA President Richard L. Ehman, MD, said.

Born in Norrbotten, Sweden, Dr. Riklund earned her medical degree at Umeå University in Sweden, and also her postdoctoral degree in diagnostic radiology and nuclear medicine. She has remained at Umeå, serving as an associate professor, head of the Clinical Department of Radiology, head of the Department of Radiation Sciences and as deputy dean of the Medical Faculty. She is currently a professor in diagnostic radiology, a consultant for radiology and nuclear medicine, and pro vice chancellor at Umeå University.

As a researcher, Dr. Riklund helped bridge the divide between immunology and nuclear medicine by developing an evaluation

of monoclonal antibodies in the diagnosis and treatment of gynecological cancers. Thereafter, she focused her research on hybrid imaging with PET/CT and PET/MR, which plays an increasingly crucial role in the routine staging of oncologic disease, treatment planning and follow-up.

Dr. Riklund has served as president of both the Swedish Society of Nuclear Medicine and the Swedish Society of Medical Radiology, where she has been a board member since 1999. She has been a member of the International Commission on Radiological Protection Committee 3: Protection in Medicine. Her longstanding relationship with the European Society of Radiology (ESR) includes serving as president of the 2016 European Congress of Radiology (ECR) and as chairperson of the ESR board of directors, and currently as the immediate past president of ESR.

Dr. Riklund is a talented educator who has advised doctoral students in radiology and nuclear medicine. She has published numerous book chapters and authored research in journals across many specialties. She is also a board member of *Acta Radiologica*.

Among her many accomplishments, Dr. Riklund has served as an imaging expert on Guidelines in Colorectal Cancer Care and Guidelines for Breast Cancer Care for the National Board of Health and Welfare and as chair of the Center for Medical Image Science and Visualization, University of Linköping, Sweden.

Dr. Riklund serves as the ESR representative on the RSNA Committee on International Radiology Education (CIRE).

Gold Medalists

RSNA will award four individuals its Gold Medal — RSNA’s highest honor — at the 103rd Scientific Assembly and Annual Meeting. They are George S. Bisset III, MD, J. William Charboneau, MD, and Roderic I. Pettigrew, PhD, MD. A posthumous Gold Medal will also be awarded during the Opening Session to Richard L. Baron, MD.

Presented Sunday, Nov. 26 • 8:30 a.m.

Richard L. Baron, MD (posthumous)

Widely respected as a masterful diagnostic radiologist, educator, author and researcher, Richard L. Baron, MD, generously shared his knowledge and insight with colleagues around the world.

“Serving on the RSNA Board with Rich, I admired the thoughtfulness that he brought to every decision and his commitment to inclusion and fair play,” RSNA President Richard L. Ehman, MD, said. “He truly worked to make the world a better place.”

Throughout his career, Dr. Baron was dedicated to building bridges between radiologists across the globe. He worked closely with radiology associations around the world, building a roster of lifelong personal and professional relationships along the way.

Among his many accolades, Dr. Baron received the Medal of Honor and honorary membership in the French Radiological Society in 2015, the Gold Medal of the Asian Oceanian Society of Radiology in 2014, and honorary membership in the European Society of Radiology earlier this year.

Dr. Baron spent the latter part of his career at the University of Chicago (UC), serving as professor of radiology from 2002 until the time of his passing. He served as UC chair of the Department of Radiology from 2002 to 2011, and as dean for clinical practice from 2011 to 2013. At the University of Pittsburgh, he served as chair of the Department of Radiology from 1992 to 1999, and as



Baron

founding president and CEO of the University of Pittsburgh Physicians from 1997 to 2002.

Dr. Baron’s research focused on diagnostic imaging of liver disease and he served as an international authority on imaging in chronic liver disease and liver tumors. At RSNA 2016, he organized a special Liver Symposium where experts met to discuss this critical area of research.

Forging a lasting legacy at RSNA, Dr. Baron served in numerous leadership positions culminating in his RSNA presidency in 2016. He joined the RSNA Board of Directors in 2008 and served as the Board liaison for education and international affairs. In his RSNA 2016 President’s Address, “Beyond Imaging: Ensuring Radiology Impact in Clinical Care and Research,” Dr. Baron offered valuable insight on the future of the specialty he devoted his life to building.

Dr. Baron passed away on May 4, 2017. In recognition of his tremendous contributions to radiology as an educator, researcher and leader, RSNA awards a posthumous Gold Medal to Richard L. Baron, MD.

Presented Tuesday, Nov. 28 • 1:30 p.m.

George S. Bisset III, MD

In a career spanning four decades, George S. Bisset, III, MD, has earned a reputation as a preeminent authority on pediatric imaging and a world-class educator who has helped shape the next generation of radiologists.

“Dr. Bisset is a respected leader in academic radiology,” RSNA President Richard L. Ehman, MD,



Bisset

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said. “During his term of service on the RSNA Board of Directors and then as RSNA president in 2012, Dr. Bisset was particularly committed to expanding the educational initiatives of RSNA through innovative programs to move the specialty forward. Dr. Bisset served the interests of patients everywhere as an articulate and committed champion of the groundbreaking Alliance for Radiation Safety in Pediatric Imaging, the force behind the Image Gently® campaign to reduce radiation dose during pediatric imaging examinations.”

Dr. Bisset is a professor of radiology at Baylor College of Medicine and Radiologist-in-Chief and Edward B. Singleton Chair of Radiology at Texas Children’s Hospital, Houston.

Dr. Bisset earned a medical degree from the University of South Florida and began his career as an assistant professor of pediatrics and co-director of the Section of Pediatric Cardiology at Tulane University in New Orleans. He ascended the ranks in pediatrics and radiology at the University of Cincinnati, serving as chief of the Section of Body Imaging. He then moved to Duke University in Durham, NC, where he spent the next 16 years serving as a professor of radiology, chief of the Division of Pediatric Radiology, and vice chair, as well as interim chair of the Department of Radiology, before moving to his current position in Houston.

As a researcher, Dr. Bisset has focused primarily on cross-sectional imaging with an emphasis on MRI. He has authored or co-authored more than 200 articles and has served as a reviewer for journals including *Radiology*, *Pediatric Radiology* and the *American Journal of Roentgenology*.

Among his many honors, Dr. Bisset takes great pride in having received the Distinguished Alumni Award from the University of South Florida in 1996. He received the Society for Pediatric Radiology John Caffey Award in 2001 and the Pioneer Award in 2012. He was awarded Honorary Membership in the Austrian and German Societies of Radiology, the Colombian Association of Radiology, the Mexican Society of Radiology, the European Society of Radiology and the Radiological and Diagnostic Imaging Society of São Paulo. He is a Fellow of the American College of Radiology.

William Charboneau, MD

An ambitious educator and internationally recognized scientist, J. William Charboneau, MD, is a leading authority in diagnostic ultrasound and image-guided ablation of cancer of the liver, kidney and bone.



Charboneau

“Dr. Bill Charboneau is a world-renowned clinician, educator, and visionary, who pioneered many advanced applications of imaging and intervention,” RSNA President Richard L. Ehman, MD, said. “His innovations, leadership, and advocacy were instrumental in the development of image-guided percutaneous tumor ablation treatment, which has had a profound impact on patients worldwide.”

A professor emeritus of radiology at Mayo Clinic College of Medicine in Rochester, MN, Dr. Charboneau received his medical degree from the University of Wisconsin in Madison and completed his radiology residency at Mayo Clinic. He began his career in the radiology department at Mayo Clinic and continued to practice there for 30 years, until his retirement in 2010.

Dr. Charboneau pioneered the use of diagnostic ultrasonography for the characterization of focal thyroid nodules and liver masses and the critical role of ultrasound in distinguishing benign from malignant lesions. He was also an early leader in the development of image-guided intervention for procedures including biopsy and ablation.

His clinical expertise and extensive research led to the publication of radiology’s most authoritative reference book on ultrasound imaging, *Diagnostic Ultrasound*. Dr. Charboneau and his fellow editors worked with more than 100 authors from around the world to finalize this book that is now in its fifth edition. In addition to this seminal work, he also authored more than 175 scientific publications and he is co-editor of several other textbooks.

Because of his expertise in imaging of thyroid cancer, the National Academy of Sciences asked him to join a committee to research the health implications of the I-131 fallout from nuclear bomb testing that took place between the 1940s and 1960s over the western U.S. From his work on this committee, he published several studies and perspectives on the role of ultrasound imaging in detection of thyroid cancer.

Dr. Charboneau presented the 2006 RSNA Eugene P. Pendgrass New Horizons Lecture entitled, “Image-Guided Cancer Treatment: The Science and Vision of an Emerging Field.” He served as a member of the RSNA Public Information Committee and on the Public Information Advisors Network.

Dr. Charboneau’s contributions to the art and science of radiology have been recognized with multiple awards, including the 2014 GI Lifetime Achievement Award from the Society of Abdominal Radiology and the 2015 Lawrence A. Mack Lifetime Achievement Award from the Society of Radiologists in Ultrasound.

Roderic I. Pettigrew, PhD, MD

Founding director of the National Institute of Biomedical Imaging and Bioengineering (NIBIB), Roderic I. Pettigrew, PhD, MD, is an innovative leader in convergence research who is helping lay the groundwork for tomorrow’s medicine.



Pettigrew

“The world of radiology owes a great debt of gratitude to Dr. Pettigrew for his outstanding service as director of the NIBIB since it was founded in 2002,” RSNA President Richard L. Ehman, MD, said. “He is a pioneer in biomedical imaging, and a true visionary. Under his leadership, NIBIB has become an indispensable home for our science in medical imaging and a powerful force for innovation in medical technology.”

Dr. Pettigrew has charted the course for the National Institute of Health’s (NIH) critical work in harnessing the power of transdisciplinary teams to create new technologies and catalyze discoveries that usher in a new era of medicine. He continually advances the institute’s mission to integrate life sciences with engineering and the physical sciences to transform basic research and medical care.

Among his accomplishments at NIBIB, Dr. Pettigrew jointly led a national effort with the Howard Hughes Medical Institute to create new interdisciplinary graduate training programs. In 2008, he established the Quantum Grants program to achieve “medical moon shots.” Recently he championed a broad-based effort to address paralysis by advancing technologies that partially restore voluntary motor and autonomic function following spinal cord injury and established an Indo-U.S. partnership to invent new technologies for passive, cuffless blood pressure monitoring. He created the NIBIB Trailblazer grant award for early-stage investigators in exploratory high-impact research.

Dr. Pettigrew was an early advocate of a national system for patient-controlled sharing of medical images, leading to the RSNA Image Share project, which is poised to help realize the goals of the NIH precision medicine initiative All of Us. He co-chairs the congressionally-requested Federal Inter-Agency

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Working Group on Medical Imaging. Dr. Pettigrew serves as the NIH Liaison to NASA and the US Department of Energy. He co-leads a joint effort with the Bill and Melinda Gates Foundation to develop a cell phone-based platform to test for influenza and other diseases at home.

At the time of his NIBIB appointment, Dr. Pettigrew was serving as professor of radiology and medicine at Emory University School of Medicine, and professor of bioengineering at the Georgia Institute of Technology, both in Atlanta. During this time, Dr. Pettigrew became known for pioneering developing 4-D imaging of the cardiovascular system using MRI.

A graduate of Morehouse College in Atlanta, Dr. Pettigrew earned his PhD in applied radiation physics from the Massachusetts Institute of Technology, Cambridge, and his

medical degree from the University of Miami School of Medicine.

Among his numerous honors, Dr. Pettigrew presented the RSNA 75th Anniversary Diamond Jubilee New Horizons Lecture. He received the Pritzker Distinguished Achievement Award of the Biomedical Engineering Society, the Distinguished Service Award of the National Medical Association, the Pierre Galletti Award of the American Institute of Medical and Biological Engineering, the Inaugural Gold Medal Award of the Academy of Radiology Research and the Distinguished Service Medal of the International Society of Magnetic Resonance in Medicine. He is an elected member of the U.S. National Academy of Medicine and the National Academy of Engineering, and an elected foreign fellow of the National Academy of Science, India.

2017 HONORED EDUCATOR AWARD

RSNA congratulates the 2017 Honored Educator award recipients for their dedication to furthering educational scholarship in the field of radiology. Award recipients will be recognized at the 2017 RSNA Annual Meeting.

This year's recipients:

Suhny Abbara, MD	Daniel Ocazionez, MD
Richard Barr, MD, PhD	Aytekin Oto, MD
Tara Barwick, MBChB	Srinivasa Prasad, MD
Spencer Behr, MD	Andrei Purysko, MD
Sanjeev Bhalla, MD	Nikhil Ramaiya, MD
Brian Bresnahan, PhD	James Rawson, MD
Margaret Chapman, MD	Caroline Reinhold, MD, MSc
Khaled Elsayes, MD	Carlos Restrepo, MD
Catherine Giess, MD	Margarita Revzin, MD
Kate Hanneman, MD, FRCPC	Andrea Rockall, MRCP, FRCR
Amy Hara, MD	Sachin Saboo, FRCR
Jon Jacobson, MD, MPH	Dushyant Sahani, MD
Jeffrey Jarvik, MD	Evis Sala, MD, PhD
Geoffrey Johnson, MD, PhD	Akram Shaaban, MD, MBChB
Venkata Katabathina, MD	Atul Shinagare, MD
Tatiana Kelil, MD	Aaron Sodickson, MD, PhD
Ania Kielar, MD	Jorge Soto, MD
Kazuto Kozaka, MD	Oleg Teytelboym, MD
Rajesh Krishnamurthy, MD	Carlos Torres, MD, FRCPC
Elizabeth Krupinski, PhD	Daniel Vargas, MD
Santiago Martinez-Jimenez, MD	Sudhakar Venkatesh, MD, FRCR
Mahan Mathur, MD	Michael Wells, MD
Osamu Matsui, MD	Antonio Westphalen, MD
Christine Menias, MD	Jeremy Wortman, MD
Frank Miller, MD	Corrie Yablon, MD
Yoav Morag, MD	Vahid Yaghmai, MD
Paul Nikolaidis, MD	Pouya Ziai, MD

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/physics trainee, fellow or medical student. One trainee research prize in breast imaging is endowed by Tapan K. Chaudhuri, MD. A list of Trainee Research Prize recipients can be viewed in the Learning Center.

Funded with a donation from Kuo York Chynn, MD, the Kuo York Chynn Neuroradiology Research Award is presented annually to the top neuroradiology research paper presented at the RSNA annual meeting.

Travel Award

The Travel Awards for young investigators support candidates invited to present high-quality science. Scientific abstracts from current RSNA members who are presently enrolled in a full-time undergraduate or graduate program; clinical trainees who are currently enrolled in a full-time clinical training program; or postdoctoral trainees who were awarded a doctorate or equivalent degree no more than three years ago, were eligible for the award. A list of the Travel Award recipients 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 Monday 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 2017.

RSNA R&E Foundation Announces 2017 Grant Recipients

The RSNA Research & Education (R&E) Foundation is funding \$4 million in grants for the second consecutive year. 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

Timothy J. Amrhein, MD

Duke University

A Randomized Trial of CT Fluoroscopy-guided Targeted Autologous Blood and Fibrin Glue Patching for Treatment of Cerebrospinal Fluid Leaks in Spontaneous Intracranial Hypotension

GE Healthcare/RSNA Research Scholar Grant

Jalal B. Andre, MD

University of Washington

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

RSNA Research Scholar Grant

Manisha Bahl, MD, MPH

Massachusetts General Hospital

Machine Learning to Predict Risk of Upgrade and Recurrence of Ductal Carcinoma In Situ

Agfa HealthCare/RSNA Research Scholar Grant

David Dreizin, MD

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

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

RSNA Research Scholar Grant

Richard S. Ha, MD

Columbia University

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

RSNA Research Scholar Grant

Kate Hanneman, MD

University of Toronto

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

GE Healthcare/RSNA Research Scholar Grant

Jeremy Josef Heit, MD, PhD

Stanford University School of Medicine

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

Bracco Diagnostics Inc./RSNA Research Scholar Grant

Misun Hwang, MD

Johns Hopkins University School of Medicine

Improved Diagnosis and Prognostication of Neonatal Hypoxic Ischemic Injury With Combined Contrast Enhanced Ultrasound and Elastography

RSNA Research Scholar Grant

Laura Jimenez-Juan, MD

Sunnybrook Health Sciences Centre, University of Toronto

Towards an Early Detection of Coronary Artery Bypass Graft Failure: A Computational Fluid Dynamics Approach Based on CT and 4D-flow MRI

Agfa HealthCare/RSNA Research Scholar Grant

Anusha Kalbasi, MD

University of California, Los Angeles

Uncoupling the Tumor Promoting and Wound Healing Properties of Macrophages in the Irradiated Microenvironment

RSNA Research Scholar Grant

Austin Kirschner, MD, PhD

Vanderbilt University Medical Center

Mechanism of PIM1 Kinase-mediated Radiosensitization for Prostate Cancer Treatment

RSNA Research Scholar Grant

Robert J. McDonald, MD, PhD

Mayo Clinic, Minnesota

Assessment of the Clinical Effects of Intracranial Gadolinium Tissue Deposition Following Intravenous Administration of Gadolinium Based Contrast Agents Using a Preclinical Rat Model

Bayer HealthCare/RSNA Research Scholar Grant

Rajni Natesan, MD, MBA

The University of Texas MD Anderson Cancer Center

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

Carestream Health/RSNA Research Scholar Grant

Matthew J. Nyflot, PhD

University of Washington

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

RSNA Research Scholar Grant

Ronnie Alex Sebro, MD, PhD

University of Pennsylvania

Integrated Biomarker PET/CT Imaging Trial for Assessing Hypoxia in Soft Tissue Sarcomas Using a Novel PET/CT Tracer

RSNA Research Scholar Grant

Rahul Anil Sheth, MD

The University of Texas MD Anderson Cancer Center

Antitumor Immune Activation by Molecularly Targeted Photothermal Ablation for the Treatment of Hepatocellular Carcinoma

RSNA Research Scholar Grant

Elizabeth J. Sutton, MD

Memorial Sloan Kettering Cancer Center

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

Guerbet/RSNA Research Scholar Grant

Takeshi Yokoo, MD, PhD

UT Southwestern Medical Center

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

Siemens Healthineers/RSNA Research Scholar Grant

RESEARCH SEED GRANT

Alessandro Furlan, MD

University of Pittsburgh Medical Center

Towards an MR-based Computer-aided Diagnostic Program for the Classification of Risk of Hepatocellular Carcinoma Using the Liver Imaging Reporting and Data System

Hitachi Medical Systems/RSNA Research Seed Grant

Sana D. Karam, MD, PhD

University of Colorado

Combined Inhibition of EphB4 and EGFR Signaling Enhances Radiosensitization in Head and Neck Cancers

Toshiba America Medical Systems and Canon Group/RSNA Research Seed Grant

Mario Maas, MD, PhD

Academic Medical Center, University of Amsterdam, Amsterdam

Is Diagnosing Osteochondral Defects in the Talar Joint with T1rho and T2 Mapping the Future?

Toshiba America Medical Systems and Canon Group/RSNA Research Seed Grant

Eduardo Jose Mortani Barbosa, Jr., MD

University of Pennsylvania

Quantitative Measurement of CT Texture Patterns in Fibrosing Interstitial Lung Diseases: Evaluation of New Imaging Biomarkers for Improved Disease Classification, Stratification of Severity and Prediction of Prognosis

Fujifilm Medical Systems/RSNA Research Seed Grant

Ming-Yen Ng, MBBS

The University of Hong Kong

Cardiac Magnetic Resonance for Asymptomatic Type 2 Diabetics with Cardiovascular High Risk (CATCH): A Pilot Study

RSNA Research Seed Grant

Adam Benjamin Prater, MD, PhD

Emory University

Comparison of Multi-parametric Feature Extraction Methods for Outcome Prediction in Patients with Aneurysmal Subarachnoid Hemorrhage

RSNA Research Seed Grant

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
Derek Harwood-Nash, MD
Martin R. Prince, MD, PhD

Ralph Schlaeger Charitable
Foundation
RSNA Presidents Circle

Silver Anniversary Campaign
Pacesetters
Strategic Radiology

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



GE Healthcare



Andrei S. Purysko, MD
Cleveland Clinic

Radiogenomics of Multiparametric Magnetic Resonance Imaging Visible and Invisible Prostate Cancers
Philips/RSNA Research Seed Grant

Andre Uflacker, MD
University of Virginia

Treatment of Knee Osteoarthritis with Intra-arterial Particle Embolization in a Non-surgically Induced Ovine Model
RSNA Research Seed Grant

Derek Lamont West, MD
Emory University

Optimization of Electroporation-assisted Nanoparticle Uptake in a Pancreatic Nude Mouse Model
RSNA Research Seed Grant

Steven Yevich, MD, MPH

The University of Texas MD Anderson Cancer Center

Transportal Irinotecan Chemoembolization Using a Lipiodol Nano-emulsion (TICL) for the Treatment of Colorectal Liver Metastases in Rat
RSNA Research Seed Grant

RESEARCH RESIDENT/ FELLOW GRANT

Bradley D. Allen, MD

Northwestern University Feinberg School of Medicine

Cardiac MRI and PET for Early Diagnosis and Screening in Chemotherapy-induced Cardiotoxicity
RSNA Research Resident Grant

Patricia Balthazar, MD

Emory University

Disparities in the Utilization of Emergency Department Computed Tomography for Common Illnesses: An All-payer Population-based Study
RSNA Research Resident Grant

Sharath Bhagavatula, MD

*Brigham and Women's Hospital
Harvard Medical School*

Development and Characterization of a System for Real-time Photoacoustic Image Guided Percutaneous Needle Interventions
Philips/RSNA Research Resident Grant

Aadel Chaudhuri, MD, PhD

Stanford University School of Medicine

Circulating Tumor DNA Quantitation as a Prognostic Biomarker for Locally Advanced Esophageal Cancer Treated with Chemoradiation
RSNA Research Resident Grant

Lauren Colbert, MD, MSCR

The University of Texas MD Anderson Cancer Center

A Prospective Study Characterizing Genomic and Immunologic Differences Driving Variable Radiation Response within HPV-related Cervical Carcinomas
RSNA Research Resident Grant

Matthew Nicholas DeSalvo, MD

Massachusetts General Hospital

Using High Temporal Resolution Functional MRI to Correlate Directional Resting-state Functional Connectivity and Surgical Outcome in Unilateral Temporal Lobe Epilepsy
Bracco Diagnostics Inc./RSNA Research Resident Grant

Azadeh Elmi, MD

University of Pennsylvania

PET Cell Proliferation Imaging Biomarker for Combined Estrogen Receptor and Cell-cycle Targeted Breast Cancer Therapy
RSNA Research Resident Grant

Penny Fang, MD

The University of Texas MD Anderson Cancer Center

Microbiome Profile as a Predictive Biomarker for Non-small Cell Lung Cancer Response to Chemoradiation and Immunotherapy Treatment
RSNA Research Resident Grant

Soudabeh Fazeli Dehkordy, MD, MPH

University of California, San Diego

Patient Reported Outcomes for Conventional Ultrasound and Investigational Abbreviated MRI in an HCC Screening Population
Philips/RSNA Research Resident Grant

Tim Finkenstaedt, MD

University of California, San Diego

Non-invasive Assessment of Knee Cartilage and Meniscus Integrity by Magnetic Resonance Imaging with Ultra-short Echo Time (UTE) Pulse Sequences
RSNA Research Fellow Grant

John Martin Floberg, MD, PhD

*Washington University School of Medicine
in St Louis Barnes-Jewish Hospital*

Imaging Oxidative Stress in Cervical Cancer: A Potential Biomarker for Traditional and Novel Therapies

Varex Medical Systems/RSNA Research Resident Grant

Thomas F. Flood, MD, PhD

University of Colorado

The Neurological Signature of Chronic Low Back Pain: fMRI-based Biomarker Characterization in a Clinical Population

RSNA Presidents Circle Research Resident Grant

Samuel J. Galgano, MD

University of Alabama at Birmingham

Pretreatment Staging of High-risk Prostate Cancer with F-18 Fluciclovine PET/MRI
RSNA Research Fellow Grant

Peiman Habibollahi, MD

University of Pennsylvania

Glypican-3 Targeting for Catheter Directed Adoptive Immunotherapy of Hepatocellular Carcinoma
RSNA Research Fellow Grant

Thomas J. Hayman, MD, PhD*Yale University School of Medicine*

Targets for Radiosensitization of HPV-negative Head and Neck Squamous Cell Carcinoma

RSNA Research Resident Grant**Cheng William Hong, MD, MS***University of California, San Diego*

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RSNA Research Resident Grant**Amin Haghighat Jahromi, MD, PhD***University of California, San Diego*

Developing a Novel Paramagnetic Fluorinated Nanoemulsion for Sensitive Imaging of Inflammation by Fluorine-19 Magnetic Resonance Imaging

Cook Medical Cesare Gianturco/RSNA Research Resident Grant**Iman Khodarahmi, MD, PhD***Johns Hopkins University School of Medicine*

Evaluation of Hip Arthroplasty Implant Heating During Metal Artifact Reduction Sequence Magnetic Resonance Imaging

Ralph Schlaeger Charitable Foundation Research Fellow Grant**Anderson H. Kuo, MD***The University of Texas Health Science Center at San Antonio*

Cardiac Magnetic Resonance Spectroscopy for Detection of Obesity with Normal Weight: Cardiac Lipotoxicity in Intrauterine Growth Restricted Adults

RSNA Research Resident Grant**Brian S Letzen, MD***Yale University School of Medicine*

Development of an Automated Liver Imaging Reporting and Data System Using Deep Machine Learning

Philips/RSNA Research Resident Grant**Ariel E. Marciscano, MD***Johns Hopkins University School of Medicine*

Non-invasive Molecular Oncologic Imaging to Elucidate Mechanisms of Synergy Between Stereotactic Radiotherapy and Immune Checkpoint Blockade

RSNA Research Fellow Grant**Aaron W.P. Maxwell, MD***The Warren Alpert Medical School of Brown University*

Comparison of Percutaneous and Endobronchial Administration of a Novel Thermal Accelerant Agent for Augmentation of Tissue Heating During Microwave Ablation in Lung

RSNA Research Resident Grant**Ali Yusuf Mian, MD***Yale University School of Medicine*

Do In Vivo Synaptic Density Changes in the Glutamine Synthetase Inhibition Model of Epilepsy in Rats Mirror Those Seen in Living Human Epilepsy Patients Using the Novel SV2A PET Tracer C11-UCB-J?

RSNA Research Fellow Grant**Sweet Ping Ng, MBBS***The University of Texas MD Anderson Cancer Center*

Using Multi-parametric Tumor Imaging Kinetics and Circulating Tumor Cells to Predict Response in Patients with High-risk Head and Neck Cancer: Matching "Liquid Biopsy" and Quantitative Tumor Modeling

RSNA Research Fellow Grant**Sana Parsian, MD***University of Washington*

Breast MRI Background Parenchymal Enhancement: Biological Basis and Utility for Predicting Effectiveness of Chemoprevention with Selective Estrogen Receptor Modulators

RSNA Research Fellow Grant**Ravi Patel, MD, PhD***University of Wisconsin*

Utilization of Radiotherapy to Enhance the Efficacy of Systemic Dual Checkpoint Inhibition in Preclinical Metastatic Cancer Models

RSNA Research Fellow Grant**Vishal Patel, MD, PhD***University of California, Los Angeles*

Quantifying White Matter Changes in Aging and Dementia Through Sparse Encoding of Diffusion-weighted MRI of the Brain

RSNA Research Resident Grant**Syedmehti Payabvash, MD***University of California, San Francisco*

Evaluation of White Matter Connectome Changes in Children with Sensory Processing Disorders Using Edge Density Imaging

Silver Anniversary Campaign Pacesetters Research Fellow Grant**Benjamin Pulli, MD***Massachusetts General Hospital*

Multimodal Molecular Imaging Profiling of Thrombus in Acute Ischemic Stroke

Prince Research Resident Grant**Priya Rajagopalan, MBBS, MPH***Indiana University School of Medicine*

Cerebral Perfusion Alterations in Cortisol Related Gene Carriers: A Potential Alzheimer's Disease Pathway

RSNA Research Resident Grant**Andreas M. Rauschecker, MD, PhD***University of Pennsylvania*

Automated Neuroradiologic Diagnosis Using Customized Advanced Image Processing Algorithms and Bayesian Networks

RSNA Research Resident Grant**Hersh Sagreiya, MD***Stanford University School of Medicine*

Quantitative Analysis of Ovarian Cancer with Novel Molecular Ultrasound Agent BR55

RSNA Research Fellow Grant**Elizabeth Tong, MD***University of California, San Francisco*

Effects of Brain Training on Brain Network Connectivity in Pre-clinical Huntington's Disease

RSNA Research Fellow Grant**Joshua Matthew Walker, MD, PhD***Oregon Health & Science University*

Correlates of T Cell Activation in Mouse Radiotherapy Models

RSNA Research Resident Grant**Jeffrey Ware, MD***University of Pennsylvania*

Implementation and Validation of a Clinical Resting State Functional MRI Protocol for Prognostic Evaluation of Acute Brain Injury

Siemens Healthineers/RSNA Research Fellow Grant**Catherine J. Wei, MD, PhD***Beth Israel Deaconess Medical Center*

Comparing Restriction Spectrum Imaging (RSI) to Conventional and Abbreviated Breast MRI for Breast Cancer Screening

RSNA Research Resident Grant**Ye Yuan, MD, PhD***University of California, Los Angeles*

The Role of MicroRNA-34 in the DNA Damage Response and Cancer Cell Immune Evasion Via Regulation of PD-L1 After Ionizing Radiation

RSNA Research Resident Grant**Kevin Amir Zand, MD***University of Mississippi Medical Center*

Comparative Effectiveness of Noninvasive Imaging Tests for Staging Chronic Liver Disease

RSNA Research Resident Grant**RESEARCH MEDICAL STUDENT GRANT****Anup K. Bhattacharya, BA***Enrolled at Lewis Katz School of Medicine at Temple University* Research conducted at Thomas Jefferson University Hospital

Identification of a Resting State Imaging Biomarker to Predict Response to Deep Brain Stimulation in Parkinson's Disease

RSNA Research Medical Student Grant**Luke William Bonham, BS***Enrolled at Johns Hopkins University* Research conducted at University of California, San Francisco

Development of a Multi-modal Imaging Risk Gradient Score for Alzheimer's Disease Prediction

Canon U.S.A./RSNA Research Medical Student Grant**Alex K. Bryant, BS***University of California, San Diego*

Outcomes of Anal Cancer Among HIV Positive Patients in the Veterans Affairs System

RSNA Research Medical Student Grant**Evan Chen, BS***Yale University School of Medicine*

Identifying Enhancement-based Staging Markers on Baseline MR Imaging in Patients with Colorectal Cancer Liver Metastases Undergoing Loco-regional Tumor Therapy

RSNA Research Medical Student Grant**Ting-Wei Fan, BS***Keck School of Medicine of the USC*

Radiomics Evaluation of Bladder Cancer: Differentiating Transitional Cell Carcinoma From Micropapillary Carcinoma

RSNA Research Medical Student Grant**Arash Fereydooni, MS***Yale University School of Medicine*

Irinotecan-eluting LC Bead-M1 (DEBIRI-M1) for Patients with Liver Metastases From Colorectal Cancer: A Phase II Single-center Study

RSNA Research Medical Student Grant**Rosalind Gerson, MSc***Dalhousie University*

Quantification of Hepatic, Splenic, and Pancreatic Fat Fraction and R2* by 3T MR, a Cross-sectional Study

RSNA Research Medical Student Grant

Elias Taylor Gunnell, MS, BS*University of North Carolina at Chapel Hill*

Coronary Artery Calcium Scoring by Cardiac Gated-stationary Digital Tomosynthesis

RSNA Research Medical Student Grant**Syed F. Haider, BS***Icahn School of Medicine at Mount Sinai*

Predicting Outcomes Using Multimodal MRI Biomarkers in Cervical Spondylotic Myelopathy

RSNA Research Medical Student Grant**Travis R. Hallett, BA***Enrolled at Boston University School of Medicine*

Research conducted at Massachusetts General Hospital

Epicardial Adipose Tissue and High-risk Plaque Features in HIV-accelerated Coronary Artery Disease

Fujifilm Medical Systems/**RSNA Research Medical Student Grant****Jingran Ji, BA***Northwestern University Feinberg School of Medicine*

Transcatheter Bacteriolytic Therapy with Iron Oxide Labeled Clostridium novyi-NT Spores

RSNA Research Medical Student Grant**Daniel Kwon, MSc***University of British Columbia, BC Cancer Research Centre*

Matriptase as an Emerging and Promising Target for PET Imaging of Invasive Epithelial Cancers

Philips/RSNA Research Medical Student Grant**Gwendolyn Joyce McGinnis, BS***Oregon Health & Science University*

[18F]DPA-714 PET Imaging of Minocycline Treatment for Radioimmunotherapy-related Neuroinflammation and Neurocognitive Impairment

RSNA Research Medical Student Grant**Anna Sophia McKenney, PhD, MPH***Enrolled at Weill Cornell Medical College*

Research conducted at Memorial Sloan Kettering Cancer Center

Texture Feature and 4D Texture Kinetic Analyses

of Dynamic Contrast Enhanced T1 MRI Perfusion of

Pseudoprogression in Glioblastoma

RSNA Research Medical Student Grant**Ricky R. Savjani, BS***Houston Methodist Hospital and Texas A&M University*

Developing an Automated Pipeline for Functional Characterization of the Boundary of Intracranial Lesions Using Resting-state fMRI

RSNA Research Medical Student Grant**Ashley Joy Schlafstein, BA***Emory University*

Understanding and Exploiting SAMHD1 in DNA Repair for Cancer Therapy

RSNA Research Medical Student Grant**Ryan Joseph Slovak, BS***Enrolled at the University of Connecticut*
Research conducted at Yale University School of Medicine

Enhancing Immunotherapy with Combined Image Guided Cryotherapy and PD-1 Axis Inhibition in a Murine Colorectal Model

RSNA Research Medical Student Grant**Marina Stukova, BS***Enrolled at San Juan Bautista School of Medicine*

Research conducted at Johns Hopkins University

Evaluating Choline Metabolism in Vivo: Targeting GDDP5 and GDDP6 in Orthotopic Human Breast Cancer Xenograft Models

RSNA Research Medical Student Grant**Justin Sun, BS***Enrolled at Lewis Katz School of Medicine at Temple University*

Research conducted at University of California, San Diego

Evaluation of Quantitative Cardiac Function and Volumes with Single Breath-hold Volumetric Cardiac MRI and Deep Learning Segmentation

RSNA Research Medical Student Grant**Jose Viramontes, BS***The University of Texas Health Science Center at Houston, McGovern Medical School*

Optimization of Electroporation-assisted Nanoparticle Uptake in a Pancreatic Nude Mouse Model

RSNA Research Medical Student Grant**Noah Wasserman, BA***Washington University in St Louis*
Mallinckrodt Institute of Radiology

Radiomics of Immune Checkpoint Therapy

RSNA Research Medical Student Grant**Jacob F. Wynne, BS***Emory University*

The Role of SIRT2 and its Inhibitors in the DNA Damage Response and the Treatment of BRCA1-associated Malignancies

RSNA Research Medical Student Grant**Annie Xiao, BS***University of Chicago*

Quantitative T1/T2 Mapping of Salivary Gland Tumors: MRI Correlation with Histopathological Features of Cellularity and Malignancy

RSNA Research Medical Student Grant**Minerva Zhou, BS***Washington University in St Louis*
Mallinckrodt Institute of Radiology

Simulating Methods of Care Delivery to Assess Patient-centered Outcomes in Acute Ischemic Stroke

RSNA Research Medical Student Grant**Andrew Zureick, BA***Enrolled at University of Michigan*
Research conducted at Massachusetts General Hospital

Partial Brain vs. Craniospinal Irradiation for Posterior Fossa Tumors: Using Quantitative MRI Analysis to Predict Adverse Neurocognitive Effects and Late Radiation-induced Changes

Canon U.S.A./RSNA**Research Medical Student Grant****EDUCATION SCHOLAR GRANT****Andres R. Ayoob, MD***University of Kentucky*Development of a Web-based Curriculum to Prepare Diagnostic Radiology Residents During their Post-graduate Year 1 by Promoting Learning via Retrieval Practice and Spaced Repetition
Philips/RSNA Education Scholar Grant**Kathryn E. Darras, MD***University of British Columbia*Technology-Enhanced Undergraduate Anatomy Education: Development of a Blended Curriculum for Digital Dissection
RSNA Education Scholar Grant**Richard Duszak, MD***Emory University*

Radiology Economics and Policy Learning Electronic Toolkit (REPLET)

GE Healthcare/RSNA Education Scholar Grant**Erin Gillespie, MD***University of California, San Diego*

eContour 2.0: Simulation-based Education to Eliminate the Quality Gap in Radiation Oncology

RSNA Education Scholar Grant**Evguenia Jane Karimova, MD***Beth Israel Deaconess Medical Center*

Simulation-based Teaching of Screening Mammography Using Deliberate Practice on Cancer Enriched Case Sets

RSNA Education Scholar Grant**Jennifer L. Nicholas, MD, MHA***Washington University in St Louis*
Mallinckrodt Institute of Radiology

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

AUR/RSNA Education Scholar Grant**Monica Majmundar Sheth, MD***Hofstra Northwell School of Medicine*Bridging the Gap Between Residency Training and Clinical Practice: The Development of Entrustable Professional Activities for Breast Imaging (EPA-BR), EPA-BR Based Curriculum and Self-assessment Modules
RSNA Education Scholar Grant**Kofoworola O. Soyebi, MBChB***University of Lagos, Idi-Araba, Lagos, Nigeria*

Capacity Building in Prevention of Sickle Cell Disorder Related Stroke in Nigerian Children

Derek Harwood-Nash Education Scholar Grant**Marc H. Willis, DO***Baylor College of Medicine*

Technology Enhanced Learning: Medical Student Education Simulation Utilizing Clinical Decision Support (Teaching Medical Students to Select the 'Right Test' at the 'Right Time' for the 'Right Reason')

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RSNA R&E Foundation Announces Recipients of the 2017 Roentgen Resident/Fellow Research Award

The RSNA Research & Education (R&E) Foundation presented the 2017 Roentgen Resident/Fellow Research Award to 183 residents and fellows throughout North America. This prestigious and competitive award recognizes trainees who have made significant contributions to their departments' research efforts as evidenced by

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- ▶ Publication of scientific papers in peer-reviewed journals
- ▶ Receipt of a research grant or contributions to the success of a research program within the department
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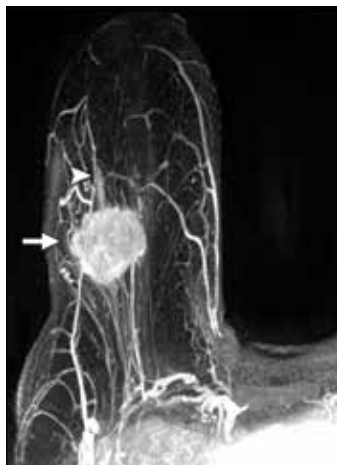
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Journal Highlights

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

Imaging Neoadjuvant Therapy Response in Breast Cancer



Images in a 57-year-old woman with newly diagnosed clinical stage IIA (T2NOMO) right breast cancer. Histologic results were grade 3, ER-negative, PR-negative, HER2-nonamplified invasive ductal carcinoma with extensive necrosis. Maximum intensity projection from contrast material-enhanced breast MRI performed prior to neoadjuvant chemotherapy demonstrates 3.3-cm irregular right breast mass with rim enhancement (arrow) and 1.8 cm of linear nonmass enhancement extending anterior to the mass (arrowhead).

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Studies of neoadjuvant therapy for breast cancer have used a variety of methods for assessing tumor response. Currently, there are no established clinical practice guidelines for how best to assess tumor response to neoadjuvant therapy. Typically, patients undergo conventional breast imaging (mammography and ultrasonography) and physical examination.

In an article published online in the October issue of *Radiology* (RSNA.org/Radiology), Amy M. Fowler, MD, PhD, University of Wisconsin School of Medicine and Public Health, Madison, WI, and colleagues present the advantages and limitations of current assessment methods and the functional and molecular imaging modalities being investigated as emerging techniques for evaluating neoadjuvant therapy response for patients with localized, nonmetastatic primary breast cancer.

Radiology

Current methods reviewed include physical examination, conventional breast imaging with mammography, contrast-enhanced MR imaging and US.

Functional and molecular imaging techniques discussed include dynamic contrast enhanced perfusion MRI, diffusion weighted MRI, MR spectroscopy, 2-Deoxy-2-Fluoroglucose Positron Emission Tomography (PET) imaging, 3'-Deoxy-3'-Fluorothymidine PET imaging, imaging amino acid metabolism, C-choline PET imaging, and PET imaging of tumor blood flow and metabolism.

Prospective, response-guided clinical trials are needed to demonstrate that the use of functional and molecular imaging to guide neoadjuvant therapy management improves patient outcomes before widespread clinical adoption can occur, the authors write.

"We anticipate that advances in the field of radiogenomics, which links imaging phenotypes to tumor gene expression patterns, will help elucidate the most clinically useful imaging approach to assess neoadjuvant therapy response for breast cancer patients," Dr. Fowler said. "Thus, an emerging paradigm of precision imaging is an important tool to fully realize the goal of precision medicine," 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 2017 Sessions

"Publishing in *Radiology*: Understanding and Using the STARD and PRISMA Guidelines," will be the focus of an RSNA 2017 session on Wednesday, Nov. 29.

Radiology Editor Herbert Y. Kressel, MD, (pictured, right) will provide the introduction for a session focusing on the Standards for Reporting Diagnostic Accuracy (STARD) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for journal submissions. Dr. Kressel and other presents will discuss the importance of quality improvement initiatives in disseminating published research in journals such as *Radiology*.

RadioGraphics Editor Jeffrey S. Klein, MD, will present, "Reviewing for *RadioGraphics*," from 9 to 9:45 a.m., Sunday, Nov. 26. Dr. Klein will discuss how peer reviewers are chosen and evaluated and will review a *RadioGraphics* mentoring program for senior radiology residents and fellows.

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



Learn about RSNA Journals at RSNA 2017

Check out RSNA's print, online and mobile publications and learn about unique online features at the Membership & Resources booth in the Connections Center at RSNA 2017. Staff will be available to assistant attendees with any journal-related customer service inquiries.

Central Nervous System Effects of Intrauterine Zika Virus Infection: A Pictorial Review

Distinct imaging modalities may be used to better evaluate the different brain abnormalities associated with congenital Zika virus infection according to an online article in the October Special Issue of *RadioGraphics* (RSNA.org/RadioGraphics).

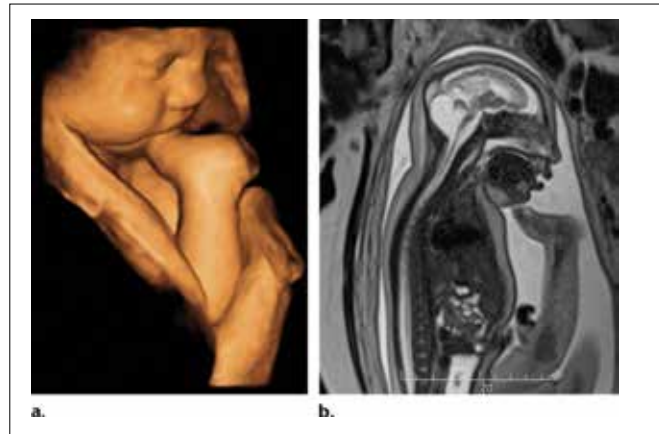
Bianca Guedes Ribeiro, MD, from the Clínica de Diagnóstico por Imagem, Rio de Janeiro, and colleagues discuss the prenatal and postnatal neurologic imaging findings of congenital Zika virus infection.

Brain abnormalities related to Zika virus infection may be primarily observed with prenatal ultrasound (US), especially in the third trimester of pregnancy. Measurement of the head circumference is one of the main tools to detect microcephaly. Ultrasound is able to easily demonstrate abnormalities including brain calcifications, cerebral atrophy, posterior fossa and corpus callosum abnormalities, ventriculomegaly and to depict craniofacial disproportion and microphthalmia.

RadioGraphics Fetal MRI improves the identification of brain malformations such as cerebral atrophy, ventriculomegaly and microphthalmia and may be performed when abnormalities such as microcephaly and calcifications are depicted at fetal US.

Transfontanelar US remains, in the authors' opinions, the best first screening method to evaluate newborns exposed to the Zika virus. After birth, CT may also be performed to improve the evaluation of microcalcifications.

"Because Zika virus infection is a new entity, the application of different imaging modalities, such as CT and MR imaging, to evaluate and follow up infected patients may uncover previously unknown information about the disease and its consequences," the author write.



Arthrogyposis and microcephaly in a 37-week fetus with congenital Zika virus infection acquired in the first trimester of gestation of a 21-year-old mother. (a) Three-dimensional fetal reconstruction MR image shows joint contractures. (b) Sagittal T2-weighted MR image shows microcephaly with cortical atrophy, posterior fossa abnormalities with cerebellar hypoplasia, and absence of the vermis. A thin brainstem is also depicted.

(*RadioGraphics* 2017); 37;6:1840-1850) © RSNA 2017. All rights reserved. Printed with permission.

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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.

- ▶ "Detection of Clinically Significant Prostate Cancer: Short Dual-Pulse Sequence versus Standard Multiparametric MR Imaging — A Multireader Study," Borna K. Barth, MD, and colleagues.
- ▶ "Utilization Management of High-Cost Imaging in an Outpatient Setting in a Large Stable Patient and Provider Cohort over 7 Years," Jeffrey B. Weilburg, MD.
- ▶ "High-Intensity Focused Ultrasound for Treatment of Symptomatic Benign Thyroid Nodules: A Prospective Study," Brian Hung-Hin Lang, MS.

Radiology
PODCASTS



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

- ▶ "Central Nervous System Effects of Intrauterine Zika Virus Infection: A Pictorial Review," Bianca Guedes Ribeiro, MD, and colleagues.
- ▶ "Clinical PET Imaging in Prostate Cancer," Kathryn L. Wallitt, MBBS, BSc, and colleagues.
- ▶ "Decreasing Stroke Code to CT Time in Patients Presenting with Stroke Symptoms," Aleksandrs Kalnins, MD, MBA, and colleagues.

RadioGraphics
PODCASTS

Radiology in Public Focus

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

MRI Reveals Striking Brain Differences in People with Genetic Autism

In the first major study of its kind, researchers using MRI have identified structural abnormalities in the brains of people with one of the most common genetic causes of autism, according to a new study in *Radiology*.

Autism spectrum disorders affect more than 3.5 million people in the U.S., according to the Centers for Disease Control and Prevention. Many people with autism have abnormalities at a specific site on the 16th chromosome known as 16p11.2. Deletion or duplication of a small piece of chromosome at this site is one of the most common genetic causes of autism spectrum disorder.

“People with deletions tend to have brain overgrowth, developmental delays and a higher risk of obesity,” said study author Julia P. Owen, PhD, a brain researcher at the University of Washington in Seattle, who was at the University of California in San Francisco (UCSF) during the study. “Those with duplications are born with smaller brains and tend to have lower body weight and developmental delays.”

Researchers at UCSF and four other sites performed structural MRI exams on 79 deletion carriers, ranging in age from 1 to 48, and 79 duplication carriers, ages 1 to 63, along with 64 unaffected family members and 109 participants in a control group. Researchers used unsupervised machine learning to cluster radiologic features. An association between clusters and cognitive and behavioral scores from IQ testing and parental measures of development were tested by using analysis of covariance. Volumetric analysis with automated segmentation was used to confirm radiologic interpretation.

Participants completed a battery of cognitive and behavioral tests, and neuroradiologists reviewed the brain images for development-related abnormalities. The results showed some striking differences in

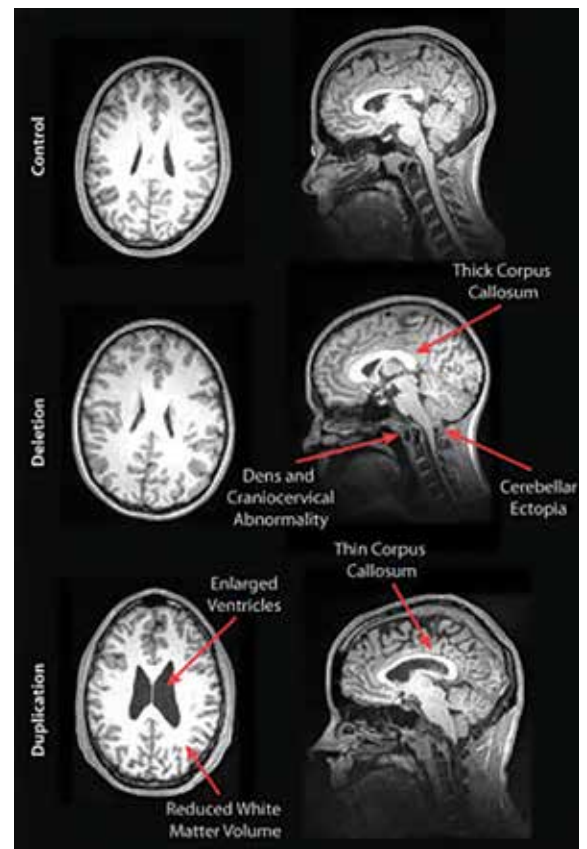
the brain structures of deletion and duplication carriers compared with non-carriers. For instance, the corpus callosum was abnormally shaped and thicker in the deletion carriers but thinner in the duplication carriers, compared to the control group and familial non-carriers. The deletion carriers displayed features of brain overgrowth, including the extension of the cerebellum toward the spinal cord. The duplication carriers showed characteristics of brain undergrowth, such as decreased white matter volume and larger ventricles.

When the researchers compared cognitive assessments to imaging findings, they discovered that the presence of any imaging feature associated with the deletion carriers — such as a thicker corpus callosum — indicated worse daily living, communication and social skills compared to deletion carriers without any radiologic abnormalities. For the duplication carriers, the presence of decreased white matter and corpus callosal volume and increased ventricle size was associated with decreased full-scale and verbal IQ scores, compared to duplication carriers without those findings.

The identification of the radiologic features associated with cognitive and behavioral deficits may inform neurologists who see 16p11.2 CNV carriers in a clinical setting, according to researchers.

WEB EXTRAS

Access the *Radiology* study, “Brain MR Imaging Findings and Associated Outcomes in Carriers of the Reciprocal Copy Number Variation at 16p11.2,” at RSNA.org/Radiology.



Example images for a control participant, a deletion carrier, and a duplication carrier. In the sagittal image of the deletion carrier, the thick corpus callosum, dens and craniocervical abnormality, and cerebellar ectopia are shown. For the duplication carrier, the sagittal image shows the thin corpus callosum and the axial image shows the increased ventricle size and decreased white matter volume.

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Public Information Activities Focus on Lung Cancer Awareness

In recognition of 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 lung cancer.

Brain Disconnections May Contribute to Parkinson's Hallucinations

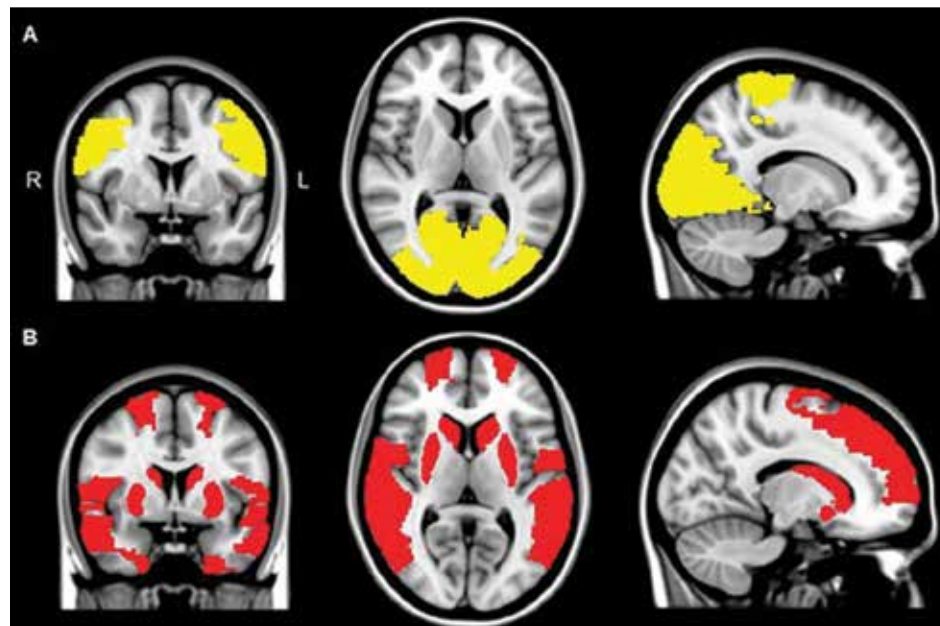
Researchers have found that disconnections of brain areas involved in attention and visual processing may contribute to visual hallucinations in individuals with Parkinson's disease, according to new *Radiology* research.

The disconnected brain areas seen on functional MRI (fMRI) may be valuable in predicting the development of visual hallucinations in patients with Parkinson's disease, according to research by Dagmar H. Hepp, MD, of the Department of Neurology and the Department of Anatomy and Neurosciences at VU University Medical Center (VUMC) in Amsterdam, the Netherlands, and colleagues.

Studies using fMRI to investigate visual hallucinations in patients with Parkinson's disease are rare and have been mainly limited to task-based methods using activities that involve visual stimulation or cognitive tasks. However, the authors note that the presence of visual hallucinations is strongly linked to the development of cognitive decline in patients with Parkinson's disease.

"Visual hallucinations in Parkinson's disease are frequent and debilitating," Dr. Hepp said. "Our aim was to study the mechanism underlying visual hallucinations in Parkinson's disease, as these symptoms are currently poorly understood."

Researchers used resting-state fMRI to examine the connectivity between brain areas. The connectivity was measured in 15 patients with visual hallucinations, 40 patients without visual hallucinations, and



15 healthy controls by calculating the level of synchronization between activation patterns of different brain areas.

The results showed that in all the patients with Parkinson's disease, multiple brain areas communicated less with the rest of the brain as compared to the control group. However, in patients experiencing visual hallucinations, several additional brain areas showed this decreased connectivity with the rest of the brain — especially in areas that are important in maintaining attention and processing of visual information. The study authors suggest that this disconnection of these brain areas may contribute to the generation of visual hallucinations in patients with Parkinson's disease.

While there are no direct therapeutic implications for patient care based on the research, the authors note that future studies could indicate whether techniques that could stimulate the areas with

MR images show reduced regional functional connectivity in, A, Parkinson's disease (PD) patients and, B, exclusively in PD + visual hallucinations (VH) patients. Regional functional connectivity analysis revealed lower functional connectivity in PD + VH as well as PD – VH patients compared with control participants in paracentral and occipital regions (yellow areas in A; $P < .05$, corrected for multiple comparisons). Functional connectivity in frontal, temporal, and subcortical regions was exclusively lower in patients with PD + VH compared with control participants (red areas in B; $P < .05$, corrected for multiple comparisons).

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decreased connectivity could be helpful to treat visual hallucinations in people with Parkinson's disease.

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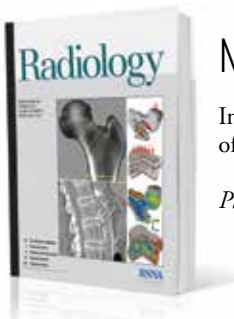
📄 Access the *Radiology* study, "Loss of Functional Connectivity in Patients with Parkinson Disease and Visual Hallucinations," at RSNA.org/Radiology.

New Videos in Spanish on *RadiologyInfo.org*

RadiologyInfo.org, the public information website produced by RSNA and ACR, recently expanded its video section with new Spanish-language videos describing various imaging procedures, including:

- Pediatric:
- Computed tomography (CT)
- Nuclear medicine
- Ultrasound
- MRI

RadiologyInfo.org
For patients



Media Coverage of RSNA

In July, 1,040 RSNA-related news stories were tracked in the media. These stories had an estimated audience reach of 594 million.

Coverage included *U.S. News & World Report*, *The Washington Post*, *Houston Chronicle*, KDKA-TV (Pittsburgh), *Philly.com*, *HealthDay*, *WebMD*, *Reuters*, *Auntminnie.com*, *DOTmed Business News* and *Diagnostic Imaging*.

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