



## RSNA Image Contest Winners Draw on Unique Inspirations

### ALSO INSIDE:

**LOOK AHEAD:** The Economics of Imaging  
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The Role of RVUs in Radiology Reimbursement  
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**FEATURES**



**4** | **LOOK AHEAD:**  
The Economics of Imaging



**7** | Virtual Autopsy Connects Radiology and Forensics/Virtual Reality Devices are Promising



**9** | RSNA Image Contest Winners Draw on Unique Inspirations



**11** | RSNA Grant Funds RF Tumor Ablation Research



**13** | Radiology Workload Outpacing Reimbursement/The Role of RVUs in Calculating Billing

**UP FRONT**

- 1** First Impression
- 1** Numbers in the News
- 3** RSNA Board of Directors Report

**RADIOLOGY'S FUTURE**

- 15** R&E Foundation Donors

**NEWS YOU CAN USE**

- 18** Radiology in Public Focus
- 19** Journal Highlights
- 21** Education and Funding Opportunities
- 23** Value of Membership
- 23** Annual Meeting Watch
- 24** *RSNA.org*

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# RSNA Launches Spotlight Course for International Members

In an effort to better serve its international members with educational opportunities, RSNA will launch its first Spotlight Course this summer in Cancún, Mexico. The RSNA Spotlight Course, “Radiología de Urgencias: Curso Interactivo con Casos” (“Emergency Radiology: Interactive Course with Cases”), will be held June 2-4 at the Grand Fiesta Americana Coral Beach Cancún Resort & Spa.

The course supports RSNA’s goal to provide quality education on important medical imaging issues in different regions of the world. Emergency radiology was selected based on an assessment of the educational needs of RSNA members in Latin America.

During the 2 ½-day program presented entirely in Spanish, participants will explore the use of emergency radiology as part of daily practice. The course will include general and breakout sessions, Cases of the Day, and interactive RSNA Diagnosis Live™ sessions, and will offer credits for CME.

Presented under the direction of Jorge Soto, M.D., of Boston University School of Medicine, and Guillermo Elizondo Riojas, M.D., Ph.D., of the University of Nuevo Leon in Monterrey, Mexico, the course will be taught by renowned radiology leaders, including instructors from Latin America, who will discuss issues of special relevance to the region.

“This Spotlight Course was designed to provide a high-level update on various aspects of one of the fastest growing fields in radiology: emergency imaging,” Dr. Soto said. “The need for 24-hour on-site coverage or off-site interpretations by well-trained radiologists is now commonplace in emergency centers throughout the world. The format of the course, with small group workshops and lectures with audience response, is well suited to allow the attendees to interact closely with the faculty.”

“This course addresses an important and broad topic, with both plenary sessions and small group workshops, using interactive tools and activities,” Dr. Riojas said. “The professors are among the best Spanish-speaking lecturers and the location is ideal.”

For more information, go to [RSNA.org/Spotlight](http://RSNA.org/Spotlight).



Riojas



Soto

# RSNA Announces Travel Award Program for Annual Meeting

RSNA has created a Travel Award program for young investigators to help defray costs of attending the RSNA annual meeting, beginning with RSNA 2016.

“The RSNA Board of Directors is excited to be able to offset a portion of travel expenses in order to ensure that the absolute top quality of imaging science is presented at our venue,” said Matthew A. Mauro, M.D., RSNA Board of Directors liaison for information technology and annual meeting.

The program will offer \$500 awards to the top 400 young investigators whose papers have been accepted for presentation. At the time of abstract submission, potential recipients must be:

- Currently 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.

Potential recipients must also be current RSNA members and the first author and intended presenter of the submitted abstract. Candidates who have been awarded stipends in the three previous years will not be considered. Full details and eligibility requirements are available with the 2016 call for abstracts at [RSNA.org/AnnualMeeting](http://RSNA.org/AnnualMeeting).



Mauro

## Numbers in the News

# 604

The number of entries for the RSNA 2015 Image Contest—more than triple the number received during RSNA 2014. Read more about the winners in four categories—Radiology Art, Most Unusual Case, Best Medical Image and Best Photo—on [Page 9](#).

# 40,000

Number of pledges received as of mid-January by the Image Wisely® campaign to increase awareness about adult radiation protection. Read further updates to the RSNA, the American College of Radiology, the American Association of Physicists in Medicine and the American Society of Radiologic Technologists campaign at [Imagewisely.org](http://Imagewisely.org).

# 1.2

Number, in billions of U.S. dollars, radiologists have lost in payments between 2006-2013 in part due to adjustments to the relative value unit (RVU) system. Read more about the impact and history of RVUs on [Page 13](#).

# 15

The number of young academics recommended for the RSNA Introduction to International Academics (IRIYA) program offered each year at the RSNA annual meeting. Read more on [Page 22](#).

# AAWA Presents Honors During RSNA 2015

The American Association for Women Radiologists (AAWR) announced its 2015 award recipients during RSNA 2015:



Applegate



Lam



Favinger



Sadigh

Kimberly E. Applegate, M.D., M.S., received the Marie Skłodowska-Curie Award.

Miranda (Kim) Lam, M.D., M.B.A., was honored with the Eleanor Montague Distinguished Resident Award in Radiation Oncology.

The Lucy Frank Squire Distinguished Award in Diagnostic Radiology was presented to Jennifer L. Favinger, M.D., and Gelareh Sadigh, M.D., a member of the RSNA Resident and Fellow Committee.

Go to [RSNA.org/News](http://RSNA.org/News) for full biographies of the award winners.

## RSNA, SPR Team up for JPR Annual Meeting in Brazil

RSNA is continuing its partnership with the Radiological and Diagnostic Imaging Society of São Paulo (SPR) to sponsor the 46<sup>th</sup> Jornada Paulista de Radiologia (JPR) meeting to be held April 28 to May 1 in São Paulo, Brazil.

RSNA began partnering with SPR at JPR 2014 to help develop the meeting's education program, and will continue in that role at JPR 2016 and JPR 2018.

"RSNA is proud to partner with SPR to present JPR 2016, the largest meeting of diagnostic imaging in Latin America," said Valerie P. Jackson, M.D., RSNA Board of Directors liaison for education, and co-chair of the JPR Program Planning Committee. "Our joint partnership is the basis for a strong educational program that supports development of the radiology discipline and provides training internationally. RSNA has worked closely with SPR to plan meeting content, provide speakers, and develop materials and courses not typically offered at JPR. We look forward to collaborating with SPR to bring unique opportunities to radiologists in Brazil."

Thirty-five RSNA speakers, including four members of the 2016 RSNA Board of Directors, are scheduled to lecture throughout the meeting.

JPR is expected to draw more than 20,000 total attendees and 110 companies. For more information, go to [JPR2016.org.br/en/](http://JPR2016.org.br/en/).

## Mahoney Named Chair of UC Radiology

An accomplished breast imager and staunch advocate of patient-centered radiology, **Mary C. Mahoney, M.D., F.A.C.R.**, has been named Ben Felson Endowed Chair and Professor of Radiology at the University of Cincinnati (UC). Dr. Mahoney has served as interim chair since August 2014 as well as being a professor in the department and the Eugene L. and Sue R. Saenger Chair of Radiological Services. Dr. Mahoney is also the director for the Breast Imaging Fellowship at UC Medical Center.



Mahoney

The current RSNA Board of Directors Liaison for Publications and Communications, Dr. Mahoney previously served on and chaired RSNA's Public Information Committee and the Patient-centered Radiology Steering Committee, and was a driving force behind the launch of the Society's Radiology Cares campaign. She also served on the RSNA Research & Education (R&E) Foundation Public Relations Committee. Dr. Mahoney is on the Board of Governors of the American Board of Radiology.

### IN MEMORIAM

#### Herbert L. Abrams, M.D.



Internationally renowned radiologist and past RSNA Gold Medal honoree Herbert L. Abrams, M.D., died Jan. 20 at his home in Palo Alto, California. He was 95.

Born in 1920 in New York, Dr. Abrams graduated from Cornell University in 1941 and earned his medical degree from Long Island College of Medicine in 1946. Dr. Abrams completed a residency in radiology at Stanford University in 1952 and joined the faculty as an assistant professor in the department in 1954.

In 1967, Dr. Abrams became the Philip H. Cook Professor of Radiology at Harvard Medical School and radiologist-in-chief at Brigham and Women's Hospital and the Dana Farber Cancer Center. He returned to Stanford in 1985 as professor of radiology and rose to become director of diagnostic radiology.

During the 1980s, Dr. Abrams developed an interest in ionizing radiation and nuclear weapons, leading to his career as an anti-nuclear activist. He became founding vice-president of the International Physicians for the Prevention of Nuclear War, which received the Nobel Peace Prize in 1985. Dr. Abrams earned an international reputation as an authority on cardiovascular radiology as well as a prolific author, editor and researcher for numerous scientific journals.

Dr. Abrams received the RSNA Gold Medal in 1995.

# RSNA Board of Directors Report

*The RSNA Board of Directors met at RSNA 2015 to assess accomplishments of the year, review the reports and updates of volunteer committees, and plan for the future.*

## RSNA 2015 Turned Toward the Future

The year-long celebration of the 100<sup>th</sup> anniversary of the Society's founding concluded at RSNA 2015 with an eye on the future of medical imaging. The Centennial Showcase was updated to include some of the latest technological advances such as 3-D printing, virtual reality and personalized medicine.

Close to 52,000 people attended the meeting, including virtual meeting participants. Professional attendees could choose from 1,728 scientific presentations, 444 education courses, six plenary sessions, 1,762 education exhibits and 921 scientific posters. The technical exhibit floors included 659 exhibits.

## RSNA 2016 Looks Beyond Imaging

Plans are underway for RSNA 2016, with exciting new sessions designed to push radiologists to think "Beyond Imaging," recognizing the larger role they play in the healthcare landscape.

RSNA will partner with other societies including the Society of Abdominal Imaging (SAR), the French Society of Abdominal Imaging (SIAD), the Korean Society of Abdominal Radiology (KSAR) and the Japanese Society of Abdominal Imaging (JSAI) to develop a symposium addressing new topics in liver imaging held on Friday, December 2.

## Collaboration for Educational Excellence

RSNA and AAPM have collaborated to produce 45 online physics modules designed to educate radiologists and radiology residents on important concepts in physics. These modules have logged over 100,000 completions since they were first made available in 2009. RSNA and AAPM are working together to ensure the modules provide the most current information. Teams from participating radiology departments, each led by one physicist and one diagnostic radiologist, will each review and update one of the modules. The modules will be updated over the next five years, with a goal to complete nine of the total 45 modules each year. Both organizations will provide honoraria to be paid to academic departments that review and update the modules.



**Rao**

The Board approved a new process to allow inclusion of late-breaking, high-impact clinical trials in the annual meeting program. The process will provide a mechanism for important findings to be presented at the meeting, even if results become available after the close of the standard abstract submission period. Qualifying abstracts will be peer-reviewed by a multi-disciplinary subcommittee. Up to three studies will be presented in a dedicated Special Interest Session allowing for longer, more in-depth presentations than are possible in the traditional format. Authors of the selected abstracts will also be invited to request fast-track consideration by *Radiology*. Studies will be evaluated independently for inclusion in the journal.

## Radiology Seeks new Editor

Herbert Y. Kressel, M.D., has announced he will leave his post of *Radiology* editor at the end of 2017, and the Board appointed a search committee to begin the process of finding a new editor to succeed him. The committee, led by Mary C. Mahoney, M.D., Board liaison for publications and communications, will conduct interviews with the goal of having a final selection made at RSNA 2016.

Applications for the position are due by April 1, 2016. More information about the search process is available on page 20 and at [RSNA.org/Radiology](http://RSNA.org/Radiology).

I am happy to report RSNA remains strong with over 54,000 members. The entire Board of Directors and I look forward to a successful 2016.

**VIJAY M. RAO, M.D.**

*Chair*

RSNA Board of Directors

## THIS MONTH IN THE RSNA NEWS ONLINE VERSION

Get more of this month's news at [RSNA.org/News](http://RSNA.org/News). Enjoy interactive features including video, audio, slide presentations and more. Go online to leave us a comment and easily share stories via social media as well.

As part of this month's cover story on the RSNA 2015 Image Contest, we invite readers to view the winning entries and check out all contest submissions on the RSNA Centennial Website at [RSNA.org/Centennial](http://RSNA.org/Centennial).



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# LOOK AHEAD

## *The Economics of Imaging*

BY GERALDINE MCGINTY, M.D., M.B.A.

At best, the economics of imaging in the U.S. have afforded our patients access to technology that has saved millions of lives and improved the health of many more. At worst, misaligned incentives around imaging payment have either failed to improve the lives of our patients or may have even harmed them. Overall the benefits of imaging have far outweighed any downsides, but if payment policy can shape care delivery then let us use that power for good.

In 2016 we, as radiologists, find ourselves with a unique opportunity to reset the payment system for imaging, and I am confident that we will leverage it to the benefit of our patients and our profession.

With the passage of the MACRA (Medicare Access and CHIP Reauthorization Act of 2015) legislation, physicians will see first a stabilization of their Medicare payments followed, starting in 2018, by an accelerated transition to value-based payments. Lest this seem far in the future, it is worth pointing out that the period of measurement for 2018 has already started, so this is not something we can file under “future projects.” Medicare represents a significant payer for most radiologists and tends to inform policy for other payers.

By 2022 a radiologist who practices in an entirely fee-for-service environment will be at risk for up to 9 percent of her Medicare payments, either as a bonus or a penalty. The metrics that will be used to determine her performance will be contained within a new program called Merit Based Incentive Payment System (MIPS) that will roll up all existing Medicare pay for performance programs such as Physician Quality Reporting System (PQRS), Meaningful Use (MU) and the Value-Based Payment Modifier (VM), and will debut a new category of value-based payments for clinical practice improvement. A radiologist who practices within an alternative payment model (APM) such as an accountable care organization (ACO) will be rewarded differently. She will receive a bonus of 5 percent assuming she and her organization meet a certain set of quality metrics. In addition, the yearly payment increases that Medicare applies will be three times higher for the APM radiologist (0.75 percent annually) than for the fee-for-service radiologist (0.25 percent). While this new payment system seems designed to drive more physicians into alternative payment models, the MIPS pathway will be more relevant for many radiologists.

### **Collaboration with CMS is a Must**

Almost six years after President Obama signed the Affordable Care Act into law, most radiologists remain in a fee-for-service environment. Even those who practice within ACOs are still typically compensated and often incentivized on the volume of imaging they interpret. The current pay-for-performance programs are clunky (i.e., PQRS), poorly applicable to radiologists (i.e., MU), or they hold radiologists account-



McGinty

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### **GERALDINE MCGINTY, M.D., M.B.A.,**

is a member of the Department of Radiology at Weill Cornell Medicine, New York, and a nationally recognized expert in healthcare economics who frequently speaks on that topic at RSNA annual meetings. She serves as Chair of the American College of Radiology's Commission on Economics.



able for spending that they do not control (i.e., VM). For many radiologists the promise of healthcare reform—to improve population health and the experience of care at lower cost—has meant reimbursement cuts and not much else. Despite our best efforts to argue otherwise, imaging has been an easy scapegoat for rapidly rising healthcare costs and the axe has fallen repeatedly. Those radiologists who have focused exclusively on preserving their fee-for-service reimbursement have been presented with other disruptions and challenges. They have cut themselves off from the other members of the care team, and their perceived value has shrunk to a written report. Thus commoditized, we can easily be replaced and many have either been displaced or disadvantaged by the incursion of national teleradiology companies.

There is no doubt that the implementation of the MIPS program will be imperfect. But the Centers for Medicare and Medicaid Services (CMS) has been clear that it cannot craft this program without the help of physicians, presenting an opportunity that we cannot afford to squander. We must use this request for collaboration to try to improve the existing programs. In order to improve population health, we need to develop metrics that can establish standard care pathways, measuring what achieves better outcomes, not just what is easy to measure.

The VM has been particularly frustrating as it measures physicians on the spending that is associated with the care they provide. This is a very blunt measure, and it is especially unfair to radiologists who typically do not decide what type or how much imaging to perform. CMS has indicated a willingness to be more creative about how this measure is calculated. There are several areas where we can measure ourselves against benchmarks to ensure the most cost-effective care. For example, the implementation of

clinical decision support for advanced imaging — originally scheduled for 2017 but now probably delayed until 2018 — provides a way for radiologists to be accountable for imaging utilization.

### Reinforcing the Value of Radiology

The Clinical Practice Improvement (CPI) category of MIPS is particularly interesting because CMS has specified that it wants to see metrics that promote patient access, engagement, care coordination and safety as well as population management. For the past three years I have been part of a growing community of radiologists who have begun to tell a different story about who we are as a profession and how we need to engage with our patients. This movement — including campaigns such as Radiology Cares™ and Imaging 3.0® — has energized and engaged a grassroots group of passionate imaging physicians. Academics and private practitioners, rural and urban, have rejected the notion that we are a commodity because we know the value we deliver and we know the value of connecting more deeply with our patients.

We can learn from radiologists like Jennifer Kemp, M.D., former chair of RSNA's Patient-centered Radiology Steering Committee, who gives her patients a direct phone number to the reading room, and Sabiha Raoof, M.D., Jamaica Hospital Medical Center and Flushing Hospital Medical Center Radiology Department Chair, who conducts multidisciplinary patient rounds to improve the patient experience. The team at Indiana University has worked to create an image sharing network across the state to reduce repeat imaging and improve care. There is a wealth of these stories that can inform payment policy, and our patients and our profession will benefit.

Perhaps most importantly we need to include the voice



of our patients. The profession is already addressing this through the American College of Radiology's new Commission on Patient and Family Centered Care, which includes patients on every committee, and through programs like Radiology Cares and Imaging 3.0. The idea that we will design payment policy to meet the needs of our patients should not seem radical, but unfortunately in the context of our existing healthcare delivery infrastructure it is. I am proud that our specialty is engaging with the beneficiaries of the care we deliver to make sure that our goals and incentives are aligned.

I am not naïve to think that our work will be short-term. The process of developing relevant and outcomes-driven metrics will be an ongoing challenge. Developing and maintaining the library of appropriate use criteria that underpin the clinical decision support (CDS) process has already required countless volunteer hours, and this will only multiply as we embed CDS into the Medicare program. A data-driven healthcare system will require doing the research to justify the value of new services if we want them to be reimbursed. The clear mortality benefit of lung cancer screening with low dose CT demonstrated by the National Lung Screening Trial was critical to CMS' decision to cover the service. Unfortunately we cannot assume that services already covered will continue to be available to our patients. The ongoing attacks on mammography screening are proof of that.

But as I look ahead I anticipate that, properly designed, imaging payment policy can incentivize radiologists to be fully engaged as stewards of appropriate imaging and collaborate actively not only with the rest of the care team but also with patients. Ideally, reimbursement will drive more patients toward life-saving screening and away from imaging that will not benefit them. Payment policy must support technology innovation as well as productivity and accessibility gains that we cannot even imagine yet. We must preserve the good of fee for service while taking full responsibility for the delivery of high-value imaging care to our patients, and effective payment policy can be a catalyst for that goal.

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#### Editor's note

Read more about the economics of radiology on Pages 13 and 14.



## RSNA, ACR Resources Foster Deeper Connections with Patients

In the shift away from a fee-for-service reimbursement model, radiologists will need to put the concepts of patient-centeredness and value vs. volume into practice. To that end, RSNA has established the resource-rich program, Radiology Cares™, featuring a wide variety of resources to help imaging professionals bring the patient-centered concept to their practice.

Radiology Cares ([RadiologyCares.org](http://RadiologyCares.org)) offers online toolkits stocked with the resources radiologists need to build a modern practice focused on high-value, patient-centered care—including educational materials, case studies, videos and more. Visitors can also explore the Radiology Cares Caring Quilt (see above) featuring a “patchwork” of messages of thanks from patients to radiologists or radiologic technologists who made a difference in that patient's life.

Imaging 3.0®, developed by the American College of Radiology ([ACR.org](http://ACR.org)), provides concrete steps to allow all radiologists to take a leadership role in shaping America's future healthcare. The website features patient- and family-centered care resources, presentations, case studies, videos and more.



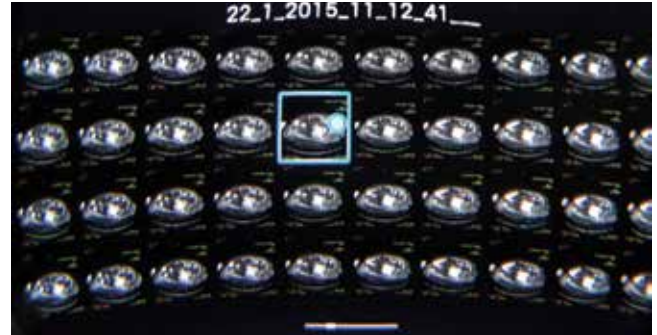
# Virtual Reality Prototype Shows Potential for Diagnostic Imaging

BY FELICIA DECHTER

*High-resolution mobile virtual reality devices could very well become the future in mobile diagnostic imaging for radiologists on the move, according to a presenter at RSNA 2015.*



A screenshot of the actual interface displaying numerous images.



A screenshot displays a CT examination in the virtual reality system.

Using a high-resolution mobile virtual-reality (VR) prototype, Vasileios Moustakas, M.D., of Evangelismos Hospital in Athens, Greece, and colleagues investigated whether VR visualization of Digital Imaging and Communications in Medicine (DICOM) images could be used without compromising image stability or quality, enabling its use for diagnostic imaging. A secondary purpose was to verify that remote diagnosis of complete CT examinations performed elsewhere, using a mobile VR system, was feasible.

The lightweight mobile VR system is powered by a high-tech Smartphone with an ultra-high-density 550 ppi display. Using the system is like being in front of a 175-inch mega screen while enabling visualization at 360 degrees, Dr. Moustakas said. Once the DICOM images are downloaded, the user wears the device and can scroll through the images, viewing up to 56 at any time—all while being on the move.

“It is very easy to use,” Dr. Moustakas said. “Once the files are downloaded it takes less than a minute to wear the VR device and start viewing the CT images. The fact that it’s also mobile is crucial, because this technique can be used for remote diagnosis, avoiding the limitations of the relatively small displays of normal mobile devices.”

Even if the VR system can be used for DICOM images, researchers opted to test the device using CT images due to the modality’s heavy use in emergency depart-

ments. Once the VR system was ready, 271 exams were reviewed by a consultant radiologist in the hospital and by another radiologist using remote VR in another area who had contact with the first doctor. The two independent, double-blinded reports were compared using standardized reporting systems to assess imaging quality of the VR system in comparison to the hospital’s workstation.

The outcome was promising. In 97 percent of the results, complete inter-observer agreement was demonstrated. The few (2.73 percent) contradicting results were limited to evaluations which also often present discrepancies between different examiners on the same monitor. In most of the evaluated parameters, good inter-observer agreement showed that the

use of the VR system did not affect image quality and therefore did not alter the diagnosis.

“The main drawbacks until now were mobility and display resolution, but our system resolves both,” said Dr. Moustakas.

But the potential advantages are boundless, he said.

“Mobile virtual reality can make it easier for radiologists who want to have access to their examinations, even when they are on the move and away from their hospital workstation,” Dr. Moustakas said.



Moustakas



The virtual reality device delivered promising results in research presented at RSNA 2015.

# Virtual Autopsy Connects Radiology and Forensics

BY PAUL LATOUR

Virtual autopsies offer several advantages over the traditional approach and help connect radiology with forensic medicine.

Unlike the traditional model, a virtual autopsy is a non-invasive approach that doesn't harm the body or tamper with forensic evidence, according to Michael J. Thali, M.D., who presented at RSNA 2015. The method creates permanent 3-D models that can be easily accessed and the data quickly relayed via computer to aid in getting a second opinion, he said.

Dr. Thali, professor and chair of the Institute of Forensic Medicine at the University of Zurich in Switzerland, co-founded The Virtopsy Project in 1999. Since then virtual autopsies have become standard procedure for forensic investigations in Switzerland, and an emerging procedure around the globe.

Although the technique has been featured on episodes of "CSI: NY" and "CSI: Miami," virtual autopsies have yet to reach wide use in the United States. Dr. Thali acknowledged that cost may be a factor, but added that the benefits outweigh the costs.

"It is a little bit expensive, but because you have this 3-D information you can always go back to it," Dr. Thali said, explaining that traditional autopsies by nature change the integrity of the anatomy. He added that he expects the costs to decrease as technology improves and the practice gains popularity, much like the path DNA testing took toward more common usage.

Dr. Thali's group pioneered Virtopsy, a technique that incorporates a broad range of technologies such as photogrammetry and 3-D surface scanning for the exterior, and CT, MR imaging, angiography and biopsy for the interior.

The information produced by the individual modalities is then merged into a robotic system called Virtobot, which creates 3-D, high-resolution computer images to document an injury.

The Virtobot system is a robotic system that performs a variety of tasks in conjunction with the CT scanner. It allows for automated, high resolution 3-D surface documentation as well as CT-guided



Thali

post-mortem tissue sampling.

In the case of a bite mark, for example, Dr. Thali said a 3-D morphological fingerprint of the mark on the body is created. That image can be compared to the dental records of the suspect, if available, to see if it matches.

Visualization is a key component in the value of virtual autopsies. As an example, Dr. Thali pointed to a domestic violence case in which the victim had been kicked by her husband, causing a torn pancreas. The 3-D recreation of the injury provided a better understanding for court officials during the trial.

"Our customer (the court system) often has no real knowledge of the body's internal structures, so having 3-D visualization is a good tool to show what really happened to the body," Dr. Thali said.

Another advantage of virtual autopsy over the conventional method is that it speeds the decision-making process because imaging can be done so quickly. Also, the process is observer-independent, allowing for objective data archiving, he said. Finally, virtual autopsies can be used in cultures and situations where conventional autopsy is not tolerated for religious reasons or is rejected by family members.



The Virtobot is a robotic system that performs a variety of tasks in conjunction with the CT scanner. It allows for automated, high-resolution 3-D surface documentation as well as CT-guided post-mortem tissue sampling.

Daily Bulletin coverage of RSNA 2015 is available at [RSNA.org/Bulletin](http://RSNA.org/Bulletin).

In the U.S., virtual autopsies are still not used as standard procedure, though they are being utilized by the U.S. military. Since 2006, the bodies of soldiers arriving at Dover Air Force Base in Dover, Del., undergo whole-body multi-slice CT as part of the postmortem examinations.

Virtopsy is also used at forensics institutes in Baltimore and Albuquerque, New Mexico, to gather forensic information that simplifies the process of death investigations.

Dr. Thali said he wants to see collaboration of the radiology and forensics fields, especially as technology improves and makes virtual autopsies even more beneficial.

"With virtual autopsy, imaging becomes the gold standard in the future examination of forensic evidence," Dr. Thali said. "At the moment, we cannot see everything with imaging, but judging by the (technology) on display at RSNA 2015, I think the direction is absolutely clear."

## WEB EXTRAS

View a video of Dr. Thali and colleagues discussing and demonstrating the virtual autopsy at [RSNA.org/News](http://RSNA.org/News).

# Artists Draw on Unique Inspirations to Create Winning Entries in RSNA Image Contest

BY MARY HENDERSON

*After viewing the hundreds of submissions to the RSNA 2015 Image Contest, it is clear radiologists can do more than interpret images. They can also create them.*

*This year's contest drew 604 entries — more than triple the number of entries received in 2014 — and a whopping 26,362 online votes for the best in four categories: Radiology Art, Most Unusual Case, Best Medical Image and Best Photo. The winners were chosen by a combination of the popular vote and a panel of RSNA experts.*

## Medical Images Transformed to Artwork

In creating her winning entry in the Best Medical Image category, Narine Wandrey, a second-year medical student at the University of Texas Health Science Center at San Antonio, focused on mineralocorticoid receptors and vasopressin synthesizing neurons in the hypothalamus of a rat. Artists in this category were asked to submit a high-quality, high-detail image depicting how medical imaging is used in the diagnosis or treatment of patients.

"Vasopressin and mineralocorticoid receptors have been implicated in the development of hypertension," Wandrey said. "The pathophysiology behind the development of salt-sensitive hypertension is poorly understood, so any finding such as the location of neurons believed to contribute to hypertension is unusual and important for scientists."

Using software, Wandrey compiled images taken from confocal microscopy to create a colorful image that mimics a modern art painting.

"I love neuroscience," Wandrey said. "The brain remains one of the most elusive organs in the body and capturing any aspect of it through art is beautiful."

The Most Unusual Case was submitted by Asad Jalil, M.D., a resident in nuclear medicine at Dr. Ziauddin Hospital in Pakistan, where a meta-static work-up on a patient revealed thoracic renal ectopia—a renal anomaly that occurs in roughly one out of every 13,000 people.

"It was the first time I have seen a kidney in the thoracic region," Dr. Jalil said. In this category, artists were asked to submit an image depicting a

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*"The human body is so complicated and fragile. . . I find it's a really fruitful field for my imagination."*

KATIA KAPLAN-LIST, M.D.

rare disease or condition or to illustrate an extremely atypical finding.

Another phenomenon known as the Northern Lights was the subject of this year's Best Photo taken by Vishal Kalia, M.D., a radiologist at SAK Akureyri Hospital in Iceland. To capture the ethereal green light show provided by the Aurora Borealis, Dr. Kalia and his wife traveled to the southern part of the country last winter.

"You need three to four conditions including total darkness and cold temperatures for the lights to show up," said Dr. Kalia, who explained that the large black spheres in the foreground of his winning picture were haystacks covered in plastic. The Best Photo category was open to all types of images.

## Re-imagining Medical Images

To create her winning Radiology Art image, radiology resident Katia Kaplan-List, M.D., from Rochester General Hospital, in Rochester, New York, drew inspiration from one of the most well-known images in modern culture: Vincent Van Gogh's *Starry Night*.

"When I was an intern in New York City, I saw the painting at the Metropolitan Museum of Art," said Dr. Kaplan-List, whose mother taught her to love art.

To take her mind off work, Dr. Kaplan-List paints and uses Photoshop to create art.

"Art is a creative outlet that allows

me to look at images from a different perspective," she said. "The human body is so complicated and fragile. . . I find it's a really fruitful field for my imagination."

It took just a few days for Dr. Kaplan-List to create "Eyes Like Stars," transforming MR and CT images of eye globes into stars and the moon, slices of brain MR images into the hills in the foreground, and ultrasound images of pseudoaneurysms into swirling yin-yang clouds. Artists in this category were asked to submit an image of a unique non-human element, with or without creative enhancements, taken with medical imaging equipment.

"The cypress tree is a composite of two images of the small bowel from a paracentesis," she said.

Her winning image has gained Dr. Kaplan-List the admiration of her colleagues at Rochester General Hospital, who have asked for copies of her artwork and plan on framing and hanging a poster of "Eyes Like Stars" in the department. She's also been able to connect with some of the other artists who submitted work to the RSNA Image Contest, including radiologists in Russia.

"It's very cool to get in touch with others who have the same interests," she said. "This type of art has aesthetic value and the ability to raise awareness of human anatomy and pathology."

## RSNA 2015 Centennial Image Contest Winners

Medical images are the lifeblood of radiology. To highlight that point during RSNA's Centennial celebration, the RSNA community was invited to enter the RSNA Centennial Image Contest, submitting entries in four categories: Radiology Art, Most Unusual Case, Best Medical Image and Best Photo.



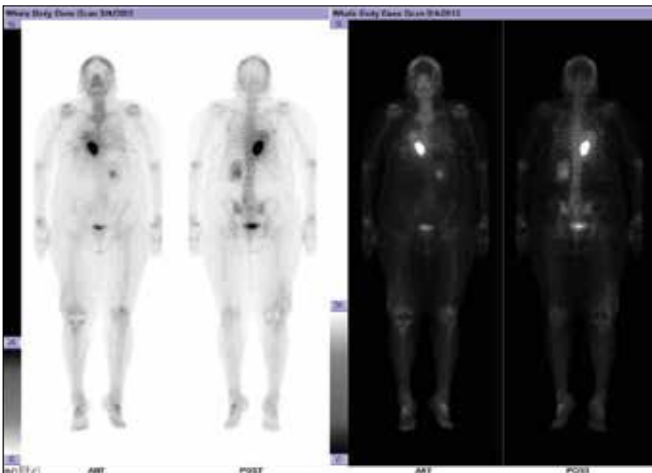
*Radiology Art*

**"EYES LIKE STARS "**  
Katia Kaplan-List, M.D.



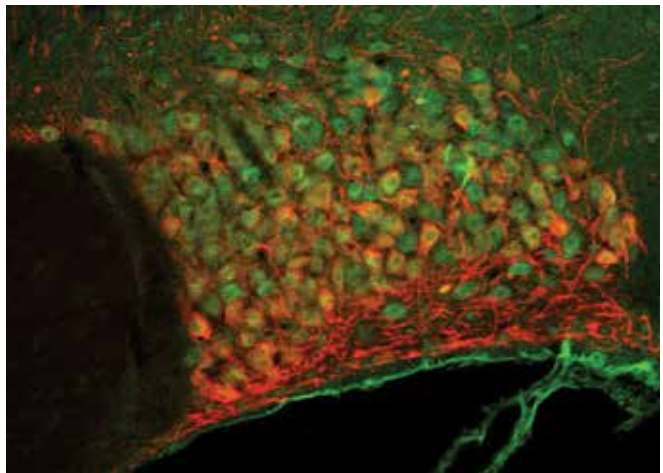
*Best Photo*

**"AURORA BOREALIS"**  
Vishal Kalia, M.D.



*Most Unusual Case*

**"RT THORACIC RENAL ECTOPIA"**  
Asad Jalil, M.D.



*Best Medical Image*

**"VASOPRESSIN AND  
MINERALOCORTICOID RECEPTORS"**  
Narine Wandrey

ALL IMAGES SUBMITTED FOR THE CONTEST CAN BE VIEWED AT [RSNA.ORG/CENTENNIAL](http://RSNA.ORG/CENTENNIAL)

# RSNA Grant Leads to Critical Research on RF Tumor Ablation

BY CINDY LENART

Four years ago, a single question posed by Muneeb Ahmed, M.D., led to a successful RSNA-funded research project on radiofrequency (RF) ablation, spawned a series of successive studies, and launched a promising line of research in interventional oncology.

“In tumor ablation, in which extreme heating or cooling is used to kill tumor cells around an ablation needle placed into the tumor with image-guidance, most research has focused on creating the largest ablation zone possible to treat larger tumors more completely,” Dr. Ahmed said. “But research has been limited to the effects of that procedure around the edges of the treatment area. My colleagues and I were interested in knowing: Can partial heating of tumor and normal liver cells at the margin of the RF ablation zone affect tumor cells that are present elsewhere in the body? We wanted to understand these reactions at a biological and mechanistic level with the hope of using this information to develop ways to direct and improve overall treatment.”

Dr. Ahmed, an associate professor of radiology and chief of vascular and interventional radiology at Beth Israel Deaconess Medical Center and Harvard Medical School, developed a 2012 RSNA Silver Anniversary Campaign Pacesetters Research Seed Grant into a study that helped characterize the effects of RF ablation on remote tumor growth and systematically identify dominant cellular and molecular pathways that activate to promote tumor growth.

In his RSNA research, Dr. Ahmed implanted breast adenocarcinoma tumors subcutaneously in animals. He then performed RF ablation in normal liver and kidney tissue in these animals to simulate everyday interventional oncology clinical practice, in which the normal tissue margin is ablated. He measured tumor growth in the animals before they were randomly assigned to the RF treatment group or to the control group. Then in all animals (treatment and control), he measured tumor growth and performed immunohistochemical (IHC) and western blot analysis for markers of inflammation and cell infiltration, cytokines, cellular proliferative indices and markers of neoplasia.

Findings demonstrated that RF ablation increased the expression of several key factors with known links to tumor growth stimulation, including hepatocyte growth factor (HGF), vascular endothelial growth factor (VEGF) and interleukin-6 (IL-6).

The initial study concluded that RF ablation of tissue can incite significant unwanted “off-target” tumor growth far away from the treatment zone. “This finding may have significant implications concerning the current use of RF ablation in clinical practice,” Dr. Ahmed said.

The findings were observed after RF ablation of two different organs and in two different animal tumor lines, suggesting that “off-target” RF-induced secondary effects may occur over multiple organs or ablation sites, and, therefore, may be more widespread than currently appreciated.

In the next experiments, immediately after RF ablation, Dr. Ahmed administered different drugs that blocked HGF, VEGF or IL-6. He demonstrated that in the presence of these blocking agents, following ablation, levels of these factors and tumor growth remained at baseline and did not increase.

“Such strategies may have the potential to reduce post-RF ablation-induced tumor recurrence and new tumor growth while improving overall ablation efficacy,” Dr. Ahmed said.

Dr. Ahmed also found that not all tumors seemed to be susceptible to off-target effects of RF ablation, suggesting that tumor receptor positivity may hold promise as a biomarker to predict tumors that are more susceptible to cytokinetic responses following hepatic ablation.

## RSNA Project Spawns Research

Results of this study were presented in two abstracts at RSNA 2013 and formed the core data for an invited refresher course at RSNA 2014 and 2015. Dr. Ahmed’s findings were also used as preliminary data for a follow-up pilot development grant from the Northeastern University Center for Translational Cancer Nanomedicine (CTCN), and for additional larger grant applications to the National Institutes



of Health (NIH), which are currently under review. Dr. Ahmed’s research was also published online in *Radiology* in September 2015 and in *PLOS ONE* in July 2015.

As a result of the initial study, Dr. Ahmed was awarded the 2014 Gary J. Becker Young Investigator Award from the Society of Interventional Radiology (SIR). SIR also sponsored Erik Velez, a now fourth-year UCSF medical student for a 1-year joint

Howard Hughes Medical Institute-SIR research fellowship in Dr. Ahmed’s lab. Six subsequent abstracts were presented at national meetings including RSNA, SIR, and Society of Thermal Medicine, and two additional manuscripts have been accepted for publication.

Dr. Ahmed said that the RSNA grant played a key role in his career as a researcher and in securing further research funding.

“An RSNA Research Seed Grant provides an excellent starting point and opportunity to obtain pilot funding to gather preliminary data and develop research ideas,” said Dr. Ahmed, who was also awarded a 2006 Covidien/RSNA Research Resident Grant to study RF thermal ablation.

The RSNA grant laid the groundwork for a very promising research career, said S. Nahum Goldberg, M.D., director of the Applied Radiology Laboratory and professor of radiology at Hadassah Medical Center and Beth Israel Deaconess Medical Center and Harvard Medical School, who mentored Dr. Ahmed through his RSNA research project. Dr. Goldberg received an RSNA 1997 Cook Incorporated Research Fellow Grant to study RF ablation.

“Not only has Dr. Ahmed used this RSNA seed grant to explore one of the most important questions currently facing interventional oncology, but he has also parlayed this into peer-reviewed, NIH-sponsored funding,” said Dr. Goldberg. “His scientifically rigorous mechanistic-based approach to understanding how and why our local therapies can have systemic and sometimes negative effects holds substantial potential for markedly improving ablation and transcatheter therapies.”



An RSNA grant put Muneeb Ahmed, M.D., (above) on the path toward securing additional funding to research RF ablation.

INNOVATE

## GRANTS IN ACTION

**NAME:**  
Muneeb Ahmed, M.D.

**GRANT RECEIVED:**  
RSNA Silver Anniversary Campaign Pacesetters Research Seed Grant (2012)

**STUDY:**  
“Elucidating the Extent and Causes of RF Ablation-induced Cell Growth”

**CAREER IMPACT:**  
“The RSNA Research & Education Foundation seed grant allowed me to obtain preliminary data that has already led to additional grant funding and has formed the core basis for several additional grants,” Dr. Ahmed said. “RSNA has been very supportive of me during the early stages of my career.”

**CLINICAL IMPLICATION:**  
“The studies supported by this RSNA research seed grant have generated very exciting, provocative and clinically relevant results – namely that RF ablation of tumor and different normal organs can stimulate variable growth in distant tumors, far away from the ablation site,” Dr. Ahmed said.

### WEB EXTRAS

Access the *Radiology* study by Dr. Ahmed and colleagues, “Hepatic Radiofrequency Ablation-induced Stimulation of Distant Tumor Growth Is Suppressed by c-Met Inhibition,” at [RSNA.org/Radiology](http://RSNA.org/Radiology).

# Understanding RVUs is Critical to Offsetting Declining Reimbursement

BY ED BANNON

While most radiologists bill patients through Relative Value Units (RVU), many do not understand the metric that determines payment for imaging studies and radiologic procedures, according to one radiologist who spoke on the topic at RSNA 2015.

"It is estimated that radiologists have lost approximately \$1.2 billion in payments between 2006 and 2013, partially due to adjustments to the RVU system," said Yuri Peterkin, M.D., a third-year radiology resident at Winthrop-University Hospital, in Mineola, New York, who has authored numerous articles on radiology reimbursement. "Radiologists need to understand the RVU system and reimbursement process in order to advocate for their specialty."

"Radiologists know about RVUs, but many don't know how RVUs are determined or how they are getting paid through this system," Dr. Peterkin said. "Even salaried radiologists should know how their services are billed because radiology reimbursements have not been keeping up with radiologists' productivity."

Congress created the RVU system in 1989 to standardize Medicare and Medicaid payments. Before the RVU system, payments were based on a legal standard of a "usual, customary and reasonable rate," which left a wide range of payments for similar procedures, Dr. Peterkin said.

RVUs are a measure of physician output based on the value assigned to each Current Procedural Terminology (CPT) code through the resource-based relative value scale used partially by Medicare and nearly all health maintenance organizations.

The Centers for Medicare and Medicaid Services (CMS) assigns an RVU to each procedure as a basis for billing. That number can be adjusted for various factors, but ultimately is multiplied by a dollar amount set by Congress to generate physician billing amounts.

CMS sets RVUs annually based on the recommendation of the American Medical Association's Relative Value Scale Update Committee (RUC), which is comprised of a panel of 30 doctors, including representatives from the major medical specialties. One radiologist member and one radiologist as an alternate are selected by the

*"Radiologists need to be aware of and understand the RVU system, which will help them better understand their current productivity and reimbursement."*

YURI PETERKIN, M.D.

American College of Radiology (ACR) to represent radiology on the committee.

## Benchmarks for Measuring Productivity

Over the years, the RVU system has generated controversy for what some perceive as the system's undervaluing of radiology productivity.

Medicare payment for most radiology services includes both the RVU professional component, which accounts for the radiologist's time and expertise, and the RVU technical components, which accounts for equipment and facilities, for the procedure code that is billed.

In an effort to improve efficiencies, CMS implemented a Multiple Procedure Payment Reduction (MPPR) in 2006, reducing the technical component by 25 percent for contiguous body part advanced imaging examinations performed on the same patient on the same day. After the Affordable Care Act was passed in 2010, the technical component was reduced by an additional 25 percent. In 2011, CMS changed the MPPR to include non-contiguous body parts across different modalities. MPPR was expanded in 2012 to include a cut to the professional component as well.

"Radiologists spend the same amount of time creating a report for the examination, so to cut any part of the professional component can get controversial from the

radiologists' standpoint," Dr. Peterkin said.

The primary justification offered by CMS for these cuts focused on the pursuit of efficiencies, or reducing overlapping and duplicative work, within the technical

and professional components on imaging examinations which—when performed together—are not repeated.

Another mechanism that lowers reimbursements is "code bundling" in which the technical and professional component for a set of procedures is reduced when those procedures are performed at the same time, Dr. Peterkin said. This reduction is most prominently seen in mammography where it was determined that 75 percent of breast intervention codes were reported together. In 2014, CMS restructured all codes into 14 new bundles, resulting in a 14 percent cut in the professional component and a 17 percent cut in the technical component.

Other challenges will arise as radiologists transition from a fee-for-service model to a pay-for-performance model under the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). Under MACRA, physicians will see first a stabilization of their Medicare payments followed by an accelerated transition to value-based payments in 2018.

Understanding how to use RVUs to develop a pay-for-performance model will be critical, Dr. Peterkin said. He urges radiologists to embrace awareness and action as the best antidote to offsetting the reimbursement decline.

"Radiologists need to be aware and understand the RVU system, which will help them better understand their current productivity and reimbursement and give them guidance for navigating future reimbursement changes," Dr. Peterkin said. "Radiologists also need to be vocal and advocate for their specialty."



Peterkin



# Radiology Workload Outpacing Reimbursement, Study Shows

BY ED BANNON

*Radiologists can employ strategies such as advocacy and adding value to combat a reimbursement imbalance that has emerged over the past decade, said a radiologist who presented an analysis on reimbursement trends at RSNA 2015.*

While radiologists' workloads increased by 43 percent between 2001-2013, their Medicare reimbursements have only increased by 24 percent, according to the analysis of Medicare Part B databases conducted by Manisha Patel, M.D., of Thomas Jefferson University in Pennsylvania.

"There is a clear imbalance," Dr. Patel said. "Radiologists' workloads grew considerably faster than their reimbursements over the entire study period, while in the downturn of the last few years, they saw a considerably greater drop in reimbursements than in workload."

The study crunched the numbers from the nationwide Medicare Part B databases for 2001-2013, examining Current Procedure Terminology (CPT) codes for all noninvasive diagnostic imaging by radiologists. By assigning a total professional component (PC) relative value unit (RVU) to each code each year and calculating RVU rates per 1,000 Medicare beneficiaries, PC RVU rates were generated as a proxy for workload and cost. Total Medicare payments to radiologists were also drawn from the database.

The study found that the RVU rate per 1,000 Medicare beneficiaries increased by 43 percent from 2001-2013—to 2,218 in 2013 from 1,548 in 2001. The rate peaked at 2,404 in 2009, representing a 55 percent increase over 2001 levels.

Meanwhile, total Medicare payments to radiologists have not kept pace. Reimbursement levels have risen by only 24 percent from 2001-2013—to \$4.2 billion in 2013 from \$3.4 billion in 2001. Reimbursements actually outpaced productivity until 2006—peaking that year at \$5.3 billion—but by 2013, reimbursement had fallen 20 percent.

The Deficit Reduction Act passed in 2005 caused the drop in reimbursement rates and the Affordable Care Act has limited cost increases since it passed in 2010, Dr. Patel said.

Daily Bulletin coverage of RSNA 2015 is available at [RSNA.org/Bulletin](http://RSNA.org/Bulletin).

The reduction in Medicare reimbursements could be creating a negative feedback loop that accelerates the imbalance, Dr. Patel said. A reduction in professional fees likely pressured radiologists to try to increase their revenue by increasing productivity. Thus, radiologists must interpret more studies within a given time period.

"This is concerning, as overworked radiologists could miss important diagnoses leading to malpractice suits," Dr. Patel said.

## Reducing Reimbursement Cuts

There are a number of strategies radiologists can employ to help reduce reimbursement cuts, Dr. Patel said. These include maintaining representation in the Relative Value Scale Update Committee to ensure that payments to radiologists are appropriate and advocating for the Center for Medicare & Medicaid Services to forgo further reimbursement cuts.

Also, Dr. Patel said, "Given the shift from a fee-for-service to a fee-for-value reimbursement model, it is important for radiologists to add value to the profession and expand their repertoire of services through noninterpretive work."

For example, she suggested joining hospital committees to build relationships with administrators, doing more consulting with referring physicians as well as patients, and screening requests for imaging exams to ensure they are necessary. To further expand their practice, radiologists could also supervise advanced imaging exams.

Dr. Patel predicted negative consequences if reimbursements continue to decline.

"Radiologists may find it financially difficult to care for Medicare patients and be forced to reduce services," she said. "There may be inappropriate emphasis on increasing efficiency rather than providing higher quality care. Radiology may be increasingly viewed as a commodity."



Manisha Patel, M.D., presented an analysis of reimbursement trends at RSNA 2015.

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*New Approaches to Curriculum Development*



**Lonie R. Salkowski, M.D., M.S., (right) with colleague Rosemary Russ, Ph.D.**

With a 2015 – 2017 RSNA Education Scholar Grant, **Lonie R. Salkowski, M.D., M.S.,** will use unique simulation devices to explore the process of how novices and experts assimilate medical imaging and their ability to correlate this information with the anatomy of the human body and the physical examination.

“The goal of this project is to provide approaches for curriculum development based on knowledge of trajectories mapped for the acquisition of skills from novice to expert, and learners with different types of medical training as they relate to medical imaging and its application to clinical cases and patient care,” Dr. Salkowski said.

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## R&E Foundation Grant Review Underway

The Research & Education (R&E) Foundation will review 2016 grant applications in March during four peer-review study sections modeled on the National Institutes of Health (NIH) format.

Each grant application is assigned to study section members (reviewers) by matching reviewers' areas of expertise with keywords identified in the application, and applications are scored using the NIH system. One primary and two secondary reviewers are assigned to provide written reviews of each application. All applicants, regardless of funding decisions, receive copies of the reviews to guide future attempts.

"Resubmitted grant proposals that are responsive to reviewers' comments and show improvement of the original study questions or design are often recognized and greatly appreciated by reviewers," said Vincent B. Ho, M.D., M.B.A., chair of the Radiology Research Faculty Grant Study Section.

Study section committees meet at RSNA headquarters in Oak Brook, Ill. or virtually by webinar to discuss the most competitive applications in detail and render final scores. Next the R&E Foundation Board of Trustees determines which grants will receive funding after considering the study section scores, available funds and programmatic balance, striving for a minimum 25 percent funding rate.

The Foundation funded 92 grants totaling \$3.6 million in 2015. The Board of Trustees will determine funding for 2016 grant awards in May, and funding will begin in July.

"It is rewarding to see impactful results from successful resident and fellow applications," said Steven C. Horii, M.D., chair of the Radiology Research Trainee Grant Study Section. "Receiving RSNA R&E funding can often be a major factor in whether a trainee continues a career in academic radiology."

RSNA members who are active researchers with a history of NIH funding are encouraged to apply to become reviewers. For more information, contact Scott Walter at [swalter@rsna.org](mailto:swalter@rsna.org) or 630-571-7816, or visit [RSNA.org/Foundation](http://RSNA.org/Foundation).



## Radiology in Public Focus

A press release was sent to the medical news media for the following article appearing in a recent issue of *Radiology*.

### Study Links Fatty Liver and Heart Failure in Obese People

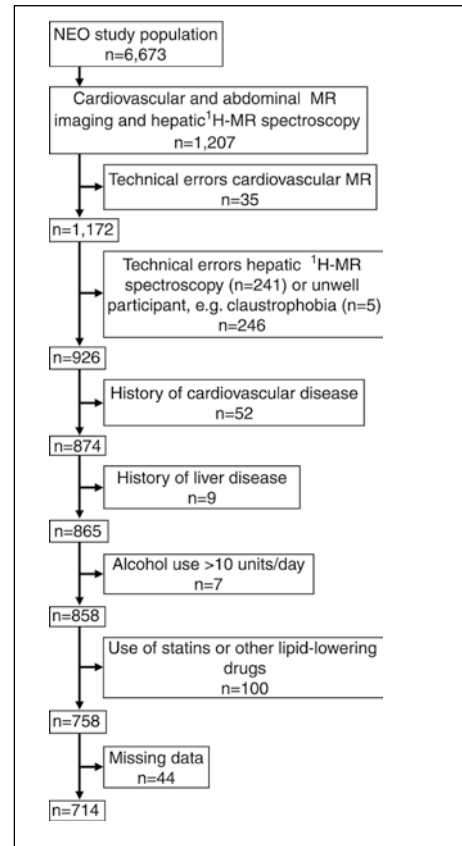
Fatty liver itself—at least in obesity—could pose a risk of myocardial dysfunction above and beyond known cardiovascular risk factors which are clustered within the metabolic syndrome, according to new research.

Ralph L. Widya, M.D., of the Leiden University Medical Center in Leiden, The Netherlands, and colleagues used proton MR spectroscopy to noninvasively measure hepatic triglyceride content and cardiac MRI to assess left ventricular diastolic function in 714 men and women aged 45 to 65 years. Of the 714 patients, 47 percent were categorized as overweight, and 13 percent were classified as obese.

The researchers found median hepatic triglyceride content was highest in the obese subgroup. Furthermore, the prevalence of the metabolic syndrome was markedly higher in the obese subgroup. Also, left ventricle (LV) end-diastolic volume and LV mass indexed to body surface area (BSA) were higher in the obese subgroup.

“Hepatic triglyceride content was associated with decreased diastolic function, but adjustments for confounding factors attenuated this association. Only in persons with obesity could an association independent of the metabolic syndrome and abdominal visceral adiposity be demonstrated significantly,” the authors write.

Watch the April issue of *RSNA News* for a full report on the role of imaging in obesity.



#### Study flowchart

(*Radiology* 2016;279:3:InPress) ©RSNA 2016 All rights reserved. Printed with permission.

## March Public Information Outreach Activities Focus on Colorectal Cancer

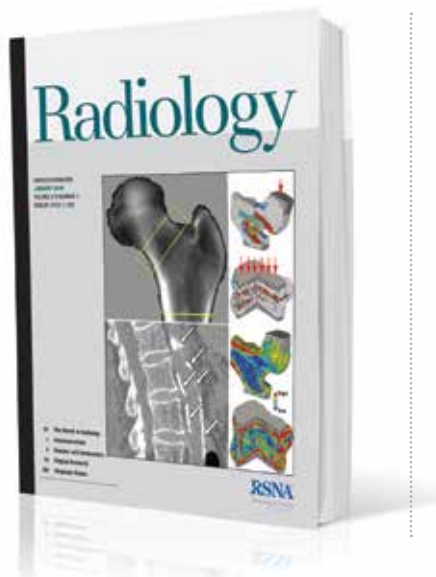
To highlight National Colorectal Cancer Awareness Month in March, RSNA is distributing radio public service announcements (PSAs) encouraging listeners to get screened for colorectal cancer.

In addition, RSNA is distributing the “60-Second Checkup” audio program to nearly 100 radio stations across the U.S. The segments also will focus on colorectal cancer.

## Media Coverage of RSNA

In November, 3,294 RSNA-related news stories were tracked in the media. These stories reached an estimated 3.2 billion people.

Coverage included *Yahoo! News*, *CNBC.com*, *Reuters*, *Bloomberg News*, *Science Daily*, *CNNMoney.com*, *Houston Chronicle*, *San Francisco Chronicle*, *Indianapolis Business Journal*, *San Diego Union-Tribune*, *Boston.com*, *The International Business Times*, *Yahoo! Finance*, *DOTmed HealthCare Business News*, *Medical News Today* and *Auntminnie.com*.



## RadiologyInfo.org tops 11 million visits in 2015

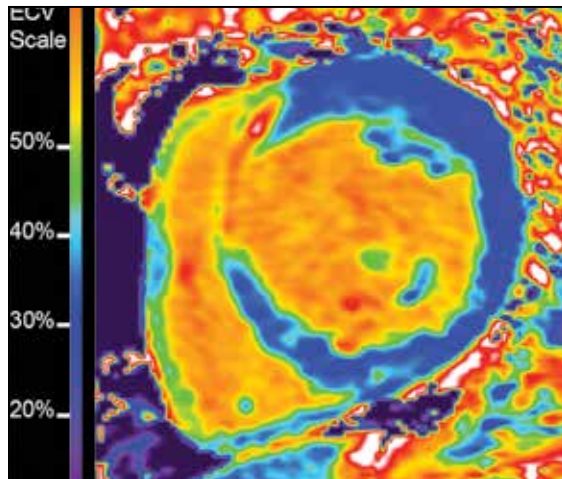
More than 11.5 million people accessed *RadiologyInfo.org* during 2015. The site provides free patient information produced by RSNA and the American College of Radiology (ACR), offering current, accurate information about more than 200 radiologic imaging exams, procedures, and treatments.

The site educates visitors on how various X-ray, CT, MRI, ultrasound, radiation therapy, and other procedures are performed.

**RadiologyInfo.org**  
For patients

## Journal Highlights

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



**Extracellular volume fraction (ECV) measurement of 25.6 percent in remote myocardium confirms minimal myocardial fibrosis beyond the infarction.**

(*Radiology* 2016;278;3:658–676) ©RSNA 2016 All rights reserved. Printed with permission.

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

### Clinical Applications of Cardiac T1 Mapping

T1 and extracellular volume fraction (ECV) mapping are emerging as important diagnostic and prognostic tools that could impact the delivery of care and influence paradigms of myocardial disease and the degree of associated vulnerability.

In the March issue of *Radiology* (RSNA.org/Radiology), Erik B. Schelbert, M.D., M.S., of the University of Pittsburgh Medical Center, and Daniel R. Messroghli, M.D., of Deutsches Herzzentrum in Berlin, review the current and developing clinical applications of cardiac T1 mapping and the existing evidence on their diagnostic and prognostic value in various clinical conditions.

**Radiology**

#### Essentials from the article:

- Cardiac T1 mapping quantifies intrinsic pathologic processes involving the myocardium using native (pre-contrast) T1 measures and ECV measures.
- Changes in native myocardial T1 may occur with disease affecting the intracellular or extracellular component of the myocardium.
- ECV dichotomizes the myocardium into its cellular and interstitial component and reflects disease limited to the interstitium.

“T1 and ECV mapping appear to be robust, provided care is exercised in their measurement. These cardiac techniques can characterize fundamental myocardial structural derangements that otherwise may be difficult to detect noninvasively with other modalities,” the authors write.

### Renal Arteriovenous Shunts: Clinical Features, Imaging Appearance, and Transcatheter Embolization Based on Angioarchitecture

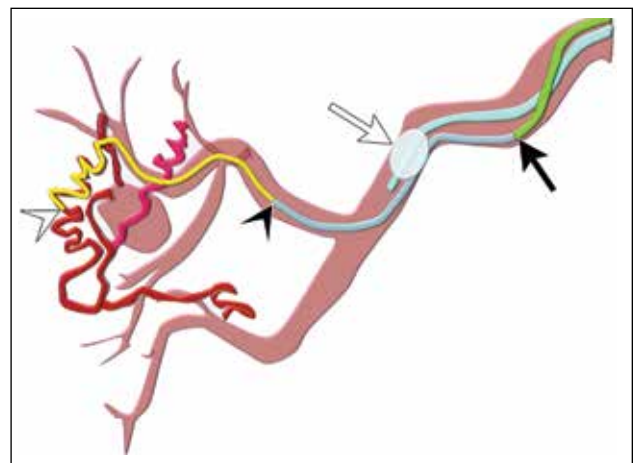
Transcatheter embolization is a safe and effective treatment for renal arteriovenous (AV) shunts. However, it is associated with a risk of complications, including renal infarction, pulmonary embolism and re-canalization.

In an article in the March issue of *RadioGraphics* (RSNA.org/RadioGraphics), Miyuki Maruno, M.D., of Oita University Faculty of Medicine, Japan, and colleagues describe the

classifications, imaging features and an endovascular treatment strategy based on the angioarchitecture of renal AV shunts.

For successful embolization, the shunted vessels should be completely and permanently obliterated while preserving the normal renal arterial branches, making it necessary to understand the angioarchitecture and classification of renal AV shunts. Appropriate treatment strategy should be determined for individual cases on the basis of the type and angioarchitecture of the shunt.

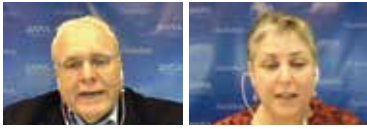
“The safe and effective treatment of renal AV shunts relies on the evaluation of radiographic findings and consideration of the type and angioarchitecture of the shunt,” the authors write.



**Renal arteriovenous (AV) shunt classified as type II, treated with transarterial glue embolization using the flow-control technique, in a 60-year-old woman with continuous microscopic hematuria. A 5-F balloon catheter (⇔) and 4-F guiding sheath (→) were introduced into the main renal arterial trunk. A microcatheter (➤) and 4-F catheter (➤) were coaxially advanced through the 4-F guiding sheath. The microcatheter was inserted as close as possible to the fistulous point through the tortuous feeding artery, then NBCA was injected via the microcatheter under flow control with proximal balloon occlusion.**

(*RadioGraphics* 2016;36;InPress) ©RSNA 2016 All rights reserved. Printed with permission.

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



Listen to *Radiology* Editor Herbert Y. Kressel, M.D., deputy editors and authors discuss the following article in the January issue of *Radiology* at [RSNA.org/Radiology-Podcasts](http://RSNA.org/Radiology-Podcasts).

“Cardiovascular Risk Factors Associated with Smaller Brain Volumes in Regions Identified as Early Predictors of Cognitive Decline,” Rajiv N. Srinivasa, M.D., and colleagues.

## RSNA Seeks Candidates for New *Radiology* Editor

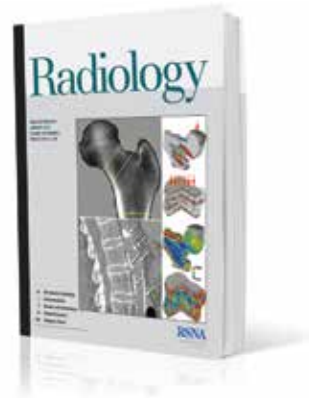
*RSNA is accepting applications for the position of Radiology editor, which has been held by Herbert Y. Kressel, M.D., since 2008. Dr. Kressel plans to step down from the position in 2017.*

The *Radiology* editor is responsible for:

- Encouraging submissions of scientific manuscripts
- Setting high standards for scientific integrity
- Developing guidelines and mechanisms for peer review of submitted manuscripts
- Releasing accepted manuscripts on a timely basis for copyediting
- Reviewing and releasing edited manuscripts on a timely basis for publication
- Formulating and interpreting editorial philosophy and policies
- Cooperating with the RSNA Board of Directors and Executive Director in the production of a self-supporting, highest quality publication with a strong impact factor

A search committee chaired by Mary C. Mahoney, M.D., Board liaison for publications and communications, is assisting the RSNA Board of Directors in its search. The new editor will be selected in December 2016. Interested physicians are invited to send their curricula vitae (marked “confidential”) to:

Mary C. Mahoney, M.D.  
 Radiological Society of North America (RSNA)  
 820 Jorie Blvd.  
 Oak Brook, IL 60523  
 Or via email to [editorsearch@rsna.org](mailto:editorsearch@rsna.org)



## Apply Now for RSNA Editorial Fellowships

Applications are being accepted for the RSNA William R. Eyler Editorial Fellowship and the RSNA William W. Olmsted Editorial Fellowship for Trainees.

Both fellowships offer the opportunity to work with *Radiology* Editor Herbert Y. Kressel, M.D., in Boston and *RadioGraphics* Editor Jeffrey S. Klein, M.D., in Burlington, Vt. The Eyler fellowship lasts one month and the Olmsted fellowship lasts one week.

Each fellow will also visit the RSNA Publications Department at RSNA Headquarters in Oak Brook, Ill. The Eyler Fellow will work with the *RadioGraphics* editorial team at RSNA 2016.

Apply by May 1 to be considered for the William R. Eyler Editorial Fellowship and April 1 to be considered for the William W. Olmsted Editorial Fellowship for Trainees. To learn more and to apply, go to [RSNA.org/RSNA\\_Editorial\\_Fellowships.aspx](http://RSNA.org/RSNA_Editorial_Fellowships.aspx).



## RadioGraphics Offers ABR Core Exam Study Guide

Access the *RadioGraphics* American Board of Radiology (ABR) Diagnostic Radiology Core Exam Study Guide Article Index for help in preparing for the ABR Diagnostic Radiology Core Exams at [RSNA.org/RadioGraphics](http://RSNA.org/RadioGraphics). In 2016, ABR exams are scheduled in June, October and November. For more information on the ABR exam, go to [theabr.org](http://theabr.org).

## Education and Funding Opportunities

### Demonstrate Your Leadership Skills: Earn an ARLM Certificate of Achievement

Radiologists looking to take the next big step in their careers can solidify their commitment to leadership excellence by earning an Academy of Radiology Leadership and Management (ARLM) Certificate of Achievement. The certificate demonstrates dedication to gaining



professional skills critical to becoming a leader among your colleagues.

Earn the certificate by completing ARLM-approved courses, both in-person and online. Several new courses were added to the online catalog at [RadLeaders.org](http://RadLeaders.org).

Each ARLM-approved course meets one or more of the elements of identified key learning domains, each representing an integral part of a well-rounded leadership curriculum. Participants must earn at least 50 education credits—including at least 30 credits in-person—within a three-year period. A minimum of three credits in each of the core learning domains is required.



### Spring 2016 Meetings with ARLM-approved Courses (in-person)

- Association of University Radiologists (AUR)  
64th Annual Meeting  
March 29 - April 1  
Manchester Grand Hyatt, San Diego  
• [AUR.org](http://AUR.org)

- American Roentgen Ray Society (ARRS) 2016 Annual Meeting  
April 17-22  
Los Angeles Convention Center  
• [ARRS.org](http://ARRS.org)

- American College of Radiology (ACR) 2016 Annual Meeting  
May 15-19  
Marriott Wardman Park Hotel  
Washington, D.C.  
• [ACR.org](http://ACR.org)

## ITAR Expanding to Include Imaging Sciences, Biomedical Engineering

Deadline for Application  
July 1, 2016

RSNA is expanding its Introduction to Academic Radiology (ITAR) program to include postdoctoral fellows in the imaging sciences and biomedical engineering.

Beginning March 1, postdoctoral fellows in those categories who received their degrees no more than six years ago are invited to apply for this opportunity to participate in a dynamic program held during RSNA 2016.

#### ITAR program learning objectives:

- Introduce participants to the scope of research in the radiologic sciences;
- Highlight the important role of postdoctoral degrees in the radiologic sciences;
- Identify keys to success for postdoctoral scientists in imaging research;
- Introduce participants to successful radiology researchers who may serve as future mentors

The program includes a combination of dedicated programming for ITAR for Scientists (ITARSc) participants and shared sessions with participants of the ITAR program. Selected participants will receive a \$1,000 stipend to offset travel and hotel costs as well as free registration for the RSNA annual meeting.

Application forms are available at [RSNA.org/ITARSc](http://RSNA.org/ITARSc).



# RSNA/ASNR Comparative Effectiveness Research Training Program

Deadline for Application  
**April 30, 2016**

RSNA and the American Society of Neuroradiology (ASNR) are jointly sponsoring an interactive course in comparative effectiveness research training (CERT) targeted to junior faculty and senior trainees in radiology.

The goal of the CERT program is to provide an introduction to the methodology and tools for performing comparative effectiveness research (CER). Led by a faculty of well-established leaders in the field, the CERT program will cover technology assessment, risk benefit analysis, cost-effectiveness evaluation, decision analysis, meta-analysis and systematic review.

The year-long CERT program consists of a combination of introductory online modules, an in-person, 1½-day workshop (Oct. 13-14, 2016), and didactic and small-group Web-based sessions.

For more information, visit [RSNA.org/CERT](http://RSNA.org/CERT).

## Nomination Forms Now Available for 2016 IRIYA Program

Nominations are now being accepted for the RSNA Introduction to Research for International Young Academics (IRIYA) program to be offered at RSNA 2016. The four-day seminar held at each RSNA annual meeting encourages young radiologists from outside the U.S. and Canada to pursue careers in academic radiology.

The RSNA Committee on International Radiology Education (CIRE) recommends 15 young academics for consideration by the RSNA Board of Directors each year.

The application deadline for the 2016 program is April 15. More information about IRIYA is available at [RSNA.org/IRIYA](http://RSNA.org/IRIYA).



## Roentgen Nominations Open

Nominations are being accepted now for the RSNA Roentgen Resident/Fellow Research Award, recognizing residents and fellows who have made significant contributions to their departments' research efforts as evidenced by presentations and publications of scientific papers, receipt of research grants or other contributions.

Nominations are limited to one resident or fellow per program in radiology, radiation oncology or nuclear medicine per year. The program director or department chair selects the nominee for each program.

The RSNA Research & Education (R&E) Foundation provides an award plaque for the department to display and a personalized award to present to the selected resident or fellow. The deadline for nomination is April 1. Learn about the nomination process and see a list of past recipients at: [RSNA.org/Roentgen\\_Research\\_Award.aspx](http://RSNA.org/Roentgen_Research_Award.aspx).

### For Your Calendar

**MARCH 2-6**  
European Society of Radiology  
(ESR)/ECR 2016  
Vienna, Austria  
*Visit the RSNA Booth*  
• [MyESR.org](http://MyESR.org)

**MARCH 17-21**  
Association for Medical  
Ultrasound (AIUM)  
New York Hilton Midtown  
New York City  
*Visit the RSNA Booth*  
• [AIUM.org](http://AIUM.org)

**MARCH 18**  
Advanced Grant Writing,  
Session III  
RSNA Headquarters  
Oak Brook, Illinois  
• [RSNA.org/Science](http://RSNA.org/Science)

**MARCH 29 - APRIL 1**  
Association of University  
Radiologists (AUR) 64th  
Annual Meeting  
Manchester Grand Hyatt  
San Diego, California  
• [AUR.org](http://AUR.org)

FIND MORE EVENTS AT [RSNA.org/Calendar.aspx](http://RSNA.org/Calendar.aspx).

## Annual Meeting Watch

### RSNA 2016 Online Abstract Submission Now Open

The online system to submit abstracts for RSNA 2016 is open. The submission deadline is noon Central Time (CT) on Wednesday, April 13. Abstracts are required for scientific presentations, education exhibits, applied science, quality storyboards and quantitative imaging reading room showcases.

To submit an abstract online, go to [RSNA.org/Abstracts](http://RSNA.org/Abstracts). The easy-to-use online system helps the Scientific Program Committee and Education Exhibits Committee evaluate submissions efficiently.

For more information about abstract submissions, contact the RSNA Program Services Department at 1-877-776-2227 within the U.S. or 1-630-590-7774 outside the U.S. Students, clinical trainees and post-doctoral trainees are eligible to receive \$500 travel awards for top-rated abstracts accepted for presentation at RSNA 2016. Full eligibility requirements are available with the 2016 Call for Abstracts.

**SHARE YOUR KNOWLEDGE**  
Present at RSNA 2016



### Important Dates for RSNA 2016

April 27	Member Registration and Housing Open at 10:30 a.m. CT
June 1	Non-Member Registration and Housing Open at 10:30 a.m. CT
July 27	RSNA Online Program Opens
Oct. 14	Deadline for International Badge Mailing
Nov. 4	Final Housing and Discounted Registration Deadline at 5 p.m. CT
Nov. 5	Increased Registration Fee Applied, \$150 for most categories
Nov. 27 – Dec 2	102 <sup>nd</sup> Scientific Assembly & Annual Meeting

## Value of Membership

### RSNA Offers Affordable Membership as Residents Transition into Practice

Residents and fellows transitioning into practice will find a strong incentive for maintaining their RSNA membership: reduced rates.

While members-in-training receive free RSNA membership, members transitioning from training qualify for greatly reduced rates during the first and second years of practice—just \$100 in year one and \$200 in year two. It is not until the third year of practice that transitioning members pay standard membership dues.

The RSNA benefit gives transitioning members time to settle into the profession before paying the full membership fee. Under the program, transitioning members receive all the benefits of full membership, including subscriptions to *Radiology*, *RadioGraphics* and *RSNA News*, free admission (with advance registration) to the RSNA annual meeting and free access to online CME opportunities.

For more information about these reduced rates, contact the Membership Department at 1-877-RSNA-MEM (1-877-776-2636) or [membership@RSNA.org](mailto:membership@RSNA.org).



# Latest *Radiology* Select Volume Available on *RSNA.org*

Visitors to *RSNA.org* can access the entire *Radiology* Select series, including the newest edition, *Radiology* Select, Volume 7: Imaging the Liver, introduced in February 2016.

*Radiology*Select is a continuing series of selected *Radiology* articles that highlight development in imaging science, techniques and clinical practice. Each volume focuses on a particular topic important in the field and is supplemented by commentaries, author interviews, podcasts and educational opportunities. Articles are personally selected by guest editor(s) for a comprehensive portfolio.

The *Radiology* Select homepage ([RSNA.org/RadiologySelect](http://RSNA.org/RadiologySelect)) also features a video introduction from Series Editor Deborah Levine, M.D., who explains the process of creating the series collection as well as how to access the series in its online and print formats.

In Volume 7 of *Radiology* Select, guest editors Valérie Vilgrain, M.D., and Maxime Ronot, M.D., have curated a collection of 31 *Radiology* articles that cover the most important advances in liver imaging. This includes concepts that were developed in earlier studies and have recently been confirmed, with an emphasis on the role of preliminary or experimental studies.



## Subject areas include:

- Diagnostic imaging with US, CT and MRI
- Disease detection and characterization with diffusion MRI
- Quantitative imaging techniques
- Liver-specific contrast agents
- Advances in treatment of liver diseases

**COMING  
NEXT  
MONTH**

Next month, *RSNA News* interviews experts on the rise of Precision Medicine, which has set healthcare on the path to patient-centered care.

# SHARE YOUR KNOWLEDGE

## Present at RSNA 2016:

- Scientific Presentations
- Applied Science
- Education Exhibits
- Quality Storyboards
- Quantitative Imaging Reading Room



## Submit online

beginning January 2016 at [RSNA.org/Abstracts](http://RSNA.org/Abstracts) through Wednesday, April 13, 2016, noon Chicago Time.

## Questions?

Call 1-877-776-2227 (within U.S.)  
or 1-630-590-7774 (outside U.S.)

*Includes sessions in joint sponsorship with the American Association of Physicists in Medicine*

## NEW for 2016!

### The RSNA Travel Award Program for Students

Up to 400 top-rated abstracts from current RSNA members will earn a \$500 travel stipend.

### Kuo York Chynn Neuroradiology Research Award

The top Neuroradiology paper as selected by the Scientific Program Committee will earn a \$3,000 award recognition.

Visit [RSNA.org/Abstracts](http://RSNA.org/Abstracts) for complete guidelines.

# RSNA® 2016

NOVEMBER 27 – DECEMBER 2