Opening Session

Plenary Sessions

PS10

Opening Session

AMA PRA Category 1 Credits ™: 1.75
ARRT Category A+ Credits: 1.50
Sun, Nov 30 8:30 AM - 10:15 AM  Location: Arie Crown Theater

Participants

Presiding
N. Reed Dunnick MD Nothing to Disclose  President, Radiological Society of North America

Greetings
John E. Bayouth PhD Nothing to Disclose  President, American Association of Physicists in Medicine
Alexander Julian Nemeth MD (Presenter): Nothing to Disclose  President, Chicago Radiological Society

Sub-Events

PS10A  Presentation of the Outstanding Educator Award
Paula J. Woodward MD (Presenter): President, Amirsys, Inc  Recipient

PS10B  Presentation of the Outstanding Researcher Award
Theodore Steven Lawrence MD, PhD (Presenter): Consultant, MedImmune, Inc Consultant, ImClone Systems Incorporated  Recipient

PS10C  The scientific and educational program of the 100th Scientific Assembly and Annual Meeting of the Radiological Society of North America is dedicated to all those who have gone before us—to those who have established and joined the RSNA, and helped our Society pursue its mission and realize its vision for the past 100 years
N. Reed Dunnick MD (Presenter): Nothing to Disclose

PS10D  President’s Address: Reflect on the Past, Prepare for the Future
N. Reed Dunnick MD (Presenter): Nothing to Disclose, G. Scott Gazelle MD, PhD Consultant, General Electric Company Consultant, Marval Biosciences Inc

As the RSNA begins its Centennial Celebration, it is appropriate for us to not only reflect upon our past but also to look forward to how we want our field to evolve and how we will reach that goal. The RSNA was founded in 1915 as the Western Roentgen Society, only 20 years after Wilhelm Roentgen announced his discovery of the X-ray. As a result, the history of the RSNA and radiology are intertwined such that our Centennial is a celebration of medical imaging and image-guided therapy. We have seen enormous advances in medical imaging in the past 100 years. Throughout this period, diagnostic radiologists, radiation oncologists and medical physicists have led the way. Radiography and fluoroscopy have been refined and made safer. The newer cross-sectional imaging modalities - ultrasound, computed tomography and magnetic resonance imaging - have added tremendously to our ability to not only diagnose medical illness, but also to guide treatment, using external beam radiation, brachytherapy, percutaneous ablation or other interventional techniques. Many new radiotracers have been developed to evaluate patients at the cellular level and they are helping to unravel the mysteries of disease pathophysiology. It is hard to imagine what the next 100 years will bring, but for medical imaging to reach its full potential, imaging scientists must maintain our intellectual leadership. We must partner with industry to develop needed tools, and we must understand the clinical settings and the role imaging plays in directing effective and efficient patient care. Most importantly must keep the patient utmost in our minds to assure that our interventions lead to an improved quality of life. As radiology, the field of medicine, and the entire healthcare system become even more complex we will need to conduct more sophisticated research so that we can continue to innovate and apply our imaging and interventional tools to healthcare appropriately. With these goals in mind, the RSNA Research and Education Foundation has awarded more than $3 million in each of the last two years to help investigators conduct imaging studies, especially the feasibility studies needed to support NIH grant applications. The NIH awarded $397 million in grants to principal investigators with primary appointment in departments of diagnostic radiology or radiation oncology. If we are to maintain the intellectual leadership in our field, we must foster a culture that values research and uses those resources to advance our field. "Our future is so bright, I gotta wear shades!"

PS10E  Special Lecture: Exceptional Opportunities in Biomedical Research
Francis S. Collins MD, PhD (Presenter): Nothing to Disclose, N. Reed Dunnick MD Nothing to Disclose

In this Special Lecture, the Director of the National Institutes of Health (NIH) will help celebrate the RSNA's centennial meeting by examining the exceptional opportunities that scientific and technological breakthroughs...
offer for biomedical research. With particular focus on NIH-supported imaging research, the talk will examine recent advances in fundamental knowledge about biology and highlight the ways in which that knowledge is serving to improve human health. Topics may include the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative; the Accelerating Medicines Partnership (AMP); and affordable technologies to extend imaging insights to low-resource settings. The lecturer will conclude with a discussion of future challenges, such as training the next generation of researchers; supporting the development of innovative research, programs, and partnerships; and encouraging broader appreciation and support for the biomedical research enterprise.

**PS12**

**Sunday Afternoon Plenary Session**

*Plenary Sessions*

**RO NR MK GI CH BR**

AMA PRA Category 1 Credits™: 1.75
ARRT Category A+ Credits: 1.50

**Sun, Nov 30 4:00 PM - 5:45 PM**  
**Location: Arie Crown Theater**

**Participants**

**Presiding**  
N. Reed Dunnick MD  
Nothing to Disclose  
President, Radiological Society of North America

**Sub-Events**

**PS12A  Report of the RSNA Research and Education Foundation**

James P. Borgstede MD (Presenter): Nothing to Disclose  
Chairman, Board of Trustees, RSNA Research and Education Foundation

**Abstract**

The RandE Foundation - A Transformative Force in Radiology  
The theme of the 2014 RSNA Scientific Assembly and Annual Meeting is "A Century of Transforming Medicine." For 30 years of that century, the RandE Foundation has played a significant role in advancing the RSNA mission to promote excellence in patient care and health care delivery through education, research and technologic innovation. In celebration of 100 years, the Foundation is launching Inspire-Innovate-Invest, The Campaign for Funding Radiology's Future. This bold campaign seeks to raise $17.5 million to fund grants in radiologic research and education, bridging the gaps in funding for promising investigators and educators. The need is great and the time is now, if the Foundation reaches its campaign goal of $17.5 million, it will keep pace with the growing demand and help ensure that critical discoveries by radiologic investigators come to fruition. This year, the Foundation will fund 95 grants totaling $3.7 million. This means the RandE is funding 25% of our ever increasing number of excellent grant applications. While pleased with these achievements, imagine what the RandE Foundation could fund with additional support from all of us as radiology colleagues? And please recall that we are all the beneficiaries of this research. Of these individuals, who will start their academic research career with a RandE grant, and what will grow from this initial funding? What advances will emanate from their research? And, how can radiologists support these investigators and educators as they pursue their chosen career paths in an effort to make the specialty even stronger? During the meeting week, please take time to visit the RandE Foundation Booth, located on Level 3 of Lakeside Center to learn more about how you can be a part of the campaign and support the RandE Foundation and the future of our specialty.

**PS12B  Image Interpretation Session**


**LEARNING OBJECTIVES**

1) Identify key abnormal findings on radiologic studies that are critical to making a specific diagnosis.  
2) Construct a logical list of differential diagnoses based on the radiologic findings, focusing on the most probable differential diagnoses.  
3) Determine which, if any, additional radiologic studies or procedures are needed in order to make a specific final diagnosis.  
4) Choose the most likely diagnosis based on the clinical and the radiologic information.

**PS20**

**Monday Plenary Session**

*Plenary Sessions*
Ultrasound is considered useful because it is safe, fast, and easy to perform. However, these mainly passive attributes will be and are being augmented by new quantitative methods that are nearly unique to ultrasound, giving ultrasound a new life and increased relevance in the medical imaging armamentarium. The first of these is elasticity imaging. Many flavors of this extremely robust new imaging and diagnostic method are now becoming standard fare in the literature. The general implementations of elastography have been strain and shear wave speed (SWS) imaging. However, these are now augmented by shear viscosity imaging, non-linear strain and non-linear shear wave imaging. The applications are expanding rapidly, and the impact will almost certainly be major. The leading application and the one getting the most notice has been assessing liver fibrosis/cirrhosis. The standard method is biopsy, which is invasive with real risks. Biopsies are also highly localized and represent a very poor sample of the underlying disease. SWS imaging is a more global measure, and it is totally benign. For these two reasons alone, SWS will likely replace liver biopsies for fibrosis/cirrhosis assessment. Other applications are being developed, and are already having impact. These include breast cancer differentiation, thyroid nodule characterization, cardiac function and conduction analysis, deep venous thrombosis aging, and Crohn's disease stricture evaluation. The second application is volume flow estimation. Using 3D and 4D sampling, volume flow becomes quite simple to measure. The technique is based on what is known as Gauss's Theorem. This relation states that volume flow is equal to the total integrated flux over any surface cutting across a conduit with flow. The method is angle independent, flow profile independent, and vessel geometry independent. Using 2D ultrasound arrays, these measurements can be performed in real-time. The applications are nearly limitless. A good approximation of its potential utility corresponds to the number of new varieties of applications for contrast agents, some of which will almost certainly be employed. Given the fact that ultrasound contrast agents are gas bubbles, it is possible to vary the composition of the shells that stabilize these gas bubbles, making these gas bubbles not only contrast agents but delivery agents. Investigators have already placed drug compounds or chemotherapeutic agents into bubble shells and bubbles have been used to facilitate gene transfection. Some of the more novel applications include manipulation of perfluorocarbon droplets that contain chemotherapeutic agents that can be made to boil in ultrasound fields at desired target locations, thus depositing its agents at precise points in the body.
This centennial year of the RSNA meeting is a good time to reflect on past successes, but also to recognize that radiology is at a crossroads. We face many threats, ranging from commoditization, to declining reimbursements, to the perception that much imaging is unnecessary, to termination of groups by hospitals, etc. One of our biggest challenges - and a way to counter some of these threats - is to effectively move from our current volume-based practice model to one which is more value-oriented. This oration will present concrete ideas on steps that need to be taken to accomplish that goal. Radiologists must refuse the notion that we are simply purveyors of a commodity by starting to act like true consulting physicians. True consulting physicians would take a more active role in activities like assessing the appropriateness of requests for imaging, supervising the performance of the studies, communicating the results to patients, and being more available to consult with referring doctors. Of course, doing these things takes time away from reading cases, and that will lead to lower incomes. I will make the case that this is a worthwhile and necessary tradeoff. Primary care physicians and specialists in clinical disciplines spend hours each day providing uncompensated services to patients, and we have to start doing some of that as well. While it may not be feasible to try to evaluate the appropriateness of every imaging request or to directly supervise every study being done, there are things we can do to add value to these processes of care. A side benefit of taking the time to act like true consultants is that it will create more jobs for young radiologists, who are having trouble finding them now. We owe them that. Radiologists will also provide greater value if they make themselves available around the clock to help their patients and referring doctors, rather than outsourcing night and weekend work to others outside their practice. Greater focus on quality is another way to provide value. Programs like the Physician Quality Reporting System have required quality measures upon radiology practices, but some of them are neither useful nor easily measurable, and fail to provide any true indication of the quality of a practice. Radiology groups could provide better value by creating and tracking their own internal quality metrics, as some have already done. Still another way for radiologists to provide value is to develop closer ties to primary care physicians, who are often overburdened and need our help, and who are going to become increasingly influential players in an era of ACOs and bundled payments. One way we can do this is to propose what might be termed "the 90% rule." If all these suggestions are followed, I believe that within 5 years radiology will be considered a high-value specialty that is more helpful to our patients and referring physicians than at present, and one that is no longer viewed as a commodity by others in the rest of the medical world.
modern radiation oncology, is a 2D representation of the 3D dose on the anatomy. DVHs typically ignore inter- and intra-fraction motion, and discard all spatial information. Any intra-structure variations in 'functional importance' for tumors (e.g. cell density, hypoxia, viability) or normal tissue (e.g. gas exchange, weight bearing, cognition) are ignored. This inherent characteristic of DVHs limits their utility in predicting outcome. ‘Functionally-weighted’ DVHs might be better in this regard. Physician-Radiologist Communication is often ambiguous. Clinician’s requisitions and Radiologist’s reports both often lack clarity. Standardization, facilitated by HER, can improve this. Widespread use of quantitative scales (e.g. BI-RADS) to score images would be helpful. Comprehension of reports can be enhanced by attention to details such as font, color, formatting and case selection. Black font on a white background with upper and lower case lettering and standard formatting is typically optimal. We need to acknowledge and minimize the error bars associated with the application of medical images to RT.

PS50

Thursday Plenary Session

Plenary Sessions

| PH | NM | MR | CT | BQ |

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50
Thu, Dec 4 1:30 PM - 2:45 PM   Location: Arie Crown Theater

Sub-Events

PS50A  RSNA/AAPM Symposium: Radiomics: From Clinical Images to Omics
Moderator Paul Eugene Kinahan PhD : Research Grant, General Electric Company Co-founder, PET/X LLC

LEARNING OBJECTIVES

1) Describe the motivation underlying medical imaging analyses of tumor heterogeneity and response to therapy. 2) Describe the role of medical imaging omics in oncology as a biomarker and the potential benefits leading to improved outcomes. 3) List the benefits and challenges of advanced and high-throughput image analysis from large data bases at multiple centers.

PS50B  The Radiology Reading Room of the Future
Robert J. Gillies PhD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the motivation underlying medical imaging analyses of tumor heterogeneity and response to therapy. 2) Describe the role of medical imaging omics in oncology as a biomarker and the potential benefits leading to improved outcomes. 3) List the benefits and challenges of advanced and high-throughput image analysis from large data bases at multiple centers.

PS50C  Radiomics in Oncology: Pathway to Precision Medicine
Hedvig Hricak MD, PhD (Presenter): Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the motivation underlying medical imaging analyses of tumor heterogeneity and response to therapy. 2) Describe the role of medical imaging omics in oncology as a biomarker and the potential benefits leading to improved outcomes. 3) List the benefits and challenges of advanced and high-throughput image analysis from large data bases at multiple centers.