Plenary Sessions
Participants
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose
Bruce H. Curran, MEng, Richmond, VA, (Bruce.Curran@vcuhealth.org) (Presenter) Nothing to Disclose
Jonathan B. Strauss, MD, Chicago, IL (Presenter) Nothing to Disclose

Sub-Events

PS10A  Presentation of the Outstanding Educator Award

Participants
Kristen K. DeStigter, MD, Burlington, VT (Presenter) Medical Advisory Board, Koninklijke Philips NV; Luminary, McKesson Corporation; Research collaboration, Koninklijke Philips NV;

PS10B  Presentation of the Outstanding Researcher Award

Participants
Clifford R. Jack JR, MD, Rochester, MN (Presenter) Stockholder, Johnson & Johnson; Research Consultant, Eli Lilly and Company;

PS10C  Dedication of the 2016 RSNA Meeting Program to the Memory of Herbert L. Abrams, MD (1920-2016)

Participants

PS10D  President's Address: Beyond Imaging: Ensuring Radiology Impact in Clinical Care and Research

Participants
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose
Mitchell E. Tublin, MD, Pittsburgh, PA (Presenter) Nothing to Disclose

Abstract
Radiologists have remarkably impacted radiology and medical care through their participation in developing and advancing the modern day imaging modalities of US, CT, MRI, Nuclear Medicine, and Interventional image-guided therapies. Modern digital advances go beyond the amazing images themselves. The introduction of digital imaging communication and storage systems has enabled timely and impactful distribution of images that has put medical imaging and radiologists at the forefront of clinical care 24 hours a day. At the same time, this rise of information technology in medicine limits personal interactions between radiologists and clinicians, making collaboration between physicians difficult. While technologic imaging innovation continues to advance, the key to continuing radiology's success will lie in our dedication to delivering the best possible care to every patient. To do so, radiologists must think beyond the images they see in practice and stay abreast of advancing subspecialty medical knowledge and more actively collaborate with referring physicians to improve patient outcomes. Meaningful continuing education and interactive training will be necessary to ensure radiologists are proficient at the subspecialty level required by an ever-increasing subspecialty approach in the medical community at large. We must reach beyond imaging in radiologic research, building truly multidisciplinary teams to develop multicenter, multi-investigator prospective trials that impact outcomes for entire populations. Today's research will become tomorrow's clinical practice, requiring radiologists to develop and lead impactful clinical imaging research that will position us as an essential part of clinical care teams. And above all, we must look beyond imaging to gain a broader perspective on the patient experience. We have entered a new era in radiology and healthcare at large driven by changes to reimbursement models and an emphasis on value in patient care delivery. Radiologists must produce examination reports that provide the solutions sought by patients and referring physicians rather than simply describe findings. Ultimately, we should strive to consistently deliver the right examination at the right time by the right radiologist with the quality of the process and the report matching what we would expect for us or our family members. In doing so, we will better serve our patients and our specialty as we navigate an ever-changing healthcare environment.

PS10E  When Machines Think: Radiology's Next Frontier

Participants
Keith J. Dreyer, DO, PhD, Boston, MA (Presenter) Medical Advisory Board, IBM Corporation
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose

Abstract
As computers outperform humans at complex cognitive tasks, disruptive innovation will increasingly remap the familiar with waves of creative destruction. And in healthcare, nowhere is this more apparent or imminent than at the crossroads of Radiology and the emerging field of Clinical Data Science. As leaders in our field, we must shepherd the innovations of cognitive computing by defining its role within diagnostic imaging, while first and foremost ensuring the continued safety of our patients. If we are dismissive, defensive or self-motivated - industry, payers and provider entities will innovate around us achieving different forms of disruption, optimized to serve their own needs. To maintain our leadership position, as we enter the era of machine learning, it is essential that we serve our patients by directly managing the use of clinical data science towards the improvement of care—a position which will only strengthen our relevance in the care process as well as in future federal, commercial and accountable care discussions. In this
session, we will explore the state of clinical data science in medical imaging and its potential to improve the quality and relevance of radiology as well as the lives of our patients.

**PS10F**  Hope, Hype, and Harm as Medicine Enters the Digital Age: Lessons From (and For) Radiology

Participants
Robert M. Wachter, MD, San Francisco, CA (Presenter) Scientific Advisory Board, PatientSafe Solutions, Inc; Stock options, PatientSafe Solutions, Inc; Scientific Advisory Board, EarlySense; Stock options, EarlySense; Scientific Advisory Board, QPID Health, Inc; Stock options, QPID Health, Inc; Scientific Advisory Board, Amino Inc; Stock options, Amino Inc; Scientific Advisory Board, Twine Health, Inc; Stock options, Twine Health, Inc; Author with royalties, Wolters Kluwer nv; Speaker, Wolters Kluwer nv; Author with royalties, The McGraw-Hill Companies; Speaker, The McGraw-Hill Companies; Author with royalties, John Wiley & Sons, Inc; Speaker, John Wiley & Sons, Inc; Investor, Smart Patients, Inc;
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose

Abstract
While radiology went digital nearly two decades ago, the wholesale switch from paper to computer in the rest of healthcare is a relatively recent phenomenon. While computerization has helped improve safety and quality, it has also had unanticipated consequences, many of them quite negative. Studies have shown, for example, that physician burnout has never been higher – and much of this is attributable to the electronic health record. Other studies have documented new types of medical errors, sometimes known as "e-iatrogenesis". Dr. Robert Wachter spent a year studying the digitization of healthcare in researching his 2015 book, The Digital Doctor: Hope, Hype and Harm at the Dawn of Medicine's Computer Age. In this talk, he'll describe what we got right – and wrong – in our journey, and why radiology was, to a large degree, a canary in the digital coal mine. Ultimately, it's a hopeful story; the experience from other industries tells us that it often takes a decade or more to obtain the promised benefits from automation – and that these improvements emerge only after the technology improves and the work has been reimagined for a digital environment.

Wachter is Professor and Interim Chairman of the Department of Medicine at the University of California, San Francisco, where he also directs the Division of Hospital Medicine. Author of 250 articles and 6 books, he coined the term "hospitalist" in 1996 and is generally considered the "father" of the hospitalist field, the fastest growing specialty in the history of modern medicine. He is past president of the Society of Hospital Medicine and past chair of the American Board of Internal Medicine. In 2015, Modern Healthcare magazine ranked him as the most influential physician-executive in the U.S., his eighth consecutive year in the top 50. The Digital Doctor was a New York Times science bestseller. In its review, the Times said, "Janus is the god of medicine these days, and it is the great strength of Wachter's eloquent new book that it has captured every one of these conflicting emotions, all powerfully felt and intelligently analyzed... Most previous authors have chosen sides, either mourning the old or hailing the new. Wachter is unusual for his equipoise. He is old enough to remember the way things used to work (or fail to work), young enough to be reasonably technology friendly... He is also an exceptionally good, fluent writer." He is currently heading a national review of IT strategy for England's National Health Service.
**PS12A**  
**Report of the RSNA Research and Education Foundation**

**Participants**  
Richard L. Baron, MD, Chicago, IL (*Presenter*) Nothing to Disclose

**Sub-Events**

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

Participants  
Burton P. Drayer, MD, New York, NY (*Presenter*) Advisor, Hologic, Inc

**Abstract**

The R&E Foundation exemplifies the 2016 Annual Meeting theme “Beyond the Image” as each and every year, R&E grant recipients pursue projects that go beyond radiologic sciences and touch every area of healthcare delivery and discovery. In the annual address of the R&E Foundation, Board of Trustees Chairman Burton P. Drayer, MD will report on this year’s record funding of 101 research and education awards totaling over $4 million, and why the need to support the Foundation is greater than ever. With a 30% funding rate of its applicants, the RSNA R&E Foundation provides a critical source of early support for so many young investigators and educators. It is through their awards that these individuals become engaged in research and excited about the prospect of pursuing a career in academic radiology. R&E grant recipients are poised to lead research efforts in the future that will extend beyond radiology into every area of patient care. To support these efforts and continue forth on this path, the Foundation launched Inspire – Innovate – Invest: The Campaign for Funding Radiology’s Future at RSNA 2014. The Campaign is moving steadily toward the Campaign goal of $17.5 million with the support of individuals, private practice groups and our corporate colleagues. For the future of radiologic research to belong to the next generation of radiologists, the specialty must put its financial support squarely behind its Foundation—our Foundation. During the meeting week, please take time to visit the R&E Foundation Booth, located on Level 3 of Lakeside Center to learn more about the 2016 grant recipients, their innovative projects and the many available opportunities to support the Foundation through our Campaign.

**PS12B  
Image Interpretation Session**

**Participants**  
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Presenter*) Nothing to Disclose  
John Eng, MD, Cockeysville, MD (*Presenter*) Nothing to Disclose  
Ellen M. Chung, MD, Bethesda, MD (*Presenter*) Nothing to Disclose  
Nancy J. Fischbein, MD, Stanford, CA, (fischbein@stanford.edu) (*Presenter*) Nothing to Disclose  
John R. Leyendecker, MD, Dallas, TX, (john.leyendecker@utsouthwestern.edu) (*Presenter*) Nothing to Disclose  
Christian W. Pfirrmann, MD, MBA, Forch, Switzerland (*Presenter*) Nothing to Disclose  
Gautham P. Reddy, MD, Seattle, WA (*Presenter*) Nothing to Disclose

**Honored Educators**

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Gautham P. Reddy, MD - 2014 Honored Educator
Monday Plenary Session

Monday, Nov. 28 1:30PM - 2:45PM Room: Arie Crown Theater

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credit: 1.00

Participants
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose

Sub-Events

PS20A Presentation of Honorary Membership

Participants
Carlo Bartolozzi, MD, Pisa, Italy (Presenter) Nothing to Disclose
Luis Donoso-Bach, MD, Barcelona, Spain (Presenter) Nothing to Disclose
Osamu Matsui, MD, Kanazawa, Japan (Presenter) Nothing to Disclose

PS20B Dedication of the Annual Oration in Diagnostic Radiology to the Memory of Edward B. Singleton, MD (1920-2015)

Participants

PS20C Annual Oration in Diagnostic Radiology: Health Care Transformation: Driving Value through Imaging

Participants
Vivian S. Lee, MD, PhD, Salt Lake City, UT (Presenter) Board of Directors, Merrimack Pharmaceuticals, Inc
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose

In the evolution from fee-for-service health care to value-driven population health, health care systems must learn to embrace patient-centered, value-focused practices, and the leaders of these systems must be committed to building these cultures. Radiology departments serve as a centralized core of experts guiding accurate diagnosis and informing care pathways, and therefore have tremendous opportunity in defining and enhancing value for providers and their patients. At University of Utah and elsewhere, engaged radiologists are tapping into the health system's culture of value to evolve the way providers engage with imaging specialists to improve patient expectations, and created real and measurable cost efficiencies. Important tools that have been implemented include "value-driven outcomes" to measure quality and costs, patient-reported outcomes tools to integrate patient perspectives in the value equation, patient and referrer-satisfaction measurement tools, and new value improvement training programs for residents and fellows are among several examples to be discussed. The transformation of health care requires engaged radiologists to produce more cost effective, high quality, patient-centered outcomes.
Cancer care—along with imaging—is on the brink of profound change. Over the last quarter century, researchers have been assembling the biological syntax and lexicon that are now starting to shape modern oncology. Shifting public expectations and technological innovations are also intensifying progress toward precision medicine. In the next ten years, radiologists will be able to take advantage of new molecular imaging probes and techniques as well as computer tools for pattern recognition, deep learning and artificial intelligence. These new techniques and tools will put us at the center of the evolving paradigm of precision oncology, giving us an unprecedented opportunity to once again reshape and enhance our specialty.

It is clear that cognitive computing will ultimately transform radiology. Rather than fear the changes it brings, we should understand and seize the opportunities. While cognitive computing may reduce the need for interpretation of today’s routine imaging studies, it will also increase our efficiency and effectiveness, improving standards of care across the board and elevating radiology interpretation into the arena of quantitative science and precision medicine. It will allow us to focus on more complex diagnostic and clinical questions and become even more valuable consultants to patients and referring physicians.

The landscape of radiology is continuously expanding. Molecular imaging is gaining traction as more imaging probes, along with technologies such as hyperpolarized MRI and PET/MRI, enter clinical trials. Post-processing tools are enabling cross-sectional imaging studies to be converted into hundreds or even thousands of quantitative, “radiomics” features that, in combination with other sources of “big data,” can be used to develop decision support. Furthermore, pilot studies have shown that radiogenomics can identify tumor phenotypes and provide prognostic and predictive imaging biomarkers.

The blossoming of all these new tools and approaches will alter and strengthen the roles of imaging. The dream of integrated diagnostics is already a reality, though not yet evenly distributed, and as we enrich our knowledge of disease-relevant molecular information, we will increasingly integrate information from imaging regarding morphology, function and metabolism into diagnostic and clinical decision-making algorithms. Though progress in precision medicine will continue to depend on tissue analysis, it will also depend on interventional radiology enabling precision biopsies based on morphologic and molecular information. In addition, imaging’s role in treatment will continue expanding. Minimally invasive, image-guided treatments are becoming a mainstay of cancer care, and theranostic approaches that combine targeted molecular imaging with targeted therapies for precise treatment selection and treatment monitoring are being adopted.

Radiology is a specialty of technical innovations, and radiologists have always excelled in embracing new technologies. But we are more than technology users; we are key participants in patient-centered care. In the last 50 years, we have gone through a number of transformations, always emerging as more clinically essential than before. In the years ahead, we must and will continue to evolve—becoming not only stewards of the ever-increasing demand for imaging and image-guide therapies, but highly valued clinical consultants and innovators in the era of precision medicine.

Honored Educators

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Participants
Richard L. Baron, MD, Chicago, IL (Presenter) Nothing to Disclose

Sub-Events

PS40A Announcement of Education Exhibit Awards

Participants

PS40B Announcement of Quality Storyboard Awards

Participants

PS40C Annual Oration in Radiation Oncology: Prostate Cancer: Improving the Flow of Research

Participants
Colleen A. Lawton, MD, Milwaukee, WI (Presenter) Nothing to Disclose
Edward Y. Kim, MD, Seattle, WA (Presenter) Research support, Eisai Co, Ltd; Research support, Novartis AG; Research support, Johnson & Johnson; Research support, Bayer AG; Research support, Threshold Pharmaceuticals, Inc; Research support, Eli Lilly and Company; Research support, MabVax Therapeutics Inc;

Abstract
Prostate cancer for men like breast cancer for women is the second leading cause of cancer death in the United States. This fact alone should cause nation-wide concern and result in a push for improved screening and treatment for men plagued with this disease. Yet over the past three decades we have seen screening with PSA come and go and treatment for localized disease improve, but at a relative snail's pace. Treatment for locally advanced disease has seen progress, but hereto the tempo is sluggish and adoption of the advances not universal. Recently there has been a large influx of treatment options for metastatic patients which of course is progress, but in the end these patients will likely die of their disease. The goal of this presentation will be to review what we have learned from prostate cancer research over the past three decades. This will include a review of the research on imaging for accurate staging in addition to research on screening and treatment options. We will look at where we have succeeded and where much work still needs to be done. Finally we will explore opportunities to identify what needs to be done to help increase the flow of research so as to brighten the future for prostate cancer patients.
Thursday Plenary Session
Thursday, Dec. 1 1:30PM - 2:45PM Room: E450A

PH
AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

PSS0A  RSNA/AAPM Symposium: Precision Imaging in Medicine

Participants
Paul E. Kinahan, PhD, Seattle, WA (Moderator) Research Grant, General Electric Company; Co-founder, PET/X LLC

LEARNING OBJECTIVES
1) To learn what the Precision Medicine Initiative (PMI) is, and how it is evolving as a national program. 2) To learn the current and potential impacts of the PMI on radiology through quantitative imaging and a focus on outcomes. 3) To learn how radiology can support the PMI through advances in big data analysis and supporting therapy.

PSS0B  Precision Medicine: Optimizing Imaging Strategies

Participants
Daniel C. Sullivan, MD, Durham, NC (Presenter) Nothing to Disclose

LEARNING OBJECTIVES
During the past two decades, the molecular characterization of disease has revealed that each patient is likely to have a unique combination of genotypic, epigenetic, and phenotypic profiles for their disease. In other words, no two patients with lung cancer or diabetes will have exactly the same molecular profile for their diseases, despite the fact that we currently give them the same clinical diagnosis. Biomarkers--both specimen and imaging--play an increasingly important role in healthcare as physicians try to determine the most appropriate therapy for any patient’s molecularly-unique version of disease. This concept is variously called targeted, personalized or precision medicine. The Federal government recently launched the Precision Medicine Initiative, the goal of which is described as tailoring therapies “to you” instead of treating based on averages. For clinical imaging there are three important implications of Personalized Medicine which will be discussed in this presentation. These are (1) the importance of imaging information (biological, functional or anatomic) that reflects the individual’s molecular basis of disease, (2) objective, quantitative information that is reproducible and can be incorporated into decision support algorithms, and (3) a focus on therapeutic implications or options as opposed to primarily focusing on diagnosis. Furthermore, these evolutionary shifts in healthcare will inevitably require radiologists to accept more standardization in imaging acquisition protocols and to use structured reporting systems.

PSS0C  Quantitative Radiomics, Big Data, and Deep Learning in Precision Medicine

Participants
Maryellen L. Giger, PhD, Chicago, IL (Presenter) Stockholder, Hologic, Inc; Stockholder, Quantitative Insights, Inc; Co-founder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Corporation;

Abstract
Adapting the Precision Medicine Initiative into imaging research includes studies in both discovery and translation in order to enable the conversion of current radiological interpretation from that of the “average patient” to the precise interpretation and patient-care management decisions specific to the individual. The goal is to individually detect disease, and then give the right person the right treatment at the right time. Discovery is a multi-disciplinary data mining effort involving researchers such as radiologists, medical physicists, oncologists, computer scientists, engineers, and computational geneticists. Similar to how the genomics community approached the big biology of the Cancer Genome project, the radiological community continues to conduct robust collection, annotation, analysis, and evaluation of images of large populations. Advances in computer power and machine learning algorithms are allowing for computer-extracted features, both from clinically-driven computer-extraction systems (such as those from computer-aided diagnosis) and deep learning methods, to yield “radiomics”, i.e., the high throughput conversion of image sets into a multi-dimensional feature space. With quantitative imaging, a patient’s tumor can be characterized quantitatively via “virtual digital biopsies”. Ultimately translation of the discovered relationships will include applications to the clinical assessments of cancer risk, prognosis, response to therapy, and risk of recurrence.