

2013 RSNA (Filtered Schedule)

**Sunday, December 01, 2013**

08:30-10:15 AM • [PS10](#) • Arie Crown Theater • Opening Session  
04:00-05:45 PM • [PS12](#) • Arie Crown Theater • Sunday Afternoon Plenary Session

**Monday, December 02, 2013**

01:30-02:45 PM • [PS20](#) • Arie Crown Theater • Monday Plenary Session

**Tuesday, December 03, 2013**

01:30-02:45 PM • [PS30](#) • Arie Crown Theater • Tuesday Plenary Session

**Wednesday, December 04, 2013**

01:30-02:45 PM • [PS40](#) • Arie Crown Theater • Wednesday Plenary Session

**Thursday, December 05, 2013**

01:30-02:45 PM • [PS50](#) • Arie Crown Theater • Thursday Plenary Session

**Opening Session**

Sunday, 08:30 AM • Arie Crown Theater

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**PS10** • AMA PRA Category 1 Credit™: 1.75 • ARRT Category A+ Credit: 1  
To receive credit, relinquish attendance voucher at end of session.

**Presiding**

**Sarah S Donaldson, MD, Palo Alto, CA**  
*President, Radiological Society of North America*

**Greetings**

**John D Hazle, PhD, Houston, TX**  
*President, American Association of Physicists in Medicine*  
**Joy S Sclamborg, MD, Deerfield, IL**  
*President, Chicago Radiological Society*

**Presentation of the Outstanding Educator Award**

**Bruce G Haffty, MD, New Brunswick, NJ**  
*Recipient*

**Presentation of the Outstanding Researcher Award**

**Norbert J Pelc, ScD\*, Stanford, CA**  
*Recipient*

**Dedication of the 2013 RSNA Meeting Program to the Memory of David H. Hussey, MD (1937-2013), and Philip E.S. Palmer, MD (1921-2013)**

**Sarah S Donaldson, MD, Palo Alto, CA**

**President's Address: The Power of Partnership**

**Sarah S Donaldson, MD, Palo Alto, CA**  
**Introduction by**  
**Richard T Hoppe, MD, Palo Alto, CA**  
*First Vice President, Radiological Society of North America*

**LEARNING OBJECTIVES**

In the current healthcare environment, radiologists must reexamine their traditional expectations, attitudes, and behaviors so as to embrace a requisite change in culture that builds partnerships throughout radiology, the general medical community, and the larger community of patients and families. This address illustrates the perils of technology that have unintentionally fragmented radiology and radiologists. Yet in this current era of precision imaging and therapy, we find natural partnerships throughout the radiologic community. Within the general medical community, multi-disciplinary team medicine mandates visibility of the radiologist, who must accept responsibility for patient care beyond rapid communication of imaging results. Team-based practice promotes collaborative clinical and research programs, augments one's expertise, and builds careers. Professional interdependence promotes innovation and adds value to our collective endeavors. However, our most important partners are the patients we serve. When we commit ourselves to focusing on their care and becoming their partners, they will come to understand our contribution to diagnosis and treatment, and will become our advocates. The physician / patient bond that is well developed in oncology serves as a model for all of radiology, and confirms the gratifications that come from being a patient-oriented radiologist.

**Annual Oration in Diagnostic Radiology: We Must Stand on the Shoulders of Giants**

**Damian E Dupuy, MD\*, Providence, RI**  
**Introduction by**  
**Matthew A Mauro, MD\*, Chapel Hill, NC**  
*Chairman, Scientific Program Committee*

**LEARNING OBJECTIVES**

Over the past 50 years the field of Radiology has undergone incredible growth that has led to greater diversity and sub specialization. A clear division between Radiation Oncology and Diagnostic Radiology was made in the early 1970s and since that time each has become even more complex and subspecialized. Within Radiology, the subspecialty of Interventional Radiology has emerged as a unique entity similar to the demarcation between Radiology and Radiation Oncology over 40 years ago. The newly approved dual Interventional Radiology (IR) and Diagnostic Radiology (DR) primary certificate for resident education emphasizes that IR is distinct in its incorporation of diagnostic imaging, image-guided procedures and patient care. Radiology and Interventional Oncology share a strong focus on cancer detection and diagnosis, tumor staging, locoregional therapy and treatment follow-up. Both specialties are vitally important to patients during their cancer treatment and should strive for collaboration to optimize patient care. Despite their

mutual goals and complementary skill sets, many Radiology and Radiation Oncology Departments struggle to be autonomous and are at times in direct competition for both hospital resources and patients. In the new health care paradigm where evidence-based medicine (e.g. cost and quality) becomes a more important determinant of treatment decision-making, a cohesive team approach to cancer care makes the most economic sense. According to an American College of Radiology survey of United States Radiology and Radiation Oncology practices in 2008, most practices from both specialties preferred a large multi-specialty group practice either within or separate from an academic medical center. This is no surprise given the growth of medical knowledge and technical innovation that our specialties have benefited from. It is becoming more difficult for smaller groups to maintain state of the art specialization within their respective fields. Radiology groups, on average, are almost three times the size of Radiation Oncology practices. It behooves these departments to reach a stronger axis of collaboration given the shared common interests and marked synergy between many of the cancer treatments each possesses in their armamentarium. Advanced imaging of treatment response with contrast-enhanced imaging, perfusion and diffusion magnetic resonance imaging as well as PET/CT and PET/MRI is providing a clearer picture into tumor anatomy and pathophysiology. Radiologists can place fiducial markers and brachytherapy catheters to provide more precise localization for stereotactic body radiotherapy techniques and higher local radiotherapy boosts for recurrent local cancers, respectively. Advanced imaging technology provides radiation oncologists with more accurate tumor targeting, thus reducing toxicity to adjacent normal and critical tissues. Combination therapies with external beam radiotherapy or brachytherapy and thermal ablation technology have shown synergistic effects with promise for improved local control in larger tumors. Intraarterial radioembolics with 90 Yttrium embolic agents utilize beta particles to destroy regional cancer of the liver. Newer non-ionizing techniques such as high intensity focused ultrasound can provide stereotactic like thermal destruction of soft tissue tumors; exciting preliminary results have shown potential in bone cancer, breast cancer and prostate cancer. Radiation oncologists have great expertise at treatment planning with ionizing radiation. This experience has come from decades of research as well as technical advances in computer science and photon delivery. Concurrently, radiologists who target tumors with ablative techniques have begun to realize the great need for 3-dimensional treatment planning. The time has come for a reunification of spirit as well as intellect. Our patients and the medical community will reap the benefits of a stronger collaboration. As Isaac Newton said, "If I have seen further than others, it is by standing upon the shoulders of giants."

## Sunday Afternoon Plenary Session

Sunday, 04:00 PM • Arie Crown Theater

GN

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**PS12** • AMA PRA Category 1 Credit™: 1.75 • ARRT Category A+ Credit: 1  
To receive credit, relinquish attendance voucher at end of session.

### Presiding

**Sarah S Donaldson, MD, Palo Alto, CA**  
*President, Radiological Society of North America*

### Report of the RSNA Research and Education Foundation

**James P Borgstede, MD, Denver, CO**  
*Chairman, Board of Trustees, RSNA Research and Education Foundation*

#### LEARNING OBJECTIVES

The RandE Foundation ♦ A Powerful Partner 2013 was an outstanding year for the RSNA Research and Education Foundation. This success is due in large part to the support of our many loyal and committed partners. The theme of the 2013 Annual Meeting and Scientific Assembly is ♦ The Power of Partnership ♦ and RandE Foundation donors are truly our partners in funding radiology's future. Individual donors, private practice and academic group supporters, and our corporate colleagues all play an integral role in the RandE Foundation. Through their incredibly generous support, the RandE Foundation was able to fund 85 grants totaling over \$3 million ♦ the highest amount awarded in the Foundation's history. The work of the Foundation's grant recipients would be impossible without the supportive partnership of the countless academic departments and their leaders. These leaders encourage investigators to apply for RandE funding and then generously yield protected time for their research. The mission of the RandE Foundation is to advance radiologic research, education and practice, and the bedrock of radiologic research is the RandE Foundation. Since its inception, the Foundation has awarded over \$40 million to nearly 1000 educators and investigators. An RandE grant is a pathway to greater funding from sources such as the NIH, and in the RandE Foundation's brief history, the Foundation has enabled over \$1 billion in radiological research. A partnership with the RandE Foundation means that critical funding is being directed to young and seasoned investigators during all stages of their careers, thus ensuring that our specialty stays at the forefront by investing in the researchers and scholars who are driving the advances in radiological sciences. The recipients in the RandE class of 2013 are performing research in a number of different subspecialty areas using many modalities and techniques. Their promising projects have clinical and translational implications that will most certainly move our specialty forward. The ongoing partnership with the RandE Foundation and the RSNA is evidenced by the number of past grant recipients presenting at the Annual Meeting. Whether a plenary session, refresher course, scientific session or education exhibit, this continuing commitment by RandE grant recipients is both steadfast and worthy of note. During the meeting week, please take time to visit the RandE Foundation Booth, located on Level 3 of Lakeside Center to learn more about our outstanding grant recipients, their innovative projects and the many available opportunities to support the RandE Foundation and the future of our specialty.

### Image Interpretation Session

#### Moderator

**Gerald D Dodd, MD, Aurora, CO**

#### Introduction by

**Donald P Frush, MD, Durham, NC**  
*Chairman, Refresher Course Committee*

#### Panel

**David A Lynch, MBBCh, Denver, CO**

**Riccardo Manfredi, MD, Verona, Italy**

**Debra L Monticciolo, MD, Temple, TX**

**Michael J Tuite, MD, Verona, WI**

**David M Yousem, MD, Owings Mills, MD**

#### 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.

## Monday Plenary Session

Monday, 01:30 PM • Arie Crown Theater

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**PS20** • AMA PRA Category 1 Credit™: 1.25 • ARRT Category A+ Credit: 1  
To receive credit, relinquish attendance voucher at end of session.

### Presiding

### **Presentation of the Alexander R. Margulis Award for Scientific Excellence**

#### **Presentation of Honorary Memberships**

**Gabriel P Krestin** , MD, PhD \* , *Rotterdam, , NETHERLANDS*  
**Anne W Lee** , MD , *Shenzhen, Guangdong, CHINA*  
**Malgorzata Szczerbo-Trojanowska** , MD , *Lublin, , POLAND*  
**Introduction by**  
**Sarah S Donaldson** , MD , *Palo Alto, CA*

### **Eugene P. Pendergrass New Horizons Lecture: Normal and Neoplastic Stem Cells: Implications for the Radiological Sciences**

**Irving L Weissman** , MD \* , *Stanford, CA*  
**Introduction by**  
**Sarah S Donaldson** , MD , *Palo Alto, CA*

#### **LEARNING OBJECTIVES**

Research that bears on the earliest stages of cancer development as well as the sequelae of cancer treatment is of import not only to radiation oncologists but to diagnostic radiologists as well. Our investigation into blood-forming stem cells (HSC) and their non-self-renewing progeny hold promise for (1) regenerating the hematopoietic system after chemotherapy and radiation for cancer, (2) replacing genetically defective or otherwise damaged blood-forming systems, and (3) understanding the stages of hematopoiesis that harbor the earliest stages of pre-leukemia. Following embryonic development, most of our tissues and organs are continuously regenerated from tissue/organ specific stem cells. The principal property that distinguishes such stem cells from their daughter cells is self-renewal; when stem cells divide they give rise to stem cells (by self-renewal) and progenitors (by differentiation). In most tissues only the primitive stem cells self-renew. Stem cell isolation and transplantation is the basis for regenerative medicine. For example, prospectively isolated blood forming [hematopoietic] stem cells [HSC] are cancer-free even when isolated from marrow or mobilized blood containing cancer cells; autologous pure HSC transplants into women with metastatic breast cancer to rescue them from high dose chemotherapy in a phase 1/2 trial resulted in 33% overall survival, compared to 6% for unpurified mobilized peripheral blood. This is contrary to conventional wisdom only because the titles of most mobilized blood transplants are still called HSC transplants, even in major journals that should know better. Still, the therapy began in the 1996-8 trial has not been extended to extended phase 3 trials, largely because most oncologists counsel against it, and the company with the rights to use it does not offer it. Pure HSC in allogeneic transplants can give graft vs host free hematopoietic regeneration, and because the host has a donor immune system, it cannot reject any organ, tissue, or tissue stem cell transplant from the HSC donor. The failure of extension of HSC transplantation clinically has blocked the testing of such protocols in humans. Nevertheless, if it is extended to its logical conclusion, in the next decades the organ and tissue donors will not be living people, but pluripotent stem cell lines that can generate HSC and organ-specific stem cells. Because total body irradiation (TBI) is the preferred method to condition for HSC transplants, it could become a major clinical entity for the radiation therapy community. Self-renewal is dangerous, and therefore strictly regulated. Poorly regulated self-renewal can lead to the genesis of cancer stem cells, the only self-renewing cells in the cancer. In myelogenous leukemia the developing cancer clones progress at the stage of HSC, until they become fully malignant. At this point, the leukemia stem cell moves to a stage of a downstream progenitor that has evaded programmed cell death and programmed cell removal, while acquiring self-renewal. While there are many ways to defeat programmed cell death and senescence, there appears to be one dominant method to avoid programmed cell removal: the expression of the cell surface "don't eat me" protein CD47, the ligand for macrophage SIRP-alpha. All cancers tested express CD47 to overcome expression of "eat me" signals such as calreticulin. Antibodies that block the CD47-SIRP-alpha interaction enable phagocytosis and killing of the tumor cells in vitro and in vivo. In primary human cancers of all types transplanted from patients to immune deficient mice orthotopically, anti-CD47 eliminates all metastases, but often requires local resection or radiotherapy to remove bulky tumors that grow faster than the macrophages can eat them. The anti-CD47 therapies are expected to be in phase 1 trials in early 2014.

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### **Tuesday Plenary Session**

Tuesday, 01:30 PM • Arie Crown Theater

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**PS30** • CME : CME credit is not available for this session.  
To receive credit, relinquish attendance voucher at end of session.

#### **Presiding**

**Sarah S Donaldson , MD , Palo Alto, CA**  
*President, Radiological Society of North America*

### **Presentation of the Gold Medal of the Radiological Society of North America**

**Theresa C McLoud** , MD , *Boston, MA*  
**Harvey L Neiman** , MD , *Reston, VA*  
**J. Frank Wilson** , MD , *Milwaukee, WI*  
**Introduction by**  
**Sarah S Donaldson** , MD , *Palo Alto, CA*

### **Special Lecture: Mobilizing Human Potential**

**Condoleezza Rice** , PhD , *Stanford, CA*  
**Introduction by**  
**Sarah S Donaldson** , MD , *Palo Alto, CA*

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### **Wednesday Plenary Session**

Wednesday, 01:30 PM • Arie Crown Theater

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**PS40** • AMA PRA Category 1 Credit™: 1.25 • ARRT Category A+ Credit: 1  
To receive credit, relinquish attendance voucher at end of session.

#### **Presiding**

**Sarah S Donaldson , MD , Palo Alto, CA**  
*President, Radiological Society of North America*

### **Announcement of the Education Exhibit Awards**

### **Dedication of the Annual Oration in Radiation Oncology to the Memory of K. Kian Ang, MD, PhD (1950-2013)**

## Annual Oration in Radiation Oncology: Beneficial Liaisons: Imaging and Therapy

Paul M Harari , MD \* , Madison, WI

### Introduction by

Nina A Mayr , MD , Seattle, WA

Chairman of the Subcommittee on Radiation Oncology and Radiobiology, Scientific Program Committee

### LEARNING OBJECTIVES

See the tumor, treat the tumor. How complicated can this be? Surgeons, radiation oncologists and interventional radiologists are guided by imaging each day to effectively deliver their craft to cancer patients. Not long ago, external anatomy and plain X-rays served as the primary guide for radiation therapy. Broad field design was the prevailing paradigm with the knowledge that the tumor surely resided within. Collateral normal tissue damage was a necessary accompaniment of treatment and tumor dose was largely limited by normal organ tolerance. Today we deliver ablative radiation doses to complex three-dimensional tumor shapes virtually anywhere in the body. We create sharp dose gradients between tumor and critical normal tissues and seek high precision for daily treatment across thousands of patients. However, this remarkable achievement requires rigorous and meticulous interaction between imaging and treatment. The revolution in imaging and treatment technology has fostered meaningful gains for patients. Intensity modulated radiation therapy (IMRT) and daily image guidance have become routinely available thereby enabling improved dose profiles, high tumor control rates and preservation of salivary, pulmonary, cardiac, bowel and many other normal tissue functions that benefit patient quality of life. The complementary use of CT, MR and PET imaging routinely influence tumor staging, treatment recommendations and outcome. Using head and neck cancer and other tumor types for illustration, this presentation highlights several major contributions of imaging to improved cancer therapy. Cooperative group trials now routinely incorporate imaging into the enrollment, treatment and follow up of cancer patients. Despite these magnificent steps forward, we are only scratching the surface of possibility. Seeing inside individual tumors and characterizing heterogeneity profiles (including proliferation, hypoxia, metabolism) with functional and molecular imaging can further personalize treatment. Tracking small clusters of tumor cells is lowering the threshold of detection. Visualizing early tumor response to treatment is providing new opportunities to tailor individual treatment plans. We are poised to move well beyond  $\diamond$ see the tumor, treat the tumor $\diamond$ . We are on the threshold of unparalleled visualization within tumors, tracking individual tumor cells, developing diagnostic agents to simultaneously image and treat, and harnessing early response profiles to shape more personalized and effective future therapies. Strengthening the bond of interaction between diagnostic and therapeutic practitioners in oncology has never been more vital and gratifying.

## Thursday Plenary Session

Thursday, 01:30 PM • Arie Crown Theater

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**PS50** • AMA PRA Category 1 Credit™: 1.25 • ARRT Category A+ Credit: 1.5  
To receive credit, relinquish attendance voucher at end of session.

### RSNA/AAPM Symposium

#### Moderator

Jeffrey H Siewerdsen , PhD \* , Baltimore, MD

AAPM Liaison to the RSNA Scientific Program Committee

### LEARNING OBJECTIVES

1) Learn how multi-modality imaging methods are being used in combination with high-precision radiation therapy delivery techniques to understand fundamental mechanisms of cancer pathogenesis, progression, and treatment response. 2) Learn the challenges and advances associated with quantitative imaging, and understand how more accurate and quantitative imaging is central to advancing the understanding of major questions in 21st century medicine. 3) Learn how imaging in partnership with medical physics and other technical and clinical disciplines provides a vital tool and multidisciplinary expertise for such advances.

### Imaging in Partnership: With Radiation Therapy

David A Jaffray , PhD \* , Toronto, ON, CANADA

### LEARNING OBJECTIVES

View learning objectives under main course title.

### Imaging in Partnership: With Physics and Quantitative Medicine

James A Deye , PhD , Bethesda, MD

### LEARNING OBJECTIVES

View learning objectives under main course title.

## Disclosure Index

### D

**Dodd, G. D. III** - Research Advisory Board, Koninklijke Philips Electronics NV

**Dupuy, D. E.** - Grant, NeuWave Medical Inc Consultant, Biocompatibles International plc Board of Directors, BSD Medical Corporation Stockholder, BSD Medical Corporation

### H

**Harari, P. M.** - Research Grant, Amgen Inc

### J

**Jaffray, D. A.** - Research Grant, Koninklijke Philips Electronics NV Research Grant, Elekta AB Research Grant, Raysearch Laboratories AB Research Grant, IMRIS Inc Research Grant, Varian Medical Systems, Inc Research Grant, Modus Medical Devices Inc Royalties, Raysearch Laboratories AB Royalties, Modus Medical Devices Inc Royalties, Elekta AB Royalties, IMRIS Inc

### K

**Krestin, G. P.** - Consultant, General Electric Company Research Grant, General Electric Company Research Grant, Bayer AG Research Grant, Siemens AG Speakers Bureau Siemens AG

**L**

**Lynch, D. A.** - Research support, Siemens AG Scientific Advisor, Perceptive Informatics, Inc Consultant, Actelion Ltd Consultant, InterMune, Inc Consultant, Gilead Sciences, Inc Consultant, F. Hoffmann-La Roche Ltd

**M**

**Mauro, M. A.** - Research Consultant, B. Braun Melsungen AG Research Consultant, BTG International Ltd

**P**

**Pelc, N. J.** - Research Grant, General Electric Company Board of Directors, Real-Time Radiography, Inc Stockholder, General Electric Company Scientific Advisory Board, Simplify Systems, Inc Scientific Advisory Board, Radguard Medical, Inc Scientific Advisory Board, Albatross Medical Imaging

**S**

**Siewerdsen, J. H.** - Research Grant, Siemens AG Consultant, Siemens AG Research Grant, Carestream Health, Inc Royalties, Elekta AB

**W**

**Weissman, I. L.** - Co-founder, StemCells, Inc Director, StemCells, Inc Stockholder, Amgen Inc

**Y**

**Yousem, D. M.** - Author, Oakstone Publishing Author, Reed Elsevier