

RSNA *News*

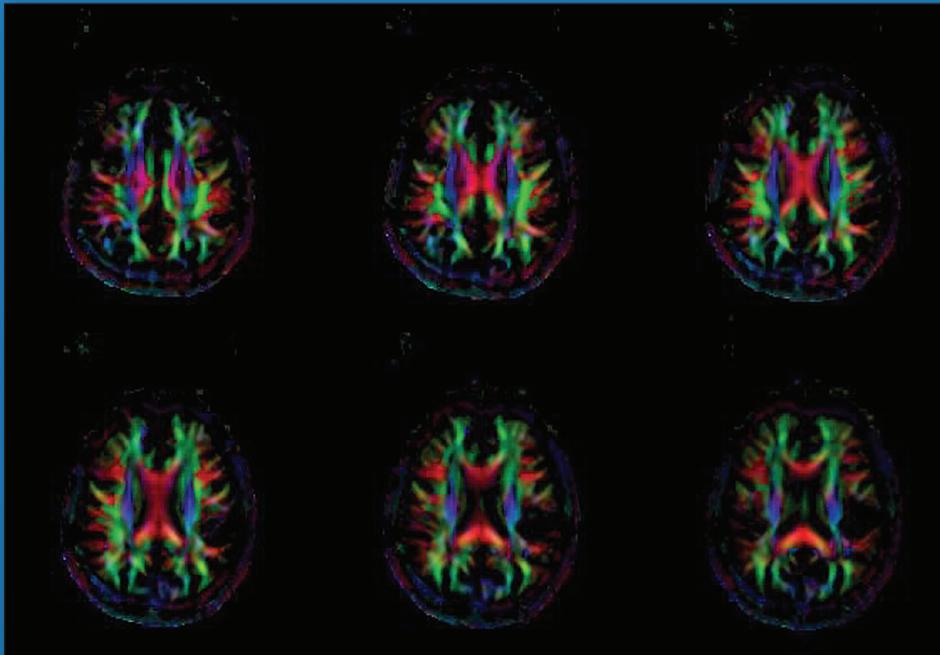


Image courtesy of Jeffrey S. Anderson, M.D., Ph.D.

MR Imaging Accuracy Questioned in Diagnosing MS

Also Inside:

- First Filmless Reading Room Gets Makeover
- PET Securing New Role in Imaging Lung Inflammation
- Safety Net Keeps Patients from Falling Through Cracks
- RSNA Highlights Conference Offers More Education Choices

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RSNA News

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New Column Offers Personal Perspective on Profession

THIS MONTH, we introduce a new column in *RSNA News* called My Turn.

In each issue, I, as your editor, or a member of the *RSNA News* Editorial Board, RSNA Board of Directors or RSNA Research & Education Foundation Board of

My Turn

ONE RADIOLOGIST'S VIEW

Trustees will provide a "first person" account of an issue of professional relevance related to new science, new technology, a vision of the future or a personal perspective on their service roles within RSNA. Not designed as a pulpit or political platform, it will allow your colleagues who hold leadership positions in our Society to express their personal views and opinions.

RSNA News reaches more than 38,000 members each month, through-

out this ever flattening world. As each person takes their turn in print, you will have an increasing awareness of RSNA programs, their value to you and our focus on excellence in research and education. As we all navigate the cur-

rent information explosion, this monthly publication seeks to help its readers with the task of transferring data to useful knowledge.

While our community of practice is expanding in a global sense, a convergence of subspecialties is taking place at home, focused on diagnostic radiology. PET/CT has brought nuclear medicine specialists, radiation oncologists and diagnostic radiologists together with a commonality of purpose—patient care and disease management. The functional information provided by

PET, fused with the precise anatomical and pathological data has quite simply changed patient management in a most fundamental way.

Your editor, editorial board and staff are committed to bringing content each month to help our members stay informed about new and evolving changes in diagnostic imaging, intervention, nuclear medicine and radiation oncology. I hope you will enjoy the new column and will provide us with feedback at rsnanews@rsna.org.



Bruce L. McClelland, M.D.

BRUCE L. MCCLELLAN, M.D.
EDITOR, *RSNA NEWS*

ANNOUNCEMENTS

R&E Foundation Restructures Grant Programs for 2007

THE RSNA Research & Education Foundation Board of Trustees has restructured the grant program menu for 2007. The changes are intended to:

- Simplify the grant programs and eligibility criteria
- Direct resources toward individuals rather than institutions
- Increase the funding rate by omitting

expensive, multiyear grant programs

- Balance research and education initiatives

The R&E Foundation is developing an online submission procedure for the January 2007 grant deadline. Online submission is scheduled to be available



later this year. Please check the Foundation's Web site at RSNA.org/Foundation for updates and complete details on the revised grant programs.

Further questions may be directed to Scott Walter, M.S., senior manager: grant administration, at 1-630-571-7816 or swalter@rsna.org.

SCAR Changes Name

The Society for Computer Applications in Radiology (SCAR) has changed its name to the Society for Imaging Informatics in Medicine (SIIM). The society also is relocating to new headquarters in Leesburg, Va.



SCAR leadership announced the name change as a part of a larger move to expand its focus to encompass clinical specialties beyond radiology.

MEDICAL IMAGING COMPANY NEWS:

IsoRay Medical, Inc. Receives Award

■ IsoRay Medical, Inc., of Richland, Wash., has received the 2006 Excellence in Technology Transfer Award from the Federal Laboratory Consortium (FLC) for the commercialization of the company's patented Cesium-131™ brachytherapy seed technology.

IsoRay collaborated with the Pacific Northwest National Laboratory (PNNL) to take Cesium-131 from the research phase to commercial-scale production. Currently being used in brachytherapy treatment for prostate cancer, Cesium-131 has a significantly shorter half-life that enables faster delivery of therapeutic radiation.

Correction

In the May 2006 issue of *RSNA News*, a chart accompanying the story "Radiographer Shortage Continues as Programs Turn Away Qualified Candidates" contained a typographical error. The chart showing issues limiting enrollment in radiography programs should read "1-5, 1 Most Important" under the "Mean Rank" heading.

Eyler Receives Gold Medal



William R. Eyler, M.D.

William R. Eyler, M.D., former editor of *Radiology* and current RSNA historian, has received the gold medal of the Michigan Radiological Society (MRS).

Dr. Eyler, of Beverly Hills, Mich., has been in practice for 63 years and continues to serve as a consulting radiologist at Henry Ford Hospital, where he was chair of the Department of Radiology for 28 years.

Editor of *Radiology* from 1966 to 1985, Dr. Eyler continues to serve as editor emeritus and last year RSNA renamed its editorial fellowship for him. He served as MRS president from 1961 to 1962.

RSNA Members Recognized for Imaging IT Work



Ramin Khorasani, M.D., M.P.H.

Health Imaging & IT magazine has named RSNA Electronic Communications Committee (ECC) members **Eliot Siegel, M.D.**, **Ramin Khorasani, M.D., M.P.H.**, and **Keith J. Dreyer, D.O., Ph.D.**, among the top 25 innovators in health imaging and IT for 2006. The magazine recognized Dr. Siegel's work on the world's first filmless radiology department (see story page 5) and also his role in developing RSNA's Medical Imaging Resource Center (MIRC).

Dr. Khorasani is director of medical imaging information technology, vice-chair of the Department of Radiology and medical director of the Center for Evidence-Based Imaging at Brigham & Women's Hospital. He was recognized for educating others on how to use IT tools, including an automated preapproval program for decreasing inappropriate imaging use, to improve patient safety and quality and efficiency of care.

Dr. Dreyer is vice-chair of radiology informatics, corporate director of medical imaging and a radiology instructor at Massachusetts General Hospital and Harvard University. The magazine noted his advanced research into the mining of radiologic and genetic image data for disease discovery and presymptomatic disease detection.

For more information on the top 25 list, go to

www.healthimaging.com/content/view/4379/110.

RADIATION SAFETY

Tip of the Month

A periodic review of your institutional procedures may help eliminate low-yield examinations and provide substitutes with better information and/or lower dose.

 American Association of Physicists in Medicine

Van Moore is Chair of ACR Board

The American College of Radiology (ACR) has named **Arl Van Moore Jr., M.D.**, of Charlotte, N.C., chair of the ACR Board of Chancellors.

Dr. Van Moore had served as vice-chair of the board since May 2004. He is president of Charlotte Radiology and medical director at Carolinas Medical Center School of Radiologic Technology. He also is a clinical assistant professor in the Department of Radiology at Duke University Medical Center.

ACR also named:

James Thrall, M.D., of Boston, vice-chair

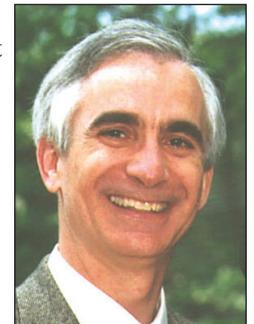
James P. Borgstede, M.D., of Colorado Springs, Colo., president

Charles D. Williams, M.D., of Tallahassee, Fla., vice-president

Paul H. Ellenbogen, M.D., of Dallas, secretary-treasurer

Royal Receives Advocate Award

Children's Resources, a Birmingham, Ala., non-profit organization focused on quality child care, has awarded **Stuart Royal, M.D.**, its Children's Advocate Award. Radiologist-in-chief at Children's Hospital in Birmingham since 1987, Dr. Royal is immediate past-president of the Society for Pediatric Radiology.



Stuart Royal, M.D.

Feedback Requested on NIH Report

The Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS) seeks public input on its draft report, *Policy Issues Associated with Undertaking a Large U.S. Population Cohort Project on Genes, Environment, and Disease*. The report is the result of a two-year study into the opportunities and challenges associated with conducting large population cohort studies aimed at understanding the relationships of genes, the environment and common, complex diseases.

The draft report, along with instructions on how to submit input, is available electronically at www4.od.nih.gov/oba/sacghs/public_comments.htm. Deadline for feedback submissions is July 31.

RSNA News

Send news about yourself, a colleague or your department to rsnanews@rsna.org, 1-630-571-7837 fax, or RSNA News, 820 Jorie Blvd., Oak Brook, IL 60523. Please include your full name and telephone number. You may also include a non-returnable color photo, 3x5 or larger, or electronic photo in high-resolution (300 dpi or higher) TIFF or JPEG format (not embedded in a document). RSNA News maintains the right to accept information for print based on membership status, newsworthiness and available print space.

MR Imaging Accuracy Questioned in Diagnosing MS

WHILE ONE recently released study disputes the accuracy of MR imaging for early diagnosis of multiple sclerosis (MS) based on past performance, other radiologists say the real news is in the present—where advances are improving MR technology and expanding its applications.

“Our results show that a number of studies of MR imaging for diagnosis of multiple sclerosis have exaggerated the apparent diagnostic accuracy of MR imaging,” said Jonathan Sterne, Ph.D., co-author of a study that appeared in the April 15 issue of the *British Medical Journal (BMJ)*. Dr. Sterne is a reader in medical statistics and epidemiology with the MRC Health Services Research Collaboration at the Department of Social Medicine in Bristol, England.

Dr. Sterne and colleagues conducted a metaanalysis of 29 studies to determine the accuracy of MR imaging and its impact on diagnosis and patient management. The team compared diagnostic criteria incorporating MR imaging to a reference standard for MS diagnosis.

Critics say this kind of metaanalysis going back to the early 1980s is outdated. “The study findings reflect outdated technology and do not include some of the newer MR methods that are used to diagnose MS,” said Jeffrey S. Anderson, M.D., Ph.D., a neuroradiology fellow at the University of Utah Health Sciences Center and 2004 recipient of an RSNA Research Resident Grant.

Approximately 400,000 Americans have MS and about 200 people are

diagnosed every week, according to the National Multiple Sclerosis Society. The society estimates that MS affects about 2.5 million people worldwide.

With confirmation of lesions through MR imaging, MS is now often diagnosed after only one episode, eliminating the need to wait for a second flare-up affecting a different part of the central nervous system. Early diagnosis can significantly speed treatment, given that years can pass between first and second attacks. Disease-modifying drugs such as beta interferon have proven to be strongly beneficial if given in the disease’s earliest stages.

Dr. Sterne and colleagues are concerned that diagnosis after just one flare-up can lead to false positives and unnecessary treatment. They said it is much easier once MS is established—versus when the disease is in its early stages—to distinguish people who have it from people affected by other conditions.

Study findings reflect outdated technology and do not include some of the newer MR methods that are used to diagnose MS.

Jeffrey S. Anderson, M.D., Ph.D.

“Analyses based on the cohort studies showed that MR imaging is diagnostic for MS, but that it is not sufficiently strongly diagnostic to be used to rule in or rule out MS,” said Dr. Sterne. “For example, based on the two studies that followed patients for at least 10 years, and assuming that 60 percent of patients presenting with possible MS will eventually go on to develop MS, even in the presence of many MR imaging lesions, the probability of the patient going on to develop MS was just over 80 percent.”

He added that in patients with a negative scan for MS, the probability of developing MS decreased to 13 per-



Jeffrey S. Anderson, M.D., Ph.D.
University of Utah

cent in the first study and 43 percent in the second.

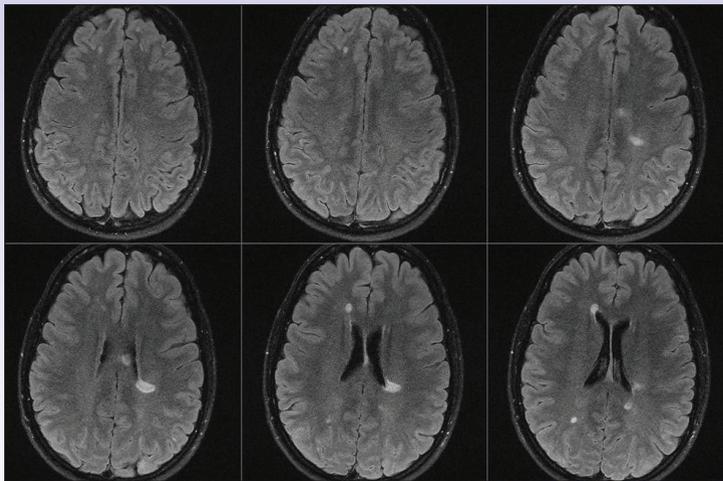
Study Based on Yesterday’s Technology

With advances in pulse sequence design, magnetic field strength and interpretation criteria, today’s MR imaging is almost unrecognizable compared to that of 20 years ago, said Dr. Anderson. He added that some of the later studies in the *BMJ* analysis reflect significantly long follow-up periods and still reference obsolete techniques.

Dr. Sterne responded, “Cohort studies in this area take years to conduct and publish, because it can take many years for patients to develop a second episode of neurologic dysfunction and be clinically diagnosed,” he said. “It follows that the newest MR imaging technologies have not been evaluated in cohort studies.”

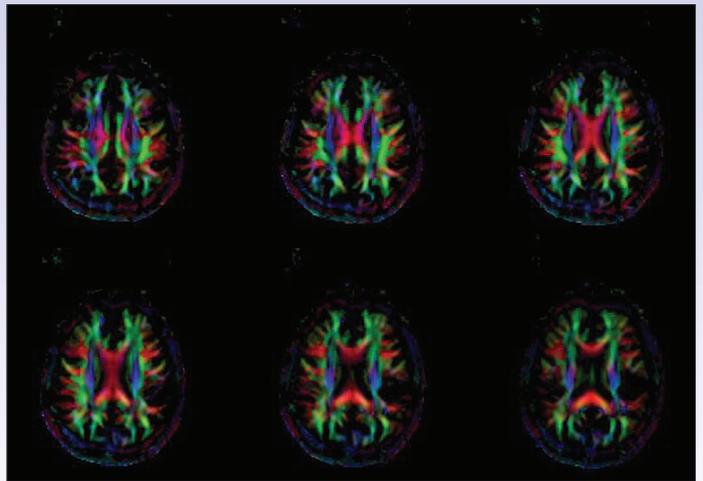
Dr. Anderson also disputed the paper’s conclusion that it is better not to diagnose patients early in MS due to the chance of unnecessary treatment.

Continued on next page



Axial FLAIR images acquired on a 3 Tesla MRI scanner show characteristic white matter lesions of multiple sclerosis.

Images courtesy of Jeffrey S. Anderson, M.D., Ph.D.



Diffusion tensor images of the same patient. Changes in fractional anisotropy and diffusivity are seen in the region of the FLAIR lesions and surrounding white matter.

Continued from previous page

“We are trying to find a screening test that can pick up very early cases,” he said. “Even if we treat some cases that turn out not to be MS, given the benefits of early treatment, this does less harm to patients.”

New Techniques Being Developed

Among the advances in imaging for MS is diffusion tensor imaging, which seems promising because it shows the disruptions in white matter tracks that are a consequence of inflammatory MS lesions, said Dr. Anderson. He added that magnetization transfer imaging, also known as magnetization transfer contrast imaging, may specifically distinguish MS lesions from lesions caused by other disease processes. Spectroscopy also has increased the sensitivity of MS lesion detection, he added.

Other studies, including the one funded by Dr. Anderson’s RSNA grant, have examined functional MR imaging (fMRI) and MS. “fMRI shows that MS patients recruit different brain regions when performing certain tasks,” he said. Several papers have indicated that this has some diagnostic relevance to MS and can increase sensitivity. Other research has evaluated fMRI as a surrogate for visual evoked potentials, since there are differences in the timing of the visual cortex response based on

whether the patient has MS or not.

Newer techniques are slowly gaining acceptance as radiologists learn more about their application in specific clinical scenarios, Dr. Anderson said.

“These new techniques may be useful in swaying diagnosis one way or the other when conventional MR imaging puts us on the fence as to whether or not a patient has MS,” he said. “They may help us refine our diagnostic capabilities.”

Imaging Has Role in Monitoring and Treatment

Beyond diagnosis, imaging is also critical in measuring subtle changes in the disease burden for monitoring and treatment, said Dr. Anderson. Monitoring is important in detecting very early

MS and in patients presenting with minimal lesions or clinical symptoms, since many of the new treatments work best when started early in the course of the disease. Meanwhile, drug trials under way for promising new agents also require highly sensitive techniques to monitor therapeutic response.

“For both of those reasons, the thrust of MS imaging now is to quantitatively determining disease burden,” said Dr. Anderson. “It requires us to be very precise in terms of quantifying the number and chronicity of lesions, which may be useful applications for some of these newer techniques. They may be just what we need in order to quantify disease to see if a drug is having any effect.” □

■ To view the abstract for “Accuracy of Magnetic Resonance Imaging for the Diagnosis of Multiple Sclerosis: Systematic Review,” go to bmj.bmjournals.com/cgi/content/abstract/332/7546/875.

Brain Imaging at RSNA 2006

MR IMAGING of white matter will be addressed in one of a dozen neuroradiology refresher courses at RSNA 2006. To register for this or any other courses, go to rsna2006.rsna.org and click on Registration, Housing & Courses.

■ RC305

White Matter Diseases of the Brain and Spinal Cord

- Review major imaging findings of white matter diseases in children and adults
- Depict uses of conventional MR imaging to provide specific diagnoses for white matter diseases
- Explain how advanced MR imaging techniques can be used to follow disease progression



First Filmless Reading Room Gets Makeover

THOUGH PERHAPS not as provocative as the transformations people and homes undergo on reality TV, the world's first filmless radiology reading room recently got a makeover of its own. The reading room at the Baltimore Veterans Affairs (VA) Medical Center now boasts a prototype showcase for interpreting images on a Picture Archiving and Communication System (PACS).

"We wanted to create an environment for radiologists that would simultaneously facilitate image interpretation and lower stress," said Eliot Siegel, M.D., a professor and vice-chair of the Diagnostic Radiology Department at the University of Maryland School of Medicine and chief of imaging at the Baltimore VA.

Dr. Siegel's research into radiology ergonomics has shown that as radiology departments began to move from film to PACS—and hospitals took out viewboxes and replaced them with computer workstations—radiologists started suffering more physical problems such as eye strain, neck strain, carpal tunnel syndrome and other repetitive stress injuries.

"When radiologists drive to and from work, they can control the position of the car seat, the airflow, the lighting and the sound," Dr. Siegel said. "But when they arrive at work, where they spend the majority of their day, the conditions are dramatically different. The seating is bad, there is no



This rendering depicts an ideal, customizable "luxury" reading room, including a 6-way adjustable chair and adjustable work surfaces, controllable ambient lighting and an air circulation system. The unit also rotates completely. Similar to a luxury car, the unit allows users to set their individual preferences on an electronic security key device so the unit can be reset immediately for each physician.

Rendering courtesy of GE Healthcare.

ventilation or temperature controls and the lighting is often abysmal." Dr. Siegel's research led to a grant from GE Healthcare, culminating in the

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Eliot Siegel, M.D.

planning and construction of the futuristic reading room. "I believe that it is possible to markedly improve our working environment and consequently increase productivity and accuracy for a relatively modest outlay of funds," he added.

GE Healthcare Marketing Manager Mark Morita, who works with doctors on emerging technologies, said Dr. Siegel came to mind immediately in the ergonomics area. "Millions of dollars have been spent on PACS and

other technology without much being spent on the doctors who use PACS," Morita said.

Morita said GE Healthcare pulled together research leaders from a variety of perspectives about three and a half years ago to brainstorm ideas for optimizing a reading room. Design firms and architects created pictures of an ideal room with four to six pods. Different ideas and designs ranged from the kind of space a community hospital might require to a larger room to be used in a major metropolitan teaching hospital.

Building the room at the Baltimore VA took about two and a half years, due to some unique constraints. "The reading room is centrally located in the radiology department, next door to the MR scanner," said Morita. "We needed to soundproof the reading room to minimize the vibrations from the scanner." Researchers also delayed opening the

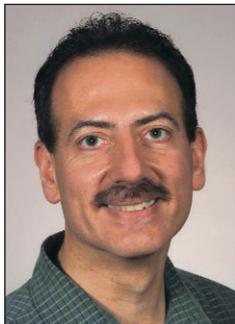
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room in order to test and deploy components that feature innovative approaches to security, acoustics, lighting and computer-based environmental control.

Virtual Tour

While functioning as the day-to-day work environment for radiologists, the Baltimore VA reading room is also a demonstration showcase. It has five separate mini-environments and six PACS workstations and features a variety of solutions for lighting, furniture,



Eliot Siegel, M.D.
University of Maryland
School of Medicine

ergonomics and other new ideas in room design. Visitors can check out each workstation and select the lighting, acoustics and ergonomics they prefer.

The reading room also was showcased at RSNA 2005, where Morita said it received a huge response. "Radiologists said they loved it but couldn't get their hospitals to do some-

thing like this," he said. "But I think there is going to be a groundswell of movement toward improving working conditions now that Dr. Siegel and his colleagues are proving, through research, the need for workstation improvements."

Futuristic items in the reading room include a biometric security code activated via fingerprint and LCD glass on the workstations that changes from transparent to opaque, depending upon whether or not the doctor wants to consult with colleagues or view images privately. Beamed-in or focused sound lets one radiologist listen to classical music while another listens to white noise, and computer monitors self-assess for quality and report the results to a central server and database. Desks and chairs can be raised and lowered for the comfort of the individual radiologist, and aromatherapy may be introduced too, said Dr. Siegel.

The Baltimore VA reading room

serves another important role as a laboratory for ergonomics research. "We can collect data to further our work on room design," Dr. Siegel said. "To date, our research on monitor and background lighting has shown a significant impact on radiologists and their levels of stress, fatigue and eye strain. The new room allows us to monitor the number of cases read and the number of breaks taken to help improve overall productivity while maintaining our diagnostic accuracy."

Remaining on the Cutting Edge

Dr. Siegel said he and his colleagues want to guard against the room becoming antiquated. "When we opened our reading room in 1993, it was the first of its kind. But without improvements and changes, it still could become obsolete quickly," he said. Consequently, the new reading room will continually be refreshed with new systems as the technology changes. Companies are clamoring to showcase their products, Dr. Siegel said. □

RSNA News Extras

■ To document their reading room makeover, Eliot Siegel, M.D., and his radiology colleagues at the Baltimore VA put on their best "geek wear" to create the "Digital Eye for the Analog Guy" video.

RSNA News EXTRAS

Following the format of Bravo television's "Queer Eye for the Straight Guy" series, one doctor focused on sound, the others on furniture, lighting, ventilation and technology.

The video is available on the new *RSNA News Extras* page at RSNA.org/Publications/rsnanews/extras.cfm. Also available is a virtual tour of the kind of radiology reading room built at the Baltimore VA, as well as a presentation by Dr. Siegel to the UK Radiological Congress.



Khan Siddiqui, M.D.

RSNA 2006 to Feature Courses on Reading Technology

REFRESHER COURSES at RSNA 2006 will look at designing reading rooms into the future. To register for these or any other courses, go to rsna2006.rsna.org and click on Registration, Housing & Courses.



■ RC126

(Re)Designing Your Department (Basic Imaging Informatics)

- Changes in the radiologist workstation and reading room for transition from film to filmless practice
- Optimizations for task-focused workstation design including ergonomic furniture, input devices, proper room and task lighting, noise abatement, ventilation and temperature controls
- How workstation and environment affect efficiency, fatigue and stress-related injuries
- How key drivers of architectural design and planning are changing in the digital department
- How to plan flexible imaging environments that can better accommodate the currently unknown medical technology that may be available in the future
- Design for multi-disciplinary collaboration among various specialists

■ RC130

Workstation Design (Advanced Imaging Informatics) (In Conjunction with the Society for Imaging Informatics in Medicine)

- The most frequent complaints about workstations and why they occur
- Other industries and professions that have similar information-intensive and image-driven workflow
- Steps users can take to improve interaction with the workstation and software changes could to make the experience less fatiguing

PET Securing New Role in Imaging Lung Inflammation

WITH ASSESSMENT methods ranging from invasive bronchoscopy to unpleasant sputum induction, monitoring lung inflammation has never been particularly easy on patients or medical professionals.

That may soon change, according to researchers at Washington University School of Medicine, whose recent studies suggest that using positron emission tomography (PET) to scrutinize lung inflammation may aid drug trials and provide better information about lung conditions.

Delphine L. Chen, M.D., and colleagues recently published articles in the *Journal of Applied Physiology* and the *American Journal of Respiratory Care and Critical Care Medicine*.

“We wanted to pursue imaging of inflammation with PET because it gives us a way to monitor and quantify the level of inflammation in acute inflammatory lung diseases,” said Dr. Chen, chief resident in nuclear medicine at the Mallinckrodt Institute of Radiology.

Current Assessment Methods Have Drawbacks

Until now, the most common procedure for measuring lung inflammation has been bronchoscopy with bronchoalveolar lavage (BAL). In addition to being invasive and requiring patient sedation, with BAL only a few lung segments can be sampled at a time. “If you have a diffusive inflammatory process, there’s no guarantee you’ve sampled the areas most affected or the ones you’re most interested in,” Dr. Chen said.

Another common technique, called sputum induction, requires patients to inhale a salty solution that causes them



Delphine L. Chen, M.D.
Mallinckrodt Institute of Radiology



Daniel P. Schuster, M.D.
Mallinckrodt Institute of Radiology

to cough up whatever is in their airways. The procedure is unpleasant and not feasible for younger children, said Dr. Chen, and also does not ensure sampling from specific lung regions. “You aren’t necessarily getting samples from the lung areas of greatest interest,” she said.

Precision of location is just one advantage of using PET, Dr. Chen said. “Because we’re imaging the whole lung, we can place regions in specific areas that we’re interested in, so we have the option of getting whole lung or regional data,” she explained.

Procedure Could Be Used in Drug Trials

The most promising application of PET may be in speeding clinical drug trials for lung conditions, said Daniel P. Schuster, M.D., Dr. Chen’s colleague and senior author. Drug companies generally do not use BAL or sputum induction for antiinflammatory drug tri-

als, he said, because the methods are so imprecise there is virtually no evidence they can be used to quantify the effects of the drugs.

Instead, said Dr. Schuster, trials usually measure lung function or health status, with the assumption that if an antiinflammatory drug works and inflammation is reduced, lung function should improve and patients should feel better.

Dr. Schuster said this cart-before-the-horse methodology can be very counterproductive. “What if the drug doesn’t seem to work?” he asked. “Is it because it was an ineffective antiinflammatory or was it because inflammation is not as important a component as thought of the disease in question?”

These questions, he said, cannot be answered without a way to measure inflammation directly. Even if a drug

PET gives us a way to monitor and quantify the level of inflammation in acute inflammatory lung diseases.

Delphine L. Chen, M.D.

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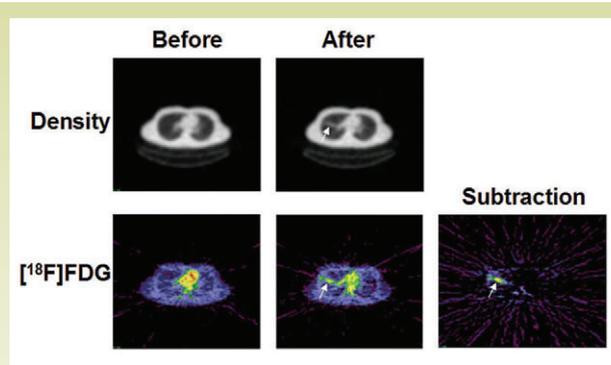
does work, pulmonary function often does not improve for several weeks or longer, prolonging the entire evaluation process.

“Drug companies and lung scientists are rather desperate for safe but accurate ways of measuring and monitoring lung inflammation that are suitable for human studies,” he said. “Newer imaging strategies go far toward meeting that need.”

Based on an NIH Model

Using a procedure developed at the National Institutes of Health (NIH), Dr. Chen and her colleagues placed a small amount of a purified protein called endotoxin into a single segment of lung, creating a mild self-limited inflammatory response.

The next day, they injected F-18 fluorodeoxyglucose (FDG) into the lungs. “We used the NIH model to test whether PET could detect the area of inflammation caused by the endotoxin,” said Dr. Chen. In each case, the rate of FDG uptake by the lungs was increased when compared with baseline



Transmission (top row) and FDG-PET (bottom row) images from one healthy volunteer, before and 24 hours after direct bronchial instillation of 4 ng/kg of endotoxin into the right middle lobe. An area of increased density (presumably due to inflammation) and ^{18}F FDG uptake are clearly visible (arrows). Also shown is a subtraction ^{18}F FDG image, in which activity of the “before” and “after” images are normalized for injected dose and the “before” image is subtracted from the “after” image.

(Journal of Applied Physiology 2006;100:1602-1609) © 2006 American Physiological Society.

values, resulting in a strong statistical difference between the baseline and post-endotoxin injection conditions. Furthermore, in separate measurements from the same volunteers, they found that the uptake of radioactive glucose was primarily limited to the neutrophil, a type of inflammatory cell recovered from BAL after endotoxin instillation. Thus, this procedure could be used to

test how new drugs reduce the effects of new neutrophilic lung inflammation in healthy volunteers, before drug trials in patients are started.

The researchers also measured FDG uptake in the lungs of people with cystic fibrosis—a disease characterized by persistent neutrophilic inflammation in the airways—and

Continued on page 12

Pulmonary Radiology at RSNA 2006

SEVERAL RSNA 2006 refresher courses will focus on different aspects of pulmonary radiology. To register for these or any other courses, go to rsna2006.rsna.org and click on Registration, Housing & Courses.



■ RC101

Case-based Review: Approach to Diffuse Lung Disease (An Interactive Session)

- Recognize main patterns of abnormality seen on high-resolution CT
- Develop an approach to the differential diagnosis of diffuse lung disease based on the pattern and distribution of abnormalities
- Review clinical and high-resolution CT findings of the most common diffuse lung diseases encountered in clinical practice

■ RC401

Imaging of Obstructive Lung Disease: Emphysema and Large and Small Airways Disease

- Learn the role of imaging in diagnosing large airway diseases and review the characteristic imaging findings of common large airway disorders
- Learn various types of small airway disease processes and their characteristic imaging findings
- Learn the types of emphysema and the best imaging techniques for detecting and quantifying emphysema severity

■ RC701

Pulmonary Infections: Tuberculosis, Atypical Mycobacteria, Immune-suppressed Hosts, and Emerging Infections (An Interactive Session)

- Review epidemiology, infection and clinical features of thoracic tuberculosis; illustrate imaging features of primary and post-primary infection; address radiologist's role in diagnosis/management
- Review epidemiology, clinical presentation, imaging features and diagnosis of thoracic non-tuberculous mycobacterial infection

- List immune system components and likely pulmonary infections in specific immune deficits; assess relative likelihood of infection after transplantation; review imaging findings of various infections in immunocompromised patients
- Illustrate relationship between radiologic manifestations of human respiratory viruses and their tropism for airway epithelium in contrast to imaging manifestations of lung injury produced by emerging viral infections

Safety Net Keeps Patients from Falling Through Cracks

MICHIGAN researchers have developed a coding and notification system that maximizes communication between radiologists and clinicians and helps ensure that patients and their referring physicians receive vital information disclosed by medical imaging.

Combining computer technology and manual case-by-case tracking, the system offers a “safety net” to cover the few patients whose information might otherwise be missed—especially when unexpected findings turn up.

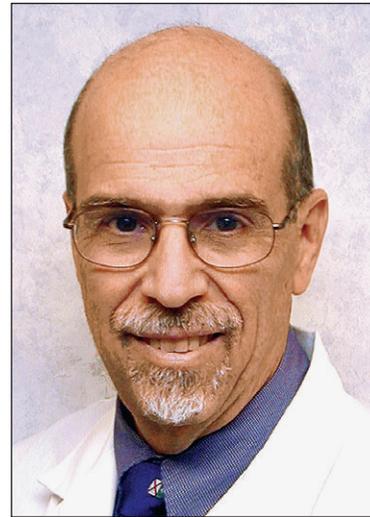
“We think this handoff between radiologists back to clinicians on these unexpected findings is extremely reliable as it exists,” said Charles Marn, M.D., chief of radiology at the Ann Arbor VA Healthcare System and associate professor of radiology at the University of Michigan, who conducted the study along with colleagues Vaishali R. Choksi, M.D., Ruth Carlos, M.D., and Yvonne Bell, C.T.R.

“It’s probably 99-plus percent reliable. The problem is that those two or three in a thousand, or some such tiny number, are still a great risk if the findings happen to be on your chest x-ray or a loved one’s chest x-ray.”

Leonard Berlin, M.D., chair of radiology at Rush North Shore Medical Center in Skokie, Ill., and a professor of radiology at Rush Medical College in Chicago, said failure of radiologic communication is a growing cause of medical malpractice litigation. Dr. Berlin focused on the Michigan study and other efforts to improve communication in a commentary in the October 2005 issue of the *American Journal of*



Charles Marn, M.D.
University of Michigan



Leonard Berlin, M.D.
Rush Medical College

Roentgenology (AJR).

Dr. Marn and his colleagues designed and studied the performance of their new system, which adheres to American College of Radiology (ACR) guidelines, over a one-year period. The

Radiologists started asking themselves: “Where does our responsibility end? What do we do once we say there might be a cancer?”

Charles Marn, M.D.

results of the study, “Efficiency of a Semiautomated Coding and Review Process for Notification of Critical Findings in Diagnostic Imaging,” appear in the April 2006 issue of *AJR*.

“We detected an intermittent error, we analyzed why the error occurred and we put up a mechanism we think will protect it from occurring,” said Dr. Marn. “I think that is a unique effort.”

Near Miss Prompted Study

The impetus to develop the system, Dr. Marn said, came from a “near miss” with a vascular surgery patient. When a chest x-ray showed multiple nodules,

the radiologist reading the film phoned the ordering physician directly to report the nodules and the possibility of metastatic disease. The house officer noted the findings and then rotated off the service the next day.

In the meantime, the patient underwent surgery. No follow-up occurred until he returned to the hospital six months later. That’s when someone discovered the note about the chest x-ray findings.

“Everyone was shocked and startled,” Dr. Marn said. “The patient got another chest x-ray and, fortunately for us, this was a near miss. It was all unchanged.”

Dr. Marn said the radiologists started asking themselves: “Where does our responsibility end? What do we do once we say there might be a cancer?”

“As we look at this, we have come to believe that clinicians are overtaxed, they are getting a lot of information, and radiology is now doing more and more studies on patients for a wider

Continued on next page

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variety of reasons,” he continued. “They may get critical information that’s not related to why the study was ordered, such as a renal mass on a CT done for an aortic aneurysm. The information obtained may cross specialties and our clinical colleagues may just be dealing with information overload.”

Pathologists Provided Answer

In studying the problem and looking at what else was available in the hospital, Dr. Marn and colleagues came across a solution used by pathologists. “Many pathology departments have a policy of creating a ‘hot list’ for positive screening studies,” Dr. Marn explained. “Many departments create a follow-up list where they look for further studies to confirm or refute whether a screening study was positive. So we decided to steal a page from their work.”

The result was a system in which a diagnostic code is attached to the bottom of each report. A “Code 8” tag indicates that a possible malignancy follow-up is needed.

“The beauty of these lists is that they are searchable and sortable, so you can ask the system how many Code 8s were issued this week and who they were,” Dr. Marn said. “We then pass the Code 8s to the cancer registrar, who follows them.”

After two to three weeks on the list, the cancer registrar—currently Yvonne Bell, a study co-author—phones the referring physician. If the registrar can’t make contact with the physician or confirm that the case is going forward, the section head is contacted. When necessary, the chief of oncology may be asked to pick up the case.

“We thought it important to make the intervention early, at four weeks, because delay in diagnosis is almost as bad as dropping the ball,” Dr. Marn said.

Medical-Legal Landscape Could Change

Over the one-year period examined in the study, 395 of the 37,736 medical

images created at the Ann Arbor VA received Code 8s. In eight cases, the doctor who ordered the scan did not react to the Code 8 report during the intervention period. “There appeared to be trouble at four weeks,” said Dr. Marn. “The handoff wasn’t right, or somebody wasn’t following up, didn’t understand the message they received, or they simply forgot it.”

Once follow-up care was initiated, it was discovered that five of the eight patients had malignant cancer, making up 2 percent of all cancers detected in the study year and 0.02 percent of all scans performed during the year.

“I think that the medical-legal landscape potentially will shift because of this,” Dr. Marn said.

In his commentary, Dr. Berlin pointed to a joint report by ACR and the Physician Insurers Association of America (PIAA) showing communication failure as the fourth most common primary malpractice allegation lodged against radiologists. The report also disclosed that in nearly 60 percent of malpractice suits involving radiologists, the referring physician had never been

directly contacted with urgent or significant unexpected findings.

“We do have to make sure that our abnormal reports are communicated,” Dr. Berlin emphasized, noting that the Michigan system is one of several good communication models in existence. “It’s our challenge to find a manner where we can effect successful communication.”

Dr. Marn urged the radiology community to proactively eliminate errors. “Communication is flawed, so back yourself up on the important stuff,” he said. “We detected this error in our system. We aggressively rooted it out, studied it and patched it. Your system may have a different error.”

“I think this is lifesaving work,” he added. “I think that if adopted around the country, this system could save dozens, if not hundreds of lives.” □

■ To view the abstract for “Efficiency of a Semiautomated Coding and Review Process for Notification of Critical Findings in Diagnostic Imaging,” go to www.ajronline.org/cgi/content/abstract/186/4/933.

Physician Communication at RSNA 2006

THE FAILURE of radiologists to communicate their findings to other physicians is a major allegation cited in malpractice lawsuits. One refresher course at RSNA 2006 looks at the myriad legal and moral issues surrounding malpractice lawsuits. To register for this or any other course at RSNA 2006, go to rsna2006.rsna.org and click on Registration, Housing & Courses.

■ RC527

Current Issues in Radiology Liability: Will Saying “I’m Sorry” Prevent a Malpractice Lawsuit?

- Review the moral and legal considerations regarding the informing or the failure of informing patients and their families that a radiologic or non-radiologic error or complication has occurred.
- Summarize published data that support the belief that medical malpractice litigation will be mitigated if patients who suffer injury resulting from a diagnostic or therapeutic radiological procedure or general medical care are promptly informed of that fact and at the same time are offered an apology from the involved radiologist or other health care provider.
- Discuss the conflicting perspectives of a plaintiff’s attorney and a defense attorney with regard to the issue of whether such apologies will be beneficial or detrimental to the legal positions of the plaintiff-patient and the defendant-physician.
- Identify the financial impact such disclosures and apologies have on the amount of the eventual indemnification paid by the malpractice insurance carrier to patients who have sustained injury as a result of medical care.



RSNA Highlights Conference Offers More Education Choices

IN KEEPING with its dedication to meeting the educational and professional development needs of radiologists, RSNA now offers another annual conference option.

RSNA Highlights: Clinical Issues for 2007 is a 2½-day conference to be held February 26–28, 2007, in Phoenix.

For radiologists who can't attend the annual meeting—or those who attend, but can't get to every lecture they want—Highlights is another way to access some of the best educational programs that RSNA has to offer, said James A. Brink, M.D., vice-chair of the RSNA Refresher Course Committee and Highlights content coordinator.

Registration begins September 5.

“Given the quality of the educational materials prepared for the RSNA

annual meeting, we want to provide another opportunity for radiologists to benefit from them,” said Dr. Brink, chair of the Department of Diagnostic Radiology at the Yale School of Medicine and Yale-New Haven Hospital.

RSNA Board Liaison for Education George S. Bisset III, M.D., agreed.

Given the quality of the educational materials prepared for the RSNA annual meeting, we want to provide another opportunity for radiologists to benefit from them.

James A. Brink, M.D.

“Those topics, featuring four refresher courses apiece, are cardiac imaging, PET/CT, breast imaging and sports injuries. Also offered will be two “hot topics” courses: “Comprehensive Imaging for Acute Stroke Treatment” and “Optimal Techniques for Multidetector CT and MR of the Liver.”



James A. Brink, M.D.
Yale University School of Medicine

“The goal is to offer a concentrated educational package that focuses on specific topics.”

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will be two “hot topics” courses: “Comprehensive Imaging for Acute Stroke Treatment” and “Optimal Techniques for Multidetector CT and MR of the Liver.”

All but two of the courses will have been presented at recent RSNA annual meetings, where they have drawn overwhelmingly positive audience evaluations. Courses will be updated, as necessary, for Highlights.

Continued on next page



The four photos at left and above show the J.W. Marriott Desert Ridge Resort and Spa in Phoenix.

At right, this image of CT angiography performed on a 64-slice MDCT scanner with automated bone removal comes from RSNA Highlights keynote speaker Eliot K. Fishman, M.D.

Continued from previous page

Two new courses are to be taught by veteran speakers who have received high marks for other presentations at RSNA annual meetings.

“Each course has been selected for the timeliness of the topic and the quality of the speakers,” said Dr. Bisset. Another benefit for Highlights attendees, he added, is immediate access to select electronic education exhibits from RSNA 2006.

Focused Content

Dr. Brink, who has helped organize regional meetings for other societies, said the keys to success are having topics that people want to hear and ensuring the conference is well focused.

“People need to identify with what they’re going to get out of the course to ensure that it will be worth their while to come,” he said. “At the RSNA

annual meeting there’s so much going on, it’s like Disneyland. There’s no need to ask whether it’s going to be worthwhile or not. But with a regional course like Highlights, you have to decide, ‘Will I really come away with an improved understanding of a specific topic?’ Highlights is structured to answer this question affirmatively.”

Given that the annual meeting is so vast, RSNA 2006 attendees can benefit from attending Highlights as well, he said.

“Highlights represents just a tiny fraction of what goes on at the annual meeting,” he said. “Odds are very high that you’ll be able to attend courses at Highlights that you were unable to attend at the annual meeting.”

The conference will kick off with a

keynote address on multislice CT imaging by Elliot K. Fishman, M.D., a professor of radiology and radiologic science and a professor of oncology at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins. Dr. Fishman delivered a similar keynote address at RSNA 2005.

Beyond its educational opportunities, the location of Highlights—the J.W. Marriott Desert Ridge Resort & Spa in Phoenix—also has appeal, said Dr. Bisset. “We have chosen an outstanding venue,” he said. “I am confident all attendees will enjoy the sunny, warm weather that Phoenix has to offer, when the majority of the country is dealing with snow.” □

■ For more information about RSNA Highlights: Clinical Issues for 2007, visit RSNA.org/highlightsconference or contact RSNA Program Services at programs@rsna.org.

PET Securing New Role in Imaging Lung Inflammation

Continued from page 8

related the measurements to the rate of decline in pulmonary function in the patients over the past four years.

“Those with the highest rate of decline in pulmonary function had the highest levels of FDG uptake by PET, and as a group, we could separate them from normal, healthy volunteers,” said Dr. Chen.

Despite her high hopes for PET, Dr. Chen doubts bronchoscopies will disappear anytime soon. “I don’t know if it will ever replace bronchoscopy, because the information is just different. Bronchoscopy gives you information you can’t get from a PET scan, and vice versa,” she said.

Dr. Chen believes this use of FDG-PET imaging will be most useful in evaluating the response to treatment

with antiinflammatory drugs. Like Dr. Schuster, she anticipates PET will be used to test different therapies before they go into larger clinical trials.

PET may also contribute to the study of glucose metabolism kinetics as it relates to inflammation. “That may lead to other therapeutic targets that we haven’t thought of before,” said Dr. Chen.

Although Dr. Chen and her colleagues have studied only patients with cystic fibrosis, they hope FDG-PET imaging may be relevant to a wide variety of lung diseases including

emphysema, chronic bronchitis, pneumonia, acute respiratory distress syndrome, lung fibrosis and rejection related to lung transplantation.

“Obviously,” said Dr. Schuster, “time will tell to what extent this or other types of imaging to monitor lung inflammation will ultimately be useful for drug development, diagnosis or disease management.” □

■ To read the abstract for “FDG-PET Imaging of Pulmonary Inflammation in Healthy Volunteers After Airway Instillation of Endotoxin,” go to jap.physiology.org/cgi/content/abstract/100/5/1602.

■ To read the abstract for “Quantifying Pulmonary Inflammation in Cystic Fibrosis with Positron Emission Tomography,” go to ajrccm.atsjournals.org/cgi/content/abstract/173/12/1363.

Journal Highlights

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

Renal Masses in the Adult Patient: The Role of Percutaneous Biopsy

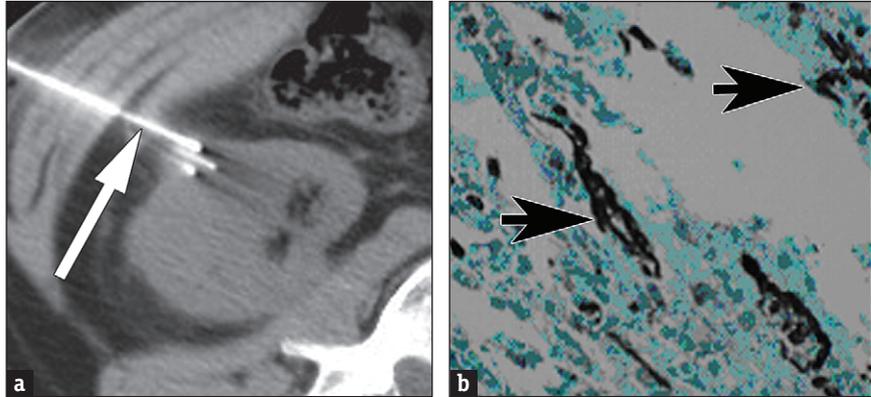
RECENT advances in imaging, interventional and cytologic techniques have given percutaneous biopsy a fundamental role in diagnosing renal masses.

In an article in the Reviews section of the July issue of *Radiology* (RSNA.org/radiologyjnl), Stuart G. Silverman, M.D., and colleagues from Brigham and Women's Hospital discuss how:

- The role of percutaneous biopsy has increased due to the incidental discovery of small renal masses that can be

Radiology

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Leukemia and a small mass in a 46-year-old man.

(a) CT-guided percutaneous biopsy, shown on transverse CT image, was performed with a 25-gauge needle (arrow). Hematoxylin-eosin-stained cell block section (not shown) revealed acute and chronic inflammatory cells. (b) Photomicrograph shows fungal organisms (arrows). The patient was treated for renal candidiasis.

(Radiology 2006;240:6-22) © RSNA, 2006. All rights reserved. Printed with permission.

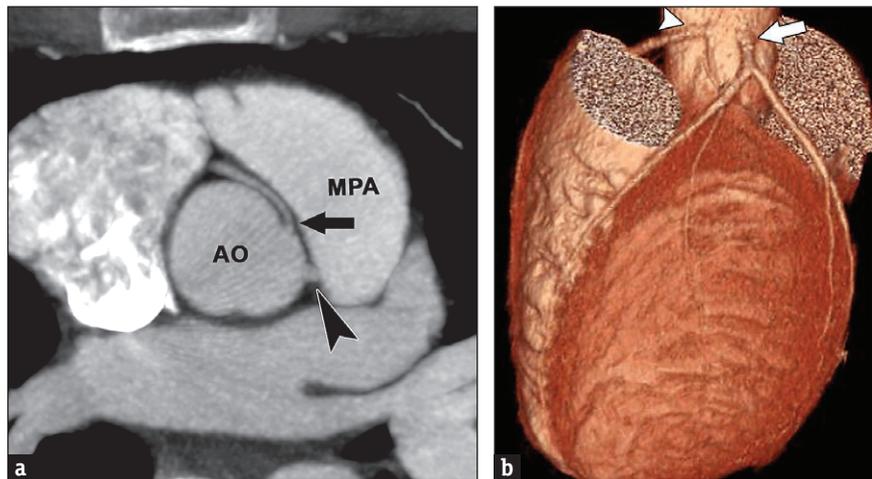
Cardiac CT in Emergency Department Patients with Acute Chest Pain

DETECTING coronary artery disease with multidetector CT could substantially improve the clinical care of emergency department patients with acute chest pain, according to a team of researchers from Massachusetts General Hospital and Harvard School of Public Health.

RadioGraphics

In an article in the July-August issue of *RadioGraphics* (RSNA.org/radiographics), Udo Hoffman, M.D., and colleagues state that current triage of emergency department patients with acute chest pain is ineffective and leads to many unnecessary hospital admissions. Multidetector cardiac CT, with examination times of approximately 5 minutes and robust image quality, constitutes a highly attractive approach for initial work-up in the emergency department setting, the researchers write.

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Multidetector CT evaluation for syncope and exertional chest pain.

(a) Thin-slab maximum intensity projection image depicts an anomalous origin of the right coronary artery (arrow) from the left Valsalva sinus as well as narrowing of the proximal segment of the right coronary artery between the main pulmonary artery and the ascending aorta. Note the normal origin of the left main coronary artery (arrowhead). (b) Three-dimensional volume-rendered image provides an overview of the coronary anatomy and helps confirm the anomalous origin of the right coronary artery from the left Valsalva sinus (arrow), adjacent to the origin of the left main coronary artery (arrowhead).

(RadioGraphics 2006;26:963-980) © RSNA, 2006. All rights reserved. Printed with permission.

Radiology in Public Focus

Press releases have been sent to the medical news media for the following articles appearing in the July issue of *Radiology* (RSNA.org/radiologyjnl):

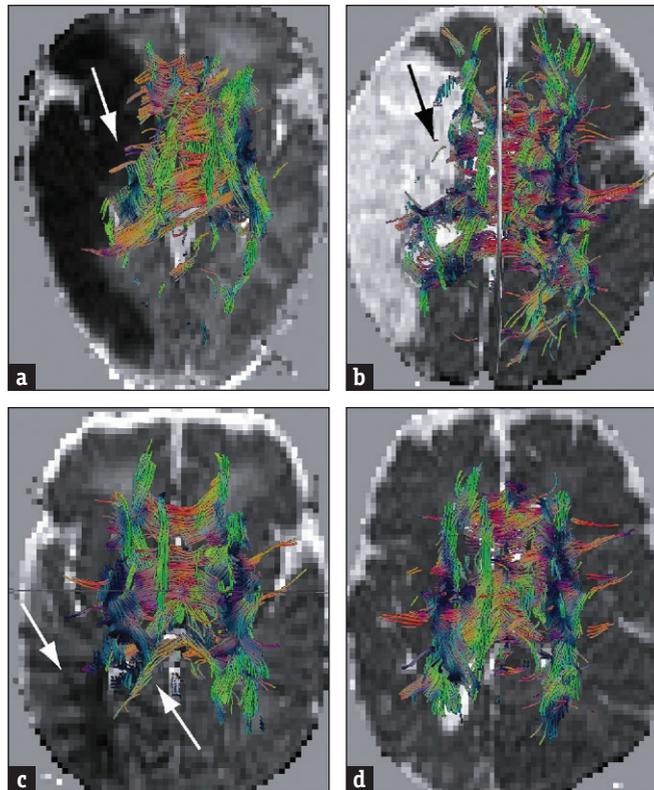
Infants with Perinatal Hypoxic Ischemia: Feasibility of Fiber Tracking at Birth and 3 Months

RESearchers in the Netherlands report they have demonstrated the feasibility of using fiber tracking to study the neonatal brain.

Carola van Pul, Ph.D., of the Department of Clinical Physics at Máxima Medical Center Veldhoven and the Department of Applied Physics at Eindhoven University of Technology, and colleagues used fiber tracking at birth and 3 months in 10 infants with hypoxic ischemia to detect disturbances in white matter development.

Fiber tracking is a three-dimensional visualization technique in which the underlying linear structure defined by diffusion tensor MR imaging is reconstructed.

“Abnormalities related to perinatal hypoxic ischemia resulted in fiber patterns that were different from the fiber structures detected in infants with standard MR imaging findings,” the researchers write. They add that the corona radiata (CR) was frequently



(*Radiology* 2006;240:203-214) © RSNA, 2006. All rights reserved. Printed with permission.

affected; all infants with disturbed patterns in the CR at 3 months demonstrated major motor problems.

Fiber-tracking images obtained in (a) a newborn at term and (b) the same infant at 3 months. Arrow points to region in which the CR fibers cannot be traced. (c) Fiber-tracking image obtained in another patient at term. Left arrow (pointing downward) indicates the infarct, which has a low apparent diffusion coefficient. Right arrow (pointing upward) indicates the splenium of the corpus callosum in the affected hemisphere, in which the splenium fibers are longer than those in the nonaffected hemisphere. (d) Fiber-tracking image obtained in the same infant at 3 months. The splenium can be traced better in the affected hemisphere than in the nonaffected hemisphere.

Mild Cognitive Impairment: Evaluation with 4-T Functional MR Imaging

MEMORY deficits in mild cognitive impairment may be linked to functional alterations in several specific brain regions and could be part of the extended latent preclinical and prodromal period of Alzheimer disease, a new study has revealed.

Jeffrey R. Petrella, M.D., of the division of neuroradiology and Alzheimer’s Disease Imaging Research Laboratory at Duke University Medical Center, and colleagues used 4-T functional MR imaging to assess abnormali-

ties in brain activation patterns in subjects with mild cognitive impairment.

Imaging subjects as they encoded and later retrieved face-name associations, the team found that subjects with mild cognitive impairment showed reduced activation magnitude in specific regions.

“We speculate that areas of reduced functional MR imaging activation in subjects with mild cognitive impairment represent regions in which axonal or synaptic function has been disrupted

by the earliest pathologic changes of Alzheimer disease and that regions of increased activation may represent compensatory changes,” the team writes.

(*Radiology* 2006;240:177-186)

Renal Masses in the Adult Patient: The Role of Percutaneous Biopsy

Continued from page 13

characterized as enhancing, and therefore solid, neoplasms by using advanced CT and MR imaging techniques.

- Many small solid renal neoplasms are benign and indistinguishable from renal cell carcinoma on images. Percutaneous biopsy may be useful in diagnosis, thereby preventing unnecessary and potentially morbid surgical and ablation procedures.
- Advances in cytologic techniques, particularly immunocytochemistry, have contributed to the increasing ability to diagnose both benign and malignant tumors percutaneously.
- Percutaneous biopsy is safe and accurate with imaging guidance and both fine- and large-needle-based techniques.
- Specific clinical scenarios exist for which percutaneous biopsy should be considered when a renal mass is encountered; relatively new ones also

are emerging, and all demonstrate the importance of biopsy in management of renal masses.

“In the future, biopsy performance will undoubtedly improve as more experience is accumulated, better targeting systems are developed, and the field of cytology is expanded,” Dr. Silverman and colleagues conclude. “The ultimate goal is to develop imaging

techniques that can be used to help diagnose and characterize renal tumors without the need to perform biopsy. Until such time, however, biopsy will continue to serve an important role in the clinical management of renal masses in the adult patient.”

Diagnosis Please Now Offers More Cases, Online Diagnosis

Beginning with the July issue of *Radiology*, the Diagnosis Please feature will offer two new cases each month. *Radiology* Editor Anthony V. Proto, M.D., said publishing two per month will allow him to use most of the accepted cases before he completes his years as editor in December 2007. Some accepted cases will be left for use by the new editor. A search process is under way for the new editor.

Also beginning in July, *Radiology* readers can submit via the Web their most likely diagnoses for Diagnosis Please cases. Instructions can be found at RSNA.org/dxplease. RSNA members can use their member login. Others must create a free account. People submitting answers via the former e-mail process will receive an automatic reply directing them to the new Web site.



Cardiac CT in Emergency Department Patients with Acute Chest Pain

Continued from page 13

Dr. Hoffman and colleagues discuss:

- Multidetector CT technique and protocols, including patient selection and preparation, image reconstruction and postprocessing
- Radiation exposure at CT coronary angiography
- Coronary anatomy
- Relevant findings at cardiac CT

“It is conceivable that fast and non-invasive detection of the presence and extent of coronary artery disease with multidetector CT, which provides information that cannot be obtained with the standard clinical evaluation, may help substantially improve the clinical care of [emergency department] patients,” Dr. Hoffman and colleagues write. They add that randomized diagnostic

trials will also help determine whether multidetector CT reduces the costs or increases the cost-effectiveness of acute chest pain management.

Media Coverage of Radiology

RSNA media coverage in May reached an estimated 182.4 million people worldwide.

A press release detailing a May *Radiology* article about the use of terahertz imaging to identify residual cancer in resected breast specimens (*Radiology* 2006; 239:533-540) appeared on the wire services Reuters Health and United Press International as well as on

Internet outlets including Yahoo! News, *Forbes.com*, *Excite.com*, Medscape, HealthDay, iVillage and RedOrbit. News about the release also appeared in *The Australian*, Australia's national daily newspaper.

Additional May media coverage about RSNA included the magazines *Self* and *Glow*, as well as newspapers including the *Chicago Tribune*, *Char-*

lotte Observer, the *Daily Herald* of Suburban Chicago and *Crain's Chicago Business* as well as *La Opinion*, a Spanish-language daily serving southern California. News also appeared on such Internet outlets as *AuntMinnie.com*, *About.com*, *Doctor's Guide*, *HealthScout* and *Science Daily*.

Working For You



(from left)
Debbie Hogan,
Donna Schulze,
Matt Westfall,
Betty Haas and
Betty Arkwright.

Radiology Editorial Office

THE *Radiology* Editorial Office in Richmond, Va., opened in July 1997 when Anthony V. Proto, M.D., became editor of *Radiology*. Staff members receive authors' manuscripts, assign them to peer reviewers and notify authors of editorial decisions. They also help authors finalize their material before sending it to the Publications Department

at RSNA Headquarters and serve as liaisons among authors, peer reviewers and other Society staff.

*Working
for you*
DEPARTMENT
PROFILE

The office has participated in many changes to the editorial process, including implementation of *Radiology Online* (RSNA.org/radiologyjnl), the journal of record with the National Library of Medicine. Continuous publishing now allows online publication of

articles weeks before they appear in print, while *Radiology* Manuscript Central saves time and money by making nearly all communication electronic.

Through close collaboration with Society staff and the investigators who submit their work, the *Radiology* Editorial Office provides timely, efficient and equitable manuscript processing to help RSNA disseminate state-of-the-art medical information via *Radiology*.

Printed Copy of the RSNA Meeting Program Available Upon Request

RSNA members can now request a printed copy of the *RSNA 2006 Scientific Assembly and Annual Meeting Program*. The *RSNA Meeting Program* is a benefit of membership.

To request a printed copy,

go to rsna2006.rsna.org and click on Meeting Program. Members may also call the RSNA Membership and Subscriptions Department at 1-877-RSNA-MEM [776-2636] (U.S. and Canada) or 1-630-571-7873.

Members can choose to have the printed copy mailed to them, or they may pick it up at the annual meeting.

The deadline for requests is September 15. Programs will not be mailed to members who do not request

them. *RSNA Meeting Program* content will be available online before, during and after the meeting.

If you have a colleague who would like to become an RSNA member, you can download an application at RSNA.org/mbrapp or contact the RSNA Membership and Subscriptions Department at 1-877-RSNA-MEM [776-2636] (U.S. and Canada), 1-630-571-7873 or membership@rsna.org.

Program and Grant Announcements

Deadline Extended for RSNA Outstanding Researcher, Educator Award Nominations

Nominations for the 2006 RSNA Outstanding Researcher and Outstanding Educator awards will be accepted through August 1. The program honors senior physicians or scientists who have made significant contributions to radiology or the radiologic sciences through research and/or education. Awardees will be recognized during the RSNA 2006 opening session and in *RSNA News*. Take time to nominate a deserving mentor or colleague. Nominating information and a list of former recipients are available at:

- RSNA.org/Foundation/OutstandingResearcherAward.cfm
- RSNA.org/Foundation/OutstandingEducatorAward.cfm

Fulbright Awards Deadline is August 1

The Fulbright program, which sends 800 scholars and professionals each year to more than 140 countries to lecture or conduct research in various academic and professional fields, is accepting applications through August 1 for medical sciences awards.

The Fulbright-Pai Fellowship, to teach graduate courses in areas of specialization including radiology for four months at the Manipal Academy of Higher Education in India, is one of several medical sciences awards available. More information can be found at www.cies.org.

Personal Financial Seminars Return for RSNA 2006

RSNA will offer two popular and comprehensive financial seminars again this year just prior to the RSNA annual meeting on Saturday, November 25, at McCormick Place in Chicago.



Protecting Assets from Creditor Claims, Including Malpractice Claims

10:00 a.m. – 12:00 p.m.

Presented by Barry Rubenstein, B.S., J.D., L.L.M.

IN TODAY'S tort claim environment, a practitioner's exposure to potential malpractice and creditor claims in excess of insurance coverage has dramatically increased. This course addresses how to minimize and even avoid that exposure and protect hard-earned assets from creditor attack. Learn how to decide when and how to use asset protection techniques and distinguish the advantages, disadvantages, benefits and risks of numerous strategies.

Each course includes a textbook written specifically for the course!

Effective Investment Strategies

1:30 p.m. – 5:00 p.m.

Presented by J. Michael Moody, M.B.A.

FOR THOSE baffled by continuing chaos in the stock market and the dizzying array of investment alternatives, as well as those struggling with the uncertainty of their own longevity and the returns they have earned, this course offers the tools necessary to achieve investing goals. Fast-paced and interactive, the course examines the advantages, disadvantages, benefits and risks of numerous investments and investing strategies.

Registration Fees

(These seminars do not qualify for *AMA PRA Category 1 Credits*™.)

- Protecting Assets from Creditor Claims, Including Malpractice Claims . . . \$129
- Effective Investment Strategies . . . \$159
- Both courses \$269

■ Register for both courses online at RSNA.org/register.

■ For more information, please contact the RSNA Education Center at 1-800-381-6660 x3747 or ed-ctr@rsna.org.

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Research & Education Foundation Donors

THE Board of Trustees of the RSNA Research and Education Foundation and its recipients of research and education grant support gratefully acknowledge the contributions made to the Foundation from **April 22 – May 19, 2006**.

This month, the Foundation begins recognizing

donors for their cumulative giving. These donors will be recognized for achieving giving milestones through the Foundation's new Visionary Donor Program.

For more information on Foundation activities, go to RSNA.org/foundation.

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A Vanguard company since 1989

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\$1 – \$199

Magdalena Ramirez Arellano, M.D.

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In memory of Francis A. Lewis III

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R&E Foundation Giving Programs

Visionaries in Practice Program

The RSNA Visionaries in Practice (VIP) Program enables radiology practice groups to offer annual support to the Foundation, advancing the field of radiology while building their practices and benefiting their patients.

The VIP Program offers four categories for annual giving, enabling groups of all sizes to support research and education:

- ★ PLATINUM \$75,000
- ★ GOLD \$50,000
- ★ SILVER \$25,000
- ★ BRONZE \$10,000

A wide range of benefits begin at the Bronze VIP level:

- Special Recognition in *RSNA News*, the R&E Foundation Pavilion at the annual meeting, the RSNA Annual Report and on the Foundation Web site
- Access to the Donor Lounge at the RSNA annual meeting
- Press release indicating VIP contribution
- Plaque recognizing participation in VIP Program
- Privilege of using the RSNA VIP Program logo on practice letterhead and promotional materials

- Complimentary job listings in *Radiology* and on the RSNA Career Connection Web site for two months

Other giving levels include additional benefits ranging from registrations for the Practice Management Leadership course to airport ground transportation for practice group members during the annual meeting.

For a detailed explanation of VIP benefits, visit RSNA.org/Foundation or contact the Foundation at REFoundation@RSNA.org or call 1-800-381-6660 x7885.

RSNA Grant Deemed Profitable Despite Research Outcome

WITH MOST patients surviving less than five years after thoracic ionizing radiation (IR) therapy for Stage III non-small cell lung carcinoma (NSCLC), 2000 RSNA Research Scholar Grant Recipient Zelanna Goldberg, M.D., saw a compelling need to seek improvements in the treatment's efficacy.

While her research did not lead to the clinical trial she anticipated, she said she still reaped benefits—her RSNA experience gave her laboratory footing and helped her develop expertise that makes her competitive for other grants. “Since getting the RSNA grant, I have had a funded independent laboratory program, which I would never have been able to establish without RSNA’s help,” said Dr. Goldberg, associate professor of radiation oncology at the UC Davis Cancer Center at the University of California, Davis.

Lung cancer remains a formidable foe for oncologists.

Despite years of research, it is still the leading cancer killer of both men and women, claiming an estimated 1 million lives worldwide each year. “I used a lung cancer model because of the huge unmet clinical need for a more effective therapy,” said Dr. Goldberg. “And, because UC Davis

offered a very strong lung cancer program, I was able to leverage existing expertise to make the project more valuable.”

Enhancing Radiation Therapy Response

Locally advanced NSCLC is treated with definitive radiation therapy and

chemotherapy in fit patients but most patients still succumb to their disease. The treatment's poor outcomes prompted Dr. Goldberg to systematically examine the interaction of IR with UCN-01, a kinase inhibitor, in an effort to enhance the response to IR through attenuation of the cancer cell's capacity to repair DNA damage.

“I found UCN-01 interesting both because it was starting to be tested in the clinic and because it's a biological response modifier, not a classic toxic chemotherapy,” she said. “Knowing that radiation sensitivity changes through various parts of the cell cycle, the drug seemed to offer a chance to enhance radiation effectiveness without debilitating side effects. But not much was known about it as a radiation modulating agent, so that's what I pursued.”

Her research tested whether UCN-01 would enhance radiation cell killing through G2 checkpoint abrogation, by not allowing cells to stop and repair DNA damage prior to dividing. The research also tested whether the extent of cytotoxicity enhancement would be sensitive to cellular p53 status, which is a critical factor in cell cycle checkpoint control. Finally, the research also examined how timing the drug exposure relative to irradiation would influence effectiveness of the combination.

Dr. Goldberg also investigated whether enhanced cell kill would be present in 2 Gy multifraction treatment schedules, thus providing the preclinical basis for a phase I trial. While initial testing went well, ultimately drug



Zelanna Goldberg, M.D.
University of California, Davis

companies and the National Cancer Institute (NCI) did not feel that UCN-01 was clinically efficacious enough to adopt. Since then, other agents in the cell cycle modulating class have superseded it.

New Research into Radiation Exposure Biology

Dr. Goldberg is now using funding from the U.S. Department of Energy and the U.S. Air Force Department of Scientific Research to examine the biology of low dosage radiation exposure. Her groundbreaking work has provided the first benchmark dataset with defined dosimetry looking at genomic response to in vivo low dose radiation exposure in human tissue. Her findings will be published in an upcoming issue of *Clinical Cancer Research* and have been published previously in the *International Journal of Radiation Oncology * Biology * Physics*.

“My current research is looking at the very important area of potential

Continued on next page

We have to complement our focus on the machines and technical components of doing radiation research with a focus on the relevant biological processes.

Zelanna Goldberg, M.D.

RSNA Grant Deemed Profitable Despite Research Outcome

Continued from previous page

normal tissue toxicities following low dose IR exposure which is of increasing concern in the era of intensity modulated radiation therapy (IMRT). There are increased areas of tissue that receive very low dose radiation and at this point we don't know what the long term biologic implications of this might be," she said.

In addition to her ongoing research and running her lab, Dr. Goldberg has a busy clinical practice specializing in prostate and lung cancer. She continues to be interested in the molecular biology of radiation modulating agents also known as radiation sensitizers or radiation protectors.

Fulfilling Clinical and Research Roles

"Physician-scientists are the key to moving successful cancer treatments

forward, but due to decreasing reimbursements, increasing time required for patient care and increasing competition for research dollars, it is becoming nearly impossible for a clinician to serve as both practicing physician and research scientist," said Ralph W. deVere White, M.D., assistant dean for cancer programs at UC Davis and director of the UC Davis Cancer Center. "Dr. Goldberg is one of the very few individuals who not only fulfills both of these highly demanding roles, but also does so superbly."

Dr. Goldberg said she thinks that those involved in translational research in radiation oncology need to mirror some of the biological research that is being done in medical oncology. "We should not be solely focused on the machines and technical components of doing radiation research," she said.

"We have to complement that with a focus on the relevant biological processes. This will enhance the synergy with our medical oncology colleagues so that we can work better as a team for our patients' benefit."

Dr. Goldberg received her medical degree from the University of Toronto, where she also pursued her specialty training in radiation oncology. She completed a postdoctoral fellowship in radiation biology at Stanford before joining the faculty at UC Davis. □

■ More information about the RSNA Research & Education Foundation (R&E) Research Resident/Fellow and Research Scholar grants, as well as other R&E grant and award programs, can be accessed at RSNA.org/Foundation/programs.cfm.

EDUCATION RESEARCH

Program and Grant Announcements

Continued from page 17

Imaging in Molecular Medicine

RSNA/SNM/SMI • August 29–30, Hilton Waikoloa Village, Hawaii

HELD BEFORE the annual meeting of the Society for Molecular Imaging (SMI), this symposium will provide an overview of molecular imaging for radiologists, nuclear medicine physicians, neuroradiologists and other physicians. Topics include advances in PET imaging technology and new PET imaging agents, as well as the molecular basis of cancer, cardiovascular disease and neurological disorders.

The symposium is sponsored by RSNA, Society of Nuclear Medicine and SMI. Information is available at www.molecularimaging.org/2006meeting/preconferencesymp06.php.



Imaging as a Biomarker: Standards for Change Measurements in Therapy

September 14–15, Gaithersburg, Md.

Recent work has shown that biomedical imaging can provide an early indication of drug response by use of x-ray, CT or PET-CT. This workshop will bring together industry, academic and government representatives to develop a strategy for standardizing imaging methods of data collection and data analysis in the context of drug or radiation therapy trials. Developing standards could significantly reduce the size of clinical trials for drug response.

RSNA is co-sponsoring this conference along with the National Institute of Standards & Technology, National Cancer Institute, National Institute of Biomedical Imaging and Bioengineering and the Food & Drug Administration. For more information, go to www.nist.gov/public_affairs/confpage/060914.htm.

News about RSNA 2006

Enroll Now for Courses

COURSE ENROLLMENT for RSNA 2006 is under way. Online enrollment occurs instantly for refresher courses, informatics (formerly *infoRAD*®) and hands-on workshops, financial seminars and RSNA tours and events. Faxed or mailed registration forms are processed in the order they are received.

RSNA mailed the Advance Registration, Housing and Course Enrollment brochure in mid-June. It is also available online at rsna2006.rsna.org.

You must be registered for RSNA 2006 in order to enroll for courses.



Important Dates for RSNA 2006

- Oct. 27** International deadline to have full-conference badge and tickets mailed in advance
- Nov. 6** Final housing reservation deadline
- Nov. 10** Advance registration deadline
- Nov. 26–Dec. 1** RSNA 92nd Scientific Assembly and Annual Meeting



RSNA | 2006

Strengthening
Professionalism

92nd Scientific Assembly and
Annual Meeting
November 26–December 1, 2006
McCormick Place, Chicago

Each physician can earn up to
85 AMA PRA Category 1 Credits™
at RSNA 2006

How to Register

There are four ways to register for RSNA 2006:

1 Internet

Go to RSNA.org/register. Use your member ID# from the *RSNA News* label or meeting flyer sent to you. If you have questions, send an e-mail to rsna@itsmeetings.com.

Fastest way
to register!

2 Fax (24 hours)

1-800-521-6017
1-847-940-2386

3 Telephone (Mon.–Fri.,

8:00 a.m.–5:00 p.m. CT)
1-800-650-7018
1-847-940-2155

4 Mail

ITS/RSNA 2006
108 Wilmot Rd.,
Suite 400
Deerfield, IL 60015-5124
USA

International Attendees

PERSONALIZED invitation letters are available at RSNA.org listed under both Annual Meeting and International. The direct URL is www2.rsna.org/visa_form/invitation_letter.cfm

Apply Early for Your Visa!

Visa applicants are advised to apply as soon as they decide to travel to the United States and at least **three to four months** in advance of their travel date. International attendees should start the visa process by July or August.

The following Web sites have additional information on applying for a visa:

- www.unitedstatesvisas.gov
- travel.state.gov/visa
- nationalacademies.org/visas

United Airlines Discount

United.com offers RSNA attendees a 10 percent discount on select United Airlines, United Express and TED qualifying flights. Use the electronic certificate number 553SB to make your discounted airline reservation online at *United.com*. If you prefer, call United (1-800-521-4041) or your personal travel agent and mention the United discount ID number 553SB to be eligible for the discounted fares.

Registration Fees

BY 11/10	ONSITE	
\$0	\$100	RSNA Member, AAPM Member
\$0	\$0	Member Presenter
\$0	\$0	RSNA Member-in-Training, RSNA Student Member and Technical Student
\$0	\$0	Non-Member Presenter
\$120	\$220	Non-Member Resident/Trainee
\$120	\$220	Radiology Support Personnel
\$570	\$670	Non-Member Radiologist, Physicist or Physician
\$570	\$670	Hospital Executive, Research and Development Personnel, Healthcare Consultant, Industry Personnel
\$300	\$300	One-day registration to view only the Technical Exhibits area

Continued on next page

■ For more information about registration at RSNA 2006, visit RSNA.org/register, e-mail reginfo@rsna.org, or call 1-800-381-6660 x7862.

Continued from previous page

RSNA Applauds McCormick Place Labor Agreement

RSNA Executive Director Dave Fellers, C.A.E., commended the efforts of Chicago's Riggers Union Local 136 to negotiate a new agreement with general contractors and McCormick Place, home of the RSNA annual meeting for the last 21 years.

Local 136 representatives "have demonstrated great forti-

tude in understanding and endorsing necessary reform to sustain Chicago and McCormick Place as the nation's leading venue in the tradeshow industry," said Fellers, urging other unions to follow their lead. The reforms will save exhibitors more than a quarter of a million dollars compared to last year, he said.

RSNA Highlights: Clinical Issues for 2007

RSNA's new educational conference, RSNA Highlights: Clinical Issues for 2007, will be held February 26–28, 2007. See page 11 for a feature article on this conference to be held at the J.W. Marriott Desert Ridge Resort & Spa in Phoenix.

Important Dates for RSNA Highlights

Sept. 5	Registration opens
Feb. 26–28	RSNA Highlights: Clinical Issues for 2007

Exhibitor News Has New Focus

EXHIBITOR NEWS is now designed to prepare RSNA annual meeting attendees to get the most out of the technical exhibition.

In the past, RSNA used this section to keep exhibitors up to date on the latest changes and developments. As a result of feedback from many exhibitors that they get their news from *RSNA Exhibit Net-*

work, the monthly online technical exhibitor newsletter, and other mailings and meetings, RSNA decided to change the focus of Exhibitor News to attendees.

This section will now include information to help attendees determine which technical exhibits they want to visit, including details on the newest exhibitors and tips on navigating the

exhibition halls.

RSNA remains committed to keeping its valued exhibitors informed. If you are not receiving *RSNA Exhibit Network*, or have other questions, please contact RSNA Technical Exhibits at 1-800-381-6660 or exhibits@rsna.org. You may also visit rsna2006.rsna.org and click on Technical Exhibitors.

2006 Exhibitor List Now Available

The Technical Exhibition at the RSNA annual meeting makes up the world's largest medical exhibition. With more than 500,000 square feet of confirmed exhibit space, RSNA 2006 will be no exception. RSNA 2006 Technical Exhibits will be located in Halls A & B, spanning Level 3 of the North and South Buildings of McCormick Place. A balanced mix of companies will be featured in each location. To see a list of participating companies, along with an interactive floor plan, visit RSNA.org/showcase.

New Companies Participating in RSNA 2006

Each year more than 100 companies participate in the RSNA annual meeting for the first time, showcasing new technologies and ideas for the healthcare industry. By visiting first-time exhibitor booths at RSNA 2006, you can stay up to date on the latest innovations that may soon enhance your work experience. A complete list of first-time exhibitors can be found at rsna2006.rsna.org under Technical Exhibition.



Technical Exhibit Fact

■ The RSNA 2005 Technical Exhibition was the 36th largest tradeshow in the U.S., and the largest medical tradeshow, according to an April 2006 supplement to *Tradeshow Week*.

Product News



NEW PRODUCT

Ergonomic Workstation

S&S Technology (www.ssxray.com) has introduced the EW100 full featured ergonomic workstation for viewing PACS images on either single or dual elevating motorized table surfaces. The height adjustment switches are programmable and the ambient lighting controls minimize eye fatigue. The workstation also was designed with a large amount of counter space and power strips for keyboards and auxiliary equipment. The workstation is offered in 48-, 60- and 72-inch sizes. Optional equipment includes monitor arms, a task reading light and mounting brackets for illuminators.

FDA CLEARANCE

4D compact ultrasound system from GE

GE Healthcare (www.gehealthcare.com) has received U.S. FDA clearance for the Voluson i, a 4D compact ultrasound system designed specifically for women's health-care, including obstetric, gynecologic and other clinical applications. GE said the compact system allows clinicians to make real-time diagnoses, particularly for high-risk patients, by providing high-quality 4D imaging wherever the patient is located.

Voluson i functions like a console-size ultrasound system but is a portable design that weighs slightly more than the average newborn. GE said the device's portability makes it ideal for community and rural clinics, as well as mobile imaging services.



NEW PRODUCT

RFA Device

RITA Medical Systems, Inc. (www.ritamedical.com) has introduced the StarBurst TALON, a radiofrequency ablation (RFA) device that enables fast, 4 cm spherical ablations. The side-deploy design assists precise device positioning in tumors that may be mobile in soft tissue or adjacent to critical structures.

A tapered cutting tip center electrode makes it easier to penetrate solid tumors. Real-time temperature

feedback from all four electrode tines ensures controlled ablation. TALON is cleared by the U.S. Food



and Drug Administration (FDA) for use in partial or complete ablation of non-resectable liver lesions and the palliation of pain associated with metastatic lesions in patients who have failed, or are not candidates for, standard therapy.

FDA CLEARANCE

Hitachi to Market Proton Beam Therapy System

HITACHI America, Ltd., (www.hitachi.com) has obtained FDA clearance to market its PROBEAT proton beam therapy system in the U.S. The company's first U.S. system is in its final stages of construction at the

University of Texas M.D. Anderson Cancer Center Proton Therapy Center in Houston. Hitachi built the very first system at the University of Tsukuba in Japan, where it has been in use since September 2001.

A localized form of radiation treatment, proton beam therapy directly targets the tumor deep within the body in order to destroy it. Because the beam has little effect on the surrounding healthy tissue and only the

cancerous cells are treated, side effects are minimized compared with conventional electron beam and x-ray radiation therapy, Hitachi said in a release.

WHAT ARE THE

25
QUESTIONS

WE HOPE TO ANSWER THROUGH RESEARCH?

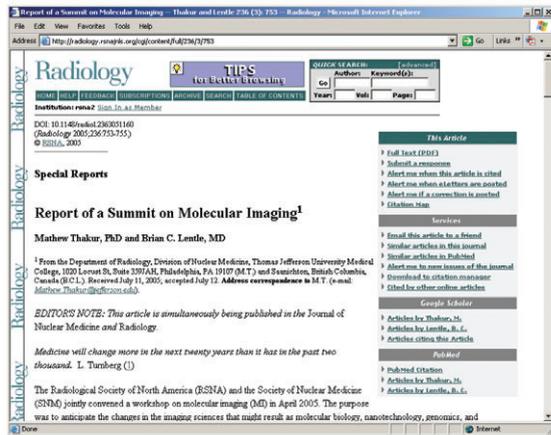
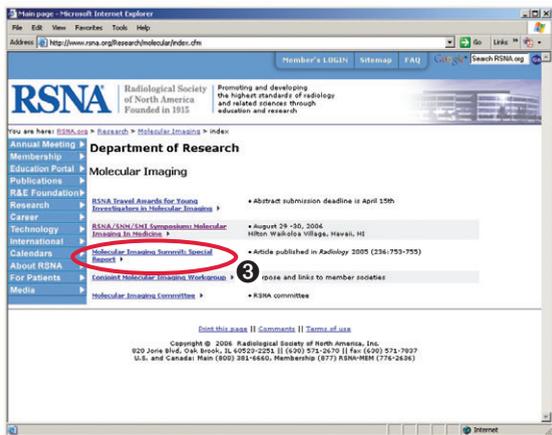
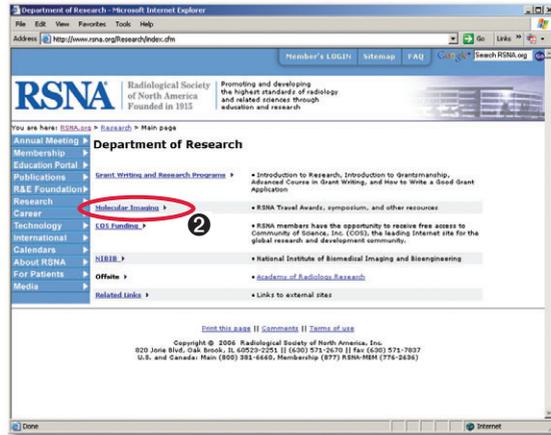
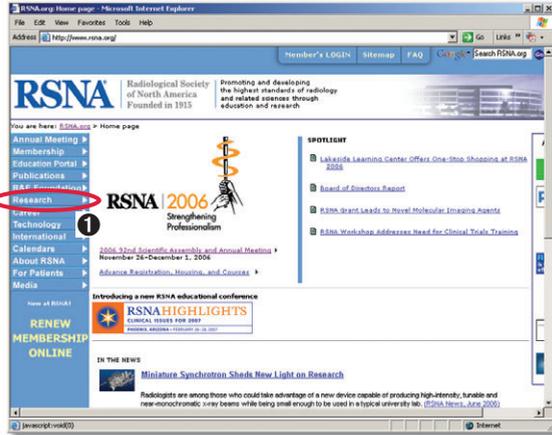
By submitting YOUR question, you can help us imagine the future of biomedical imaging and radiation oncology.



To participate, visit our “25 Questions” site at RSNA.org/25questions.

For additional information call (1-630) 571-7810 or e-mail the RSNA Research & Education Foundation at r&efoundation@rsna.org.

RSNA.org



Molecular Imaging Page

AS PART of its ongoing effort to promote research and education in the field of molecular imaging, RSNA has established a molecular imaging page on *RSNA.org*. This page will feature information about the RSNA Molecular Imaging Committee and molecular imaging conferences and programs, as well as content

such as the special report of the 2005 Molecular Imaging Summit.

To access the Molecular Imaging page, go to *RSNA.org* and click on Research ①. On the Research page choose Molecular Imaging ②.

Click Molecular Imaging Summit: Special Report ③ to read the *Radiology* article ④ about the

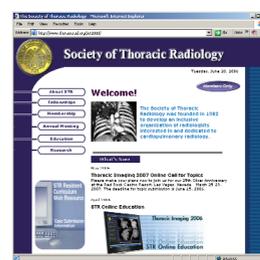
16 societies that convened last year to discuss the changes in the imaging sciences that might result as molecular biology, nanotechnology, genomics and proteomics increasingly affect everyday medical practice and imaging in particular.

OTHER WEB NEWS

Cardiac Imaging Lectures Available

THE Society of Thoracic Radiology (STR) has made a series of 18 lectures on cardiac imaging available on its Web site at www.thoracicrad.org. The lectures were captured electroni-

cally during the cardiac imaging symposium at STR's recent annual meeting. Access is free.



connections

Your online links to RSNA

RSNA.org

Radiology Online
RSNA.org/radiologyjnl

Radiology Manuscript Central
RSNA.org/radiologyjnl/submit

Radiographics Online
RSNA.org/radiographics

RSNA News
rsnanews.org

Education Portal
RSNA.org/education

RSNA CME Credit Repository
RSNA.org/cme

CME Gateway
CMEgateway.org

RSNA Medical Imaging Resource Center
RSNA.org/mirc

RSNA Career Connection
RSNA.org/career

RadiologyInfo™
RSNA-ACR patient information Web site
RadiologyInfo.org

RSNA Press Releases
RSNA.org/media

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RSNA.org/25questions

Community of Science
RSNA.org/cos

Membership Applications
RSNA.org/mbrapp

RSNA Membership Directory
RSNA.org/directory

Register for RSNA 2006
RSNA.org/register

RSNA 2006
rsna2006.rsna.org

RSNA Highlights: Clinical Issues for 2007
RSNA.org/highlightsconference

Medical Meetings

August – September 2006

JULY 30–AUGUST 3

American Healthcare Radiology Administrators (AHRA),
34th Annual Meeting & Exposition, MGM Hotel & Casino,
Las Vegas • www.ahraonline.org

JULY 30–AUGUST 3

American Association of Physicists in Medicine (AAPM),
48th Annual Meeting, Orange County Convention Center, Orlando,
Fla. • www.aapm.org

AUGUST 6–9

11th Asian Oceanian Congress of Radiology (AOCR), Hong Kong
Convention & Exhibition Centre • www.aocr2006.org

AUGUST 6–10

Society of Computed Body Tomography and Magnetic Resonance
(SCBTMR), Summer Practicum, Fairmont Le Chateau Frontenac,
Quebec City • www.scbtmr.org

AUGUST 12–17

North American Society for Cardiac Imaging (NASCI), The Teton
Symposium 2006: Modern Cardiovascular Imaging, Snow King
Resort, Jackson Hole, Wyo. • www.tetonsymposium.com

AUGUST 27–SEPTEMBER 1

World Congress on Medical Physics and Biomedical Engineering
2006, COEX Convention Center, Seoul, Korea
• www.wc2006-seoul.org

AUGUST 29–30

RSNA/Society of Nuclear Medicine (SNM)/Society for Molecular
Imaging (SMI), Imaging in Molecular Medicine symposium,
Hilton Waikoloa Village, Hawaii • [www.molecularimaging.org/
2006meeting/preconferencesymp06.php](http://www.molecularimaging.org/2006meeting/preconferencesymp06.php)

AUGUST 30–SEPTEMBER 2

SMI, 5th Annual Meeting, Hilton Waikoloa Village
• www.molecularimaging.org

SEPTEMBER 8–9

American Society for Therapeutic Radiology and Oncology
(ASTRO), Translational Research in Radiation Oncology, Physics
and Biology, Radisson Boston Hotel • www.astro.org

SEPTEMBER 9–13

Cardiovascular and Interventional Radiological Society of Europe
(CIRSE), Annual Meeting and Postgraduate Course, Palazzo dei
Congressi, Rome • www.cirse.org

SEPTEMBER 12–16

International Society of Radiology (ISR)/Radiological Society
of South Africa (RSSA)/International Society for Magnetic Res-
onance in Medicine (ISMRM), 24th International Congress of
Radiology, Cape Town International Convention Center, South
Africa • www.isr2006.co.za

SEPTEMBER 12–16

33rd Annual International Skeletal Society, Radiology Refresher
Course, Fairmont Hotel Vancouver, British Columbia
• www.internationalskeletalsociety.com

SEPTEMBER 14–15

National Institute of Standards and Technology (NIST), Imaging
as a Biomarker: Standards for Change Measurements in Ther-
apy, NIST headquarters, Gaithersburg, Md.
• www.nist.gov/public_affairs/confpage/060914.htm

SEPTEMBER 14–16

European Society of Gastrointestinal and Abdominal Radiology
(ESGAR), 5th Hands-On Workshop on CT-Colonography,
Green Park Resort Hotel, Pisa, Italy • www.esgar.org

SEPTEMBER 15–16

ASTRO, Health Services Outcomes Research in Radiation
Oncology, The Westin Horton Plaza, San Diego • www.astro.org

SEPTEMBER 15–17

Australasian Society for Ultrasound in Medicine (ASUM),
Annual Scientific Meeting, Melbourne Convention Centre,
Victoria, Australia • www.asum.com.au/asum2006.htm

SEPTEMBER 27–29

Argentine Society of Radiology, 52nd Argentine Congress of
Diagnostic Imaging and Radiation Therapy, Sheraton Hotel and
Convention Center, Buenos Aires, Argentina • www.sar.org.ar

SEPTEMBER 27–30

American Society of Emergency Radiology (ASER), 2006
Annual Scientific Meeting and Post Graduate Course, The Omni
Shoreham, Washington • www.erad.org

NOVEMBER 26–DECEMBER 1

RSNA 2006, 92nd Scientific Assembly and Annual Meeting,
McCormick Place, Chicago • rsna2006.rsna.org

FEBRUARY 26–28, 2007

RSNA Highlights: Clinical Issues for 2007, J.W. Marriott
Desert Ridge Resort & Spa, Phoenix, Ariz.
• RSNA.org/highlightsconference

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