

# RSNA *News*

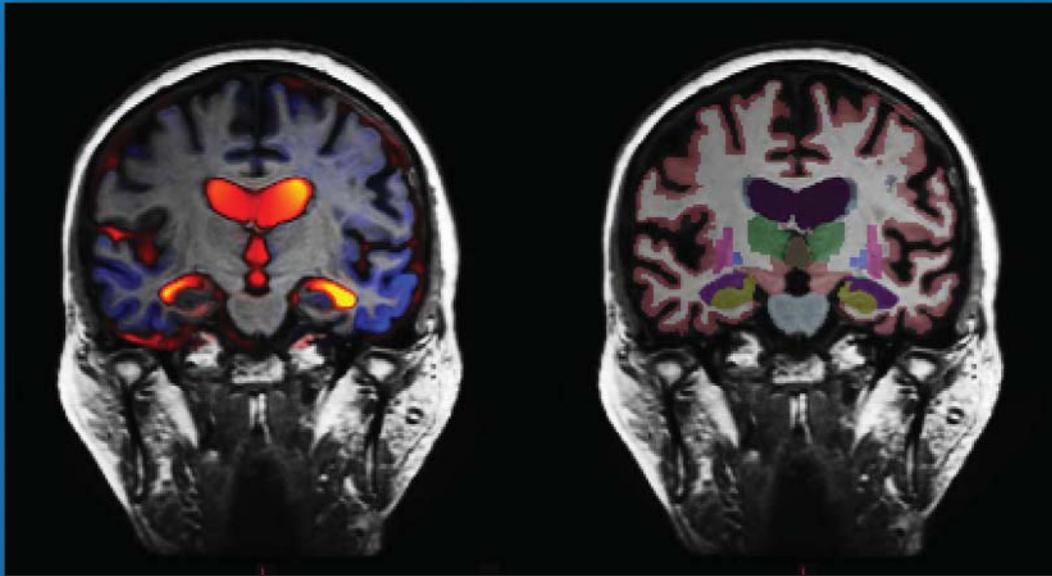


Image courtesy of Dominic Holland, Ph.D., University of California, San Diego.

## Multinational Alzheimer Imaging Initiative Delivers Early

### Also Inside:

- RSNA Research Project a Tipping Point for Modern Molecular Imaging
- Salaries Up Slightly While Practice Losses Continue
- Molecular Imaging Advance Watches Tumors Grow, Shrink
- RSNA 2007 Outstanding Researcher, Educator Announced

**RSNA 2007**  
**November 25-30**

# RSNA *News*

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**RSNA News**

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## RSNA Announces International Visiting Professor Teams

The RSNA Board of Directors has announced the teams of International Visiting Professors (IVP) for 2008. The professors and their destinations are:



### China

**Edgardo J. Angtuaco, M.D.**  
University of Arkansas

**Ken L. Schreiber, M.D.**  
University of Wisconsin

**Raquel Del Carpio-O'Donovan, M.D.**  
McGill University Health Center

**Yvonne Lui, M.D.**  
Dana-Farber Cancer Institute

**Kitt Shaffer, M.D.**  
Albert Einstein College of Medicine

### Nigeria

**William E. Brant, M.D.**  
University of Virginia Health System

**Anne C. Roberts, M.D.**  
University of California, San Diego

**Sughra Raza, M.D.**  
Brigham & Women's Hospital

### Mexico

*(In cooperation with the Mexican Society of Radiology and Imaging [SMRI])*

**Giovanna Casola, M.D.**  
University of California, San Diego

**Theodore J. Dubinsky, M.D.**  
University of Washington, Seattle

### Vietnam

**Barry A. Siegel, M.D.**  
Washington University, St. Louis

**Eric J. Stern, M.D.**  
Harborview Medical Center, Seattle

**Franz J. Wippold, M.D.**  
Washington University, St. Louis

For more information about the IVP program, go to [RSNA.org/international/CIRE/ivpp.cfm](http://RSNA.org/international/CIRE/ivpp.cfm). An article about one of the 2007 teams will appear in the January 2008 issue of *RSNA News*.

## Becker is New ABR Executive Director

**T**HE American Board of Radiology (ABR) has appointed Gary J. Becker, M.D., executive director effective January 1, 2008.

Dr. Becker will succeed Robert R. Hattery, M.D., who has served as executive director since July 2002 and will retire at the end of the year.

Dr. Becker is chairman of the RSNA Board of Directors and a professor of vascular and interventional radiology at the University of Arizona in Tucson. He began his career in diagnostic radiology at Indiana University and previously served as assistant medical director of the Baptist Cardiac & Vascular Institute of Miami and branch chief of image-guided intervention in the National Cancer Institute's Cancer Imaging Program. Dr. Becker was elected to the ABR Board of Trustees in 2000 and since 2006 has served as associate executive director for diagnostic radiology and subspecialties.



**Gary J. Becker, M.D.**

## State of Nuclear Medicine Detailed

Nuclear medicine's critical role in drug development, preventive healthcare and personalized medicine is being jeopardized by aging facilities and equipment, a shortage of trained nuclear medicine scientists and loss of federal research support, according to a committee that studied the issue.

The Committee on the State of the Science of Nuclear Medicine, formed by the National Academies in response to a request from the U.S. Department of Energy (DOE) and National Institutes of Health (NIH), was chaired by RSNA Board Liaison for Publications and Communications Hedvig Hricak, M.D., Ph.D. In "Advancing Nuclear Medicine Through Innovation," the committee details problems and offers solutions:

**Loss of Federal Commitment for Nuclear Medicine Research**—Answers posed by the committee include restoring the budget for DOE's Office of Biological and Envi-

ronmental Research, reduced 85 percent in fiscal 2006.

**Cumbersome Regulatory Requirements**—The committee urges the U.S. Food and Drug Administration to simplify requirements for pre-investigational evaluation of, and current good manufacturing practices for, radiopharmaceuticals.

**Inadequate Domestic Supply of Radionuclides for Research**—A dedicated accelerator and upgrade to an existing research nuclear reactor must be considered, according to the committee.

**Trained Nuclear Medicine Scientists Shortage**—Appropriate curricula and innovative grants will address a "generation gap" of leadership, the committee said.

**Need for Technology Development and Transfer**—The committee calls on DOE to encourage interdisciplinary collaboration and involve industry.

Serving on the committee were: S. James Adelstein, M.D., Ph.D., Peter S. Conti, M.D., Ph.D., Joanna Fowler, Ph.D., Joe Gray, Ph.D., Lin-Wen Hu, Ph.D., Joel Karp, Ph.D., Thomas Lewellen, Ph.D., Roger Macklis, M.D., C. Douglas Maynard, M.D., Thomas J. Ruth, Ph.D., Heinrich Schelbert, M.D., Gustav Von Schulthess, M.D., and Michael R. Zalutsky, Ph.D.

Report excerpts and purchase information are available at [www.nap.edu/catalog/11985.html](http://www.nap.edu/catalog/11985.html).

## VIEWING TECHNOLOGY Tip of the Month

**CR and DR images can be greatly overexposed and still have normal density and contrast. Too much radiation will preserve the findings.**

American Association of Physicists in Medicine

### Radiologist is Canadian Medical Association President-Elect

The Canadian Medical Association has named **Robert Ouellet, M.D.**, a radiologist from Laval, Quebec, as its president-elect.

Dr. Ouellet helped launch Canada's first private axial tomography clinic in 1987 and, 10 years later, created Laval's first private MR imaging clinic. In 2004, Dr. Ouellet became director of diagnostic radiology clinics in Laval and Terrebonne. He has served as an imagery consultant on the Laval integrated network information system and as an adviser to the Canada Health Infoway committee.



**Robert Ouellet, M.D.**

### Brenner Named Royal College Honorary Member

**R. James Brenner, M.D., J.D.**, a professor of clinical radiology and chief of breast imaging at the University of California, San Francisco, has been named an honorary life member of the U.K. Royal College of Radiologists

Breast Group. Dr. Brenner recently completed a two-year term as president of the Society of Breast Imaging and has addressed the Royal College Breast Group as a keynote speaker.

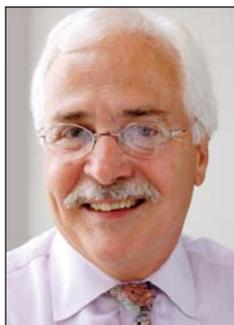


**R. James Brenner, M.D., J.D.**

### NCI Appoints Deputy Director for Management

**Lawrence Ray, M.A., J.D.**, has been named deputy director for management and executive officer for the National Cancer Institute (NCI). Ray will serve as NCI chief operating officer and oversee administrative management of NCI programs, with key responsibilities in budget and workforce management.

Ray has 26 years of federal service, including 14 years at NCI as chief administrative officer of the division of extramural activities, coordinator of patent licensing and collaborative research and development agreements, chief administrative officer of the division of cancer treatment and diagnosis and deputy associate director. He recently served as vice-president for research operations at Beth Israel Deaconess Medical Center in Boston and has served as vice-president of clinical program development at Dana-Farber/Partners CancerCare and program administrator for clinical sciences at Dana-Farber/Harvard Cancer Center, both in Boston.



**Lawrence Ray, M.A., J.D.**

### Giger is AAPM President-Elect

**Maryellen L. Giger, Ph.D.**, a professor of radiology and associate chair for basic science research at the University of Chicago, is 2008 president-elect of the American Association of Physicists in Medicine (AAPM).

Dr. Giger also serves as chair of the Physics Subcommittee of the RSNA Scientific Program Committee and chairs the research study section of the RSNA Research & Education Foundation Grant Program Committee.



**Maryellen L. Giger, Ph.D.**

### Canadian Association of Radiologists Honors Mason, Bhargava

**William F. Mason, M.D.**, of Halifax, Nova Scotia, has received the gold medal of the Canadian Association of Radiologists (CAR). Dr. Mason served in various roles, including associate dean for postgraduate medical education, at Dalhousie University for more than 30 years. He was also recognized for his service to patients at Victoria General Hospital in Halifax.

**Ravi Bhargava, M.D.**, an associate professor of radiology and diagnostic imaging at the University of Alberta, received the 2007 CAR Young Investigator Award.

### Rogers Receives ASER Gold Medal

**Lee F. Rogers, M.D.**, a professor of radiology at the Arizona Health Sciences Center in Tucson, has received the gold medal of the American Society of Emergency Radiology. Dr. Rogers previously served as chair of the Department of Radiology at the

Northwestern University School of Medicine in Chicago and was the I. Meschan Distinguished Professor of Radiology at Wake Forest University in Winston-Salem, N.C. Dr. Rogers was editor-in-chief of the *American Journal of Roentgenology* from 1995 to 2003.



**Lee F. Rogers, M.D.**

**IN MEMORIAM:**

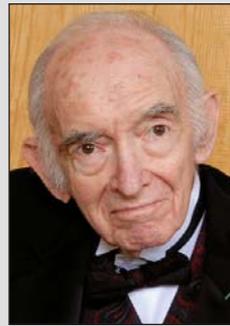
**Eugene L. Saenger, M.D.**

**Eugene L. Saenger, M.D.**, a nuclear medicine legend who profoundly influenced the study of radiation safety and efficacy, died Sept. 30 in Cincinnati at the age of 90. Dr. Saenger received the RSNA gold medal in 1993.

Dr. Saenger established the radioisotope laboratory at University Hospital in Cincinnati in 1958 and served as its director until 1987. The lab was named for him in 1978. Dr. Saenger also served as vice-chair of the Department of Radiology at the

University of Cincinnati from 1975 to 1987.

A longtime consultant to the U.S. military who helped develop safety and medical treatment guidelines for radiation exposure, Dr. Saenger is remembered by many for leading controversial Cold War-era human radiation experiments. After the 1986 Chernobyl reactor disaster in Ukraine, Dr. Saenger assisted the military with its decision whether to evac-



**Eugene L. Saenger, M.D.**

uate armed forces personnel and their families.

Dr. Saenger also chaired patient radiation safety committees for the National Council on Radiation Protection and Measurements and the International Commission on Radiological Safety. He received the Hevesy Nuclear Medicine Pioneer award from SNM in 1987 and the gold medal of the American Roentgen Ray Society in 1998.



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**MY TURN**

**Working Together: What Superb Staff and Volunteers Mean to a Society**

**H**AVE worked for RSNA for more than 18 years as *RadioGraphics* Editor and more recently as Education Editor. In these roles, I have served on or participated in most RSNA Committees. I am always excited and continuously gratified how the combination of our wonderful RSNA staff and the many volunteers who serve the Society come together so well to accomplish project after project in a first-class, quality way. Planning for our annual meeting is continuous and looks ahead several years; Society journals have sufficient quality content that issues are planned months in advance; Education Center content is developed using a three-year cycle. Strategic planning conducted by the Board of Directors looks well into the future of our specialty and Society.

*My Turn*  
**ONE RADIOLOGIST'S VIEW**

Overall, I know *RadioGraphics* and the Education Center the best. The personnel in Bethesda and Oak Brook are absolutely superb: smart, organized, focused and extremely hard-working. All you have to do is to look at an issue of *Radio-*

*Graphics* or an Education Center product to see the devotion and care that went into it. Talented Society volunteers plan and implement initiatives set by the Board of Directors—all without compensation. In the *RadioGraphics* and Education Center areas, these outstanding volunteers include our authors, editorial board, subspecialty exhibit review panelists and *RadioGraphics* reviewers.

I often mention to my colleagues



**William W. Olmsted, M.D.**

that RSNA, with its leadership, staff and volunteers, could make any project a success with an emphasis on quality. So, next time you read an RSNA journal or publication, open an Education Center product, take a CME test, come to an annual meeting, participate in a funded research project or are involved in anything else the RSNA does, please think about our talented staff and volunteers, as these groups are the backbone of the Society—past, present and, most importantly, future.

*William W. Olmsted, M.D., has served as RadioGraphics Editor since 1990 and as RSNA Education Editor since 1999.*

# RSNA Board of Directors Report

**A**T ITS September meeting, the RSNA Board of Directors discussed international participation in RSNA and its global outreach, as well as new education and technology initiatives. The Board also met with Anne G. Osborn, M.D., chair of the RSNA Research & Education Foundation Board of Trustees, to learn more about projects the Foundation is undertaking. Appointments to RSNA's many committees were also approved by the Board.

## International Relations

RSNA is pleased to see its **international presence** continue to grow exponentially, as measured by membership, *Radiology* submissions and other metrics. Members outside North America now make up nearly 18 percent of RSNA membership, with international membership forecast to increase more than 40 percent in the next five years.

The number of scientific and education abstracts submitted for the annual meeting by international participants continues to rise significantly, while **international attendance at the annual meeting has risen** 14 percent over the last five years. Such programs as the International Leadership Reception and the new "Italy Presents" Integrated Science and Practice session (see Page 19 for more information) at RSNA 2007 are designed to encourage international attendance.

Submissions to *Radiology* by international authors have also increased from 56 percent of total submissions in

2000 to 64 percent in 2006.

RSNA uses its analysis of international interest in the Society to help plan its outreach efforts. In 2008, RSNA's next president, Theresa C. McCloud, M.D., will represent the Society at the European Congress of Radiology (ECR) in Vienna, Austria, the Japan Radiological Society meeting in Yokohama, the Canadian Association of Radiologists meeting in Ottawa, the International Congress of Radiology (ICR) in Marrakesh, Morocco, and the Asian Oceanian Congress of Radiology (AOCR) in Seoul, Republic of Korea. In addition, RSNA will exhibit at ECR and AOCR as well as the Italian Society of Medical Radiology in Rome.

**RSNA also presented a refresher course at the Chinese Congress of Radiology** last month, will present another at ICR and is involved in several collaborations with international societies.

*Members outside North America now make up nearly 18 percent of RSNA membership, with international membership forecast to increase more than 40 percent in the next five years.*

The 2008 teams for the **RSNA International Visiting Professor (IVP)** program, approved by the Board earlier this year, can be found on Page 1.

## Annual Meeting

The newest phase of the **RadLex® radiology lexicon**, the RadLex Playbook, will be released during RSNA 2007. RadLex is a single unified source of radiology terms intended to be the standard for information produced by radiologists and used in various systems. The first 7,500 terms were released in November 2006. Focusing on various devices, exams and procedures pertaining to different modalities, the RadLex Playbook adds



**Gary J. Becker, M.D.**  
Chairman, 2007 RSNA Board of Directors

another 2,500 terms. Separate RadLex courses during RSNA 2007 will be geared toward developers and radiologists.

The RadLex subcommittee of the RSNA Radiology Informatics Committee anticipates spending another six to 12 months filling gaps and linking terms in RadLex. The committee is also fostering projects to demonstrate to clinical radiologists how RadLex can be used in teaching file and report systems. RadLex has already been incorporated into numerous radiology products.

The McCormick Place Convention Center in Chicago has opened its **new West Building**. The expansion offers a 460,000 square-foot exhibition hall and 250,000 square feet of meeting space. Possible uses for the new building at future RSNA annual meetings are under consideration. During RSNA 2007, the West Building will be used for smaller events such as alumni functions and committee meetings.

Many activities are planned during RSNA 2007 to **pay tribute to Anthony**



**Anthony V. Proto, M.D.**, editor of *Radiology*, will be honored at RSNA 2007 as he prepares for his retirement at the end of the year.



The new West Building at the McCormick Place Convention Center will be used for committee meetings and alumni functions at RSNA 2007.



RSNA international outreach activities this year included the European Congress of Radiology in Vienna, Austria, where Executive Director Dave Fellers, C.A.E., and President R. Gilbert Jost, M.D., greeted booth visitors.

**V. Proto, M.D.**, who will retire as *Radiology* editor at the end of 2007. The *Daily Bulletin* will provide coverage of the recognition of Dr. Proto's decade overseeing RSNA's science journal.

Looking forward to RSNA 2008, a review procedure has been approved for the new **Applied Science Exhibit** category of submitted abstracts. The category will cover submissions that demonstrate non-hypothesis-based work not yet generally accepted enough in practice to be considered an education exhibit. Abstract submission will open in January.

### Quality Improvement

The American Board of Radiology (ABR) acknowledges the important role that societies have in helping their members fulfill the **practice quality improvement (PQI)** component of the ABR maintenance of certification (MOC) process and RSNA continues to develop materials to support diplomates in fulfilling this requirement. RSNA's Continuous Quality Improvement Initiative (CQII) is offering a one-day quality symposium and two quality roundtables during RSNA 2007 and has created a PQI "starter kit" to be posted

soon at *RSNA.org*. A **new quality section in RadioGraphics** will debut next year and other projects such as a quality officer summit and team training course are also being planned.

RSNA is also working with AAPM to develop an online program to educate radiology residents about the physics of imaging procedures. RSNA is also working with the education committee of the Association of Program Directors in Radiology to develop a **Web-based resident learning portfolio** for residents to document their activities as now required by the Accreditation Council for Graduate Medical Education.

### Intersociety Collaboration

RSNA has joined the new **Alliance for Radiation Safety in Pediatric Imaging** and will support the "Image Gently" educational campaign the alliance plans to launch early next year. RSNA is also continuing its membership in the Academy of Radiology Research and will appoint a representative to the Ambulatory Care Professional and Technical Advisory Committee of The Joint Commission.

### Financial Picture

RSNA remains very strong financially, due in part to continued expansion of the annual meeting and cost-efficient operations throughout the Society.

In light of an overwhelmingly positive response to the six-month pilot of RSNA's daily electronic news briefing, **The Daily Scan**, RSNA will extend the service for another year.

Finally, starting in 2008, RSNA will launch an "on demand" service for members to order hard copies of its membership directory. More details will be available at *RSNA.org*.

**GARY J. BECKER, M.D.**  
CHAIRMAN, 2007 RSNA BOARD OF DIRECTORS

■ Note: In our continuing efforts to keep RSNA members informed, the chairman of the RSNA Board of Directors will provide a brief report in *RSNA News* following each board meeting. The next RSNA Board Meeting will be at RSNA 2007.

# Salaries Up Slightly While Practice Losses Continue

**S**ALARIES increased last year for non-interventional, diagnostic radiologists, but at a much smaller rate than in the previous year, according to a new report. Salaries of interventional, diagnostic radiologists once again showed a modest gain, while a trend toward many medical practices losing money continued in much of the nation.

These findings are part of the American Medical Group Association (AMGA) 2007 Medical Compensation and Financial Survey, which provides a complete financial picture of medical group operations across the U.S. during 2006. Included are compensation, productivity and financial operations data from 43,000 healthcare providers. RSM McGladrey conducted the survey for AMGA.

Salaries of interventional, diagnostic radiologists in group practices showed an increase of 3.53 percent last year—nearly equal to the 3.59 percent increase posted in 2005. The median salary of \$440,004 was once again the second highest among 29 specialties included in the AMGA survey.

Non-interventional diagnostic radiologists again ranked fifth overall among specialists studied, with a median salary of \$414,875 in 2006. The figure represents an increase of 3.72 percent, compared to 9.62 percent the previous year.

## Salary Not Only Motivator

Richard B. Gunderman, M.D., Ph.D., associate professor of radiology, pediatrics, medical education, philosophy, liberal arts and philanthropy at Indiana

University Purdue University Indianapolis (IUPUI), has written about compensation for the RSNA journal *Radiology*. He suggested that if compensation is a motivating factor in drawing people into radiology and keeping them active in the profession, the latest salary trends could be somewhat worrisome in a medical specialty that is experiencing a workforce shortage.

“If we feel we’re unfairly underpaid, that may very well take a toll on our dedication to our work and our willingness to keep doing that work,” said Dr. Gunderman, a member of the RSNA Professionalism Committee and author of the recently released book *Achieving Excellence in Medical Education*. He emphasized, however, that

*It's not in the best interests of our profession or the patients we serve, if we focus all the time on the money and the revenue and expenses and compensation.*

Richard B. Gunderman, M.D., Ph.D.

compensation is only one of the factors that motivate radiologists in their work.

“Are there things we can do to help radiologists better appreciate the contribution we’re making to patients and referring physicians?” he asked. “In other words, when we leave work at the end of the day, can we have an even clearer sense of how important the work we’ve done is to the patients and health professionals we’ve served?”

“Another [way to motivate practitioners] would be to make sure that we feel we have an opportunity to learn and develop as radiologists, as physi-



Richard B. Gunderman, M.D., Ph.D.

cians and even as human beings, in the work we’re doing today,” Dr. Gunderman continued.

Dr. Gunderman proposed that there might be too much emphasis on finances. “I think ultimately it’s not in the best interests of our profession or the patients we serve, if we focus all the time on the money and the revenue and expenses and compensation,” he said.

“If people feel unfairly underpaid, we’re in trouble,” he said. “But simply increasing compensation is not the only way, and probably not even the best way, to make sure that we really care about the work we do and that we’re doing it as well as we possibly can.”

## Many Practices Still Fighting Losses

The AMGA survey found that cardiac/thoracic surgeons were once again the highest paid specialty, with a median salary of \$460,000. This represents, however, a decrease of 2.13 percent from the previous year.

Median salaries of OB/GYN physicians also dropped slightly. While salaries of other specialties studied in 2006 did increase, many medical groups across the country continued to lose money per physician.

“Reimbursements for Medicare have been frozen for the last couple of years and many commercial payers actually link their payment to the Medicare fee schedule changes,” explained AMGA President and Chief Executive Officer Donald W. Fisher, Ph.D., C.A.E.

“What we’re seeing is increased

<b>Top Physician Compensation</b>				
<b>Specialty</b>	<b>2006</b>	<b>2005</b>	<b>2005-2006 Percent Increase</b>	<b>2004</b>
Cardiac / Thoracic Surgery	\$460,000	\$470,000	-2.13	\$421,620
Diagnostic Radiology - M.D.s (Interventional)	\$440,004	\$424,992	3.53	\$410,250
Orthopedic Surgery	\$436,481	\$409,518	6.58	\$381,429
Cardiology - Cath Lab	\$435,000	\$406,230	7.08	\$380,279
Diagnostic Radiology - M.D.s (Non-Interventional)	\$414,875	\$400,000	3.72	\$364,899

<b>Top Physician RVUs</b>				
<b>Specialty</b>	<b>2006</b>	<b>2005</b>	<b>2005-2006 Percent Increase</b>	<b>2004</b>
Diagnostic Radiology - M.D.s (Interventional)	9,208	8,949	2.90	8,582
Cardiology - Cath Lab	8,736	9,083	-3.81	8,562
Diagnostic Radiology - M.D.s (Non-Interventional)	7,815	7,571	3.22	7,679
Gastroenterology	7,598	7,548	0.66	7,298
Cardiac / Thoracic Surgery	7,410	7,998	-7.35	7,650

<b>Top Physician Gross Charges</b>				
<b>Specialty</b>	<b>2006</b>	<b>2005</b>	<b>2005-2006 Percent Increase</b>	<b>2004</b>
Cardiology - Cath Lab	\$2,172,881	\$2,338,394	-7.08	\$2,161,296
Diagnostic Radiology - M.D.s (Interventional)	\$2,162,725	\$1,999,231	8.18	\$1,748,617
Cardiac / Thoracic Surgery	\$1,872,880	\$1,875,143	-0.12	\$1,505,710
Diagnostic Radiology - M.D.s (Non-Interventional)	\$1,832,567	\$1,793,100	2.20	\$1,722,194
Orthopedic Surgery	\$1,778,351	\$1,702,524	4.45	\$1,511,748

Source: American Medical Group Association (AMGA) 2007 Medical Compensation and Financial Survey.

costs by medical groups, as we all experience—fuel costs have gone up, personnel costs continue to go up—and yet the reimbursement to the providers themselves has remained the same, or in some cases, gone down,” he continued. “The margins for these medical groups are getting thinner and thinner each year.”

Dr. Fisher said median salaries of most medical specialties have increased, but the gains result largely from physicians being asked to work longer hours and be more productive with the time they spend with patients.

“What we’re seeing is an increase in productivity and longer hours at a higher production rate, so they’re actually generating more money for the institution,” he said. “Since you have the same number of doctors providing services, it allows them to make a little bit more money at the end of the day.”

### Competing Objectives

Dr. Fisher said he believes that one of the major problems in healthcare today is that providers are paid for throughput, putting them in a Catch-22.

“If you’re more efficient—you diagnose quicker, you treat people less often, you really do things that are much more beneficial to the patient—at the end of the day you end up not generating as much revenue because you’re not doing as much throughput,” said Dr. Fisher. “The more efficient you become in terms of taking care of patients, and the higher the quality of care you deliver, the less money you generate for the institution.”

Dr. Fisher said many medical practices lose money even as they implement lean production alongside high quality patient care. “They have really improved quality, they’ve improved safety, they’ve been much more efficient and the patients are much happier,

but they’re losing their shirts because they’re not generating revenue for services that they otherwise would have been providing,” he said.

Dr. Fisher believes the time has come for major changes in the way healthcare providers throughout the U.S. are paid.

“We need to remove the perverse incentives,” he said. “We need to begin to pay providers based on results or outcomes, and not on throughput. We really do need a complete overhaul of the healthcare reimbursement system if we’re ever going to get anywhere in terms of real savings and real efficiency.” □

### Learn More

■ More information about the American Medical Group Association and its annual survey is available at [www.amga.org](http://www.amga.org).

# Multinational Alzheimer Imaging Initiative Delivers Early

**A**N EFFORT launched just two years ago to coordinate Alzheimer imaging studies is already yielding results that point to less expensive and more time efficient clinical trials.

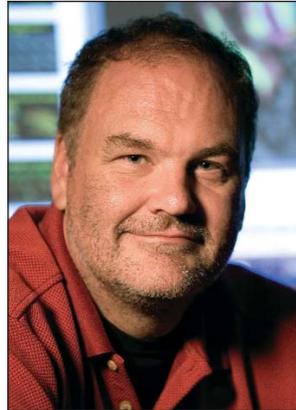
Early results from the Alzheimer's Disease Neuroimaging Initiative (ADNI) show promise in such areas as finding changes in early and established Alzheimer disease (AD), validating PET scans and monitoring MR scanners.

Launched in 2005, ADNI is a five-year, \$60 million, public-private research partnership organized by the National Institutes of Health to improve neuroimaging and biomarker measures. Approximately 800 subjects are enrolled in studies—coordinated through 58 sites in the U.S. and Canada—that track changes in normal individuals, people with AD and people with mild cognitive impairment (MCI), a condition which often precedes AD. Researchers are capturing changes in the brain with PET and MR imaging, analyzing blood and other body fluids and conducting clinical interviews to track cognitive performance over time. Results are then coordinated to compare physical changes in the brain, biomarkers and disease progression.

Public health experts believe the number of people living with AD will quadruple in the next four decades. Researchers at the Johns Hopkins Bloomberg School of Public Health announced in June that the number of cases would jump from the current 26



**Michael W. Weiner, M.D.**  
University of California,  
San Francisco



**Anders Dale, Ph.D.**  
University of California,  
San Diego



**Jeffrey R. Petrella, M.D.**  
Duke University

million worldwide to more than 106 million by the year 2050.

“Ultimately, the holy grail is to have a treatment that slows the progression of Alzheimer disease,” said Michael W. Weiner, M.D., ADNI principal investigator and a professor of medicine, radiology and psychiatry and neurology at the VA Medical Center and the University of California, San Francisco. “Once we have a treatment,

*[We want] to identify people at an early stage before they start having cognitive impairments and prevent the progression of the disease.*

**Michael W. Weiner, M.D.**

the next holy grail will be to identify people at an early stage before they start having cognitive impairments and prevent the progression of the disease.”

### Online Global Database Created

One of the biggest accomplishments of ADNI so far is creating a huge global research database, added Dr. Weiner, who also serves as the scientific director of the MR unit at the San Francisco VA Medical Center. “We have 800 subjects who are getting MR and PET

scans and lumbar punctures every six months for two to three years,” he said. “There are numerous time points to track longitudinal change. It’s an unprecedented amount of information.”

The real impact of the database, said Dr. Weiner, is that it is fully accessible online ([www.loni.ucla.edu/ADNI/](http://www.loni.ucla.edu/ADNI/)) to qualified scientists. Stored images have undergone several distortion-correcting steps, he added. “The images are really beautiful. We modified some of the product sequences to get specific ADNI MR imaging sequences that would provide virtually identical scans across vendor platforms,” he said.

Such advances come amidst a looming global AD epidemic tied to population aging, said Ron Brookmeyer, Ph.D., lead author of the Johns Hopkins study and a professor of biostatistics. Dr. Brookmeyer’s study showed that by 2050, 1 in 85 persons worldwide will suffer from the disease. “If we can make even modest advances in preventing AD or delay its progression, we could have a huge global public health impact,” he said.

## MR Monitoring Utilizes Anatomical Brain Model

Neuroradiologist Clifford R. Jack, M.D., and colleagues at Mayo Clinic in Rochester, Minn., have helped ensure the clinical accuracy and standardization of 80 MR scanners from multiple ADNI sites. They have reported that a standard anatomical model of a brain—the ADNI phantom—can be used to monitor the performance of each scanner. Meanwhile, a team at the Banner Alzheimer’s Institute in Phoenix has validated the use of PET scanning to predict Alzheimer progression. The team compared changes over time in PET scans of glucose metabolism in normal patients, those with MCI and those with AD. Researchers found changes in the scans correlate with disease progression seen in patients who go on to develop AD.

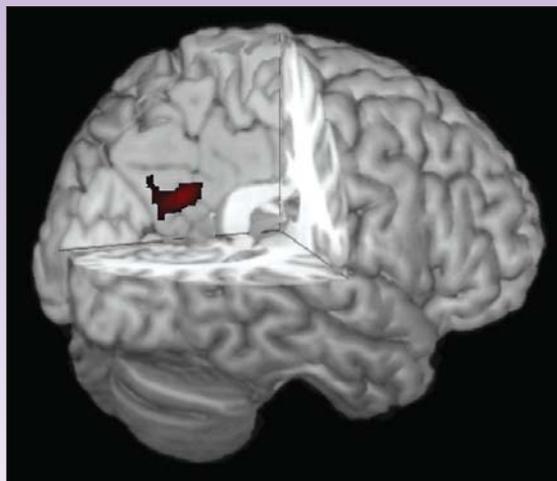
Anders Dale, Ph.D., a professor of radiology and neurosciences and co-director of multimodal imaging at the University of California, San Diego, is conducting an ADNI-funded study that analyzes MR and PET images to detect early changes in cerebral cortex thickness and regional metabolism in the brains of people with MCI over a six-month period.

“We can predict, with a fair amount of accuracy, which patients in the mild cognitive impairment category will get worse clinically in the next six to 12 months,” said Dr. Dale. “It’s really clear that imaging biomarkers, like cerebral cortex thickness, provide a sensitive and specific measure of something going wrong very early on.”

## fMRI Also Has a Role

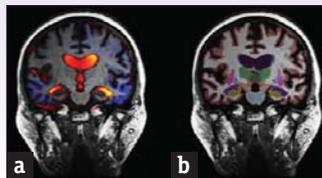
Other studies outside the ADNI project also continue to provide valuable insight into AD progression.

Researchers at Duke University Medical Center in Durham, N.C., used functional MR imaging (fMRI) to find brain markers that might help enhance early diagnosis and treatment. The team led by Jeffrey R. Petrella, M.D., focused on measuring alterations in



3D rendering demonstrating location of focus in medial parietal cortex, which may represent an early functional marker of dementia.

Image courtesy of Jeffrey R. Petrella, M.D., Duke University Medical Center.



## ON THE COVER

### Longitudinal Change in Alzheimer Disease

(a) Volume change over 1 year: red/yellow 5-20% increase; blue 5-10% decrease. (b) Automatic segmentation

Volume change calculations and picture by Dominic Holland, Ph.D., University of California, San Diego.

brain activation across the entire brain, including the medial temporal lobe, an area of the brain marked by profound atrophy in patients with AD. Results of their study were published in the October 2007 issue of *Radiology*.

“We thought we would try to focus on a process which is occurring relatively early in the pathologic evolution of AD, namely neuronal or synaptic, dysfunction,” said Dr. Petrella, an associate professor of radiology at Duke. “We believe this is an earlier pathophysiologic marker of the disease than cell death or atrophy.” Looking at 28 healthy control subjects, 34 patients with MCI and 13 patients with mild AD, the team used a face/name matching activity to test subjects’ memories. Along the spectrum of healthy people at low risk, to the MCI group, to the patients with AD, there was decreasing activation in the medial temporal lobe, an area of the brain associated with episodic memory that normally increases its activity during a memory task.

More surprising was an additional finding—the team saw increasing activation in the posteromedial cortices (PMC), an area recently implicated in personal memory, which normally suppresses its activity during a memory

task. “You lose the coordination of a finely-tuned system, which normally shuts its resources to where they’re needed depending on the task at hand,” said Dr. Petrella. “Abnormal suppression of activity was actually a more robust marker of the disease and very closely correlated with the level of cognitive impairment.” He said the fMRI study indicated that functional markers may prove a valuable tool for health professionals trying to identify patients at risk for developing AD.

Said Dr. Petrella, “This evidence may lead to another set of treatments that target areas of the brain that should suppress their activity during memory function, adding to cognitive enhancement treatments already available.” □

## Learn More

- More information about the Alzheimer’s Disease Neuroimaging Initiative can be found at [www.adni-info.org](http://www.adni-info.org).
- The abstract for “Cortical Deactivation in Mild Cognitive Impairment: High-Field-Strength Functional MR Imaging” is available at [radiology.rsna.org/cgi/content/abstract/245/1/224](http://radiology.rsna.org/cgi/content/abstract/245/1/224).

# Molecular Imaging Advance Watches Tumors Grow, Shrink

**H**AVING USED bioluminescence tomography (BLT) to identify adrenal tumors in living mice, researchers at Virginia Tech said they have brought BLT imaging a step closer to potential use in preclinical drug and therapy trials.

Ge Wang, Ph.D., is an endowed engineering professor and director of the newly established Biomedical Imaging Division at the Virginia Tech-Wake Forest University School of Biomedical Engineering & Sciences in Blacksburg, Va. Dr. Wang was instrumental in inventing the BLT process in 2002 while on faculty at the University of Iowa in Iowa City.

BLT is a form of optical molecular imaging in which a naturally occurring enzyme, luciferase, is used to tag specific cells in small animals such as mice. The organic light from the enzyme—the same light that causes fireflies to glow—can then be measured from surface readings of the animal in order to achieve in vivo mapping.

Michael Henry, Ph.D., an associate professor in the Department of Molecular Physiology and Biophysics at the University of Iowa, who worked with Dr. Wang on past projects, explained the process. “The gene that makes the enzyme is cloned and put into cancer cells or microbial cells, which are then injected into animals,” said Dr. Henry. “The animal then expresses that gene in some tissue or in some particular cell. To visualize those cells, you give the animal an injection of luciferin, a substrate of luciferase.”



**Ge Wang, Ph.D.**  
Virginia Tech-Wake Forest University  
School of Biomedical Engineering &  
Sciences



**Michael Henry, Ph.D.**  
University of Iowa

The appeal of this approach is that it allows researchers to monitor tumor growth in a living animal, said Dr. Henry. “You can watch the tumor grow, and if you put the animal on an experi-

mental therapy, you can watch whether the tumor responds by monitoring the change in light output from that particular tumor,” he said.

The emitted bioluminescent light is captured by a cooled charge-coupled device (CCD)-based camera. When mapping gene expressions, BLT imaging is more sen-

sitive and specific than standard X-ray and MR imaging techniques, researchers said.

In addition to monitoring tumors, the nature of BLT imaging also lends itself to measuring specific cell behav-

ior. “People often want to study how various signaling processes work within cells,” noted Dr. Henry. “You can set up the system so that the luciferase only gets turned on when a particular pathway is activated. Therefore, you know that the particular signaling event is happening in that cell.”

Said Dr. Wang: “The introduction of BLT relative to planar bioluminescent imaging can be compared to the development of computed tomography based on radiography. The advantage of BLT is that you can not only target specific cell structures or cell behaviors but also localize and quantify them within a living mouse volumetrically and dynamically.”

## Diffusion is the Catch

The catch to using bioluminescence for imaging, the researchers said, is that as the light signal is emitted from the animal’s internal organs, it is instantly diffused by the living tissue around it,

*The introduction of  
BLT relative to planar  
bioluminescent imaging  
can be compared to the  
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tomography based on  
radiography.*

**Ge Wang, Ph.D.**

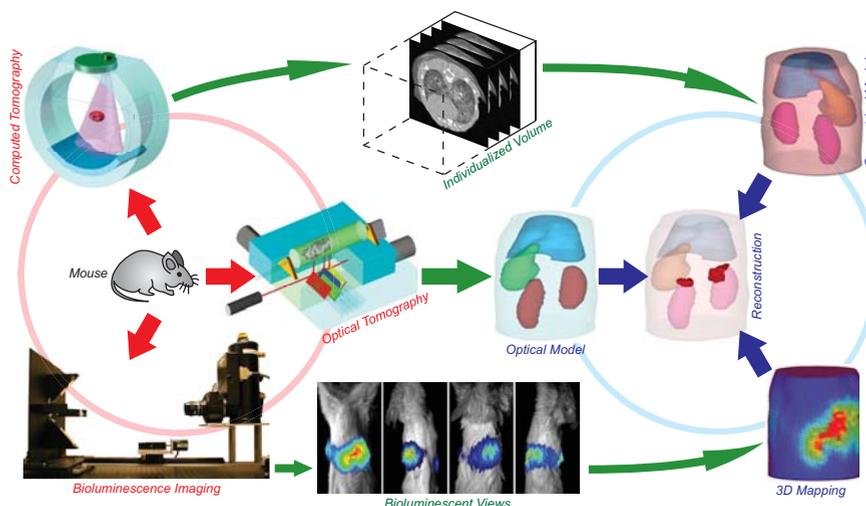
making it difficult to derive useful information. Noted Dr. Wang: “You have this beautiful bioluminescent light coming out from around the mouse, but the question is, what is the source? Where is the underlying bioluminescence? How strong is it? Where is the tumor? How many cancer cells are there?”

“When you see the signal coming from the surface of the animal, you can’t tell exactly where inside the animal the source of that signal is, and you can’t tell other things about it, like how large or intense the source is,” added Dr. Henry. “The signal is significantly impacted by its interaction with tissues, so it gets scattered and absorbed by the various tissues that it passes through. You can’t tell whether the signal is emanating from a very weak source that’s very near the surface of the animal, or a very strong source that is much deeper in tissues.”

Dr. Wang said he and his collaborators were able to render BLT imaging practical by developing a series of computer algorithms that work from 3D models of mouse anatomy and its optical properties. “The light diffuses in a zig-zag pattern, and the algorithms help decode that pattern,” he said. As a result, Dr. Wang and his team were able to successfully use BLT to find and measure the bioluminescent sources inside mice and therefore define internal tumors.

Two problems still make clinical use of BLT imaging a relatively distant goal, the researchers said. Noted Dr. Henry, “One problem with applying this technology clinically is that humans don’t make luciferase—in order to use BLT, you would have to introduce the enzyme into the human in some way, and that is complicated.” He added that while the depth through which the light diffuses in a mouse is small, the attenuation of light through much deeper tissues—like those of humans—is a significant barrier to extracting any signal or any information.

“For those two reasons—that you need to introduce the luciferase gene in



### Flowchart for Bioluminescence Tomography.

A bioluminescent source active mouse is imaged in a bioluminescent mode to capture bioluminescent views around the mouse, in a tomographic mode (CT or MR) to reconstruct an anatomical volume and in an optical mode to estimate optical parameters keyed to each structural component. A linear imaging model is then built between the bioluminescent measurement and source distribution and inverted for 3D localization and quantitative analysis of the underlying molecular/cellular activities.

Copyright by Biomedical Imaging Division, Virginia Tech-Wake Forest University School of Biomedical Engineering & Sciences.

Wang G: Feasibility study for bioluminescence tomography. NIH proposal (R21 RR018373), June 1, 2002

Wang G et al.: Development of the first bioluminescent CT scanner. *Radiology* 229(P):566, 2003

Wang G, Li Y, Jiang M: Uniqueness theorems in bioluminescence tomography. *Med. Phys.* 31:2289-2299, 2004

Cong WX et al.: Practical reconstruction method for bioluminescence tomography. *Optics Express* 13:6756-6771, 2005

some way and the depth problem—there is probably no immediate application in patients,” said Dr. Henry.

### Critical Role to Play in Drug Development

Both Drs. Wang and Henry, however, underscored the immediate use of BLT imaging in nonhumans. “Right now bioluminescence tomography is very important for preclinical study using animal models,” said Dr. Wang. “It’s a tool that can be useful for small animal studies, especially when testing drugs or gene therapy.”

Added Dr. Henry: “A lot of drug development involves creating drugs to block or enhance the function of certain signaling pathways. With this system, luciferase is your reporter on whether or not that particular pathway is active and whether or not it responds to the drug you’re developing to block or enhance one of those pathways.”

Dr. Wang said he is also enthusiastic about future research into using temperature modulation techniques to improve BLT imaging. The emission spectra of various bioluminescent

probes are temperature dependent, so manipulating the temperature of the mouse’s body, using techniques similar to ultrasound thermal therapy, can change the spectrum of the BLT light emissions. “This is something we are actively working on so we can achieve better results,” said Dr. Wang.

He also expressed a strong interest in finding more collaborators and partners who need BLT imaging to answer their important biomedical questions. “With an increasing number of successful pre-clinical applications of BLT, we hope we will demonstrate that this technology is critically useful and becoming more and more popular,” he said. □

### Learn More

■ More information on the Bioluminescence Tomography Laboratory at the Virginia Tech-Wake Forest University School of Biomedical Engineering & Sciences can be found at [www.imaging.sbes.vt.edu/bltlab/bltlab.html](http://www.imaging.sbes.vt.edu/bltlab/bltlab.html). Researchers interested in collaborating with Dr. Wang on uses for BLT imaging can contact him [wangg@vt.edu](mailto:wangg@vt.edu).

# RSNA Research Project a Tipping Point for Modern Molecular Imaging

IN THE early 1980s as a medical and doctoral candidate at Duke University in Durham, N.C., David Piwnica-Worms, M.D., Ph.D., was introduced to cell culture, biochemistry, cell biology and radiotracer principles by his mentor and thesis advisor Melvyn Lieberman, Ph.D. This experience, said Dr. Piwnica-Worms, ignited his interest in using the very new field of MR imaging and spectroscopy to explore biochemistry in vivo.

Dr. Piwnica-Worms, now a professor of radiology, molecular biology and pharmacology and director of the Molecular Imaging Center at the Washington University School of Medicine, is too modest to say that it was his subsequent research project, funded by a Squibb Diagnostics/RSNA Research & Education Foundation (R&E) Research Scholar Grant, that was the catalyst for molecular imaging. He will admit, however, that his was some of the groundbreaking work in the field.

"This was one of the early examples where we combined the tools of molecular cell biology and functional molecular phenotyping with the intent of using noninvasive imaging to map molecular events in vivo," said Dr. Piwnica-Worms.

"This was a time when radiology was very much about imaging anatomy and all of the very wonderful diagnostic tools," he continued. "It was also an explosive time for MR, MR spectroscopy and the early days of PET

imaging. With my background in biochemistry and physiology, I was interested in imaging and mapping biochemistry in vivo. I had this vague notion of what it might be—not because I had any vision of the future, but just because I was interested in it."

## Career Choice Led to RSNA Grant

While advisors urged him to pursue a different path, Dr. Piwnica-Worms followed his instincts and chose diagnostic radiology for his residency and subsequent career.

He began his training at Brigham and Women's Hospital at Harvard Medical School in Boston in 1984,

where his mentor and later-chair of radiology, Leonard Holman, M.D., introduced him to investigators who were working on the development of a new radiopharmaceutical. Knowing Dr.

Piwnica-Worms' background in cell culture, heart cells, biochemistry and cell physiology, Dr. Holman suggested that Dr. Piwnica-Worms look into the localization of some of these new cardiac perfusion imaging agents.

"It all sounded very interesting and I started applying tools I had learned in Dr. Lieberman's lab to test the hypothesis that these perfusion tracers were



David Piwnica-Worms, M.D., Ph.D.  
Washington University School of Medicine

indeed inert and non-specifically binding to heart cells as suspected," said Dr. Piwnica-Worms. "Much to our surprise, we found that the tracers were, in fact, very sensitive to the energetics of mitochondria."

This finding formed the basis of his 1989 RSNA grant proposal, which aimed to more quantitatively explore the mechanism of local-

ization of these radiopharmaceuticals in terms of cellular energetics and mitochondrial membrane potential.

"This was the first major grant I received that provided the resources and guaranteed me the research time to develop and test my hypothesis. As a result, I was able to produce findings that led to much bigger grants from the National Institutes of Health and the American Heart Association. RSNA was a critical stepping stone," said Dr. Piwnica-Worms.

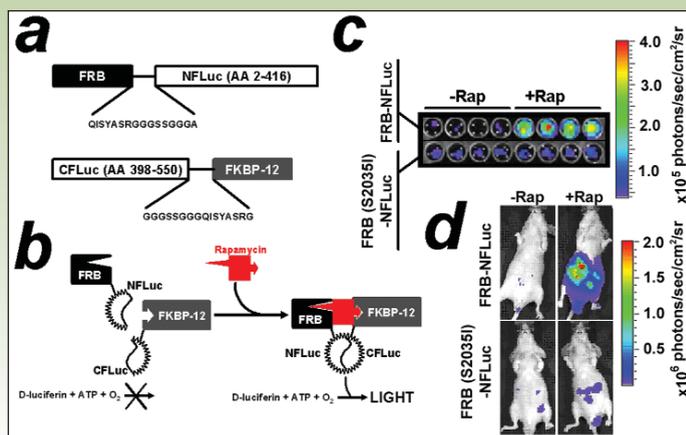
## Moving Beyond the Heart

After completing the R&E grant, Dr. Piwnica-Worms began using all that he had learned to move beyond the heart to explore other tissue types. While he had initially found a strong correlation between the "uptake," or inward movement of radiotracers in heart tissue, and the energy charge of the membrane potentials of the mitochondria and surface of the cells, he found that this correlation broke down in other tissues,

*"It has really been a 20-year adventure from basic discovery bench work into animal models to the patient."*

David Piwnica-Worms, M.D., Ph.D.

Today, 1989 RSNA Research Scholar David Piwnica-Worms, M.D., Ph.D., runs a lab with 20 investigators. The group uses genetically encoded imaging reporter paradigms to look at signal transduction pathways in cancer and inflammation, as well as protein-protein interactions in an effort to develop the tools to study conditions non-invasively in live cells and in animals.



### Imaging Protein-Protein Interactions In Vivo with Optimized Firefly Luciferase Protein-Fragment Complementation Imaging (LCI).

Reprinted with permission from Gross, et. al. "Spying on Cancer: Molecular Imaging in vivo with Genetically Encoded Reporters." *Cancer Cell* 2005;7:5-15.

especially select cancer tissues.

Dr. Piwnica-Worms said he wondered if his hypothesis was simply wrong or if there was something else going on.

The answer, he said, was that the radiotracer was also being recognized by another transport protein known as the multidrug resistant P-glycoprotein, which was considered to be a "hot" molecule in multidrug resistant cancer.

"Here we are, 20 years later, and P-glycoprotein is still being studied and targeted as a major cause of chemotherapeutic failure in cancer patients," he said. "P-glycoprotein is expressed on the surface of some cells, including some cancer cells, and is able to effectively pump chemotherapeutic agents out of the cells, rendering them resistant. We now know that P-glycoprotein also impacts drug absorption and has a role in Alzheimer disease by pumping beta-amyloid out of the brain."

Dr. Piwnica-Worms feels fortunate to have made this discovery. "This finding opened up a whole new model for understanding that the uptake mechanism is driven by the membrane potential, the battery driving the radiopharmaceutical in. But if the cell expresses the P-glycoprotein on the surface, then it will pump the radiopharmaceutical out. We could then show that if you block the P-glycoprotein—boom—it would all go back into the cell because the mitochondria were all charged up and ready to go. We could image these molecular events in vivo with the radiotracers," he said.

### Witnessing the Birth of Molecular Imaging

In the early 1990s, Dr. Piwnica-Worms went on to use the tools of molecular cell biology to clone genes into cancer cells to show that the radiopharmaceutical responded specifically to that multidrug resistant gene and its protein product—P-glycoprotein. He said that this was the earliest work aimed at cloning genes into cells with the intent of imaging their function with radiopharmaceuticals and the birth of what we now recognize as reporter-based molecular imaging.

"It has really been a 20-year adventure from basic discovery bench work into animal models to the patient over time," he said.

Today, Dr. Piwnica-Worms runs a lab with 20 investigators. The group uses a variety of genetically encoded imaging reporter paradigms to look at signal transduction pathways in cancer and inflammation, as well as protein-protein interactions in an effort to develop the tools to study conditions noninvasively in live cells and in animals.

"In the big picture, our work is very basic cell biology, chemistry and biochemistry aimed at imaging molecular events and understanding mechanisms of cancer and therapeutic responses," he said. "We are looking at the mechanisms and targets for tomorrow's drugs."

It's the excitement of discovery that drives Dr. Piwnica-Worms. "We've been able to develop strategies and paradigms that change the way people approach certain types of scientific

problems," he said. "I see clinical work as very rewarding and very local. You help a patient or a community. In contrast, research is global. You can have a discovery that has a direct impact on scientists and patients all over the world. I love having a broad-based impact." □

### 5 More Questions for...

#### Dr. David Piwnica-Worms

What is your favorite way to relax?

Dinner with family and friends (and a nice bottle of cabernet).

Who are some of your personal heroes?

Three mentors nurtured my early career: Mel Lieberman, Charles Putman, and Len Holman. Each was a man of honor and character—they all passed away at much too early an age. I will always be indebted to them.

When did you decide you wanted to pursue radiology?

As I was finishing my Ph.D. thesis on sodium-proton exchange in heart cells, I spent a month in the laboratory of Al Johnson at Duke University, using P-31 NMR spectroscopy to noninvasively analyze intracellular pH in my cells. This was 1982, the early days of MR imaging, and served to introduce me to the field of radiology and sparked an interest in developing ways to noninvasively monitor molecular-specific biochemistry in vivo.

What do you like best about your job?

Research allows you to impact biomedicine worldwide. Clinical care is important, but the impact is by definition local. By contrast, well-validated research discoveries potentially impact scientists and patients around the world.

What's your favorite travel destination?

Lake Como, Italy—heaven on earth.

Additional information about RSNA Research & Education Foundation grant programs and other past recipients is available at [RSNA.org/foundation](http://RSNA.org/foundation).





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Lynn E. & Fred M. Moeslein, M.D., Ph.D.  
Lucinda & Dixon M. Moody, M.D.

Linda A. Nall, M.D.  
Hiromitsu Onishi, M.D.  
Sarah G. Pope, M.D.  
Susan & Matthew D. Rifkin, M.D.  
Hugh J. Robertson, M.D.  
Frank J. Rybicki III, M.D., Ph.D.  
Jaroslaw Ryterski, M.D.  
Kathy J. Schilling, M.D.  
Florian T. Schmid, M.D.  
Barbara & Lloyd B. Schnuck Jr., M.D.  
Ralph L. Smathers, M.D.  
Vivian M. Fraga, M.D. &  
James B. Spies, M.D.  
Margaret A. Stull, M.D. & Gregory J. Stull  
*In memory of Glen Dobben, M.D.*  
Ruth H. & Richard A. Szucs, M.D.  
Amy S. Thurmond, M.D.  
Ina L. Tonkin, M.D. & Allen K. Tonkin, M.D.  
Lorraine Vazquez de Corral, M.D.  
Cristina G. Ortega & Cesar C. Victorino, M.D.  
Darlene & James C. Walker Jr., M.D.

Donors who give \$1,500 or more in the giving year qualify for membership in the Presidents Circle. Their names are shown in bold face.

*Celebrating 25 years, the RSNA R&E Foundation provides the R&D that keeps radiology in the forefront of medicine. Support your future, donate today at [RSNA.org/campaign](http://RSNA.org/campaign).*

## RSNA Research & Education Foundation Grant Deadlines Approaching

### Education Grants • January 10, 2008

Applications will be accepted through January 10, 2008, for the Educational Scholar, Education Seed, Fellowship Training and Education Research Development grant programs.

### Research Grants • January 15, 2008

Applications will be accepted through January 15, 2008 for the Research Scholar, Research Resident/Fellow and Research Seed grant programs.

The online grant application system and more information on all grant programs are available at [RSNA.org/Foundation](http://RSNA.org/Foundation).

**RSNA**

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- Access to the online Membership Directory and Career Connection Web site

\*with advance registration

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(1-877-776-2636) or e-mail [membership@rsna.org](mailto:membership@rsna.org).

**RSNA.org**

## RSNA 2007 Lecture/Oration Preview

RSNA 2007 will feature honored lectures by these esteemed medical leaders: Elias A. Zerhouni, M.D., of Baltimore, Lawrence W. Bassett, M.D., of Los Angeles, and Allen S. Lichter, M.D., of Ann Arbor, Mich.

### Eugene P. Pendergrass New Horizons Lecture

Biomedical imaging has had a tremendous, evolving impact on medicine as the daunting complexity of biological and behavioral responses in health and disease demands better quantitative measurements of the specific subcomponents of biological systems, said this year's New Horizons lecturer.

"Imaging may gain an even more prominent place in this century by redefining itself as the core interdisciplinary science for extracting spatially and temporally resolved biological information at all physical scales from angstroms to microns to centimeters," said Elias A. Zerhouni, M.D., director of the National Institutes of Health (NIH), who will deliver his "Major Trends in the Imaging Sciences," on Monday, Nov. 26.

Imaging's potential impact is influenced by several factors, said Dr. Zerhouni, among them the ever-changing landscape of public health—the shift from acute to chronic diseases, a rapidly aging population, persistent health disparities and emerging communicable and non-communicable disease threats create enormous cost pressures that tax the healthcare systems of all nations. Imaging's own evolution also plays a role, as strategies first developed for radiologic applications in vivo are continuously modified and adapted to a new class of problems, he said.

In this century, imaging will remain the mainstay of evaluation and diagnosis for acute diseases and will lead the development of innovative, minimally invasive therapies in a growing number of conditions, said Dr. Zerhouni. "At the same time, there will be a progressive move from curative to preemptive medical and

public health strategies," he said. "This transformation will be based on the many advances in our understanding of the molecular mechanisms of disease, which clearly point towards a more predictive, personalized and preemptive form of medicine and require the development of better functional and quantitative imaging methods to guide medical interventions."

As NIH director, Dr. Zerhouni oversees 27 institutes and centers with more than 18,000 employees and a \$29 billion budget. Since assuming the position in May 2002, Dr. Zerhouni has led the effort to transform the medical research enterprise. He initiated the NIH Roadmap for Medical Research, which draws upon a small fraction of the NIH budget to help leverage resources and move NIH forward as a single entity, better

able to address the changing nature of science and medicine. Dr. Zerhouni also launched the NIH Pioneer and New Innovator Awards to promote innovative research and the Pathway to Independence Awards to encourage young people to pursue research careers. He has supported trans-NIH initiatives in obesity and neuroscience research, established and supported projects to reduce health disparities and has worked to ensure public access to results of NIH-funded research.

Dr. Zerhouni was formerly executive vice-dean of The Johns Hopkins University School of Medicine, as well as chair of the Russell H. Morgan Department of Radiology and Radiological Science, Martin Donner Professor of Radiology and a professor of biomedical engineering. Honors that he has received include the gold medal of the American Roentgen Ray Society and two Paul C. Lauterbur awards from the Society of Computed Body Tomography & Magnetic Resonance. Earlier this year, Dr. Zerhouni received the Special Presidential Award of the European Congress of Radiology.



Elias A. Zerhouni, M.D.

### Annual Oration in Diagnostic Radiology

Over the past 30 years, breast imagers have emerged from obscurity to become the gatekeepers for breast health and problems.

"When I was made director of mammography at UCLA in 1976, residents did not rotate through the mammography section, indicating its low priority," said Lawrence W. Bassett, M.D., who will present the Annual Oration in Diagnostic Radiology, "Breast Imaging: Yesterday, Today and Tomorrow," on Tuesday, Nov. 27.

Just a few years later, however, mammography received national attention after publication of landmark data showing the benefit of breast cancer screening, said Dr. Bassett. Further research and the development of standards have steadily raised the profile of breast imaging within radiology and the public—today, almost half of all age-appropriate American women have annual mammograms, he said.

Breast imagers have a tremendous role, said Dr. Bassett, interpreting screenings, overseeing diagnostic exams for women with abnormal screenings or clinical findings and performing and managing follow-up after image-guided core needle biopsies. "A woman who is satisfied with her breast imaging care will likely send her family members to the same healthcare system," he said.

The subspecialty has struggled with relatively low reimbursements, medicolegal concerns and other issues that dampen resident interest and contribute to workforce shortages, said Dr. Bassett, but technological advances in areas such as digital mammography and breast MR and ultrasound offer hope for a bright future.

"These advances, along with image-guided interventional procedures, have made breast imaging a high-tech field,"



Lawrence W. Bassett, M.D.

said Dr. Bassett. "I anticipate that this will further improve detection of early breast cancers and, hopefully, also make breast imaging more appealing to our residents."

A pioneer in breast imaging education and standards, Dr. Bassett is the Iris Cantor Professor of Breast Imaging at the David Geffen School of Medicine at the University of California, Los Angeles (UCLA). Dr. Bassett has been section head for breast imaging in the UCLA Radiology Department since 1976 and serves as vice-chair for academic affairs for the radiology department. He has been an assistant dean for student affairs in the UCLA School of Medicine since 1985.

Architect of the first Fellowship Training Program in Breast Imaging at UCLA, Dr. Bassett has supervised 56 breast imaging fellows. He was also an original member of the American College of Radiology (ACR) Breast Imaging Reporting and Data System (BI-RADS) Committee for Standardized Reporting, has been a member of the ACR Mammography Accreditation Program Committee since its inception in 1989 and chairs the new ACR Breast Imaging Commission's Joint Committee on Practice Guidelines and Technical Standards and Appropriateness Criteria.

Among awards Dr. Bassett has received are the gold medal of the Society of Breast Imaging and the Leo G. Rigler Outstanding Teaching Award from UCLA Radiology Residents.

### Annual Oration in Radiation Oncology

The economic burden of cancer in the U.S. is estimated to be more than \$263 billion, with more than \$78 billion spent on direct medical costs. Medicare spending is forecast to outpace growth in the economy nearly threefold by 2030. Cancer treatment advances have been made, but some offer only weeks or months of additional life at a price that has policymakers and payers responding with a focus on value-based purchasing. "As medical professionals, we have a responsibility to be good stewards of increasingly limited resources," said Allen S. Lichter, M.D.

"We are also positioned to be a uniquely positive force as the nation struggles with issues of healthcare cost, benefit and value."

Dr. Lichter will deliver this year's Annual Oration in Radiation Oncology, "The Cost of Cancer Care: Near-Term Strategies and Long-Term Solutions," on Wednesday, Nov. 28.

Physicians must be willing to question the current health system and be prepared to offer solutions, said Dr. Lichter, with age-old arguments about reimbursement giving way to dialogue on creative ways to deliver the care patients deserve. As the national dialogue on health reform unfolds, physicians can contribute by supporting and participating in research for better treatments, focusing on evidence-based practices, delivering high quality care, communicating effectively with patients and not shying away from hard social questions, he said.

"Scientific inquiry brings more effective treatments, as well as the means to identify individuals most likely to benefit," he said. "Recommendations based on solid scientific evidence promote high-quality care and decrease the potential for wasteful, ineffective and possibly harmful treatments. We need to expand efforts to develop guidelines and enhance their implementation in practice. The paradigms for treatment—and for organizing delivery of care—are shifting. We should lead the way.

"Payers speak in terms of accountability and pay for performance," Dr. Lichter continued. "More important than these carrot and stick approaches is our own commitment to excellence and a willingness to examine—and improve—our own processes of care."

Executive vice-president and chief executive officer of the American Society of Clinical Oncology (ASCO), Dr. Lichter is an internationally recognized radiation oncology expert, particularly well known in the field of breast cancer for research he conducted at the National Cancer Institute on radiation after lumpectomy.

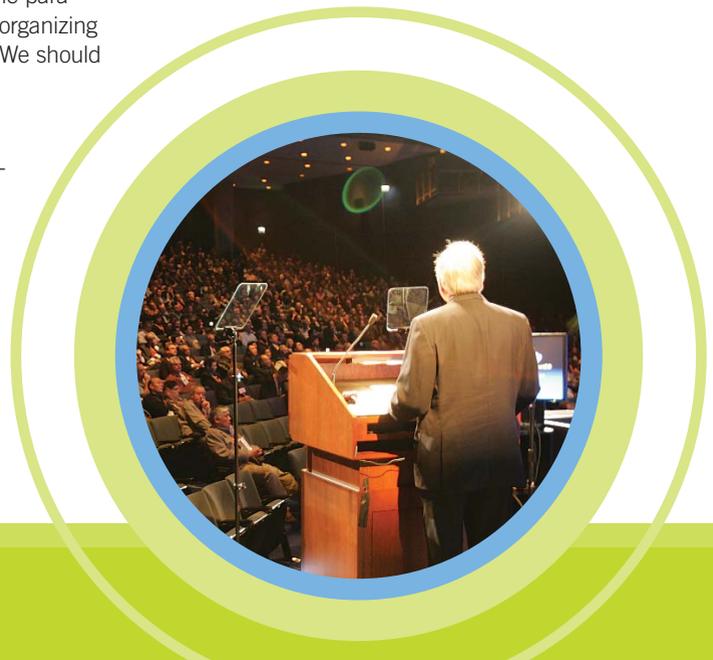
Dr. Lichter was dean of the medical school at the University of Michigan in Ann Arbor from 1998 to 2006 and chair and professor of radiation oncology from 1984 to 1998,

during which time he helped bring 3D treatment planning and conformal therapy to prominence. Dr. Lichter also was named the first Isadore Lampe Professor of Radiation Oncology at the university and was honored as a Newman Family Professor of Radiation Oncology in 2000. During his time as dean, Dr. Lichter introduced an innovative curriculum to meet the needs of future medical students and oversaw the creation of a new Biomedical Science Research facility.

Prior to joining the University of Michigan, Dr. Lichter was the director of the Radiation Therapy Section of the NCI Radiation Oncology Branch. He has served as ASCO president and received the gold medal of the American Society for Therapeutic Radiology and Oncology in 2005.



Allen S. Lichter, M.D.



## RSNA 2007 Outstanding Researcher, Educator Announced

RSNA will honor two individuals at RSNA 2007 for their commitment to research and education. The 2007 RSNA Outstanding Researcher is **Bruce J. Hillman, M.D.** The 2007 RSNA Outstanding Educator is **Robert A. Novelline, M.D.**

**Dr. Hillman** is the Theodore E. Keats Professor of Radiology and professor of health evaluation sciences at the University of Virginia in Charlottesville. He has received 22 grants as principal investigator or co-investigator, including the National Cancer Institute \$23 million UO-1 award that led to the founding of the American College of Radiology Imaging Network (ACRIN) in 1999. To date, ACRIN has received more than \$192 million in grant funding.

Among the many radiology research, education and mentoring programs developed by Dr. Hillman are the Introduction to Research Program sponsored by RSNA, the American Roentgen Ray Society and Association of University Radiologists (AUR), the Picker-AUR Young Faculty Academic Development Program and the General Electric-AUR Radiology Research Academic Fund.



Bruce J. Hillman, M.D.

Dr. Hillman is an honorary member of the Society of Computer Applications in Radiology. In 2005, he received the AUR gold medal. Under his direction, ACRIN received a 2007 Distinguished Service Award for Scientific Leadership presented by the American Society of Clinical Oncology.

“His career epitomizes great dedication to both his own research and the development of better research in our specialty,” said Laurie L. Fajardo, M.D., chair of the Department of Radiology at the University of Iowa in Iowa City, who was mentored by Dr. Hillman at the University of Virginia.

Dr. Hillman at the University of Virginia.

**Dr. Novelline** is a professor of radiology, director of emergency radiology and director of the Core Radiology Clerkship at Massachusetts General Hospital and Harvard Medical School in Boston. Establishing one of the nation’s first emergency radiology residency/fellowship programs in the early 1980s, Dr. Novelline has since trained hundreds of residents, fellows and junior staff in this subspecialty.

Dr. Novelline helped found the American Society of Emergency Radiology (ASER) and led the effort to revise and disseminate the ASER

National Curriculum in Emergency Radiology. Among the many awards Dr. Novelline has received are the ASER gold medal in 2000 and the Association of Program Directors in Radiology Achievement Award in 2004. He has served more than 50 visiting professorships around the world.

*Radiology of Emergency Medicine* and *Squire’s Fundamentals of Radiology* are among the definitive textbooks that Dr. Novelline helped author and edit. He also founded the Alliance for Medical Student Educators in Radiology (AMSER).

Dr. Novelline has co-chaired the *Radiology Info.org* committee and served nine years on the RSNA Refresher Course Committee, first as head for emergency radiology and then vice-chair and chair.

“Dr. Novelline has been a consummate innovator in education, deftly weaving well-working classical components of education with new, improved and modern versions of teaching,” said Mark E. Mullins, M.D., Ph.D., an assistant professor of radiology, assistant program director and director of radiology medical student education at Emory University.



Robert A. Novelline, M.D.

**Expanded versions of the biographies of Drs. Hillman and Novelline will be displayed at the RSNA Research & Education (R&E) Foundation Pavilion at RSNA 2007, located in the RSNA Services area. The biographies will also appear in the RSNA Meeting Program and on the RSNA 2007 Web site, [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org).**



## More About RSNA 2007

### Italy's Best Radiologic Research Showcased

The Italian Society of Medical Radiology (SIRM) has teamed with RSNA to offer an Integrated Science and Practice (ISP) session, "Italy Presents—Multicenter Trials on Screening Research," representing the best of radiologic science in Italy. The session will be held Monday, Nov. 26, 10:30 a.m. – 12:00 p.m. Included will be a brief lecture on the current status of radiologic research in Italy, as well as presentations on studies of colorectal carcinoma, coronary artery disease, breast cancer, carotid artery stenosis and ablation of hepatic, renal and adrenal malignancies.

Luigi Solbiati, M.D., SIRM delegate for international activities, hopes the program will help strengthen international relationships with SIRM, the largest medical society in Italy and among the largest national radiology societies worldwide. "SIRM is particularly honored and grateful to have been given this opportunity to present these studies at RSNA, the most important radiologic convention in the world," he said. "Attendees will be informed on results and limitations of some of the largest multicenter screening studies ever performed with imaging modalities in four very common fields of pathology."

More information about this session can be found in the online *RSNA Meeting Program*. Access the online program by going to [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org) and clicking Meeting Program in the left-hand column. Click Search at the top of the page and then enter SSC23 in the Code box.

### Public Information Activities Address the Media, Patients

#### Screening Mammography and ATV Accidents are Among Press Conference Topics

Watch the news for coverage of RSNA 2007. More than 170 members of the medical news media typically attend the annual meeting, generating thousands of stories appearing in print and electronic media in the U.S. and around the world. Among the scientific papers to be the subject of press conferences are:

- Does Ethnicity Influence Women's Preferences for Higher Recall from Screening Mammography with the Potential for Earlier Detection of Breast Cancer?
- Improved Accuracy of Lesion Detection in Breast Cancer Screening with Stereoscopic Digital Mammography
- Gray Matter Enlargement in Children with High Functioning Autism and Asperger Syndrome Using a Novel Method of Diffusion Based Morphometry
- Are We Meeting the Imaging Needs of the Obese? A Longitudinal Study of 450-pound Patients Who Underwent Gastric Bypass Surgery
- Utilization of Radiological Examinations in Pregnant Women: A 10 Year Review—1997-2006
- Ultrasound-guided Percutaneous Approach to the Therapy of Calcific Tendonitis of the Rotator Cuff
- Imaging Findings in 455 Children Following All-Terrain Vehicle Accidents

Press releases from the annual meeting will be available beginning November 26 in the Media section of [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org).



### Increased Patient Interaction the Subject of Refresher Course

Also at RSNA 2007, the RSNA Public Information Committee will sponsor a course:

- **RC116**  
**Sunday, Nov. 25, 2:00 p.m. – 3:30 p.m.**  
**Patient-centered Radiology: Use It or Lose It**

Current committee chair Philip O. Alderson, M.D., and immediate past-chair Michael N. Brant-Zawadzki, M.D., join Marcy Brown, R.T., of the American Registry of Radiologic Technologists in discussing how—in an era of consumer-driven healthcare, outsourcing of imaging services and growing competition—radiologists must connect with patients to prevent imaging from becoming a commodity. The course will examine how personalizing and optimizing patient contact varies by practice setting and also offer specific examples and strategies.



Philip O. Alderson, M.D.



Michael N. Brant-Zawadzki, M.D.

*Continued on next page*

## More About RSNA 2007

Continued from previous page

### **RadiologyInfo™ Ever Expanding as Patient Resource**

Stop by the online demonstration area of RSNA Services to learn how *RadiologyInfo.org*, the patient information Web site sponsored by RSNA and the American College of Radiology, can benefit your practice by saving your time while reassuring your patients. While supplies last, pick up your free *RadiologyInfo.org* cyber brush, designed to keep keyboards clean and dust-free.



### **Informatics Sessions Look at Latest in Technology**

#### **Teleradiology is Timely Topic**

According to recent studies, many radiologists feel teleradiology services improve patient care and physician workflow, while others remain uncertain. RSNA 2007 offers a number of sessions addressing the subject:

- RC226  
Monday, Nov. 26, 8:30 a.m. – 10:00 a.m.  
**Imaging Informatics Updates (Basic Imaging Informatics)**
- RC326  
Tuesday, Nov. 27, 8:30 a.m. – 10:00 a.m.  
**Quality Control in Picture Archiving and Communication Systems (Basic Imaging Informatics)**

- RC826  
Friday, Nov. 30, 8:30 a.m. – 10:00 a.m.  
**Practical and Operational Issues in Picture Archiving and Communication Systems and Radiology Information Systems (Basic Imaging Informatics)**
- Course 053  
Monday, Nov. 26, 10:45 a.m. – 11:45 a.m.  
**Practical Informatics for the Practicing Radiologist (In conjunction with the Society for Imaging Informatics in Medicine)**

### **RadLex® is Ready, Robust**

Coming to RSNA 2007 is the newest phase of the RadLex® radiology lexicon, the RadLex Playbook. RadLex, developed by RSNA in collaboration with the National Cancer Institute and National Institute of Biomedical Imaging and BioEngineering, is a single unified source of radiology terms intended to be the standard for information produced by radiologists. The first 7,500 terms were released in November 2006. Focusing on various devices, exams and procedures pertaining to different modalities, the RadLex Playbook adds another 2,500 terms. During RadLex courses at RSNA 2007, learn more about using RadLex in teaching file and report systems and see the radiology products into which RadLex has already been incorporated.



### **Subspecialty Brochures Help Organize Meeting Components**

Available at RSNA 2007 and online at [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org) are brochures that organize components of the annual meeting by subject and correspond to radiologic subspecialties:

- Breast/Mammography
- Cardiac Radiology
- Chest Radiology
- Computed Tomography
- Education/Research Statistics
- Emergency Radiology
- Gastrointestinal Radiology
- Genitourinary Radiology/Obstetric and Gynecologic Radiology
- Health Policy/Management/Quality Assurance and Quality Improvement/Professionalism
- Informatics
- Molecular Imaging/Nuclear Medicine
- Musculoskeletal Radiology
- Magnetic Resonance Imaging
- Neuroradiology/Head and Neck Radiology
- Radiation Oncology/Oncologic Imaging
- Pediatric Radiology
- Physics and Basic Science
- Ultrasound
- Vascular and/or Interventional Radiology



### Financial Education Seminars Offer Retirement, Real Estate Strategies

Two comprehensive financial seminars—“Effective Retirement Plans and Distribution Strategies” and “Effective Real Estate Investment Strategies”—will be held Saturday, November 24, at McCormick Place just prior to RSNA 2007.

Attendees receive textbooks written specifically for each course. The cost is \$129 for the morning course and \$159 for the afternoon course, or \$269 for both. Register onsite in Room E271AB. These seminars do not qualify for *AMA PRA Category 1 Credit™*. For more information, contact the RSNA Education Center at 1-800-381-6660 x7772 or [ed\\_ctr@rsna.org](mailto:ed_ctr@rsna.org).

### Up to 85.75 AMA PRA Category 1 Credits™ Available

The many refresher courses, scientific sessions, honored lectures and education exhibits offered at RSNA 2007 give each physician the opportunity to earn up to 85.75 *AMA PRA Category 1 Credits™*.

For more information on the *AMA PRA Category 1 Credit* system, visit [www.ama-assn.org/ama/pub/category/2922.html](http://www.ama-assn.org/ama/pub/category/2922.html).

### Business Center Services Enhanced

Business centers at the McCormick Place Convention Center are now operated by FedEx Kinko's®. Business centers are located in the Grand Concourse (Level 2.5), Lakeside Center (Level 2, near Gate 31) and North Building (Level 2). Services offered include:

- Full-service digital color and black/white copying and printing
- Computer rentals and laptop docking stations
- Document finishing, including binding, collating, cutting, folding and stapling
- Presentation products such as mounted boards
- FedEx Express U.S. package services
- FedEx Ground

### Important Registration Information Registration Wallet

Registration materials were mailed in advance of RSNA 2007 to North Americans who registered by November 5. If your registration wallet does not arrive in time, please plan to visit one of the Help Centers onsite, located in the Grand Concourse and Lakeside Center, to have the contents reprinted. RSNA encourages attendees to do this on Saturday, Nov. 24, to avoid long lines later in the week.



Materials were mailed to international attendees whose registration forms were received by October 26. For those

registered after October 26, international documents will be available for pickup onsite at Desk A, located in the Lakeside Center Ballroom near Professional Registration.



### Name Badge

You must wear your name badge at McCormick Place to attend RSNA courses and events or to enter the exhibit halls. This year RSNA will track attendance in the Technical Exhibit Halls and Lakeside Learning Center using radiofrequency identification, also known as RFID. RFID badge scanning is a

noninvasive way to track attendance and exhibit booth participation. No personal information is stored on the RFID chip, only an identification number. Badges will be scanned to obtain total attendance counts, exhibit booth participation and exhibit floor traffic flow through the entrances.

### Meeting Program, Lanyard and Official Meeting Bag

One complimentary copy of the *RSNA Meeting Program*, official meeting bag and lanyard are available with the presentation of a voucher at the distribution counters located in the Grand Concourse or Lakeside Center, Level 3.



### Onsite Registration

Those who register in advance can wear their badge at the McCormick Place Convention Center and proceed directly into the exhibit halls and classrooms. Those who need to register onsite should proceed to Professional Registration in the Lakeside Center Ballroom.

#### Onsite Registration

##### Hours of Operation

Saturday (Nov. 24)	12:00 p.m. – 6:00 p.m.
Sunday – Wednesday (Nov. 25 – 29)	7:00 a.m. – 5:00 p.m.
Friday (Nov. 30)	7:30 a.m. – 12:00 p.m.

#### Onsite Registration Rates

\$100	RSNA Member, AAPM Member
\$0	Member Presenter
\$0	RSNA Member-in-Training, RSNA Student Member and Non-Member Student
\$0	Non-Member Presenter
\$230	Non-Member Resident/Trainee
\$230	Radiology Support Personnel
\$720	Non-Member Radiologist, Physicist or Physician
\$720	Hospital or Facility Executive, Commercial Research and Development Personnel, Healthcare Consultant, Industry Personnel
\$300	One-day registration to view only the Technical Exhibits area

For more information about registration at RSNA 2007, visit [RSNA.org/register](http://RSNA.org/register), e-mail [reginfo@rsna.org](mailto:reginfo@rsna.org) or call 1-800-381-6660 x7862.

## More About RSNA 2007

*Continued from previous page*

### Record Number of Companies to Exhibit at RSNA 2007

The RSNA Technical Exhibition is the largest collection of healthcare imaging equipment and services in the world. Located in the South Building, Hall A, and North Building, Hall B, at the McCormick Place Convention Center, the RSNA Technical Exhibition will include more than 750 healthcare companies spanning more than a half million square feet. Participating companies offer everything from computer-aided detection systems to molecular imaging equipment.

### Prepare for Your Visit

A searchable database of RSNA 2007 technical exhibitors includes a list of contact information, booth numbers and product listings, as well as interactive floor plans. Accessing the database at [RSNA2007.RSNA.org/showcase](http://RSNA2007.RSNA.org/showcase) before the meeting can help you make the most out of your time at the technical exhibition. The database is also available during and after the meeting.

### Navigate the Technical Exhibition

While at RSNA 2007, the RSNA Technical Exhibitor List and Floor Plan can be accessed at Internet Zones established throughout the McCormick Place Convention Center. The list and floor plan can also be accessed within the Technical Exhibition at Booth 8368 in the North Building and near Cafés A1 and A2 in the South Building.

### Technical Exhibit Hours

#### Halls A & B, South and North Buildings

Sunday – Wednesday, Nov. 25 – Nov. 28  
10:00 a.m. – 5:00 p.m.

Thursday, Nov. 29 10:00 a.m. – 2:00 p.m.

An abridged version of the Exhibitor List, with contact information, booth numbers and floor plans, will also be available in the RSNA 2007 *Meeting Guide*, located in bins throughout McCormick Place. Please refer to the RSNA 2007 meeting Web site for the most current listing. Also for the convenience of all attendees, Company Locators have been established at the entrance of each hall. You Are Here kiosks will also be placed throughout the RSNA Technical Exhibition.

### Learn What's New

Many exhibiting companies with products and services released within the last 12 months choose to promote them in the New Products & Services section of the *Daily Bulletin*. The *RSNA Daily Bulletin* is the official daily newspaper of the annual meeting, providing overnight coverage of meeting news. Each edition of the *Daily Bulletin* will have a fresh list of New Products and Services. The *Daily Bulletin* will also be available online at [RSNA.org/bulletin](http://RSNA.org/bulletin).

### Education Store Stocks All RSNA Products

In the Education Store in the RSNA Services area at RSNA 2007, the RSNA Education Center will have all of its educational products available for purchase, including:

- RSNA syllabi, including the 2007 syllabus, *Categorical Course in Diagnostic Radiology: Clinical PET and PET/CT Imaging*, more than 20 chapters on various PET/CT topics and up to 22 AMA PRA Category 1 Credits™ available.
- Refresher courses on CD-ROM, with a demonstration area for viewing
- *RadioGraphics* special issues
- *RSNA Meeting Program*

In addition, Education Center staff will host a demonstration area where attendees can “walk through” education-related parts of the RSNA Web site and get answers to questions.



# Journal Highlights

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

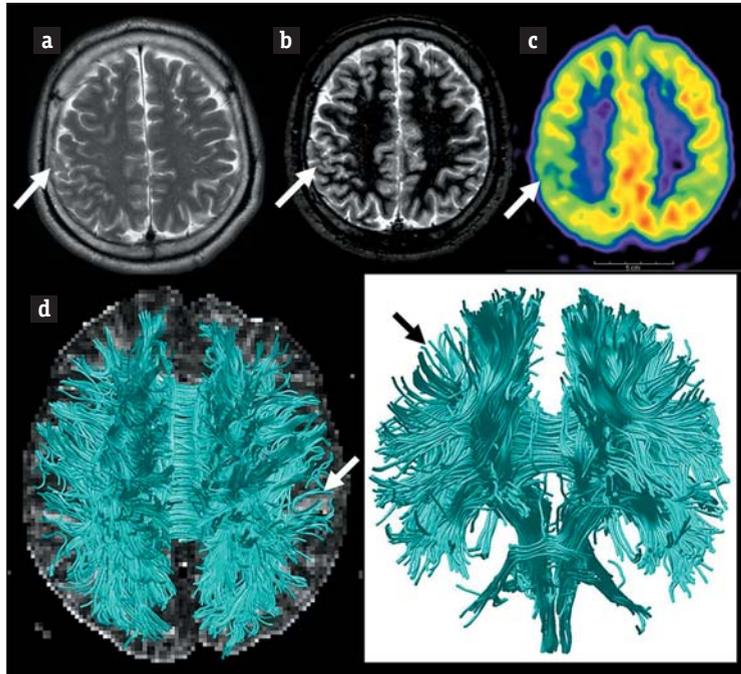
## Diffusion-Tensor MR Imaging and Tractography: Exploring Brain Microstructure and Connectivity

**D**IFFUSION MR imaging techniques like diffusion-tensor (DT) imaging offer a glimpse into brain microstructure at a scale not easily accessible with other modalities, in some cases improving detection and characterization of white matter abnormalities. Diffusion MR tractography offers an overall view of brain anatomy and degree of connectivity between different brain regions. Optimal utilization of the wide range of data provided with directional diffusion MR measurements, however, requires careful attention to acquisition and post-processing.

**Radiology**

In a review article in the November issue of *Radiology* ([RSNA.org/radiology](http://RSNA.org/radiology)), Paolo G.P. Nucifora, M.D., Ph.D., and colleagues review the principles of

*Continued on next page*



**Images in 17-year-old boy with left-side motor seizure.**

(a) Equivocal finding (*arrow*) on transverse T2-weighted image. (b) Transverse fast inversion recovery with myelin suppression image shows focal cortical dysplasia in right precentral gyrus (*arrow*). (c) Transverse fluorine 18 fluorodeoxyglucose positron emission tomography reveals decreased metabolism in right precentral area. (d) Whole-brain white matter tractography (blue-green) depicts decreased subcortical fiber connectivity in right precentral area and adjacent cortex.

(*Radiology* 2007;245:367-384) © RSNA, 2007. All rights reserved. Printed with permission.

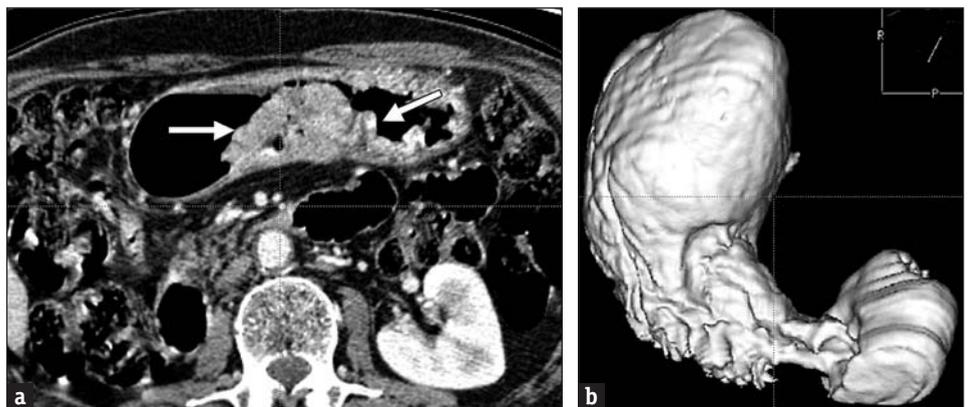
## Neuroendocrine Neoplasms of the Gastrointestinal Tract: Classification, Pathologic Basis and Imaging Features

**T**HE classification of neuroendocrine tumors has evolved rapidly over the past decade, keeping pace with the development of immunohistochemical analysis techniques

**RadioGraphics**

but perhaps confusing radiologists in the process. Many radiologists are unfamiliar with the recently developed World Health Organization classification scheme.

*Continued on next page*



**Well-differentiated endocrine carcinoma (malignant carcinoid) of the stomach in a 61-year-old man.**

(a) Transverse CT scan shows a large mass in the lower gastric body and proximal antrum (*arrows*). (b) Three-dimensional volume-rendered image shows a large indentation caused by an ulceroinfiltrative lesion in the lower gastric body and proximal antrum.

(*RadioGraphics* 2007;27:1667-1679) © RSNA, 2007. All rights reserved. Printed with permission.

## Diffusion-Tensor MR Imaging and Tractography: Exploring Brain Microstructure and Connectivity

Continued from previous page

diffusion contrast and anisotropy, as well as clinical applications in psychiatric, developmental, neurodegenerative, neoplastic, demyelinating and other diseases.

Diffusion-weighted (DW) imaging has been rapidly adopted in radiology, the authors note, and is commonly used in the early detection of ischemia.

While diffusion imaging is almost ideal for this purpose, its scope extends much further, the authors write.

“By incorporating directionality into a DW measurement, DT images can be obtained,” they write. “Rather than probe cellular pathophysiology, DT imaging provides a means of investigating tissue microstructure and brain anatomy.”

Although the initial results with DT imaging appear promising, its utility must still be fully established with prospective clinical trials, the authors conclude. “The full potential of DT imaging will probably not be realized until it is integrated with other modalities to obtain a richer characterization of white matter,” they write.

## Neuroendocrine Neoplasms of the Gastrointestinal Tract: Classification, Pathologic Basis and Imaging Features

Continued from previous page

In an article in the November-December issue of *RadioGraphics* ([RSNA.org/radiographics](http://RSNA.org/radiographics)), Samuel Chang, M.D., of Samsung Medical Center in Seoul, Republic of Korea, and colleagues discuss the classification scheme for neuroendocrine tumors

of the gastrointestinal tract and describe the imaging features of various neuroendocrine neoplasms of the gastrointestinal tract at different modalities.

“Neuroendocrine tumors of the gastrointestinal tract are not common but should be considered in developing the

differential diagnosis for gastrointestinal tract tumors in patients with a typical syndrome or when the tumors have characteristic imaging features,” Dr. Chang and colleagues conclude.

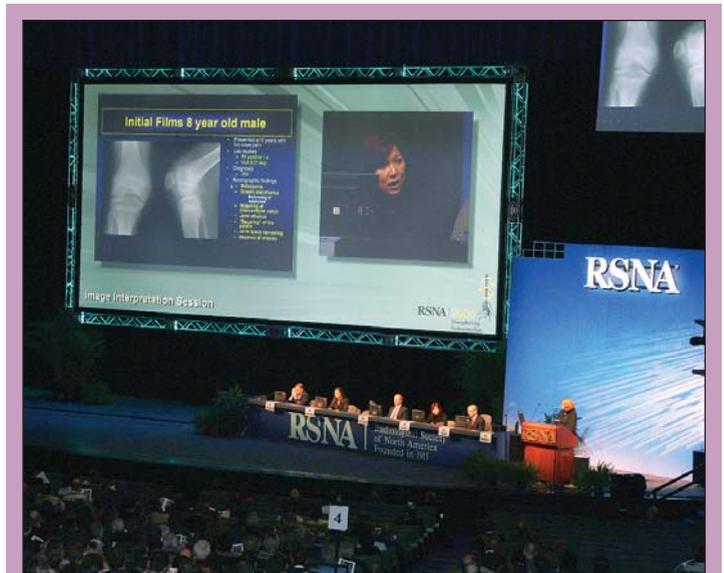
This article meets the criteria for 1.0 AMA PRA Category 1 Credit.

## RSNA Journals Offer RSS Feeds

Readers of *Radiology* and *RadioGraphics* can ensure they'll never miss content of interest by subscribing to RSS feeds. An RSS—which stands for really simple syndication or RDF (resource description framework) site summary—feed contains titles, authors and abstracts with links to the full-text version of articles.

RSS feeds are available from *Radiology* and *RadioGraphics* for the current issue, last four issues and continuous publishing, which includes articles published online before print. *Radiology* also offers RSS section feeds ranging from book reviews and breast imaging to technical developments and vascular and interventional radiology.

For more information on the RSS feeds, how they work and how to subscribe, visit [RSNA.org/radiologyjnl](http://RSNA.org/radiologyjnl) or [RSNA.org/radiographics](http://RSNA.org/radiographics) and click the RSS icon on the lower right-hand side of the page.



### Cases for RSNA 2007 Image Interpretation Session Online

Unknown cases to be presented during the Image Interpretation Session at RSNA 2007 are available at [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org).

The Image Interpretation Session brings together five experts from various radiology subspecialties, each of whom are shown two unknown cases. Cases are designed to provide a challenge to the panelists and a learning experience for the audience.

The moderator for this year's session is C. Daniel Johnson, M.D. Information on registering to view the Image Interpretation Session remotely as a Webcast is also available at [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org). The live Webcast offers 1.75 AMA PRA Category 1 Credits™. Although the Webcast will be archived for later viewing, CME will not be offered.

# Radiology in Public Focus

## Media Coverage of Radiology

IN September, media outlets carried 121 news stories generated by articles appearing in *Radiology*. These stories reached an estimated 66 million people.

A news release promoted findings from a study on the use of MR imaging to monitor multiple sclerosis disease progression (*Radiology* 2007; 244:823-831).

Print coverage included placements in *The Montana Standard*, *Las Vegas Israelite*, *Tri-City Herald* (Kennewick, Wash.), *Arthritis Today*, *Diagnostic Imaging*, *RT Image*, *Biophotonics International*, *Radiology Today* and *Ask Dr. Weil*. Prominent Web placements included Yahoo! News, iVillage, Science Daily, *aol.com*, *forbes.com*, *washingtonpost.com*, *healthcentral.com*, *drkoop.com*, *docguide.com* and *healthscout.com*.



## November Public Information Activities Target Lung Cancer

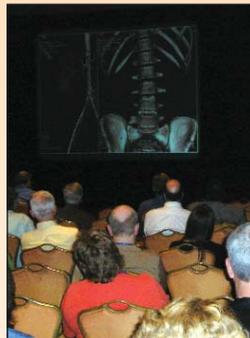
To highlight National Lung Cancer Awareness Month, RSNA distributed public service announcements (PSAs) related to lung cancer risks, symptoms and treatment options, as well as the importance of early detection and new CT screening methods being tested in clinical trials.

In addition, a “60-Second Checkup” radio program, focusing on lung cancer imaging and interventional treatments for lung cancer, was distributed to radio stations in the U.S. and Canada.

## MEETING WATCH RSNA HIGHLIGHTS™ 2008

# RSNA Highlights™ 2008: Clinical Issues

REGISTRATION continues for RSNA Highlights™ 2008: Clinical Issues, to be held February 18–20, 2008, in Orlando, Fla., at the Ritz-Carlton/JW Marriott Orlando, Grande Lakes. A series of refresher courses, including some unique to Highlights 2008, will be offered along with electronic education exhibits and hot topics sessions from RSNA 2007. Courses will focus on thoracic radiology, cardiac imaging, head and neck radiology and breast imaging, while hot topics sessions will address the latest developments PET/CT and body MR imaging. For more information and to register now, go to [RSNA.org/Highlights](http://RSNA.org/Highlights).



# Working For You

## RSNA Committees

RSNA News continues its series highlighting the work of RSNA's volunteer committees with a look at the RSNA Professionalism Committee.

### RSNA Professionalism Committee

**I**N ACCORDANCE with national and international laws and guidelines for medical professionalism, the RSNA Professionalism Committee strives to guide members toward making ethical choices in their daily practice.

The committee is in its fourth year since it was revamped to more widely encompass tasks and topics addressed by what was formerly known as the ethics committee, according to Leonard Berlin, M.D., committee chair.

"We contribute our expertise and our knowledge, but also learn from the experience of others," Dr. Berlin said. "The members of this committee all have different backgrounds and different perspectives. Every time I meet with them, I walk away having learned something."

The committee typically sponsors one or two sessions at the RSNA annual meeting, and its members are often challenged to feature topics that are timely and engaging, said Dr. Berlin. "When you're giving a presentation on professionalism and you look out and see only seven or eight people in the audience, it's pretty depressing," he said. He added, however, that sexual harassment has proven to be an intriguing

subject and the committee hopes its interactive session at RSNA 2007 (see below) will also generate interest and discussion among attendees.

Dr. Berlin said he expects issues of self-referral, financial incentives from pharmaceutical and other companies and situations in which scientific article authors receive remuneration from vendors will become prominent trends for the committee to address in the near future. "Life and radiology are becoming more complex," he said. "If you're a guest on a quiz show or you're taking an exam, you know the right answer because someone will tell you at the end. In professional situations, legal implications aside, doing the right thing is often left to one's conscience."



Leonard Berlin, M.D.

*Working for you*  
COMMITTEE PROFILE

RC216 • Monday, Nov. 26, 8:30 a.m. – 10:00 a.m.

When the Doctor Is the Problem:  
Dealing with the Disruptive or  
Impaired Physician



### Special Member Recognition

Last month, RSNA mailed special member recognition ribbons to more than 6,700 people who have been RSNA members for 25 years or more. The teal and gold ribbon can be attached to the RSNA annual meeting badge so that longtime members are easily recognizable at RSNA 2007.



YEARS OF MEMBERSHIP	NUMBER OF MEMBERS
25–29 years	1,861
30–39 years	3,454
40–49 years	1,006
50+ years	420



### Integrating the Healthcare Enterprise (IHE®)

Meeting at RSNA Headquarters in October, companies prepared for RSNA 2007 demonstrations of the Cross-enterprise Document Sharing for Imaging (XDS-I) and Teaching File and Clinical Trial Export (TCE) profiles.

If you have a colleague who would like to become an RSNA member, you can download an application at [RSNA.org/mbrapp](http://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](mailto:membership@rsna.org).

# Program and Grant Announcements

## IHE® Connectathon 2008 Conference

January 30, 2008 • Hyatt Regency Chicago—Wacker Drive

**T**HE 2008 Integrating the Healthcare Enterprise (IHE®) Connectathon will include a one-day conference, featuring presentations by leaders of national healthcare information technology organizations as well as an introduction to IHE and the Connectathon process and a tour of the event. More than 120 healthcare leaders and industry representatives attended the 2007 conference.

At the IHE Connectathon, companies test the interoperability of their health information systems by exchanging information with complementary systems of multiple vendors. Thousands of vendor-to-vendor connections have been tested since the first Connectathon was held in 1998.

For more information, go to [www.ihe.net/connectathon/](http://www.ihe.net/connectathon/).



## NIH Grantsmanship Workshop

November 24 • McCormick Place, Chicago

RSNA will hold a National Institutes of Health (NIH) Grantsmanship Workshop on Saturday November 24, from 1:00 to 5:00 p.m. at the McCormick Place Convention Center in Chicago prior to RSNA 2007. The workshop covers grantsmanship techniques from concept development to submission, as well as the NIH review process. There is also an opportunity to experience a mock study section. Speakers will address the entire NIH grant application experience, including basic applications as well as K grants. Register online at [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org). There is a \$35 registration fee.



Facilitated by: **Lee Rosen, Ph.D.**,  
NIH Center for Scientific Review

Speakers: **Reed A. Omary, M.D.**,  
Northwestern University, Chicago  
**Warren Grundfest, M.D.**,  
University of California, Los Angeles  
**John Haller, Ph.D.**,  
NIH, National Institute of Biomedical  
Imaging and Bioengineering  
**Xiang-Ning Lee, M.D. Ph.D.**,  
NIH Center for Scientific Review

## Writing a Competitive Grant Proposal

February 1–2, 2008 • RSNA Headquarters, Oak Brook, Ill.

This 1½ day, intermediate-level course is for researchers in the field of radiology and related sciences interested in pursuing federal funding. Guided by a faculty experienced in all aspects of grant application and funding processes, the program will be a combination of didactic and interactive small-group sessions, focusing on realistic expectations and tools for getting started.



For more information, including cost and application deadline, go to [RSNA.org/grantwriting](http://RSNA.org/grantwriting). Questions can be directed to Fiona Miller at [fmiller@rsna.org](mailto:fmiller@rsna.org) or 1-630-590-7741.



# Product News

## FDA CLEARANCE

### Digital Acquisition System

**V**IRTUAL IMAGING, INC. ([www.virtualimaging-fl.com](http://www.virtualimaging-fl.com)) has received FDA clearance for FluoroPro, its new high-resolution digital acquisition system. Designed for easy installation and maintenance, the system consists of a high resolution charge-coupled device (CCD) camera, image processor and interface kit. The camera is specifically designed for fluoroscopic imaging and can be integrated with any image intensifier to provide excellent image quality in low light conditions. FluoroPro evolves through simple software upgrades, eliminating the cost of proprietary image processing hardware. A customizable graphical user interface (GUI) enables users to view digital fluoroscopic images immediately and the system is DICOM 3.0 compliant.



## NEW PRODUCT

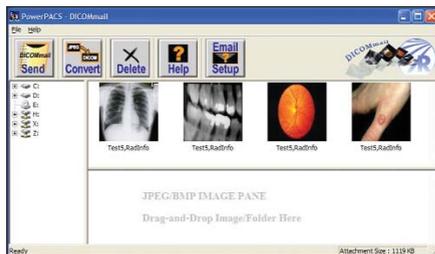
### Neurological MR Image Analysis

CorTechs Labs Inc. ([www.cortechslabs.com](http://www.cortechslabs.com)) has released its NeuroQuant™ software for fully-automated neurological MR image analysis and reporting. According to the company, the software is the first to quantify regional brain atrophy in the clinical setting, replacing methods that were too slow and cumbersome for use outside of research studies. The software relies on techniques to minimize artifacts that have traditionally been a barrier to standardized, automated MR analysis and then employs intelligent image analysis and feature extraction methods to recognize anatomical structures known to atrophy in some diseases. Numerical information about the size of the structures is extracted from the images and provided to the referring physician in an easy-to-read report, with values that can be compared to age-appropriate normative data. NeuroQuant also returns numerical and color-blended anatomical volumes, annotated with graphical overlays, to most DICOM-compliant picture archiving and communication system (PACS) viewers or third-party workstations.

## NEW PRODUCT

### DICOM Compliant E-Mail

RADinfo SYSTEMS ([www.radinfosystems.com](http://www.radinfosystems.com)) has introduced DICOMmail, a software program allowing physicians to share critical and protected images through common e-mail systems. DICOMmail includes the DICOM-



mail Viewer—based on the RADinfo Scan View System™ (RSVS)—and DICOMmail Send. DICOMmail Send allows a user to drag and drop images into the software for conversion into

DICOM format as necessary and delivery to any e-mail address. DICOMmail supports DICOM, jpeg, gif and bitmap images. The recipient views the images in the free RSVS viewer after an Internet download of the DICOMmail application.

## FDA CLEARANCE

### Radiation Dose Calculation Algorithm

Accuray Incorporated ([www accuray.com](http://www accuray.com)) has received FDA clearance for its Monte Carlo dose calculation algorithm for radiation therapy and radiosurgery. Accuray uses several techniques to speed up the Monte Carlo dose calculation process, considered the gold standard of probabilistic statistics but historically time consuming to compute and difficult to employ in clinical settings. Unlike traditional dose calculation methods that assume all photons in an X-ray beam take a single path to the target, the Monte Carlo dose calculation method takes into account the probability of potential interactions for each individual photon when calculating the dose delivered by a single photon. The Monte Carlo method then considers the probabilities for each of millions of photons, to generate a dose calculation for the target and surrounding structures. The Monte Carlo dose calculation capability will be added to Accuray's MultiPlan 2.0 System and will also be available as an upgrade for existing users.

# RSNA.org

## Online Meeting Program

ACCESS the *RSNA Meeting Program* online to get the most out of RSNA 2007. Get started by going to [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org) and clicking Meeting Program in the left-hand navigation bar ❶.

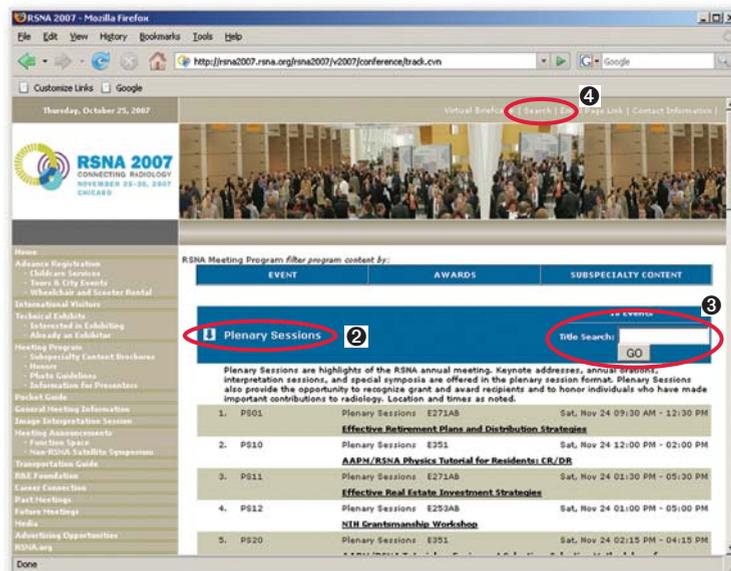
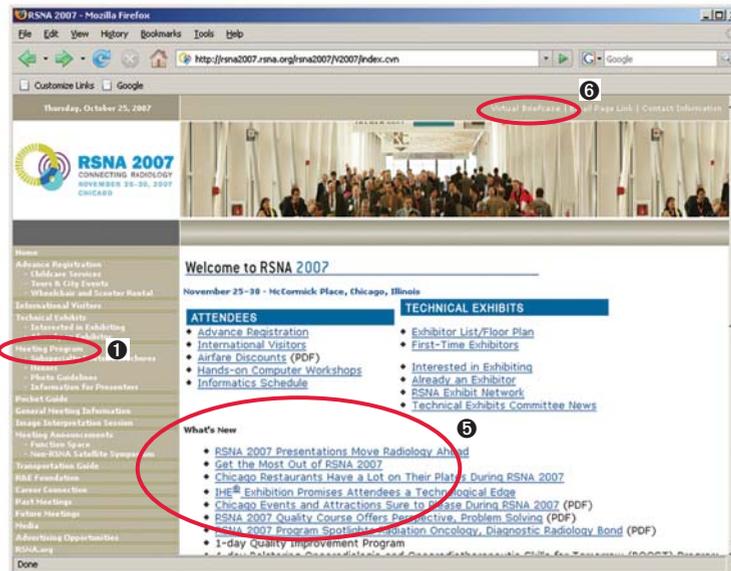
To see a list of all events in a particular category, click a section heading such as Plenary Sessions ❷. To search events within that category, use the search box located in the title bar ❸.

To search the entire meeting program, click Search at the top right hand corner of the page, completing as much information as you know about the event you're seeking ❹.

More information about RSNA 2007 is available by clicking the links underneath What's New on the main meeting page at [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org) ❺.

## Virtual Briefcase

Creating a personalized itinerary is even easier with Virtual Briefcase, which allows RSNA 2007 attendees to maintain a list of technical exhibitors (My Exhibits), access a personalized floor plan (My Floor Plan) and create a schedule of sessions selected from the *Meeting Program*. Get started by clicking Virtual Briefcase at the top right-hand corner of the page ❹. To use this feature, you must be registered for RSNA 2007 and enter your Confirmation/Badge Number at the login screen.



## Connections

Your online links to RSNA

[RSNA.org](http://RSNA.org)

**Radiology Online**  
[RSNA.org/radiologyjnl](http://RSNA.org/radiologyjnl)

**Radiology Manuscript Central**  
[RSNA.org/radiologyjnl/submit](http://RSNA.org/radiologyjnl/submit)

**RadioGraphics Online**  
[RSNA.org/radiographics](http://RSNA.org/radiographics)

**RSNA News**  
[rsna-news.org](http://rsna-news.org)

**Education Portal**  
[RSNA.org/education](http://RSNA.org/education)

**RSNA CME Credit Repository**  
[RSNA.org/cme](http://RSNA.org/cme)

**CME Gateway**  
[CMEgateway.org](http://CMEgateway.org)

**InterOrganizational Research Council**  
[radresearch.org](http://radresearch.org)

**RSNA Medical Imaging Resource Center**  
[RSNA.org/mirc](http://RSNA.org/mirc)

**RSNA Career Connection**  
[RSNA.org/career](http://RSNA.org/career)

**RadiologyInfo™**  
RSNA-ACR patient information Web site  
[radiologyinfo.org](http://radiologyinfo.org)

**RSNA Press Releases**  
[RSNA.org/media](http://RSNA.org/media)

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[RSNA.org/memberservices](http://RSNA.org/memberservices)

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**R&E Foundation Silver Anniversary Campaign**  
[RSNA.org/campaign](http://RSNA.org/campaign)

**Community of Science**  
[RSNA.org/cos](http://RSNA.org/cos)

**CQI Initiative**  
[RSNA.org/quality](http://RSNA.org/quality)

**Membership Applications**  
[RSNA.org/mbrapp](http://RSNA.org/mbrapp)

**RSNA Membership Directory**  
[RSNA.org/directory](http://RSNA.org/directory)

**Register for RSNA 2007**  
[RSNA.org/register](http://RSNA.org/register)

**RSNA 2007**  
[RSNA2007.RSNA.org](http://RSNA2007.RSNA.org)

**RSNA Highlights™ 2008**  
[RSNA.org/Highlights](http://RSNA.org/Highlights)

# Medical Meetings

## December 2007 – March 2008

**NOVEMBER 25–30**

**RSNA 2007, 93rd Scientific Assembly and Annual Meeting,**  
McCormick Place, Chicago • [RSNA2007.RSNA.org](http://RSNA2007.RSNA.org)

**DECEMBER 1–3**

European Society for Therapeutic Radiology and Oncology (ESTRO)/Latin American Association of Radiation Oncology Therapy (ALATRO), Physics for Clinical Radiotherapy, Casa Pueblo Hotel, Punta del Este, Uruguay • [www.estroweb.org](http://www.estroweb.org)

**DECEMBER 3–21**

International Society of Radiology, Virtual Congress  
• [www.isradiology.org](http://www.isradiology.org)

**DECEMBER 4–7**

ALATRO, 1st Congress, Montevideo, Uruguay • [www.alatro.org](http://www.alatro.org)

**DECEMBER 7–8**

European School of Interventional Radiology (ESIR), Image-guided Radiofrequency Tumor Ablation Course, Future Inn Plymouth, United Kingdom • [www.cirse.org](http://www.cirse.org)

**DECEMBER 9–13**

ESTRO, Image-Guided Radiotherapy in Clinical Practice, Erasmus Hogeschool, Brussels, Belgium • [www.estroweb.org](http://www.estroweb.org)

**JANUARY 17–18, 2008**

Society of Interventional Radiology (SIR), Renal Cancer and Renal Masses, Westin Tampa Harbour Island, Florida • [www.sirweb.org](http://www.sirweb.org)

**JANUARY 17–20, 2008**

Indian Radiological & Imaging Association (IRIA), 61st Annual Congress, Bangalore International Exhibition Center, Bangalore, Karnataka • [www.iriablr2008.com](http://www.iriablr2008.com)

**JANUARY 30–FEBRUARY 3, 2008**

Sociedad Mexicana de Radiología e Imagen (SMRI), 42nd Annual Radiology and Imaging Course, Hotel Sheraton Centro Histórico, Mexico City • [www.smri.org.mx](http://www.smri.org.mx)

**FEBRUARY 1–3, 2008**

American Society for Therapeutic Radiology and Oncology (ASTRO), IMRT Practicum, Hyatt Regency Grand Cypress, Orlando, Fla. • [www.astro.org](http://www.astro.org)

**FEBRUARY 9–10, 2008**

Armed Forces Institute of Pathology (AFIP), 23rd Annual Neuroradiology Course, Hyatt Regency Denver at Colorado Convention Center • [www.afip.org/Departments/edu/upcoming.htm](http://www.afip.org/Departments/edu/upcoming.htm)

**FEBRUARY 16–21, 2008**

SPIE, Medical Imaging, Town and Country Resort & Convention Center, San Diego • [spie.org](http://spie.org)

**FEBRUARY 17–22, 2008**

Society of Gastrointestinal Radiologists and Society of Uroradiology, Annual Meeting and Abdominal Radiology Postgraduate Course, Westin Mission Hills Resort & Spa, Rancho Mirage, Calif. • [www.sgr.org](http://www.sgr.org)

**FEBRUARY 18–20, 2008**

**RSNA Highlights™, Ritz-Carlton/JW Marriott Orlando, Grande Lakes, Florida • [RSNA.org/Highlights](http://RSNA.org/Highlights)**

**FEBRUARY 25–28, 2008**

Healthcare Information and Management Systems Society (HIMSS), Annual Conference and Exhibition, Orange County Convention Center, Orlando, Fla. • [www.himssconference.org](http://www.himssconference.org)

**FEBRUARY 28–29, 2008**

American Brachytherapy Society (ABS), Breast Brachytherapy and Brachytherapy Physics School, Scottsdale Plaza Resort, Arizona • [www.americanbrachytherapy.org](http://www.americanbrachytherapy.org)

**MARCH 2–5, 2008**

Society of Thoracic Radiology (STR), Annual Meeting, Sanibel Harbour Resort & Spa, Fort Myers, Fla. • [www.thoracicrad.org](http://www.thoracicrad.org)

**MARCH 7–11, 2008**

European Congress of Radiology (ECR), Annual Meeting, Austria Center, Vienna • [www.ecr.org](http://www.ecr.org)

**MARCH 12–15, 2008**

American Institute of Ultrasound in Medicine (AIUM), Annual Convention, San Diego Marriott Hotel and Marina • [www.aium.org](http://www.aium.org)

**MARCH 15–20, 2008**

Society of Interventional Radiology (SIR), 33rd Annual Scientific Meeting, Washington, D.C., Convention Center • [www.sirmeeting.org](http://www.sirmeeting.org)

**MARCH 25–29, 2008**

Association of University Radiologists (AUR)/Society of Chairmen of Academic Radiology Departments (SCARD)/Association of Program Directors in Radiology (APDR), In Collaboration with RSNA, 56th Annual Meeting, Sheraton Seattle Hotel • [www.aur.org](http://www.aur.org)

**RSNA**News

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