

RSNA *News*

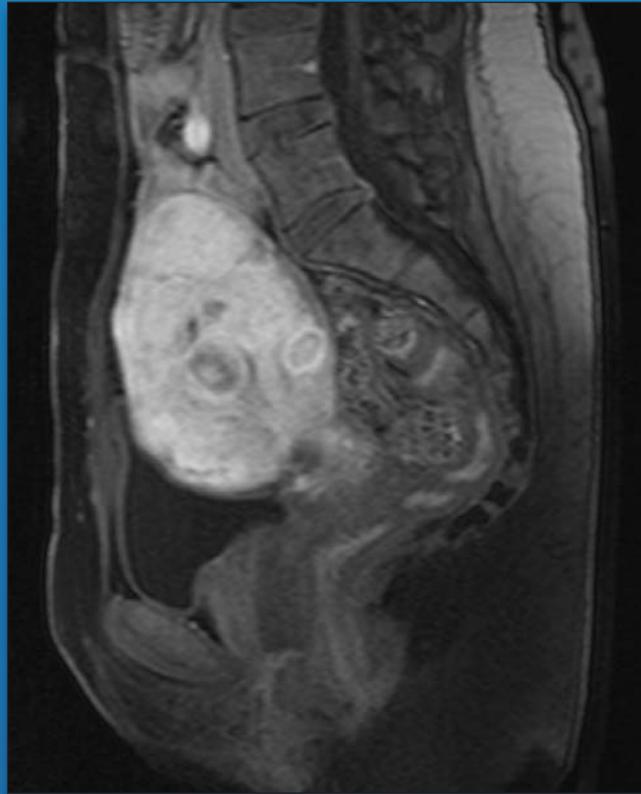


Image courtesy of Reed Omary, M.D.

Uterine Fibroid Findings Support Radiology-Based Treatments

Also Inside:

- Miniature Synchrotron Sheds New Light on Research
- New Modalities, Agents Define Role of Molecular Imaging in Drug Discovery
- Lakeside Learning Center Offers One-Stop Shopping at RSNA 2006
- Sudoku Stardom Follows Algorithm Discovery

Refresher Course Enrollment Begins June 19
rsna2006.rsna.org

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Distinguished Honorees and Lecturers

THE RSNA Board of Directors has announced this year's list of distinguished honorees and lecturers to whom the Society will pay tribute at the 92nd Scientific Assembly and Annual Meeting. They are:



GOLD MEDALISTS



George R. Leopold, M.D.
La Jolla, Calif.

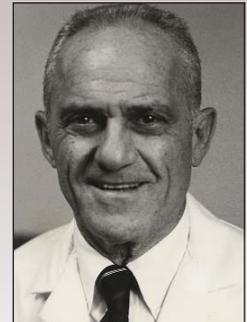


Anne G. Osborn, M.D.
Salt Lake City



Jerry P. Petasnick, M.D.
Chicago

RSNA MEETING PROGRAM DEDICATION



In memory of
Milton Elkin, M.D.

HONORARY MEMBERS



**Andy Adam, F.R.C.R.,
F.R.C.S., F.R.C.P.**
London

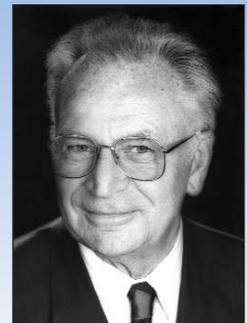


Hitoshi Katayama, M.D.
Tokyo



**Kofoworola Oluwatoyin
Soyebi, M.B.Ch.B.**
Lagos, Nigeria

SPECIAL PRESIDENTIAL AWARD



Josef A. Lissner, M.D.
Munich, Germany

**EUGENE P. PENDERGRASS
NEW HORIZONS LECTURE**
*Image-Guided Cancer
Treatment: The Science
and Vision of an
Emerging Field*



**J. William Charboneau,
M.D.**
Rochester, Minn.

**ANNUAL ORATION IN
DIAGNOSTIC RADIOLOGY**
*Cardiac Imaging—
A Second Chance*



Kerry M. Link, M.D.
Winston-Salem, N.C.

**ANNUAL ORATION IN
RADIATION ONCOLOGY**
*Looking Beyond
Anatomic-Based Treat-
ment in Radiation
Oncology*



**Theodore S. Lawrence,
M.D.**
Ann Arbor, Mich.

■ Detailed information about each of these honorees and presenters will be available in future editions of RSNA News.

R&E Foundation Unveils New Giving Programs and Donor Benefits

THE RSNA Research & Education Foundation Visionary Donor program now recognizes individuals for their cumulative cash donations to the Foundation. A donor will be recognized as Visionary as soon as he or she has contributed a cumulative total of at least \$5,000.

In addition to adopting this change, the R&E Foundation Board of Trustees also recently created a Legacy Donor program, through which the Foundation will recognize planned gifts.

The Visionary Donor program allows RSNA to recognize con-

tributors for their giving histories as well as for individual annual gifts. The R&E Foundation also has added benefits—including priority taxi/shuttle bus lines at the RSNA annual meeting, early annual meeting registration and hotel selection and thank you gifts—to various annual giving levels.

More information about Visionary Donor benefits can be found with this month's list of R&E Foundation Donors on page 19. Information about all R&E Foundation programs can be found at RSNA.org/Foundation or by calling 1-800-381-6660 x7885.



RADIATION SAFETY

Question of the Month

Q A patient asks, "Am I radioactive after I have a whole-body CT study?"

[Answer on page 17.]

Preliminary Abstract Count Tops 10,000

A record 10,003 abstracts were submitted for presentation consideration at RSNA 2006, up 488 from last year. The RSNA Scientific Program Committee is now working on the scientific program. Abstracts were required for scientific papers and posters and education and medical informatics (formerly *infoRAD*[®]) exhibits. More information about the scientific program will be available in future editions of *RSNA News*.

RSNA 2006 Associated Sciences Program Announced

THE Associated Sciences Consortium has announced the topics for its symposium and refresher course series at the RSNA annual meeting. The

symposium will be held Monday morning, with refresher courses on Monday, Tuesday and Wednesday.

For more information, go to

rsna2006.rsna.org and click on Registration, Housing & Courses. Course enrollment begins June 19.

Symposium

MONDAY, NOVEMBER 27

The Art and Science of Radiology Planning and Design

Moderator: Morris A. Stein

The 2006 symposium will explore four overarching trends that significantly determine how imaging project design and implementation will be impacted.

- A. **New Technology: Trends and Science That Impact Building Planning, Design and Construction in Any Radiology Setting**
Morris A. Stein
- B. **New Places: Directions and Patterns for Imaging Outside the Traditional Imaging Department**
Bill Rostenberg
- C. **New Work: How Changes in Practice, Expectations and Work Flow Relate to Facility Design**
Steven C. Horii, M.D.
- D. **New Environments: The Relationship of Design to Patient Satisfaction and Staff Performance**
Panel Presentation and Discussion

Refresher Courses

MONDAY – NOVEMBER 27

- Fusion Imaging: Technical & Clinical Highlights
- Optimizing Image Acquisition and Display in Digital Radiography

TUESDAY – NOVEMBER 28

- Compliance Continuum for Radiologists
- Policies and Procedures: The Key to Imaging Compliance
- Development of the Radiologist Assistant: An Education and Certification Update
- The Treasure Hunt: Keys to Unlocking Radiology Reimbursement

WEDNESDAY – NOVEMBER 29

- Joint Commission on Accreditation of Healthcare Organizations National Patient Safety Goals
- Controversies in Screening: Breast, Cardiac, Chest, and Virtual Colonoscopy

The Associated Sciences Consortium consists of American Healthcare Radiology Administrators (AHRA), American Institute of Architects–Academy of Architecture for Health (AIA–AAH), American Radiological Nurses Association (ARNA), American Society of Radiologic Technologists (ASRT), Association of Educators in Radiological Sciences, Inc. (AERS), Association of Vascular and Interventional Radiographers (AVIR), Canadian Association of Medical Radiation Technologists (CAMRT), Radiology Business Management Association (RBMA), Section for Magnetic Resonance Technologists (SMRT-ISMRT) and Society of Nuclear Medicine–Technologists Section (SNM–TS).

ASNR Awards Gold Medals

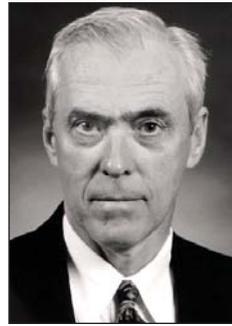
THE American Society of Neuroradiology (ASNR) has awarded its gold medal to **R. Nick Bryan, M.D., Ph.D.**, and **Charles Kerber, M.D.**

Dr. Bryan, a professor of radiology at the University of Pennsylvania, was the 2002 RSNA president and still serves on several RSNA committees. ASNR acknowledged Dr. Bryan's service in major ASNR leadership positions and the ASNR journal, as well as how he has represented radiology nationally and internationally.

ASNR recognized Dr. Kerber, a clinical professor of radiology at the University of California San Diego, for contributing to ASNR's growth and respectability through his work in interventional neuroradiology.



R. Nick Bryan, M.D., Ph.D.



Charles Kerber, M.D.

Minnesota Endowed Chair Named for Amplatz

The University of Minnesota Medical School, the Minnesota Medical Foundation and AGA Medical Corporation have established the Amplatz Chair in Radiology in honor of **Kurt Amplatz, M.D.**

Dr. Amplatz, a pioneer in the fields of interventional radiology and pediatric cardiology, retired from the University of Minnesota in 1999 after a long career as a research professor of diagnostic radiology. He is a co-founder of AGA Medical.

Among Dr. Amplatz's inventions are several guidewires, renal dilators and sheaths, thrombectomy devices, gooseneck snares and vena cava filters. He received a Society of Interventional Radiology gold medal in 1996 and in 1999 received the Outstanding Researcher Award from the RSNA R&E Foundation.

Bakic Receives Komen Grant

2003 RSNA Research Seed Grant Recipient **Predrag Bakic, Ph.D.**, a research associate in the Department of Radiology at the University of Pennsylvania, has received a \$250,000 grant from the Susan G. Komen Breast Cancer Foundation for "Volumetric Estimation of Breast Percent Density from Tomosynthesis."

Dr. Bakic, the principal investigator, and colleagues will test whether a 3D analysis of breast percent density from tomosynthesis images is superior to currently used methods and yields an improved accuracy of cancer risk estimation. His RSNA grant funded research on the correlation between breast pathology and cancer risk with the breast ductal branching pattern.



Predrag Bakic, Ph.D.

New ARRS President

The American Roentgen Ray Society (ARRS) has named **Philip O. Alderson, M.D.**, as its 2006 president. Dr. Alderson is the James Picker Professor and chair of the Department of Radiology at Columbia University Medical Center. He also is vice-chair of the RSNA Public Information Committee. Dr. Alderson replaces 2005 ARRS President Bruce L. McClennan, M.D., who is also editor of *RSNA News*.

ARRS also named these gold medalists:

- **N. Reed Dunnick, M.D.**, Fred Jenner Hodges professor and chair of the Department of Radiology at the University of Michigan
- **Frieda Feldman, M.D.**, professor of radiology and orthopedic surgery at Columbia University College of Physicians and director of musculoskeletal radiology at Columbia University Medical Center
- **Britton Chance, Ph.D., Sc.D.**, Eldridge Reeves Johnson University Professor Emeritus of Biophysics, Physical Chemistry and Radiologic Physics at the University of Pennsylvania.



Philip O. Alderson, M.D.

Brink Named Yale Radiology Chair

James A. Brink, M.D., has been named chair of the Department of Diagnostic Radiology at the Yale School of Medicine and Yale-New Haven Hospital. Dr. Brink had served as interim chair since 2003.

Dr. Brink is vice-chair of the RSNA Refresher Course Committee and is coordinating the course content for RSNA Highlights: Clinical Issues for 2007.



James A. Brink, M.D.

Uterine Fibroid Findings Support Radiology-Based Treatments

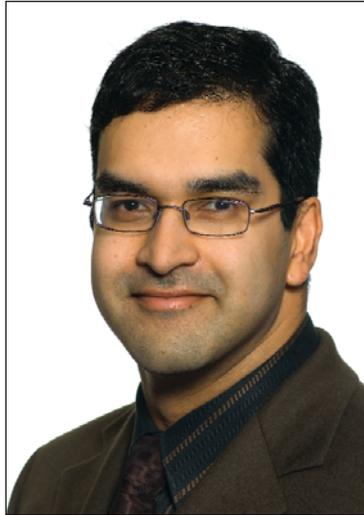
NEW patient studies provide more evidence of the benefits of radiology-based treatments, such as uterine fibroid embolization (UFE) and MR-guided focused ultrasound surgery (MRgFUS), over traditional surgical options for fibroid treatment.

UFE is the front-runner among radiology-based therapies, with several studies affirming its ability to relieve symptoms and improve quality of life with few complications.

“UFE should be the first line of treatment offered to patients,” said Sanjoy Kundu, M.D., an interventional radiologist at Scarborough General Hospital in Toronto.

Some 20 to 40 percent of women over age 35 have uterine fibroids large enough to cause heavy and prolonged menstrual periods, according to the Society of Interventional Radiology (SIR). Additionally, many of those women suffer from pelvic pain, constipation, a frequent need to urinate and painful intercourse. African-American women are at a higher risk for fibroids, with as many as 50 percent of women over age 35 having fibroids of a significant size. It is not known why African-American women are at a greater risk.

According to SIR, fibroids are the reason why at least 30 percent of the more than 600,000 women in the United States and 50,000 women in Canada undergo hysterectomies each year. New research reveals many of those women could be treated by much less invasive means, thus preserving the uterus.



Sanjoy Kundu, M.D.



Reed Omary, M.D.

Latest UFE Studies

Dr. Kundu was among several physicians to present studies touting UFE benefits at SIR’s recent annual scientific meeting. Dr. Kundu and colleagues verified previous anecdotal data showing women who underwent UFE had significantly better outcomes than those who had a hysterectomy or myomectomy.

Over two years, Dr. Kundu and colleagues compared 313 women who underwent traditional surgery for fibroid disease to 65 women who had UFE.

Among those who had abdominal hysterectomy, vaginal myomectomy, vaginal hysterectomy or laparoscopic-assisted vaginal hysterectomy, there were 20 cases of major complications ranging from bowel or urinary tract injury to anemia and even death. There were no complications in the UFE group. Additionally, there were three pulmonary embolisms and 27 cases of infection related to sur-

gery but none related to UFE.

In addition, the researchers found that women who had surgery were hospitalized two to 25 days after treatment, while those who had UFE were hospitalized 1.5 to 1.8 days. After discharge, 62 surgery patients returned to the hospital’s emergency department, with 31 readmitted for pain control. Five of the UFE patients returned for pain control with three being admitted. All patients were given antibiotics before and after the procedures.

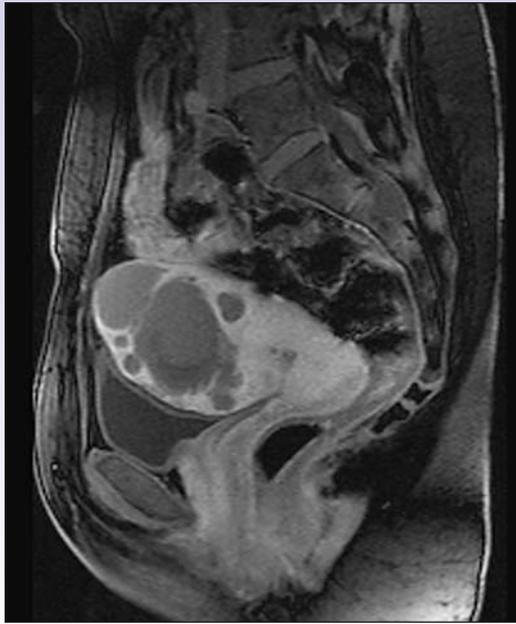
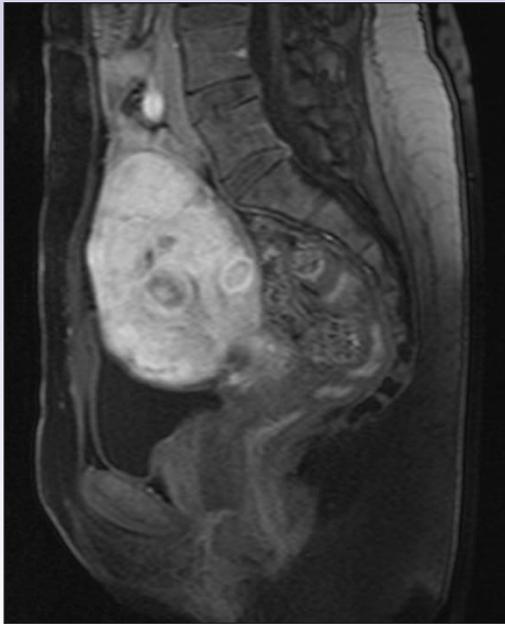
Dr. Kundu emphasized UFE’s financial benefits as well. UFE patients are asked to take five to 10 days off work but most are back in a week, he said, versus the three to six weeks hysterectomy patients must take.

Not treating fibroids also has a negative financial impact. “When women suffer from fibroids, many may miss three to five workdays each month due to their pain or very heavy periods. They can wind up losing their jobs because of their absentee rate. That’s a huge socioeconomic impact,” he said.

Dr. Kundu said future research in

UFE is a maturing procedure. We have a lot of data showing that UFE can be done safely with durable symptom control.

James Spies, M.D.



53-year-old postmenopausal woman with multiple uterine fibroids producing size-related symptoms of urinary frequency and constipation. Sagittal post-contrast material enhanced MR images before UFE show multiple enhancing fibroids. Sagittal MR images three months after UFE shows interval volume reduction of fibroids, along with necrosis.

Images courtesy of Reed Omary, M.D.

this area will focus on determining which agents used for UFE are most successful and on creating a patient pain protocol that allows same-day discharge after UFE.

UFE for Post-Menopausal Women

A Northwestern University Medical School study also presented at the SIR annual meeting showed UFE can be used successfully to treat postmenopausal women. While most uterine fibroids shrink after menopause, some women still experience pain and other problems.

Interventional radiologists Robert Vogelzang, M.D., and Reed Omary, M.D., studied 25 menopausal women who underwent UFE for size-related symptoms. Fibroids can enlarge the uterus and make a woman look like she's pregnant. They can also compress the bladder and lead to increased urination or can compress the rectum and create constipation.

The study revealed that UFE was technically successful in 100 percent of the patients, with symptom relief achieved in 92 percent.

Statistics on postmenopausal women have been included in other UFE studies, but this is the first time the entire cohort had completed menopause.

Drs. Vogelzang and Omary said this research gives postmenopausal women another important non-surgical treatment option. "You don't need to remove the entire uterus in carefully selected women with fibroids," Dr. Omary said.

Symptom Improvement After UFE

The one-year data from a multicenter UFE registry—the Fibroid Registry for Outcomes Data (FIBROID)—published in the December 2005 issue of *Obstetrics & Gynecology*, showed significant symptom improvement and patient satisfaction with UFE. Another study published in the same journal in November 2005, by James Spies, M.D., professor and chief of service in the Department of Radiology at Georgetown University Hospital, showed that five years after UFE, 73 percent of the 200 women studied still have symptom control.

"This is encouraging because when we started performing UFE, people thought the symptom control would last only one year," said Dr. Spies. "We've shown women can have a second UFE if necessary. This is something gynecologists had reservations about, but the ultimate goal of a UFE is to avoid a hysterectomy."

He added that in the past, women who wanted to become pregnant had

been told not to get a UFE. However, FIBROID data show there have been 70 pregnancies among the 3,000 women who volunteered to be part of the research.

"UFE is a maturing procedure. We have a lot of data showing that UFE can be done safely with durable symptom control," said Dr. Spies.

MRgFUS

Also gaining popularity is MRgFUS, a non-invasive treatment that destroys fibroids by heating them. It is also sometimes called high-intensity focused ultrasound (HIFU).

Results published in the January 2006 issue of *Fertility and Sterility* revealed that of the 109 women studied at hospitals in the U.S., England, Germany and Israel, 70 percent had improved symptoms six months after treatment with MRgFUS and 50 percent had improved symptoms 12 months out.

Principal researcher Elizabeth A. Stewart, M.D., regards this as the pivotal study for the U.S. Food and Drug Administration's approval of the technology. "Previous fibroid therapies were used first for other diseases, such as treating breast cancer," said Dr. Stewart,

Continued on page 7

Miniature Synchrotron Sheds New Light on Research

RADIOLOGISTS are among those who could take advantage of a new device capable of producing high-intensity, tunable and near-monochromatic x-ray beams while being small enough to be used in a typical university lab.

The Compact Light Source (CLS), a miniature synchrotron, has been developed by Lyncean Technologies in Palo Alto, Calif.

“The CLS brings the brightness and quality of a synchrotron x-ray beam to a scale that can be used in a local experimenter’s laboratory or, eventually, in a hospital or clinic,” said

Lyncean President
Ronald Ruth, Ph.D.

Etta Pisano, M.D., professor of radiology and biomedical engineering and vice-dean of Academic Affairs at the University of North Carolina School of Medicine, has used synchrotrons in her research and can envision using the new CLS. “It provides x-rays of single energy which potentially may be useful for human imaging,” she said. “We may be able to develop new ways to use x-rays with this device.”

Laser Undulator is the Key

Synchrotrons—large rings of magnets that store electron beams—have been used for three decades to generate x-rays. Because these x-rays come from a very tiny and very high energy source, they are directed in a beam.

“In a large synchrotron, that beam looks like a searchlight spinning

around,” explained Dr. Ruth. “And as it spins past you, you see a pulse of x-rays.”

Synchrotrons produce x-rays by accelerating electrons sideways—basically wiggling them back and forth, or bending them in a circle. Techniques have been developed to enhance the technology and make it more useful to scientists, including material scientists, condensed matter physicists, biologists and radiologists. Stadium-sized synchrotrons now use “undulator” magnets, which provide the best beam lines.

“A miniature synchrotron seems impossible when you first think about

The CLS brings the brightness and quality of a synchrotron x-ray beam to a scale that can be used in a local experimenter’s laboratory or, eventually, in a hospital or clinic.

Ronald Ruth, Ph.D.

it,” Dr. Ruth said. “One of the requirements to get x-rays with one angstrom wavelength, or an energy of about 12 kilovolts, is that the electron beams have to be very high energy—many billions of electron volts. That’s what causes these devices to be very large in size.”

But the undulation that wiggles the electron beam back and forth does not have to be done with magnets. It can also be done with a light beam. And that’s what Lyncean has developed: a laser undulator. Because it uses laser wavelengths, the energy of the electron beam can be small, consequently decreasing the device size.

“This big ring of magnets shrinks down to tabletop size,” said Dr. Ruth. “The CLS storage ring is about two meters long by a meter wide.”

Scientific Applications

In 2004 Lyncean announced that it was



Ronald Ruth, Ph.D.

constructing the CLS and the prototype is now up and running. The first beta CLS is already in production and will be installed at the Scripps Research Institute in La Jolla, Calif., where it will be part of the new Accelerated Technology Center for Gene to 3D Structure (ATCG3D). The ATCG3D is one of the specialized centers of the Protein Structure Initiative funded through the National Institute of General Medical Sciences (NIGMS) and the National Center for Research Resources (NCRR). Part of the National Institutes of Health, NIGMS and NCRR support basic biomedical research and foster development of new technologies.

“Essentially within one laboratory we will produce a protein, crystallize the protein and do synchrotron x-ray diffraction experiments,” said Peter Kuhn, Ph.D., professor of cell biology at Scripps. “This is something that, outside of a national lab, is completely unprecedented.”

The CLS allows an individual scientist to drive an entire experiment, which just wasn’t possible before, Dr. Kuhn said. “Having a small-scale,

high-performance synchrotron is essentially one of the last critical steps in the process,” he said.

Dr. Pisano’s work with synchrotrons has involved diffraction enhanced imaging (DEI), which uses a crystal downstream of the object being radiated to capture the diffraction part of the x-ray beam.

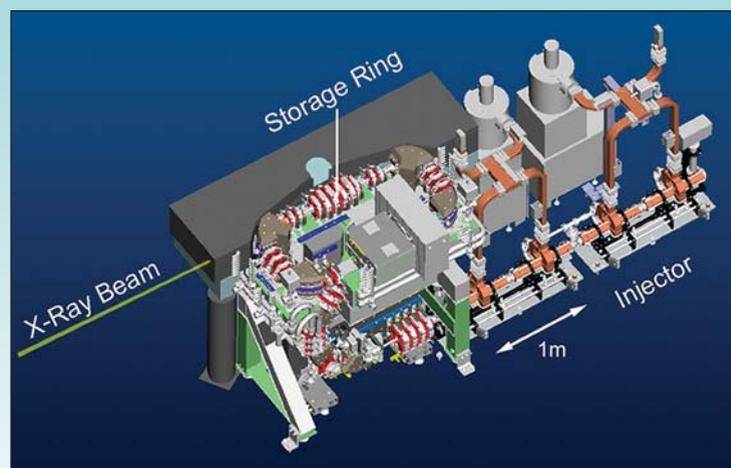
“When an object is exposed to an x-ray beam, the images created with traditional radiography are due to the absorption component of the beam—in other words, which photons get through,” Dr. Pisano explained. “But we’ve been doing some experiments at the synchrotron facility at Brookhaven National Laboratory that use the diffraction component of the beam, meaning the photons that get bounced off. We’re capturing them with a crystal and making images with it.”

With a focus on breast cancer imaging, Dr. Pisano has been researching whether diffracted beams can be used to determine the extent of disease in a specimen. “It’s very preliminary at this point—we haven’t done it on any humans,” she said. “But we’ve seen that DEI images seem to show finer detail at the edges than typical absorp-

tion images of the same specimens. We found that fine lines around the surface of the cancer were more visible. Those are often important to see, because you can tell that something is spreading out into the surrounding tissue, as opposed to just confined to a local space.”

CLS development has been supported by NIGMS through a Small Business Innovation Research (SBIR) grant. NIGMS Director Jeremy M. Berg, Ph.D., said that with its decreased size and cost, the CLS “puts an option on the table that hasn’t existed.”

Dr. Ruth said he sees the CLS as practical enough to one day be used in a hospital, where radiologists will be among those to reap the benefits. “There has been a tremendous amount of research, but many radiologists have not been interested in x-ray research



A rendering of the Compact Light Source miniature synchrotron, which can produce high-intensity, tunable and near-monochromatic x-ray beams while remaining small enough for a university lab.

Image courtesy of Lyncean Technologies.

with synchrotron light because they didn’t see the possibility that it could ever be practical,” he said. “But now the possibility is not only there, we’re actually building devices.

“I believe the Compact Light Source will substantially expand the interest in using synchrotron light for radiography,” he said. □

■ To read more about the Compact Light Source being developed by Lyncean Technologies, go to www.lynceantech.com/sci_tech.html.

Uterine Fibroid Findings Support Radiology-Based Treatments

Continued from page 5

an obstetrician and gynecologist and clinical director of the Center for Uterine Fibroids at Brigham and Women’s Hospital in Boston. “Fibroids are the first approved indication for this novel therapy.”

None of the study participants had to be hospitalized and women were able to return to work within two to four days, said Dr. Stewart, adding that follow-up visits also revealed few of the women were taking pain medications a week later. “It is remarkable how well these women did,” she said.

Dr. Stewart said the FDA originally wanted a six-month study but then required longer-term follow-up. Study participants will be followed for three

years after treatment.

As for long-term goals, Dr. Stewart said she’d like to see how the procedure can be made faster and if intervention can come earlier. Right now, it takes three hours to treat one 10-cm fibroid or several smaller ones. She said she wonders if outcomes might be improved if fibroids were to be shrunk with medications prior to the treatment

and also if women were to begin treatment as soon as they became symptomatic.

“This is such new technology that where the treatment is today is not where we may see it in five years,” she said. “However, more women will have another less invasive option to treating fibroids.” □

■ To view the abstracts presented at the SIR annual meeting, including the UFE studies, go to directory.sirweb.org/eseries/amabst/index.cfm.

■ To view the abstract for “The Long-Term Outcome of Uterine Artery Embolization of Leiomyomata,” go to www.greenjournal.org/cgi/content/abstract/106/5/933. To view the abstract for “The FIBROID Registry: Symptom and Quality of Life Status 1 Year After Therapy,” go to www.greenjournal.org/cgi/content/abstract/106/6/1309.

■ To view the abstract for “Clinical Outcomes of Focused Ultrasound Surgery for the Treatment of Uterine Fibroids,” go to www.fertstert.org/article/PIIS0015028205036551/abstract.

Sudoku Stardom Follows Algorithm Discovery

MILLIONS OF puzzle-loving Sudoku fans can rest easy. Cornell University Physics Professor Veit Elser, Ph.D., has no intention of ruining their fun.

While Dr. Elser has been using the popular Sudoku grid puzzle as an illustration for understanding his new difference-mapping algorithm, the algorithm itself—created to aid in biological imaging microscopy—serves a slightly higher calling.

“There are perfectly adequate algorithms in existence for solving Sudoku,” said Dr. Elser, whose research focuses on phase retrieval, imagery construction, structural biology and protein folding. He points out that the “whole Sudoku business”—meaning, how he and the game came to be linked on news, science and leisure sites across the Web—simply arose as a way of “demonstrating an algorithm that many people consider a very esoteric form of problem solving.”

Simply put, his difference-map algorithm takes the massive but incomplete data generated by x-ray diffraction microscopy and produces images by inferring the missing information, in a process similar to solving a puzzle.

By making quick work of shaking through the possibilities in the piles of data and finding an “arrangement” consistent with the constraints, the algorithm is a very, very complex variation on the way Sudoku puzzle solvers chew over numbers in order to make them fit into a puzzle’s row and box restrictions.

Inspiration Strikes

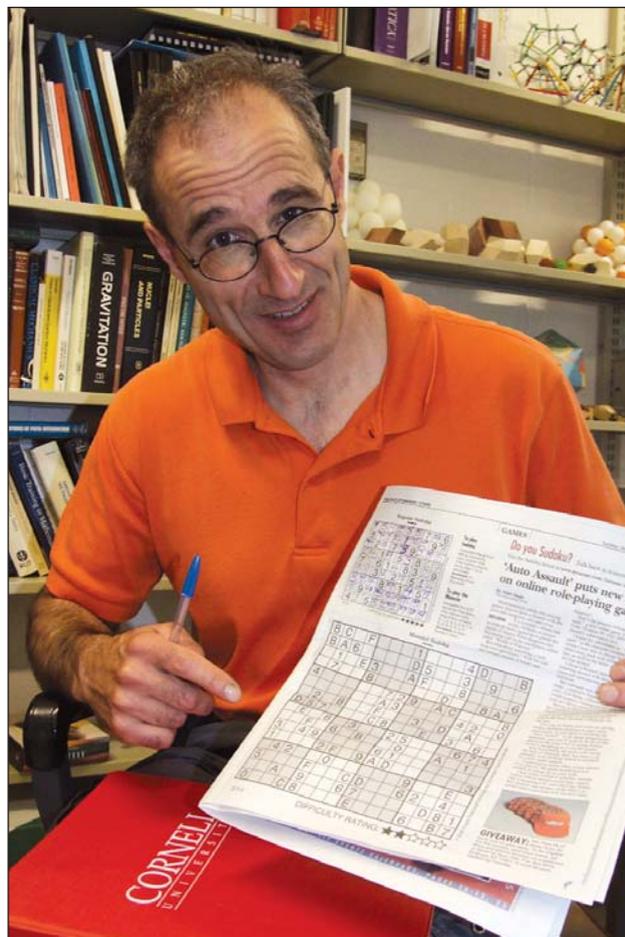
Dr. Elser found the roots of his algorithm in x-ray crystallography and its five-decade-old quest to sort out the

phase problem that arises when scientists attempt to examine the complex diffraction patterns created during the study of small molecules.

Sorting large amounts of diffraction data requires a large amount of heavy mathematical processing. It was only recently, Dr. Elser pointed out, that people began to think about crystallography as an extreme, less direct form of microscopy.

When examining delicate biological specimens using x-ray diffraction microscopy, however, the staining or other methods used to help create microscopic images wound up damaging or altering the specimen. Even then, the Fourier synthesis—the mathematical process of reconstructing the image of an object from the data collected in a diffraction experiment—requires many so-called phase angles that have to be inferred by a separate logical process. “The big challenge was in solving the phase problem,” said Dr. Elser. Phase angles were left out of the Fourier transformation, he said, because fitting in the data they added was a daunting mathematical task that choked even the fastest computers.

This is where Dr. Elser came in.



Veit Elser, Ph.D.

After attending a 2001 workshop at the University of California at Berkeley on new approaches to the phase problem, Dr. Elser was intrigued by the hybrid input-output (HIO) algorithm of James R. Fienup, Ph.D., a University of Rochester optics researcher. The HIO algorithm, which solved the phase retrieval problem, had been developed primarily for industrial and engineering purposes, including military and astronomy fields. Researchers, however, were thrilled by the prospect that Dr. Fienup’s HIO algorithm looked like it could be applied to microscopy.

Photo courtesy of Sabina Lee, Cornell Press Relations Office. Copyright © Cornell University.

“People were singing the praises of the HIO algorithm,” recalled Dr. Elser. “They were saying this is the greatest thing since sliced bread, it performs miracles, it never gets stuck. But when I probed deeper, it seemed like nobody understood why it worked.” So Dr. Elser went home and began analyzing Dr. Fienup’s algorithm. In doing so, he not only discovered how it works, but also developed his own algorithm, called the difference-map, that had potential beyond the applications for which it was designed.

The new algorithm applies to situations where there are two competing constraints. In the case of biological imaging, that meant matching the wave amplitudes measured in the experiment, together with the known fact that the object occupies a limited region in the field of view. In that sense, said Dr. Elser, the algorithm “was turning into an integral part of the microscope—the first half is the physical apparatus, the x-ray beam, detector, etc., and the second half is a very efficient algorithm on a computer that creates the image.”

Dr. Elser began working with David Shapiro, Ph.D., and others at the State University of New York (SUNY) at Stony Brook, applying his new algorithm to the study of yeast cells in an attempt to examine the cells without staining them. In August 2005, the team published an article in the *Proceedings of the National Academy of Sciences (PNAS)* titled, “Biological Imaging by Soft X-Ray Diffraction Microscopy.” It was, said Dr. Elser, “a demonstration of the principle”—his algorithm had made its debut.

Algorithm Also a Communication Tool

While he remains unmoved by his puzzle popularity, Dr. Elser is excited that his difference-map algorithm not only provides a powerful tool for simplifying and speeding up biological imaging

9				7		2		
1			3			6		
	5		6		9			1
		1	4		7	5		
	9		8		2		1	
7								4
	8		7		3	4		
3							8	
6			5		8			3

How to Sudoku

Fill in the grid so that every row, every column, and every 3x3 box contains the digits 1 through 9. The solution to this one is on page 11

but also could have unseen applications beyond the realm of x-ray diffraction microscopy. Just as Dr. Fienup’s HIO algorithm spread beyond engineering, Dr. Elser hopes people in other fields, such as nanotechnology and biophysics, will find imaginative new uses for the speed and efficiency his algorithm brings to complex searching and sorting problems. “We dream,” said Dr. Elser, “about other things that exploit the generality of the algorithm.” For example, he speculated that an x-ray researcher would “be able to map out, in exquisite detail, the 3D structure of biological cells,” using the difference-map algo-

algorithm to do an “end run” around what is now a very laborious computation process.

“I’m always impressed at what this thing can do,” said Dr. Elser. “In terms of the process of interpreting diffraction patterns, it’s pretty amazing.” He went on to point out how the algorithm can process millions of pieces of data in real time. “The sheer numbers tell

me there’s a lot of potential there for solving hard problems.”

Dr. Elser himself is now using the algorithm to work at solving the problem of protein folding, a challenge once considered so daunting that many researchers had almost given up hope of ever finding an applicable algorithm.

From a more general perspective, Dr. Elser sees his algorithm as a communication tool. “It used to be that it was impossible for x-ray crystallography people to talk to computer science people,” he said. By demonstrating his algorithm on more mainstream problems, he sees his algorithm as “a bridge between very different worlds—and hopefully something interesting will happen.” □

[Sudoku is a way of] demonstrating an algorithm that many people consider a very esoteric form of problem solving.

Veit Elser, Ph.D.

■ The full text of the article, “Biological Imaging by Soft X-ray Diffraction Microscopy,” is available at www.pnas.org/cgi/content/full/102/43/15343.

New Modalities, Agents Define Role of Molecular Imaging in Drug Discovery

BY DEVELOPING new imaging modalities and molecularly selective agents, radiologists continue to secure the place of molecular imaging—and, consequently, their own place—in drug discovery and development.

“More and more treatments are molecularly targeted. Imaging needs to show at an early stage if a specific treatment is working or if a treatment targeting an alternate cellular pathway would better serve an individual patient,” said Umar Mahmood, M.D., Ph.D., director of animal imaging at Massachusetts General Hospital’s Center for Molecular Imaging Research (CMIR). CMIR aims to bring molecular imaging agents, including optical, MR and PET agents, from the basic science lab to the clinic. Several agents are already in clinical trials.

An assistant professor of radiology at Harvard Medical School, Dr. Mahmood oversees all mouse imaging at CMIR, using two MR units, PET/CT, SPECT/CT, and numerous specialized optical imaging systems. Speaking at a recent meeting of industry, academic and government representatives regarding imaging’s role in drug discovery and development, he maintained that every modality makes a different contribution to molecular imaging research.

RSNA 2006 will feature molecular imaging in a couple areas. The Emerging Technologies refresher course track, which made its debut at RSNA 2005,

returns with an eight-course comprehensive look at molecular imaging. (See sidebar, next page) In addition, the new Molecular Imaging Zone in the newly redesigned Lakeside Learning Center will offer molecular imaging exhibits and posters as well as other tools and information. (See story, page 12).

Visualizing Cellular Changes

Molecular imaging provides another useful dimension in imaging by allowing radiologists to visualize some of the cellular changes that drive disease processes before they become anatomically apparent. Information gathered from an imaging target, said Dr. Mahmood, can be applied to the diagnosis and treatment of multiple diseases.

“A variety of diseases may share the same underlying process,” he

explained. “Sometimes you hope to see the processes active, and sometimes you hope to see them dormant. Angiogenesis in a heart with severe coronary artery disease is beneficial, but angiogenesis in a tumor is harmful.”

CMIR has developed a number of diverse agents which may improve screening and diagnosis of—as well as speed therapeutic drug development for—some of the most common diseases including cancer, cardiovascular disease, autoimmune disease and infection, said Dr. Mahmood. Two examples are autoquenched near-



Umar Mahmood, M.D., Ph.D.

infrared fluorescence probes, which may be an impetus for bringing optical molecular imaging to the clinic, and imaging agents such as iron oxide nanoparticles for use with MR.

One example of CMIR’s bench-to bedside focus involves Type I diabetes. “Using a combination of optical- and MR-detectable agents, we have shown that we can image the inflammation associated with Type I diabetes in mice,” Dr. Mahmood said. “This early detection is important. By the time elevated blood sugar is found, it is relatively late in the disease. At that point the islet cells are mostly destroyed and it may be too late for therapies to change the course of the disease.”

Dr. Mahmood and colleagues are using iron oxide nanoparticles to non-invasively image the inflammation that occurs in islet cells, before the disease is detectable by other noninvasive means. “This has worked so well in

Imaging needs to show at an early stage if a specific treatment is working or if a treatment targeting an alternate cellular pathway would better serve an individual patient.

Umar Mahmood, M.D., Ph.D.

mice that we are now in clinical trials to test whether MR imaging can reveal the islet inflammation of the pancreas in people who are at high risk for Type I diabetes before clinical symptoms develop,” he said.

More Training Needed

The role of molecular imaging—and radiologists—in drug discovery and development underscores the need for radiology education programs to offer additional training with tracers and with molecular imaging

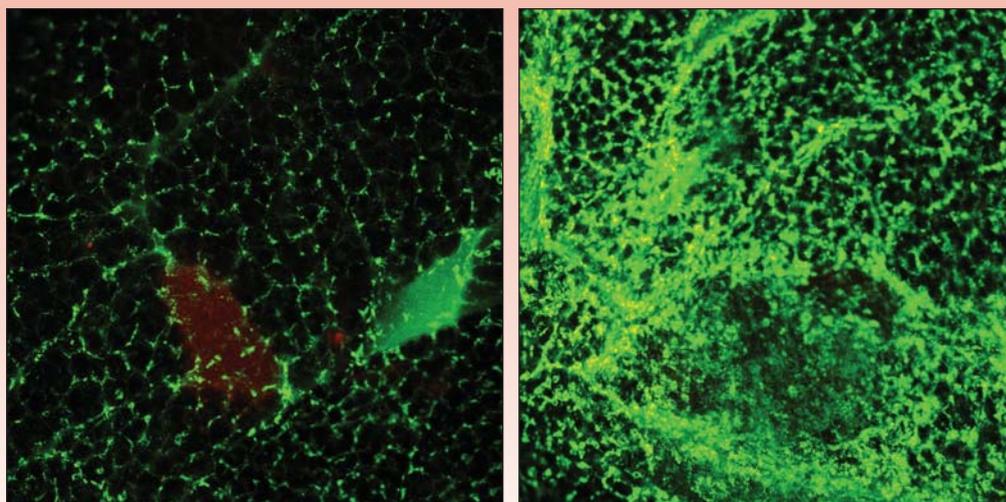
modalities, said Lawrence H. Schwartz, M.D., director of MR imaging at Memorial Sloan-Kettering Cancer Center in New York City.

“More emphasis will be needed on the basic sciences,” said Dr. Schwartz, who delivered the RSNA 2005 New Horizons Lecture, “Imaging in Drug Discovery: Emerging Roles and Challenges.” “As radiologists, we have always had to know this area, but the future will require an even better understanding of disease pathways.” □

■ More information about the Center for Molecular Imaging Research at Massachusetts General Hospital/Harvard University is available at cmir.mgh.harvard.edu.

Solved Sudoku puzzle

9	6	3	1	7	4	2	5	8
1	7	8	3	2	5	6	4	9
2	5	4	6	8	9	7	3	1
8	2	1	4	3	7	5	9	6
4	9	6	8	5	2	3	1	7
7	3	5	9	6	1	8	2	4
5	8	9	7	1	3	4	6	2
3	1	7	2	4	6	9	8	5
6	4	2	5	9	8	1	7	3



Confocal microscopy of a normal pancreas (left) and a pancreas with insulinitis (right). The red area is an islet. An optically labeled magnetic nanoparticle (green) demonstrates increased vascularity and leak around the inflamed islet.

(PNAS 2004;101:12634-12639) © 2004 National Academy of Sciences, U.S.A.

Molecular Imaging at RSNA 2006

The Emerging Technologies refresher course track returns at RSNA 2006 with an eight-course comprehensive look at molecular imaging. Registration begins June 19. To register, go to rsna2006.rsna.org and click on the Advance Registration, Housing and Course brochure.



■ RC117 Molecular Biology for Radiologists

- A. Molecular Imaging Introduction and Overview
- B. Introduction to Molecular Biology: Overview for Imagers
- C. Methods in Molecular Biology

■ RC217 Target Identification and Bioinformatics

- A. Proteins for Imaging: Receptors, Enzymes, and Transporters
- B. Informatics for Imaging: General Principles
- C. Informatics for Imaging: Genomics and Proteomics

■ RC317 Probe Design II

- A. Sensitivity and Specificity Concerns
- B. Development of

- Radionuclide Imaging Probes
- C. MR and Optical Probes for Molecular Imaging

■ RC417 Imaging Modalities and Instrumentation

- A. Nuclear Imaging
- B. MR Imaging
- C. Optical Imaging

■ RC517 Molecular-Genetic Imaging

- A. Reporter Systems in Molecular Imaging: A Comparative Analysis
- B. Imaging of Cellular Networks and Protein-Protein Interaction
- C. Molecular-Genetic Imaging in Oncology

■ RC617 Clinical Translation

- A. Current and Near-term Applications of Molecular Imaging Research

- B. Training for Molecular Imaging
- C. Involving Community Imaging Specialists

■ RC717 Opportunities from Industry and Government

- A. Academic-Industrial Collaborations
- B. Funding Opportunities: Imaging in the NIH Roadmap
- C. Obtaining Approval for Clinical Use of Molecular Imaging Probes

■ RC817 In Vivo Cellular Imaging

- A. General Considerations: Choice of Method
- B. Cardiovascular Applications of Cellular Imaging
- C. Neurologic Applications of Cellular Imaging

Lakeside Learning Center Offers One-Stop Shopping at RSNA 2006

RSNA 2006 attendees can see all the education exhibits, scientific posters and informatics demonstrations they want and still have time to discuss them with their colleagues, thanks to changes in the layout of Hall D.

In the hall, now dubbed the “Lakeside Learning Center,” attendees will find exhibits, posters and demonstrations clustered according to subspecialty. Subspecialties will be grouped as “spokes” in a layout resembling two giant wheels. (See graphic, next page.) A new Molecular Imaging Zone, situated between the wheels at the hall’s south end, also makes its debut this year.

Rows of hard-copy education exhibits will make up the spokes. At the outer end of each spoke will be large format, specialty-specific computer workstations that can be used for individual or group viewing and discussions of electronic exhibits and scientific posters. The workstations will be situated in lounge areas with comfortable seating, snacks and beverages that

encourage people to stop and share what they’re seeing and learning.

“The goal is to organize the hall according to the needs and practice patterns of attendees,” said Linda B. Bresolin, Ph.D., M.B.A., C.A.E., assistant executive director for research and education at RSNA. “The layout creates one-stop shopping for an attendee.”

In the past, an attendee looking for

particular content—for example, pediatric radiology—had to visit that particular area of the hard-copy education exhibits and also use one of the banks of computers in the back of the hall to view relevant electronic presentations of education exhibits and scientific posters. Now that same attendee just looks for the Pediatric Radiology sign and finds everything in one place, including a place to chat with friends old and new.

“An attendee can just dive in, with quick access to both electronic and hard-copy exhibits, as well as posters,” said RSNA Board Liaison for Education George S. Bisset III, M.D.

Mainstreaming Informatics

Another big change this year is that medical informatics demonstrations have been integrated with the rest of the exhibits, said Steven T. Drew, RSNA assistant executive director for informatics and the scientific assembly. In the past, these demonstrations, found in what was known as the *infoRAD*® area, were

housed in a designated portion of Hall D. Drew said that many people, despite being interested, didn’t find time to visit *infoRAD*® after traversing the hard-copy exhibit areas and accessing electronic exhibits. Giving computer applications in radiologic education and practice their own special area made sense when they were new, Drew said, but now these applications are so commonplace that it

An attendee can just dive in, with quick access to both electronic and hard copy exhibits, as well as posters.

George S. Bisset III, M.D.



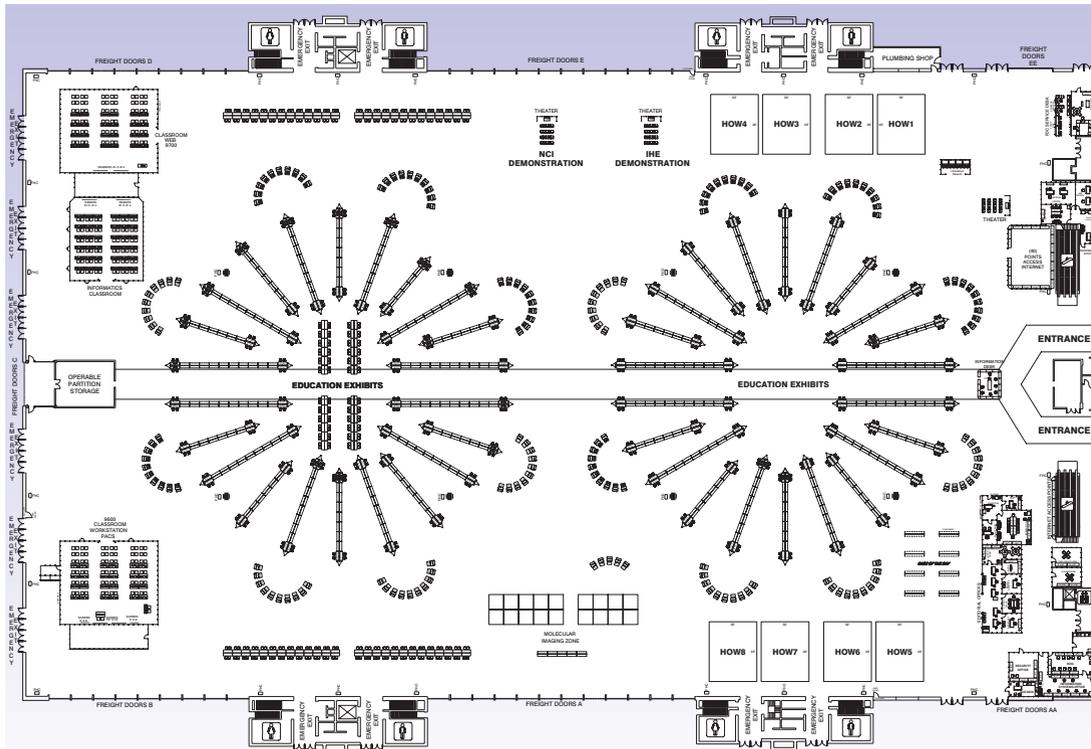
George S. Bisset III, M.D.

doesn’t make sense to create such a separation.

This year, informatics demonstrations that apply to many subspecialties will have “spokes” within the big wheel layout, while informatics used only in a particular subspecialty will be grouped with that subspecialty area.

Ramin Khorasani, M.D., a member of the Electronic Communications Committee (ECC), said the new approach to informatics presentations is meant to enhance, rather than undermine, what’s been done in the past.

“RSNA is and wants to be seen as forward thinking,” said Dr. Khorasani, of Brigham & Women’s Hospital. “Informatics is its own subspecialty, in terms of its importance to radiology. RSNA is committed to being a leader in informatics, as it is critical in meeting our goals of quality care, patient safety and efficiency.”



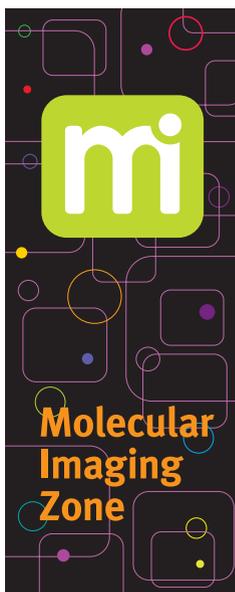
Hall D in McCormick Place has been changed to this new layout for RSNA 2006. Now known as the "Lakeside Learning Center," the hall will feature exhibits, posters and demonstrations clustered according to subspecialty, arranged as "spokes" on two giant wheels.

Molecular Imaging Zone

This year all molecular imaging exhibits and posters will be grouped together in an area of the Lakeside Learning Center called the Molecular Imaging Zone. Attendees also will find exhibits from federal agencies, such as the National Cancer Institute, on their molecular imaging programs, as well as information about funded centers of excellence in molecular imaging located nationwide. Molecular imaging societies, such as the Academy of Molecular Imaging and Society for Molecular Imaging, also will be on hand.

"The zone will give people involved in molecular imaging a space to gather, as well as expose general radiologists to molecular imaging so they can learn about the field at their own pace," said Dr. Bresolin.

Though not located in the Molecu-



lar Imaging Zone, technical exhibitors with molecular imaging products will feature the Molecular Imaging Zone logo (see below) in their booths.

User-Friendly Design

The Lakeside Learning Center redesign grew out of strategic planning meetings involving the ECC, Education Exhibits, Scientific Program and Refresher Course committees, whose members considered their own perspectives on the Hall D experience as well as feedback obtained from attendees, Dr. Bresolin said.

Dr. Bresolin added that scientific poster authors will be asked to lead scheduled discussions in the subspecialty lounge areas as well, encouraging even further discourse.

"Attendees were feeling a sense of loss for the social experience," she said. "They wanted to see friends and colleagues. We wanted to see if we

could foster a sense of community, even with the electronic exhibits."

The hubs of the wheels, Dr. Bisset noted, will house computers loaded with all the online scientific posters and education exhibits. An attendee will be able to sit at a terminal and peruse the entire electronic program, just as they used to do previously at a computer in the bank at the end of the hall.

"This new configuration is an attempt to deal with changing exhibit venues while at the same time attempting to keep things user-friendly for submitters and attendees," he said.

As far as keeping things "user-friendly" is concerned, Dr. Bresolin acknowledged that the redesign represents a pretty big change for longtime attendees who grew accustomed to the previous Hall D layout. Attendees should not worry, she said, as RSNA will provide detailed maps and even have "traffic cops" on hand to direct people to the various subspecialty areas.

Journal Highlights

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

Diffusion-weighted and Perfusion MR Imaging for Brain Tumor Characterization and Assessment of Treatment Response

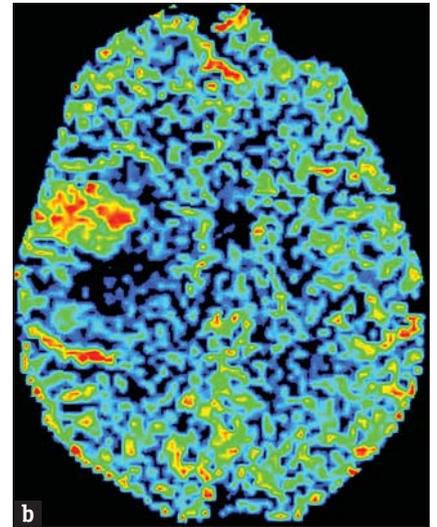
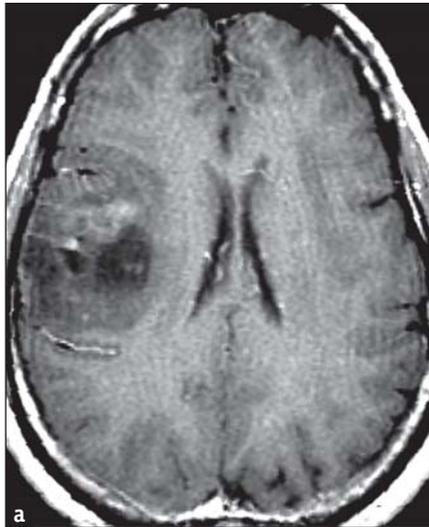
DIFFUSION-WEIGHTED (DW) MR imaging and perfusion MR imaging are advanced techniques that provide information not available from conventional MR imaging. In particular, these techniques can be used in many ways to characterize tumors and assess tumor response to therapy.

Radiology

In an article in the Special Reviews section of the June issue of *Radiology* (RSNA.org/radiologyjnl), James M. Provenzale, M.D., and colleagues from the Department of Radiology at Duke University Medical Center:

- Describe the fundamental principles of DW and perfusion MR imaging
- Provide an overview of how these techniques are used to characterize tumors by helping distinguish types, assess grades and determine margins
- Outline the role of these techniques for evaluating response to tumor therapy

Dr. Provenzale and colleagues note that to date, MR imaging has been used



Conventional MR images and rCBV map in 37-year-old man with biopsy-proved World Health Organization grade III astrocytoma.

(a) Transverse contrast-enhanced T1-weighted image shows inhomogeneous mass in right frontal lobe. Anterior portion of the mass shows contrast enhancement; posterior half of the mass does not. (b) rCBV map shows that anterior portion of the mass (corresponding to contrast-enhanced portion in (a)) has high rCBV (red and yellow), and posterior portion has low rCBV (blue).

(*Radiology* 2006;239:632-649) © RSNA, 2006. All rights reserved. Printed with permission.

to show the neoplasm and help distinguish tumors from other pathologic processes. MR imaging also has been used to depict basic signs of tumor response to therapy, such as change in size and degree of contrast material enhancement.

Perfusion MR imaging and DW MR imaging, according to the authors,

have gone beyond the traditional uses to become important new means for assessing tumors and tumor therapies.

“Perfusion and DW MR imaging appear to have great promise for increasing our understanding of brain tumors and the effects of therapy,” they write.

Preoperative Staging of Rectal Cancer with MR Imaging: Correlation with Surgical and Histopathologic Findings

MR IMAGING is increasingly being used to evaluate tumor resectability in patients with rectal cancer and to determine which patients can be treated with surgery alone and those who will require radiation therapy to promote tumor regression. Rectal cancer contin-

ues to have a highly variable outcome, with local pelvic recurrence after surgical resection usually leading to incurable disease.

RadioGraphics

In an article in the May-June issue of *RadioGraphics* (RSNA.org/radiographics), Franco Iafrate, M.D., of the University of

Rome and colleagues:

- Discuss the diagnosis, management and treatment of rectal cancer
- Review the normal rectal anatomy
- Discuss and illustrate the correlation of MR imaging findings with pathologic findings in rectal cancer and the clinical impact of MR imaging in this setting

Dr. Iafrate and colleagues note that

Continued on page 16

Radiology in Public Focus

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

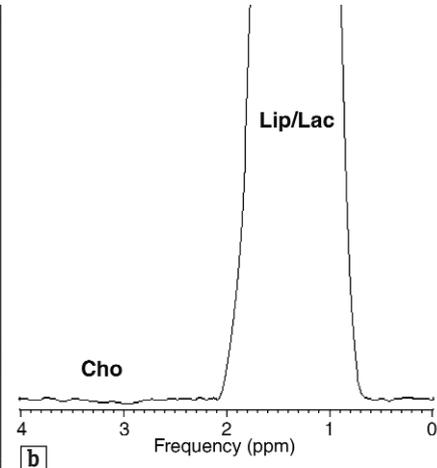
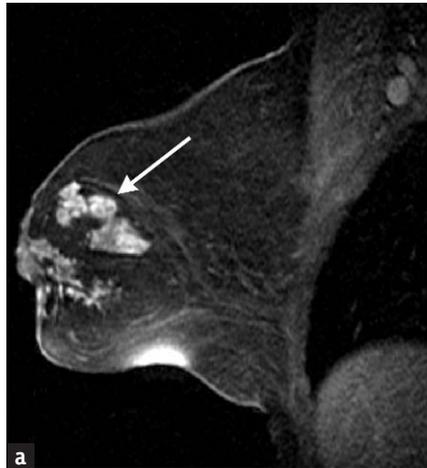
Proton MR Spectroscopy with Choline Peak as Malignancy Marker Improves Positive Predictive Value for Breast Cancer Diagnosis: Preliminary Study

USING MR spectroscopy in conjunction with MR imaging in breast cancer diagnosis may decrease the number of benign biopsy results, researchers at the Memorial Sloan-Kettering Cancer Center have concluded.

Lia Bartella, M.D., and colleagues evaluated the diagnostic performance of MR spectroscopy in 56 patients with 57 suspicious lesions or biopsy-proved cancers at MR imaging. At histologic analysis, 31 lesions were malignant and 26 were benign.

Diagnosis with proton MR (^1H MR) spectroscopy is typically based on the detection of elevated levels of choline compounds that are a marker of active tumor. In this study, a positive choline peak was present in 34 lesions, including all 31 found to be malignant at histologic analysis.

“MR spectroscopy achieved 100



New palpable mass in right breast of 43-year-old woman.

MR imaging-guided biopsy followed by surgical excision yielded benign fibrosis and ductal hyperplasia. (a) Postcontrast sagittal T1-weighted MR image of the right breast demonstrates an irregular 4.2-cm mass. (b) Spectrum did not demonstrate a choline resonance peak; only noise level was observed at a frequency of 3.2 ppm. This is a true-negative finding. Cho = choline, Lac = lactate, Lip = lipid.

(*Radiology* 2006;239:686-692)

percent sensitivity for the detection of breast cancer in this group of patients,” the authors write. They add that the positive predictive value of MR imaging and MR spectroscopy combined was 82 percent, versus 35 percent for MR imaging alone. Biopsy could have been spared in 23 of 40 lesions, they note, and none of the cancers would

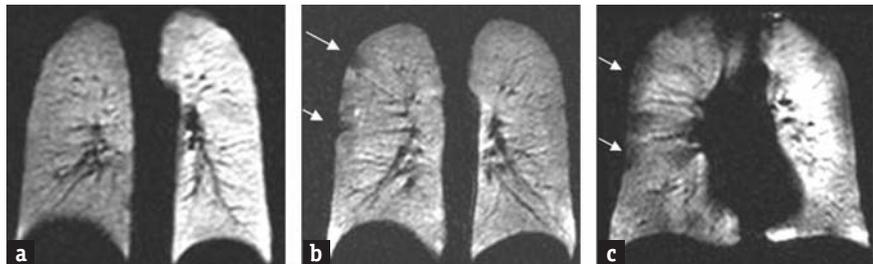
have been missed.

“These data suggest that MR spectroscopy may be a useful supplement to breast MR imaging by reducing the number of benign biopsy results without compromising the diagnosis of breast cancer,” Dr. Bartella and colleagues conclude.

Early Emphysematous Changes in Asymptomatic Smokers: Detection with ^3He MR Imaging

DIFFUSION-WEIGHTED hyperpolarized helium 3 (^3He) MR imaging can potentially be used for early detection of emphysema, researchers have found.

Studying asymptomatic smokers and healthy nonsmokers of similar age, Sean B. Fain, Ph.D., of the University



Coronal sections from ventilation ^3He MR images demonstrate typical defects (arrows). (a) No defects in a smoker with 14 pack-years of smoking. (b) Small peripheral defects in a nonsmoker. (c) Large peripheral defects in a smoker with 39 pack-years of smoking.

(*Radiology* 2006;239:875-883) © RSNA, 2006. All rights reserved. Printed with permission.

Continued on next page

Early Emphysematous Changes in Asymptomatic Smokers: Detection with ^3He MR Imaging

Continued from previous page

of Wisconsin, and colleagues looked at apparent diffusion coefficient (ADC) measurements derived from ^3He MR imaging. They compared these measurements with functional and structural findings using spirometric tests and thin-section computed tomography (CT) of the lungs.

Data in prior studies have shown an increase in the ADC in animal models and patients with emphysema, compared with normal control subjects, the

researchers note. Results of studies in animal models, they add, have confirmed that the increase in ADC is caused by less restricted diffusion of gas within the airspaces as the disease progresses.

The researchers evaluated eight healthy nonsmokers, defined as individuals who had smoked fewer than 100 cigarettes in their lifetime, and 11 healthy smokers with five to 30 pack-years.

The study revealed a statistically significant correlation between mean

ADC values derived from ^3He MR imaging and common pulmonary function test measurements used to diagnose emphysema, especially diffusing capacity of the lung for carbon monoxide (DLCO).

Mean ADC values and number of pack-years also were significantly correlated, with the relationship remaining significant after adjustment for age. This conclusion “supports the high sensitivity of this technique for early detection of disease,” the team writes.

Preoperative Staging of Rectal Cancer with MR Imaging: Correlation with Surgical and Histopathologic Findings

Continued from page 14

the success of tumor excision depends on accurate tumor staging and appropriate surgical technique. They also point to recent surgical trials which indicate that evaluating the involvement of the mesorectal fat and mesorectal fascia is even more important than tumor staging for treatment planning.

Acknowledging the lack of consensus on diagnostic imaging’s role in the tumor staging, the researchers assert, “because of its high-contrast spatial resolution and large field of view, MR imaging has now fulfilled the requirements for becoming the ideal imaging technique.” They note that transrectal ultrasonography still offers some advantages in terms of spatial resolution for differentiating between stage T1 and stage T2 tumors.

The researchers add that MR imag-



Rectal carcinoma.

Coronal turbo spin-echo T2-weighted MR image shows a stage T1 tumor (*) of the rectum. The tumor has an intermediate signal intensity between the high signal intensity of the fat tissue (jagged line) and the low signal intensity of the muscular layer (black arrow). The inner layer of the rectal wall (white arrow) consists of mucosal and submucosal layers and has a high signal intensity.

(RadioGraphics 2006;26:701-714) © RSNA, 2006. All rights reserved. Printed with permission.

ing also consistently allows accurate measurement of the depth of extramural tumor spread, determination of mesorectal involvement, and prediction of circumferential resection margin

(CRM) involvement.

“The use of MR imaging with a phased-array surface coil has an undeniable role in the therapeutic management of rectal cancer,” they conclude.

Media Coverage of Radiology

RSNA media coverage in April potentially reached more than a quarter of a billion people around the globe.

Stories referring to a *Radiology* article about breast cancer in pregnant women (*Radiology* 2006;239:52-60) appeared on ABC, Fox and CBS, as well as on the United Press International wire service and in the *Indianapolis Star*. Stories also appeared on the Internet outlets Yahoo! News,

Discovery Health, *Forbes.com*, *DrKoop.com*, *Excite.com*, RedOrbit, HealthDay, MedPage Today, HealthCentral and MEDLINEplus. Coverage for this study reached an estimated 90,796,040 people worldwide.

Additional news from *Radiology* and RSNA 2005 appeared in the *Wall Street Journal*, *Chicago Tribune*, *Los Angeles Times*, *Dallas Morning News*, *Connecticut Post*, *Pittsburgh Post-*

Gazette, *Fort Worth Star-Telegram*, *The Charlotte Observer* and *The Kansas City Star*. Stories also were carried by the Reuters Health and Reuters UK wire services, as well as on Internet outlets including Yahoo! Australia, *ivillage.com* and Medscape. These stories reached a potential audience of more than 160 million.

Working For You



(from left)
Thomas Kruk,
Kathy Rosewell,
Sera Stack,
Vida Wojewski,
Carol Douglas,
Assistant Director,
Lucinda Foulke,
Julie Pietryla

RSNA Production Department

THE Production Department is responsible for pre-press operations for RSNA's two peer-reviewed journals, *Radiology* and *RadioGraphics*. Under the leadership of Assistant Director Carol Douglas, the department maintains high quality while meeting deadlines. By developing new methods and procedures, the department never stops working to improve its quality and efficiency.

The Production Department:

- Develops production schedules and tracks the progress of journal material at all stages
- Cleans up and inserts typesetting codes into about 800 manuscripts per year
- Sends PDF manuscript proofs to authors

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**DEPARTMENT
PROFILE**

and edited manuscripts to RSNA's printing vendor

- Assesses the quality of and arranges about 10,000 journal images per year
- Checks page layouts and proofs

The production staff also helps produce RSNA syllabi, PowerPoint presentations and other projects related to the annual meeting, such as the digital presentation and exhibit for the Sunday Image Interpretation Session. The department also helps implement the online journals, cases of the day and self-assessment modules.

The Production Department reports to Roberta E. Arnold, M.A., M.H.P.E., assistant executive director for publications and communications.

Graduated Dues Ease Transition for Resident Members

RSNA has implemented a graduated dues program to give resident members time to settle into the profession before paying full membership dues.

Beginning with the first full year after residency or fellowship, dues for existing resident members are only \$100. In the second year, dues are only \$200. Resident members do not remit full dues until their third year of full membership.

The graduated dues program confers all the benefits of full membership, including subscriptions to *Radiology*, *RadioGraphics* and *RSNA News**, free admission to the annual meeting and free access to CME credit on InteractED®.

For more information about graduated dues and other RSNA member benefits, contact the Membership Department at 1-877-RSNA-MEM (1-877-776-2636) or membership@rsna.org.

*Small additional postage fee for members outside North America

RADIATION SAFETY

Answer

[Question on page 2.]

A After CT is performed, there is no radiation left inside your body. You do not become radioactive from the procedure. (Note: The difference between irradiation [from an external source] and contamination [from the administration of a radionuclide] is not intuitive to most patients.)

Q&A courtesy of AAPM.

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

Program and Grant Announcements

IHE® Workshop 2006: Changing the Way Healthcare Connects

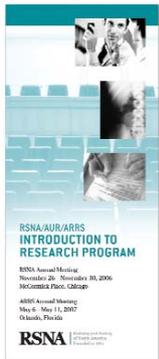
June 19–21, Oak Brook, Ill.

The workshop will focus on the role of the Integrating the Healthcare Enterprise (IHE®) initiative in improving information technology in various care settings and realizing the vision of a connected health system. Featured will be sessions for vendors, public health experts, consultants and healthcare providers on participating in and leveraging the IHE initiative. For more information visit: www.ihe.net/Participation/iheWorkshop2006.cfm.

Introduction to Research Program

RSNA/AUR/ARRS • Application deadline—July 15

Second-year residents are encouraged to apply for the Introduction to Research programs sponsored by RSNA, Association of University Radiologists (AUR) and American Roentgen Ray Society (ARRS). Programs will be held during RSNA 2006 and the 2007 ARRS meeting. For more information, visit RSNA.org/i2rapp or call 1-630-590-7741.



RSNA Derek Harwood-Nash International Fellowship

Application deadline—July 1

International radiologists 3-10 years beyond training are invited to apply for a 3-month fellowship at a North American institution. Candidates must demonstrate how the fellowship meets their specific educational goals and how the knowledge and experience gained will benefit radiology practice in their home institutions. More details are available at RSNA.org/International/CIRE/dhnash.cfm or by calling 1-630-590-7741.

Imaging in Molecular Medicine

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

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

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



Participants in the RSNA Advanced Grant Writing Course met recently at RSNA Headquarters. The course assists junior faculty members in preparing and submitting quality grant applications to the NIH, NSF or other equivalent institution by the October 2007 NIH deadline. The application deadline for the next course is July 1. Visit RSNA.org/Research/educational_courses.cfm for more information.



Research & Education Foundation Donors

THE BOARD OF TRUSTEES of the RSNA Research & Education Foundation and its recipients of research and education grant support gratefully acknowledge the contributions made to the Foundation between **March 17 – April 21, 2006.**

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

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Howard D. Harper, M.D.

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Pierre-Jean Valette, M.D.
Marco H. Villanueva-Meyer, M.D.
Lewis Wexler, M.D.
Jason R. Williams, M.D.
Tetsuo Yoshida, M.D.
Ian A. Zealley, M.D.
Peter T. Zimmerman, M.D.
Olga & Christoph L. Zollikofer, M.D.

Continued on next page

R&E Foundation Giving Programs

Visionary Donor Program **NEW PROGRAM**

DESIGNED for donors interested in a commitment to lifelong giving to ensure the vibrant future of radiologic research, the Visionary Donor program recognizes cumulative cash giving. Membership begins once a donor has contributed at least \$5,000 to the Foundation, with recognition as well at other milestones:

★ GALAXY	\$1,000,000	★ PLATINUM	\$25,000
★ STAR	\$500,000	★ GOLD	\$15,000
★ DIAMOND	\$250,000	★ SILVER	\$10,000
★ RUBY	\$100,000	★ BRONZE	\$5,000
★ SAPPHIRE	\$50,000		

Benefits Include

- Early registration and hotel selection notice for the RSNA annual meeting
- Special Recognition in *RSNA News*, the R&E Pavilion at the annual meeting, the RSNA Annual Report and on the R&E Foundation Web site
- Access to premier services in the Donor Lounge at the RSNA annual meeting

- Priority taxi/shuttle bus lines at the RSNA annual meeting
- Choice of thank you gift at each level

RSNA News will feature information about different R&E Foundation giving programs over the next several months. For more details about the Foundation and its programs, go to RSNA.org/Foundation or call 1-800-381-6660 x7885.

25 Questions Project Looks to Future Research

Continued from previous page

THE RSNA Research & Education Foundation wants to know, What important imaging questions must research still answer?

In the past 21 years, the Foundation has awarded \$23 million to support more than 560 research and education projects that have answered critical imaging questions. RSNA members are invited to chart the course for future discovery by identifying questions they consider most compelling.

Questions may be entered at RSNA.org/25questions. Scientific reviewers will choose the top 25, which will be announced along with the

names of the submitters during RSNA 2006 and in RSNA publications.

Among the questions already submitted:

- “Will imaging ever be able to differentiate benign and malignant disease, reducing or even eliminating the need for biopsy?”
- “Will it be possible to image and measure bone strength and not just bone density or structure?”
- “Can MR diffusion and/or functional imaging be used to link diseased brain structure with abnormalities in brain function?”



Submit your questions at RSNA.org/25questions by August 31.

MEETING WATCH RSNA HIGHLIGHTS

RSNA Highlights: Clinical Issues for 2007

THOSE unable to attend RSNA 2006 or who want to attend additional education sessions are encouraged to check out RSNA's new educational conference, RSNA Highlights: Clinical Issues for 2007. The conference will be held February 26–28, 2007, at the J.W. Marriott Desert Ridge Resort & Spa in Phoenix, Ariz.

The conference will include selected refresher courses and electronic education exhibits from RSNA 2006, with special emphasis

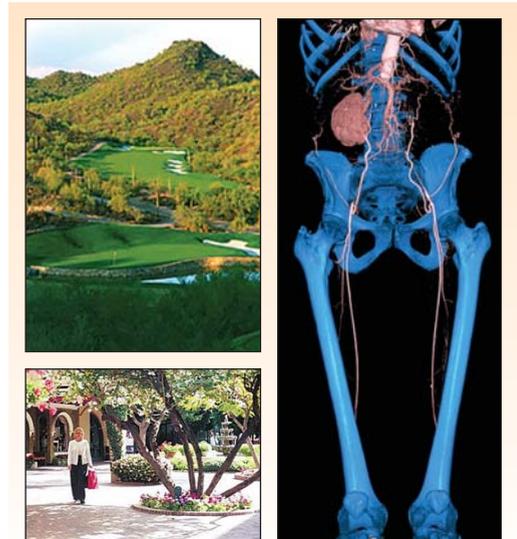
on cardiac imaging, PET/CT, breast imaging and sports injuries. All courses will be taught in an interactive format, using audience response technology. A feature article about the conference will be included in the July issue of *RSNA News*.

Important Dates for RSNA Highlights

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

Registration begins September 5. Up-to-date information is available

at RSNA.org/highlightsconference. For more information, contact RSNA Program Services at programs@rsna.org.



News about RSNA 2006

Refresher Course Enrollment Opens June 19

COURSE enrollment information for RSNA 2006 will be mailed in mid-June and will also be available online. Go to rsna2006.rsna.org and click on Registration, Housing & Courses.

Enrollment is required for various com-

ponents of the meeting, including refresher courses, informatics and hands-on workshops, investment courses and RSNA tours and events. Series courses and the Digital Mammography Training and Self Assessment Workshop also require registration.

How to Register

There are four ways to register for RSNA 2006:

1 Internet

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

Fastest way to register!

2 Fax (24 hours)

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

3 Telephone (Mon.–Fri.,

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

4 Mail

ITS/RSNA 2006
108 Wilmot Rd.,
Suite 400
Deerfield, IL 60015-0825
USA

International Delegates

Invitation Letters

Personalized invitation letters are available at www2.rsna.org/visa_form/invitation_letter.cfm.

Apply Early for Your Visa!

Visa applicants are advised to apply as soon as they decide to travel to the United States and at least **three to four months** in

advance of their travel date. That means international attendees should start the visa process by July or August.

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

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

Request a Printed Copy of the RSNA Meeting Program

Beginning in mid-June, RSNA members can request a printed copy of the *RSNA Scientific Assembly and Annual Meeting Program*. The *RSNA Meeting Program* is a benefit of membership.

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

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

The deadline to request a printed copy of the *RSNA Meeting Program* is September 15. Programs will not be mailed to members who do not request them. *RSNA Meeting Program* content will be available online before, during and after the meeting.

Important Dates for RSNA 2006

- June 19** Course enrollment opens
- Oct. 27** Badge mailing deadline for international registrants
- Nov. 6** Final housing deadline
- Nov. 10** Advance registration deadline
- Nov. 26–** RSNA 92nd Scientific
- Dec. 1** Assembly and Annual Meeting



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

**CME Update: Earn up to 85
AMA PRA Category 1 Credits[™]
at RSNA 2006**

Registration Fees

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

■ For more information about registering for RSNA 2006, visit rsna2006.rsna.org, e-mail reginfo@rsna.org or call 1-800-381-6660 x7862.

RSNA 2006 Exhibitor News

Exhibitor Housing

ON May 15, RSNA mailed all confirmed RSNA 2006 exhibitors a letter explaining exhibitor housing procedures.

Exhibitors requiring 25 rooms or more must submit a Block Housing Form. Block housing assignments are based on a priority point system similar to the one used for exhibit space assignments. Maximum points have been awarded to Block Housing Forms submitted before June 5. Housing date points expire July 5.

The housing bureau's Web site opened June 5 for individual housing. The deadline for individual housing is Nov. 3. Please note individual housing is reserved on a first-come, first-served basis.

Questions about exhibitor housing can be directed to the RSNA Housing Department at housing@rsna.org or 1-800-381-6660.

Customize your RSNA 2006 Exhibitor Listing

Beginning July 5, confirmed RSNA 2006 exhibitors will be able to add to or modify their online exhibitor listings. At no charge, exhibitors can enhance their exhibitor listing by:

- Uploading a company logo
- Adding keywords to the search engine on the RSNA meeting Web site
- Selecting company product(s) or service(s)
- Highlighting up to five products with photos and descriptions
- Customizing the look of the listing by changing the color and font size

In late June, RSNA will send each exhibitor's main contact a personalized 8-digit user ID and password to access the site.

Technical Exhibitor Service Kit

The RSNA 2006 Technical Exhibitor Service Kit will be available beginning July 5 at rsna2006.rsna.org. Click on the Service Kit link in the Technical Exhibition area on the right.

With this electronic kit, exhibitors can download service request forms and easily find important information such as registration hours, exhibit installation and dismantling hours, rules and regulations, RSNA forms and official contractor information. The kit also allows online ordering capabilities with some contractors.



June Exhibitor Planning Meeting

RSNA will release booth assignments on June 27 at the Exhibitor Planning Meeting and Luncheon. All RSNA 2006 exhibitors are invited to attend the meeting at Rosewood Restaurant and Banquets near Chicago's O'Hare International Airport.

Advertising at RSNA 2006

Many opportunities exist for companies to promote their RSNA 2006 exhibits. For more information, go to RSNA.org/Advertising/upload/meeting-3.pdf or contact:

- | | |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| • Jim Drew
Director of Advertising
1-630-571-7819
jdrew@rsna.org | • Judy Kapicak
Senior Advertising Manager
1-630-571-7818
jkapicak@rsna.org |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|

Important Exhibitor Dates for RSNA 2006

June 27	Exhibitor Planning/Booth Assignment Meeting
July 5	Technical Exhibitor Service Kit available online Block housing deadline
July 28	Deadline for reduction/cancellation (for full refund)
Aug. 11	Deadline for final payment Deadline for reduction/cancellation (for partial refund)
Aug. 14	Deadline to submit Block Housing room deposits
Aug. 25	Headquarter Office Space Assignments close
Nov. 10	Exhibitor advance badge request deadline
Nov. 26– Dec. 1	RSNA 92nd Scientific Assembly and Annual Meeting

■ For up-to-date information about technical exhibits, go to rsna2006.rsna.org. For more information, contact RSNA Technical Exhibits at 1-800-381-6660 x7851 or exhibits@rsna.org.

Product News

NEW PRODUCT

Cardinal Unveils Vertebrex System

CARDINAL Health (www.cardinal.com) has introduced its new Vertebrex system to treat vertebral compression fractures. The company said it worked with interventional radiologists to improve cement control and cement preparation during vertebroplasty procedures. A new cement tube design allows the physician to avoid pressure build-up when starting an injection and reduces the risk of trailing cement behind when the injection is complete. Vertebrex is a closed system, which minimizes noxious odors and the sharps risk associated with the glass ampoule.



NEW PRODUCT

Radiology Reporting Solution

StructuRad L.L.C. (www.structurad.com) has launched its new product called ReportNow for workgroups. ReportNow unifies dictation, speech recognition, macro templates and structured reporting. According to the company, ReportNow makes reporting faster and less costly by combining Microsoft® Word with StructuRad's proprietary menus. The

system also includes speaker-independent voice command navigation and edit and a comprehensive radiology knowledge base. Radiologists benefit by completing a report in a single session, while referring physicians and patients benefit from more timely access to clinical information, the company said.

FDA CLEARANCE

Wireless Technology for Interventional Radiology

The FDA has granted Siemens Medical Solutions (www.siemens.com) clearance for its AXIOM Wireless Footswitch and AXIOM Voice Control products. The wireless footswitch technology eliminates the hazard of excess cables in the examination room. AXIOM Voice Control lets physicians command the image processing of an AXIOM Artis system directly via voice control signals.



FDA CLEARANCE

Implantable Radiation Sensor and Reader

SICEL TECHNOLOGIES, INC. (www.siceltech.com) has received FDA clearance for its DVS® Dose Verification System, a wireless, implantable radiation sensor and reader.

Measuring 20 mm x 2 mm, the sensor pinpoints the target during a patient's treatment cycle and measures the amount of radiation received by the tumor. Information is transmitted to physicians via a handheld reader.

Implantation of the DVS® sensor did not lead to any adverse events in a multicenter clinical trial of breast cancer patients. While several methods are available to facilitate tumor localization, none provide actual dose recordings, the company noted.



RSNA | 2006

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92nd Scientific Assembly and Annual Meeting

November 26 – December 1
McCormick Place, Chicago

Radiological Society
of North America

Introducing a **new** RSNA conference...



RSNA HIGHLIGHTS

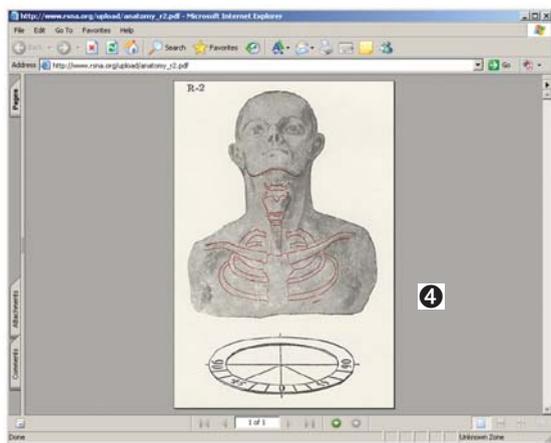
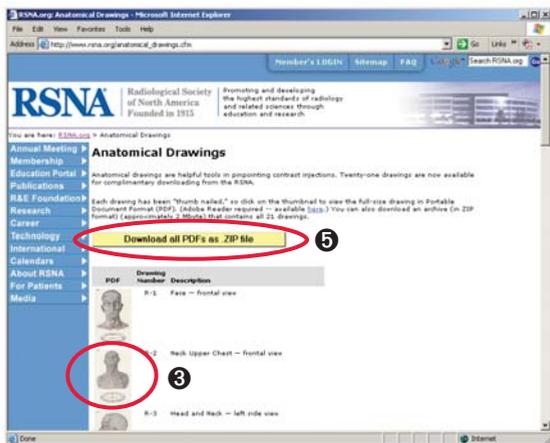
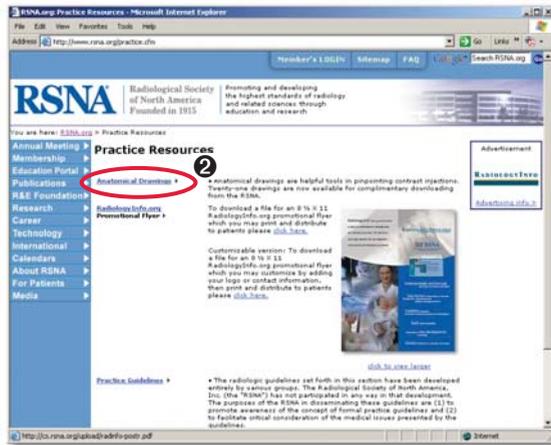
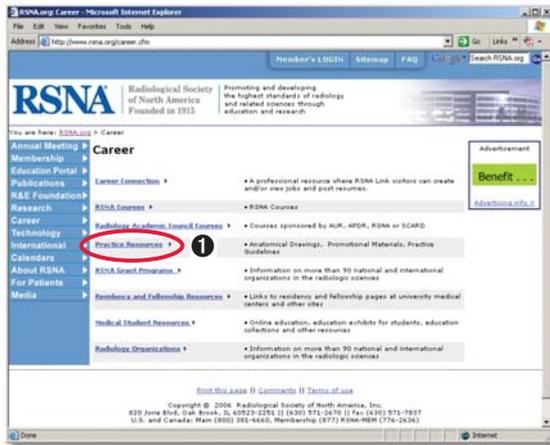
CLINICAL ISSUES FOR 2007

PHOENIX, ARIZONA – FEBRUARY 26–28, 2007



RSNA.org

RSNA.org



Anatomical Drawings

RSNA now offers its Anatomical Drawings series free online. Helpful in pinpointing contrast injections, 21 drawings are available as individually downloadable PDFs.

To access the drawings, go to RSNA.org/career.cfm and click on Practice Resources 1. Click on Anatomical Drawings 2 and then click on a picture 3 to see the

full-size version 4. You can also download an archive of all 21 drawings 5.

OTHER WEB NEWS

Go Back in Time with the Internet Archive “Wayback Machine”

SELECT archived pages of RSNA.org are available via the Internet Archive “Wayback Machine” (web.archive.org). The direct link is web.archive.org/web/*/www.rsna.org.

Not all pages are archived on the Internet Archive and some pages won't display properly in contemporary browsers. Visitors will still be interested to see, however, how quickly Web technology and design—and RSNA too—have changed in the past decade.



connections Your online links to RSNA

RSNA.org

Radiology Online
RSNA.org/radiologyjnl

Radiology Manuscript Central
RSNA.org/radiologyjnl/submit

RadioGraphics Online
RSNA.org/radiographics

RSNA News
rsnanews.org

Education Portal
RSNA.org/education

CME Credit Repository
RSNA.org/cme

CME Gateway
CMEgateway.org

RSNA Medical Imaging Resource Center
RSNA.org/mirc

RSNA Career Connection
RSNA.org/career

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

RSNA Press Releases
RSNA.org/media

My RSNA Profile & Benefits
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RSNA Research & Education Foundation
Make a Donation
RSNA.org/donate

R&E 25 Questions Forum
RSNA.org/25questions

Community of Science
RSNA.org/cos

Membership Applications
RSNA.org/mbrapp

RSNA Membership Directory
RSNA.org/directory

NEW Register for RSNA 2006
RSNA.org/register

RSNA 2006
rsna2006.rsna.org

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

Medical Meetings

July – September 2006

JUNE 28–JULY 1

CARS (Computer Assisted Radiology and Surgery), 20th International Congress and Exhibition, Osaka International Convention Center, Osaka, Japan • www.cars-int.org

JULY 30–AUGUST 3

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

JULY 30–AUGUST 3

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

AUGUST 6–9

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

AUGUST 6–10

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

AUGUST 27–SEPTEMBER 1

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

AUGUST 29–30

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

AUGUST 30–SEPTEMBER 2

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

SEPTEMBER 12–16

International Society of Radiology (ISR), 24th International Congress of Radiology, Cape Town International Convention Center, South Africa • www.isr2006.co.za

SEPTEMBER 12–16

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

SEPTEMBER 8–9

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

SEPTEMBER 9–13

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

SEPTEMBER 14–16

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

SEPTEMBER 15–16

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

SEPTEMBER 15–17

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

SEPTEMBER 27–29

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

SEPTEMBER 27–30

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

SEPTEMBER 27–OCTOBER 1

American Society of Head and Neck Radiology (ASHNR), 40th Annual Meeting, Sheraton Wild Horse Pass Resort and Spa, Chandler, Ariz. • www.ashnr.org

NOVEMBER 26–DECEMBER 1

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

FEBRUARY 26–28, 2007

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

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