

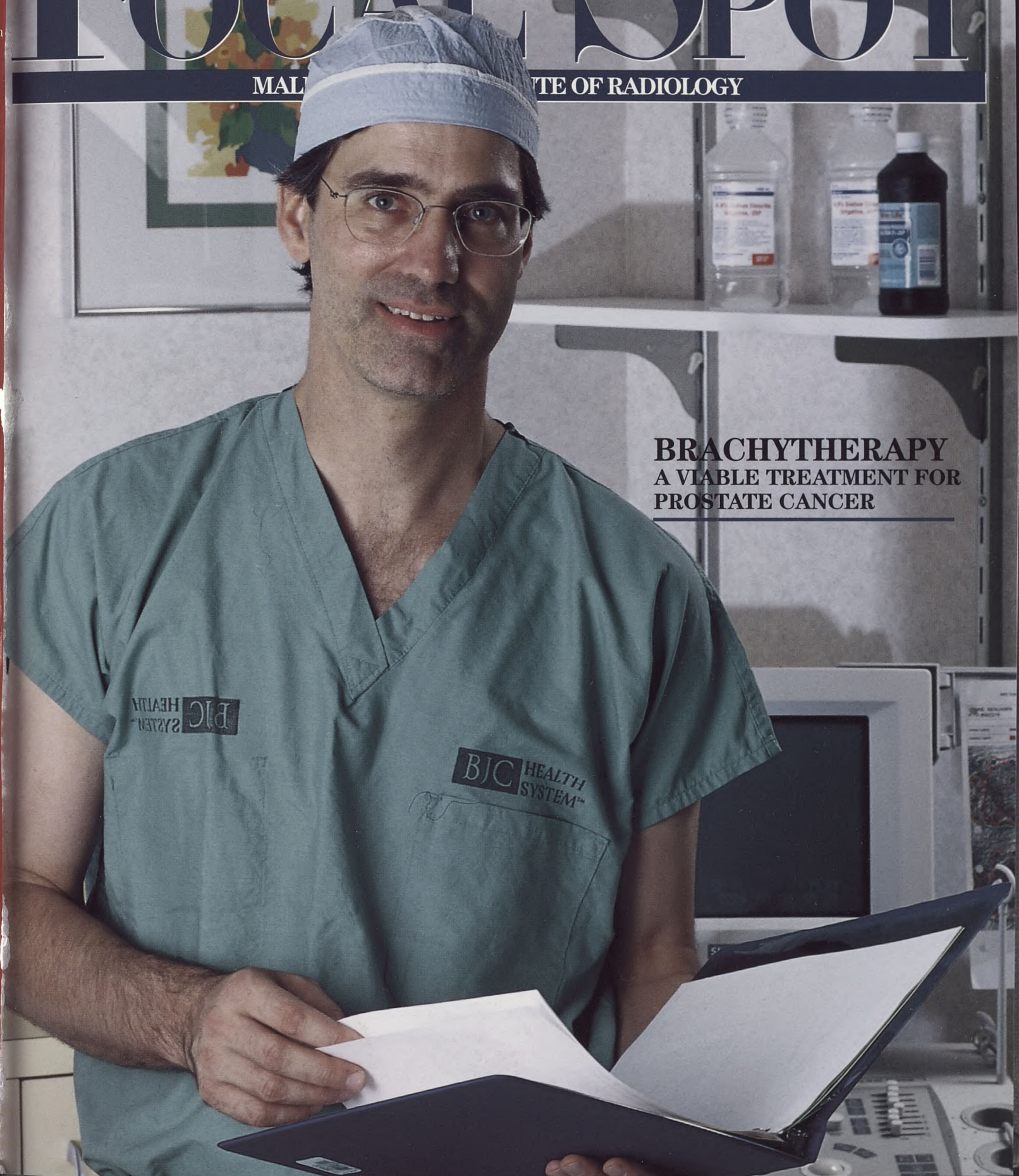
SUMMER, 1998

VOLUME 29, NUMBER 2

# FOCAL SPOT

MALDEN COLLEGE OF RADIOLOGY

**BRACHYTHERAPY  
A VIABLE TREATMENT FOR  
PROSTATE CANCER**





Above, MIR Director Ronald Evens presents Dr. Siegel with a commemorative clock.



Dr. Barry Siegel is celebrating 25 years as director of Mallinckrodt Institute's Division of Nuclear Medicine. Under his leadership, the Division has maintained a consistently high level of quality patient care while expanding research efforts, such as cardiovascular and oncologic applications of positron emission tomography, digital imaging techniques, radionuclide tracer usage in clinical diagnosis, and diagnostic criteria refinement for pulmonary embolism.

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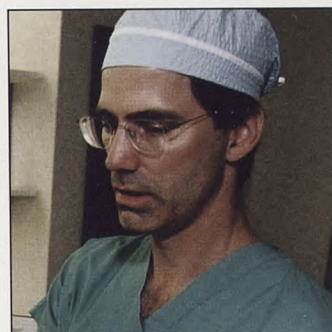


## CELEBRATION OF LIFE

More than 500 cancer survivors, family, friends, and caregivers gathered at the Washington University Medical Center to celebrate life and to share the memories of hard-fought battles and sweet victories over cancer.

## 8 BRACHYTHERAPY— A VIABLE TREATMENT FOR PROSTATE CANCER

Improved imaging technologies working in tandem with three-dimensional treatment planning systems are driving a resurgence in the treatment of early-stage prostate cancer with internal radiation therapy.



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## DICOM: SETTING STANDARDS FOR THE FUTURE

Since 1992, researchers in Mallinckrodt Institute's Electronic Radiology Laboratory have developed and subsequently expanded a software package that facilitates a universal approach to transferring electronic images among different manufacturers' medical equipment—a crucial step forward in the storage, transmission, and retrieval of medical data.

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### ON THE COVER:

Radiation Oncologist Jeff Michalski believes that men whose early-stage prostate cancer are treated with brachytherapy will have a greater chance for long-term survival and a better quality of life. Photograph by Tim Parker.



William McAlister, MD

## SPR Gold Medal for McAlister

The Society for Pediatric Radiology (SPR) awards its most distinguished honor—the Gold Medal—to those pediatric radiologists who have “contributed greatly to the SPR and our subspecialty of pediatric radiology as a scientist, teacher, personal mentor, and leader.” In May of this year that honor was presented at the society’s 41st Annual Meeting in Tucson, Arizona, to William McAlister, MD, professor of radiology and of pediatrics and chief of pediatric radiology at Mallinckrodt Institute.

McAlister received an undergraduate and a medical degree from Michigan’s Wayne State University, where he graduated first in his medical class. After an internship at Detroit Receiving Hospital, followed by a two-year tour with the U.S. Air Force, he began a radiology residency and fellowship at Cincinnati General Hospi-

tal. McAlister joined the MIR faculty in 1960 and has served as chief of pediatric radiology since 1965. He was appointed professor of radiology in 1968 and was named radiologist-in-chief at St. Louis Children’s Hospital in 1992.

His research interests focus on metabolic bone disease, skeletal dysplasia, contrast media, and paranasal sinus disease. McAlister’s seminal research demonstrating tannic acid’s detrimental effects on the liver resulted in the FDA’s ban on its use in barium enemas. He is said to have a “computer-like ability to quickly synthesize images and clinical data to arrive at a diagnosis.”

McAlister is a fellow of the American College of Radiology and a past president of the SPR, the Greater St. Louis Society of Radiologists, and the Missouri State Radiologic Society. He is a member of the governing body of the St. Louis Medical Society and a member of the editorial board for the journal *Pediatric Radiology*.

## Top honor to Raichle

Add one more entry to Dr. Marcus Raichle’s long list of distinguished honors: election into the American Academy of Arts and Sciences. Established in 1780, the Academy honors leading intellectuals in every profession from the United States and abroad and, according to its Charter, “cultivates every art and science which may tend to advance the interest, honor, dignity, and happiness of a free, independent and virtuous people.” The convocation ceremony will be held at the House of the Academy in Cambridge, Massachusetts, in October.

Raichle is professor of radiology and codirector of the Division of Radiological Sciences. He also holds a joint appointment as a professor of neurology and neurobiology and is a senior fellow with the McDonnell Center for Studies of Higher Brain Function. In 1996, Raichle was elected to membership in the National Academy of Sciences, one of the highest honors in the country accorded to a scientist or engineer. His research focuses on the application of positron emission tomography to the study of the human brain, research that has produced groundbreaking discoveries in psychiatric disorders and in the development of functional maps of the brain’s sensory and language information-processing areas.

## Wilson Award presented

The 1998 Hugh M. Wilson Award for Meritorious Work in Radiology was presented at the Washington University commencement exercises on May 15 to Raymond Hsu. Now in its thirtieth year, the annual award recognizes outstanding work in the basic or clinical radiological sciences and is a tribute to Doctor Hugh Wilson, the second director of Mallinckrodt Institute who was an advocate of the advancement of education.

Hsu rotated through radiology early in his senior medical year. According to Stuart Sagel, MD, professor of radiology and chief of chest radiology, and Fernando Gutierrez, MD, associate professor of radiology, Hsu was “a valuable asset to the chest radiology section and was instrumental in the organization of the section’s teaching files. He upheld the high standards set by previous Wilson Award recipients.”

Under the mentorship of Thomas Conturo, MD, PhD, assistant professor of radiology and adjunct professor of physics, Hsu conducted research in the Neuroimaging Lab where he developed novel fMRI stimulus devices and developed a complex experimental system for *in vivo* validation of magnetic resonance arterial gadolinium concentration measurements. Along with fellow researchers Erbil Akbudak, PhD; Kim Deal, PhD; Steve Chun, BS; and Avi Snyder, MD, PhD, Hsu used the system to validate arterial input function measurements for quantitative magnetic resonance perfusion imaging.

## 1998-1999 chief residents appointed

Doctors Lannis Hall-Daniels and David Diamond were appointed cochief residents, and Doctor Heather Curry was appointed assistant chief resident for the Institute's radiation oncology residency program. Prior to their residencies at the Institute, Hall-Daniels completed a surgical internship and a surgical residency at Howard University Medical Center, Diamond completed a one-year internship at Yale-New Haven Hospital, and Curry completed an internship at Abington Hospital, Pennsylvania.

Cochief residents for the diagnostic radiology program are Sanjeev Bhalla, MD, and Christine Menias, MD. Prior to his residency at MIR, Bhalla completed an internal medicine internship at New York's Columbia Presbyterian Medical Center. Menias came to the Institute as a first-year post-graduate after receiving a medical degree from George Washington University, where she was a member of the Alpha Omega Alpha honorary medical society.

## Best doctors at MIR

Woodward/White, Inc. first began publishing *The Best Doctors in America* in 1992. Their compilation was based on an extensive nationwide poll of medical specialists who were asked to name those physicians whom they considered as the best in a particular field. Mallinckrodt Institute physicians were among those named in that first edition and have been listed in each subsequent publication. Top St. Louis doctors named in the 1999 edition of *The Best Doctors in America* appeared in the September issue of *St. Louis* magazine, including the following MIR physicians:

### Nuclear Medicine

Farrokh Dehdashti, MD  
Keith Fischer, MD  
Robert Gropler, MD  
Tom Miller, MD, PhD  
Mark Mintun, MD  
Henry Royal, MD  
Barry Siegel, MD

### Radiation Oncology

Mary Graham, MD  
Perry Grigsby, MD  
Jeff Michalski, MD  
Robert Myerson, PhD, MD  
Carlos Perez, MD  
Joseph Simpson, MD, PhD  
Marie Taylor, MD  
Todd Wasserman, MD

### Radiology

Claire Anderson, MD  
DeWitte Cross, MD  
Michael Darcy, MD  
Jay Heiken, MD  
William McAlister, MD  
William Middleton, MD  
Barbara Monsees, MD  
Daniel Picus, MD  
David Rubin, MD  
Stuart Sagel, MD  
Marilyn Siegel, MD  
William Totty, MD

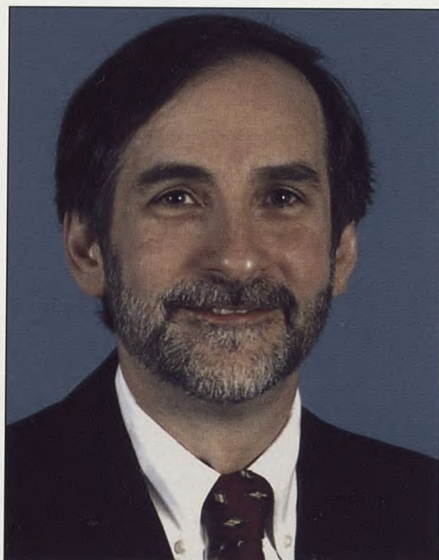
## ACR elects fellows

At the American College of Radiology's (ACR) 75th Annual Meeting in September, Doctors Jeffrey Brown and Michael Darcy were among the 105 outstanding clinicians and scientists named as ACR fellows. Fellowship is one of the highest honors that the ACR awards to its members based on distinguished accomplishments in service, teaching, or research.

Brown, who is associate professor of radiology, director of clinical research, and codirector of magnetic resonance imaging, was assistant professor of radiology at the University of California, San Francisco (UCSF) prior to joining the MIR faculty in 1993. He completed a diagnostic radiology residency (chief resident 1986-1987) and a one-year fellowship at UCSF. Brown serves on several Washington University Medical Center clinical- and research-related committees and is associate editor of *Radiology*, a leading radiological scientific journal.

Darcy is associate professor of radiology and of surgery and serves as director for the Institute's vascular and interventional radiology fellowship program. He completed residencies in surgery and radiology as well as a fellowship in cardiovascular and interventional radiology at the University of Minnesota. Prior to joining the MIR faculty in 1989, Darcy was director of vascular and interventional radiology at the Medical University of South Carolina in Charleston, where he received the 1987-1988 Faculty Teaching Award. He serves as consultant to the editor for *Cardiovascular and Interventional Radiology* and as associate editor of the *Journal of Vascular and Interventional Radiology*, two highly regarded medical journals.

# SPOT NEWS



Harvey Glazer, MD

## Glazer is teacher of the year

For the past 15 years, the diagnostic radiology residents have nominated and voted on the MIR faculty member who made the greatest contribution to resident education during the academic year. This year the recipient of the Annual Senior Residents' Distinguished Teaching Award, which is presented at the residents' and fellows' farewell dinner each June, was Harvey Glazer, MD, professor of radiology.

A graduate of the Washington University School of Medicine, Glazer completed his diagnostic radiology training at Mallinckrodt Institute (cochief resident 1980-1981) and joined the MIR faculty in 1981. He is a fellow of the American College of Radiology and a member of the Alpha Omega Alpha honorary medical society. Glazer has played an important role in the education of

medical students, residents, and fellows at Washington University Medical Center: teaching conferences, senior radiology resident Mock Boards, the Second-year Medical Student Radiology Course, and instruction in and interpretation of studies in chest radiology and body computed tomography.

### Past award winners:

Premisri Barton, MD — 1997  
Mokhtar Gado, MD — 1996  
Gary Shackelford, MD — 1995  
Jay Heiken, MD — 1994  
William Middleton, MD — 1993  
Anthony Wilson, MD — 1992  
Franz Wippold, MD — 1991  
Barry Siegel, MD — 1990  
Marilyn Siegel, MD — 1989 and 1984  
Stuart Sagel, MD — 1988  
Dennis Balfe, MD — 1987 and 1983  
Fernando Gutierrez, MD — 1986  
David Ling, MD — 1985

## Shile appointed mammography reviewer

Based on the consistently high quality over the past three years of his evaluation of mammographic images submitted by facilities seeking accreditation by the American College of Radiology (ACR), Peter Shile, MD, assistant professor of radiology, was appointed as a senior reviewer for the ACR's Mammography Accreditation Program. As a senior reviewer, Shile's responsibilities include arbitration of disagreements within accreditation review teams, special appeals from mammography facilities, and application review from facilities that have previously lost accreditation.

## MIR hosts international meetings

In the summer of 1999, three international radio-pharmaceutical symposia will be held at the Washington University Medical Center. Michael Welch, PhD, codirector of the Division of Radiological Sciences, is symposia coordinator.

### 8th Workshop on Targetry and Target Chemistry

June 24 - June 27

### 11th International Symposium on Radio-pharmacology

June 24 - June 27

### 13th International Symposium on Radio-pharmaceutical Chemistry

June 27 - July 1

For more information, e-mail ISRC13@mirlink.wustl.edu or call 314-362-8436.

Or visit the symposia Web site at <http://www.mir.wustl.edu/meetings/andlectures/symposia/symposia.html>

# CELEBRATION OF

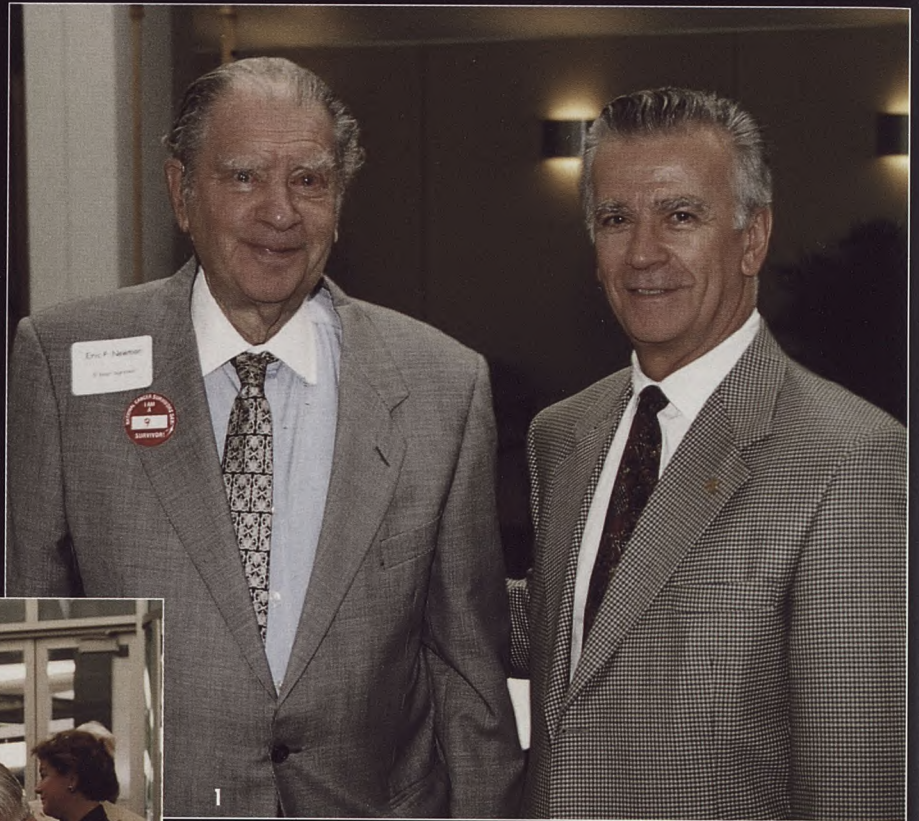
# Life

The last decade has produced significant advancements in the treatment of cancer—contributions that have resulted in higher survival rates and better quality of life for cancer survivors. “The goal of cancer therapy research at the Washington University Medical Center is to make the chance of survival even greater,” says Todd Wassermann, MD, professor of radiology. ● Wasserman is the driving force behind “Celebration of Life,” an event he began in 1989 (and sponsored by the Radiation Oncology Center) to reunite cancer survivors with their caregivers and to reaffirm that patients can lead active, productive lives after a diagnosis of cancer. This year’s event was held on June 6 at The Eric P. Newman Education Center on the Washington University Medical Center campus. It highlighted 40,000 years of combined survival of the 4,700 former patients who were treated with radiation, chemotherapy, or surgery at the medical center and are cancer-free for at least five years after treatment. ● According to Wasserman, “Celebration of Life” is the largest known gathering of long-term cancer survivors treated at a single institution. “We feel it’s important to focus on the good news about cancer detection and treatment and to share that hope with the thousands of Americans who will be touched in some way by cancer,” he adds. **by Vicki Kunkler**





In the 1930s the survival rate for five years after treatment for cancer was less than one in five patients. In the 1960s, it was one in three. Today, four out of 10 patients will be alive five years after diagnosis. When normal life expectancy is taken into consideration, a “relative” five-year-survival rate of 51 percent is seen for all types of cancers.



1. Eric P. Newman, namesake of Washington University Medical Center's Eric P. Newman Education Center, has been cancer-free for 9 years. Shown at right is Dr. Carlos Perez, director of the Radiation Oncology Center.

2. As a guest speaker, Francis Davis talked about his successful fight against prostate cancer.

3. Former patients and their guests went home with “a little sunshine” from the table centerpieces and plenty of balloons.

4. William Bailey is a two-time cancer survivor; he was diagnosed with lymphoma in 1973 and prostate cancer in 1992. Christine Bowman is a 20-year survivor of Hodgkin's disease.






5. Dr. Todd Wasserman, chairman of the "Celebration of Life," greets his former patient, Andrea Cohen.

6. Mr. and Mrs. William Ruyle.

7. The barbershop quartet, Sound F/X, prompted some chuckles and sing-alongs with their renditions of old familiar tunes.

8. Washington University Medical Center employees comprise the always popular Code Blue musical group.



**one in every five**

American men will develop **prostrate cancer**



## **BRACHYTHERAPY— a viable treatment for prostate cancer**

**Brachytherapy**, also called internal radiation therapy or interstitial therapy, involves the insertion of “seeds” containing high doses of a radioactive isotope into or around a malignant tumor. It has been used since the 1930s to successfully treat a wide variety of cancers, especially gynecologic and head and neck malignancies. But often, due to uneven seed placement and unfavorable patient-selection criteria, the outcomes of brachytherapy were poor for patients with prostate cancer. The surgical removal of the prostate gland (known as radical prostatectomy) or external radiation therapy became the treatments of choice for the disease.

Since the mid-1980s, the medical community has seen a resurgence in the use of brachytherapy to treat early-stage prostate cancer. The introduction of improved, noninvasive imaging technologies—such as transrectal ultrasound, computed tomography, and magnetic resonance imaging—now provides a direct visualization of the radioactive seed placement. Dovetailed with these technologies are improved radioisotope development and computer-based treatment planning. Because of these advancements, Dr. Jeff Michalski, a radiation oncologist at Mallinckrodt Institute of Radiology, believes that “More men will now benefit from brachytherapy as compared to historical experiences with older techniques of seed implantation.”

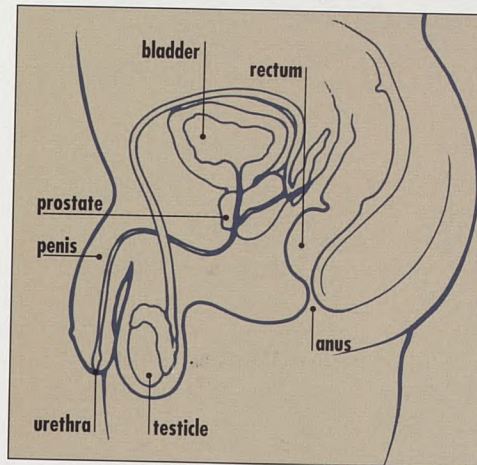
**by Vicki Kunkler**

## BRACHYTHERAPY

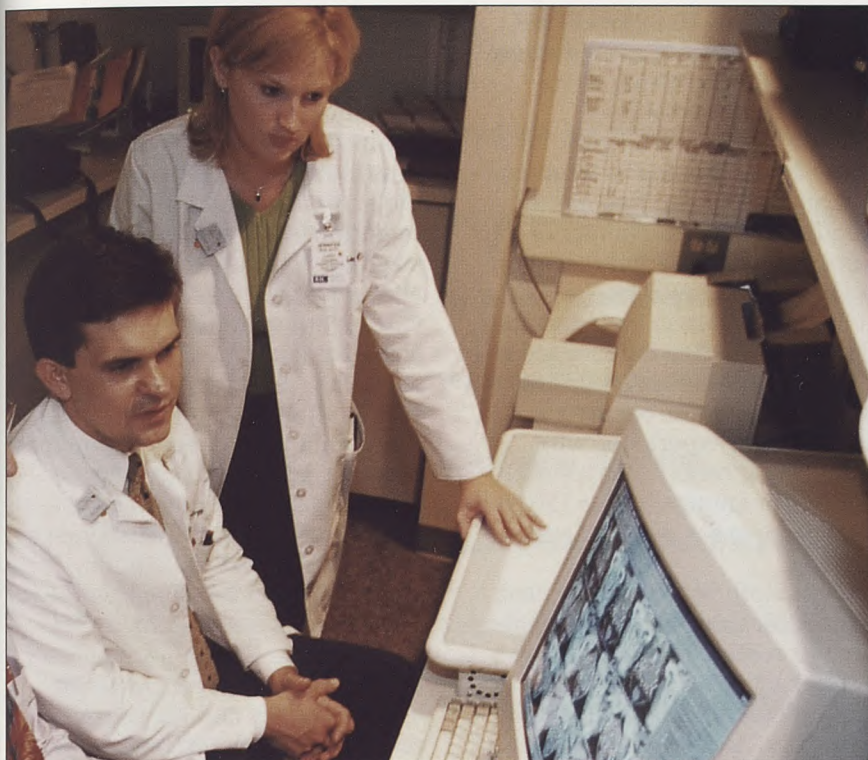
### INCIDENCE OF PROSTATE CANCER

The prostate is a male genital gland that surrounds the upper part of the urethra, the tube that carries urine and semen out of the penis. As a man ages, his risk of developing prostate cancer greatly increases, with more than an 80 percent incidence in men over the age of 65. The age of men diagnosed with prostate cancer typically falls within the 60s to 70s range, but the risk of the disease begins to increase at age 50. The American Cancer Society (ACS) and the National Cancer Institute (NCI) estimate that by the end of this year nearly 200,000 new cases of prostate cancer will be diagnosed in the United States.

While approximately one in every five American men will develop prostate cancer in his lifetime, early detection dramatically increases the prognosis for long-term survival. A digital rectal exam should become a regular part of the annual physical check-up for men who are 40 years of age or older. The ACS recommends that men over the age of 50 also have an annual test to measure the levels of prostate-specific antigen (PSA) in the blood. A rise in the PSA level—normal level should be around four or less—could indicate prostate cancer and requires further testing, such as a biopsy.



Edie Romvari, a registered nurse (foreground); Jackie Williams, a brachytherapy technologist; and Dr. Michalski review a volume study. The study is based on ultrasound images (on monitor) of the patient's prostate and determines the number of radioactive seeds used during treatment.



### CHOOSING THE BEST TREATMENT

The treatment of prostate cancer depends on a combination of factors: the patient's general health, expected lifespan, age, and treatment preferences; the tumor stage; and the treatment's anticipated effect. "Education is very important," says Michalski. "A patient must know what treatment options are available to him and understand which procedure is best in his particular situation."

A patient who has opted for brachytherapy must fit the following criteria:

- Tumor is stage I or II. (See "Determining the extent of the cancer" information accompanying this article.)
- Prostate gland must be under 50 cubic centimeters in size. A larger size gland can obstruct the catheters during insertion of the radioactive seeds.
- Patient's general health is good.

Dosimetrist Jennifer Brit and Sasa Mutic, a radiation oncology physicist, provide critical information during the brachytherapy treatment planning for prostate cancer cases. The treatment-planning computer shown here has 3-D and computed tomography imaging capabilities.

"Of all of the treatments for prostate cancer, brachytherapy appears to have the lowest risk of impotency—twenty-five percent overall as compared to thirty to forty percent with radical prostatectomy and external radiation therapy," says Michalski. "Because many patients are interested in retaining their sexual function, brachytherapy has become a popular choice among men with early-stage prostate cancer."

## DETERMINING THE EXTENT OF THE CANCER

Before treatment of prostate cancer can begin, the stage—finding out if the cancer has spread to other parts of the body—must be determined.

**STAGE I** No symptoms. Tumor is not detected by rectal exam; usually detected during surgery to relieve urination problems. May be in more than one area of the prostate but has not spread to other areas of the body.

**STAGE II** Tumor can be felt during a rectal exam or detected by a blood test. Disease has not spread outside of the prostate.

**STAGE III** Disease has spread to nearby tissues.

**STAGE IV** Cancer cells have spread to lymph nodes or to other parts of the body.

*Excerpted from the National Cancer Institute's What You Need To Know About Prostate Cancer.*

## BRACHYTHERAPY

### SYMPTOMS

Although there often are no specific symptoms accompanying early-stage prostate cancer, the following problems could be an indication of the disease and should be checked by a physician:

- Frequent urination, especially at night
- Weak or interrupted flow of urine
- Pain or burning sensation during urination
- Inability to urinate
- Incontinence
- Frequent pain or stiffness in the lower back, hips, or upper thighs
- Painful ejaculation
- Blood in urine or semen.

*Excerpted from the National Cancer Institute's What You Need To Know About Prostate Cancer.*

### FROM PLANNING TO COMPLETION

Brachytherapy is a labor-intensive procedure involving physicians, dosimetrists, nurses, physicists, and technologists. The process from planning to treatment can span from one to two months depending on the availability of the isotopes. Iodine 125 and Palladium 103, the isotopes used in brachytherapy, are in high demand and orders are often backlogged at the manufacturer. "Mallinckrodt Institute, because of our strong brachytherapy experience with other types of cancer, has a standing order for enough Iodine 125 to handle three cases weekly," says Michalski.

One month before the implant, an ultrasound image is taken of the patient's prostate to determine the gland's exact size and proximity to nearby organs, such as the rectum and bladder. Information from this study is computer formulated into a tailor-made treatment plan for the patient: the precise number and strength of seeds to be implanted and where those seeds will be placed within the prostate.

Once the isotopes are received, the implantation is scheduled as an outpatient procedure. While the patient is under general or spinal anesthesia, an ultrasound image is taken to verify the gland's position. Guided by real-time imaging, the physician inserts catheters loaded with 75 to 150 seeds—depending on the size of the prostate—through the perineum, directly into the prostate. After the correct placement of the isotopes is confirmed by the ultrasound image, the catheters are removed and the seeds remain within the prostate.

The patient is sent home after he has recovered from the effects of the anesthesia. The immediate side effects of brachytherapy are minimal, usually involving soreness in the pelvic region following the procedure and possible urinary retention or obstruction due to swelling. These symptoms can be alleviated with medication provided by the physician. Occasionally a patient may require temporary bladder catheterization. Weeks after the procedure, as the seeds emit their energy inside the prostate, some patients may notice a burning sensation with urination.

"This procedure has regained popularity across the country because health care facilities like Mallinckrodt Institute have had good results. The convenience of the procedure coupled with the low impotency and high survival rates have prompted recommendations from patient to patient," says Michalski. "It's also becoming very popular with the Internet culture. The online discussion groups have become a favorite tool for disseminating knowledge about brachytherapy for early-stage prostate cancer." **MIR**

**Editor's note:** *Dr. Michalski and Dr. James Purdy, a physicist who is associate director of MIR's Radiation Oncology Center, will collaborate with the Radiation Therapy Oncology Group and the NCI to assess the quality of brachytherapy treatment among medical facilities nationwide. Purdy is director of the Quality Assurance Center that was established at Mallinckrodt Institute by the NCI to monitor multi-institutional clinical trials on prostate cancer.*

## **DICOM:** Setting Standards for the Future

**W**hen it comes to our everyday household products, we take industry standards for granted. For example, we don't think twice about plugging any ordinary, 120-volt toaster into any two-pronged outlet. It doesn't matter which manufacturer made the toaster or the plug; it doesn't even matter which builder installed the wiring. Thanks to manufacturing and installation standards, the toaster always works. "But what if every appliance manufacturer made different plugs or used different voltages?" says Laurens Ackerman, MD, director of medical informatics for the Department of Radiology/Nuclear Medicine at Rush Presbyterian-St. Luke's Medical Center in Chicago, and former chairman of the Radiological Society of North America's (RSNA) Electronic Communication Committee. "What if everyone had different standards? None of these products would work." by Candace O'Connor



Just a few years ago, the world of **medical imaging** was in that same kind of **turmoil...**

# DICOM



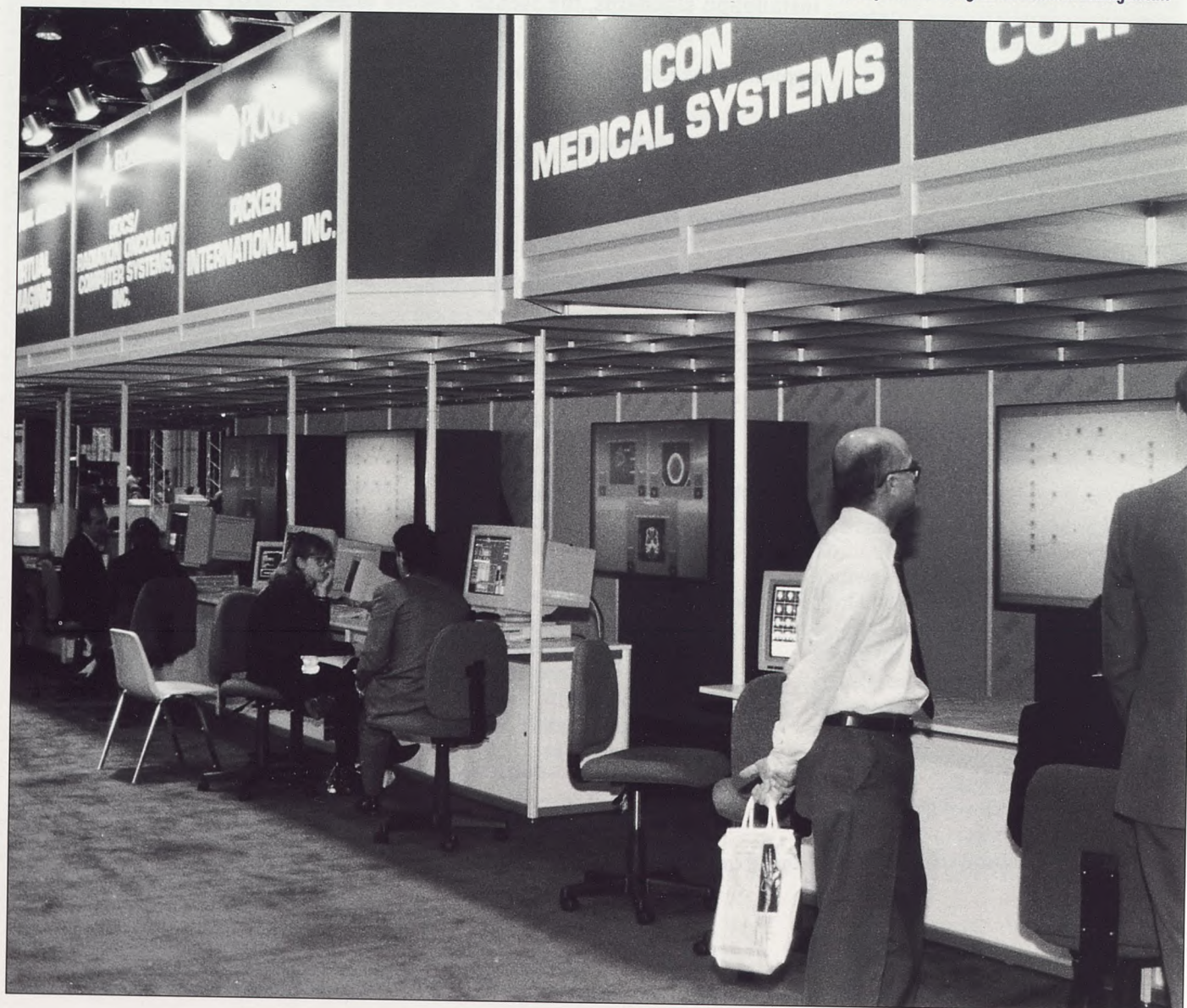
Just a few years ago, the world of medical imaging was in that same kind of turmoil. No uniform standard existed; vendors had different proprietary formats for their images or networks. When customers bought a piece of equipment—such as a scanner—from one company, they also had to buy the workstation or printer from the same vendor; otherwise, the system couldn't communicate. And transferring images from one department to another was also a problem.

"Whenever the Institute would buy a CT scanner from one manufacturer, it was unable to communicate with the CT scanner from another manufacturer," says Gilbert Jost, MD, professor of radiology and chief of the Division of Diagnostic Radiology at Washington University's Mallinckrodt Institute of Radiology (MIR). "That lack of communication paralyzed our ability to capitalize on the fact that images are in electronic form."

But over the past six years, MIR's Electronic Radiology Labora-

tory (ERL) has played a crucial role in facilitating the exchange of electronic images through their work on an industry standard called Digital Imaging Communications in Medicine (DICOM). In 1992 in cooperation with RSNA, the ERL embarked on its first successful project in this area—writing software to support standards for radiologic imaging.

*At RSNA's 1992 meeting in Chicago, some of the nation's top medical-imaging equipment companies participated in an on-line demonstration that stressed the importance of digital information management.*





This year MIR expanded its work on DICOM to include the field of cardiology. The American College of Cardiology (ACC) wanted to extend the existing DICOM standard to handle not only images but also cardiac waveforms—such as electrocardiograms—used to measure cardiovascular function. In March, the ERL participated with cardiology equipment vendors in a successful demonstration of new DICOM software at the ACC's 47th Annual Scientific Session in Atlanta.

"The next horizon is the integration of additional information in the health care enterprise," says James Blaine, DSc, professor of radiology and director of the ERL. "When DICOM was conceived, it was aimed at solving a department's problem, not a hospital's problem. Now the Holy Grail that people seek is the total electronic medical record: to give a one-stop shopping place where the physician can access all of the data about a particular patient's care."

Even as this future unfolds, Blaine adds, DICOM already has played a large role in changing the radiologic industry—and in making it more competitive. Facilities like MIR can now consider purchasing equipment from a variety of vendors rather than from a single company and can easily add new components that represent cutting-edge technology.

"Today, virtually all of the equipment we buy has DICOM standards incorporated, and images are able to flow from one manufacturer to another without much difficulty," says Jost. "Many people look at those demonstrations that RSNA put together, with the participation of Mallinckrodt Institute, as a pivotal point in making this transfer of medical information happen."

## THE DEVELOPMENT OF DICOM

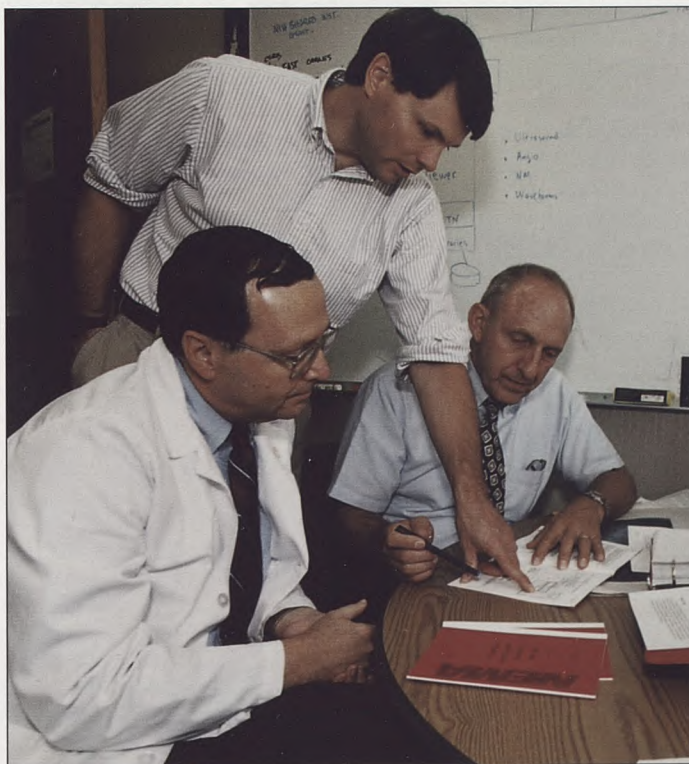
In 1984 and again in 1989, the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) developed the first two versions of a standard for the formatting and exchange of electronic images. But these versions provided too much leeway for interpretation. Following their understanding of the standard, manufacturers were producing hardware that still couldn't communicate with other equipment. Work was begun on a third, more precise version.

Meanwhile, RSNA's Electronic Communication Committee (ECC) decided that the user community needed some evidence of progress. So they planned a demonstration at the 1992 RSNA annual meeting that would show the vendors' ability to transfer images using the DICOM standard. The demonstration would require a software

package that could run on all of the manufacturers' equipment and allow this transfer to take place.

The ECC sent a request for proposals to various university groups active in the Picture Archiving and Communication Systems research. In mid-May of 1992, the Institute's ERL group received notification that they were the successful applicant. But there was one big catch: The software had to be presented to the vendors by July 15—only two months later.

Stephen Moore, MS, research assistant professor of radiology and digital imaging expert, was appointed as chief designer of the new software. It was a hectic time, he recalls, but exciting. "The only part that was not enjoyable was reading the standard—it was like reading the phone book. The fun part was in designing how the software was going to work, then putting it together, and seeing the end product," he says.



(left to right) Gilbert Jost, Stephen Moore, and James Blaine.

# DICOM



In July, the vendors came to an RSNA/NEMA-sponsored workshop at Mallinckrodt Institute to see how the software worked. Then in September, they all met again in a rented warehouse in Chicago to test the vendors' own implementation effort. At the November RSNA meeting in Chicago, Moore and the ERL team set up their computers surrounded by a circle of vendor workstations—and the demonstration was a success.

"Most vendors were surprised at the quality we produced," Moore says. "University groups are notorious for not documenting anything, but we had gone to great lengths to document everything and to produce what we believed was a good implementation."

In 1993, the ERL team was asked by RSNA to produce a more elaborate demonstration, with software that implemented even more segments of the DICOM standard. The new package included system refinements, such as a better image server and a better connection to a database. The group also designed a graphical user-interface that allowed the user to take images, format them on the computer screen, and then transmit the images over a network to a DICOM printer.

Late in 1997, the Institute was approached again about a DICOM demonstration, this time for the ACC. The cardiology group wanted an application that vendors could run in their individual exhibit booths, demonstrating the use of the DICOM standard to display both waveforms and cine images. This time, Moore collaborated on the project with Kevin Fritz of the information services group at BJC Health System<sup>SM</sup> in St. Louis.



The 1992 demonstration represented a major step in the definition of the DICOM standard, and Mallinckrodt Institute played a significant role as a literal consensus builder.

"We delivered the final working version to the vendors the day before the show started. They installed it on their machines and got it up and running," says Moore. "The comments we received were very positive. The vendors were happy with the features we had developed."

## DICOM OF THE FUTURE

To demonstrate one application of DICOM, Moore sits in front of a computer screen and chooses the name "Roberta Johnson" from a list of fictitious patients. The computer returns a list of Roberta Johnson's medical studies. Moore picks one—cardiac catheterization—and the cine image, retrieved from storage, appears on the screen. Waveform images, such as blood pressure images or electrocardiograms, are also available.

In the field of cardiology, the current DICOM standard allows this kind of reporting to take place, but vendors have not yet provided the products to make it happen. In radiology, these products are already widely available. At Rush Presbyterian-St. Luke's, with its millions of dollars worth of imaging equipment, "it would be a nightmare to get all of this equipment working if DICOM weren't available," Ackerman says.

Other medical fields, such as dermatology and pathology, are working on their own DICOM applications. In partnership with an information system organization called HIMSS, RSNA has launched its own program, "Integrating the Health Care Enterprise," which will reach beyond cardiology over the next five years to expand the standards process to incorporate many other elements of the medical record.

"I'm very proud of our ERL group," says Jost. "When I go to an electronic imaging meeting, it's extraordinary to see how many university groups and vendors have incorporated the software developed by Mallinckrodt Institute—or derivations of the software—into their own projects and products. This is an instance in which one relatively small effort on the part of our Institute has had worldwide implications." ■

*In this section, the names of personnel who are full-time faculty or staff or who have an appointment in the Department of Radiology are highlighted in boldface type.*

## THE DIRECTOR'S OFFICE REPORT

### PROMOTIONS

**Prem Sri Barton, MD**, assistant professor of radiology, was promoted to associate professor of radiology, Division of Diagnostic Radiology.

**Farrokh Dehdashti, MD**, assistant professor of radiology, was promoted to associate professor of radiology, Division of Nuclear Medicine.

**David Piwnica-Worms, MD, PhD**, associate professor of radiology and of molecular biology and pharmacology, was promoted to professor of radiology, Division of Radiological Sciences.

**Thomas Vesely, MD**, assistant professor of radiology, was promoted to associate professor of radiology, Division of Diagnostic Radiology.

**Dmitriy Yablonskiy, PhD**, instructor in radiology, was promoted to assistant professor of radiology, Division of Radiological Sciences.

### APPOINTMENTS

**Randy Buckner, PhD**, assistant professor of psychology, was appointed as assistant professor of radiology, Division of Radiological Sciences.

**Joseph O'Sullivan, PhD**, associate professor of electrical engineering, was appointed as associate professor of radiology, Division of Radiological Sciences.

### NEW FACULTY

**Jeffrey Bradley, MD**, instructor in radiology, Radiation Oncology Center.

**Todd Grigereit, PhD**, instructor in radiology, Radiation Oncology Center.

**Keith Kronemer, MD**, instructor in radiology, Division of Diagnostic Radiology.

**David Rubin, MD**, assistant professor of radiology, Division of Diagnostic Radiology.

**Marie Schmidt, MD**, assistant professor of radiology, Division of Diagnostic Radiology.

**Jason Sohn, MD**, instructor in radiology, Radiation Oncology Center.

### FIRST-YEAR FELLOWS

**Stephen Anvar, MD**, instructor in radiology, is a fellow in neuroradiology. He received an undergraduate degree from Weber State University and a medical degree from Ohio State University College of Medicine. Anvar completed a four-year diagnostic residency at the Medical College of Ohio.

**Kevin Berger, MD**, instructor in radiology, is a fellow in neuroradiology. He completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**Frank Bonelli, MD**, instructor in radiology, is a fellow in neuroradiology. He received an undergraduate and a medical degree from the University of Illinois. Bonelli completed a one-year internship at Lutheran General Hospital and a four-year diagnostic radiology residency at the Mayo Clinic.

**Ilya Boridy, MD**, instructor in radiology, is a fellow in abdominal imaging. He received an undergraduate and a medical degree from McGill University. Boridy completed a one-year internal medicine internship at Baylor College of Medicine and a four-year diagnostic radiology residency at the University of Texas Health Science Center.

**Antoinette Cortese, MD**, instructor in radiology, is a fellow in breast imaging. She received an undergraduate and a medical degree from the University of Nevada. Cortese completed a one-year internship and a four-year diagnostic radiology residency at University of Nevada Affiliated Hospitals.

**Mark Culton, MD**, instructor in radiology, is a fellow in musculoskeletal radiology. He received an undergraduate and a medical degree from Duke University. Culton completed a one-year internship at Emanuel Hospital and a four-year radiology residency at Santa Clara County Medical Center.

**Mark Fromke, MD**, instructor in radiology, is a fellow in abdominal radiology. He completed four years of training in diagnostic radiology (cochief resident, 1997-1998) at Mallinckrodt Institute of Radiology.

**Robert Gelczer, MD**, instructor in radiology, is a fellow in musculoskeletal radiology. He received an undergraduate degree from Trinity University and a medical degree from Columbia University's College of Physicians and Surgeons. Gelczer completed a one-year internship and a four-year diagnostic radiology residency at the Mayo Clinic.

**Rimvydas Gilvydis, MD**, instructor in radiology, is a fellow in neuroradiology. He received an undergraduate degree from the University of Michigan and a medical degree from Wayne State University. Gilvydis completed a four-year diagnostic radiology residency at St. Joseph Mercy Hospital.

**Christopher Gordon, MD**, instructor in radiology, is a fellow in chest radiology. He received an undergraduate degree from the University of North Carolina and a medical degree from Bowman Gray School of Medicine. Gordon completed a four-year diagnostic radiology residency at the University of Oklahoma.

**Ross Halperin, MD**, instructor in radiology, is a fellow in radiation oncology. He received undergraduate degrees from Mount Allison University and from Dalhousie University and a medical degree from the University of Alberta. Halperin completed a five-year residency at the Cross Cancer Institute.

## THE DIRECTOR'S OFFICE REPORT

*Continued from page 17*

**Peter Hathaway, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. He received an undergraduate and a medical degree from the University of Utah. Hathaway completed a transitional internship at LDS Hospital and a four-year diagnostic radiology residency at the University of Washington.

**Stephanie Hiskes, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. She completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**Paul Ho, MD**, instructor in radiology, is a fellow in magnetic resonance imaging. He received an undergraduate, a graduate, and a medical degree from Washington University. Ho completed a four-year diagnostic radiology residency at the University of Wisconsin.

**Hero Hussain, MD**, instructor in radiology, is a fellow in magnetic resonance imaging. He received an undergraduate degree from the American School and a medical degree from the University of Baghdad. Hussain completed a one-year internship at the Baghdad Medical City Teaching Hospital and a six-year diagnostic radiology residency at St. Bartholomew Hospital.

**Scott Kaltman, MD**, instructor in radiology, is a fellow in abdominal radiology. He completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**Anil Khosla, MD**, instructor in radiology, is a fellow in neuroradiology. He received a premed degree from D.A.V. College and a medical degree from All India Institute of Medical Sciences. Khosla completed three years of radiology residency at All India Institute of Medical Sciences and a radiology residency at St. Louis University Health Sciences Center.

**Alan McDaniel, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. He completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**John Neil, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. He completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**Demetri Papadatos, MD**, instructor in radiology, is a fellow in abdominal radiology. He received an undergraduate and a medical degree from McGill University. Papadatos completed a four-year diagnostic radiology residency at McGill University Hospitals.

**Lorraine Portelance, MD**, instructor in radiology, is a fellow in radiation oncology. She received an undergraduate degree from McGill University and a medical degree from the University of Montreal. Portelance completed a five-year residency at the University of Montreal.

**Peter Salazar, MD**, instructor in radiology, is a fellow in pediatric radiology. He completed four years of training in diagnostic radiology at Mallinckrodt Institute of Radiology.

**Gavin Slethaug, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. He completed a four-year diagnostic radiology residency at Mallinckrodt Institute of Radiology.

**Timothy Usey, MD**, instructor in radiology, is a fellow in vascular and interventional radiology. He received an undergraduate degree from the University of Mississippi and a medical degree from Johns Hopkins University.

### FIRST-YEAR POSTGRADUATE

**Edward Wooten, MD**, assistant in radiology, received an undergraduate degree from The University of the South and a medical degree from Vanderbilt University School of Medicine.

### FIRST-YEAR DIAGNOSTIC RADIOLOGY RESIDENTS

**Noah Appel, MD**, assistant in radiology, received an undergraduate and a medical degree from Washington University. He completed a one-year internship at St. John's Mercy Medical Center.

**Trent Austin, MD**, assistant in radiology, received an undergraduate degree from Purdue University and a medical degree from Indiana University. He completed a one-year internship at Ball Memorial Hospital.

**Mark Bakalars, MD**, assistant in radiology, received an undergraduate degree from Marquette University and a medical degree from the Medical College of Wisconsin. He completed a one-year internship at St. Joseph's Hospital.

**Douglas Curry, MD**, assistant in radiology, received an undergraduate degree from the University of Texas and a medical degree from the University of Texas Southwestern. He completed a one-year internship at St. Joseph's Hospital.

**James Goddard, MD**, assistant in radiology, received an undergraduate degree from the University of Tennessee and a medical degree from East Tennessee State University. He completed a one-year internship at the University of Tennessee.

**Jennifer Gould, MD**, assistant in radiology, received an undergraduate degree from Cornell University and a medical degree from Washington University. She completed a one-year internship at Barnes-Jewish Hospital.

**Juliet Howard, MD**, assistant in radiology, received an undergraduate degree from Northwestern University and a medical degree from the University of Texas Health Science Center. She completed a one-year internship at Barnes-Jewish Hospital.

**Bonnie Joe, MD, PhD**, assistant in radiology, received an undergraduate degree from the University of California and a medical and a doctorate degree from the University of Pittsburgh. She completed a one-year internship at Western Pennsylvania Hospital.

**Thelma Lopes, MD**, assistant in radiology, received a medical degree from the School of Medicine of Universidade Federal do Parana. She completed a one-year internship at the Metropolitan Hospital Medical Center.

**Sailendra Naidu, MD**, assistant in radiology, received an undergraduate degree from the University of Wisconsin and a medical degree from the Medical College of Wisconsin. He completed a one-year internship at St. Joseph's Hospital.

**Joseph Philip, MD**, assistant in radiology, received an undergraduate degree from Rice University and a medical degree from the University of Texas Health Science Center. He completed a one-year internship at Baylor College of Medicine.

**Grace Phillips, MD**, assistant in radiology, received an undergraduate degree from Yale University and a medical degree from Johns Hopkins University. She completed a one-year surgery residency at the University of Cincinnati.

**Francisco Rodriguez, MD**, assistant in radiology, received an undergraduate degree from Brown University and a medical degree from the University of Florida College of Medicine. He completed a one-year internship at the University of Florida College of Medicine.

**Eric Schallen, PhD, MD**, assistant in radiology, received an undergraduate degree from California Polytechnic State University, a doctorate degree from Cambridge University, and a medical degree from the University of Michigan. He completed a one-year internship at St. John's Hospital.

**Matthew Vanasco, MD**, assistant in radiology, received an undergraduate degree from Occidental College and a medical degree from the University of Illinois. He completed a one-year internship at West Suburban Hospital.

## FIRST-YEAR NUCLEAR MEDICINE TRAINEES

**Tate Allen, MD**, assistant in radiology, received an undergraduate degree from Oklahoma State University and a medical degree from the University of Oklahoma. He completed a diagnostic radiology residency at the University of New Mexico.

**Jeffrey Chesnut, DO**, assistant in radiology, received an undergraduate degree from Oral Roberts University and a medical degree from Kirksville College of Osteopathy. He completed a one-year internship at the Osteopathy Hospital of Maine and a five-year diagnostic radiology residency at Memorial Hospital.

**John Leahy, MD**, assistant in radiology, completed a four-year diagnostic radiology residency at Mallinckrodt Institute of Radiology.

**Sarah Reimer, MD**, assistant in radiology, received an undergraduate degree from Washington University and a medical degree from the University of Missouri. She completed a diagnostic radiology residency at the University Hospitals of Cleveland.

## FIRST-YEAR RADIATION ONCOLOGY RESIDENTS

**Ana Botero, MD**, assistant in radiology, received an undergraduate degree from the Gimnasio Los Pinares and a medical degree from the Instituto de Ciencias de la Salud. She completed a one-year internship at the General Hospital of Medellin and a one-year internship at Deaconess Health System.

**Xiao Lin, MD, PhD**, assistant in radiology, received an undergraduate degree from Florida State University and a medical degree from Shanghai Medical University. She completed one year of residency at the Cancer Hospital of Shanghai Medical University.

**Jacob Locke, MD**, assistant in radiology, received an undergraduate degree from the University of Wisconsin and a medical degree from Boston University. He completed two years of residency at the University of Washington.

## OFF STAFF

**John Alifieri, MD**, instructor in radiology, completed a one-year fellowship in vascular and interventional radiology and has accepted a position with Radiology Consultants, Inc., Lynchburg, Virginia.

## THE DIRECTOR'S OFFICE REPORT

*Continued from page 19*

**Lefian Alotaibi, MD**, instructor in radiology, completed a one-year fellowship in pediatric radiology.

**Dwayne Anderson, MD**, instructor in radiology, completed a one-year fellowship in neuroradiology and has accepted a position with Radiology Regional, Fort Meyers, Florida.

**Kyongtae Bae, MD, PhD**, instructor in radiology, completed five years of training in diagnostic radiology and a one-year fellowship in chest radiology. He has accepted a position with Mallinckrodt Institute of Radiology.

**Scott Beasley, MD**, instructor in radiology, completed four years of training in diagnostic radiology and a one-year fellowship in abdominal radiology. He has accepted a position with Western Pennsylvania Hospital, Pittsburgh.

**James Blechman, MD**, instructor in radiology, completed a one-year fellowship in abdominal radiology.

**John Carico, MD**, assistant in radiology, completed four years of training in diagnostic radiology and has received a fellowship in body imaging at the University of Florida, Gainesville.

**Jason Cheng, MD**, assistant in radiology, completed one year of training in radiation oncology and has accepted a position with Koo Foundation Sun Yat-Sen Cancer Center, Taipei, Taiwan.

**Maria Chong, MD**, instructor in radiology, completed a one-year fellowship in abdominal radiology.

**Laurie Cleland, MD**, instructor in radiology, completed a one-year fellowship in breast imaging and has accepted a position with Vancouver Radiologists, Vancouver, Washington.

**Todd Doyle, MD**, assistant in radiology, completed six months of training in radiation oncology.

**Robert Feiwell, MD**, instructor in radiology, completed a three-year fellowship in neuroradiology and has accepted a position with the University of California, San Francisco.

**Howard Goldberg, MD**, instructor in radiology, completed a one-year fellowship in vascular and interventional radiology and has entered private practice in Maryland.

**Paul Guillerman, MD**, assistant in radiology, completed four years of training in diagnostic radiology and has accepted a position with Children's Hospital Medical Center, Cincinnati, Ohio.

**Jonathan Gurney, MD**, assistant in radiology, completed a four-year diagnostic radiology residency and has received a fellowship in cross-sectional imaging at the University of Wisconsin, Madison.

**Daniel Hassell, MD**, instructor in radiology, completed four years of training in diagnostic radiology and a one-year fellowship in vascular and interventional radiology. He has accepted a position with Greensboro Radiology Associates, North Carolina.

**Donald Heck, MD**, instructor in radiology, completed four years of training in diagnostic radiology (cochief resident, 1996-1997) and a one-year fellowship in vascular and interventional radiology. He has accepted a position with Mississippi Baptist Hospital, Jackson.

**Marshall Hicks, MD**, associate professor of radiology, Division of Diagnostic Radiology, has accepted a position with M. D. Anderson Cancer Center, Houston, Texas, as head of interventional radiology.

**Noah Jaffee, MD**, instructor in radiology, completed a one-year fellowship in musculoskeletal radiology and has entered private practice in Scottsdale, Arizona.

**Matthew Jaksha, MD**, assistant in radiology, completed one year of training in nuclear medicine and has entered private practice in Jackson, Mississippi.

**Annette Johnson, MD**, instructor in radiology, completed a two-year fellowship in neuroradiology and has accepted a position with the University of Alabama, Birmingham.

**David Kim, MD**, assistant in radiology, completed a four-year residency in diagnostic radiology and has received a fellowship in abdominal radiology at Duke University Medical Center, Durham, North Carolina.

**George Kimbiris, MD**, instructor in radiology, completed a one-year fellowship in vascular and interventional radiology and has accepted a position with Allegheny University, Philadelphia, Pennsylvania.

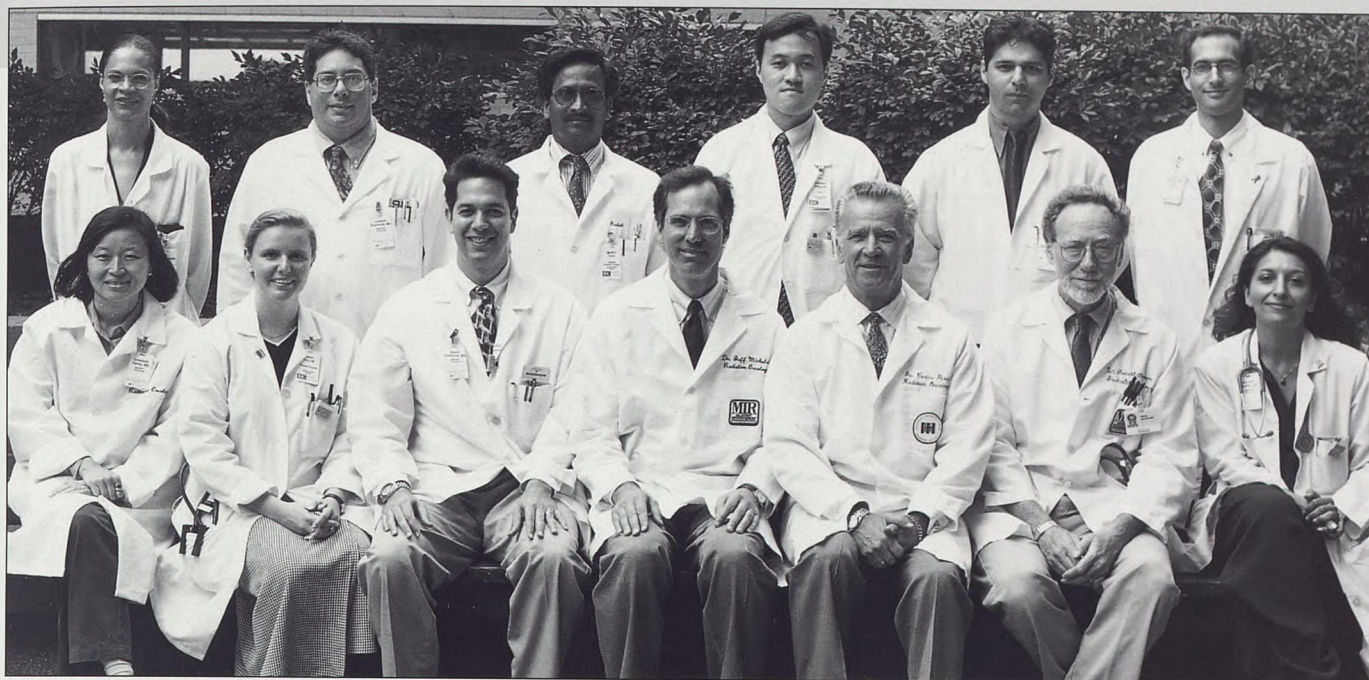
**Debra Lau, MD**, instructor in radiology, completed four years of training in diagnostic radiology and a one-year fellowship in pediatric radiology. She has accepted a position with Stanford University, California.

**Edmund Lee, MD**, instructor in radiology, completed a one-year fellowship in musculoskeletal radiology and has accepted a position with Kern Radiology Medical Group, Bakersfield, California.

**David Leifer, MD**, instructor in radiology, completed a one-year fellowship in abdominal radiology and has accepted a position with The Methodist Hospitals of Dallas, Texas.

**Debiao Li, PhD**, assistant professor of radiology and of electrical engineering, has accepted a position on the faculty of Northwestern University, Chicago, Illinois.

**Eugene Lin, MD**, instructor in radiology, completed a one-year fellowship in abdominal radiology and has accepted a position with the University of Colorado Health Sciences Center, Denver.



**Radiation Oncology Fellows and Residents:** (front row , left to right) Doctors Cristiane Takita; Heather Curry, assistant cochief resident; David Diamond, cochief resident; Jeff Michalski, director, Radiation Oncology Residency Program; Carlos Perez, director, Radiation Oncology Center; Robert Myerson, director, Radiation Oncology Residency Program; Noushin Izadifar. (back row) Lannis Hall-Daniels, cochief resident; Joseph Aronovitz; Murty Godau; Jason Cheng; Imran Zoberi; Shervin Karimpour. Not shown are Doctors Samuel Au, Ana Botero, Xiao Lin, Jacob Locke, and Lorraine Portelance.

**Lee Madeline, MD**, instructor in radiology, completed a one-year fellowship in neuro-radiology and has accepted a position with Greenville Radiology, P.A., Greenville, South Carolina.

**Paul Malcolm, MD**, instructor in radiology, completed a one-year fellowship in magnetic resonance imaging and has accepted a position with Pilgrim Hospital NHS Trust, Lincolnshire, England.

**Vamsidhar Narra, MD**, instructor in radiology, completed a one-year fellowship in magnetic resonance imaging and has accepted a position with Mallinckrodt Institute of Radiology.

**Lisa Oakley, MD**, assistant in radiology, completed one year of training in nuclear medicine and has accepted a position with Missouri Baptist Medical Center, St. Louis.

**Michael Quinn, MD**, assistant in radiology, completed one year of training in nuclear medicine and has accepted a position with Maine Medical Center-Radiology, Portland.

**Sandy Ruhs, MD**, assistant in radiology, completed four years of training in diagnostic radiology (cochief resident, 1997-1998) and has accepted a position with Mallinckrodt Institute of Radiology.

**Farid Shafaie, MD**, instructor in radiology, Division of Diagnostic Radiology.

**Lloyd Stambaugh, MD**, assistant in radiology, completed four years of training in diagnostic radiology and has accepted a position at Scott Air Force Base, Illinois.

**Joseph Steele, MD**, instructor in radiology, completed a one-year fellowship in vascular and interventional radiology and has accepted a position with Santa Fe Radiology, New Mexico.

**Christopher Thornton, MD**, assistant in radiology, completed one year of training in diagnostic radiology and has accepted a position with Mallinckrodt Institute of Radiology.

**Stephanie Yen, MD**, assistant in radiology, completed one year of training in nuclear medicine and has accepted a position with Radiology Consultants, Inc., Nashville, Tennessee.

**David Youmans, MD**, assistant in radiology, completed four years of training in diagnostic radiology and has received a fellowship in interventional radiology at Yale University, New Haven Connecticut.

## APPOINTMENTS/ ELECTIONS

**Colin Derdeyn, MD**, assistant professor of radiology, was named as a fellow of the Stroke Council of the American Heart Association at the association's Stroke Meeting in February in Orlando, Florida.

**Steven Don, MD**, assistant professor of radiology, was reappointed to The Society for Pediatric Radiology's Committee on Medical Informatics.

**Louis Gilula, MD**, professor of radiology and of surgery and chief of musculoskeletal radiology, and **Daniel Kido, MD**, professor of radiology and chief of neuroradiology, were appointed as examiners for the American Board of Radiology's Diagnostic Radiology Oral Examinations held in Louisville, Kentucky, May 31 - June 3.

**Lawrence Kotner, MD**, associate professor of radiology, was appointed to the Steering Committee of the Barnes-Jewish Hospital Cares Committee, which will study all aspects of patient care at BJH.

**William Mehard, MD**, assistant professor of radiology, was elected 1998-1999 chairman of the Program Committee for the Greater St. Louis Society of Radiologists.

**Scott Mirowitz, MD**, associate professor of radiology, radiologist-in-chief at Barnes-Jewish Hospital north, and codirector of body magnetic resonance imaging, was named a Diplomate of the American Board of Managed

Care Medicine. He was appointed to a three-year term on the Physician Executives Committee of the American College of Healthcare Executives. Mirowitz was appointed as a delegate to the National Radiology Summit, in conjunction with the National Managed Health Care Congress, held in April in Atlanta, Georgia. He also was appointed as 1998-1999 associate chair of the Research Awards-Scientific Committee of the Society for Computed Body Tomography and Magnetic Resonance Imaging.

**Henry Royal, MD**, professor of radiology and associate director of the Division of Nuclear Medicine, was appointed program chairman for the 1999 Annual Meeting of the National Council on Radiation Protection and Measurement.

**Marilyn Siegel, MD**, professor of radiology and of pediatrics, was elected vice president of the Society of Computed Body Tomography and Magnetic Resonance Imaging.

**Jerold Wallis, MD**, associate professor of radiology, was elected to a four-year term as president of the Computer and Instrumentation Council of the Society of Nuclear Medicine. He will serve one year as president-elect, two years as president, and one year as past president.

**Bruce Whiting, PhD**, instructor in radiology, was elected to a one-year term as secretary of the Optical Society of Greater St. Louis.

**Pamela Woodard, MD**, assistant professor of radiology, was appointed to the Editorial Advisory Panel for the Editorial Subcommittee for Magnetic Resonance Imaging of the *American Journal of Roentgenology*.

## FELLOWSHIPS/ GRANTS

**Carolyn Anderson, PhD**, assistant professor of radiology and of molecular biology and pharmacology, as principal investigator, received a one-year grant in the amount of \$21,400 from the Washington University Cancer Center. She will study "Copper-64-labeled pre-targeting agents for diagnosis and radiotherapy of cancer."

**Jeffrey Brown, MD**, associate professor of radiology, director of clinical research, and codirector of magnetic resonance imaging, received an \$11,000 grant from Nycomed-Amersham for research on "Imaging pancreatic cancer: a comparison of Teslascan-enhanced MRI, Omniscan-enhanced MRI, and contrast-enhanced spiral CT." Coinvestigators are **Vamsidhar Narra, MD**, instructor in radiology; **Paul Malcolm, MD**, instructor in radiology; and **Jay Heiken, MD**, professor of radiology, chief of abdominal imaging, and codirector of body computed tomography.

**Robert Gropler, MD**, associate professor of radiology, received a \$2.6 million grant from the National Institute on Aging to study "PET detection of the effects of aging on

the human heart." Coinvestigators for the five-year grant are Michael Pasque, MD, professor of surgery; Ali Ehsani, MD, professor of medicine; and Victor Davila-Roman, MD, assistant professor of medicine.

**Timothy McCarthy, PhD**, assistant professor of radiology, received a \$71,000 grant (a third-year extension) from The Whitaker Foundation for his research on "Investigation of *in vivo* kinetics of inhaled nitric oxide: application of positron emission tomography."

**Pamela Woodard, MD**, assistant professor of radiology, as principal investigator, received a \$42,000 industrial grant from Schering, Inc., for research on "Stenosis detection using gadomer-17-enhanced coronary MR angiography." Coinvestigators for the one-year grant are Debiao Li, PhD, Northwestern University; Dana Abendschein, PhD, associate professor of medicine, Department of Internal Medicine; **Fernando Gutierrez, MD**, associate professor of radiology; **Mark Haacke, PhD**, professor of radiology; and **Robert Gropler, MD**, associate professor of radiology.



## HONORS/AWARDS

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**Duffy Cutler, PhD**, assistant professor of radiology, received a Whitaker Foundation Biomedical Research Award in the amount of \$55,217 for his research on "Clinically viable 3D PET imaging of the torso."

**Steven Don, MD**, assistant professor of radiology, received the Silver Research Award at the 41st Annual Meeting of the Society for Pediatric Radiology held May 7-9 in Tucson, Arizona. Coauthors of the paper (which Dr. Don presented at the meeting) on "Comparison of computed radiography with film-screen radiography in detecting pulmonary edema in a rabbit model simulating the neonate" are **Charles Hildebolt, DDS, PhD**, associate professor of radiology; **Terry Sharp, RT**, technical supervisor; **Debra Lau, MD**, instructor in radiology; **Thomas Herman, MD**, associate professor of radiology; **Gary Shackelford, MD**, professor of radiology; and **William McAlister, MD**, professor of radiology and chief of pediatric radiology.

**Douglas Robertson, MD, PhD**, assistant professor of radiology and of orthopaedic surgery, and **Jie Yuan, PhD**, research associate, along with Ge Wang, PhD, and Michael Vannier, MD, of the University of Iowa, received in June, 1998, the 1997 Giovanni DiChiro Award for Outstanding Scientific Research published in the *Journal of Computer Assisted Tomography*. The honorees are coauthors of "Total hip prosthesis metal-artifact suppression using iterative deblurring reconstruction."

**Richard Slone, MD**, assistant professor of radiology, received the Radiographics Editors Certificate of Recognition for his outstanding service to the Radiological Society of North America.

## LECTURES/PRESENTATIONS

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**Carolyn Anderson, PhD**, assistant professor of radiology and of molecular biology and pharmacology, presented "Radiolabeled peptides for imaging and radiotherapy of cancer" to the Department of Chemistry, University of Missouri-Columbia, April 14. She spoke on "Radiometal-labeled bifunctional chelate-biomolecule conjugates for cancer diagnosis and therapy" at Monsanto, Inc., St. Louis, Missouri, May 13.

**James Blaine, DSc**, professor of radiology, of electrical engineering, and of computer science, and director of the electronic radiology laboratory, spoke on "Electronic radiology: challenges and opportunities" at the Biomedical Engineering Workshop, "Jerry Cox Day," Washington University, St. Louis, Missouri, May 12.

**Thomas Conturo, MD, PhD**, assistant professor of radiology and adjunct assistant professor of physics, as keynote speaker, presented "MR imaging of perfusion and brain function" to the Department of Molecular Physiology and Biophysics, Vanderbilt University, Nashville, Tennessee, May 15.

**Colin Derdeyn, MD**, assistant professor of radiology, spoke on "Stroke and carotid disease" and "Carotid imaging" at the Current Concepts in Peripheral Vascular Disease meeting, Concord, North Carolina, April 25. He presented "Temporal stability of hemodynamic stage in patients with carotid occlusion," "Hemodynamic and metabolic effects of middle cerebral artery stenosis and occlusion," and "Increased oxygen extraction fraction predicts increased incidence of ipsilateral stroke in patients with carotid artery occlusion" at the Symposium Neuroradiologicum XVI/American Society of Neuro-radiology, Philadelphia, Pennsylvania, May 15-19.

**Andrew Fisher, MD**, instructor in radiology, spoke on "CT/MR of the adrenal glands" at the Mt. Sinai Medical Center, Miami, Florida, May 2, and at the Montreal General Hospital, McGill University, Montreal, Quebec, Canada, May 19. Fisher presented "CT of abdominal trauma," "Imaging evaluation of urolithiasis," and "Radiology of aortic injury" at the Bangkok, Khonkaen, and Songkla medical centers, Thailand, June 21 - July 4.

**David Gierada, MD**, assistant professor of radiology, presented "Gadolinium used as a CT contrast agent: assessment in a porcine model" at the Annual Course of the Society of Computed Body Tomography and Magnetic Resonance, Rancho Mirage, California, March 29 - April 3.

## LECTURES/ PRESENTATIONS

*Continued from page 23*

**Louis Gilula, MD**, professor of radiology and of surgery, and chief of musculoskeletal radiology, as visiting professor, spoke on "Analytic approach to carpal injuries and examples," "Ligamentous instabilities of the wrist," and "Less frequently known wrist conditions to be recognized by the radiologist" at the Veterans Administration Hospital, San Diego, California, April 6. As guest lecturer, he spoke on "Wrist imaging: carpal injuries and ligament instabilities" at the Armed Forces Institute of Pathology, Washington, DC, April 23 and 24. As visiting professor, Gilula presented a series of lectures at the University of Rochester, New York, May 8. He spoke on "SPC criterion for lateral wrist radiographs" at the annual meeting of the International Wrist Investigators' Workshop and also presented "Less commonly known wrist conditions that need radiologic recognition" at the Congress of the International Federation of Societies for Surgery of the Hand, Vancouver, British Columbia, Canada, May 25. He presented "Arthrography and CT-arthrography," "MRI of wrist ligaments," and "Lesser known imaging entities of the wrist which should be known" at the Advanced Course on Musculoskeletal Radiology, Scientific Institute Hospital "CSS," San Giovanni Rotondo, Italy, June 18 - 20.

**Harvey Glazer, MD**, professor of radiology, presented "Pitfalls in the radiologic evaluation of bronchogenic carcinoma" at the 98th Annual Meeting of the American Roentgen Ray Society, San Francisco, California, April 26 - May 1.

**Mary Graham, MD**, assistant professor of radiology and chief of thoracic service, spoke on "Radiation standards and innovations in non-small cell lung cancer" at the Conference on Facing the Challenges of Non-small Cell Lung Cancer: Innovations in Combined-modality Treatment Strategies, Philadelphia, Pennsylvania, April 2. She presented "3D radiation therapy for lung cancer" at the Cancer Management for Practitioners Seminar, St. Louis, Missouri, June 19. She spoke on "Dose volume histograms (DVHs) and normal tissue complication probabilities (NTCPs) and their clinical applications" at the International Association for the Study of Lung Cancer Conference, Annecy, France, June 22 - 27.

**Perry Grigsby, MD, MBA**, professor of radiology, spoke on "Dose in reference volumes and points in relation to clinical outcome" at the European Society for Therapeutic Radiology and Oncology, Naples, Italy, May 11. He presented "Long-term pelvic control rates following

LDR brachytherapy for cervical cancer" at the Annual Brachytherapy Society Meeting, Albuquerque, New Mexico, May 29 - June 1.

**William Harms, BS**, instructor in radiology, presented "Evaluation of commercial 3D RTP systems" to the American Association of Physicists in Medicine, Missouri River Valley Chapter, Osage Beach, Missouri, May 9.

**Ryuji Higashikubo, PhD**, research assistant professor of radiology, as invited lecturer, spoke on "Cytometric assays for the prediction of radiation therapy outcome" at the 28th Symposium on the Control of Cancer by Radiation, Tokyo, Japan, July 11 and 12.

**Daniel Low, PhD**, assistant professor of radiology, presented "Intensity modulated radiation therapy" at Conformal Therapy: A Clinical Perspective, London, England, May 21.

**Elizabeth McFarland, MD**, assistant professor of radiology, presented "Evaluation of the dynamic velopharynx during speech production with magnetic resonance imaging"; as coinstructor, spoke on "Virtual colonoscopy: theory and practice"; and was scientific session moderator for "Virtual colonography and procedures" at the 98th Annual Meeting of the American Roentgen Ray Society, San Francisco, California, April 26 - May 1.

**Robert McKinstry, MD**, instructor in radiology, presented "Diffusion tensor imaging of normal infant brain: isotropic ADC and anisotropy" to the American Society of Neuroradiology, Philadelphia, Pennsylvania, May 17 - 21.

**Jeff Michalski, MD**, assistant professor of radiology, spoke on "Prostate treatments using conformal therapy techniques" and "Pediatric treatments using conformal therapy techniques" at Conformal Therapy: A Clinical Perspective, London, England, May 21.

**James Purdy, PhD**, professor of radiology, associate director of the Radiation Oncology Center, and chief of radiation oncology physics, as invited lecturer, presented "Technical improvements in radiation oncology treatment planning and delivery" at the First Annual Suntharalingam Lectureship, Thomas Jefferson University, Philadelphia, Pennsylvania, April 8. He presented "Simulation and treatment planning: lung cancer," "Simulation and treatment planning: prostate cancer," "New tools for treatment planning: 3-D conformal radiation therapy planning," "Physics for physicians: recent advances in radiation therapy," and "Acceptance testing, commissioning, and QA of treatment planning systems" at the CRILA Meeting, Pucon, Chile, April 13 - 17. Purdy spoke on "Prescribing, recording and reporting photon beam therapy: a review of ICRU 50," "Education and training of medical physicists," "Acceptance testing and quality assurance of treatment planning systems," "3-D conformal radiation therapy planning," and "Recent advances in radiation therapy" at the AAPM/IOMP Workshop, Cairo, Egypt, May 11 - 15. He presented "3-D treatment planning: the virtual simulation process" at the Current Concepts Symposium sponsored by the University of Minnesota, Minneapolis, May 20 and 21.



Diagnostic radiology and nuclear medicine fellows, residents, and trainees for 1997-1998: (first row, left to right) Doctors Felix Song; Paul Licata; Peter Salazar; Lori Kunzelman; Eliza Shin; Sangeev Bhalla; Gilbert Jost, director, Division of Diagnostic Radiology; Sandy Ruhs, cochief resident; Ronald Evens, director of the Institute; Mark Fromke, cochief resident; Dennis Balfe, director, Diagnostic Radiology Residency Program; Christine Menias; Vamsidhar Narra; John Carico; David Kim. (second row) Margaret Lee; Lisa Oakley; Noah Jaffee; Jonathan Gurney; Robert Boerner; Theodore Vander Velde; Alan McDaniel; Jon Fromke; Stephanie Hiskes; John Leahy; Christopher Thornton; Denise Iuliano; Cole Graham; Ali Shaibani; Sean Pierce; David Youmans; Brian Lawner; Mary Wyers. (third row) Matthew Jaksha; Scott Lee; John Lim; Craig Hamasaki; Faraz Khan; Tim Davis; Scott Kaltman; Mark Oswood; Pratik Murherjee; David Jeck; Christine Etyne; Paul Malcolm; Laurie Cleland; Jennie Yoon; Dallas Peck; Donald Johann. (fourth row) Jason Levy; Stephen Schmitter; Bartosz Rydzewski; Mark Fister; Hank Chen; Huy Tran; Terry Falk; Lawrence Kaskowitz; Robert Guillerman; Anthony Hein; Kevin Berger; Lloyd Stambaugh; Robert McKinstry; Robert Feiwell; Daniel Fullmer; Joshua Shimony; Donald Heck.

**Marcus Raichle, MD**, professor of radiology and of neurology and neurobiology, and codirector of the Division of Radiological Sciences, presented "PET and cerebral blood flow" at Neuro Grand Rounds, University of Maryland, Baltimore, April 15. He spoke on "Progress in functional imaging of the human brain" at the meeting of the Missouri Medical Association-Neurology, St. Louis, April 18. He presented "Is there a baseline state in the human brain?" at the University of Missouri, Columbia, May 11. Raichle spoke on "Images of mind" at the German Neurology and Psychiatry Joint Meeting, Baden-

Baden, Germany, June 6, and at the St. Louis Science Center, St. Louis, Missouri, July 21.

**Joseph Roti-Roti, PhD**, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, as invited speaker, presented "The nuclear matrix as a target and a determinant of the cells' response to stress: heat shock and ionizing radiation" at the 1998 Keystone Symposium Conference on The Nuclear Matrix: Involvement in Genomic Organization, Function and Cellular Regulation, Copper Mountain, Colorado, April 4 - 9.

**Henry Royal, MD**, professor of radiology and associate director of the Division of Nuclear Medicine, as invited lecturer, presented "The plutonium injection: whitewash or witch-hunt?" to The New York Academy of Medicine, New York, New York, April 21. He spoke on "Relative biological effectiveness of external radiation vs. I-131: a review of animal data" at the First International Seminar on Radiation and Thyroid Cancer, St. John's College, Cambridge, England.

**Stuart Sagel, MD**, professor of radiology, chief of chest radiology, and codirector of body computed tomography, spoke on "Instructive case presentations" and "CT of the pericardium" at the Annual Conference on Chest Disease of the Fleischner Society, Washington, DC, April 23 - 25. He presented "Helical CT of the thorax," "CT: anatomic variants and pitfalls in the thorax," "Digital chest radiography," and "CT of the pleura" at the 10th Radiology Today Post Graduate Course: Chest Radiology, Salzburg, Austria, June 11 - 13.

## LECTURES/ PRESENTATIONS

*Continued from page 25*

**Barry Siegel, MD**, professor of radiology and of medicine and director of the Division of Nuclear Medicine, presented "Applications of PET in oncology" at the University of Vermont, Burlington, May 22.

**Marilyn Siegel, MD**, professor of radiology and of pediatrics, presented categorical courses on "Ultrasonography of gastrointestinal diseases in children" and "Pediatric oncology" at the 98th Annual Meeting of the American Roentgen Ray Society, San Francisco, California, April 26 - May 1. She spoke on "Spiral CT of the pediatric chest" and "MRI of pediatric knee" at the annual meeting of the Society of Pediatric Radiology, Tucson, Arizona, May 7 - 10. As visiting professor, Siegel presented "Ultrasonography of the acute pediatric abdomen" and "CT/MR of the pediatric retroperitoneum" at the University of Vermont, Burlington, May 22. She presented "Spiral CT techniques," "Spiral CT of the pediatric airways and vessels," "Spiral CT of the pediatric abdomen," and "Spiral CT of the pediatric musculoskeletal system" at the Johns Hopkins Course on Computed Body Tomography

for the Technologist, Las Vegas, Nevada, June 11 - 14. As visiting professor, Siegel spoke on "Abdominal sonography in the neonate," "Cranial ultrasonography in the neonate" and "Imaging of the acute abdomen in the older child" at Seminars in Pediatric Radiology, Corpus Christi, Texas, July 10 and 11. She presented "Helical CT of the chest in children," "Helical CT of the pediatric abdomen and pelvis," and "Musculoskeletal CT in children" at the 12th Annual Summer Radiology Meeting of the University of Washington, Coeur D'Alene, Idaho, July 22 - 25.

**Douglas Spitz, PhD**, assistant professor of radiology, spoke on "Glucose deprivation-induced oxidative stress in human tumor cells" at the From Radiation to Molecular Biology Symposium, Bethesda, Maryland, July 2.

**Franz Wippold, MD**, associate professor of radiology, as visiting professor, presented a course on "Head and neck radiology review" at the National Naval Medical Center, Bethesda, Maryland, and at the Walter Reed Army Center, Washington, DC, April 27 - May 8.

## SYMPOSIA

### INTERNATIONAL SOCIETY FOR MAGNETIC RESO- NANCE IN MEDICINE

*6th Annual Meeting  
Sydney, Australia  
April 20 - 24*

**Pamela Woodard, MD**, moderator, scientific session, "Coronary artery imaging and flow."

### PRESENTATIONS

**Erbil Akbudak, PhD**; Raymond Hsu, medical student\*; **Daniel Li**, research assistant; **Thomas Conturo, MD, PhD**, "Delta R2\* and delta phi contrast agent perfusion effects in blood: quantitation and linearity assessment." \*Washington University, St. Louis, Missouri.

**Robert McKinstry, MD**; Jeffrey Ojemann, MD\*; **Abraham Snyder, MD, PhD**; **Erbil Akbudak, PhD**; **John Ollinger, DSc**; Harold Burton, PhD\*; **Kathleen McDermott**, research associate; **Timothy Davis, MD**; **Marcus Raichle, MD**; **Thomas Conturo, MD, PhD**, "BOLD-fMRI changes in regions of rCBF-PET increases and decreases during vibrotactile stimulation." \*Washington University, St. Louis, Missouri.

**Joshua Shimony, MD, PhD**; **Robert McKinstry, MD**; **Erbil Akbudak, PhD**; **Joseph Aronovitz, MD, PhD**; **Abraham Snyder, MD, PhD**; **Thomas Conturo, MD, PhD**, "Quantitative diffusion tensor anisotropy imaging: normative human cerebral data."

Jeffrey Neil, MD, PhD\*; Shelly Shiran, research assistant\*; **Robert McKinstry, MD**; Georgia Schefft, RN\*; **Abraham Snyder, MD, PhD**; Robert Almlı\*; **Erbil Akbudak, PhD**; Philip Miller\*; **Benjamin Lee, MD**; **Thomas Conturo, MD, PhD**, "Diffusion tensor imaging of normal human infant brain: apparent diffusion coefficient and anisotropy." \*Washington University, St. Louis, Missouri.

**Jie Zheng, PhD**, "Comparison of intravascular and extravascular contrast agents in coronary artery imaging" and "3D gadolinium-enhanced coronary MRA: initial experience."

### RADIATION RESEARCH SOCIETY

*The 46th Annual Meeting  
and  
NORTH AMERICAN  
HYPERThERMIa SOCIETY  
The 17th Annual Meeting  
Louisville, Kentucky  
April 25 - 29, 1998*

**David Diamond, MD**, received a Radiation Research Society Travel Award for his study of "Induction of Redox Factor-1 (Ref-1) in HeLa and NIH 3T3 cells in response to heat shock." Coinvestigators are **Lee Albee**, medical research technician; **Clayton Hunt, PhD**; **Azemat Parsian, BS**; **Prabhat Goswami, PhD**; and **David Gius, MD**, mentor/supervisor of the research.

**Eduardo Moros, PhD**, and **William Straube, MS**, cochairs, "Advances in oncological hyperthermia technology."

**Joseph Roti Roti, PhD**, chairman, "How does the nuclear matrix contribute to radiation resistance?"; cochairman, "Cytotoxicity of denatured and aggregated proteins in diseased and stressed cells."

## PRESENTATIONS

**Mary Graham, MD**, "Volume effects in the treatment of lung cancer with radiotherapy."

**Robert Malyapa, MD, PhD**, "DNA damage studies using the comet assay after *in vitro* or *in vivo* exposure to radiofrequency radiation."

**Douglas Spitz, PhD**, "Increased prooxidant production induced by exposure to 41.5°C hyperthermia."

**Eduardo Moros, PhD; Xiaobing Fan, PhD; William Straube, MS; Robert Myerson, PhD, MD**, "Temperature oscillations during superficial hyperthermia induced by reflected-scanned planar ultrasound."

**Xiaobing Fan, PhD; Eduardo Moros, PhD; William Straube, MS; Robert Myerson, PhD, MD**, "*In vitro* evaluation of temperature penetration control using dual array scanned-reflected ultrasound system."

**Robert Myerson, PhD, MD; William Straube, MS; Eduardo Moros, PhD; Marie Taylor, MD; Bahman Emami, MD\***, "Towards biologically meaningful hyperthermia for superficial tumors: simultaneous ultrasound hyperthermia and external beam irradiation." \*Loyola University, Chicago, Illinois.

**William Straube, MS; Robert Myerson, PhD, MD; Eduardo Moros, PhD; Xiaobing Fan, PhD**, "A database for analysis of clinical and temperature data from patients treated with simultaneous radiation and ultrasound hyperthermia."

**Mai Xu, PhD; William Wright, BS; Ryuji Higashikubo, PhD; Joseph Roti Roti, PhD**, "Initial characterization of NSY chronic heat resistant (NSY-CHR) cells."

**William Wright, BS; Clayton Hunt, PhD; Joseph Roti Roti, PhD**, "Mapping of a heat shock-response MAR in the murine HSP70 gene cluster."

**Robert Malyapa, MD, PhD; Eric Ahern**, medical research technician; **Chen Bi**, medical research technician; **William Straube, MS**; Marie LaRegina, DVM\*; **William Pickard, PhD\***; **Joseph Roti Roti, PhD**, "DNA damage in rat brain cells following *in vivo* exposure to 2450 MHz electromagnetic radiation and various methods of euthanasia." \*Washington University, St. Louis, Missouri.

**Mai Xu, PhD; William Wright, BS; Ryuji Higashikubo, PhD; LiLi Wang, MD\***; Peng Zhang, research associate\*; **Chen Bi**, medical research technician; **Judy Lee, BS\***; **Joseph Roti Roti, PhD**, "Thermal radiosensitization of NSY-42129 cells which develop chronic thermotolerance with proliferation at 41.1°C." \*Washington University, St. Louis, Missouri.

## SOCIETY OF NUCLEAR MEDICINE

*45th Annual Meeting  
Toronto, Ontario, Canada  
June 7 - 11, 1998*

**Duffy Cutler, PhD**, comoderator, Session 28: Instrumentation & Data Analysis—Instrumentation II.

**Perry Grigsby, MD, MBA**, "The new NRC patient release guidelines—benefits and practical considerations."

**Robert Gropler, MD**, comoderator, Session 50: Cardiovascular PET—Perfusion.

**Timothy McCarthy, PhD**, comoderator, Session 19: Radiopharmaceutical Chemistry—Fluorine-18 II.

**Henry Royal, MD**, invited lecturer, "Summary of the NCI's report on radioiodine exposure from atmospheric testing" and "Screening for thyroid cancer."

**Vallabhaneni Rao, PhD; Julie Dahlheimer**, medical research technologist; **Abraham Snyder, MD, PhD; Carolyn Crankshaw, MS; David Piwnica-Worms, MD, PhD**, "MDR1 P-glycoprotein (Pgp) and multidrug resistance-associated protein (MRP) mediate the blood-cerebrospinal fluid permeability barrier of Tc-99m-SESTAMIBI in choroid plexus epithelium."

Darlene Eyster, MD\*; Linda Peterson, MD\*; Michele Vaughn, RN\*; **Robert Gropler, MD**, "Relationship between the myocardial blood flow and hemodynamic response to adenosine in postmenopausal women." \*Washington University, St. Louis, Missouri.

Eric Hostetler, graduate student\*; **Stephanie Jonson, MS; Michael Welch, PhD**; John Katzenellenbogen, PhD\*; "2-[F-18]fluoroestradiol: A receptor-based radiopharmaceutical with high binding for SHBG." \*University of Illinois, Urbana.

**Stephanie Jonson, MS; Michael Welch, PhD**, "Biological evaluation and baboon PET imaging studies of the potential adrenal imaging agent cholesteryl-P-[F-18]fluorobenzoate."

Norio Takahashi, MD\*; Yasuhisa Fujibayashi, PhD, DMSc\*; Yoshiharu Yonekura, MD, PhD\*; **Michael Welch, PhD**; et al\*; "Evaluation of copper-62 ATSM in patients with lung cancer as a hypoxic tissue tracer." Fukui Medical University, Fukui, Japan.

Buck Rogers, PhD\*; **Carolyn Anderson, PhD**; Matthew Mayo, PhD\*; **Margaret Lanahan, MS**; Richard Kirkman, BS\*; David Curiel, MD\*; Donald Buchsbaum, PhD\*; "Localization of Cu-64-Tetatoctreotide to human ovarian cancer xenografts induced to express SSTR2 with an adenoviral vector." \*University of Alabama, Birmingham.

## SYMPOSIA

Continued from page 27

A. Srinivasan, PhD\*; Michelle Schmidt, PhD\*; **Carolyn Anderson, PhD**, "In vitro and in vivo evaluation of copper-64-Teta-Tyr<sup>3</sup>-Octreotate: Somatostatin receptor binding studies, rodent biodistribution and primate PET imaging." \*Mallinckrodt Medical, Inc., St. Louis, Missouri.

Eric Hawman, PhD\*; **Jerold Wallis, MD**, "Fast projection and backprojection with modeling of attenuation and depth dependent resolution for iterative SPECT reconstruction." \*Siemens Medical Systems, Inc., Hoffman Estates, Illinois.

**Jason Lewis, PhD; Deborah McCarthy, PhD; Michael Cristel, MS; Michael Welch, PhD**, "In vitro and in vivo evaluation of copper-radiolabeled hypoxia targeting agents in the EMT6 hypoxic tumor model."

**Jason Lewis, PhD**; A. Srinivasan, PhD\*; Michelle Schmidt, PhD\*; **Sally Schwarz, RPh, MS; Lynne Jones, BA; Carolyn Anderson, PhD**, "Radiotherapy and dosimetry of copper-64-Teta-Tyr<sup>3</sup>-Octreotate in a somatostatin receptor positive tumor bearing rat model." \*Mallinckrodt Medical, Inc., St. Louis, Missouri.

Judith Connett, PhD\*; Thomas Buettner, BS\*; **Sally Schwarz, RPh, MS; Carolyn Anderson, PhD**, "In vivo toxicity and radioimmunotherapy studies comparing Cu-64- and I-131-labeled anti-colon carcinoma monoclonal antibody (MAb)-1A3 in the GW39-hamster model." \*Washington University, St. Louis, Missouri.

**Timothy McCarthy, PhD; Gregory Gaehle, BS**; Rene Gust, visiting research associate\*; James Kozlowski, technologist\*; **William Margenau**, cyclotron supervisor; Shashi Kumar, research assistant\*; "An [N-13]nitric oxide inhalation system to determine the effectiveness of inhaled nitric oxide therapy." \*Washington University, St. Louis, Missouri.

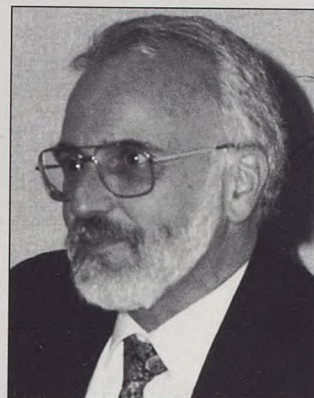
Pilar Herrero, MD\*; William Oellerich, postdoctoral fellow\*; **Carmen Dence, MS; Terry Sharp**, technical supervisor; **Robert Gropler, MD**, "Quantification of myocardial glycogen storage and glucose metabolism by PET and carbon-11 glucose." \*Washington University, St. Louis, Missouri.

## ALUMNI NEWS

## IN MEMORIAM

**Leonard Holman, MD**, chairman emeritus of the Department of Radiology at Brigham and Women's Hospital and the Philip H. Cook Professor of Radiology at Harvard Medical School, died this past February after a long illness. He was 56 years old.

Dr. Holman was an alumnus of Washington University School of Medicine and completed three years of training in diagnostic radiology and nuclear medicine (1967-1970) at Mallinckrodt Institute. He joined the faculty of Peter Bent Brigham Hospital in 1970 as head of the Department of Nuclear Medicine and was appointed chairman of the hospital's Department of Radiology in 1988.

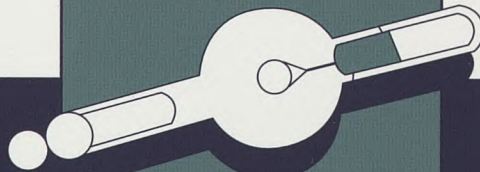


**Larry Schertz, MD**, a former MIR diagnostic radiology chief resident (1989-1990), died on June 3 from cancer. He was 38 years old.

An eager and accomplished student, Dr. Schertz graduated Phi Beta Kappa from Northwestern University and received a medical degree from Washington University School of Medicine, where he was a member of the Alpha Omega Alpha honorary medical society. While in medical school, he received the 1985 Hugh M. Wilson Award for meritorious contributions to radiology. After completing a four-year residency at the Institute and a neuroradiology fellowship at Johns Hopkins University, Dr. Schertz joined a radiology practice at Fairfax Hospital in Virginia.

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