

Fall 1999

Focal Spot, Fall/Winter 1999

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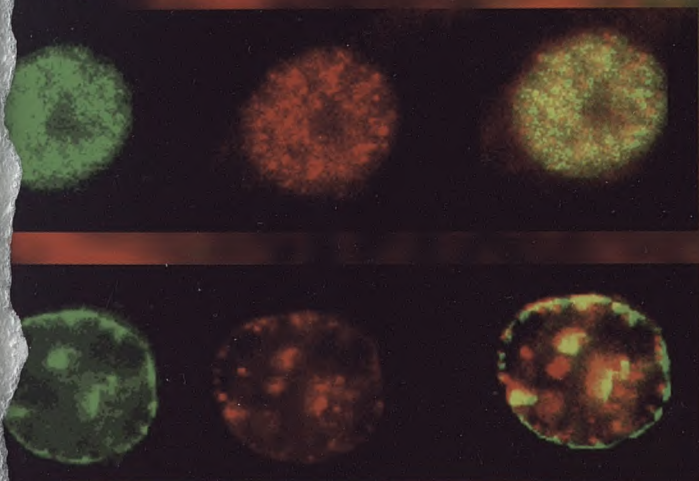
FALL/WINTER, 1999

VOLUME 30, NUMBER 3

FOCAL SPOT

MALLINCKRODT INSTITUTE OF RADIOLOGY

Improving Cancer Treatment



Prostate Cancer Awareness

USA 33

Annual
Checkups
and
Tests

1999

The National Cancer Institute (NCI) ranks prostate cancer as the second most common type of cancer in men in the United States. Approximately one in every five American men will develop prostate cancer in his lifetime, but early detection dramatically increases the prognosis for long-term survival.

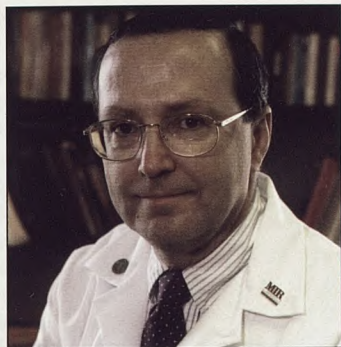
The United States Postal Service commissioned artist Michael Cronan of San Francisco to design the prostate cancer awareness stamp as a reminder of the importance of annual checkups and tests for the disease.

FALL/WINTER, 1999

FOCAL SPOT

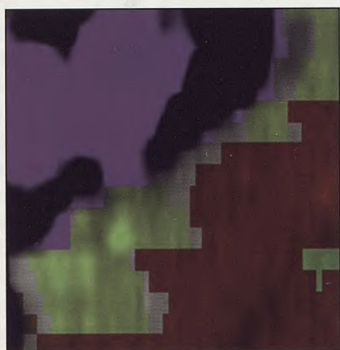
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MALLINCKRODT INSTITUTE OF RADIOLOGY



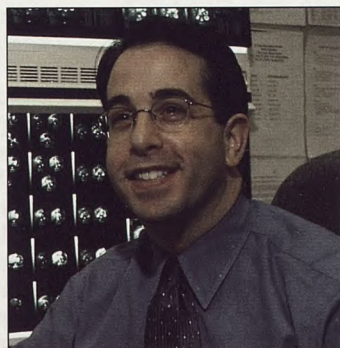
4 PROFILE: DR. GILBERT JOST

His work on developing the Institute's first computer network in the 1970s catapulted MIR into the computer era. As interim director, he plans to keep MIR in the vanguard of clinical care and scientific exploration.



6 IMPROVING CANCER TREATMENT

Radiation oncology physicists work to improve the cure rate of locally advanced cervical cancer while cancer biologists strive to determine why radiation does not always succeed in destroying tumor cells.



11 THE ECONOMICS OF HEALTHCARE

Dr. Scott Mirowitz has developed a benchmark program to provide radiology residents with the necessary management principles and business concepts to meet the needs of a changing health-care environment.



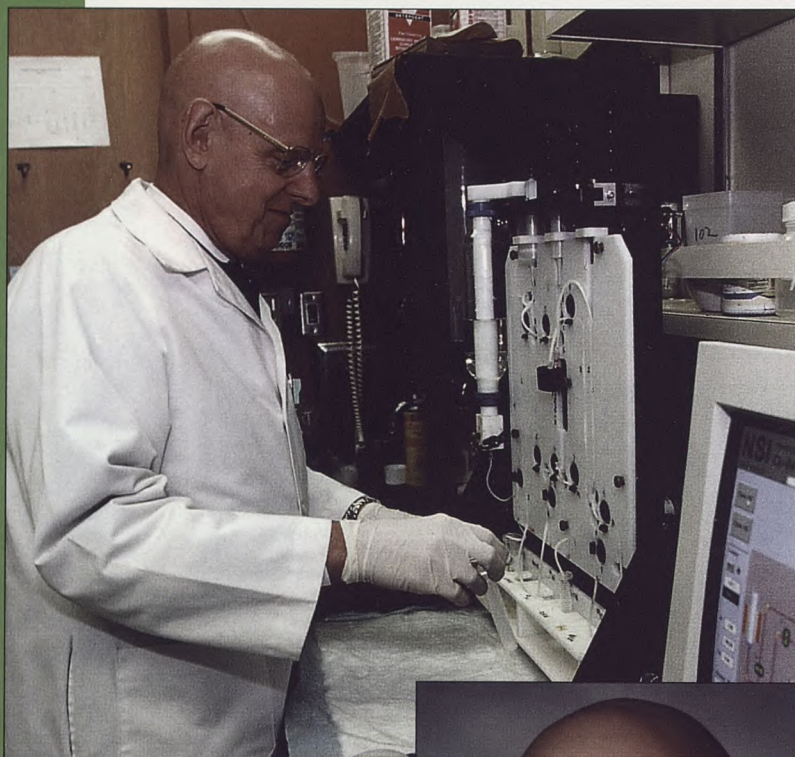
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ON THE COVER:

By studying the effects of temperature changes on tumor cells, MIR researchers hope to correlate their findings with strategies for improving cancer therapy. Image courtesy of Robert Vanderwaal, PhD.

SPOT NEWS



Welch elected to Institute of Medicine

Michael Welch, PhD, professor of radiology, of chemistry, and of molecular biology and pharmacology, and codirector of the Division of Radiological Sciences, is one of 55 new members of the Institute of Medicine (IOM), a private organization that, as part of the National Academy of Sciences, promotes the study of health policy issues. IOM election is one of the most distinguished honors accorded United States medical scientists. Members are selected for their outstanding contributions to health and medicine and their interest in public health issues.

Welch joined the Washington University School of Medicine faculty in 1967 as an assistant professor of chemistry. His highly regarded work on rapid synthesis of positron-labelled organic chemicals was of vital importance in the development of positron emission tomography (PET) at the Institute in the early 1970s and in the technology's subsequent application to diagnostic medicine. At a time when other scientists were unfamiliar with cyclotron-produced short-

lived radionuclides, Welch was one of the first researchers to apply modern organic chemistry to the preparation of radiopharmaceuticals used in medical imaging. His production of novel radiopharmaceutical imaging agents provided a basis for breakthrough clinical research studies on breast tumor localization and brain neuroreceptors.

Among his many honors are the Society of Nuclear Medicine's Georg Charles de Hevesy Nuclear Medicine Pioneer Award, Paul C. Abersold Award, and Berson-Yalow Award as well as the American Chemical Society's National Award for Nuclear Chemistry. Many of the staff members or heads of radioisotope production, imaging, and research centers in the U.S. trained under Welch as students or research collaborators.

MIR's Division of Radiological Sciences now has the unique distinction of having both of its codirectors (Welch and Marcus Raichle, MD) elected to the Institute of Medicine. Raichle, a professor of radiology and of neurology and neurobiology, not only is a member of IOM but also was elected to the National Academy of Sciences in 1996.

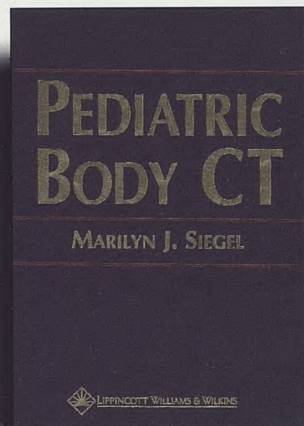
ACR elects fellows

Thomas Herman, MD, and William Reinus, MD, were among the 103 outstanding clinicians and scientists named as American College of Radiology (ACR) fellows at the organization's 76th Annual Meeting held in Washington, DC, in September. ACR fellowships are awarded to members for their distinguished accomplishments in service, teaching, or research.

The ACR is comprised of more than 31,000 radiologists, radiation oncologists, and medical physicists and supports programs that focus on the practice of radiology and the delivery of comprehensive radiological health services. Fellowship is one of the highest honors the ACR awards to its members.

Herman, an associate professor of radiology, is a member of MIR's pediatric radiology section. His research interest is in general pediatric radiology, with a particular focus on congenital malformation syndromes, skeletal dysplasias, and genetic disease.

Reinus, an associate professor of radiology and of medicine, is a member of the musculoskeletal radiology section. His research interests include outcome efficacy and artificial neural networks, especially in the interpretation of mammograms.



Siegel pens pediatric CT text

Marilyn Siegel, MD, professor of radiology and of pediatrics, is the author of *Pediatric Body CT*, a comprehensive text on the extracranial applications of computed tomography (CT) in children. Intended primarily for use by practicing radiologists, residents, fellows, and CT technologists, this concise review provides vital clinical information on a variety of issues, ranging from general techniques for performing CT exams of children to a summary of possible technical and interpretative errors in computed tomography imaging to CT's role in evaluating children with thoracoabdominal trauma. Published by Lippincott Williams & Wilkins of Philadelphia, the 380-plus page volume contains hundreds of detailed illustrations and images that provide an invaluable guide to pediatric computed tomography.

Changing of the guard

After 25 years as chief of musculoskeletal radiology, Louis Gilula, MD, professor of radiology and of surgery (orthopaedic, plastic, and reconstructive), chose to relinquish his administrative duties as section chief to devote more time to his clinical responsibilities and to research, particularly the development of an expanded musculoskeletal special procedures program. Gilula is internationally known for his expertise in diagnosing and treating the myriad and complex causes of chronic wrist pain. He and his research group developed a clinical center for patients with wrist pain, with referrals from hand surgeons throughout the metropolitan St. Louis area and the bistate region. Through Gilula's efforts in fine-tuning the delivery system used in vertebroplasty, Washington University Medical Center is one of the few healthcare facilities in the United States to offer this procedure, which provides pain relief and mobility to patients suffering from spinal bone loss and vertebral compression fractures.

David Rubin, MD, who joined the MIR faculty in 1998 as an assistant professor of radiology, succeeds Gilula as chief of musculoskeletal radiology. Rubin earned an undergraduate degree from Brown University and a medical degree from the University of Pennsylvania School of Medicine. He completed a medical internship at the Crozer-Chester Medical Center, Pennsylvania, and a radiology residency (diagnostic radiology chief resident,

1991-1992) and musculoskeletal radiology fellowship at the Hospital of the University of Pennsylvania, Philadelphia. He was an assistant professor of radiology at the University of Pittsburgh Medical Center (1994 to 1998), where he twice received the Ronald J. Hoy Award for Excellence in Teaching.

Gado receives teaching award

Mokhtar Gado, MD, professor of radiology, is the recipient of a Distinguished Service Teaching Award from the Washington University School of Medicine (WUSM) Class of 2002. Annually, first- and second-year WUSM students honor a special number of professors for their excellence in teaching and their dedication and commitment to medical education. On November 10 in the Eric P. Newman Education Center, the 1999 award recipients were officially recognized by the student body and by medical school administration.

Gado joined the Mallinckrodt Institute faculty in 1970 as an instructor in neuroradiology. He was named assistant professor of radiology and chief of neuroradiology in 1971 and professor of radiology in 1976. In 1991, Gado stepped down as chief of neuroradiology to devote more time to his clinical and research interests. An active member of many professional societies, he is a fellow of the American College of Radiology and serves on the editorial board of the scientific journal *Surgical Neurology*.



P R O F I L E

Dr. Gilbert Jost, interim director of Mallinckrodt Institute of Radiology (MIR)

It takes vision and optimism to run one of the most scientifically sophisticated radiological centers in the world. Gilbert Jost, MD, the recently appointed interim director, plans to maintain the high standards for research, patient care, and teaching established by his predecessors. Jost succeeds Dr. Ronald Evens, MIR director for the past 28 years who was named president of Barnes-Jewish Hospital in October.

From an early age, the native Philadelphian set and attained personal goals. Jost excelled at Harvard University, where he earned the Detur Prize for highest academic average, was elected to Phi Beta Kappa, and graduated *magna cum laude* with highest honors. His academic interests at Harvard focused on neurophysiology, psychology, and computers. "In my early college years, the idea of becoming a medical doctor never entered my mind," he says.

But his interest in neurophysiology eventually did lead him to Yale University School of Medicine. "In 1964, working in neurophysiology also required a good understanding of both electronics and the very primitive computer systems available in the sixties," Jost remembers. "So, I decided to take a year out of medical school and enroll in engineering classes."

by Kirstin Blase

After earning his medical degree, Jost completed an internship at Cleveland (Ohio) Metropolitan General Hospital. Armed with a medical degree, an engineering background, and a strong knowledge of computers, Jost landed a research post at the National Institutes of Health's Laboratory of Neural Control where he was responsible for developing the lab's computer systems.

In 1972 he decided to head west, more specifically the Midwest, to enter the diagnostic radiology residency program at Mallinckrodt Institute. In the early '70s, MIR was a paper-driven department with no computer systems in place. With his customary vision and optimism, Jost took on the challenge of advancing MIR into the computer era. He found a kindred spirit in Rex Hill, a self-taught computer expert with an electrical engineering degree. Hill would later head the Institute's computer section for more than 20 years before retiring in 1997. Jost and Hill initiated the purchase of the Institute's first computer equipment for \$125,000: one computer, two disk drives. It was the beginning of a serpentine network that eventually supported administrative, clinical, and research efforts and was hailed as one of the medical imaging world's best systems.

Jost and wife Peggy were unfamiliar with St. Louis when they first arrived but were soon impressed by the city's friendly atmosphere and the wide variety of cultural opportunities. They harbored the intention of someday returning "home," but with the residency completed plus an offer of a faculty position at the Institute, the family, which now included daughters Sarah and Amy, decided that St. Louis was home. Plus, by this time Jost had become an enthusiastic Cardinals baseball fan. He joined the MIR faculty in 1975 as an instructor in radiology

and was named professor of radiology and affiliate professor of computer science in 1985.

Radiology has now moved into an era where strong information systems are *de rigueur* and imaging systems are in demand. As evidenced by the Institute's filmless radiography and off-site teleradiology systems, the ability to transmit and view high-resolution images promises convenient, efficient, and cost-effective diagnosis without compromising patient care. Jost's groundbreaking work in computer science has resulted in his election as chairman of the Radiological Society of North America's (RSNA) Electronic Communication Committee (ECC). RSNA is the largest of the radiological societies (with a membership of more than 30,000 radiologists, physicists, and allied scientists) and promotes the study and practical application of radiology. The ECC guides RSNA in all of its many activities related to computers and high-speed communications.

On November 30, Jost was elected to a six-year term on the RSNA Board of Directors, the first MIR faculty to have earned this high honor. During this first year, Jost will serve as liaison designate for communication and corporate relations and will become chairman of the Board in his sixth year. At the completion of his one-year chairmanship, Jost will be named president of RSNA.

In addition to the interim directorship, Jost remains chief of the Division of Diagnostic Radiology. The Division is based on an organ system orientation: abdominal, breast imaging, chest, vascular and interventional, musculoskeletal, neuroradiology, and pediatric. He says that, as chief, his job of coordinating the sections and making decisions about new space and technology as the Division expands is made much easier due to the sup-

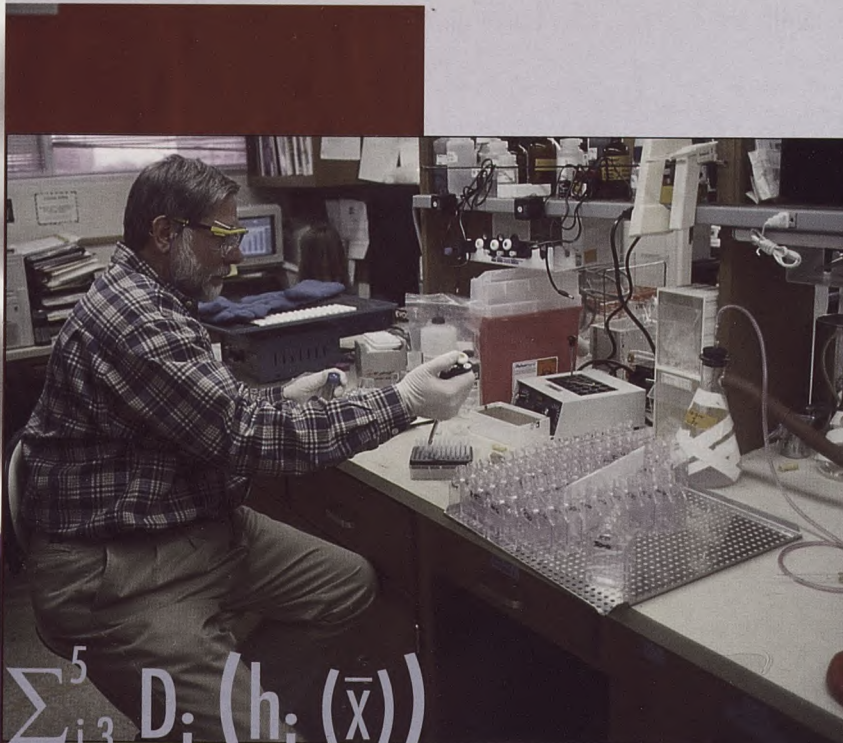
port and ability of his strong and capable faculty and staff.

Jost says it is important to him as interim director to keep the Institute moving forward, to keep the momentum going. "These are exciting and challenging times at MIR," he says. "There are additional radiology facilities being planned in conjunction with the new Barnes-Jewish Hospital emergency care facility, and the new Ambulatory Care Center will greatly change the image of radiology on this campus. A good percentage of the radiology business will be transferred here."

According to Jost, there are many opportunities for medical growth in the community as is already evidenced by hospitals such as Barnes-Jewish West County and Barnes-Jewish St. Peters. With his customary aplomb, Jost foresees MIR reaching out regionally and perhaps beyond. "Though Barnes-Jewish and Children's hospitals at the Washington University Medical Center will always be the 'crown jewels,' not all of our patients are at this location. People want quality healthcare wherever they live, and our challenge is to make that happen."

While healthcare issues such as reimbursement and government control are hot topics of debate and present tremendous challenges for physicians and healthcare administrators, Jost is not discouraged. On the contrary, he is very excited about MIR's ability to adapt to change, to survive, and to thrive. His mission as interim director is to take on the challenges and to keep the vision of the Institute alive. Although years ago as an undergraduate at Harvard he had no clear-cut idea of his professional destination, Jost has enjoyed the ride so far and plans to continue contributing his sense of direction for and commitment to Mallinckrodt Institute of Radiology. **MIR**

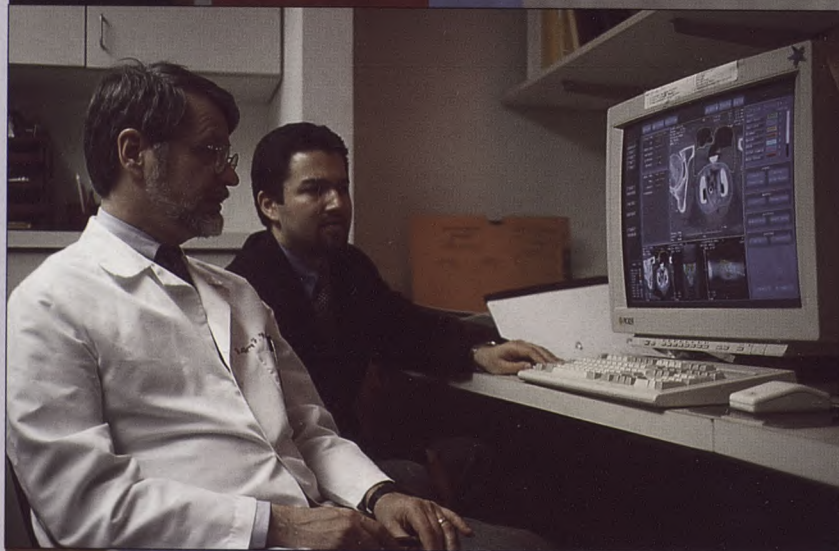
Joseph Roti Roti, PhD




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Jeffrey Williamson,
PhD, (foreground)
and Fritz Lerma, PhD





Radiation Oncology Researchers and Clinicians Focus on Improving Cancer Treatment

MIR's Radiation Oncology Center scientists seek to understand and eliminate cancer in the future while its clinicians strive to heal cancer patients in the present. In two separate studies funded by the National Cancer Institute (NCI), radiation oncology physicists are integrating computer-based imaging techniques with gynecologic brachytherapy, and cancer biologists are studying the stress response of cells and their radiosensitivity. These two important studies are aimed at advances in basic science that may have significant clinical implications.

By Candace O'Connor

Imaging methods and cervical cancer

In 1998 Jeffrey Williamson, PhD, a medical physicist and professor of radiology, received a four-year, \$1 million grant from NCI to develop the integration of three-dimensional imaging into the external-beam treatment of locally advanced cervical cancer. Two years into the project, Williamson proposes that with 3-D imaging the geometry of the tumor can be more precisely defined, doctors will have a better tool to estimate the amount of radiation reaching normal and malignant tissue, and radiation doses can be customized effectively for individual tumors.

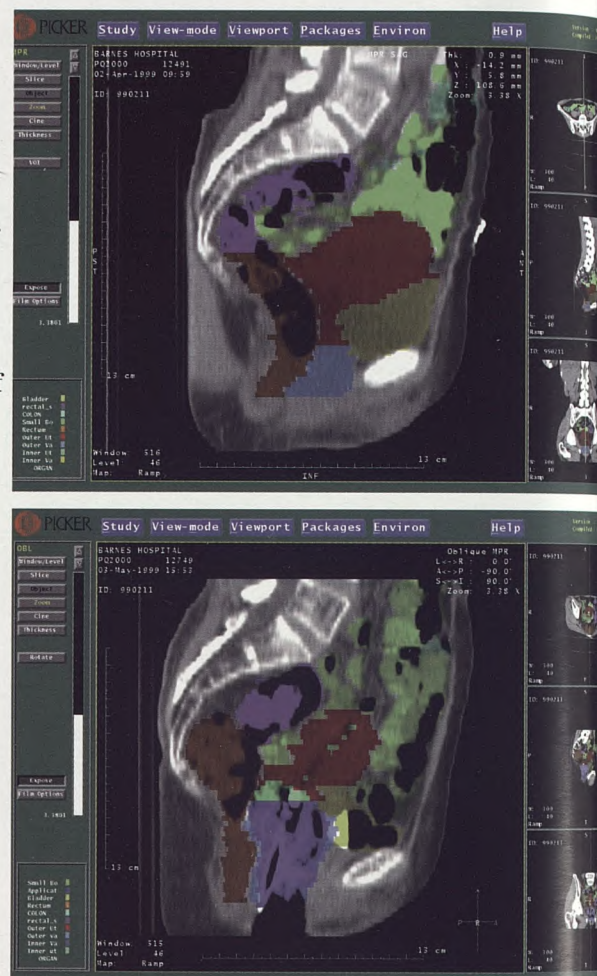
Historically, radiation therapy effectiveness was restricted by the oncologist's ability to target only the tumor site. Within the last two decades methods for treatment planning and radiation dose-delivery systems have been significantly improved through the use of medical imaging, such as computed tomography (CT), and the subsequent generation of 3-D computer models that provide actual maps of the patient's internal anatomy. Intensity-modulated radiation therapy (IMRT), in which concentrated doses of radiation are guided by 3-D imaging and external-beam techniques, is evidence of the sophistication of modern external-beam radiotherapy. At the Institute, the IMRT system is attached to a low-energy analog accelerator, a combination that provides the most effective method to date for delivering precise, highly tailored, individually controlled radiation dose distributions to the tumor while sparing the surrounding healthy organs and tissue.

Intracavitary brachytherapy—also called internal radiation therapy or interstitial therapy—is used in combination with external-beam

radiation to treat locally advanced cervical cancer. In this procedure, physicians place metal applicators containing radioactive seeds within the patient's vagina and uterus. Typically, patients undergo four to six weeks of external-beam radiation and two to six intracavitary insertions. A good outcome depends on the correct placement of the implants: close enough to the tumor to kill malignant cells, yet far enough away from healthy soft tissue that the tissue is not affected by the radiation. Currently, the physician has few tools to rely upon when gauging the placement of the implants and the treatment duration: visual inspection, some simple dosimetry parameters, and previous clinical experience.

"Conventional X rays can visualize only in a two-dimensional way as to where the applicators have been placed in relation to the posterior wall of the vagina," says Williamson, while pointing to an X ray of a patient with cervical cancer. "We can see a portion of the bladder here and can guess that the rectum is behind the bladder. But the three-dimensional relationship of these structures to the dose distribution is unknown. It's really like shooting in the dark."

Despite its uncertainties, gynecologic brachytherapy has been remarkably successful. As far back as 1901, early-stage cervical cancers were among the first of the solid tumors located deep within the body to be cured. By 1930 physicians in several medical centers worldwide were delivering radiation in doses comparable to



Top image: Taken prior to implant insertion, the rectum (brown), inner vagina (purple), small bowel (green), outer uterus (red), bladder (yellow), and inner uterus (light green) are viewed in their normal positions and shapes.

Bottom image shows the distortion of the organs' shape and position caused by the implant.

the rate currently being used. However, while brachytherapy produced good outcomes for early-stage tumors, it was not a preferred treatment for locally advanced disease.

A breakthrough in treatment delivery occurred in the 1950s when doctors began to combine megavoltage external-beam radiotherapy with brachytherapy to treat locally advanced disease. For years, the five-year survival rate for

patients hovered around 40 to 50 percent. Then multi-institutional studies, in which Mallinckrodt Institute participated, revealed that concomitant chemotherapy boosted the survival rate to 60 to 70 percent. But 30 to 40 percent of patients had recurrences, and approximately 5 to 15 percent experienced unpleasant complications such as removal of the rectum.

"When I began this research, I believed that we could raise the cure rate even more—take it up a notch and maybe take healthy tissue complications down a notch," says Williamson. "The technique had done well without any dosimetric optimization; I thought it could do even better **with** it."

Compiling data from the imaging techniques is a highly complicated matter, compounded by the distortion of the internal organs' shape and position caused by the applicators themselves: The bladder may be compressed, the small bowel may be pushed on top of the uterus, or the rectum may be folded on top of the applicator. Each time the applicators are inserted, the internal anatomy map changes again. Furthermore, the treatment itself can change the picture as the tumor shrinks and tissues lose their elasticity.

"It's difficult to determine the dose distribution to the anatomy. We can 'freeze one instant in time' with a computed tomography scanner but, even one hour later or at the next implant insertion, all of the anatomy will have changed due to the shifting and distortion of the organs caused by the implant or by normal organ function," says Williamson. "Consequently, physicians and physicists must figure out how to combine the dose distribution of these several treatments and come up with a cumulative risk, either of the tumor recurring due to a cold spot where the radiation did not reach or of a complication

occurring in normal tissue because of a hot spot that received too much radiation."

To tackle these problems, Williamson and a team of collaborators, including clinicians Carlos Perez, MD, director of the Radiation Oncology Center, and Perry Grigsby, MD, professor of radiology, are now studying 30 patients at Barnes-Jewish Hospital who are receiving radiotherapy. During their treatment, these patients receive five CT scans and one magnetic resonance imaging scan. Clifford Chao, MD, an assistant professor of radiology at the Institute, contours the data and sends it on to Gary Christensen, DSc, at the University of Iowa. Christensen, an assistant professor of electrical engineering, uses various algorithms to compile the data, estimating the true dose distribution to the tumor and surrounding tissues. As the consulting MIR radiologist, Kyongtae Bae, MD, PhD, provides quality assurance for the research.

"By looking at these thirty patients we can keep a statistical scorecard on the conventional treatment technique and estimate what features of the three-dimensional dose distribution can predict an increased risk of recurrence," says Williamson. "These hypotheses may be useful in developing a larger clinical trial or for introducing immediate improvements into the treatment."

A further difficulty of this study is the image acquisition itself. Because of the metal applicators used in the treatment, CT scans contain "streak" artifacts that may obliterate tissue detail. To combat this obstacle, Williamson is collaborating with Donald Snyder, PhD. Using an innovative algorithm in a method called "Object Constrained CT Reconstruction," Snyder, professor of electrical engineering and of radiology, can produce good soft-tissue reconstruction.

Cellular stress responses to ionizing radiation

When cells are exposed to harsh environmental conditions, such as changes in temperature or physiological conditions, they respond in a positive way by developing strategies to survive. But these stress responses also can stand in the way of effective cancer treatment; for example, when tumor cells become more resistant to ionizing radiation that is intended to destroy them.

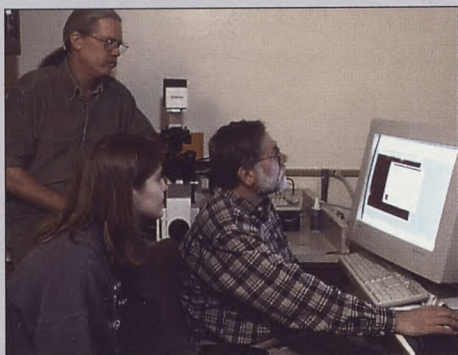
Funded in 1997 by a \$4.6 million NCI program project grant, a team of eight researchers has been studying various cellular stress responses, with a goal of understanding why radiation does not always succeed with large populations of tumor cells. Eventually, these insights should allow radiation oncologists to develop strategies for improving cancer therapy by overcoming cellular resistance or preventing it altogether.

Joseph Roti Roti, PhD, chief of cancer biology and the grant's principal investigator, says his research team had disagreed with the compartmentalized way in which other researchers had previously looked at such stress responses as heat shock, oxidative stress, or repair of radiation damage.

"As our group continued to work in this area, we realized that there were many similarities and common components in stress responses," he says. "It made sense to develop an integrated program that put stress responses side by side with radiation responses."

Incorporated into Roti Roti's grant are a number of individual projects, all related to the central hypothesis that stress responses involve one or more measurable determinants of sensitivity to ionizing radiation. One project, under the direction of Andrei Laszlo, PhD,

Focus on Improving Cancer Treatment



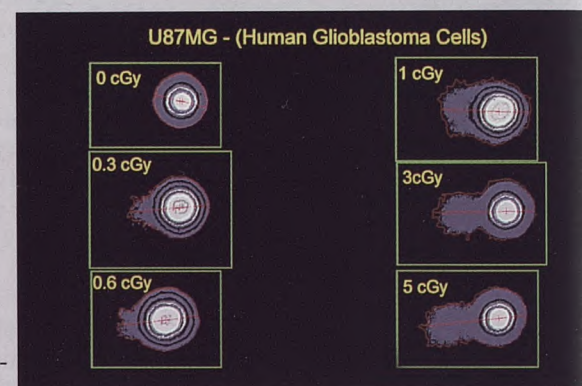
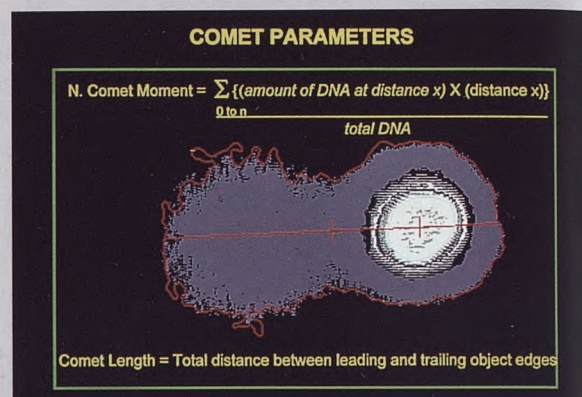
Research collaborators William Wright and Cara Humes in the image analysis lab with Roti Roti (seated at computer).

associate professor of radiology, and Douglas Spitz, PhD, assistant professor of radiology, looks at the resistance of tumor cells to radiation in the presence of excess heat (hypothermia). A second, led by Spitz and Michael Mackey, PhD, assistant professor of radiology, examines the contribution of oxidative stress conditions to the heat-induced sensitivity of tumor cells to radiation.

"In the case of heat and oxidative stress, it is a very clear-cut case of a cell being exposed to stress; if it survives, it is more resistant," says Roti Roti, who holds academic professorships in radiology, biochemistry and molecular biophysics, and cell biology and physiology. "Think of the way in which you acclimate a goldfish to new pond conditions. Unless you allow it to adjust gradually to the stressful difference in water and temperature, the fish quickly dies. Heat and oxidative stress are characterized by a transient adaptation to make the cells more resistant to that stress."

A third project, headed by Roti Roti and William Wright, BS, instructor in radiology, focuses on the nuclear matrix, a protein mesh-work that contains more than three feet of coiled genetic material. Radiation damages this genetic material and unwinds the DNA, disrupting gene expression. Researchers are investigating whether differences in matrix protein function or gene activity make cell lines respond differently to the radiation. And in a fourth project, Clayton Hunt, PhD, assistant professor of radiology, is studying the effects of DNA on gene expression and cell function. The DNA Hunt works with has been modified by a Washington University research team led by John-Stephen Taylor, PhD, professor of chemistry, to imitate changes made by radiation.

Two additional projects, not originally included in the program project grant, now have been folded into the research effort: The first, a highly productive project under the direction of Spitz, involves the very different response of tumor cells and normal cells to glucose deprivation. The other project, directed by David Gius, MD, PhD, instructor in radiology, focuses on signal transduction, a key part of any oxidative stress and perhaps the way in which the cell detects the stress so that it can begin its response.



Each cell's genetic makeup may influence its reaction to radiation.

Although two years remain on the grant, some positive results are apparent already, says Roti Roti. The work of the various investigators is becoming even more integrated than they had anticipated in the beginning.

"We are finding more rationale for sharing the research ideas, for taking principals from one stress response and applying them to another," he says. "And on the programmatic level we are finding that the results of our research support such integration even more strongly, that there are more closely interacting components than we had originally thought."



The Economics of Healthcare

A benchmark program at Mallinckrodt Institute partners medical practice and business issues.

Diagnostic radiology residents have been trained at Mallinckrodt Institute of Radiology (MIR) for more than 60 years, with the program evolving into one of the highest rated in the United States. Traditionally the Institute's training, as well as other medical training programs nationwide, has focused entirely on clinical and related scientific skills. But the dramatic changes in the healthcare environment in the last decade have emphasized that physicians also need a strong business foundation in order to better manage their practices and, ultimately, to benefit their patients.

by Chris Wayland

The Economics of Healthcare

Dr. Scott Mirowitz, associate professor of radiology, received the Radiological Society of North America's (RSNA) Roentgen Centennial Fellow Award in Radiologic Innovation for his proposal to develop, implement, and evaluate a radiology medical management curriculum. Mirowitz's "Radiology Policy and Practice Curriculum" includes one-hour seminars that focus on key management principles and healthcare business concepts. The five-week series of 19 workshops held this past summer at the Washington University Medical Center highlighted healthcare economics, managed care, legal issues, ethics, and organizational behavior.

Realizing that physicians would need additional education to keep pace with healthcare changes, Mirowitz earned a Master's degree in Medical Management (MMM) from the Tulane University School of Public Health and Tropical Medicine. Along with his new degree, he also received the distinction of becoming the first radiologist in the United States with this specialized education. In addition, he is certified in medical management as a Diplomate of the American College of Physician Executives, the American College of Healthcare Executives, and the American College of Managed Care Medicine.

"I had been involved in administrative aspects of radiology, although formal administrative training was never a part of my graduate education in medical school or in my residency or fellowship," says Mirowitz. "The administrative responsibilities that accompanied my appointment six years ago as chief of radiology at Barnes-Jewish Hospital north fueled my interest in pursuing a business-related degree."

"Later, I realized that I could use my training to benefit the Institute's residents who may not be prepared for the complex and challenging economic and related issues they will encounter during their radiology careers," he adds.

The condensed time frame for the Radiology Policy and Practice Curriculum did not allow for in-depth coverage of each topic, but the program did provide residents with a working knowledge of relevant business concepts and a starting place for pursuing further information. The inclusion of this curriculum in MIR's residency program is intended to provide radiologists with distinct advantages in making rational business decisions, effectively communicating and interacting with hospital administrators, becoming effective managers and assuming leadership roles in their organizations, and becoming knowledgeable about ongoing healthcare changes. These skills not only help the individual radiologist, they also make the profession stronger and better able to meet its future challenges.

Of the 31 residents who attended each program, 84 percent described the overall educational value of the curriculum as "very good" or "excellent." Along with the workshops, participants received a 600-page syllabus containing an overview of the program, summaries of lectures, biographies of faculty, and listings of additional resources. In surveys conducted after completion of the workshops, 87 percent of the participants said their knowledge about the topics had increased and that they were interested in learning more. They believed that management training should be a standard part of the radiology residency program.

Some clinicians may say that a radiologist's years of training should be spent exclusively on learning clinical skills and gaining scientific information, not on administrative education. "This concern is certainly valid. I

agree that the primary reason physicians are in residency training programs is to become experts in their chosen clinical field—that is first and foremost and should not be compromised,” Mirowitz explains. “However, I believe that there is sufficient flexibility during a four-year residency program to allow the introduction of medical management issues without adversely affecting the quality of clinical education.”

“It is a matter of striking the right balance,” he says. “The number of hours in the total program devoted to this special curriculum is relatively small, in fact trivial, when you look at the big picture. So, there should be no concern that residents will not be learning radiology. This additional training is simply a complementary source of education, one that I believe will be integral to a radiologist’s future performance and career.”

According to Mirowitz, a good radiologist can possess clinical expertise and healthcare-delivery and finance-system savvy. Informed radiologists with a better sense of the healthcare system will be more capable of understanding changes as they occur and of navigating the system to their patients’ benefit.

Mirowitz’s timing for introducing the curriculum was definitely on target.

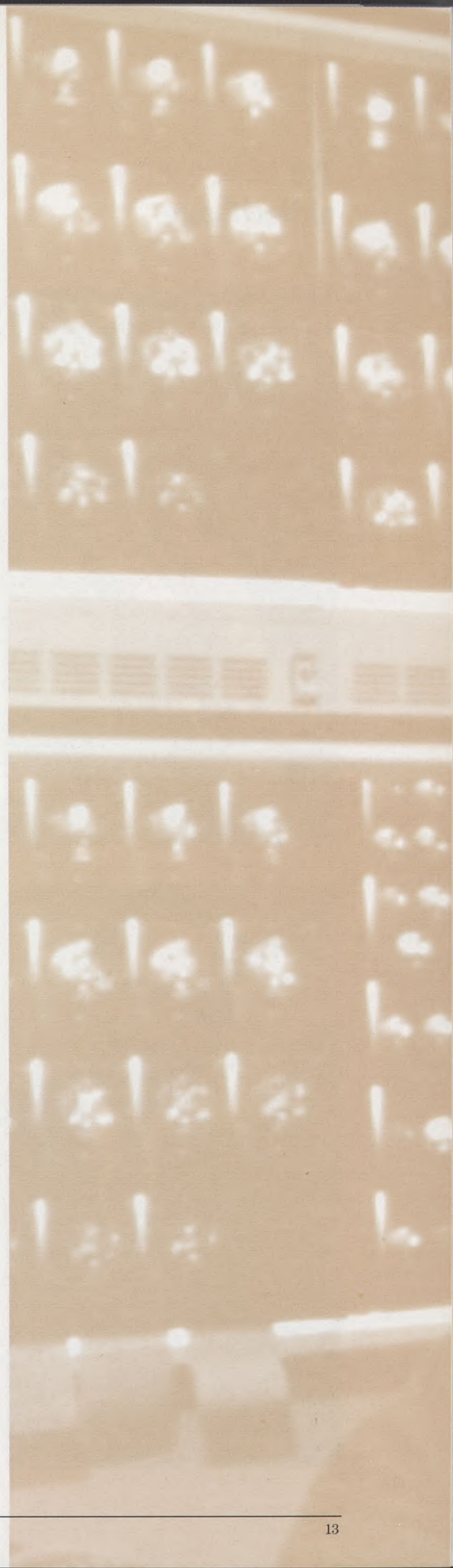
The Balanced Budget Act of 1997 places the role of teaching hospitals squarely in the middle of patient and healthcare changes. Budget cuts in a part of the Medicare program that supports teaching hospitals have resulted in the loss of billions of dollars to hospitals from coast to coast. The original Congressional Budget Office estimate put the loss from Balanced Budget Act Medicare cuts at \$43.8 billion; The American Hospital Association estimated actual losses for hospitals at \$71.2 billion.

This past June, more than 100 healthcare executives, including Dr. Peter Slavin, who at the time was president of Barnes-Jewish Hospital (BJH), met in Washington, DC, to urge lawmakers to stop further cuts. In a subsequent letter to BJH physicians, Slavin wrote that “teaching hospitals are already experiencing significant financial challenges due to managed care and rapidly growing technology-related expense” and that the Balanced Budget Act “is making a tough situation even tougher.” According to Mirowitz, portions of the Act are being reconsidered.

“Teaching hospitals have a tremendous responsibility to the public to train future physicians, care for indigent patients, and advance the frontiers of medical research—which benefits everyone in society, not just the patients in a particular hospital,” Mirowitz says. “In the long run everyone is negatively impacted if academic medical centers cannot carry out the responsibilities that society has come to expect of them.”

In light of continually changing healthcare issues and the radiology management training’s positive reception by MIR’s residents, the program will be repeated in future years. “The RSNA’s generous funding was extremely helpful in getting this project off the ground,” says Mirowitz.

Although the exact format has not been determined, most likely one-half of the topics will be presented next year with the remaining topics presented the following year. This will allow residents to participate in the initial seminars during the first two years of their training and, in the last two years of residency, have the topics repeated with updates to reflect current trends. Most of the doctors surveyed preferred that training be given in a continuous block because the topics built upon one another. The training curriculum also is expected to serve as a model for other teaching hospitals’ radiology programs.



The Economics of Healthcare



Several MIR faculty have earned a Master of Business Administration degree, including Jeffrey Brown, MD, associate professor of radiology, director of clinical research, and codirector of magnetic resonance imaging; Gene Davis, MD, assistant professor of clinical radiology; Ronald Evens, MD, professor of clinical radiology; Perry Grigsby, MD, professor of radiology; Eric Malden, MD, assistant professor of radiology; Timothy McCarthy, PhD, assistant professor of radiology; William Reinus, MD, associate professor of radiology; and Naris Rujanavech, MD, assistant professor of clinical radiology.

Here, Jeffrey Brown, a diagnostic radiologist, and Perry Grigsby, a radiation oncologist, share their views on the importance of physicians having a strong business foundation.

◀ **Dr. Brown:** The growth of managed care has led to a through-put dominated medical environment with increased emphasis on the bottom line. In order to keep priorities where they should be—on patient care—physicians need to become more involved in the management of healthcare organizations. Academic medicine is particularly imperiled by managed care organizations that place too little value on medical research and education. Hopefully, physicians with business and management skills can assume a leadership role in safeguarding and promoting the academic mission.

◀ **Dr. Grigsby:** The healthcare environment I entered as a medical student some 20 years ago is not the same world in which I now practice medicine. In the last 10 years, managed care, changes to Medicare, new technology, increasing costs, and budget cuts have dramatically affected patient care. As is true of the clinical and research sides of medicine, the business side of medicine has its own terminology, its own language. As a physician, the bottom line has always been to provide the best care for my patients—and that meant expanding my limited business knowledge in order to meet the present and future demands of managed care. **MIR**

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.

PROMOTION

Thomas Conturo, MD, PhD, assistant professor of radiology and adjunct assistant professor of physics, was promoted to associate professor of radiology, Division of Radiological Sciences.

David Gius, MD, PhD, instructor in radiology, was promoted to assistant professor of radiology, Radiation Oncology Center.

Ryuji Higashikubo, PhD, research assistant professor of radiology, was promoted to research associate professor of radiology, Radiation Oncology Center.

John Matthews, DSc, instructor in radiology, was promoted to research assistant professor of radiology, Radiation Oncology Center.

Eduardo Moros, PhD, assistant professor of radiology, was promoted to associate professor of radiology, Radiation Oncology Center.

Janice Semenkovich, MD, assistant professor of radiology, was promoted to associate professor of radiology, Division of Diagnostic Radiology.

APPOINTMENT

Shiying Zhao, PhD, Department of Mathematics and Computer Science, University of Missouri-St. Louis, was appointed adjunct associate professor of radiology, Division of Radiological Sciences.

NEW FACULTY

Nikolai Boubnov, MD, research assistant professor, Radiation Oncology Center, cancer biology.

Joanna Costello, MD, instructor in radiology, Division of Diagnostic Radiology, Barnes-Jewish West County Hospital.

Joseph Deasy, MD, assistant professor of radiology, Radiation Oncology Center.

Dione Farria, MD, assistant professor of radiology, Division of Diagnostic Radiology, breast imaging.

David Politte, DSc, research instructor in radiology, Division of Radiological Sciences, optical imaging laboratory.

Nikolaos Tsekos, PhD, assistant professor of radiology, Division of Radiological Sciences, cardiovascular imaging laboratory.

Kim Wiele, MD, assistant professor of radiology, Division of Diagnostic Radiology, breast imaging.

JOINT APPOINTMENTS

Victor Davila-Roman, MD, associate professor of medicine, was appointed associate professor of radiology.

Jeffrey Neil, MD, PhD, assistant professor of neurology, was appointed associate professor of radiology.

John Schotland, MD, PhD, associate professor of electrical engineering, was appointed assistant professor of radiology.

GRANTS

Kyongtae Bae, MD, PhD, assistant professor of radiology, as principal investigator, received a five-year, \$3.1 million grant from the Department of Health and Human Services, Public Health Service, to establish a Data Coordinating and Imaging Analysis Center for the study of polycystic kidney disease. Coinvestigators and collaborators for the project are Drs. Saulo Klahr, Brent Miller, and Marvin Grieff, WUSM Division of Nephrology; Philip Miller and Paul Thompson, WUSM Division of Biostatistics; Lei Wang, PhD, WUSM Department of Psychiatry; Michael Vannier, MD, University of Iowa; and MIR's **James Blaine, DSc**, professor of radiology; **Paul Commean, BEE**, senior research engineer; **William Middleton, MD**, professor of radiology; **Scott Mirowitz, MD**, associate professor of radiology; and **Cary Siegel, MD**, assistant professor of radiology.

Harold Burton, PhD, professor of anatomy and neurobiology, of cell biology and physiology, and of radiology, as principal investigator, received a National Institutes of Health, National Institutes of Neurological Disorders and Stroke grant for \$1.9 million for research on "Braille reading and adaptive plasticity in the human brain." Coinvestigators for the five-year grant are **Thomas Conturo, MD, PhD**, associate professor of radiology and adjunct assistant professor of physics; **Erbil Akbudak, PhD**, research instructor in radiology; **Abraham Snyder, MD, PhD**, research scientist of radiology; **John Ollinger, DSc**, research assistant professor of radiology; **Marcus Raichle, MD**, professor of radiology and of neurology and neurobiology; and Robert Sinclair, PhD, WUSM Department of Anatomy and Neurobiology.

Elizabeth McFarland, MD, assistant professor of radiology, as principal investigator, received a two-year National Cancer Institute contract modification renewal for research on "Spiral CT colography (virtual colonoscopy) for detection of colorectal polyps." Coinvestigators for the \$661,000 contract are **Jay Heiken, MD**, professor of radiology; **Dennis Balfe, MD**, professor of radiology; James Brink, MD, Yale University; Leonard Weinstock, MD, and Eric Tucson, MD, WUSM Division of Gastroenterology; **Bruce Whiting, PhD**, instructor in radiology; Stephen Ristvedt, PhD, WUSM Department of Psychiatry; Ge Wang, PhD, and Bruce Brown, University of Iowa; and Benjamin Littenberg, MD, University of Vermont.

GRANTS

Continued from page 15

Robert McKinstry, MD, PhD, assistant professor of radiology, as principal investigator, received a six-year National Institutes of Health, National Institutes of Neurological Disorders and Stroke contract for "Pediatric Study Centers (PSCs) for an MRI study of normal brain development." Coinvestigators for the \$1.3 million award are **Kelly Botteron, MD**, assistant professor of psychiatry and of radiology; **Robert Almlie, PhD**, WUSM Occupational Therapy Program; **Jeffrey Neil, MD, PhD**, assistant professor of pediatrics, of neurology and neurological surgery, and of radiology; and **Richard Todd, MD, PhD**, WUSM Department of Psychiatry. Collaborators are **Benjamin Lee, MD**, associate professor of radiology; **Erbil Akbudak, PhD**, research instructor in radiology; **Abraham Snyder, MD, PhD**, research scientist of radiology; and **Thomas Conturo, MD, PhD**, associate professor of radiology and adjunct assistant professor of physics.

Jeff Michalski, MD, assistant professor of radiology, received a \$144,374 grant from Calydon, Inc. for the research project "Phase I/II dose finding trial of intraprostatic injection of Calydon CV787 in patients with locally recurrent prostate cancer." Coinvestigators are **Carlos Perez, MD**, professor of radiology; **Chandramani Sundaram, MD**, assistant professor of surgery; and **Adam Kibel, MD**, instructor in surgery.

Eduardo Moros, PhD, associate professor of radiology, as principal investigator, received a \$27,456 grant from the Center for Disease Control, National Institute for Occupational Safety and Health, to study the construction and characterization of two *in vitro* electromagnetic irradiators (radio transmission lines) for bioeffect studies in the frequency spectrum of wireless communications. Coinvestigator for the six-month study is **William Straube, MS**, instructor in radiology.

David Piwnica-Worms, MD, PhD, professor of radiology and of molecular biology and pharmacology, and director of the molecular pharmacology laboratory, as principal investigator, received a \$1.5 million National Institutes of Health grant to study "Membrane permeant peptides for imaging cell function." Coinvestigators for the five-year project are **Vijay Sharma, PhD**, research assistant professor of radiology; **Kathryn Luker, PhD**, research associate; **Valery Polyakov, PhD**, research associate; and **Julie Dahlheimer**, senior research technician.

James Purdy, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of radiation oncology physics, as principal investigator, received a \$2.3 million National Cancer Institute grant for "Advanced Technology QA Center."

Maria Schmidt, MD, assistant professor of radiology, as project director, received the 1999 Komen St. Louis Race for the Cure grant for "Breast cancer: dealing with the diagnosis. An educational outreach program." The \$57,931 grant was presented by the St. Louis Affiliate of the Susan G. Komen Breast Cancer Foundation. **Dione Farria, MD**, instructor in radiology, is coauthor of the program.

Michael Welch, PhD, professor of radiology and of chemistry and codirector of the Division of Radiological Sciences, as principal investigator, received a \$3.8 million resource grant from the National Cancer Institute to produce and develop low-energy radioactive elements for use in imaging and therapeutic studies nationwide. Coinvestigators for the five-year grant are **Deborah McCarthy, PhD**, research instructor in radiology, and **Duffy Cutler, PhD**, assistant professor of radiology.

APPOINTMENTS/ELECTIONS

DeWitte Cross, MD, associate professor of radiology, was appointed to the Abstract Review Committee for the American Association of Neurological Surgeons/Congress of Neurological Surgeons/ASITN 2000 Joint Meeting.

Keith Fischer, MD, associate professor of radiology, was appointed to a two-year term on the Missouri Radiological Society Board of Directors.

Louis Gilula, MD, professor of radiology and of surgery, was appointed organizer of the International Wrist Investigator's Workshop held in Boston, Massachusetts, on September 1.

Eric Klein, MS, assistant professor of radiology, was reappointed to a two-year term on the editorial board of the *Journal of Medical Physics*.

Mark Mintun, MD, associate professor of radiology, was appointed to the National Institutes of Health's Center for Scientific Review Special Emphasis Panel, Study Section ZRG1 IFCN-8.

Scott Mirowitz, MD, associate professor of radiology, chief of radiology at Barnes-Jewish Hospital north, and codirector of body magnetic imaging, was appointed associate medical director for radiology at Health Management Partners, LLC, a managed care organization sponsored by Washington University School of Medicine and BJC Health System.

Joseph Roti Roti, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, was named president-elect of the North American Hyperthermia Society for 1999-2000.

Todd Wasserman, MD, professor of radiology, was appointed chair of the Constitution Committee of the Radiation Therapy Oncology Group. He was appointed to the Medical Specialties Advisory Committee of the American College of Radiology Imaging Network (ACRIN), a new National Cancer Institute-sponsored cooperative group that focuses on the advancement of combining diagnostic imaging and image-guided interventional procedures in the treatment of cancer.

Bruce Whiting, PhD, instructor in radiology, was elected president of the Optical Society of Greater St. Louis for 1999-2000.

HONORS/AWARDS

Joseph Roti Roti, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, was a member of two National Institutes of Health site visits: the Department of Health and Human Services, Special Emphasis Panel, Tarrytown, New York, June 7-9, and University of Pennsylvania Cancer Center, Philadelphia, June 14-16.

LECTURES PRESENTATIONS

Jeffrey Bradley, MD, instructor in radiology, presented "Advances in 3D conformal radiation therapy" for the panel discussion on "New primary and adjuvant therapies for advanced stage lung cancer" at the Chest 1999 Conference sponsored by the American College of Chest Physicians, Chicago, Illinois, November 3.

Jeffrey Brown, MD, associate professor of radiology, director of clinical research, and codirector of magnetic resonance imaging, as visiting professor, presented "Current concepts in adrenal imaging at the University of Louisville and "Contrast-enhanced hepatic MRI" to the Louisville Radiological Society, Louisville, Kentucky, October 20. He spoke on "MR imaging of abdominal masses in children," "MR imaging of the kidneys and pancreas," "CT and MR imaging of the adrenal glands," and "MR imaging of the liver" at the 4th Medical Imaging and Interventional Radiology Congress, Antalya, Turkey, October 27-30.

DeWitte Cross, MD, associate professor of radiology, spoke on "GDC treatment of cerebral aneurysms" at the GDC Focus Session sponsored by Target Therapeutics/Boston Scientific Corporation, St. Louis, Missouri, October 30.

MR Training Course

In collaboration with Siemens Medical Systems, the Institute sponsored an international cardiac MR training course on July 21 through the 23rd. Under the direction of **Pamela Woodard, MD**, assistant professor of radiology, the course provided radiologists, magnetic resonance technologists, cardiologists, and physicists with hands-on training on the Siemens 1.5T cardiac MR platform, "Symphony." Course faculty included MIR's **Vamsi Narra, MD**, instructor in radiology; **Fernando Gutierrez, MD**, associate professor of radiology; and **Glenn Foster, RT**, research patient coordinator; and Orlando Simonetti, PhD; Jeff Bundy, PhD; and Kevin Johnson, RT, from Siemens.

Duffy Cutler, PhD, assistant professor of radiology, presented "Extra shielding for improved signal-to-noise in 3D whole-body PET" at the IEEE Medical Imaging Conference, Seattle, Washington, October 27-30.

Colin Derdeyn, MD, assistant professor of radiology, spoke on "A new EC/IC bypass trial: scientific and economic rationale" at the session on "Current Issues in Cerebrovascular Disease," 77th Clinical Congress of the American College of Surgeons, San Francisco, California, October 14. He presented "A cost-effectiveness analysis of therapy for symptomatic carotid occlusion: PET screening followed by selective EC/IC bypass versus medical treatment" at the Institute for Clinical PET, 11th Annual Meeting, Van-

couver, British Columbia, October 23. He spoke on "Endovascular treatment of cerebral aneurysms with GDC: initial technical details" at the GDC Focus Session sponsored by Target Therapeutics/Boston Scientific Corporation, St. Louis, Missouri, October 30. Derdeyn presented "Management of carotid disease" at the Stroke Prevention and Treatment Seminar sponsored by the American Heart Association, Greater Saint Louis Division, St. Louis, Missouri, November 5. He spoke on "Cerebral hemodynamic impairment: methods of measurement and current applications" at Radiology Grand Rounds, University of Chicago, Illinois, November 8.

LECTURES PRESENTATIONS

Continued from page 17

Louis Gilula, MD, professor of radiology and of surgery, presented "Nerve blocks for the person performing vertebroplasty" at the Vertebroplasty Course, Sundance, Utah, August 7. He spoke on "Tendon sheath injection and hydroxyapatite aspiration" at the International Skeletal Society meeting, Seattle, Washington, August 19. He presented "Analytic approach to carpal injuries," "28 wrist trauma cases," "Indications and techniques of CT/MRI of the wrist," and "Update on interventional musculoskeletal radiology" at the Update in Musculoskeletal Radiology: Wrist, Shoulder, Knee, and Interventional Procedures Symposium, Brescia Italy, September 13.

Rimvydas Gilvydis, MD, clinical fellow in neuroradiology, presented "Quantitative diffusion MR imaging of pediatric intracranial abscesses" at the Annual Meeting of the AANS/CNS Section on Pediatric Neurological Surgery, Atlanta, Georgia, December 3.

Prabhat Goswami, PhD, assistant professor of radiology, spoke on "Possible role of redox sensitive RNA-protein binding in mRNA stability of cell cycle regulated gene expression" at the Free Radical and Radiation Biology Program, University of Iowa, Iowa City, November 11. He presented "Cell cycle regulation of topoisomerase II mRNA by redox sensitive protein binding in the 3'-UTR" at the 6th Annual Meeting of the Oxygen Society, New Orleans, Louisiana, November 18-22.

Perry Grigsby, MD, MBA, professor of radiology, presented "Patients with stage IIB-IVA cancer of the cervix should have prophylactic para-aortic irradiation" at the Controversies in the Management of Gynecologic Malignancies Symposium, Washington, DC, September 9 and 10. He spoke on "FDG-PET evaluation of recurrent endometrial carcinoma" and "Radiotherapy: software, machines, and combinations" at the 7th Biennial Meeting of the International Gynecologic Cancer Society, Rome, Italy, September 26-30. He spoke on "Carcinoma of the cervix: recent advances" at the Genitourinary and Gynecologic Cancers in the New Millennium meeting, Missouri Baptist Hospital, St. Louis, Missouri, October 15.

Robert Gropler, MD, associate professor of radiology, of medicine, and of biomedical engineering and director of the cardiovascular imaging laboratory, presented "Short-term oral estrogen replacement therapy does not enhance myocardial perfusion reserve via endothelial-independent vasodilation," "Demonstration of reversible myocardial trapping of F-18 fluorodeoxyglucose," "Decreased myocardial fatty acid utilization in patients with hypertension and LVH," and "Decreased contractile reserve (myocardial work) in LVH is associated with impaired myocardial perfusion reserve" at the American Heart Association 72nd Scientific Session, Atlanta, Georgia, November 8. He spoke on "Myocardial perfusion imaging for risk stratification of patients with coronary artery disease" at Cardiology Grand Rounds,

University of Missouri, Columbia, September 22 and 23. He presented "Functional imaging: its value and comprehensive reporting" at the Fall Meeting of the Missouri Valley Nuclear Cardiology Working Group of the American Society of Nuclear Cardiology, St. Louis, Missouri, October 26.

Jay Heiken, MD, professor of radiology, chief of abdominal radiology, and codirector of body computed tomography, spoke on "Liver masses: characterization with CT and MRI," "Diffuse liver diseases," "Imaging evaluation of nontraumatic emergencies of the GI tract," "The peritoneal spaces and ligaments: anatomy and pathology," "Neoplasms of the omentum and mesentery," and "Gynecologic applications of MRI" at the 20th Diagnostic Imaging Course, Rosario, Argentina, July 31-August 3. He presented "A practical approach to helical CT," "CT evaluation of abdominal aortic rupture and postoperative complications," "Characterization of hepatic masses with CT and MRI," and "Tumors of the omentum and mesentery" at the Society of Gastrointestinal Radiologists International Course in Latin America, Lima, Peru, August 28-30. He presented "Imaging evaluation of pancreatic carcinoma, cholangiocarcinoma, and hepatic metastases" at the Postgraduate Course of the 85th Clinical Congress of the American College of Surgeons, San Francisco, California, October 10-15.

Pilar Herrero, MS, research scientist of radiology, spoke on "Demonstration of reversible myocardial trapping of F-18 fluorodeoxyglucose" at the American Heart Association 72nd Scientific Session, Atlanta, Georgia, November 8.

Daniel Kido, MD, professor of radiology and chief of neuroradiology, presented "Can primary central nervous system tumors be staged using high-resolution BOLD venography (HRBV)?" at the XI International Workshop on Magnetic Resonance Angiography, Lund University, Lund, Sweden, September 22-25. He presented "Can gliomas be staged using high-resolution BOLD venography (HRBV)?" at the Combined Research Seminar, Loma Linda University, Loma Linda, California, October 14 and 15.

Jacob Locke, MD, assistant in radiology, presented "Comparison of IMRT versus lateral photon electron technique for total scalp irradiation" at the Head, Chest, and Neck Malignancies First Annual Meeting, University of Chicago, Illinois, October 1-3.

Daniel Low, PhD, assistant professor of radiology, spoke on "Intensity modulated radiation therapy" in Tokyo, Japan, October 9; at Hokkaido University, Sapporo, Japan, October 12; in Fukuoka, Japan, October 13; and in Osaka, Japan, October 16.

Elizabeth McFarland, MD, assistant professor of radiology, presented "Spiral CT colonography" to the Colon Subcommittee, American College of Radiology Imaging Network (ACRIN) Annual Report, Washington, DC, October 23.

Robert McKinstry, MD, PhD, assistant professor of radiology, spoke on "Health rush on the Internet" at the AMA/Intel Internet Health Road Show, sponsored by the Texas Medical Society, Austin, Texas, September 17.

Jeff Michalski, MD, assistant professor of radiology, presented "Intracranial ependymomas," "Spinal cord tumors," and "Children's oncology group: CNS tumors: clinical trials" at the University of Witwatersrand, Johannesburg, South Africa, August 18, and at Groote Schuur Hospital, Cape Town, South Africa, August 24. He spoke on "Standard radiotherapy vs. conformal radiotherapy," "Quality control in conformal radiotherapy: medical aspects," "Conformal radiotherapy in prostate carcinoma," "Prostate LDR brachytherapy," and "Conformal RT in pediatric tumors" at Clinica Alemana, Santiago, Chile, September 2 and 3. Michalski presented "Quality assurance: application of new technologies in clinical trials" at the International Society of Pediatric Oncology, American Society of Pediatric Hematology/Oncology, Montreal, Canada, September 15. He spoke on "Role of hormonal therapy in the treatment of newly diagnosed prostate cancer" at Portsmouth Naval Hospital, Portsmouth, Virginia, November 10.

Mark Mintun, MD, associate professor of radiology, as invited speaker, presented "Compartmental models" at the National Cancer Institute Workshop on Quantitative Analysis of Tumor Biochemistry Using PET and SPECT, Bethesda, Maryland, November 18.

Stephen Moerlein, PhD, associate professor of radiology, delivered poster presentations "Optimized clinical production of the PET tracer 6-[F18]Fluorodopa" and "Rapid purification and quality control procedures for carbon-11 labeled receptor-binding radiopharmaceuticals" at the 34th Annual Midyear Clinical Meeting of the American Society of Health-System Pharmacists, Orlando, Florida, December 6.

Eduardo Moros, PhD, associate professor of radiology, spoke on "Physical aspects of ultrasound hyperthermia of the chest wall" at the First Joint Meeting of the Biomedical Engineering Society and the IEEE Engineering in Medicine and Biology Society, Atlanta, Georgia, October 13-6. He and coauthors **William Straube, MS**, instructor in radiology, and **Robert Myerson, PhD, MD**, professor of radiology, presented "Temperature feedback control for hyperthermia of chest wall volumes with dual-frequency ultrasound" at the 1999 International Mechanical Engineering Congress and Exposition, Nashville, Tennessee, November 14-19.

Carlos Perez, MD, professor of radiology and director of the Radiation Oncology Center, spoke on "3-D conformal and intensity modulated radiation therapy: a new frontier," "Multidisciplinary cancer care and impact of locoregional tumor control on outcome," and "Chemoirradiation in carcinoma of the uterine cervix" at the Instituto Nacional de Cancerologia de Colombia, Bogotá, Colombia, August 13 and 14. He spoke on "Standard radiation therapy

in non-small cell lung cancer" at the American Society for Therapeutic Radiology and Oncology Fall Symposium: Advances in the Management of Non-Small Cell Lung Cancer, Washington, DC, September 25. As visiting professor, he presented "Three-dimensional conformal radiation therapy in localized carcinoma of the prostate" and "Concomitant chemoirradiation in high-risk carcinoma of the uterine cervix" at Loyola University, Chicago, Illinois, September 29 and 30. Perez presented "Methodology of research for the third millennium," "Three-dimensional conformal irradiation alone or combined with hormones in management of patients with localized prostate can-

cer," "Evidence-based medicine: meaning and implications for improvement of patient management," and "Modern radiotherapy and methodology of research for the third millennium" at the Università Cattolica S. Cuore, Rome, Italy, November 8-12. He presented "Three-dimensional conformal external radiation therapy in carcinoma of the prostate," "Brachytherapy in carcinoma of prostate," and "Radiation therapy and adjuvant hormone therapy in prostate cancer" at the 4th Meeting on Prostate Cancer, University of Lisbon Medical School, Lisbon, Portugal, December 2.

NCI Forum

Mallinckrodt Institute was well-represented at the National Cancer Institute-Industry Forum on Biomedical Imaging in Oncology held on September 1 in Washington, DC. MIR alumnus James Potchen, MD, chair of the Department of Radiology at Michigan State University, was session moderator for "Case study #2: Positron emission tomography in the staging of cancer." **Barry Siegel, MD**, professor of radiology and of medicine and director of the Division of Nuclear Medicine, and MIR alumnus Edward Coleman, MD, director of nuclear medicine and vice chairman of radiology at Duke University, were panel members for the session. Coleman and former MIR faculty member Michael Vannier, MD, professor and chair of the Department of Radiology at the University of Iowa, moderated "Summary/discussion of forum issues."

LECTURES
PRESENTATIONS*Continued from page 19*

James Purdy, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of radiation oncology physics, spoke on "Research in medical physics for clinical radiation oncology" at the NCI Radiation Research Program Workshop, Washington, DC, September 21 and 22. As invited speaker, he presented "Innovations in 3-D treatment planning dose delivery and quality assurance" at the Canadian Association of Radiation Oncologists Annual Meeting, Montreal, Canada, September 24-26. As invited speaker, Purdy presented "3-D conformal radiation therapy quality assurance" at the Tenth Alabama Cancer Congress, Sandestin, Florida, October 8 and 9.

Marcus Raichle, MD, professor of radiology and of neurology and neurobiology and codirector of the Division of Radiological Sciences, as invited lecturer, presented "Imaging: past and future" at the dedication of the Sackler Institute for Developmental Psychobiology, New York City, New York, October 8-10. He spoke on "Searching for images of the mind" at the SPG Meeting, 1999 World Congress on Psychiatric Genetics, Monterey, California, October 17. As the William S. Fields Lecturer, Raichle presented "Emerging images of the human brain" to the Houston Neu-

rological Association, Houston, Texas, November 3. He spoke on "Imaging human brain function" at the University of Texas, Houston, November 4. He presented "Neuroimaging" at the IS&E Seminar, Washington University, St. Louis, Missouri, November 12. Raichle presented "A default system of the human brain reflects the balance between cognition and emotion" at the SRP Symposium (Emotion/Cognition Meeting, Montreal, Canada, November 20. He spoke on "Imaging cognitive function with PET" at the Third PET Symposium, Dusseldorf, Germany, December 8 and 10.

Joseph Roti Roti, PhD, professor of radiology, associate director of the Radiation Oncology Center, and chief of cancer biology, presented "Ongoing studies on the biological effects of 835.62 MHz FMCW and 847.74 MHz CDMA radiation" at the Wireless Technology Research LCC Meeting, Long Beach, California, June 19-24. He presented "Lack of neoplastic transformation in C3H 10T1/2 cells following RF exposure relevant to cellular phone communications" at the 11th International Meeting of radiation Research, Dublin, Ireland, July 16-23, and participated in the In Vitro Transformation meeting, Cork, Ireland, July 24 and 25. Roti Roti spoke on "Further (final?) studies to find DNA damage due to exposure to radiofrequency and microwave radiation" at the Sixth Annual Michaelson Research Conference,

Cloudcroft, New Mexico, August 13-16. As guest speaker, he presented "The effects of hyperthermia on DNA replication complexes: implications for cell killing and radiosensitization" at Thomas Jefferson University, Philadelphia, Pennsylvania, December 2.

Stuart Sagel, MD, professor of radiology, chief of chest radiology, and codirector of body computed tomography, spoke on "Digital chest radiography," "Spiral CT in the thorax," "Role of CT in bronchogenic carcinoma," "CT angiography for pulmonary embolism," "CT of non-vascular mediastinal masses," "CT of the pleura," "CT of the pericardium," "CT of the thorax: anatomic variants and pitfalls," and "Problematic cases discussions" at the Annual South African Radiological Society Congress, Pretoria, South Africa, September 23-26. As visiting professor, he presented "Digital chest radiography," "CT angiography for pulmonary embolism," and "Role of CT in bronchogenic carcinoma" at the University of Nebraska, Omaha, November 4 and 5.

Maria Schmidt, MD, assistant professor of radiology, presented "Breast ultrasound" and participated in the Ultrasound-guided Breast Biopsy Workshop at the Breast Health Seminar, sponsored by Barnes-Jewish Hospital for the American Society of Radiologic Technologists, St. Louis, Missouri, September 11.

Barry Siegel, MD, professor of radiology and of medicine and director of the Division of Nuclear Medi-

cine, as guest speaker and moderator, presented "The emerging role of positron emission tomography (PET) in clinical oncology" at the Fourteenth Meeting of the Detroit Metropolitan Nuclear Radiology Club, Detroit, Michigan, September 14.

Marilyn Siegel, MD, professor of radiology and of pediatrics, spoke on "Pediatric mediastinum: common and uncommon diseases" and "Spiral CT: pediatric musculoskeletal applications" at the Summer Practicum of the Society of Computed Body Tomography and Magnetic Resonance Imaging Meeting, Keystone, Colorado, August 25-27. As visiting professor, she presented "CT/MR of the liver: techniques and indications," "CT/MR of retroperitoneal neoplasms: diagnosis and staging" and "CT/MR of pediatric gynecologic disorders" at Harvard Medical School, Cambridge, Massachusetts, September 21 and 22. As invited guest speaker, she presented "Hemorrhagic/ischemic brain injury in infants" at the New England Society of Ultrasound in Medicine meeting, Boston, Massachusetts, September 21. Siegel spoke on "Cranial ultrasonography," "Ultrasonography of acute abdominal pain in children," and "CT and MRI of the pediatric pelvis" at the Fourth Medical Imaging and Interventional Radiology Congress, Antalya, Turkey, October 28-30. She presented "Sonography of acute abdominal pain in children" and "CT/MRI of pediatric retroperitoneal tumors" at the University of Medicine and Dentistry of New Jersey, Newark, December 16.

Todd Wasserman, MD, professor of radiology, spoke on "Ethylol" at M. D. Anderson Cancer Center, Department of Radiation Oncology, Houston, Texas, August 9; at Ohio State University-James Cancer Center, Columbus, August 20; at Virginia Mason Clinic, Seattle, Washington, August 23; at Tacoma General/Multicare Regional Cancer Center, Tacoma, Washington, August 24; at the University of Minnesota, Minneapolis, September 7; at the University of Nebraska, Omaha, September 8; at the Radiotherapy Ethylol Meeting, Guanajuato, Mexico, October 2; and at Providence Hospital Cancer Center, Southfield, Michigan, October 21. He presented "The use of radiation to definitively treat prostate cancer" at the Advances in Prostate Treatment Symposium, Effingham, Illinois, November 9.

Pamela Woodard, MD, assistant professor of radiology, presented "Cardiac MR" at the Update on New Imaging Techniques Symposium, 9th Annual Meeting of the Illinois Chapter of the American College of Cardiology, Springfield, October 9.

SYMPOSIA

In this section of FYI, only those faculty and staff who have MIR appointments are listed.

SOCIETY FOR NEUROSCIENCE

*29th Annual Meeting
Miami, Florida
October 24 - 27, 1999*

Mark Mintun, MD, chairperson, "Brain metabolism and blood flow: animal models."

ORAL PRESENTATIONS

Harold Burton, PhD; Thomas Conturo, MD, PhD; Erbil Akbudak, PhD; Abraham Snyder, MD, PhD; John Ollinger, DSc; Marcus Raichle, MD, "Whole brain fMRI in early and late blind subjects who performed a verb generate task to reading Braille embossed nouns."

Maurizio Corbetta, MD; John Ollinger, DSc; Erbil Akbudak, PhD; Thomas Conturo, MD, PhD; Abraham Snyder, MD, PhD; Steven Petersen, PhD, "Event-related fMRI of visuospatial attention: cue, delay, and validity effects."

John Ollinger, DSc; Steven Petersen, PhD; Erbil Akbudak, PhD; Thomas Conturo, MD, PhD; Abraham Snyder, MD, PhD; Maurizio Corbetta, MD, "Effects of cue duration on cued motion detection studied with event-related fMRI."

Randy Buckner, PhD; Steven Petersen, PhD; Abraham Snyder, MD, PhD; John Ollinger, DSc; Erbil Akbudak, PhD; Thomas Conturo, MD, PhD; Marcus Raichle, MD, "Common and unique brain regions engaged by working memory and intentional encoding."

Mark Mintun, MD; Yvette Sheline, MD; Stephen Moerlein, PhD; Abraham Snyder, MD, PhD; Ying Huang, technical assistant, "Widespread progressive decrease with age in human 5-HT_{2A} receptor binding using [18F]altanserin."

AMERICAN SOCIETY FOR THERAPEUTIC RADIOLOGY AND ONCOLOGY

*San Antonio, Texas
October 31 - November 4, 1999*

Jeff Michalski, MD, moderator, "Implementation of innovative radiation technologies in the management of pediatric central nervous system tumors;" panel member, "Counterpoint: individualized treatment approaches."

Todd Wasserman, MD, chair, Subcommittee on Combined Modality Management.; member, Nominating Committee.

Tolmach Lecture



As the Eighth Annual Leonard J. Tolmach Memorial Lecturer, Dr. John Little, MD, Department of Cancer Cell Biology, Harvard School of Public Health, spoke on "Challenging the standard paradigms for radiation carcinogenesis." Joseph Roti Roti, PhD, chief of MIR's cancer biology section, is shown with Dr. Little at the November 5th lecture.

SYMPOSIA

Continued from page 21

POSTER PRESENTATIONS

Samuel Au, MD, "Statistical variation of late complication rates of the proximal vagina in the high-dose rate and the low-dose rate brachytherapy of cervical cancers."

Clifford Chao, MD, "IMRT provides better tumor target coverage and normal tissue sparing in patients with nasopharyngeal carcinoma."

Jacob Locke, MD, "Radiation therapy for epithelial skin cancer."

Marie Taylor, MD, "The impact of radiation therapy treatment volume on chemotherapy administration and the 5- and 10-year disease outcomes for stage I/II breast cancer patients treated with conservation therapy."

Todd Wasserman, MD; Robert Drzymala, PhD, "A phase II trial of the radiosensitizer, Etanidazole (SR-2508) and radiosurgery for the treatment of primary brain tumors or brain metastases (RTOG protocol 95-02)."

ORAL PRESENTATIONS

Ana Botero, MD, "Thioredoxin nuclear translocation and interaction with redox factor-1 activates the AP-1 transcription factor in response to ionizing radiation."

Heather Curry, MD, "Heat shock inhibits NF-KB DNA binding via inhibition of IKK. Possible role for hyperthermia radiosensitization."

Eric Klein, MS, "Feasibility of differential dosing of prostate and seminal vesicles using dynamic multileaf collimation."

MIR-ROC RADIATION AND BIOLOGICAL SCIENCES SYMPOSIUM

*15th Annual Meeting
St. Louis, Missouri
November 5 - 7, 1999*

Andrei Laszlo, PhD; Douglas Spitz, PhD; Michael Mackey, PhD; Joseph Roti Roti, PhD, program committee.

Kathy Bles, local arrangements committee.

WORKSHOP I: REDOX SENSITIVE PROCESSES

Douglas Spitz, PhD, chair.

David Gius, MD, PhD, "Redox sensitive signal transduction."

Prabhat Goswami, PhD; Jamie Sheren, research technician; **Lee Albee**, medical research technician; **Azemat Parsian, BS; Lisa Ridnour, PhD; Julia Sim**, senior medical research technician; **Ryuji Higashikubo, PhD; Clayton Hunt, PhD; Douglas Spitz, PhD**, "Possible role of redox sensitive RNA-protein binding in cell cycle regulated topoisomerase II mRNA stability."

Lisa Ridnour, PhD; Julia Sim, senior medical research technician; **Prabhat Goswami, PhD; Ruyji Higashikubo, PhD; Douglas Spitz, PhD**, "Nitric oxide-induced accumulation of P21 mRNA is associated with a G2 cell-cycle arrest."

William Wright, BS; Cara Humes, research technician; **Joseph Roti Roti, PhD**, "Redox-induced alterations in DNA-nuclear matrix anchoring."

Joy Hsu, research associate; **Robert Huang, Douglas Spitz, PhD; Clifford Chao, MD**, "Hypoxia inducible factor-1 (HIF-1) modulates chemotherapy resistance of malignant glioma under hypoxia."

Hsiu-san Lin, MD, PhD; Theodore D'Rosario, BS, "Fullerenes as a new class of radioprotectors."

SYMPOSIUM I: THE BIOLOGICAL EFFECTS OF RF RADIATION FROM CELLULAR PHONES
Eduardo Moros, PhD; William Straube, MS, "Exposimetry of the radial transmission line (RTL) irradiator at wireless communication frequencies(summary and recent advances)."

Ruyji Higashikubo, PhD; Michael Ragouzis, senior research technician; **William Straube, MS; Prabhat Goswami, PhD**, "Alterations in growth and messenger RNA expression observed in mammalian cells cultured at slightly elevated temperature."

Kheem Bisht, research associate; **Li Li**, research technician; **William Straube, MS; Eduardo Moros, PhD; Joseph Roti Roti, PhD**, "The effect of radiofrequency radiation with modulation relevant to cellular phone communication (835.62 MHz FDMA and 847.74 MHz CDMA) on the induction of micronuclei in C3H 10T 1/2 cells."

Li Li, research technician; **Peng Zhang, MD; Ruyji Higashikubo, PhD; William Straube, MS; Eduardo Moros, PhD; Joseph Roti Roti, PhD**, "Measurement of DNA damage and apoptosis in mammalian cells exposed to radiofrequency fields at high SAR in vitro."

WORKSHOP II: STRESS PROTECTIVE PROTEINS

Andrei Laszlo, PhD, chair.

Heat Shock

Ming-shun Chen, PhD; Joseph Roti Roti, PhD; Andrei Laszlo, PhD, "HSC40, a functional partner HSC70?"

Douglas Spitz, PhD, "A mechanistic study of HSP-27 stress protection in cells using a chimera of HSP-27 and enhanced green fluorescent protein."

Mai Xu, MD, PhD; Prabhat Goswami, PhD; William Wright, BS; Ruyji Higashikubo, PhD; Cara Humes, research technician; **Joseph Roti Roti, PhD**, "Expression of E-cadherin in NSY human colon adenocarcinoma cell line and its variants with different sensitivity to 41.1°C."

Oxidative Stress

Douglas Spitz, PhD; Julia Sim, senior medical research technician; **Lisa Ridnour, PhD**, "Dominant-negative JNK-1 inhibits metabolic oxidative stress during glucose deprivation in breast cancer cells."

SYMPOSIUM III: DNA DAMAGE PROTEIN INTERACTIONS

Clayton Hunt, PhD, chair.

Azemat Parsian, BS; Clayton Hunt, PhD, "AP1 transcription factor binding to DNA containing site specific damage."

Peng Zhang, MD; Li Li, research technician; **William Wright, BS; Joseph Roti Roti, PhD**, "Measurement of radiation-induced DNA damage in the context of nuclear structure in XRCC4 transfectants of XR-1 cells."

WORKSHOP III: RADIATION-INDUCED CELL DEATH

Fiorenza Ianzini, PhD, chair.

Michael Mackey, PhD; Fiorenza Ianzini, PhD, "Time-lapse digital cinematography: the tool of the future."

WORKSHOP IV: PROTEINS ALTERED BY HEAT SHOCK

Robert VanderWaal, PhD; William Wright, BS; Cara Humes, research technician; **Joseph Roti Roti, PhD**, "The effects of heat-shock on nuclear-matrix-associated DNA replication complexes."

Nikolai Boubnov, PhD; Andrei Laszlo, PhD, "Heat-induced inactivation of Ku."

RADIOLOGICAL SOCIETY OF NORTH AMERICA

*85th Scientific Assembly and Annual Meeting
Chicago, Illinois
November 28 - December 3, 1999*

Louis Gilula, MD, presiding officer, Musculoskeletal (elbow, hand, wrist).

Jay Heiken, MD, keynote speaker, Gastrointestinal Scientific Session.

Gilbert Jost, MD, chairman RSNA Electronic Communications Committee.

Elizabeth McFarland, MD, panelist, Special Focus Session: Beginning an academic career.

William Middleton, MD, presiding officer, Ultrasound (Musculoskeletal) Session; moderator, Special Focus Session: Sonography of the shoulder and musculoskeletal system - Can you/should you do it?

David Rubin, MD, moderator, Musculoskeletal knee.

Peter Shile, MD, InfoRAD Presentation, Feature-based auditing for mammography.

Marilyn Siegel, MD, speaker, Special Focus Session: When appendicitis is suspected in children.

Richard Slone, MD, head, Chest Section Scientific Exhibit Committee.

Sharlene Teefey, MD, panelist, Special Focus Session: Sonography of the shoulder and musculoskeletal system - Can you/should you do it?

INTEGRATING THE HEALTH-CARE ENTERPRISE (IHE) SYMPOSIUM

Gilbert Jost, MD, "The IHE initiative: the conceptual model, technical specifications, and plans for future years."

InfoRAD EXHIBITS

Peter Shile, MD, "Feature-based auditing for mammography."

SCIENTIFIC EXHIBITS

Mehdi Poustchi-Amin, MD; Scott Mirowitz, MD; Jeffrey Brown, MD; Robert McKinstry, MD, PhD, "Echo planar imaging (EPI): principles and applications (a review for the general radiologist.)"

Pamela Woodard, MD; Fernando Gutierrez, MD, "Complications of median sternotomy."

Kyongtae Bae, MD, PhD; Bruce Whiting, PhD; Jay Heiken, MD, "Multi-slice spiral CT: technique and applications."

REFRESHER COURSES

Louis Gilula, MD, "Imaging upper-extremity trauma with plain films, CT, and MR"; "Imaging of ligaments, capsules, and tendons of the wrist and hand."

Fernando Gutierrez, MD, "MR imaging of congenital cardiovascular disease: cardiac applications."

Jay Heiken, MD, "The acute abdomen: CT evaluation."

David Hovsepian, MD, "Hysterosalpingography and selective salpingography (a 'how-to' workshop)."

Scott Lecture



Anthony Proto, MD, editor of the journal *Radiology*, presented the Twenty-eighth Annual Wendell G. Scott Memorial Lecture on September 13 in Scarpellino Auditorium. Dr. Proto spoke on "Radiology: Now and the Future."

SYMPOSIA

Continued from page 23

Elizabeth McFarland, MD, "CT of the small bowel and colon: principles, techniques, and applications."

Jeff Michalski, MD, "Radiation therapy for prostate cancer: dose escalation with 3D conformal radiation therapy."

William Middleton, MD, "Musculoskeletal US (a 'hands-on' workshop)"; "Practical tips in US (small parts: other musculoskeletal US.)"

David Rubin, MD, "Shoulder injuries."

Stuart Sagel, MD, "Digital chest radiography: techniques and clinical applications."

Cary Siegel, MD, "Advances and controversies in CT and MR of the genitourinary tract."

Marilyn Siegel, MD, "Special course in pediatric radiology: current concepts in body imaging at the millennium"; "Special course in pediatric radiology: current concepts in body imaging at the millennium (MR imaging of extremities: marrow and soft tissues. Bone marrow: normal and variants.)"

William Totty, MD, "Wrist and hand injuries."

SCIENTIFIC SESSIONS

Kyongtae Bae, MD, PhD; Jay Heiken, MD; Fernando Gutierrez, MD, "CT diagnosis of aortic dissection: evaluation of the relative importance of unenhanced images."

Kyongtae Bae, MD, PhD; Jay Heiken, MD, "CT assessment of renal cysts: Are attenuation values artifactually increased on contrast-enhanced images?"

Kyongtae Bae, MD, PhD; Jay Heiken, MD, "Determining scan delay for CT angiography: Can contrast bolus tracking eliminate the need for a test bolus?"

Brian Lawner, MD; Marilyn Siegel, MD; Scott Mirowitz, MD, "Magnetic resonance cholangiopancreatography in children and adolescents with pancreatitis."

Hsiu-San Lin, MD, PhD; Theodore D'Rosario, BS, "Fullerenes as a new class of radioprotectors."

Elizabeth McFarland, MD, "Reliability and accuracy of polyp size measurement with spiral CT colonography."

Jeff Michalski, MD, "Radiation oncology brachytherapy: GU session."

Pratik Mukherjee, MD; Robert McKinstry, MD, PhD; Mark Bahn, MD, PhD; Benjamin Lee, MD; Thomas Conturo, MD, PhD, "Comparison of diffusion-weighted MR with diffusion tensor MR: stroke, hypoxic-ischemic encephalopathy, and cerebrovascular autoregulatory dysfunction."

Robert Myerson, PhD, MD, "Outcome of patients with rectal adenocarcinoma and localized pelvic non-nodal metastatic foci."

Peter Shile, MD; Vivin Ramamurthy, MSEE, "Performance issues in the softcopy display of mammograms."

Bruce Whiting, PhD; Elizabeth McFarland, MD, "Multidetector vs. single detector CT colonography: in vitro investigation of lesion conspicuity and rippling artifact."

Dmitriy Yablonskiy, PhD; David Gierada, MD, "Diffusion lung imaging of hyperpolarized ^3He in patients with emphysema: changes in the structure of alveoli."

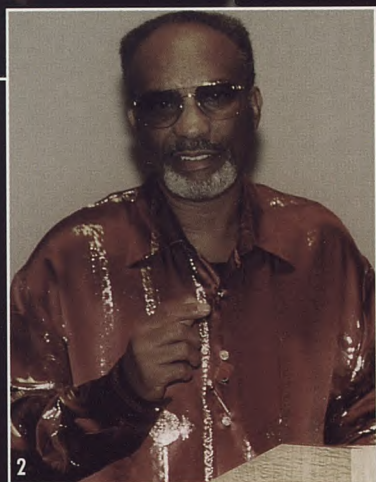
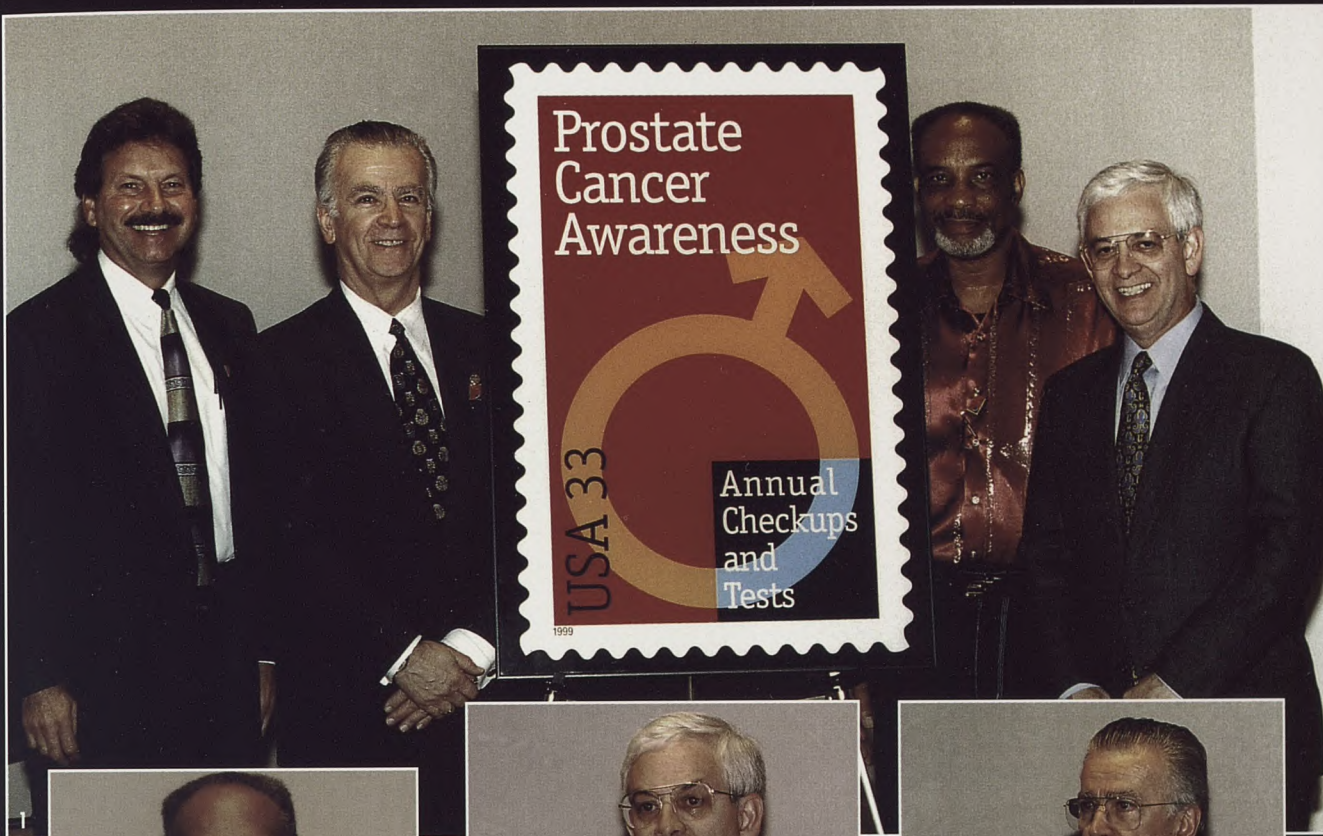
Shiying Zhao, PhD; Douglas Robertson, MD, PhD; Bruce Whiting, PhD; Kyongtae Bae, MD, PhD, "Metal artifact suppression using wavelet-based reconstructions."

Melson Lecture

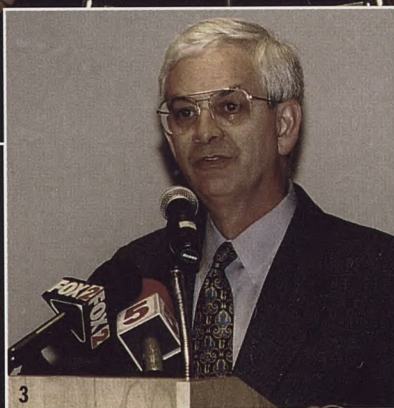


On October 4 Dr. Laurence Needleman presented the Seventh Annual G. Leland Melson Visiting Professorship and Lecture, "Ultrasound contrast agents." Dr. Needleman was presented with a commemorative plaque by (left to right) Drs. William Middleton, head of MIR's ultrasound group; Jay Heiken, chief of abdominal radiology; and Sharlene Teefey from ultrasound.

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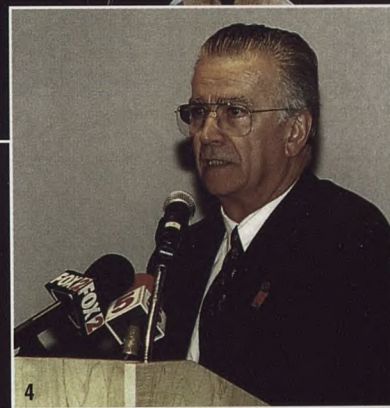


On October 8, 1999, Mallinckrodt Institute of Radiology and Washington University School of Medicine hosted a press conference for the official St. Louis unveiling of the United States Postal Service's prostate cancer awareness stamp.



1. (left to right) Jack Hederman, manager of retail operations for the United States Postal Service Gateway District; Carlos Perez, MD, professor of radiology and director of the Radiation Oncology Center; L. D. Sims, prostate cancer survivor; and William Catalona, MD, professor of surgery and director of the Division of Urologic Surgery.

2. As a prostate cancer survivor, Mr. L. D. Sims is an enthusiastic member of the Cancer Information Center Prostate Cancer Support Group at Washington University Medical Center.



3. As guest speaker, Dr. Catalona commended the U.S. Postal Service for their role in raising awareness of prostate cancer. Catalona is a pioneer in prostate gland research, including his work on blood tests for the early detection of prostate cancer.

4. As keynote speaker, Dr. Perez stressed the importance of the early detection of prostate cancer. Perez is recognized internationally for his valuable contributions to the field of radiotherapy through clinical research, analysis and publication of that research, lectures, and involvement in radiotherapy-related organizations.

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