Summer 2006

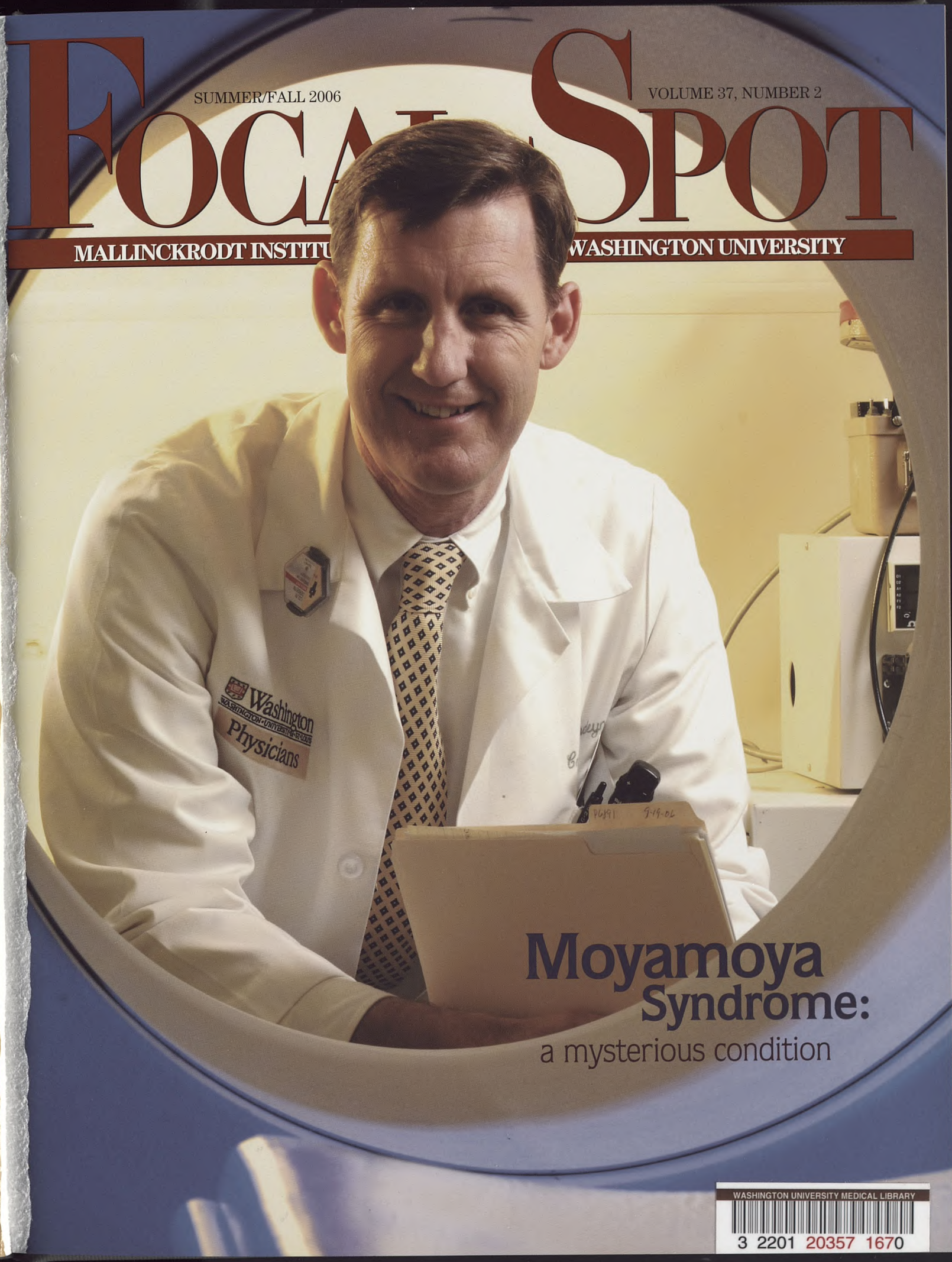
Focal Spot, Summer/Fall 2006

SUMMER/FALL 2006

VOLUME 37, NUMBER 2

FOCAL SPOT

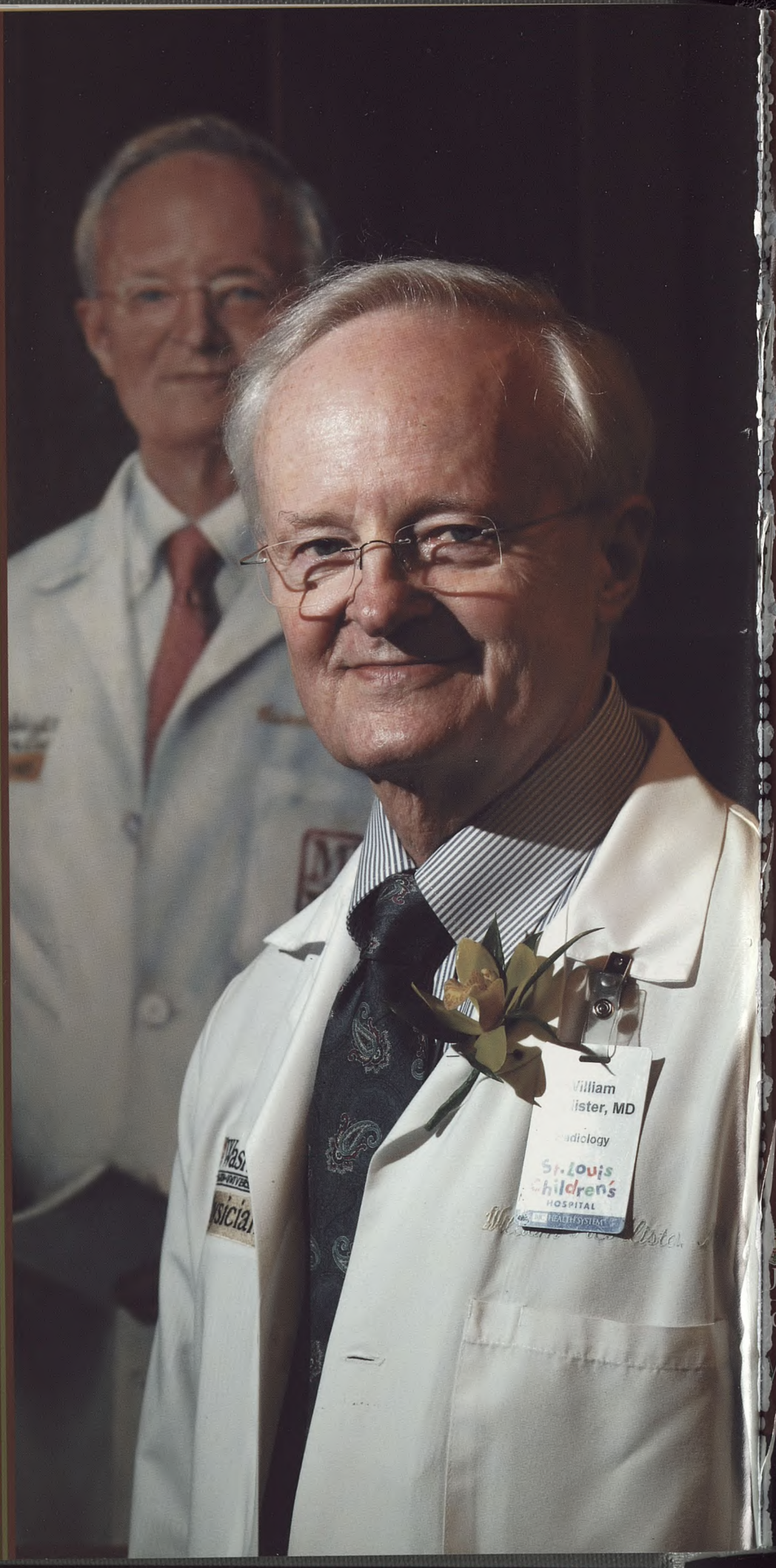
MALLINCKRODT INSTITU WASHINGTON UNIVERSITY



Moyamoya Syndrome:

a mysterious condition

On September 20, the medical staff of St. Louis Children's Hospital (SLCH) presented William McAlister, MD, with the 2006 Distinguished Service Award. McAlister, a professor of radiology and of pediatrics, served as Mallinckrodt Institute's chief of pediatric radiology since 1965 and as radiologist-in-chief at SLCH since 1992. He recently stepped down from both positions to devote more time to clinical duties. The award presentation included the unveiling of McAlister's portrait, which will be permanently displayed in the third-floor SLCH auditorium.



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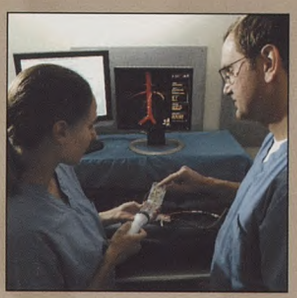


Washington University in St. Louis
SCHOOL OF MEDICINE
MIR Mallinckrodt Institute of Radiology

Visit the MIR web site at www.mir.wustl.edu

ON THE COVER Colin Derdeyn, MD, a neuroradiologist at Mallinckrodt Institute, is director of The Moyamoya Center at Washington University—one of the most experienced facilities in the United States for the diagnosis and treatment of this rare condition. Photograph by Tim Parker.

Spot News

Best Doctors in St. Louis

Once again, Mallinckrodt Institute physicians were included in the list of "Best Doctors in St. Louis" as reported in the August 2006 issue of *St. Louis Magazine*. The extensive list was excerpted from The Best Doctors in America database, which includes more than 30,000 doctors in approximately 40 medical specialties. Nominations from physicians worldwide are based on patient care rather than academic or research excellence.

While we consider all of our physicians "Top Docs," the following full-time Mallinckrodt Institute faculty appeared in the magazine's compilation:

Claire Anderson, MD
Sanjeev Bhalla, MD
Daniel Brown, MD
DeWitte Cross, MD
Michael Darcy, MD
Farrokh Dehdashti, MD
Colin Derdeyn, MD
Keith Fischer, MD
Fernando Gutierrez, MD
Jay Heiken, MD
David Hovsepian, MD
William Middleton, MD
Tom Miller, MD, PhD
Mark Mintun, MD
Barbara Monsees, MD
Christopher Moran, MD
Vamsidhar Narra, MD
Daniel Picus, MD
Henry Royal, MD
David Rubin, MD
Stuart Sagel, MD
Barry Siegel, MD
Marilyn Siegel, MD
William Totty, MD
Suresh Vedantham, MD
Pamela Woodard, MD
Franz Wippold, MD

MIR at Top of NIH Funding

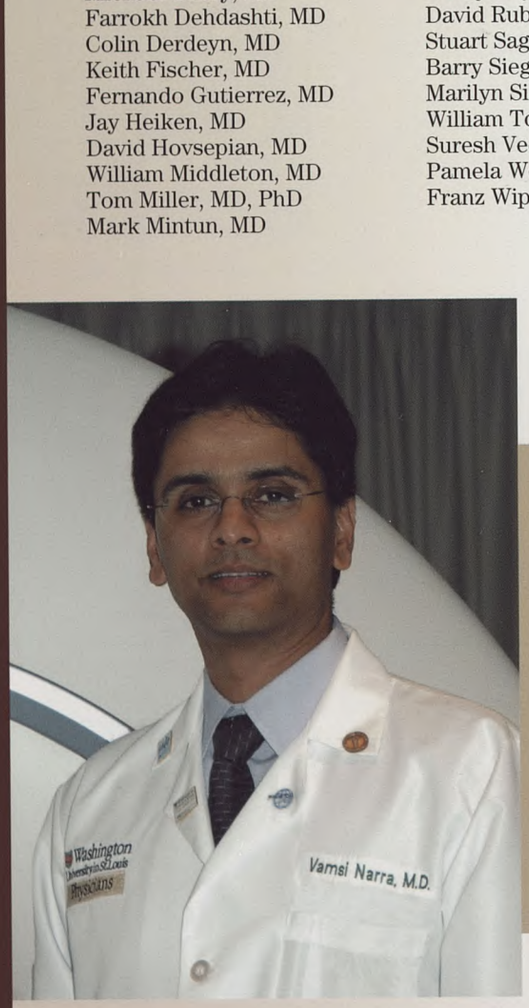
Mallinckrodt Institute has consistently been among the top medical research facilities that receive funding from the National Institutes of Health (NIH). For the second consecutive year, MIR earned the top rank in regard to NIH funding of radiology departments: 57 awards (of which 54 are research grants) for a total of $28.9 million. These figures were posted in early September by NIH and cover the 2005 fiscal year.

NIH, a part of the United States Department of Health and Human Services, is the primary Federal agency for conducting and supporting medical research. It is this research that improves people's health and saves lives. For more information about NIH, go online at www.nih.gov.

Radiology residents receive awards

Diagnostic radiology residents Kevin Johnson, MD (third year) and Yihua Zhou, MD (first year) are among the recipients of the 2006-2007 Barnes-Jewish Hospital (BJH) Center for Diversity and Cultural Competence award. The competitive awards are given to members of the Washington University Medical Center residency and fellowship training programs who have demonstrated a commitment to enhancing diversity among the BJH house staff and to improving the hospital's ability to provide culturally competent health-care services in the St. Louis community. Award recipients will participate in various activities aimed at building and strengthening a diverse culture at BJH and the Washington University Medical Center.

A key focus of the new BJH Center for Diversity and Cultural Competence is to increase recruitment and retention of minority residents and fellows. Other areas of emphasis include coordination of refugee health and interpreter services, planning for employee diversity initiatives, and support for efforts to reduce health-care disparities.



Teacher of the Year

At the annual awards dinner in June, Vamsidhar Narra, MD, associate professor of radiology and cochief of body magnetic resonance imaging, was named the 2006 Diagnostic Radiology Teacher of the Year. Radiology senior residents select the faculty member who has made outstanding contributions to resident education during the academic year.

Funding received for research fellowship

A three-year educational grant from Berlex, Inc. will sponsor a research fellowship at Mallinckrodt Institute. Berlex, a specialty pharmaceutical company, develops new diagnostic imaging techniques as well as medicines that treat multiple sclerosis, dermatological disorders, female health concerns, and cancer.

According to Jeffrey Brown, MD, professor of radiology and principal investigator for the fellowship initiative, the Berlex grant will allow a post-doctoral scientist to conduct a full-time research study of diagnostic imaging contrast agents. Applications are now being accepted for a one-year, full-time, academic research fellowship with the opportunity to apply for a second year. For more information, go online at www.mir.wustl.edu/pages/pages.asp?NavID=645.

Welch honored at symposium

Michael Welch, PhD, professor of radiology, of chemistry, and of molecular biology and pharmacology, received the International Isotope Society's Melvin Calvin Award. The award—which was presented in July at the Society's Ninth International Symposium on Isotopes and Isotopically Labelled Compounds—honors Professor Melvin Calvin, whose research on carbon dioxide assimilation in plants earned him the 1961 Nobel Prize in Chemistry.

Welch, cochief of MIR's Division of Radiological Sciences, has focused his research on developing image-enhancement agents ultimately used in clinical radiology techniques and procedures. He has been internationally acknowledged for his work on the rapid synthesis of positron organic chemicals, a vital component in the development of positron emission tomography at Mallinckrodt Institute in the early 1970s.

Michael Welch, PhD, (right) receives the Calvin Award from Scott Landvatter, treasurer of the International Isotope Society and a former graduate student who worked in Welch's laboratory at MIR.

Out with the old

The removal or installation of large pieces of equipment has become a common site around Washington University Medical Center—and particularly at Mallinckrodt Institute of Radiology, where older equipment is routinely replaced with state-of-the-art, high-tech scanners. In July, the removal of a Siemens 1.5 Tesla MAGNETOM Vision System magnetic resonance (MR) scanner from the Imaging Center on Scott Avenue necessitated a little more planning than usual. A section of the green-tinted glass front of the Imaging Center had to be removed so the multi-ton research scanner could be rolled out via a track system and loaded onto a truck. As part of Washington University School of Medicine's and Mallinckrodt Institute's commitment to local, national, and global outreach, this MR scanner will eventually find a new home in a clinic in Argentina.

In with the **new**

The new MR scanner—a 3.0 Tesla MAGNETOM TIM Trio System—was unloaded and wheeled into the Imaging Center, taking advantage of the same "glass-less" opening used to remove the other scanner. The 3.0T scanner, housed in Bay 3 on the first floor of the Imaging Center, will be used for whole body imaging.

The Mallinckrodt Institute of Radiology at Washington University Imaging Center opened on November 11, 1994. As one of the best equipped multidisciplinary facilities worldwide, the research center provides centralized resources for the scientific evaluation of imaging technology and for the development and application of advanced imaging systems, such as MR and positron emission tomography.

75 Years of Radiology Experience, Part II

The first of three installments covering the history of radiology at Washington University in St. Louis and the establishment of Mallinckrodt Institute of Radiology (MIR) appeared in the Spring 2006 issue of Focal Spot magazine. That first installment focused on the early years of radiology at Washington University, the subsequent funding of the Department of Radiology and construction of a facility to house the department, and the Institute's formative years during the1930s and '40s. The following article focuses on the1950s through the '70s—periods of groundbreaking developments in radiology technology and of rapid expansion at Mallinckrodt Institute and the Medical Center.

(Information for this three-part history of MIR was condensed from several sources, including the booklet Mallinckrodt Institute of Radiology 50th Anniversary and an informal text prepared by Sam Merenda, MD, a St. Louis radiologist.)

The Expansion Years

Soon after his arrival at MIR in 1949, Hugh Wilson, MD, defined his goals as the Institute's second director: establish radiological subspecialties—including gastroenterology, cardiac roentgenology, neuoradiology, radiotherapy, and pediatric radiology—and expand educational and training programs.

The 1950s

Establishing the School of X-ray Technology in 1950 was one of Wilson's first education initiatives. The School's curriculum was based on requirements established by the American Medical Association and the Council on Medical Education in X-ray Technology. In the beginning, the School's program included 295 hours of instruction in anatomy, physiology, radiographic technique, radiation physics, and other X-ray technology-related topics.

In 1951, Wilson moved forward with his plans to establish a radiation therapy section at MIR—a groundbreaking move since radiation therapy as a separate modality was a relatively new concept in the medical community. William Moss, MD, a graduate of Washington University School of Medicine with three years of radiation therapy training, joined the MIR faculty and was the only practicing radiation therapist in the St. Louis area. Also in 1951, Wilson expanded radiation physics activities by adding Michel Ter-Pogossian, PhD, as MIR's first radiophysicist.

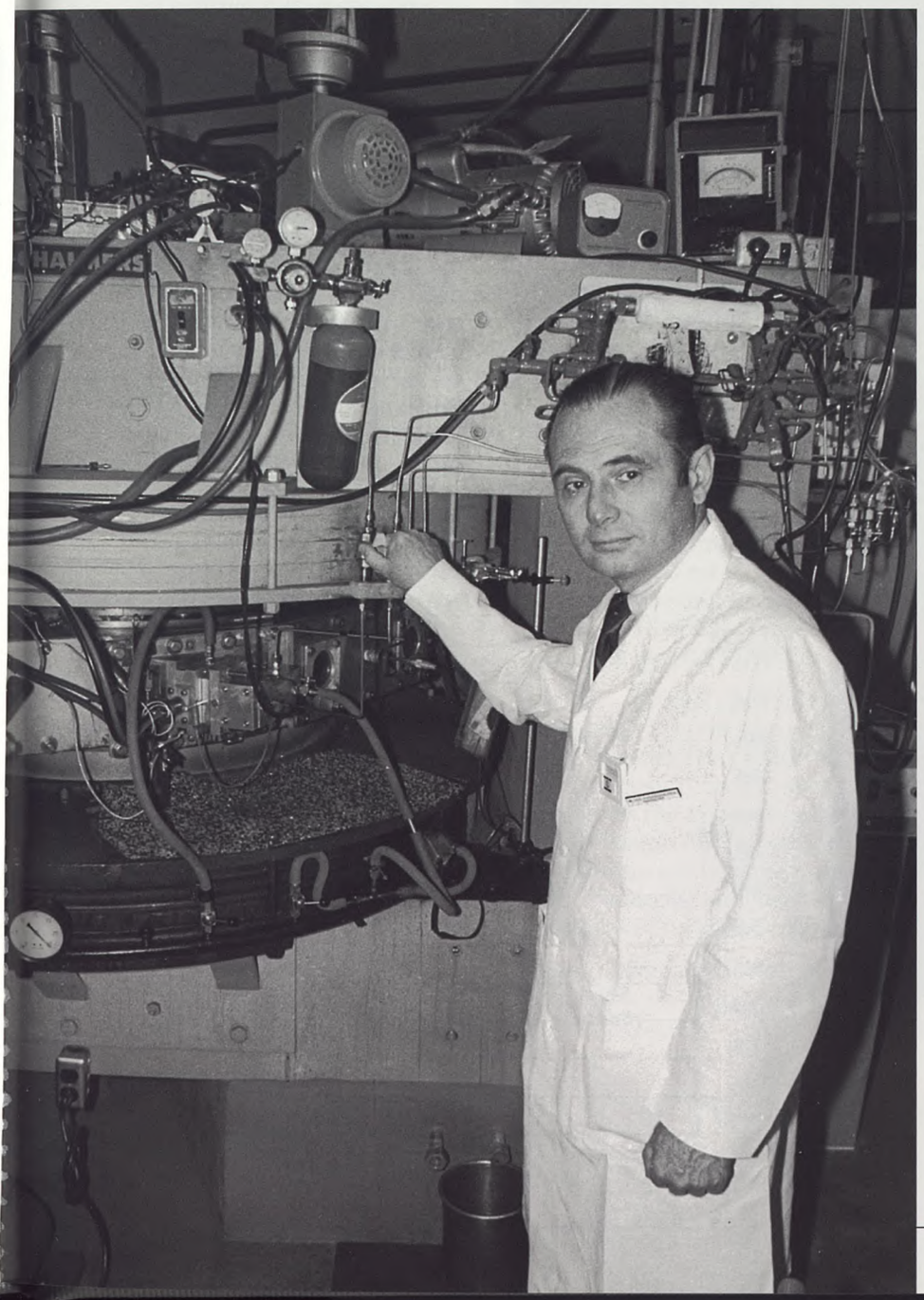
During the early 1950s "invasive" radiology, including angiography, was coming into its own. This was due in part to the Swedish radiologist Sven-Ivar Seldinger's development of vascular catheterization—placing a catheter into a vessel via a needle puncture. Although the 1949 Nobel Laureate Egas Moniz, MD, had developed the technique of X-ray cerebral angiography in 1927, Seldinger's method resulted in a safer way to perform the procedure. At Wilson's invitation, radiologists from Stockholm's Karolinska Institute came to MIR to train residents and staff in angiography procedures.

In 1958, Ter-Pogossian and William Powers, MD, who then was head of MIR's radiation therapy group, were using the University's cyclotron (in operation on the main "Hilltop" campus and primarily utilized by the Department of Physics) to study the distribution of oxygen in malignant tumors. Based on the success of their initial investigations, the United States Atomic Energy Commission provided funding for more detailed studies.

Biomedical

The 1960s

By the early 1960s Wilson had several clinical sections and research laboratories in place, including gastrointestinal radiology, cardiac radiology, pediatric radiology, neuroradiology, cardiac/peripheral angiography, radiation therapy, radiophysics, and radiation biology. A 24MeV Betatron high-energy accelerator was installed at MIR in 1962, and around 1963 an electron microscope was used to study the effects of radiation in cells. This electron microscope—which is thought to have been the first one installed at Washington University Medical Center—provided up to 2 million times higher magnification than the regular light microscopes in use in the early '60s.



Ter-Pogossian's early work with radioisotopes for biomedical research evolved into the use of cyclotron-produced short-lived isotopes, and it soon became evident that the Hilltop campus cyclotron would be inadequate for the rapidly evolving biomedical research. In 1964, a cyclotron specifically designed to produce short-lived radionuclides for biomedical use was installed in the basement of Barnard Hospital at Washington University Medical Center—the first cyclotron operating in a United States medical center.

Wilson retired in late 1963, and Marvin Friedenberg, MD, served as interim head. In 1964, after a nationwide search for a third director, Juan Taveras, MD, a distinguished neuroradiologist, arrived at Mallinckrodt Institute. Taveras soon set his own goals for the Institute: identify MIR as a major center for neuroradiology research and clinical studies, further expand the subspecialty organization, and dramatically increase the Institute's physical space.

Taveras divided the department entirely into organ-oriented specialties—for example, some clinicians in abdominal radiology specialized in gastrointestinal radiology while others specialized in genitourinary radiology. This subdivision into organ-oriented specialties was, by all accounts, the first of its kind in radiology departments in the United States. He also encouraged the acquisition of state-of-the-art equipment, including a 35MeV linear accelerator, Franklin cassette changers, and a rotating pneumoencephalogram chair used to diagnose brain obstructions. The Division of Nuclear Medicine was established in 1966 and was the

Michel Ter-Pogossian, PhD, with the first cyclotron installed at Washington University Medical Center.

Technology

first in the United States to interface a microcomputer with a gamma camera to improve the accuracy and efficiency of nuclear medicine procedures. In 1967, a radiochemistry laboratory was set up to support the Institute's expanding research involving cyclotron-produced radionuclides.

By 1969, Taveras had obtained funding for the construction of four laboratory areas and a four-story addition ("shell space") to the main MIR building. The Institute now included 13 vertical floors (12 above ground) and had space for electrical and mechanical shops, teaching facilities, biology laboratories, and support facilities for diagnostic radiology research. Plus, a new five-story building was constructed immediately to the west of the existing Institute. A memorial donation from the family of Lewis A. Scarpellino, MD, a radiologist and Washington University graduate, provided funding for the construction of an auditorium on MIR's first floor.

Taveras also addressed the teaching aspects of the Institute by establishing a series of monthly case-review and lecture sessions—called the City Wide Radiology Conference—that were well-attended by MIR faculty and St. Louis-area radiologists. He also added a technical administrator and director of radiological technology education to the MIR staff.

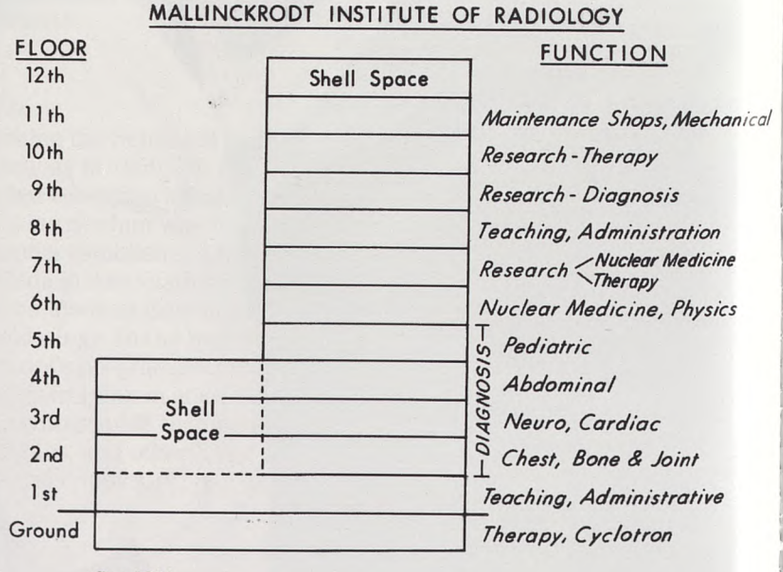
Technology Explodes

The 1970s

In 1971 Taveras accepted the position of radiologist-in-chief at Massachusetts General Hospital, and Ronald Evens, MD, was named the fourth MIR director. Evens began to launch programs necessary to sustain and to enhance a world-class radiology facility.

In the 1970s a second cyclotron was installed in the basement of Barnard Hospital, making Mallinckrodt Institute the only radiology facility to have access to two dedicated medical cyclotrons. Neuroscience researchers at Washington University Medical Center pioneered the technology for measuring blood flow and metabolism, using the short-lived radionuclides produced by the on-site cyclotrons.

(Left to right) Doctors Ronald Evens, Gilbert Jost, Stuart Sagel, and Robert Stanley discuss CT procedures with Sir Godfrey Hounsfield.



Circa 1969

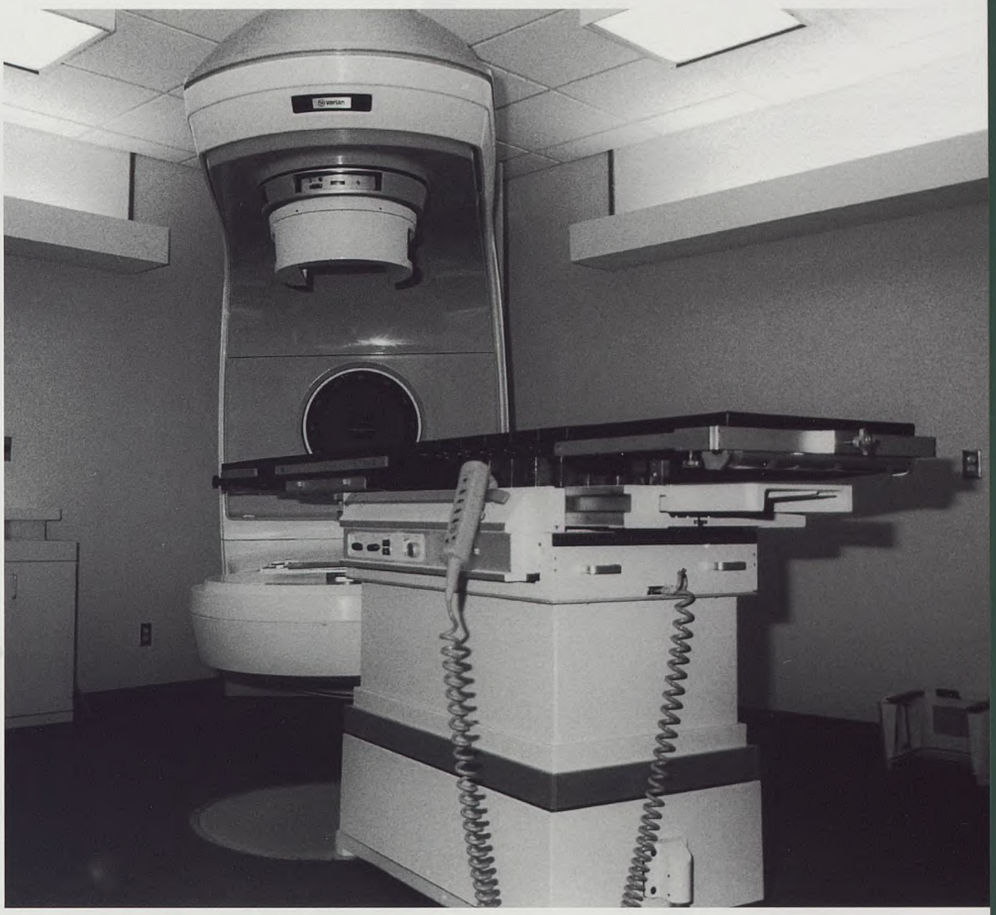
In 1972 Mallinckrodt Institute made national and international news: Sir Godfrey Hounsfield of England arrived at MIR with his prototype computed tomography (CT) head scanner, a revolutionary development that ushered in an era of high-technology, noninvasive imaging. Hounsfield later won the Nobel Prize for his invention. And, based on specifications developed by MIR scientists, the Institute received a prototype Clinac 35 linear accelerator—a high-energy, megavoltage radiation therapy machine manufactured by Varian Associates.

In the early 1970s, a team of researchers led by Ter-Pogossian developed positron emission tomography (PET), technology that identified physiologic and metabolic activity within different regions of organs and tissues. PET is one of the Institute's most impressive contributions to nuclear medicine and biomedical research. The first PET machine was designed and built at the Institute.

In 1975 MIR received one of the nation's first body CT scanners, which could obtain a cross-sectional image in approximately 18 seconds during suspended respiration.

Several changes in the Institute's organization occurred in the 1970s:

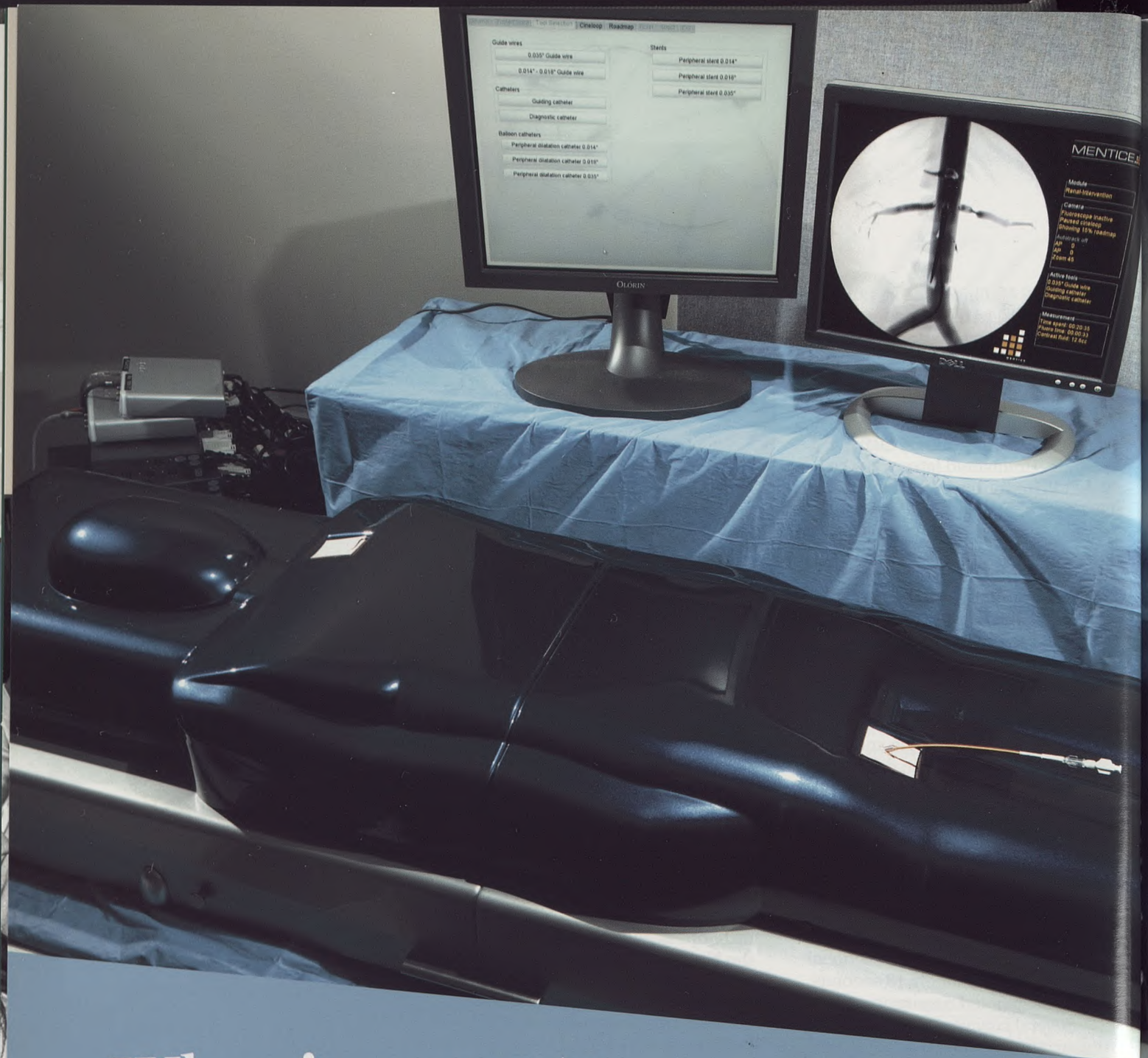
- Chest radiology section was established in 1972.
- Diagnostic ultrasound laboratory opened in 1973.
- Radiation Oncology Center, in 1974, formed the Oncology Data Center, which provided data processing support for the entire division.



The prototype Clinac 35 linear accelerator

- By 1974, all of the shell space adjacent to the Institute was finished and occupied, so MIR "set up shop" in additional areas of the Medical Center: the newly completed West Pavilion of Barnes Hospital, several areas in Barnard Hospital, and a medical building at 4511 Forest Park.
- In 1975, a large, dedicated computer system was installed on the Institute's twelfth floor, with patient registration and billing as the system's primary applications. MIR's computer facilities soon became one of the world's largest and most advanced systems of its kind.
- The Division of Radiation Sciences was organized in 1975.
- From 1975 to 1980, fellowship programs were organized for abdominal radiology, CT, genitourinary, and musculoskeletal radiology.
- The Cancer Information Center was established in 1977, one of the first such centers to provide information and services to patients with cancer, their family and friends, and physicians. MIR

Editor's note: The third and final installment of MIR's history will cover the 1980s up to the present—years that encompassed the challenges of installing an all-digital department, expanding research initiatives, improving patient care, and strengthening an already excellent program.

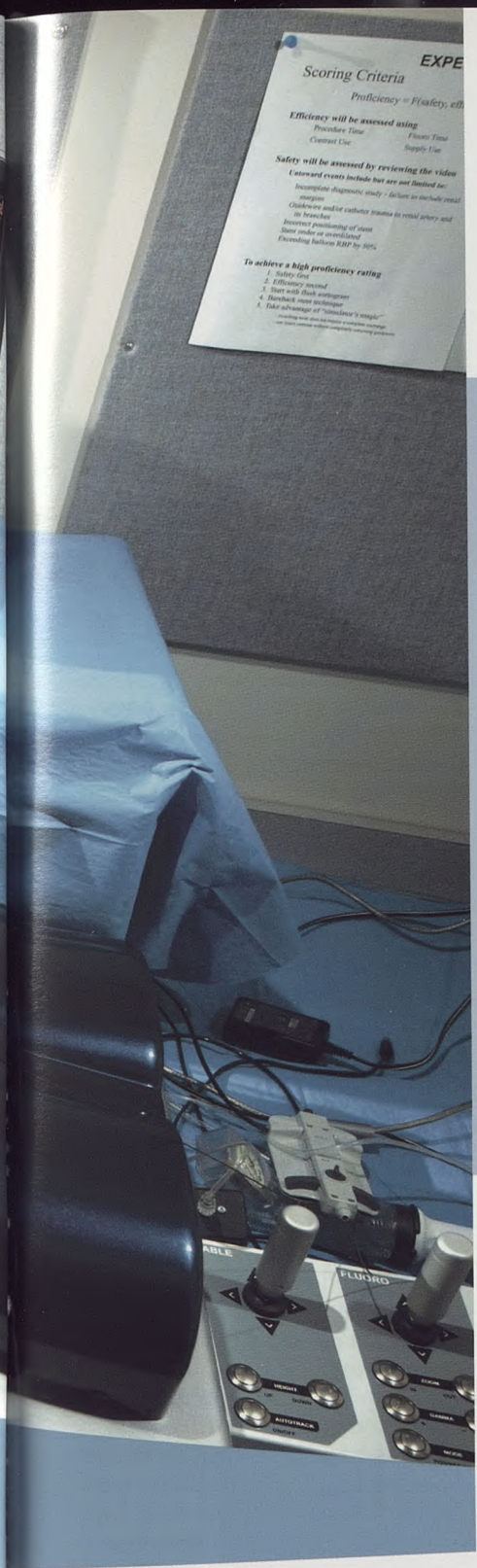


When it comes to complex imaging procedures,

Practice Makes Perfect

by Mary Jo Blackwood, RN, MPH

This article is a follow-up to the announcement about an innovative training technique for radiology residents that ran in the Winter 2005/2006 issue of *Focal Spot* magazine.



With the increasing complexity of radiology procedures, patient safety has never been more paramount. How to preserve that safety while giving radiology residents the training and skill-honing they need has led interventional radiologists to take a lesson from aircraft pilot training. Much like cockpit simulators used to improve pilots' skills, angiographic simulator training can provide much-needed practice and skill-building for endovascular techniques involving guidewires and catheters that are the mainstay of interventional radiology.

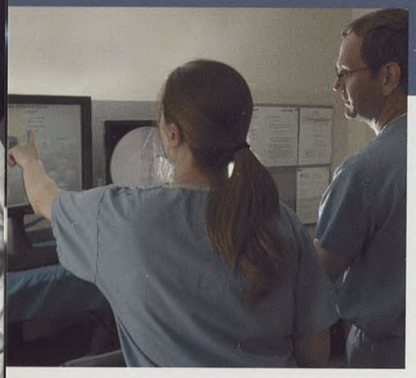
"Professional athletes practice before the main event. But the practice of medicine is not practice—for physicians, it's the main event every day. We can't practice on patients, and we don't have many opportunities to obtain practice through alternative means," says James Duncan, MD, PhD, an assistant professor of radiology and of surgery and an interventional radiologist, who likens himself to a coach for residents at Mallinckrodt Institute of Radiology (MIR). He wants to give those residents practice time for guidewire and catheter placement so they have learned from their mistakes long before a patient is involved.

"We learn more from our own mistakes, but we do everything we can to eliminate mistakes on game day," he says. With simulator training, physician "coaches" who are experts in the procedures can stage different types of common mistakes to make sure residents using the simulator can identify those mistakes and know how to prevent them.

"The test is to distinguish between good and not-so-good techniques, understand the differences, and put these ideas into practice. We are essentially deconstructing long complex procedures. Sequencing and segmenting the content is important for anyone who is learning a new task. We can lay the foundation and build on it," he adds. Duncan believes that if you want to become good at something, you should find a coach who gets you started and then be prepared to spend a lot of time practicing your skills. The simulator fills the role of the practice field.

Practice Makes Perfect

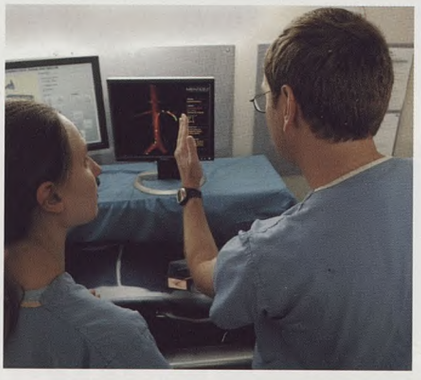
James Duncan, MD, PhD, demonstrates the capabilities of the VIST simulator to Danielle Weems, MD, a third-year diagnostic radiology resident.



Duncan has been studying how people learn. With simulators, deliberate practice can be staged. "Golfers work on every section of their game: drives, short game, and putting. It's deliberately segmented. With simulators, that segmentation can be incorporated into training. We need convincing measures of the learning curve. Can people learn four times faster? We must strive to measure skill acquisition and how much training is needed to reach different levels," he explains.

Craig Glaiberman, MD, assistant professor of radiology and an interventional radiologist, would like to see simulator training for all radiology trainees: residents and fellows. He believes the training also should be available for physicians who need to practice new or unfamiliar procedures. The simulator used by Duncan and Glaiberman is the Mentice Vascular Interventional System Trainer (VIST®); it is featured on the MIR Web site at www.mir.wustl.edu/education/internal.asp?NavID=632. Duncan and Glaiberman hope that simulation will one day be phased into the MIR radiology residency training program.

"We took the simulator to international meetings for interventional radiology experts to use and to help us compile data evaluating expert performance," says Glaiberman. "We recorded direct video output from the fluoroscopy screens, along with digital video of the practitioners' hands as they went through a procedure. We then put together a compiled video with three side-by-side screens to analyze the experts' performances. The analysis for efficiency and safety is underway and should tell us how people learn on the simulator and where simulations need to be improved, so they can be applied effectively in a teaching or testing environment."

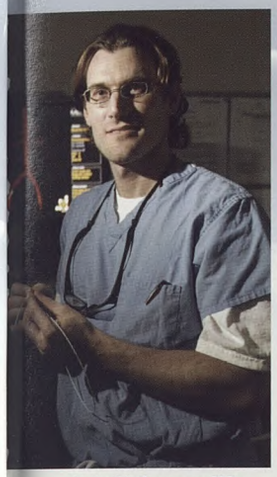


"We've taken the renal artery stenting procedures and broken them into six separate steps with defined points where specific decision-making and treatment occur. We can determine how long it takes to choose equipment, access the correct artery, and appropriately treat the lesion. With certain measures, we can use the simulator to determine who is a novice and identify specific problems a trainee has, so he or she can have additional practice on that step," Glaiberman says.

Glaiberman is quick to point out that simulators have not yet been validated. "We can't say that if you use the simulator a certain number of hours per week that your skills will improve by a defined amount. Our supposition that simulation works is based upon results obtained with aircraft pilots and flight simulators. The best way to prove the simulation works would be to feature an actual patient but, of course, we can't do that. So we have to find another way."

Assuming that simulation works, the next big hurdle, he says, is getting it into a resident curriculum that already is crammed with training courses and includes long work days. The best way, in Glaiberman's opinion, is to introduce a dedicated simulator curriculum with scheduled simulator time. "We can add other procedures as they are developed. Simulation will one day be able to replicate any procedure that uses a needle, a catheter, or a guidewire," he says.

How simulation training came to MIR



Craig Glaiberman, MD

Duncan is in total agreement—he wants the role of simulation to be increased in medical training. "The national board exam for a medical doctor's certification now includes two different types of simulation. Other medical specialties also want to include simulation in their training. NASA *[National Aeronautics and Space Administration]*, the airlines, or the military wouldn't dream of trying to train people without using simulation. As medical knowledge advances, there is so much more to learn in a finite training time. As physicians, as radiologists, we must increase efficiency in training."

The VIST will not be accessible for general medical use for a while, but Duncan and Glaiberman are working with other simulation companies. Together, with Simbionix (a leader in the development of simulation-based medical education and training), they hope that within the next six months they will have some simple simulations available for physician access via the Internet. "First, we must obtain more data on the measurable results of doing the simulation. It's all about performance assessment, which is already being done in radiology. Do you know it? Can you do it? That's the ultimate test," says Duncan. MIR

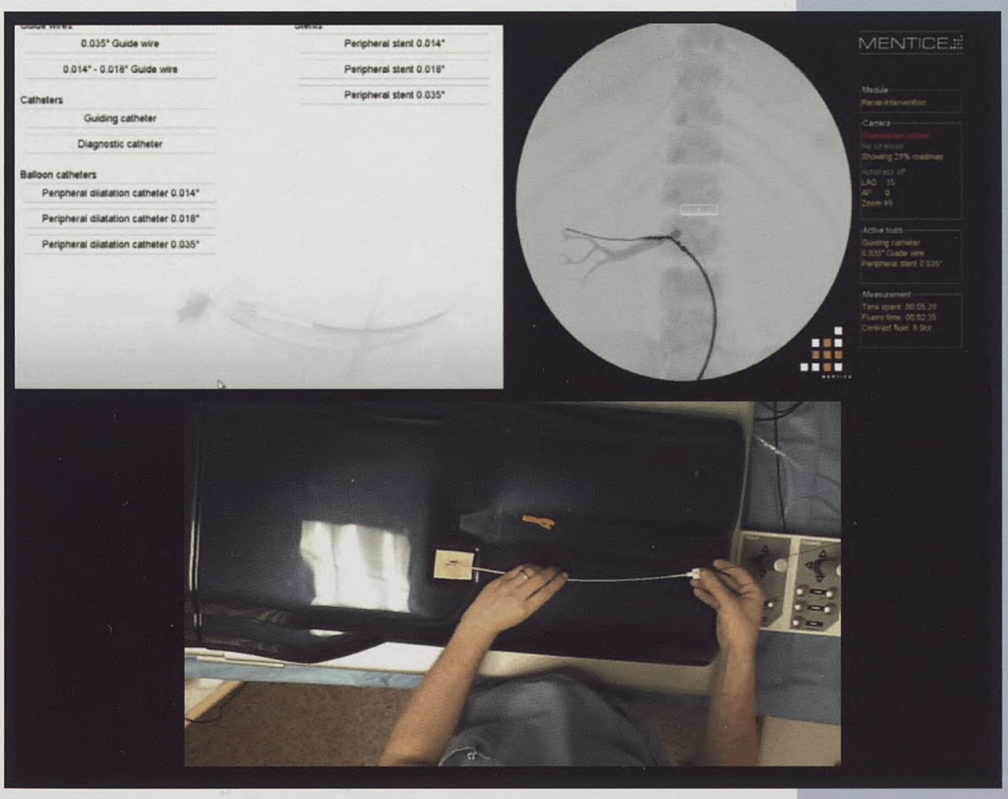
Who needs simulator practice to improve their technique while preserving patient safety? The 4,000 interventional radiologists who make up the Society of Interventional Radiology (SIR) believe that any physician who must acquire expertise in placing guidewires and catheters within the correct anatomical structures can benefit from simulation training.

But it takes funding and dedication to get all the pieces in place: Duncan and Glaiberman were able to bring the VIST system to MIR through funding from the Barnes-Jewish Hospital Foundation. A pilot grant from the Society of Interventional Radiology assisted in efficiency assessment during renal artery stent placement.

"To render errors without consequence to patients, to learn from those errors, and to practice on a realistic system until they are eliminated: these are the defining abilities of simulation that will enable the coming revolution in medical education. The ultimate beneficiary of this revolution will not be the physician; it will be our patients."

—Steven Dawson, MD, Department of Radiology, Massachusetts General Hospital Center for Integration of Medicine and Innovative Technology, Harvard Medical School, and the developer of the VIST system.

(Commentary: A Primer for Procedural Simulation. *Journal of Vascular Interventional Radiology.* 2006;17:205-213)



Right: Overhead photo of the three-on-one image of the fluoroscopy screens plus practitioner's hands during a procedure.

Moyamoya Syndrome:

a mysterious condition Like *"smoke drifting in the air"*

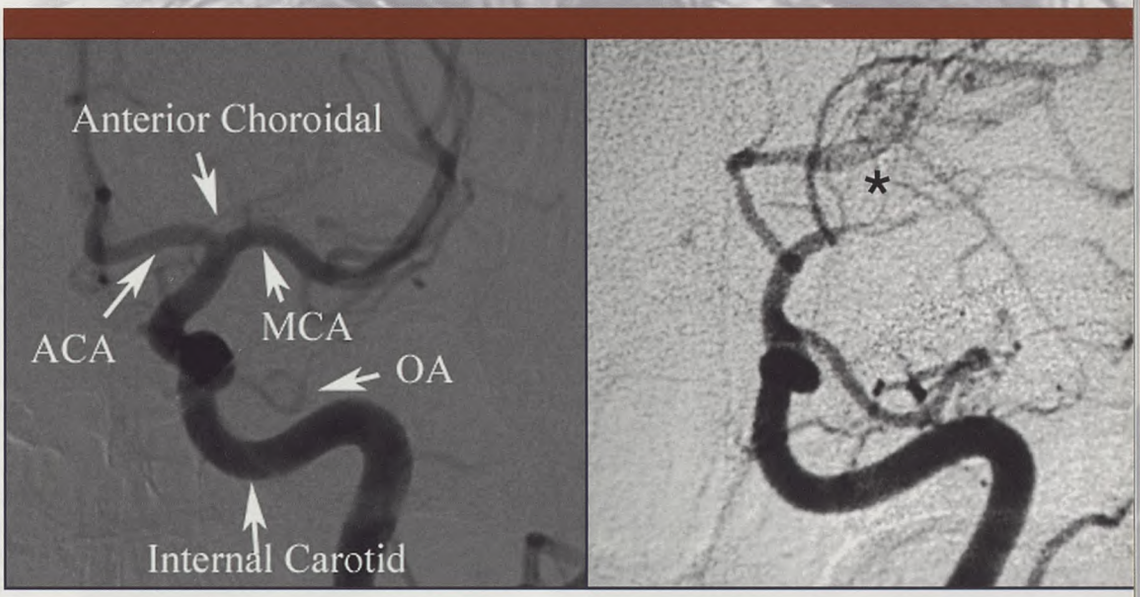
by Anne Kessen Lowell

As winter closed in on the quintessential Midwestern city of Bloomington in early 2003, Jenny Steffens was excitedly expecting her first child. She had dealt with serious health problems but was not going to let them occupy her thoughts as she and her husband prepared for "Baby" Steffens' arrival. Then, says Steffens, she filled her midwife in on her health history and "that's when things got crazy." Steffens was told that due to her condition, her pregnancy put her at risk for severe bleeding or even death.

puff of smoke

Jenny Steffens suffers from a rare, poorly understood condition with an unusual name—Moyamoya syndrome. Her midwife's concern was justified, as some patients with Moyamoya do experience serious complications during pregnancy or delivery. Steffens was fortunate to be in the care of someone who was familiar with Moyamoya. The Steffens case highlights the degree of confusion and lack of knowledge surrounding this mysterious and potentially fatal condition.

Colin Derdeyn, MD, associate professor of radiology and of neurology and neurological surgery, wants to put Moyamoya on the medical map in communities where even well-trained specialists are unfamiliar with the condition. Armed with a five-year, $1.7 million National Institutes of Health (NIH) grant, Derdeyn has established a consortium of five clinical centers in the Midwest in the first major prospective study of adult, North American patients with Moyamoya. *[Read the sidebar on page 17 for more information about participating in the clinical trial.]*



Cerebral arteriograms: (Left) Normal arterial anatomy; frontal projection after injection of left internal carotid artery that enters cranial vault and bifurcates into anterior (ACA) and middle (MCA) cerebral arteries. Ophthalmic artery (OA) and normally small anterior choroidal artery arise before the bifurcation. (Right) Changes of Moyamoya disease; frontal projection after injection of left internal carotid artery in 35-year-old woman with minor stroke in diseased, contralateral hemisphere. Normal internal carotid artery courses upward from bottom of image to a small, tapered occlusion (below asterisk); anterior and middle cerebral arteries do not fill. Above the asterisk: the "puff of smoke" appearance of enlarged lenticulostriates (branches of the middle cerebral arteries).

Condition identified half a century ago

In the 1950s in Japan, doctors identified a rare disease that was causing strokes in children. In these patients, something—perhaps a malfunctioning gene inflammation—was causing the large arteries at the base of the brain to narrow, which restricted blood flow and, thus, starved the brain of oxygen. The children's brains, struggling to compensate for this restriction, were creating a web of tiny new vessels around the narrowed arteries. These thin, twisted vessels, as viewed on an arteriogram, were christened by one of the more poetic Japanese clinicians as *moyamoya*—loosely translated as "hazy cloud like a puff of smoke" or "smoke drifting in the air."

Outside of Asia, says Derdeyn, people like Jenny Steffens—20 to 40 year olds, primarily women—are most likely to develop Moyamoya syndrome. "The North American medical community often considers Moyamoya a disorder of Asian children. Recent studies, including our own, indicate that in North America this disorder most often affects young women who are otherwise healthy," he says.

Moyamoya is not in itself a disease, although it is frequently referred to as one. Rather, it is a response of the brain's blood vessels that occurs in some cases of single or bilateral occlusion of the distal internal carotid arteries. The root cause of the narrowing of the arteries is not known. Moyamoya has been associated with other diseases, including neurofibromatosis and sickle cell anemia. But in the healthy, young, female patients seen by Derdeyn, there is no known cause or association with other diseases.

A frightening feature of Moyamoya is its progressive nature in many patients. The first sign of the disease often is a transient ischemic attack (TIA)—a brief episode of weakness or other neurological event. Because of the young age and good health of most North American patients with Moyamoya, these symptoms often are ignored or not completely investigated. Diagnosis frequently is delayed until the patient has more spells or even a stroke.

Moyamoya Syndrome:
a mysterious condition

Mary Catanzaro, RN, clinical research nurse coordinator; Lennis Lich, RT, research radiology technologist; and Colin Derdeyn, MD.

Before her official diagnosis, Jenny Steffens was frustrated by her treatment in hospital emergency departments and in doctors' offices. "People treat you like a hypochondriac," she says. "I was told that I had wax build-up in my ear, carpal tunnel syndrome, or ate too much Chinese food as a child." Months after her initial symptom of what was diagnosed as an abnormality in the carotid artery, Steffens learned she had Moyamoya. But she had no idea what to expect. Since she had no other symptoms, Steffens was told to continue her normal activities.

Goals of a multicenter trial

For most patients with Moyamoya, a stroke is the event that finally leads to a diagnosis. Although it is rare (a one in one-million occurrence in the United States), Moyamoya may account for five percent to 10 percent of strokes in people ranging from the age of 20 years to 40 years. There is a dearth of information about Moyamoya. "We need answers," says Derdeyn. "Can we predict who is at risk for future stroke? Do we need a prospective study of surgical treatment and, if so, what would that study look like?"

Derdeyn's NIH study will look closely at the ability of the brain to compensate to the arterial blockages. In some cases, the brain successfully compensates for arterial occlusion of the main arteries with a well-developed collateral network of blood vessels on the surface of the brain. "What really matters are these natural bypasses over the surface of the brain. We know that many patients with complete blockage of one or both carotid arteries—the main arteries bringing blood to the brain—have completely normal blood flow because of these natural bypasses. It is likely that patients with Moyamoya and normal brain blood flow have low risk for future stroke, as compared to those with poor flow," says Derdeyn.

The study may bring relief to patients with Moyamoya, who so far have had no idea of their future. Risk of subsequent stroke has been estimated at 10 percent per year following the first event, but there is a wide variation among patients. Many patients remain completely asymptomatic; some suffer mild ischemic attacks (called TIAs) that have a minor impact on quality of life. Others suffer a major stroke, resulting in disability or death. The primary goal of Derdeyn's study is to separate patients with Moyamoya into risk categories based on quantitative data.

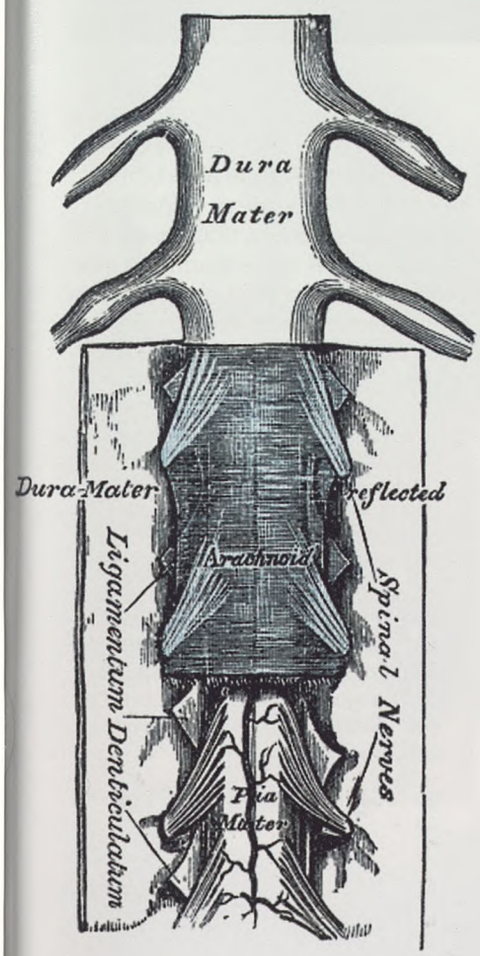
Diagnosing Moyamoya

Fear of the unknown was frustrating for Steffens: "I'm a physician's assistant, and in medicine we know so much about other conditions and making lifestyle changes. But when you come to this *[condition]*, most people just throw up their hands. My husband and I got so many opinions about what would happen to me."

Evaluating the collateral network of blood vessels in the brain is complex. In studies of patients with other forms of arterial occlusion, researchers have looked at cerebral blood flow (CBF). It appears that in response to a shutdown in the main arteries, the brain "revs up" blood flow in other areas to compensate. Maintaining CBF is the brain's first line of defense against an arterial blockage.

These natural bypasses may not be enough to maintain normal flow, however. Derdeyn believes that clinicians may be able to identify those patients with Moyamoya who are at high risk for subsequent stroke by looking at oxygen extraction fraction (OEF). If CBF is not sufficient, the brain kicks in a second compensatory mechanism: extracting a higher percentage of oxygen from the blood *[See PET image of OEF on page 18]*. But high OEF and low CBF are a dangerous duo.

In a recent study of patients with arteriosclerosis, Washington University and Mallinckrodt Institute of Radiology (MIR) researchers—led by William Powers, MD, professor of neurology, of radiology, and of neurological surgery, and William Grubb, Jr., MD, professor of neurological surgery—found that a high OEF was associated with a high risk of stroke subsequent to a first event. (Medical "poets" got involved again in labeling the condition as "misery perfusion.") Studying OEF in patients with Moyamoya may at last provide a definitive understanding of who will be at risk for future stroke.



The key to the analysis is positron emission tomography (PET) imaging. MIR scientists developed and built the first PET scanners in the late 1970s, and the Institute is a world leader in innovative uses of this technology. "What makes our study possible is the PET scanner," says Derdeyn. "Basically, angiogram, CAT *[computed axial tomography]*, and MRI *[magnetic resonance imaging]* can show us the 'highways' that bring blood to the brain, but they do not let us look at the traffic on those highways. That's what PET can do."

Making informed decisions

A secondary goal of Derdeyn's study is to help patients make informed decisions about whether to choose surgical treatment of the blockage in the distal arteries. There is currently no evidence that surgery over the long term will improve cerebral blood flow in patients with Moyamoya.

The most common surgery used for treating Moyamoya is called encephaloduralarteriosynagiosis (EDAS). In this procedure a neurosurgeon cuts a small hole in the skull and dura mater (the tough inflexible outermost layer surrounding the brain and spinal cord) and places a branch of the superficial temporal artery on top of the brain. This procedure is believed to spur development of new arterial vessels on the surface of the brain.

Derdeyn believes that more information is needed to help patients make the decision as to whether surgery is right for them. If the cerebral blood flow is already healthy because the natural bypasses (that first line of defense) are working, then surgery will not improve the patient's condition any further. Derdeyn's study will look at the outcomes of participants who choose the surgical option, and he hopes to obtain a solid estimate of surgical risk in patients with Moyamoya.

The Midwest Moyamoya Clinical Trial

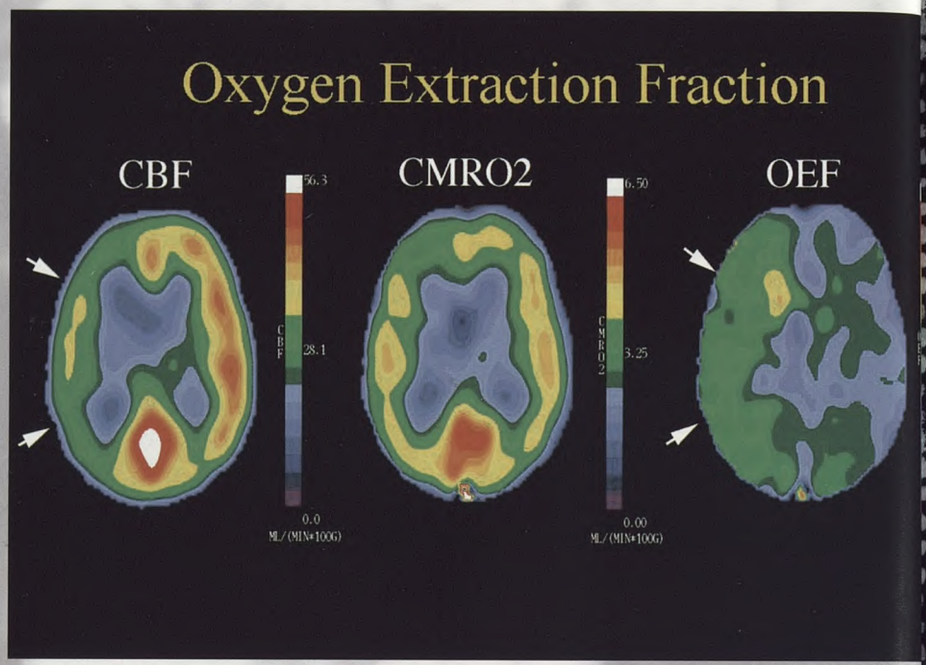
Clinical trial enrollment will begin in late 2006. In addition to Mallinckrodt Institute of Radiology at Washington University in St. Louis, participating centers include Indiana University, Bloomington; Saint Louis University, St. Louis, Missouri; University of Arkansas for Medical Sciences, Little Rock; University of Illinois, Chicago; and the University of Iowa Hospitals and Clinics, Iowa City.

Plans are to enroll 10 patients per year. Investigators will study both brain hemispheres. Patients will undergo a PET scan to evaluate OEF, and other clinical and laboratory information will be collected. Thereafter, patients will return to their participating medical center every six months for evaluation and for further determination of stroke risk. Additional PET scans will be done at one-year and three-year intervals following the patient's initial visit. For more information about enrolling in the clinical trial, call The Moyamoya Center at Washington University at (314) 362-3466.

Moyamoya Syndrome:
a mysterious condition

A leader in Moyamoya research

Washington University physicians are national leaders in the study of Moyamoya in otherwise healthy adults. It is this expertise that finally eased Jenny Steffens' worries. Her worst fears came true when she suffered a stroke during her seventh month of pregnancy. Shortly after delivering a healthy baby she had two more strokes—and they kept coming. When she was referred to Derdeyn in the fall of 2005—more than four years after her diagnosis—she was relieved to have an expert evaluate her condition. "My local neurologist had seen five cases *[of Moyamoya]*. My doctor in Chicago had more, but Doctor Derdeyn had forty-five cases. He has been so helpful to me and my husband."



This is a far cry from Steffens' visits to local practitioners when she was first diagnosed. She recalls, "Once I was waiting to see the doctor and the nurse came over and told me, 'the doctor will be in shortly but he's sitting in a corner reading a book about your condition.'" Based on Derdeyn's experience with patients with Moyamoya and in-depth understanding of the condition, he was able to determine that Steffens fit the category of patients with a good prognosis: there had been a long interval since her last symptom, and she has unilateral blockage.

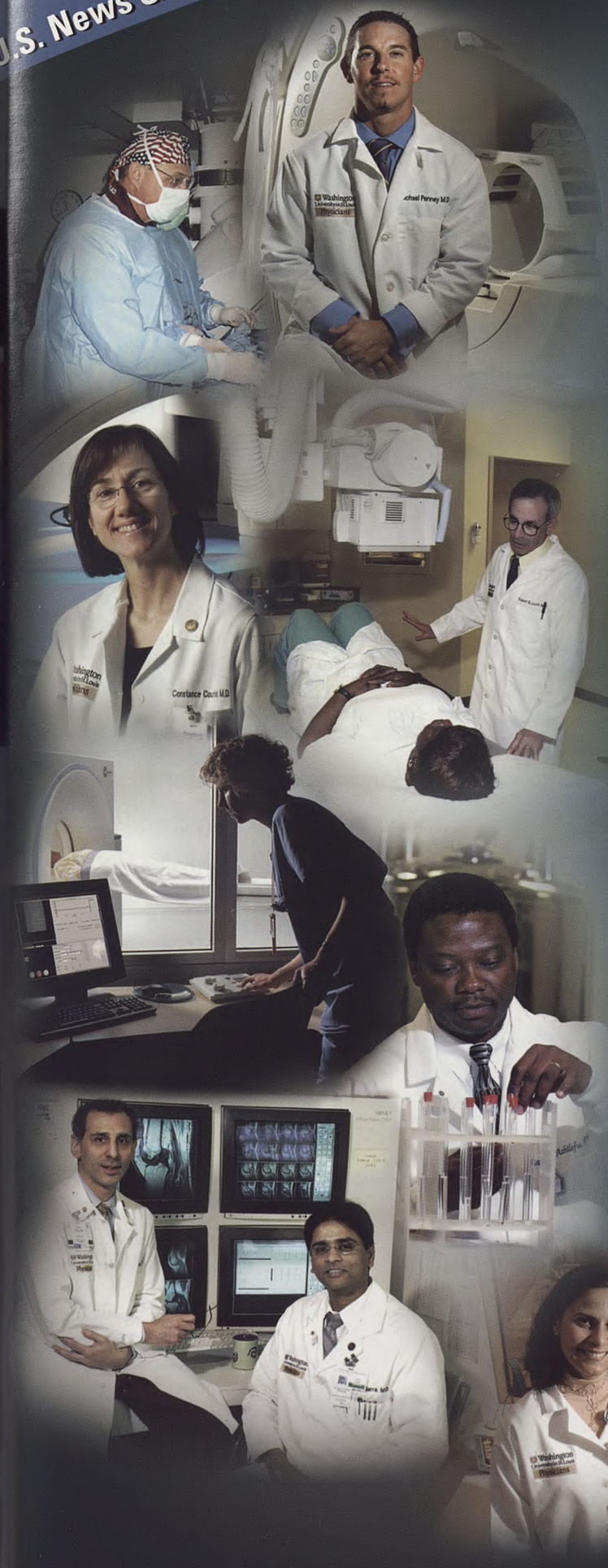
Now, with the help of PET technology and the collaborative efforts of colleagues throughout the Midwest, Derdeyn hopes to help other patients diagnosed with Moyamoya to understand the condition and its impact on their lives. For those patients, Moyamoya will become *akiraka*—clear, obvious, and evident. MIR

Editor's note: Faculty for The Moyamoya Center at Washington University include Colin Derdeyn, MD, director and associate professor of radiology and of neurology and neurological surgery; David Carpenter, MD, codirector and associate professor of neurology; and Gregory Zipfel, MD, codirector and assistant professor of neurosurgery and of neurology.

For more information about **Moyamoya syndrome**, visit these web sites:

- The Moyamoya Center at Washington University—www.neuro.wustl.edu/moyamoya/
- National Institute of Neurological Disorders and Stroke—www.ninds.nih.gov/disorders/moyamoya/moyamoya.htm
- E medicine from WebMD—www.emedicine.com/neuron/topic616.htm
- National Organization for Rare Disorders—www.rarediseases.org/search/rdbdetail_abstract.html?disname=Moyamoya%20Syndrome
- Internet support for those diagnosed with Moyamoya (includes a patient's video clip)—www.moyamoya.com
- Wikipedia, the free encyclopedia—http://en.wikipedia.org/wiki/Moyamoya_syndrome

As seen in U.S. News & World Report



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SIT & iSITE:

An Ideal Match

by Candace O'Connor

IN MID 2004, the landmark Silent Infarct Transfusion (SIT) study was one-year old, and data collection was planned to begin in two months. Patient enrollment would be international, with 28 participating clinical sites. And researchers knew that the stakes were high—this study would evaluate the effectiveness of blood transfusion therapy in preventing silent cerebral infarcts (or strokes) among children with sickle cell disease. Funding for the six-year study would come from an $18.5 million grant awarded to Washington University in St. Louis School of Medicine (WUSM) by the National Institutes of Health/National Institute of Neurological Disorders and Stroke. Michael DeBaun, MD, MPH, associate professor of pediatrics, of biostatistics, and of neurology, would head the WUSM team of investigators.

Silent Infarct Transfusion

Problem Met/ Problem Solved

But the study organizers were having a problem with the project's imaging core: a contract group hired to coordinate the expected 1,500 to 1,800 magnetic resonance (MR) imaging studies with over 300,000 images of children's brains. In an age of digital imaging, this group was planning to send actual plain films (radiographs) from place to place by express mail and then record the study results on paper.

"That was the model used for studies done in the late 1980s and early 1990s but not in this decade—and certainly not at Mallinckrodt Institute of Radiology *[MIR]*," says Robert McKinstry, MD, PhD, a pediatric neuroradiologist and associate professor of radiology, who is on SIT's Executive Committee. "Mike DeBaun asked me, 'Is there any way that radiology here at Washington University could provide the image coordination service?'"

McKinstry contacted Fred Prior, PhD, head of MIR's 27-member Electronic Radiology Laboratory (ERL), which was already serving successfully as the imaging core for two major clinical studies: The National Lung Screening Trial (NLST) and the Consortium for Radiologic Imaging Studies of Polycystic Kidney Disease (CRISP). But, could the ERL create a solid digital solution—and do it in only two months time?

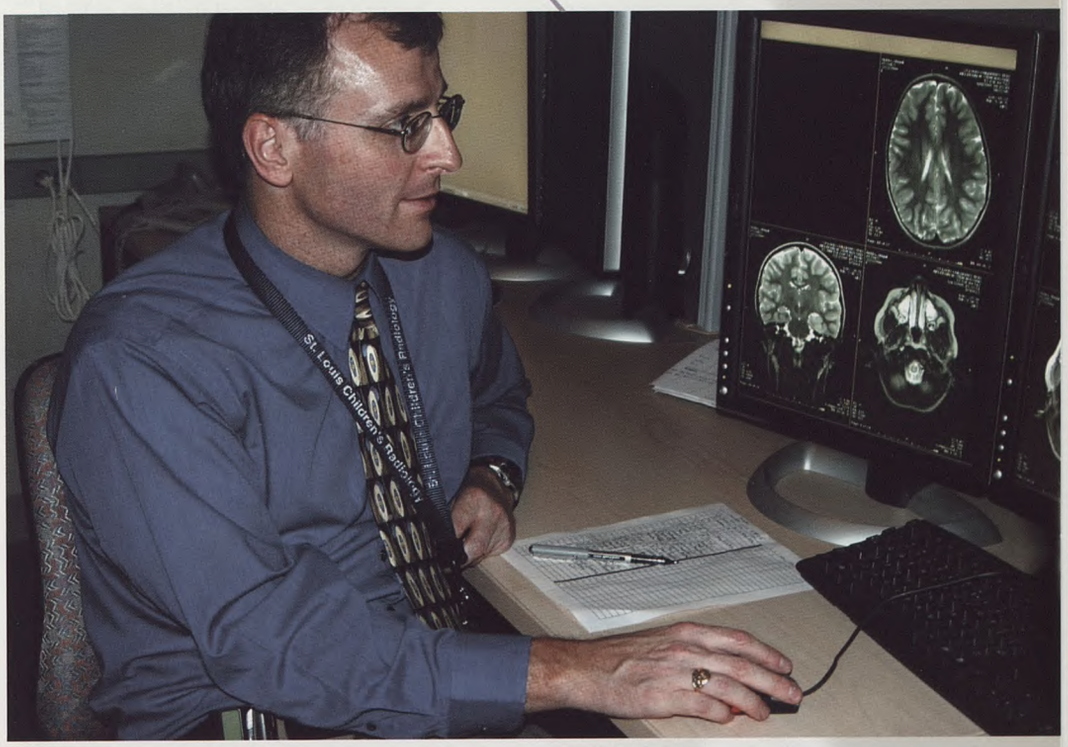
Two years later, the answer is a resounding "yes." Since the study began enrolling patients in late 2004, nearly 450 children with sickle cell disease have undergone screening MR examinations; 157 children have qualified for participation in SIT by showing signs of silent stroke-like lesions, as detected on the MR images. To date, 67 children have met all the eligibility criteria and have been randomly assigned into the observation-only arm of the trial or into its therapy arm. Children in the therapy group will receive blood transfusions, with the goal of staving off more strokes.

All the MR images have been processed by the ERL in an efficient, state-of-the-art system devised by Prior, a research associate professor of radiology, and Stephen Moore, a research assistant professor of radiology; and coordinated by Bruce Vendt, information systems project manager. For the interpretation of images the SIT trial relies on a stellar group of neuroradiologists: McKinstry, who also is chairman of the SIT radiology sub-committee; William Ball, MD, University of Cincinnati; and Michael Kraut, MD, PhD, Johns Hopkins University.

This group of reviewers has "provided immaculate service when interpreting MR images of the brain," says DeBaun. "And the ERL has provided a tremendous service to the SIT trial. They have created a system that allows an image to be processed within three days of its receipt, regardless of which one of the national or international sites is sending the image."

The Toll of Sickle Cell Disease

Sickle cell disease—a general term for a group of genetic disorders in which red blood cells contain an abnormal amount of hemoglobin and become sickle-shaped—can also reduce life expectancy. In the United States,



Robert McKinstry, MD, PhD

SIT & iSITE:
An Ideal Match

Michael DeBaun, MD, MPH, with a pediatric patient at St. Louis Children's Hospital

the disease affects mostly African Americans (one in 400, or about 50,000 people) but has been diagnosed in some Latino Americans and in people whose ancestors came from Mediterranean countries or from East India. Among African Americans, sickle cell is the most common genetic disease. Its symptoms vary from one patient to another, depending on the organs affected but may include pain in the joints, arms, legs, and back; jaundice in the eyes; and acute chest syndrome, which involves sudden difficulty in breathing, a deep cough, fever, and abdominal or chest pain.

"Sickle cell disease can be a major problem for a child," says McKinstry. "In a family with two children, one sibling may have the disease while the other doesn't. These children's lives will be very different in school performance, hospital admissions, ability to concentrate, the amount of pain they have to live with. The disease is a major determinant of a child's quality of life—it can define who that child is."

In young patients, silent cerebral infarcts are the most common neurological complication. While these infarcts may not cause immediate, clear-cut symptoms, they can lead to serious, long-term problems: poor school performance, forgetfulness, a reduced ability to follow even simple directions, and a risk for additional strokes that can cause more severe injury. Researchers estimate that 22 percent of children with sickle cell disease will have a silent stroke before they complete high school.

So it is crucial to identify these silent strokes early and to find ways to prevent more damage. DeBaun's group found in a pilot study that blood transfusion therapy could potentially be effective and, currently, blood transfusion therapy is the standard treatment for children with overt strokes. But there has been no agreed-upon way to identify or treat those children with silent strokes.

The SIT study investigators began with a hypothesis: that blood transfusion therapy in children with silent cerebral infarcts would result in at least an 86 percent reduction in the rate of new, overt or silent strokes, as determined by MR images of the brain. They decided to continue this therapy over a 36-month period, performing MR exams on patients from the intervention and the observation groups at several points: the screening stage, the beginning of the trial, and at the trial's end.

The Crucial Role of MR

Since MR images are such a key component of the study, it is critically important to interpret them correctly—yet the lesions the neuroradiologists are trying to detect and to measure are often subtle and very tiny, as small as three millimeters in diameter. If the neuroradiologists had been forced to use plain film, their task would have been even more difficult,

Check these Web sites for more information about sickle cell disease

- Washington University's SIT Study
  http://sitstudy.wustl.edu
- Sickle Cell Disease Association of America
  www.sicklecelldisease.org
- The Sickle Cell Information Center
  www.SCInfo.org
- American Stroke Association
  (type "sickle cell disease" in search box)
  www.strokeassociation.org
- Information Center for Sickle Cell and Thalassemic Disorders
  www.sickle.bwh.harvard.edu
- KidsHealth (type "sickle cell disease" in search box)
  http://kidshealth.org

since film has a fixed point of color contrast. However, with digital images the contrast settings can be varied and the lesion can be highlighted against the background of healthy brain tissue.

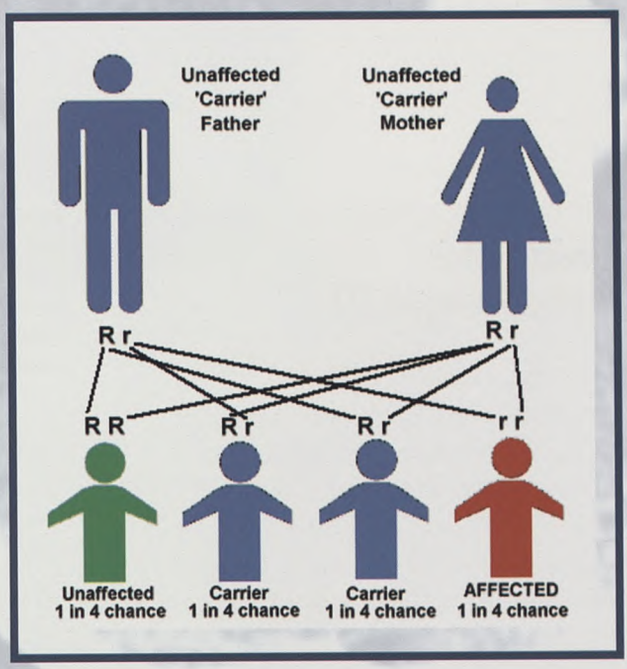
In particularly difficult cases when McKinstry, Ball, and Kraut may disagree on the findings, they can view the digital image simultaneously via their computers, discuss their findings, and come to a consensus—an impossibility with plain film images. With the technology provided by the ERL, McKinstry and his colleagues can read images in their offices, while traveling, even on vacation. All findings are recorded on a set of Web-based forms created by Paul Commean, an ERL senior research engineer.

The Digital Solution

When McKinstry came to the ERL with his image coordination dilemma, Prior knew immediately what was required to meet the SIT trial's needs: the newly released iSITE system from Stentor (now Philips Medical Systems). Thanks to its compression-based viewing software, images can appear instantaneously on laptop computer screens around the world. As it happened, the ERL had an in-house "loaner" system being used for some research projects.

The ERL team began the SIT trial using that system, and it worked flawlessly. "But one night we 'swapped in' the iSITE system that we bought from Stentor—and no one even noticed the change. The process just kept going," says Prior.

The ERL team also purchased for each neuroradiologist a two-monitor work station with calibrated displays that allows the three neuroradiologists to make precise measurements. The ERL also provided each neuroradiologist with software tools to monitor the calibration for accuracy. For other users, including a team of neurologists who receive the reviewers' findings and make further assessments of the patients, the easy-to-use, Web-based iSITE Enterprise program allows study information to be accessed by the users and displayed on their computer screens.



Autosomal recessive pattern: Sickle cell disease develops when a child inherits the defective gene from both parents. A child inheriting one healthy gene and one defective gene is a "carrier" and does not develop the disease but can pass it on.

Implementing the System

Not only did the ERL system work well, but so did Prior's choice of a project manager: Bruce Vendt. "Bruce is just a wizard at this, and largely it has been a success because of him," says Prior. "He keeps track of all the data, makes the process fairly painless for the radiologists, and does a marvelous job."

Vendt began by helping each of the clinical sites obtain the hardware and software needed to transmit images and by coordinating a method with each site's information technology (IT) staff to establish a secure connection with the ERL. He also trained the local study coordinators and radiology staffs on using ERL-developed software to transmit the MR images.

"One of the biggest challenges is collecting the MR images and reporting the findings while protecting confidential patient information," says Vendt. "We worked closely with the radiology and IT staffs at each site to establish a HIPAA *[Health Insurance Portability and Accountability]*-compliant system. Our process not only provides the encrypted electronic transmission of images but also removes any patient information, which keeps the radiologists 'blinded' to the demographics of each patient."

As an additional safeguard Joan Moulton and Mary Wolfsberger, ERL data analysts, perform an extensive quality assurance review of each MR study before it is uploaded to the iSITE viewing system.

"The methods devised by the ERL can be extended," adds McKinstry. "If a form must be added to the evaluation, we look at that as a team, the ERL implements it, and the form becomes part of our process. It's an incredibly seamless operation."

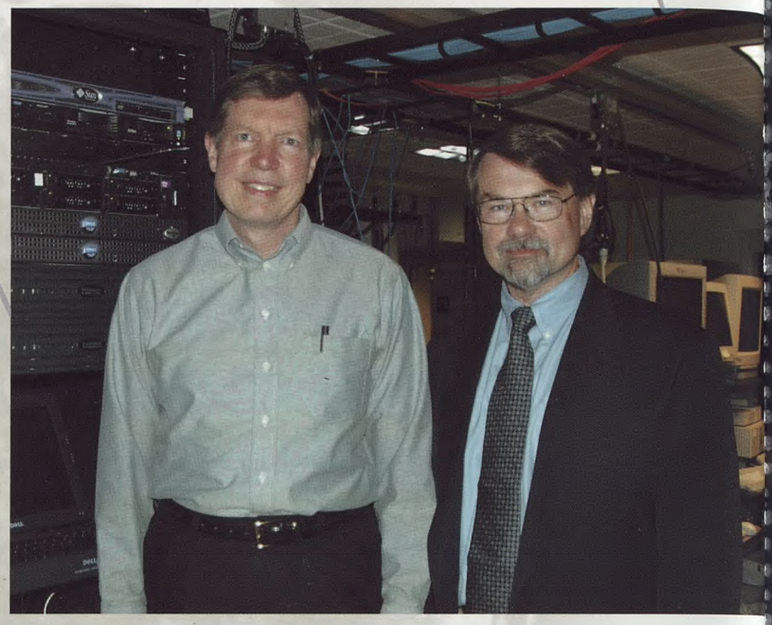
"We *[the ERL]* specialize in IT solutions for various aspects of radiology and medical imaging, but participating in multicenter clinical trials is important," says Prior. "That's a critical form of clinical and translational research, and we are pleased to make a contribution to such a significant trial."

SIT&iSITE:
An Ideal Match

Clinical Sites Participating in SIT

- University of Cincinnati (Ohio)
- Medical College of Wisconsin (Milwaukee)
- Ohio State University (Columbus)
- University of Arkansas (Little Rock)
- University of Southern California (Los Angeles)
- University of Alabama (Birmingham)
- University of Mississippi (Jackson)
- Case Western Reserve University (Cleveland, Ohio)
- Baylor College of Medicine (Houston, Texas)
- Tulane University (New Orleans, Louisiana)
- Wake Forest University (Winston-Salem, North Carolina)
- State University of New York (Brooklyn)
- University of Texas Southwestern (Dallas)
- Children's National Medical Center (Washington, DC)
- Riley Hospital for Children (Indianapolis, Indiana)
- Wayne State University (Detroit, Michigan)
- Northwestern University (Evanston, Illinois)
- University of Missouri (Kansas City)
- Washington University in St. Louis (Missouri)
- University of Toronto (Ontario, Canada)
- University of North Carolina (Chapel Hill)
- Centre Hospitalier Intercommunal de Créteil (Paris, France)
- East Carolina University (Greenville, North Carolina)
- Johns Hopkins University (Baltimore, Maryland)
- Georgetown University (Washington, DC)
- Sinai Hospital (Baltimore, Maryland)
- University of Maryland (College Park)
- University College of London (England)*

*London has 4 sub sites: Guy's (near London Bridge) and St. Thomas' (near Westminster) hospitals; The Royal London Hospital, Whitechapel; Central Middlesex Hospital; and King's College London.



Bruce Vendt (left) and Fred Prior, PhD, in the Electronic Radiology Laboratory

Clinical Surprises

One of the forms built into the ERL's SIT reporting system is an Incidental Findings Report, which enables the reviewers to send word of any potentially worrisome findings to the child's clinical team. In two study cases, brain lesions that might have been tumors were detected, and images of one child's spinal cord showed a large cavity.

Interpreting these images requires extensive training, especially if a reviewer is not accustomed to looking at pediatric brain images. Neuroradiologists specializing in adult patients are used to seeing specks—little white spots that probably are related to atherosclerotic disease—on images of the brain. "But children haven't aged to the point where they develop those types of diseases; they shouldn't have anything wrong with their brains," says McKinstry. "Our team has established rules that are being prospectively applied here in a randomized trial format for the first time. We hope to report these guidelines to the pediatric radiology and neuroradiology community, so they also can better detect these lesions."

In another on-going study of normal brain development, the investigators have not seen nearly as many incidental findings as they have in the SIT trial. According to McKinstry, healthy children generally have healthy brains. So the incidental findings in this study, which shows that sickle cell disease is more devastating than previously thought, are quite "stunning." The investigators have further learned that previous reports estimating the number of children with sickle cell disease who have silent cerebral infarcts are not correct: Many more children have these lesions than anyone had thought. Instead of the previously reported typical rate of 20 percent positive scans, the SIT investigators are finding a 35-percent rate.

"We expected a certain percentage of children who had these silent infarcts to have another one during the trial," McKinstry says. "What is worrisome from a radiological perspective is that we have already seen some children progress from having a silent stroke to having a major occurrence. Although, since they are randomly assigned into groups, we have no idea which arm of the trial they are in. But to have a child under your care go on to have a major stroke really hammers home why we are doing this study," he says. MIR

UPDATE

The Center for CLINICAL IMAGING Research

There's been a flurry of activity in the vacant area on 10 West Pavilion, which will eventually house Mallinckrodt Institute's Center for Clinical Imaging Research (CCIR). The 9,000 square-foot area was totally gutted, and workers are now reinforcing floor and ceiling space to accommodate the Center's array of high-tech imaging equipment—including high-powered magnetic resonance imaging, 64-slice computed tomography (CT), high resolution positron emission tomography (PET), advanced PET-CT, and 3-D ultrasound.

The CCIR will be an integral part of BioMed 21, Washington University's initiative to accelerate the development of basic science discoveries into new and improved patient treatments. According to Mark Mintun, MD, director of the CCIR and chief of Mallinckrodt Institute's recently established Division of Research Development, the CCIR will provide a broad support for research programs in every department of the medical school and stimulate basic and translational clinical research.

FYI

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

New Faculty

Catherine Appleton, MD, instructor in radiology, Breast Imaging Section, Division of Diagnostic Radiology.

Tammie Benzinger, MD, PhD, instructor in radiology, Neuroradiology Section, Division of Diagnostic Radiology.

Andrew Bierhals, MD, MPH, instructor in radiology, Thoracic Imaging Section, Division of Diagnostic Radiology.

Delphine Chen, MD, instructor in radiology, Division of Nuclear Medicine.

Matthew Parsons, MD, instructor in radiology, Neuroradiology Section, Division of Diagnostic Radiology.

Christine Peterson, MD, instructor in radiology, Abdominal Imaging Section, Division of Diagnostic Radiology.

Aseem Sharma, MD, assistant professor of radiology, Neuroradiology Section, Division of Diagnostic Radiology.

First-Year Fellows

Rashid ALSukaiti, MD, abdominal imaging clinical fellow, received an undergraduate degree and a medical degree from Sultan Qaboos University. He completed an internship and a residency at Montreal General Hospital/McGill University.

Anu Bansal, MD, neuroradiology clinical fellow, received an undergraduate degree from Harvard University and a medical degree from Albert Einstein College of Medicine. He completed an internship at Beth Israel Medical Center and a residency at Brigham & Women's Hospital.

Aaron Biala, MD, neuroradiology clinical fellow, received an undergraduate degree from Claremont Pitzer College and a medical degree from the State University of New York (SUNY) College of Medicine. He completed an internship and a residency at SUNY Downstate Medical Center.

David Chang, MD, neuroradiology clinical fellow, received an undergraduate degree from Stanford University and a medical degree from Yale University School of Medicine. He completed an internship at Yale-New Haven Hospital.

Wincha Chong, MD, magnetic resonance imaging clinical fellow, received an undergraduate degree from Brown University and a medical degree from Washington University in St. Louis. She completed transitional training at the University of Hawaii and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Daniel Cohen, MD, magnetic resonance imaging clinical fellow, received an undergraduate degree and a medical degree from Washington University in St. Louis School of Medicine. He completed transitional training at St. John's Mercy Medical Center and a residency at Massachusetts General Hospital.

Jamie Colonnello, MD, musculoskeletal radiology clinical fellow, received an undergraduate degree from the University of California, Davis, and a medical degree from Saint Louis University School of Medicine. He completed an internship at Loyola University and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Ryan Cook, MD, interventional radiology clinical fellow, received an undergraduate degree from Brigham Young University and a medical degree from Saint Louis University School of Medicine. He completed an internship at St. Mary's Health Center and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Zoltan Cseri, MD, neuroradiology clinical fellow, received an undergraduate degree from Miami University and a medical degree from the University of Louisville School of Medicine. He completed an internship and a residency at Saint Louis University.

Kerri Dias, MD, breast imaging clinical fellow, received an undergraduate degree from Southern Illinois University, Edwardsville, and a medical degree from Southern Illinois University, Springfield. She completed an internship through the University of Missouri-Columbia Health Care Network and a residency at St. Luke's Medical Center.

Christine Doherty, MD, abdominal imaging clinical fellow, received an undergraduate degree from Truman State University and a medical degree from Southern Illinois University, Springfield. She completed an internship at Forest Park Hospital and a residency at Saint Louis University.

Nelson Elkins, MD, neuroradiology clinical fellow, received an undergraduate degree from the University of Texas, Austin, and a medical degree from Texas Tech University. He completed an internship at Presbyterian Hospital and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Brian Goelitz, MD, interventional radiology clinical fellow, received an undergraduate degree from the University of Illinois, Urbana, and a medical degree from Loyola University Chicago, Stritch School of Medicine. He completed an internship and a residency at Loyola University Medical Center.

Sean Higginson, MD, neuroradiology clinical fellow, received an undergraduate degree from Wilkes University and a medical degree from the Medical College of Pennsylvania, Hahnemann University. He completed an internship at Chestnut Hill Hospital and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

FYI

Jason Kerr, MD, interventional radiology clinical fellow, received an undergraduate degree from Brigham Young University and a medical degree from the University of California, San Francisco. He completed an internship at the Mayo Clinic, Scottsdale, and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Raisa Lev, MD, neuroradiology clinical fellow, received an undergraduate degree from the University of the Sciences in Philadelphia and a medical degree from McGill University School of Medicine. She completed transitional training at Frankford Medical Center and a residency at the University of California, Irvine.

Michael Lin, MD, abdominal imaging clinical fellow, received an undergraduate degree from Northwestern University and a medical degree from Rush Medical College. He completed an internship at Rush University Medical Center and a residency at University of Illinois Chicago-Mercy Hospital and Medical Center.

Judy Liu, MD, magnetic resonance imaging clinical fellow, received an undergraduate degree from the University of California, Los Angeles, and a medical degree from Washington University in St. Louis School of Medicine. She completed an internship at Arrowhead Regional Medical Center and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Prakash Masand, MD, pediatric radiology clinical fellow, received an undergraduate degree from Jaihind College and a medical degree from Topiwala National Medical College. He completed an internship and a residency at Nair Hospital, Topiwala National Medical College.

David Niebruegge, MD, neuroradiology clinical fellow, received an undergraduate degree from Saint Louis University and a medical degree from Loyola University Chicago, Stritch School of Medicine. He completed transitional training at Saint Louis University and an internship at Resurrection Medical College.

Ashesh Parikh, MD, interventional radiology clinical fellow, received an undergraduate degree and a medical degree from Northwestern University. He completed an internship at the University of California, San Francisco, and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Kathryn Robinson, MD, abdominal imaging clinical fellow, received an undergraduate degree from the University of Pennsylvania and a medical degree from the State University of New York at Stony Brook. She completed an internship at Winthrop University Hospital and a residency at Nassau University Medical Center.

Humberto Rosas, MD, musculoskeletal radiology clinical fellow, received an undergraduate degree from Stanford University and a medical degree from Duke University School of Medicine. He completed transitional training at Barnes-Jewish Hospital and four years of diagnostic radiology training at Mallinckrodt Institute of Radiology.

Karun Sharma, MD, PhD, interventional radiology clinical fellow, received an undergraduate degree from the College of William and Mary, a medical degree from the Medical College of Virginia, and a doctoral degree from Virginia Commonwealth University. He completed an internship at the Medical College of Virginia and four years of diagnostic radiology training (chief resident 2005-2006) at Mallinckrodt Institute of Radiology.

Anand Suresh, MD, musculoskeletal radiology clinical fellow, received an undergraduate degree and a medical degree from Saint Louis University. He completed transitional training at St. John's Mercy Medical Center and a residency at the University of Washington.

Daniel Wessell, MD, PhD, musculoskeletal radiology clinical fellow, received an undergraduate degree from North Carolina State University and a medical degree and a doctoral degree from the University of North Carolina. He completed an internship at Western Pennsylvania Hospital and four years of diagnostic radiology training (chief resident 2005-2006) at Mallinckrodt Institute of Radiology.

John Winn, MD, neuroradiology clinical fellow, received an undergraduate degree and a medical degree from the University of Missouri-Kansas City. He completed preliminary training at St. Mary's Medical Center and a residency at Saint Louis University.

Jason Yewell, JD, MD, abdominal imaging clinical fellow, received an undergraduate degree from Transylvania University and a law degree and a medical degree from the University of Kentucky. He completed an internship at St. Vincent Indianapolis Hospital and a residency at Eastern Virginia Medical School.

First-Year Diagnostic Radiology Residents

Celine Buckley, MD, received an undergraduate degree from Yale University and a medical degree from the University of Pittsburgh School of Medicine. She completed a surgery residency at Washington University in St. Louis School of Medicine.

John Burkett, MD, received an undergraduate degree from Transylvania University and a medical degree from the University of Kentucky College of Medicine. He completed transitional training at Barnes-Jewish Hospital.

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First-Year Diagnostic Radiology Residents

Continued from page 27

Victoria Chen, MD, received an undergraduate degree from Stanford University and a medical degree from Washington University in St. Louis School of Medicine. She completed transitional training at St. John's Mercy Medical Center.

Ferenc Czeyda-Pommersheim, MD, received an undergraduate degree from Marquette University and a medical degree from Georgetown University School of Medicine. He completed transitional training at Georgetown University.

Kathryn Fowler, MD, received an undergraduate degree from the University of South Carolina and a medical degree from the University of Wisconsin School of Medicine and Public Health, Madison. She completed transitional training at St. John's Mercy Medical Center.

Matthew Gipson, MD, received an undergraduate degree from the University of Colorado and a medical degree from New York Medical College. He completed transitional training at Saint Joseph Hospital.

William Grande, MD, received an undergraduate degree from Northwestern University and a medical degree from the University of Pennsylvania School of Medicine. He completed transitional training at St. John's Mercy Medical Center.

Travis Henry, MD, received an undergraduate degree from Virginia Polytechnic Institute and State University and a medical degree from Vanderbilt University School of Medicine. He completed transitional training at Vanderbilt University.

Alex Hofling, MD, PhD, received an undergraduate degree from Cornell University and a medical degree from Washington University in St. Louis School of Medicine. He completed transitional training at Forest Park Hospital.

Yasha Kadkhodayan, MD, received an undergraduate degree from the University of Illinois and a medical degree from Washington University in St. Louis School of Medicine. He completed transitional training at Barnes-Jewish Hospital.

James Kelly, MD, received an undergraduate degree from the University of Notre Dame and a medical degree from Washington University in St. Louis School of Medicine. He completed transitional training at St. John's Mercy Medical Center.

Cade McDowell, MD, received an undergraduate degree from Texas A&M University and a medical degree from the University of Texas Medical School at Houston. He completed transitional training at CHRISTUS St. Joseph Hospital.

Salil Patel, MD, received an undergraduate degree from Rice University and a medical degree from Johns Hopkins School of Medicine. He completed transitional training at CHRISTUS St. Joseph Hospital.

Benjamin Pettus, MD, PhD, received an undergraduate degree from Point Loma Nazarene University and a medical degree and a doctoral degree from the Medical University of South Carolina. He completed transitional training at Riverside Regional Medical Center.

Edmund Pillsbury, MD, received an undergraduate degree from Yale University and a medical degree from Baylor College of Medicine. He completed transitional training at the University of Texas Medical School at Houston.

Lance Reinsmith, MD, received an undergraduate degree from the University of Texas, Austin, and a medical degree from Baylor College of Medicine. He completed transitional training at St. Vincent Hospital.

Kyle Shipley, MD, received an undergraduate degree from the University of Texas, Austin, and a medical degree from the University of Texas Medical School at Galveston. He completed preliminary training at the University of Texas at Galveston.

Yihua Zhou, MD, PhD, received an undergraduate degree from Capital University of Medical Sciences, a medical degree from Zunyi Medical College, and a doctoral degree from Ohio University. He completed transitional training at St. Luke's Hospital.

First-year Nuclear Medicine Residents

Xiaoni Hong, MD, received a medical degree from, Xi'an Medical University. She completed an internship at Wyoming Family Practice Center and a residency at Beijing Medical University.

Shane Inoue, MD, received an undergraduate degree from the University of Hawaii and a medical degree from Washington University in St. Louis School of Medicine. He completed an internship and an orthopedic surgery residency at The Queen's Medical Center.

Brandon Peters, MD, received an undergraduate degree from Birmingham Southern College and a medical degree from the University of South Alabama College of Medicine. He completed an internship and a residency at the Medical College of Georgia.

Grants

Kevin Black, MD, associate professor of psychiatry, of neurology, of radiology, and of anatomy and neurobiology, as principal investigator, received a $1.3 million grant from the National Institutes of Health/National Institute of Mental Health to study "Dopaminergic effects on cortical function in Tourette's." Coinvestigator for the five-year grant is **Tamara Hershey, PhD**, assistant professor of psychiatry and of radiology.

James Duncan, MD, PhD, assistant professor of radiology, as principal investigator (and mentor for medical student and radiology predoctoral trainee Benjamin Jacobs), received a one-year Society of Interventional Radiology Foundation Medical Student Research grant for $2,000 to study "Measuring efficiency during simulated renal stent placement."

Craig Glaiberman, MD, assistant professor of radiology, as principal investigator, received a one-year Society of Interventional Radiology Foundation Pilot Research grant in the amount of $25,000 to study "Assessing proficiency during simulated renal artery stent placement."

Jennifer Gould, MD, assistant professor of radiology, as principal investigator, received a three-year Society of Interventional Radiology Foundation Clinical Fellowship Research Training Program grant in the amount of $30,000 for the project "IVR clinical fellowship and research training."

Bradley Schlaggar, MD, PhD, assistant professor of neurology, of pediatrics, and of radiology, as principal investigator, received a five-year, $818,905 grant from the National Institutes of Health for the research project "Development of orthographic knowledge: fMRI studies."

Appointments/ Elections

Samuel Achilefu, PhD, associate professor of radiology, was elected to a two-year term as councilor for the Society of Molecular Imaging. He was named co-chairman of the Engineering Conference International—Advances in Optics for Medicine and Surgery to be held in Naples, Florida, June 10-14, 2007.

Colin Derdeyn, MD, associate professor of radiology and of neurology and neurological surgery, was elected to a one-year term as chairman of the Nominating Committee of the American Society of Interventional and Therapeutic Neuroradiology. He was appointed to a two-year term as a member of the Marketing and Communications Committee of the American Heart Association.

John Kotyk, PhD, research associate professor of radiology, was appointed to a three-year term on the Board of Directors of the Society of Noninvasive Imaging in Drug Development.

Linda Larson-Prior, PhD, research associate professor of radiology, and **Joseph Culver, PhD**, assistant professor of radiology, were appointed co-organizers of the Frontiers in Imaging Brain Energetics and Electrical Activity symposium at the IEEE/NLM Life Science Systems and Applications Workshop, National Library of Medicine, Washington, DC, July 13 and 14.

Robert McKinstry, MD, PhD, associate professor of radiology, was appointed to the Expert Committee Review Panel for the Canada Foundation for Innovation meeting, Toronto, Ontario, Canada, June 20 and 21.

Robert Mach, PhD, professor of radiology, was elected vice president of the Radiopharmaceutical Science Council of the Society of Nuclear Medicine.

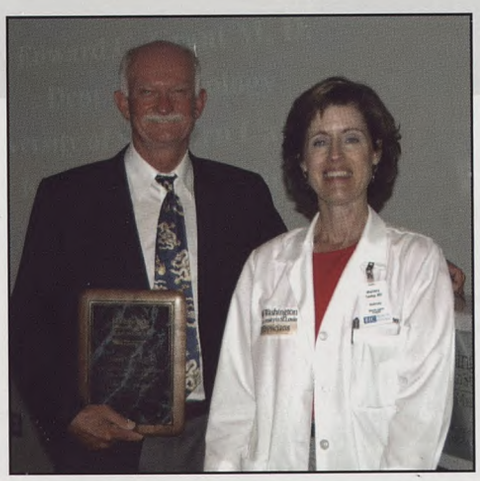
Joel Perlmutter, MD, professor of neurology, of radiology, and of physical therapy, was appointed chairman of the Standards Committee of the Huntington's Study Group.

Yoram Rudy, PhD, professor of engineering, of biomedical engineering, cell biology and physiology, and of medicine, and research professor of radiology, was elected to a two-year term as president of the Cardiac Electrophysiology Society. He was appointed as the Washington University in St. Louis ambassador to Technion-Israel Institute of Technology (a member of the McDonnell International Scholars Academy), Haifa, Israel

Honors/Awards

Kevin Black, MD, associate professor of psychiatry, of neurology, of radiology, and of anatomy and neurobiology, was named a fellow of the American Neuropsychiatric Association.

Yoram Rudy, PhD, professor of engineering, of biomedical engineering, cell biology and physiology, and of medicine, and research professor of radiology, was named a fellow of the Heart Rhythm Society.



Sharlene Teefey, MD head of MIR's ultrasonography, is shown with Grant in Scarpellino Auditorium.

Melson Lecture

On August 30, 2006, Edward Grant, MD, professor and chairman, Department of Radiology, University of Southern California, Los Angeles, presented the Fourteenth Annual G. Leland Melson Visiting Professorship and Lecture. He spoke on "Beyond the bifurcation: There's more to carotid ultrasound than stenosis."

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LECTURES

Samuel Achilefu, PhD, associate professor of radiology, presented "Molecular probe-assisted optical imaging of diseases" at the Seminar Series "Translational research in biomedical engineering," sponsored by the Biomedical Engineering Department, Florida International University, Miami, June 6. As visiting professor, he spoke on "Molecular optical imaging in humans and small animals" at the Food and Drug Administration Center for Drug Evaluation and Research, Bethesda, Maryland, June 13. He presented "Spying on tumors with optical molecular probes" at the Université de Montréal/L École Polytechnique, Montreal, Quebec, Canada, June 15.

Kevin Black, MD, associate professor of psychiatry, of neurology, of radiology, and of anatomy and neurobiology, presented "Parkinson disease blues (and reds and yellows): neuroimaging of depression in PD" to the British Association for Psychopharmacology, Oxford, England, July 25.

Jeffrey Brown, MD, professor of radiology, presented "MR imaging of the indeterminate renal mass" at Radiology Grand Rounds, Evanston Northwestern Healthcare, Chicago, Illinois, July 14.

Maurizio Corbetta, MD, professor of neurology, of radiology, and of anatomy and neurobiology, spoke on "Attentional networks of the human brain and their breakdown after brain injury" at the 6th Annual John Merck Fund Summer Institute on the Biology of Developmental Disabilities, Princeton, New Jersey, June 25-30.

Colin Derdeyn, MD, associate professor of radiology and of neurology and neurological surgery, presented "Cerebral hemodynamics" at the Department of Neurological Surgery Grand Rounds, University of Virginia, Charlottesville, June 3; and at Neuroscience Grand Rounds, Toronto Western Hospital, University of Toronto, Ontario, Canada, August 3.

Jay Heiken, MD, professor of radiology, spoke on "Imaging evaluation of the living-related liver donor" at the 17th Annual Meeting and Postgraduate Course of the European Society of Gastrointestinal and Abdominal Radiology, Crete, Greece, June 19-23. He presented "CT colonography for colorectal cancer screening: current status" at the UICC World Cancer Congress 2006, Washington, DC, July 8-12. He spoke on "Distinguishing benign from malignant liver masses with CT and MRI"; "CT of the abdominal aorta: aneurysm rupture"; and "CT colonography for colorectal cancer screening: current status" at the 16th Summer Practicum Society of Computed Body Tomography and Magnetic Resonance, Quebec City, Canada, August 16-10. Heiken presented "Acute mesenteric ischemia: MDCT evaluation" and "CT colonography for colorectal cancer screening: current status" at the 4th Annual Practical Applications of Multislice CT and PET-CT, sponsored by Vanderbilt University School of Medicine, Nashville, Tennessee, September 7-9. He presented "Peritoneal malignancy: imaging evaluation" and "CT colonography for colorectal cancer screening: current status" at Giornate Taorminesi di Radiologia, Taormina, Sicily, Italy, September 16. As visiting professor, he spoke on "Mesenteric ischemia: CT evaluation"; "Cystic pancreatic neoplasms: diagnosis and management"; and "Optimizing contrast enhancement from single to 64-slice CT" at the Mayo Clinic, Rochester, Minnesota, September 26 and 27.

John Kotyk, PhD, research associate professor of radiology, spoke on "Anatomical imaging technologies: MRI applications" at the MRI Research Symposium: Advances in Therapeutic Discovery and Drug Development: Molecular Imaging in Translational Research, Kalamazoo, Michigan, September 21.

Linda Larson-Prior, PhD, research associate professor of radiology, presented "Imaging across scale: the promise of multi-modal imaging" at the IEEE/NLM Life Science Systems and Applications Workshop, National Library of Medicine, Washington, DC, July 14.

Robert Mach, PhD, professor of radiology, spoke on "Imaging cellular proliferation with PET" at the 9th International Symposium of the Synthesis and Applications of Isotopes and Isotopically Labelled Compounds, Edinburgh, Scotland, July 19. He spoke on "The development of dopamine D3- and D2 selective imaging agents" at the Wolfson Brain Imaging Center, Addenbrooke Hospital, University of Cambridge, Cambridge, England, July 21. He presented "Imaging cellular death with PET" at the MRC Clinical Sciences Centre, Imperial College London, London, England, July 24.

Joel Perlmutter, MD, professor of neurology, of radiology, and of physical therapy, spoke on "Dystonia: neuroimaging clues to pathophysiology" at the National Institute of Neurological Disorders and Stroke/Dystonia Medical Research Foundation Symposium, Bethesda, Maryland, June 5. He presented "Mechanisms of deep brain stimulation" at the Neural Interfaces Workshop, sponsored by the National Institute of Neurological Disorders and Stroke, Bethesda, Maryland, August 21. Perlmutter presented "Rationale for targeting DBS in Tourette's syndrome" and "Development of international database for Tourette's and DBS" at the Tourette's Workshop for DBS, Milan, Italy, September 1 and 2. He spoke on "Neuroimaging of dystonia" at the Benign Essential Blepharospasm Research Foundation Workshop, Houston, Texas, September 28.

Fred Prior, PhD, research associate professor of radiology, presented "Imaging data management requirements in a multi-center medical research environment" at Imaging Biomarker Summit II, Philadelphia, Pennsylvania, June 27. He spoke on "Software special interest group status update and phase II project plan" at CaBIG in Vivo Imaging Workspace, Washington, DC, July 20.

Yoram Rudy, PhD, professor of engineering, of biomedical engineering, cell biology and physiology, and of medicine, and research professor of radiology, spoke on "IKs: Its role in repolarization and repolarization reserve" at Cardiostim 2006—15th World Congress in Cardiac Electrophysiology and Cardiac Techniques,

Nice, France, June 14-17. As keynote speaker, he presented "Electrocardiographic imaging (ECGI): a new noninvasive imaging modality for cardiac electrophysiology and arrhythmia" at the International Society for Heart Research—European Section meeting, Manchester, England, June. As keynote speaker, Rudy presented "Inverse electrocardiography: going back to the heart using electrocardiographic imaging (ECGI)" at the 33rd International Congress on Electrocardiology, Cologne, Germany, June 29-July 1. He spoke on "Ventricular myocyte models, channelopathies, and arrhythmia" at the Cardiac Electrophysiology and Arrhythmia Workshop, sponsored by the Mathematical Biosciences Institute, Ohio State University, Columbus, Ohio, September 25-29.

Stuart Sagel, MD, professor of radiology, presented "CT screening for lung cancer," "Role of CT in evaluation and staging of bronchogenic carcinoma," and "CT of diffuse lung disease" at the 16th Summer Practicum of the Society of Computed Body Tomography and Magnetic Resonance, Quebec City, Canada, August 6-10.

Bradley Schlaggar, MD, PhD, assistant professor of neurology, of pediatrics, and of radiology, spoke on "The development and plasticity of controlled lexical processing" at the 6th Annual John Merck Fund Summer Institute on the Biology of Developmental Disabilities, Princeton, New Jersey, June 25-30.

Barry Siegel, MD, professor of radiology and of medicine, presented "Other oncologic applications: The National Oncologic PET Registry" at Practical Utility of Positron Emission Tomography (PET) and PET/Computerized Tomography (CT) in Oncologic Patient Management, sponsored by the American Society of Clinical Oncology, Atlanta, Georgia, June 2. He presented "PET and PET/CT in oncology: diagnosis and staging" and "Oncologic PET: monitoring and predicting response to treatment" at the Australia and New Zealand Society of Nuclear Medicine meeting, Napier, New Zealand, July 15. He spoke on "The National Oncologic PET Registry" at the Seventh Annual Workshop: Molecular Diagnosis and Imaging—Detecting Early Neoplasia, sponsored by Michigan State University, East Lansing, July 27 and 28. He presented "Clinical applications/thoracic oncology with PET-CT" at the CT/MRI Symposium 2006, sponsored by Siemens Medical Solutions, Quebec City, Canada, September 16 and 17.

Marilyn Siegel, MD, professor of radiology and of pediatrics, spoke on "CT of congenital lung anomalies," "CTA of mediastinal vascular anomalies," "CTA of pediatric hepatic masses," and "Pediatric mediastinal masses" at the Armed Forces Institute of Pathology courses, Madrid, Spain, June 12-15; Lisbon, Portugal, June 16-19; and Vienna, Austria, June 20-23. As invited international speaker, she presented "Ultrasound of congenital brain anomalies," "Ultrasound of the acute pediatric abdomen," "Pediatric scrotal ultrasound," and "Spinal sonography" at the Australasian Society of Ultrasound meeting, Napier, New Zealand, July 13-16. She presented "MDCT of congenital lung disease in children and adults," "CT of pediatric mediastinal masses," and "CTA of hepatic masses" at the 16th Summer Practicum of the Society of Computed Body Tomography and Magnetic Resonance, Quebec City, Canada, August 6-10. Siegel spoke on "CT of adult congenital heart disease" at the American Roentgen Ray Society Education program: Cardiac CTA Angiography—A Practical Approach, Chicago, Illinois, September 15. She presented "Pediatric multislice CT and CTA: techniques, applications, and risks" at the CT/MRI Symposium 2006, sponsored by Siemens Medical Solutions, Quebec City, Canada, September 16 and 17.

SYMPOSIA

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

INTERNATIONAL SOCIETY FOR MAGNETIC RESONANCE IN MEDICINE

14th Scientific Meeting
Seattle, Washington
May 6-12, 2006

PLENARY SESSION

Marcus Raichle, MD, "Functional brain imaging: an evolving perspective." (The Lauterbur Lecture)

SCIENTIFIC MEETING: "CAN DIFFUSION MR MEASURE ANYTHING?"

Joseph Ackerman, PhD, "Yes, but caveat emptor."

SCIENTIFIC SESSIONS

Xiang He; Dmitriy Yablonskiy, PhD, "Quantitative BOLD: separation of effects from blood volume and oxygen extraction fraction."

Donna Lesniak; Robert Gropler, MD; Pamela Woodard, MD, "Clinical safety of magnetic resonance imaging on recently placed coronary artery stents."

Junqian Xu; Sheng-Kwei Song, PhD, "Diffusion measurement of human optic nerve using fat suppressed diffusion turbo FLASH sequence."

POSTERS

James Goodman; Joseph Ackerman, PhD; Jeffrey Neil, MD, PhD, "Subcompartmental cesium diffusion in healthy and globally ischemic rat brain."

Eren Gultepe; Erbil Akbudak, PhD; Nicolas Lori; Thomas Conturo, MD, PhD, "Identification of parallel hippocampo-fusiform and amygdalo-fusiform pathways in living humans."

Shu-Wei Sun; Hsiao-Fang Liang; Sheng-Kwei Song, PhD, "Axonal injury is detected by postmortem DTI before fixation (but not after)."

Shu-Wei Sun; Sheng-Kwei Song, PhD, "Diffusion time dependence of DTI measurements."

Lin Zhao; Christopher Kroenke, PhD; Joseph Ackerman, PhD; Jeffrey Neil, MD, PhD, "The intracellular water diffusion coefficient of cultured microbead-adherent HeLa cells is $\geq 1 \mu m^2/ms$."

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Symposia

Continued from page 31

Mingming Zhu; Joseph Ackerman, PhD; Alexander Sukstanskii; Dmitriy Yablonskiy, PhD, "Effect of blood flow on brain temperature distribution."

SOCIETY OF NUCLEAR MEDICINE

53rd Annual Meeting
San Diego, California
June 3-7, 2006

PROGRAM COMMITTEES

Farrokh Dehdashti, MD, sub-chair, Oncology-Clinical Diagnosis.

Jason Lewis, PhD, sub-chair, New Chemistry-Oncology.

Sally Schwarz, RPh, MS, sub-chair, Radiopharmacy.

CONTINUING EDUCATION SESSIONS

Perry Grigsby, MD, organizer, "Clinical applications of PET/CT: gynecologic disease."

Henry Royal, MD, organizer, "Terrorism involving radioactive materials: facts and fantasies."

SCIENTIFIC SESSIONS

Martin Eiblmaier; Laura Meyer; Wen Ping Li, PhD; Carolyn Anderson, PhD, "EGFR receptor binding properties and internalization of copper-64-DOTA-C225 in five cervical cancer cell lines."

Pilar Herrero, MS; Deborah DeLano, RN; Jeffrey Baumstark; Robert Gropler, MD, "Nitric oxide production mediates myocardial glucose metabolism in older adults."

Pilar Herrero, MS; Jeffrey Baumstark; Deborah DeLano, RN; Robert Gropler, MD, "Exercise training improves left ventricular oxidative metabolism and efficiency in older adults."

Richard Laforest, PhD; Jerrel Rutlin; Lori Strong; Michael Welch, PhD, "Comparison of biodistribution data from animal sacrifice and small animal imaging."

Robert Mach, PhD; Zhude Tu, PhD; Wenhua Chu, PhD; Jinbin Xu; Shihong Li; Lynne Jones; Carmen Dence, MS; Joel Perlmutter, MD; Mark Mintun, MD, "Synthesis and in vivo evaluation of a [^{11}C]WC-10: a novel radiotracer for imaging dopamine D3 receptors."

Jennifer Sprague; Samuel Achilefu, PhD; Carolyn Anderson, PhD, "microPET/micro CT of $\alpha v\beta 3$ integrin on osteoclasts in osteolytic bone metastases."

Yuan-Chuan Tai, PhD; Heyu Wu; Martin Janecek, PhD, Joseph O'Sullivan, PhD, "An insert for microPET-F220 to achieve sub-millimeter mouse imaging."

Zhude Tu, PhD; Jinbin Xu; Shihong Li; Lynne Jones; Michael Welch, PhD; Robert Mach, PhD, "Fluorine-18 labeled $\sigma 2$ receptor radiotracers for imaging breast cancer."

Xia Wang; Farrokh Dehdashti, MD; Perry Grigsby, MD; Barry Siegel, MD, "Preliminary results of PET/CT in assessment of patients with anal carcinoma."

Lihu Wei; Michael Welch, PhD; Jason Lewis, PhD, "Synthesis and biological evaluation of Cu-64 labeled rheniumcyclized α-MSH analogue using a cross-bridged cyclam chelator."

POSTER SESSIONS

Grainne Biddlecombe; Jason Lewis, PhD, "A novel CHX-A bifunctional chelator for N-terminal modification: synthesis, characterization, and validation via Y-86 microPET/CT of somatostatin-positive tumors."

Wenhua Chu; Dong Zhou, PhD; Jinbin Xu; Lynne Jones; Robert Mach, PhD, "Characterization of [18F]N-(9-(4-fluoroethylbenzyl)-9-aza-bicyclo[3.3.1]nonan-3α-yl) -N-(2-methoxy-5-methylphenyl) carbamate (1) as a potential $\sigma 2$ receptor radiotracer for PET."

Pilar Herrero, MS; Andrew Coggan; Zulfia Kisrieva-Ware, MD, PhD; Carmen Dence, MS; Paul Eisenbeis; Robert Gropler, MD, "Assessment of myocardial fatty acid metabolism with 1-11C-palmitate and kinetic modeling: testing the limits."

Douglas Rowland, PhD; Richard Laforest, PhD; Kooresh Shoghi-Jadid, PhD; Michael Welch, PhD, "Image derived input function from the left ventricle of rats."

Kooresh Shoghi-Jadid, PhD; Robert Gropler, MD; Michael Welch, PhD, "The convergence of in-silico biology and molecular imaging: the Virtual Imaging Platform (VIP) with a computational model for myocardial substrate utilization."

Suwanna Vangveravong; Zhude Tu, PhD; Jinbin Xu; Lynne Jones; Shihong Li; Robert Mach, PhD, "Evaluation of a C-11 labeled dopamine D_2 selective imaging agent."

Thaddeus Wadas; Martin Eiblmaier; Yunpeng Ye; Samuel Achilefu, PhD; Carolyn Anderson, PhD, "Radiochemistry and biological evaluation of novel copper-64-labeled bifunctional chelate-somatostatin analog conjugates."

Xia Wang; Jerold Wallis, MD; Keith Fischer, MD; Tom Miller, MD, PhD, "Pitfalls of FDG PET/CT imaging."

Lihui Wei; Brian Muegge; Ravneet Nagi; Laura Meyer; Jason Lewis, PhD, "Topo-II activity and tumor cell uptake studies of the ^{64}Cu-^{4}N-azabicyclo[3,2,2] nonane TSC complexes targeted at topoisomerase-II."

Alumni News

Eduard Kotlyarov, MD, PhD, was inducted as a fellow of the American College of Radiology (ACR) during the organization's 83rd Annual Meeting and Chapter Leadership Conference in Washington, DC. Kotlyarov is chairman of the Department of Radiology at PHO (Physician Hospital Organization) Medical Center in Pontiac, Michigan. He is a clinical professor of radiology at Wayne State University, Detroit, Michigan; at Georgetown University Medical Center, Washington, DC; and at Michigan State University, East Lansing. He was a third-year resident in radiology (nuclear medicine) at Mallinckrodt Institute in 1976.

Diagnostic Radiology and Nuclear Medicine/Nuclear Radiology

FELLOWS AND RESIDENTS FOR 2005-2006

(SEATED, LEFT TO RIGHT) Doctors Judy Liu; Wincha Chong; Joseph Erinjeri; Premsri Barton; Daniel Wessell, diagnostic radiology chief resident; Dennis Balfe, diagnostic radiology residency program director; Gilbert Jost, director, Mallinckrodt Institute; Daniel Picus, chief, Division of Diagnostic Radiology; Jennifer Gould, diagnostic radiology residency program assistant director; Robert McKinstry, research residency program director; Kevin Lee, diagnostic radiology chief resident; Karun Sharma, diagnostic radiology chief resident; Scott Bolton.
(SECOND ROW) Doctors Heather Tauschek, Ranista Tongdee, Delphine Chen, Phoebe Freer, Constantine Raptis, Stanley Chan, Jennifer Demertzis, Gilbert Cheung, Jason Stephenson, Thomas Watson, Travis Hillen, Krishna Thirumala, Nelson Elkins, Jason Kerr, Jamie Colonnello, Michael Gelbart, Jakob Schutz, Shao Lin, Ambrose Huang, Jeffrey Lin, Kavita Gorantla. (THIRD ROW) Doctors David Loy, Asif Moinuddin, Ryan Cook, Kelsey Moran, Tabassum Ahmed, William Holloway, Amy Oberhelman, Michelle Lee, Paul Frohnert, Heather Garrett, Alexander Sevrukov, Mark Wall, Ryan Murtagh, Glenn Kaplan, John Anderson, Robert Cargile, Jonathan McConathy, Quan Vu.

FOCAL SPOT

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