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PUTTING A CAP ON IMAGING

Diffuse optical tomography (DOT) allows researchers to safely and accurately image the brains of pediatric patients.
Uterine fibroid embolization (UFE) offers women with severe uterine fibroids an alternative to hysterectomy that — in most cases — provides long-lasting relief from the condition’s worst symptoms.

Mallinckrodt Institute of Radiology taps department leaders to address key challenges facing the specialty of radiology and critical to the department’s missions of patient care, education and research.

Catch up with resident alumnus Perry J. Pickhardt, MD, professor of radiology and chief of gastrointestinal imaging at the University of Wisconsin School of Medicine and Public Health in Madison, Wisconsin.

Mallinckrodt Institute of Radiology researchers are using diffuse optical tomography (DOT) to study the underlying neuroscience behind both autism and basic brain development in children. DOT — which does not emit a magnetic field — also shows promise for use in patients with electronic implants such as pacemakers, cochlear implants, and deep brain stimulators used to treat Parkinson’s disease.
Breast Health Center improves patient experience

Procedural and aesthetic changes are making the Joanne Knight Breast Health Center even more welcoming and accessible for the women who pass through its doors.

“I call these changes a ‘refresh’ to better accommodate our patients,” says program manager Chera Dunn, who joined the center in January. “We’ve done small things that don’t cost a lot of money, but in the end do have an impact on patients.”

One key change is that the same mammography technologist now stays with the patient throughout her imaging procedure. Once imaged, the patient stays in the mammography room while the technologist presents her case to the radiologist. If additional imaging is needed, it happens immediately. This one-on-one approach helps both to feel more comfortable and establishes a partnership in care.

Aesthetic improvements provide a more “spa-like” environment and include newly painted walls with updated artwork, heated gowns, and complimentary coffee, tea and snacks. Since the changes were implemented, patient satisfaction rates have soared, says Dunn. “In 2014, our overall score for the year was at the 48th percentile. We are currently at the 81st percentile, and that’s just year to date.”

“We are delighted with these results,” says Catherine M. Appleton, MD, associate professor of radiology and chief of Mallinckrodt’s breast imaging section. “The patient is assured of continuity of service throughout her entire appointment, and the physical renovations reflect our ongoing efforts to provide a soothing and nurturing setting for breast imaging care.”

Expanding patient care

Residents of South County, southern Illinois and surrounding areas will soon have even greater access to cancer and other outpatient services. A second building — located adjacent to the South County Siteman Cancer Center at Interstate 55 and Butler Hill Road that debuted in 2013 — began construction in Fall 2014 and is scheduled for completion in April 2016.

The new, 83,000-square-foot facility will include outpatient surgery, imaging, lab and therapy services, and Washington University physician subspecialty offices, including orthopedic surgery. Mallinckrodt Institute of Radiology will offer plain film, CT, MRI, PET/CT (mobile pad), and mammography at the new location.

Jointly owned by Barnes-Jewish Hospital and Washington University School of Medicine, this second phase of Siteman South County will alleviate outpatient capacity constraints on the main campus as well as allow patients to receive cancer, surgical and imaging care closer to their homes and families.

Siteman Cancer Center has additional satellite locations in west St. Louis County and neighboring St. Charles County.

Above: Designated a Breast Imaging Center of Excellence by the American College of Radiology, the Joanne Knight Breast Health Center at Barnes-Jewish Hospital and Washington University School of Medicine offers a full array of all-digital breast imaging services, including screening and diagnostic mammography, breast ultrasound, breast MRI, and tomosynthesis (3D mammography), as well as other specialized breast procedures.

Above: The Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine opened its initial South County outpatient facility at Interstate 55 and Butler Hill Road in 2013. Construction is under way on a second building at the same location to serve cancer and other patients.
Mallinckrodt Institute of Radiology graduate students, postdocs and junior faculty, as well as some senior faculty, showcased their work in March at the 2015 Mallinckrodt Institute of Radiology Research Symposium. This was the first year that the annual poster event included a symposium. Mallinckrodt director Richard L. Wahl, MD, delivered the keynote lecture, and additional lectures were presented by Fred W. Prior, PhD, (Electronic Radiology Laboratory) and Victor Song, PhD, (Biomedical Magnetic Resonance Laboratory).

More than 200 people attended the event, held at Washington University School of Medicine’s Farrell Learning and Teaching Center. Following the lectures, attendees viewed more than 70 posters representing a vast array of basic and clinical research being done at Mallinckrodt.
A night of achievements

Another successful academic year concluded as residents, fellows and faculty gathered for the annual Mallinckrodt Institute of Radiology graduation dinner in June at the Hilton at the Ballpark in downtown St. Louis.

Residents and fellows were honored individually as they received their certificates from Mallinckrodt director and department chair Richard L. Wahl, MD, and their individual program directors. A number of special awards also were bestowed at the event.

Matthew S. Parsons, MD, took top honors as Teacher of the Year. Although unable to attend, Parsons noted that “teaching residents and fellows is the most rewarding part of my career,” and thanked the fourth-years for allowing him to play a “small role” in their education.

Four other faculty members garnered Distinguished Teacher honors: Vincent M. Mellnick, MD, Sanjeev Bhalla, MD, William D. Middleton, MD, and Michelle Lee, MD.

Anup S. Shetty, MD, now an instructor in radiology in Mallinckrodt’s abdominal imaging section, was named Fellow of the Year, while fourth-year resident Adam N. Wallace, MD, was acknowledged as one of the 2015 recipients of the Radiological Society of North America’s (RSNA) Roentgen Resident/Fellow Research Award.

The evening was capped with a “Toast to the Josts” in which the graduating class recognized former Mallinckrodt director and department chair R. Gilbert Jost, MD, and his wife, Peggy. Jost was further honored with a newly created Distinguished Service Award for his many years of service to Mallinckrodt.
Construction is winding down on the 4515 McKinley research building, adding much-needed laboratory space to the Washington University School of Medicine campus. Positioned along McKinley Avenue just west of Taylor Avenue, the energy-efficient, multistory facility will house Mallinckrodt Institute of Radiology’s Optical Radiology Laboratory, Center for Molecular Imaging, and Center for Multiple Myeloma Nanotherapy, as well as laboratories from the Department of Genetics, the Center for Genome Sciences & Systems Biology, the Department of Medicine, and the Department of Developmental Biology.

Chief Residents 2015–16

Chief residents for the Diagnostic Radiology Residency Program and the Division of Nuclear Medicine are recommended by their peers and chosen by Mallinckrodt Institute of Radiology leadership. They function as a liaison between the residents and the department leadership and program administrative staff. Chief residents also assist with both resident and call schedules and are responsible for organizing extracurricular actives throughout the year.

Left to Right: Christopher Smith, MD, Hilary Orlowski, MD, Sebastian McWilliams, MB BCh BAO

Kiran Sargar, MD
PUTTING A CAP ON IMAGING
Charming though they are, toddlers and young children are notorious wiggle worms. This makes them difficult to image; unlike adults, they can’t be offered a choice of piped-in music to assuage the noise of loud, powerful magnets or to distract from the constraints of lying still in a narrow tube. Technicians often resorted to sedating children from 18 months to 5 years of age, but the practice has fallen out of favor due to concerns about sedation adversely affecting brain health.

“There are many open questions about brain function and how it changes during childhood development from infancy through adolescence, but it can be challenging to scan the younger kids,” says Adam T. Eggebrecht, PhD, instructor in radiology. Although functional magnetic resonance imaging (fMRI) has been the tool of choice to illuminate brain anatomy and function in adults, it has been more difficult to use with children, as any movement during imaging can create artifacts in the data. Eggebrecht and collaborators at Mallinckrodt’s Optical Radiology Laboratory are developing an alternative yet complementary technology to fMRI called diffuse optical tomography (DOT).
What is remarkable about DOT, a tool developed at Washington University, is that it records movies of brain function using a cap connected by fiber optics to a portable cart. In contrast to fMRI, it is silent and does not require a magnet. Unlike positron emission tomography (PET), also a common method to map brain function, there is no radiation involved. And the DOT devices that Eggebrecht is using and continually developing are relatively small and portable, making the technology attractive for operating room and hospital room use. Patients don’t have to be wheeled into a large testing room to slide into an intimidating PET or MRI machine. Instead, DOT enables clinicians to measure brain function right at the bedside.

Two DOT systems are in use at Washington University Medical Center. One, located at Barnes-Jewish Hospital, measures brain hemodynamics in older adults who are in the acute phase of recovery from an ischemic stroke. The measurements are taken within 72 hours of the event to try to understand how the brain is responding to and hopefully recovering from the stroke. This work, headed by Joseph P. Culver, PhD, associate professor of radiology, in collaboration with Jin-Moo Lee, MD, PhD, professor of neurology, is funded by the National Institute of Neurological Disorders and Stroke, and Eggebrecht is a lead author on the study.

Another DOT system is employed at St. Louis Children’s Hospital. It images newborns from a day to a couple of weeks of age to test whether DOT data matches or confirms fMRI data acquired from the same newborns. “We want to demonstrate that we get the same maps of functional brain networks in newborns as we have demonstrated in healthy adults using the two technologies, says Eggebrecht. This work is headed by Culver, in collaboration with Christopher D. Smyser, MD, assistant professor of neurology, along with Eggebrecht.

The DOT system literally uses a cap that a patient wears. Out of the cap spring dozens of wires that are like a Medusa’s head of optical fibers. About half of the fibers send light into the head and the other half receive light emanating back out. The fibers shine harmless near-infrared light of wavelengths between 750 and 850 nanometers, with each received signal relating different information about brain activity. Combining the information from each wavelength, the system measures relative changes in the local concentrations of oxygenated, de-oxygenated and total hemoglobin. The system combines multiple optical measurements to reconstruct movies of three-dimensional volumes of blood oxygenation during rest, tasks or responses to
ABOUT HALF OF THE FIBERS SEND LIGHT INTO THE HEAD AND THE OTHER HALF RECEIVE LIGHT EMANATING BACK OUT

All photos of Adam T. Eggebrecht, PhD, and oldest boy // Tim Parker
stimuli. Thus researchers can visualize brain responses to everything from language to motor skills to daydreaming.

Eggebrecht works on optimizing hardware, software and analysis pipelines. Hardware development includes designing electro-optical components and circuit boards, optic-scalp coupling comfort and wearability, and system infrastructure. The software algorithms and pipelines are growing parts of a self-contained tool box called NeuroDOT for acquiring and analyzing DOT data. Compatible with fMRI and other standard neuro-imaging data, NeuroDOT can readily be shared worldwide.

**MAPPING NEURAL NETWORKS OF CHILDREN WITH AUTISM**

Eggebrecht’s current primary research emphasis is to study 40 children annually between the ages of 18 months to 17 years who are typically developing or have been diagnosed with Autism Spectrum Disorder (ASD), commonly referred to as autism. Previously funded by Autism Speaks via a Meixner Postdoctoral Fellowship and currently funded by a grant from the National Institute for Mental Health (NIMH), Eggebrecht aims to validate DOT against fMRI to explore the underlying neuroscience behind autism and basic brain development in children, whether autistic or not.

It is estimated that roughly one in 68 children are affected with ASD, one of the most serious disorders of childhood. ASD children typically have deficits in social functioning, communication and motor skills and often display restricted interests and a tendency toward repetitive behaviors. Children diagnosed early have the best chances of gaining language and social skills through focused clinical interventions.

Eggebrecht partners with Washington University School of Medicine pediatric psychiatrists John N. Constantino, MD, the Blanche Ittleson Professor of Psychiatry and director of the William Greenleaf Eliot Division of Child and Adolescent Psychiatry, and John R. Pruett, MD, PhD, associate professor of psychiatry and of radiology, both experts in ASD. Many of the children in Eggebrecht’s studies are recruited from their patients. Constantino and another collaborator on the project, Bradley L. Schlaggar, MD, PhD, the A. Ernest and Jane G. Stein Professor of Developmental Neurology and head of the Division of Pediatric and Developmental Neurology, co-direct the NIH-funded Intellectual and Developmental Disabilities Research Center (IDDRC), a community clinical care and research resource at which ASD and other neurodevelopmental disorders can be diagnosed.

"Kids with autism have processes in the brain underlying language and social interactions that can be different than in typically developing kids,” Eggebrecht says. “While clear differences in behavior are observed between the two groups, the underlying differences in brain function have proven very hard to replicate in neuroimaging studies. This has been in part due to challenges in taking data from large numbers of kids who are more severely affected and therefore more difficult to study with fMRI.”

Eggebrecht says that DOT is able to image the top two centimeters of the head, "one centimeter of scalp and skull and another centimeter of actual brain tissue. Though this is a comparatively small sampling of the brain, we get access to an awful lot of interesting things happening there. Also, rather than focus on just one area like the visual cortex, we are working to build out the DOT cap to cover all the accessible parts of the brain to maximize the field of view. That way, we have access to a variety of important aspects of brain function.”

Take language generation, for instance. This happens to a large extent in the superficial left aspect of the brain, in regions known as Broca’s and Wernicke’s areas, all “superficial enough in the head for us to be sensitive to the brain activity,” he says. "The visual cortex is accessible in the back of the head, and at the sides of the head we can access the auditory and motor cortices, and even multiple areas involved in the production and understanding of language and social interaction.”

Networks are another theme of Eggebrecht’s research. “By correlating neural activity over time between different parts of the brain, we can generate maps of different so-called resting-state networks within the brain. This allows us to analyze brain function in people who will not or cannot respond to demands of a task like finger tapping,” he says.

As for making neuroimaging less constraining and less daunting, Eggebrecht and his group have started designing DOT caps based on photos of kids’ favorite hats. “Kids find it fun,” he says. “The older ones see a sci-fi connection and the younger ones feel more at home because they recognize the cap. Really young kids can sit in highchairs or even on their mothers’ laps while we stimulate them with monitors, speakers or simple tasks. The overall goal is simple: to develop a new tool that can help us better understand brain function in development and disease. Ideally, it may be useful for prediction of ASD and sensitive to changes over the course of treatment and can therefore help make ASD more manageable."
Debra Stockard wasn’t the type to run to the doctor for every little ache and pain. But after years of suffering from heavy bleeding during painful periods and a host of other discomforts, she relented and then received a diagnosis: uterine fibroids. Another seven years later, she finally waved the white flag.

Rejecting the options given at diagnosis — hysterectomy or drug treatment — Stockard tried valiantly for years to manage her condition with diet and vitamins, exercise and sheer willpower. Earlier this year, she contacted Mallinckrodt Institute of Radiology to schedule a consultation after reading online about uterine fibroid embolization (UFE).

In May, Stockard underwent UFE at Barnes-Jewish Hospital. Performed by Mallinckrodt Institute of Radiology interventional radiologist Seung Kwon Kim, MD, the hour-long procedure eliminated the worst of her symptoms and launched a recovery that has vastly improved her quality of life.

According to Kim, uterine fibroids are common in women and especially in African-American women, who tend to get them at a younger age. Fibroids also grow more quickly and cause more symptoms in these women.

UFE isn’t new; in fact, the procedure has been available for more than two decades and offered at Mallinckrodt since the early 1990s. Yet this very effective, minimally invasive alternative for treating fibroids seemingly remains under the radar of patients and some gynecologists.

Uterine fibroids are muscular tumors that grow on and in the walls of the uterus. Although their exact origin remains unknown, hormones are the likely culprit as fibroids tend to grow rapidly during pregnancy, when hormone levels are high, and shrink once a woman reaches menopause and hormones are diminishing.
A family history of fibroids is a known risk, as are obesity, eating a lot of red meat and ham, and age (fibroids are most common in women from age 30 through menopause). In rare cases, fibroids can become cancerous.

The size and number of fibroids in any one individual can vary greatly. And although it’s estimated that as many as 80 percent of women develop fibroids by age 50, most do not experience any accompanying symptoms. But for women who do have symptoms, fibroids can be very hard to live with.

That was certainly the case for Stockard, who had most of the condition’s classic features — the aforementioned painful periods and heavy bleeding causing anemia, frequent urination, lower back and leg pain, and abdominal bloating and constipation.

The only complete cure for fibroids is to remove the uterus via hysterectomy. For women who wish to have children, this is not a viable option, and other alternatives exist. But many older women and women who don’t plan to have children also do not want to undergo a major surgery. UFE — with 90 percent symptom relief within 12 months and fewer complications and minimal blood loss compared to hysterectomy — is a cost-effective and ideal solution.

While under local anesthetic, a catheter is passed into an artery in the patient’s groin and threaded into the uterine arteries, releasing tiny gel or plastic particles that lodge in the arterioles feeding the fibroids and uterus. The uterus recovers quickly from the ensuing loss of blood by drawing on other vessels, but the fibroids essentially "starve." They become soft and spongy, taking pressure off adjacent organs, and shrink over time — often 50 percent or more.

The benefits of UFE are fairly straightforward: minimally invasive versus major surgery, two weeks
of missed work versus six, and in many cases, near-immediate pain relief. In the majority of cases, fibroids do not grow back.

At Mallinckrodt, Kim and other radiologists in the interventional radiology section perform about 50 UFEs annually, says clinical nursing supervisor Lynn R. Hoese, RN. Many of the cases, she adds, are self-referred: People hear the options provided by their gynecologists, and then begin an Internet search to see if anything else can be done.

That’s exactly what happened for Stockard. Unwilling to go the hysterectomy route and not wanting to take a drug, she began researching her options. “I started seeing billboards about UFE,” she says. “Online, I read as many cases and blogs as I could find, really trying to gain a better understanding of what fibroids were and what might be helpful.”

Stockard remembers little of the procedure itself. She spent one night in the hospital — although the procedure can be done on an outpatient basis — and had some pain and mild nausea afterward, likely caused by anesthesia. The UFE left just a small incision scar in her groin.

“I returned to work one week later,” says Stockard, the mother of three and a moving company receptionist, though she admits that she tired easily at first and likely should have taken an additional week to recover. “After a couple of weeks it started to turn around. My first period was almost back to normal, without serious cramping; it was dramatically better.”

Nearly six months later, Stockard’s anemia is gone, and she’s gradually getting back to normal daily activities. An avid gardener, she looks forward to bringing her yard back to showcase status in the coming years. That’s what she wants people to understand about fibroids: Severe cases can truly impede quality of life.

“I’m glad I did it,” says Stockard. “Fibroids really affected me emotionally, as well as physically, and I was grateful this alternative to hysterectomy existed.”

Patient consultations are conducted at Mallinckrodt Institute of Radiology at Washington University Medical Center. Procedure locations include Barnes-Jewish Hospital and Barnes-Jewish West County Hospital.

For patient scheduling or to talk with a nurse coordinator about UFE, please call (314) 362-2375.
MIR’S NEW VICE-CHAIRS

From left to right, standing: Vamsi R. Narra, MD, MBA; Pamela K. Woodard, MD; Sanjeev Bhalla, MD
From left to right, sitting: James R. Duncan, MD, PhD; Samuel I. Achilefu, PhD
When he came on board as Mallinckrodt Institute of Radiology’s director last year, Richard L. Wahl, MD, was poised for change — looking for ways to maintain Mallinckrodt’s eminence in the specialty and to shape the future of radiology.

“We’re a really big department (about 600 faculty, residents, fellows, students and staff),” says Wahl. “Departments of our size have multiple missions, including clinical, education and research, and each of those areas needs leadership. After considering our setup, I thought it would be useful to structure our administrative framework a bit differently.”

As part of that process, four faculty members are now senior vice-chairs in addition to being directors of their respective divisions: Daniel D. Picus, MD, diagnostic radiology; Barry A. Siegel, MD, nuclear medicine; Robert J. Gropler, MD, radiological sciences; and Robert C. McKinstry, MD, PhD, radiology research facilities.

Each of these areas is critical to Mallinckrodt’s success, says Wahl. Although each faculty member’s area of responsibility remains the same, Wahl’s intention in adding the senior vice-chair title was to make clear the importance of these key individuals, both to other departments at Washington University School of Medicine and to the outside world.

“At Mallinckrodt, we all know that being a division director carries a lot of responsibility. Adding the senior vice-chair designation allows us to keep the historical title but formalize the administrative importance of these roles.”

Wahl also has created five new vice-chair positions to guide Mallinckrodt in several emerging areas of importance.

**QUALITY AND SAFETY**

Quality and safety is critically important, and it has to permeate our system, says Wahl. The issue is so critical that Wahl has named James R. Duncan, MD, PhD, as vice chair for quality and safety.

“Jim has really been taking leadership in the department and across the medical center in some areas of radiation safety,” says Wahl. “Having a vice chair for quality and safety is essential.”

Wahl is relying on Duncan, an interventional radiologist, to identify key issues, measure them, analyze them, and then adapt processes to address any concerns as part of an ongoing methodology.

“One of the things that Jim has emphasized is that you can make a really pretty picture with lots of radiation, but you may not need to make it that pretty to make the diagnosis,” says Wahl.

According to Wahl, radiation dose is one of the specialty’s biggest issues. “Our goal is to make sure Mallinckrodt produces the best quality images at the lowest radiation dose possible,” he says. “That effort already has been quite successful in pediatrics, but there’s a push to decrease radiation dose across the entire enterprise.”

And although Mallinckrodt’s current quality and safety practices are quite good, Wahl feels that — like any group — the department could probably do better.

“We want to improve and standardize our overall peer review process,” he says, “It truly is a science; we need to have processes in place, analyze those processes when things don’t go as well as we planned, and then learn from that. My clear intention is to have Mallinckrodt lead in this arena.”
Radiology has the most demanding IT needs of any medical specialty, says Wahl, due to the large amount of data in its millions of images. And although the university and Mallinckrodt provide professional radiology services, technical services are provided by the hospital system, creating the need for streamlined collaboration between the two entities.

“Working at that interface is critical,” says Wahl, who has named Vamsi R. Narra, MD, MBA, as vice chair for clinical imaging and new clinical business development. In his new role, Narra — who already serves as chief of abdominal imaging and of magnetic resonance imaging and as chief of radiology at Barnes-Jewish West County Hospital — will work to bring people and processes together to create a more efficient means of serving radiologists, referring physicians and, ultimately, patients in the clinical imaging informatics space.

“Vamsi bravely has agreed to serve as the point person to bring together a number of disparate reporting entities managing our image data flow into a more common radiology clinical imaging informatics structure,” Wahl says.

Using the current system, referring physicians have to order a study, the order has to be entered into Mallinckrodt’s radiology information system, the patient has to be scheduled, the images have to be generated and then shipped to the correct archive, the images must be made available for the radiologist to read (as well as to the referring physician), and the radiologist must generate a report. To further complicate matters, the radiologist must consult two electronic medical records — one on the hospital side and one on the university side, or more.

The latter issue is being addressed: A new, common medical record for the hospital and university is in development and scheduled for roll-out in 2017. As for the former, Wahl says that the details are nearly finalized, and that Mallinckrodt and its Barnes-Jewish Hospital partners are making excellent progress.

“Vamsi is working very hard with hospital colleagues to reorganize and rationalize our imaging informatics into a structure called 1Rad, in which the many moving parts will be pulled together and coordinated,” says Wahl.

As with any change, there may be some “pain to achieve gain,” acknowledges Wahl. However, he says: “I am confident that what Vamsi is doing will make the lives of radiologists easier and patient care better.”

Historically, Mallinckrodt has been strong in radiology education, but Wahl feels that to remain a leader, the institute must be proactive and open to upgrading and refining its efforts concerning medical students, prospective trainees, current trainees, and program alumni. To make certain these efforts are a top priority, he has named Sanjeev Bhalla, MD, as vice-chair for education.

Wahl has charged Bhalla, who also is chief of body computed tomography and of cardiothoracic imaging, with taking a broad look at the education portion of Mallinckrodt’s mission. “I want Sanjeev to evaluate the entire education continuum,” says Wahl, “from getting people interested in radiology early on in medical school or even pre-medical school, to helping with our already strong residency and fellowship programs, to ushering in a new period of training opportunities.”

One current challenge for the specialty is that the number of medical students applying to radiology residency programs has decreased from prior years. While this has not yet affected Mallinckrodt adversely — its large residency program continues to do exceptionally well filling available slots — Wahl wants to make certain that the department does its part to ensure that potential trainees have a complete understanding of the exciting work radiologists “do.”

“We have the biggest residency program in the country, but we want to make sure we have our pipeline of Washington University medical students in radiology as we’ve always had,” Wahl says. “So we’re asking ourselves: ‘Do we change what we’ve done for medical students? Do we integrate our rotations earlier? How do we make sure that medical students are engaged in the learning process?’”

Another area of focus is the establishment of an alumni society. “Sanjeev will spend a lot of time figuring out how to engage our alumni after they leave Mallinckrodt — for purposes of education and for networking,” says Wahl. In addition, Wahl hopes that the vast number of Mallinckrodt trainees will help philanthropically with the department’s education mission.

Bhalla also will work with colleagues, including diagnostic radiology training program director Jennifer E. Gould, MD, to continually update the curriculum as well as focus on new training opportunities, such as the direct pathway to interventional radiology certification currently under review and to be led by Gretchen M. Foltz, MD. “All of these things,” says Wahl, “are clear areas of opportunity.”
Today’s marketplace demands that to make something successfully, inventors must often create a commercial company or have a business partner. For that reason, Wahl has named prolific inventor Samuel I. Achilefu, PhD, as vice chair for technology transfer and commercialization.

“Sam has an interesting background in that he also has worked in industry, in addition to academia,” says Wahl. That, along with Achilefu’s own inventions — most notably goggles that help surgeons to better ‘see’ cancer — made him the natural choice for the new position, Wahl says.

“With this position, I want to emphasize what I view as the importance of the ‘fourth mission’ of our department: transferring technology and commercializing it,” says Wahl. “Our ideas are going to have global impact, and sometimes they need to be patented, copyrighted, licensed to other companies, or start-up companies must be formed. I wanted Sam to focus on helping our faculty learn to negotiate this space so they can disclose and protect their inventions, as well as get them into the marketplace.”

Achilefu, director of Mallinckrodt’s Optical Radiology Laboratory (ORL), already has worked closely with the university’s Office of Technology Management and so was a clear leader in this area, says Wahl, who views ramping up efforts in this area as both operational and educational.

“We need to encourage and perhaps incentivize our faculty to make these disclosures,” says Wahl. “Most companies will not want to take an idea forward if they don’t have a patent.”

If Mallinckrodt faculty are successful in capitalizing on their creations, it will be “win-win-win,” says Wahl. “Right now, the university is investing considerably in technology transfer and so is Mallinckrodt. I want our individual faculty inventors to do better and hopefully our patients also will do better.”

“Performing large-scale studies with human subjects takes a special research portfolio and skill set, and Pam is expert in this area,” says Wahl. Woodard is director of the department’s Center for Clinical Imaging Research and head of cardiac CT/MR.

While the specifics of her new responsibilities are evolving, Wahl says Mallinckrodt must keep ‘pushing the envelope’ in the area of clinical research.

“I want our radiologists in clinical practice to continue to provide quality work day to day, but what we’re doing now can’t be what we’re doing in 20 years,” says Wahl. “Pam will lead our effort to monitor existing and new methodologies to determine the best way to provide images that will assist in the diagnosis and treatment of disease.”

A classic example, says Wahl, is the evolution of positron emission tomography (PET). Although PET has been in use as a research tool at Mallinckrodt for many years, and modern PET was invented here, it was only through recent studies conducted by nuclear medicine faculty here and elsewhere that PET was determined to work better than existing techniques in staging lung cancer. Today, PET/CT is the standard for that diagnosis.

That type of careful analysis is exactly what Wahl hopes to encourage. “Clinical translational research will help our radiologists innovate and help form a curriculum to give them the tools to ask and answer questions.”

“All of these areas are critical to Mallinckrodt’s overall missions of patient care, education and research. Mallinckrodt has many different responsibilities, and we need to cover all these domains. We need to keep pushing on all fronts so that we’re not just staying the same — we’re moving ahead and creating the future of radiology.” Richard L. Wahl, MD
ALUMNI SPOTLIGHT

PERRY J. PICKHARDT, MD, is a professor of radiology and chief of gastrointestinal imaging at the University of Wisconsin School of Medicine and Public Health in Madison, Wisconsin. He began publishing widely during his residency at Mallinckrodt Institute of Radiology and remains a prolific researcher, particularly in the field of virtual colonoscopy.

What attracted you to radiology?
I was a physics major as an undergraduate at the University of Wisconsin, which has a world-class medical physics department. I took some graduate-level medical physics courses, and the imaging side intrigued me the most. I became more interested in interpreting the images than being the technical person tweaking the image quality. So I essentially went into medical school because I was interested in radiology. That’s atypical. Many people find radiology after starting their residencies.

Why did you choose Mallinckrodt for your residency training?
When I attended the University of Michigan Medical School, David Kim, who was two years ahead of me (and became a Mallinckrodt alum), mentioned Mallinckrodt as a place I had to check out. I later realized it was far and away the best radiology residency training program. My interview at Mallinckrodt came after visiting the University of Pennsylvania, which had a one-time interview process for several hundred people at once. At Mallinckrodt, I was the only one interviewed that day. To experience this entire building devoted to radiology, the floor-by-floor organization of the different imaging modalities, the history that had been made there, and to be the sole focus of the interview process that day, I was simply awestruck.

Who were some of the instructors at Mallinckrodt who left the greatest impression upon you?
Dennis Balfe, who still slings in GI, has a unique style that many of his former residents emulate. Instead of going on with unimportant details, he cuts to the quick. Jay Heiken, who is also in the abdominal imaging section, has a smooth style of lecturing and is an eloquent speaker. Stuart Sagel was head of chest; I emulate his dictation style to this day. He’d use phrases others are often afraid to use, such as “This almost certainly represents (disease X),” rather than list a long differential. Lou Gilula, in muscular/skeletal, was one of the kindest people. He was incredibly dedicated to his patients and trainees. He taught what it means to be a radiologist but still be a physician. Fernando Gutierrez in cardiothoracic is incredibly astute. He has an ability to evaluate a complex case and boil it down to the essentials. All of these mentors were remarkable people who left a lasting impression upon me.

Tell us about your unusual career path.
I was on a Navy scholarship in medical school, so I owed four years after residency. I spent the first year at the U.S. Naval Hospital in Guantanamo Bay, Cuba. I had five technologists, no CT scanner, and very light volume since the base was largely filled with healthy marines. After that, I spent three years at the National Naval Medical Center in Bethesda, Maryland. The opportunity arose to use Department of Defense funding for a large prospective screening trial using CT colonography (virtual colonoscopy). I initially thought this study will...
ultimately prove that it doesn’t work for screening, but I was completely wrong. It blew me away in terms of actual performance. In my opinion, virtual colonoscopy is the best of all available colorectal screening tests.

**What excites you about these developments in virtual colonoscopy?**

Colon cancer remains the second leading cause of cancer death, even though it is completely preventable. If virtual colonoscopies can help more people get screened and prevent cancers, you have the rare opportunity to impact many lives. We’ve set up the first such screening program at the University of Wisconsin.

**How do you spend your time as professor and chief of gastrointestinal imaging?**

I’ve been here almost 12 years now. It is a great practice, with a lot of former Mallinckrodt residents. I have the perfect mix of clinical care and academic medicine, about half and half. On the clinical side, I do cross-sectional imaging, including CT, ultrasound and MRI, and perform a lot of biopsies. On the academic side, we’re allowed enough time to pursue our interests.

**What are your favorite areas of research?**

Most of my research involves CT, including volumetrics, texture analysis, appendicitis, steatosis, virtual colonoscopy, interventions, opportunistic screening, oncology, and incidental findings, among other areas. I also have several ongoing NIH R01 grants. It just seems one idea leads to another — and I have incredible colleagues at UW to collaborate with.

**What are your interests beyond radiology?**

My wife and I have three boys, ages 5, 10 and 12, so our lives center on family activities, such as raising chickens, which we keep as pets and for the eggs. I enjoy music, movies and eating. I also like to stay active with tennis, golf and basketball. When I was a kid, I wanted to be an artist and recently, for the first time since seventh grade, I started drawing again. My two older sons are also taking a strong interest, so we’ve been sketching together quite a bit.
**IN MEMORY**

Former resident **Hank Chen, MD, (1996–2000)** died on March 4, 2015, after a 10-year battle with lung cancer. He was 47. Chen earned his undergraduate degree at the University of California, Berkeley, and his medical degree from the David Geffen School of Medicine at the University of California, Los Angeles. After completing residency at Mallinckrodt Institute of Radiology, Chen operated imaging centers in the Bay Area. He also developed, managed and worked for a teleradiology program for the VA Palo Alto Health Care System. Chen is survived by his wife, Vivian Fu, and two daughters, Zoe and Ariel.

**LECTURES**

**Mikhail Y. Berezin, PhD,** presented “Hyperspectral Imaging: To See the Unseen” at the Computer Science Institute for Women, Danforth Plant Science Center in St. Louis, MO, in July. Berezin also lectured on “Challenges in Hyperspectral Microscopy in Shortwave Infrared” at the Advances in Structural and Chemical Imaging symposium in Pullman, WA, in May.

**Colin P. Derdeyn, MD,** professor of radiology, of neurological surgery and of neurology, made several recent presentations: “Stroke 2025: Revascularization Strategies” and “The Next Big Thing in Endovascular Therapy for Stroke” at the International Stroke Conference in Nashville, TN, in February; “Management of Carotid Dissection” at Charing Cross, London, United Kingdom, in April; “Cerebral Hemodynamics and Ischemic Stroke” at the University of Iowa Carver School of Medicine in Iowa City, IA, in June; “Advances in Acute Stroke Intervention” at the Department of Anesthesia Grand Rounds at Washington University School of Medicine in St. Louis, MO, in June; and “Advances in Acute Stroke Intervention” at the Juan Taveras Annual Lecture at Harvard Medical School in Boston, MA, in September.

**Cheryl R. Herman, MD,** assistant professor of radiology, presented “Advances in Breast Cancer Imaging” at Cancer en la Mujer: Mama, Ovario, Endometrio y Cervicouterino in Guatemala City, Guatemala, in March.

**Suzanne E. Lapi, MD,** associate professor of radiology, presented “Antimatter and Antibodies: Pet Imaging with 89Zr in Oncology” at the University of Pennsylvania in May; “Cyclotron Production of PET Radiometals” at the International Symposium on Radiopharmaceutical Sciences in Columbia, MO, in May; and “From Nuclear Chemistry to Nuclear Medicine: Positron Emitting Radiometals for Cancer Imaging” at the Lawrence Berkeley National Laboratory in June.

**Robert C. McKinstry, MD, PhD,** professor of radiology and of pediatrics, presented “Pediatric CT Physics: A Radiologist’s Perspective” at the American Association of Physicists in Medicine’s spring clinical meeting. The symposium, Best Practices in Pediatric CT Physics, was held at the Hyatt Regency St. Louis at the Arch in March.

**Barry A. Siegel, MD,** professor of radiology and of medicine, presented “Impact of PET in Cancer” at the Nuclear Medicine in Cancer Management: Improving Efficacy and Reducing Costs symposium held by the Association of Imaging Producers and Equipment Suppliers in Brussels, Belgium, in September.


**Pamela K. Woodard, MD,** professor of radiology, presented “Targeted Molecular Imaging of Atherosclerosis” at New York University, New York, NY, in July. Woodard also presented “Advocacy Round Table: Coronary CT Evidence Review and Payer Perspective” for the Society of Cardiovascular Computed Tomography in Las Vegas, NV, in July.
Jinbin Xu, PhD, instructor in radiology, made several recent presentations: “Dopamine D1, D2, D3 Receptors, Vesicular Monoamine Transporter Type-2 (VMAT2) and Dopamine Transporter (DAT) densities in aged and diffuse Lewy Body Disease (DLBD) Human Brains” at the 12th International Conference on Alzheimer’s and Parkinson’s Diseases in Nice, France, in March; “Biomarkers for Imaging Apoptosis” at the 2015 Asian-Pacific Conference of Tumor Biology and Medicine in Nanjing, China, in March; “Pre- and Postsynaptic Biomarkers for Imaging Nigrostriatal Neurons” at the 10th China, Nanjing Conference of Molecular Biomarker and Nuclear Medicine Targeted Theranostics in Nanjing China in March; “Sigma-2 Receptor: Precision Imaging and Therapy” at the College of Chemistry, Beijing Normal University in Beijing, China, in March; and “Pre- and Postsynaptic Biomarkers for Imaging Nigrostriatal Neurons” at the American Parkinson Disease Association, Inc., Scientific Advisory Board meeting in New York, NY, in May.

Pamela K. Woodard, MD, professor of radiology, is a standing member of the Medical Imaging Study Section (MEDI), Center for Scientific Review, of the National Institutes of Health. Her term runs from July 2015 through June 2019. Woodard also was appointed to a two-year term on the Council Operations Committee of the American Heart Association (AHA), which provides administrative and operational oversight of all AHA Scientific Councils in relation to financial management.

GRANTS

Mikhail Y. Berezin, PhD, assistant professor of radiology, received a two-year, $275,000 grant for “Assessment of Chemotherapy-induced Peripheral Neuropathy with Activatable Probes” from the National Institutes of Health (NIH). Matthew D. Wood, PhD, assistant professor of surgery, and Walter J. Akers, PhD, assistant professor of radiology, are co-investigators on the study.

Steven Don, MD, associate professor of radiology, received a $29,400 WU Bear Cub Award for “Enhancing Safety and Quality of Medical X-ray Imaging,” a project that will support developing a prototype system for X-rays that addresses clinical challenges and then taking that system from the laboratory into preclinical testing by technologist-educators. Don also received a $50,000 award from the Society of Pediatric Radiology that will address the unmet need in medical X-ray imaging to control radiation dose through patient-specific tailoring of X-ray acquisition techniques and the elimination of unnecessary repeat exams.

Manu S. Goyal, MD, instructor in radiology, received a two-year, $150,000 RSNA Research Scholar Award for “Integrating Brain Imaging and Metabolomics in Malnourished Children.” Pediatric endocrinologist Ana Maria Arbalaez, Joshua S. Shimony, MD, PhD, associate professor of radiology, and Christopher D. Smyser, MD, assistant professor of radiology and of neurology, are co-investigators on the study. Goyal also received the $34,100 McDonnell Center for Systems Neuroscience New Resource Award for “Lifespan Changes in Cerebral Vasculature, Blood Flow, and Oxygen Metabolism in Humans: An MRI-based Study of Normal Subjects Aged 0-79 Years.” Neuroradiology fellow Adam Wallace is co-principal investigator on the project; fellows Andria Ford, neurology, and Kristin Guilliams, pediatrics and neurology, are co-investigators.

Suzanne E. Lapi, MD, associate professor of radiology, received a two-year, $230,000 grant from the Department of Energy for “Potential for Isotope Harvesting at FRIB.” Collaborators are Graham Peaslee (Hope College) and David Robertson (University of Missouri, Columbia).

Daniel S. Marcus, PhD, associate professor of radiology, along with co-principal investigator David C. Van Essen, PhD, the Alumni Endowed Professor of Neurobiology and professor of biomedical engineering, received a five-year, $2.5 million award from the National Institutes of Health’s (NIH) National Institute of Mental Health. The award will be used to establish a Connectome Coordination Facility that will capitalize on the recent successes of the Human Connectome Project (HCP).

ELECTIONS

Steven Don, MD, associate professor of radiology, is co-chair of the American College of Radiology’s (ACR) Committee on Quality and Safety–Pediatric and its Subcommittee on Pediatric Digital Radiographic Techniques. He also is a member of the ACR’s Pediatric Imaging Research Committee.

Above: Zimin Hang and Ben Bronsther display their technology in the lab.

PILLOW TALK

“Smart pillow” tested in Mallinckrodt lab may improve quality of zzzz’s

Those sleepless in Seattle, St. Louis and elsewhere may benefit from a pillow insert being tested in Mallinckrodt’s Electrical and Optical Neuroimaging (EON) Laboratory that its developers say will help users sleep more deeply and wake up more alert. It’s called “Chrona.”

“Chrona is a sleep optimization system,” says Zimin Hang, a 2014 Washington University graduate who came up with the concept and co-founded a company with Ben Bronsther, Class of 2013, to produce the inserts.

“Chrona is a thin memory-foam pad you insert into your pillowcase, on top of your pillow, and it turns your pillow into a smart pillow,” says Hang. “Movement sensors in Chrona capture you tossing and turning in the night. It also has speakers that play sounds to help you sleep more deeply or help you get ready to wake up. Chrona tracks your sleep and optimizes it based on where you are in your sleep cycle, allowing you to sleep better without having to spend more time in bed.”

Hang and Bronsther came up with the idea of a sleep-tracking pillow while they were undergraduates at Washington University. They collaborated with biomedical engineering students at the university to develop a prototype and established an entrepreneurial group to promote and manufacture the smart pillow. In April 2015, the duo launched a Kickstarter campaign to raise $50,000; they’ve met and exceeded that amount. But they also needed some science to test their theory and their product.

Enter Linda Larson-Prior, PhD, associate professor of radiology at Mallinckrodt Institute of Radiology. Hang and Bronsther had a sleep-aid product and Larson-Prior has a lab to conduct a sleep study. She is also director of EON, which is a branch of the Neuroimaging Laboratory (NIL) at Mallinckrodt. Larson-Prior’s research focuses on the neurobiological mechanisms by which brains shift their state, sleep being one of them.

Hang contacted Larson-Prior and sought her expertise. They established a journal club in which they met regularly to review papers and talk about the field. “Those discussions led to my inclusion in the development of a scientific project to test the validity of their system,” says Larson-Prior. She is the principal investigator of the small pilot study about Chrona casually known as the “nap entrainment study.” Entrainment is the process by which the body synchronizes its internal biological clock to external stimuli.

The study will include 23 participants, between 18 and 35 years of age, who will take two naps on different days in Larson-Prior’s laboratory. (The study is ongoing and accepting participants. Please contact Zimin Hang at ziminhang@ultradia.co to learn more.)

“My lab is running the research study to do initial testing of the system to see if, under controlled conditions, it operates as Zimin expects it to and both increases delta power (brain waves associated with deep sleep) and results in improved cognitive performance on a straightforward associative learning task,” says Larson-Prior. “This is a nap study — participants will be given a 90-minute period during which they will be asked to sleep. Before and after the nap opportunity, they will learn to associate pairs of words — a well-established learning task.”

Among other things, Larson-Prior wants to know if the sound waves make participants more alert upon waking as...
exhibited by better retention of learned word-pairs.

Study participants will be exposed to specific sounds and a placebo while they sleep. “The idea is, during this nap, we may or may not play these sounds,” continues Hang. “Then we are going to measure the neurophysiological changes.

“We have two sounds we are testing,” says Hang. “One we call ‘deep-sleep’ boost. That’s our commercial name for it. Basically it’s a 2-Hertz delta frequency band sound. We expect it to amplify waveforms in that frequency band, which has been shown to enhance the potency of restorative sleep.

“The other sound we’re testing is a 10-Hertz pre-wake sound,” says Hang. (They call it the perfect wakeup.) “We want to boost the frequency band that’s associated with this state of relaxed wakefulness, like when you meditate with your eyes closed. Our aim with this higher-frequency sound (in the alpha bandwidth) is to get you ready to wake up so once your alarm goes off you’re already in a slightly lighter state of sleep.”

The sounds emitted by the pillow insert are soft and audible to users regardless if they sleep face up, face down or with their face on the side of the pillow. Their bed partner will not be disturbed, says Blake Sakran, core engineer for Chrona. “The sounds are like a rhythmic hum, a pure tone,” he adds.

“Our role is as technical advisors,” continues Sakran. “Because we have an interest in the technology itself, we have to avoid a conflict of interest and, for that reason, we advise. So basically we don’t interact with the patients. We make sure that we’re collecting data in the most unbiased way possible and that everything is running as it should.”

“We all hope that this pilot study is successful,” says Larson-Prior. “Having a non-invasive and inexpensive commercial device to track and potentially improve sleep is a huge benefit to the study of sleep as it would allow us to move away from lab-based investigations and into home-based studies.”

HONORS/AWARDS

Mikhail Y. Berezin, PhD, assistant professor of radiology, was elected senior member of SPIR, the international society for optics and photonics.

Colin P. Derdeyn, MD, professor of radiology, of neurological surgery and of neurology, won the American Society of Neuroradiology (ASNR) Foundation Award for Outstanding Contributions in Research in April.

Vincent M. Melnick, MD, assistant professor of radiology, received the 2014 Editor’s Recognition Award with Distinction for outstanding effort as a reviewer for Radiology.

Barbara S. Monsees, MD, professor of radiology, was featured as one of the top 25 radiology professors on the blog of medicaltechnologyschools.com.

Vamsi R. Narra, MD, professor of radiology, completed the Executive MBA from the Olin Business School at Washington University and graduated with honors in May. He was inducted into the Beta Gamma Sigma honor society.

Marilyn J. Siegel, MD, professor of radiology and of radiology in pediatrics, was featured in “Washington People” on the Washington University in St. Louis website (wustl.edu).

Kimberly N. Wiele, MD, assistant professor of radiology in the breast imaging section, received the University of Missouri–Kansas City School of Medicine Alumni Achievement Award in April.

Dmitry A. Yablonskiy, PhD, professor of radiology, was awarded the Marilyn Hilton Award by the Conrad N. Hilton Foundation for innovation in MS research for his project with Anne Cross, MD, professor of neurology, titled “Gradient Echo MRI to Detect and Measure Evolution of Progressive MS.”

APPOINTMENTS/ PROMOTIONS

Catherine M. Appleton, MD
Associate Professor of Radiology

Andrew J. Bierhals, MD
Associate Professor of Radiology

Eric P. Eutsler, MD
Instructor in Radiology

Jennifer E. Gould, MD
Associate Professor of Radiology

Andrew J. Gunn, MD
Assistant Professor of Radiology

Nalinikanth Kotagiri, PhD
Instructor in Radiology

Steven P. Poplack, MD
Associate Professor of Radiology

Raja Ramaswamy, MD
Assistant Professor of Radiology

Anup S. Shetty, MD
Instructor in Radiology

Christopher D. Smyser, MD
Assistant Professor of Radiology (primary appointment in the Department of Neurology)

Rui Tang, PhD
Instructor in Radiology

Mikhail Y. Berezin, PhD, assistant professor of radiology, was elected senior member of SPIR, the international society for optics and photonics.
2015–16 BEST DOCTORS

Forty-one Mallinckrodt Institute of Radiology faculty are among 1,400 physicians in the St. Louis region to be named as 2015–16 Best Doctors. Nominated by their peers, the honorees are considered to be among the nation’s most respected specialists.

Catherine Appleton, MD
Chief, Breast Imaging
Director, Breast MRI

Dennis Balfe, MD
Abdominal Imaging

Sanjeev Bhalla, MD
Chief, Body Computed Tomography
Chief, Cardiothoracic Imaging

Andrew Bierhals, MD
Cardiothoracic Imaging

DeWitte Cross, MD
Chief, Interventional Neuroradiology
Neuroradiology

Michael Darcy, MD
Chief, Interventional Radiology

Farrokh Dehdashti, MD
Nuclear Medicine

Colin Derdeyn, MD
Neuroradiology
Interventional Neuroradiology

Keith Fischer, MD
Nuclear Medicine

Kathryn Fowler, MD
Abdominal Imaging
Director, Abdominal and Pelvic MRI

David Gierada, MD
Cardiothoracic Imaging

Harvey Glazer, MD
Cardiothoracic Imaging

Fernando Gutierrez, MD
Cardiothoracic Imaging

Jay Heiken, MD
Abdominal Imaging

Thomas Herman, MD
Pediatric Radiology

Susan Holley, MD, PhD
Breast Imaging

Cylen Javidan-Nejad, MD
Cardiothoracic Imaging

Jack Jennings, MD, PhD
Musculoskeletal Radiology

Geetika Khanna, MD
Pediatric Radiology

Robert McKinstry, MD, PhD
Chief, Pediatric Radiology

William Middleton, MD
Abdominal Imaging
Chief, Ultrasonography

Barbara Monssees, MD
Breast Imaging

Christopher Moran, MD
Interventional Neuroradiology

Vamsi Narra, MD
Chief, Abdominal Imaging
Chief, Magnetic Resonance Imaging

Daniel Picus, MD
Division Chief, Diagnostic Radiology

Henry Royal, MD
Nuclear Medicine

David Rubin, MD
Chief, Musculoskeletal Radiology

Nael Saad, MD
Interventional Radiology

Janice Semenkovich, MD
Cardiothoracic Imaging

Akash Sharma, MD
Nuclear Medicine

Aseem Sharma, MD
Neuroradiology

Barry Siegel, MD
Division Chief, Nuclear Medicine

Cary Siegel, MD
Abdominal Imaging
Chief, Gastrointestinal/Genitourinary Radiology

Marilyn Siegel, MD
Cardiothoracic Imaging
Pediatric Radiology

Sharlene Teefey, MD
Abdominal Imaging

Suresh Vedantham, MD
Interventional Radiology

Katie Vo, MD
Neuroradiology

Richard Wahl, MD
Director and Department Chair
Nuclear Medicine

Kimberly Wiele, MD
Breast Imaging

Franz Wippold, MD
Chief, Neuroradiology

Pamela Woodard, MD
Cardiothoracic Imaging
Head, Cardiac CT/MRI
Mallinckrodt Institute of Radiology, the Department of Radiology at Washington University School of Medicine, is working to strengthen its reputation for excellence — through outstanding resident and fellow education programs, pioneering research, and innovative advances in patient care. Philanthropic resources play an important part in the continued advancement and future work of Mallinckrodt and those who train in its programs.

There are many ways you can make a gift to support Mallinckrodt Institute of Radiology — from joining the Eliot Society with a gift of $1,000 or more to a larger gift opportunity, such as supporting an endowed professorship.

Online donations can be made at gifts.wustl.edu. To ensure that your donation is designated for Mallinckrodt Institute of Radiology, please follow these directions:

• At Designation Options, please choose the fourth box marked “Other”
• Type in Mallinckrodt Institute of Radiology in the space provided

For more information, please contact:

Medical Alumni & Development Programs
Campus Box 1247
7425 Forsyth Blvd., Suite 2100
St. Louis, MO 63105-2161
(314) 935-9691
A LOOK BACK

THE CORNERSTONE OF MALLINCKRODT INSTITUTE OF RADIOLOGY

Eighty-five years ago, on October 2, 1930 at 4 pm, Edward Mallinckrodt, Jr., laid the MIR cornerstone “without ceremony,” says the official record. Oddly enough, this cornerstone was not placed on the building’s first floor, as usual, but on the seventh floor; it was removed in 1969 during the building’s renovation. Inside the cornerstone, within a copper box, were these items.

Images from Mallinckrodt Institute of Radiology Archives

Text from Imaging & Innovation: A History of Mallinckrodt Institute of Radiology by Candace O’Connor

A photograph of the Edward Mallinckrodt Institute of Radiology taken while under construction, October 1, 1930

A Bulletin of the Washington University School of Medicine of March 20, 1930

Brief history of the founding and purposes of the Edward Mallinckrodt Institute of Radiology

A nickel from the time
A copy of *The Washingtonian* of March, 1928, including an account of Edward Mallinckrodt, Jr. at the time of his election to membership on the Board of Trustees of Washington University.

A copy of *The Washingtonian* from February, 1930, including an account of the Edward Mallinckrodt Institute of Radiology.

The Diamond Jubilee number of *The Washingtonian*, issued February, 1928, and containing an account of Edward Mallinckrodt, Sr.
Left to right: Vascular and interventional radiology fellow Atabak Allaei, obstetrics/gynecology resident Samantha Thomson, first-year diagnostic radiology resident Marina Mityul, and neuroradiology fellow David Rodriguez were among the Mallinckrodt Institute of Radiology residents, fellows, faculty, staff, family and friends who took in a Cardinals baseball game on September 21. The annual event gives members of the Mallinckrodt community a chance to socialize outside the medical center and welcome those new to St. Louis into “Redbird Nation,” often referred to as “the best fans in baseball.”