

FOCAL SPOT

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**WINTER 2020** How MIR Is Keeping Patients from Getting Lost in the System  
MALLINCKRODT INSTITUTE OF RADIOLOGY // WASHINGTON UNIVERSITY // ST. LOUIS



# 10 INSIDE RSNA 2019

“See Possibilities Together” was the theme of the 105th Annual Meeting, held December 1-6 in Chicago.



### 3 MAPPING THE BRAIN

A recent paper co-authored by Adam T. Eggebrecht, PhD, illuminates new potential for more precise brain images.



### 4 MIDWIVES OF MASAKA

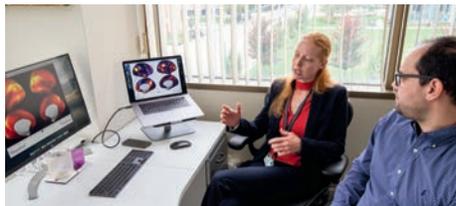
Sharlene A. Teefey, MD, brings ultrasound to the rural villages of Uganda to help pregnant women.



### 6 CLOSING THE LOOP

MIR's incidental finding follow-up program provides personalized care for patients.

**Cover Photo:** (From left) Andrew J. Bierhals, MD, Paula Grow, and James R. Duncan, MD, PhD. Grow, a registered nurse, coordinates MIR's follow-up program.



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## FOCAL SPOT MAGAZINE WINTER 2020

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# Advancing Precision Medicine by Investigating the Brain

by Pam McGrath

*Janine D. Bijsterbosch, PhD, and Aristeidis Sotiras, PhD, assistant professors of radiology at MIR, use advanced computer technology to quantify large volumes of data to, respectively, study functional brain connectivity and develop novel computational algorithms for brain image analysis. Although they take different approaches, their goals are the same: to better understand and interpret the brain's complexities, and therefore advance personalized treatments to best meet individual patients' needs.*



**Janine D. Bijsterbosch, PhD**  
Neuroimaging Lab

Bijsterbosch's research focuses on how functional connectivity networks in the brain differ from person to person. By identifying the variables in these "personalized connectomes," there exists the potential for understanding and predicting differences in behavior, performance, mental state, disease risk, treatment response and physiology.

To characterize connectivity, Bijsterbosch uses functional magnetic resonance imaging (fMRI) of individuals in a resting state. A major resource for these images is the UK Biobank Imaging Study, which aims to scan 100,000 people over five to six years. With no explicit inclusion or exclusion criteria, the genetic diversity of the UK Biobank provides Bijsterbosch with a rich set of phenotypic variables. From these, she aims to differentiate between shared connectivity abnormalities and unique markers of disease through cross-diagnostic research.

The ultimate goal of Bijsterbosch's research is finding markers that indicate where individuals fall within a mental health continuum. An MRI could then inform part of patients' treatment indication. For instance, those at risk for developing anxiety or depression could be given the tools they need to deal with stressors that may trigger mental health issues. Another long-term goal may be treatment response predictions that indicate which antidepressant is best suited for someone with particular markers along the continuum.



**Aristeidis Sotiras, PhD**  
Electronic Radiology Lab

The goal of Sotiras' work is to teach computers to see images not as a collection of pixels of varying intensity, but instead to interpret them as humans do — with the ability to easily identify anatomical structures such as the heart and brain.

Combining the sensitivity of human perception with a computer's ability to quantify large volumes of information is vital to advancing diagnostic and prognostic abilities and treatment planning, as well as understanding brain health in general. To that end, Sotiras is interested in developing unique computational algorithms and applying them to various problems. His methodological work concentrates on developing novel algorithms for image analysis that involves image segmentation, for example, labeling regions of interest. Another use is image registration — the alignment of images in the same coordinate system — to compare individuals and build models.

Finally, Sotiras is developing machine-learning techniques for identifying patterns in data and creating predictive models. His work has applications in brain development, brain aging and brain tumor segmentation. Sotiras hopes to advance automation and quality assurance workflows in clinical practice in order to help clinicians manage increasing data volume. But ultimately, he hopes to use machine learning to fully utilize large volumes of complex imaging and nonimaging data to advance the model of precision medicine.



A paper co-authored by Adam T. Eggebrecht, PhD, (left) showed that flashing light at a faster speed results in a more precise brain image.

## DOT Levels Up: High-Speed Optical Imaging Shows Promise

by Kristi Luther

High-density diffuse optical tomography (HD-DOT) — a brain-mapping tool developed at Washington University School of Medicine for imaging research — is already revolutionary for several reasons: the technology is portable, silent and less invasive and cheaper than methods like functional MRI (fMRI) and PET. HD-DOT is especially attractive for young study participants who have trouble sitting still and for whom radiation or sedation are not ideal. HD-DOT requires only that the patient wear a cap connected to fiber optics, which is portable enough to be used at the bedside or even in an operating room.

Now a recent modeling paper co-authored by Adam T. Eggebrecht, PhD, assistant professor of radiology, shows how using a particular type of light, known as frequency-domain near-infrared spectroscopy (FD NIRS), improves image quality beyond what has previously been possible. Frequency-domain (FD) produces twice as many measurements as the continuous wave (CW) measurements that are the current standard for HD-DOT in Eggebrecht's lab. With CW, light flashes in the kilohertz range, "which sounds like it's quick, but it's not," says Eggebrecht. With FD, light flashes in the megahertz range, 1,000 times faster. The result is a more precise brain image.

"Basically, we image brain function by turning each light on like a flashlight — one by one by one — over a small amount of time, and we cycle through the field of view to see what the brain is doing."

While scientists have studied FD NIRS since the mid-1990s, cost has largely been prohibitive. Eggebrecht says it's much cheaper to build a large channel count system using CW measurements, which is why his lab focuses its efforts

on CW. The lab boasts the largest high-density CW system in the world, combining 96 sources and 92 detectors for over 1,200 measurements per wavelength of light.

When Eggebrecht's colleague Hamid Dehghani, PhD, of the University of Birmingham in the United Kingdom, procured an FD system in 2016, the two discussed collaborating and eventually decided that a high-density configuration made sense for both of their purposes. Eggebrecht then booked a flight to the UK to collect data. It's this data that led them to produce the modeling paper "High-density functional diffuse optical tomography based on frequency-domain measurements improves image quality and spatial resolution," published in *Neurophotonics* in August.

Fortunately Eggebrecht will no longer need a trip to the UK to investigate FD data, as his team has procured its own FD system. The system, which arrived in December 2019, establishes the lab as the largest combined CW-FD team in the world.

Although more expensive than the CW setup the lab has been using for years, FD is still cheaper than MRI — not to mention more portable and less invasive. Both CW and FD are also absolutely silent, which proves helpful when imaging children with an autism diagnosis, a major focus of Eggebrecht's research.

"Kids could wear these caps while they're directly interacting with their mom or caregiver or a member of the lab, and we can image their brain function during these natural interactions," he says. "The idea is that FD can provide higher image quality so that potentially down the road we can image their brain function more precisely while in more naturalistic settings." //

# Ultrasound Improves Pregnancy Outcomes in Uganda

by Kristin Rattini

Cost, distance and tradition. These three factors keep impoverished pregnant mothers in the rural Masaka District of Uganda from seeking the care of trained midwives in village health centers (VHCs), increasing the mothers' risk of obstetric fistulas and the risk of death for themselves and their babies when complications arise during delivery. But thanks to the Safe Birth Project — launched in 2017 by Sharlene A. Teefey, MD, a professor of radiology at MIR — the introduction of ultrasound at 16 VHCs has increased the number of prenatal visits and improved outcomes for mothers with high-risk pregnancies.

Teefey — who is a board member of MicroFinancing Partners in Africa (MPA), a St. Louis nonprofit that is active in the Masaka District — was asked by Bishop John Baptist Kaggwa of the Masaka Diocese to address the high rate of obstetric fistula.

“The obstetric fistula rate in Uganda is second highest in the world after Ethiopia,” Teefey says. “Bishop Kaggwa asked, ‘Can you help?’ How do you say no to a bishop? You don’t.”

Midwives trained through the Safe Birth Project now use ultrasound to screen pregnant women for three high-risk conditions: twins, placenta previa and abnormal fetal lie. “When one of these three conditions is diagnosed, the midwives will educate the mothers about the risks of delivery and make a referral to either a village health center with an obstetrician or to a local hospital,” Teefey says.

Obstetric fistula can only be diagnosed at the time of labor using a partograph and requires a cesarean section. The midwives are trained to use the partograph and, when indicated, will emergently refer a mother for surgery.

In the six months after adopting ultrasound, the first three VHCs reported no fistulas. They saw 605 pregnant women and had 1635 prenatal visits and 422 deliveries — about twice as many as in the previous six months. The most recent data continues to show an increase in the numbers of prenatal visits and deliveries. The screenings have also strengthened the bond between mother and child. “Many mothers come in because they’re very motivated to see their babies on the ‘TV,’” Teefey explains.

Because so many pregnant women cannot afford their health-care costs, microfinancing projects were introduced to the VHCs, who in turn will teach impoverished mothers about microfinancing. Nearly all 16 centers are funded and in various stages of development.

“This is going to have a great impact,” Teefey says, “because now we’ll be able to help mothers afford their care.” Additional VHCs will receive ultrasound machines and funding by January 2021. ▮





**Opposite:** Through Teefey's creation of the Safe Birth Project, midwives in the Masaka District of Uganda are trained to use ultrasound technology to screen pregnant women for high-risk conditions. **Clockwise from upper left:** **a.** Teefey bonds with two mothers who had recently undergone obstetric fistula repair. **b.** For remedial training, Safe Birth Project sonographers complete rounds at all of the village health centers with ultrasound equipment. **c.** A midwife records the findings of an ultrasound she just performed. **d.** Piggeries (in background) are one type of microfinancing project at village health centers. Ugandan mothers are granted a piglet (photo a) which eventually enables them to finance their health-care costs.

**Photos //** Sharlene A. Teefey, MD

# Closing the Loops

MIR Creates a Safety Net for  
Patients with Incidental Findings



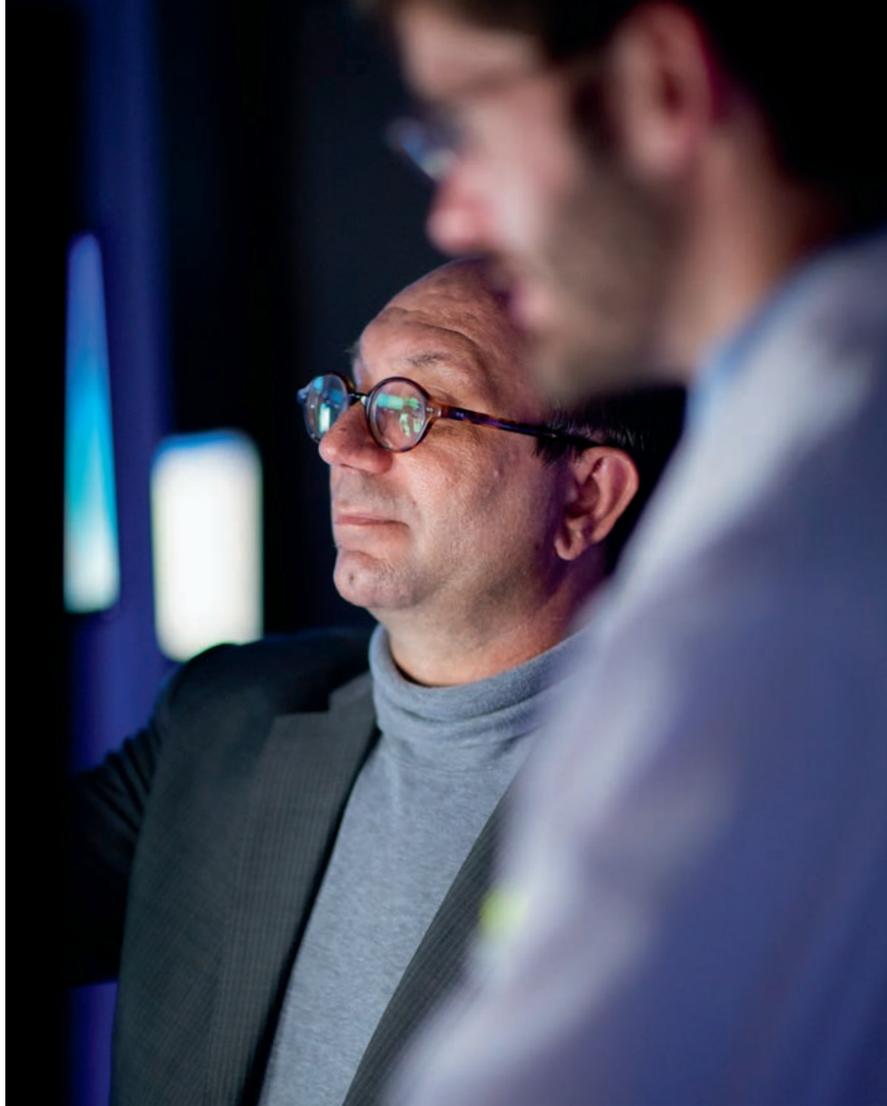
by Pam McGrath

**After falling and hitting the back of his head in August 2018, Kent Kiplinger found himself in the Barnes-Jewish Hospital emergency department. A head and cervical spine computed tomography (CT) scan didn't indicate a concussion, but it did reveal something else: a mass the size of a silver dollar in the frontal lobe of Kiplinger's brain.**

That incidental finding, included in the report submitted by a radiologist at Mallinckrodt Institute of Radiology (MIR), prompted a call to Kiplinger from Paula Grow, a registered nurse and the coordinator of MIR's incidental finding follow-up program. She encouraged him to undergo a follow-up magnetic resonance imaging (MRI) scan. Upon following her recommendation, he was diagnosed as having a benign meningioma. With no easily identifiable symptoms — Kiplinger only later realized his sense of smell had diminished — the tumor could have eventually reached his optic nerves.

### **A Program to “Seal the Cracks”**

Kiplinger is one of 60 to 70 patients a week who benefit from MIR's incidental finding follow-up program, established in January 2018. The program's goal is



to close the loop between the time MIR radiologists identify and report incidental findings on imaging scans to when next-step actions are taken — whether that means scheduling another scan, visiting a primary-care physician or seeing an appropriate subspecialist.

“Today's health care is so complex that patients have fractionated care,” says Andrew J. Bierhals, MD, associate professor of radiology and vice chair of quality and safety. “In the past, primary-care physicians would admit their patients to the hospital, visit them there, write orders and then see them back in their offices. Today, primary-care physicians no longer see their patients once they are hospitalized; instead, hospitalists and a team of experts care for patients, thus creating multiple patient records. The potential for important information being lost, or transmitted but unseen, by those who need to take further action is substantially increased.”

**Opposite:** MIR's follow-up program is currently tracking incidental findings from radiology reports at Barnes-Jewish and Barnes-Jewish West County Hospitals but will expand to Barnes-Jewish St. Peters and Progress West Hospitals during the program's second grant year.

**Above:** Andrew J. Bierhals, MD, serves as the project lead of the follow-up program. He and Paula Grow, the project's nurse coordinator, work to eliminate the potential of “important information being lost, or transmitted but unseen,” Bierhals says.



Paula Grow, (left), shown with James R. Duncan, MD, PhD, personally connects with patients and physicians by phone to ensure any incidental findings are communicated and next steps established. Other follow-up programs exist that use text or email, but “a busy physician may receive hundreds of electronic communications a day,” says Bierhals.

MIR’s follow-up initiative, supported by a grant from Coverys Community Healthcare Foundation, has uncovered a startling statistic — 15% of the patients or physicians contacted by the program’s coordinator are unaware of the incidental findings reported by MIR radiologists.

“According to an Institute of Medicine quality and safety report, the process for reporting incidental findings on imaging scans is not complete until the

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**“The template prompts MIR radiologists to describe the incidental finding, recommendations for follow-up and a timeframe for that follow-up.”**

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patient and their family, or someone acting in their best interest, is made aware of and is taking action on those findings,” says James R. Duncan, MD, PhD, professor of radiology and chief of interventional radiology, who helped secure the Coverys grant.

“What sets our program apart is that we not only inform patients and physicians about incidental findings, we take seriously the Institute of Medicine’s recommendation of making sure follow-up occurs.”

### **An Epic Resource**

Bierhals and Grow have worked closely with representatives of the electronic medical records (EMR) software system Epic to develop a radiology template that flags scans requiring follow-up communication. Working from a list generated in Epic, Grow acts as a patient-advocate detective.

“The template prompts MIR radiologists to describe the incidental finding, recommendations for follow-up and a timeframe for that follow-up,” says Grow. “Starting with the most urgent first, I contact the physician who ordered the scan, the patient’s primary-care doctor or a nurse or medical assistant in the medical offices to make sure they have received the radiology report and recommendations.”

If a patient is seen in the Barnes-Jewish Hospital emergency department, for instance, and no primary-care physician is listed, Grow contacts the patient directly to explain the radiologist's findings and help them take the next steps toward follow-up care.

"A personal phone call ensures there is direct, one-to-one communication with someone who can take responsibility for further action on behalf of the patient," says Bierhals. "Programs exist at other institutions that focus on sending notifications by text or email. The complication is a busy physician may receive hundreds of electronic communications a day.

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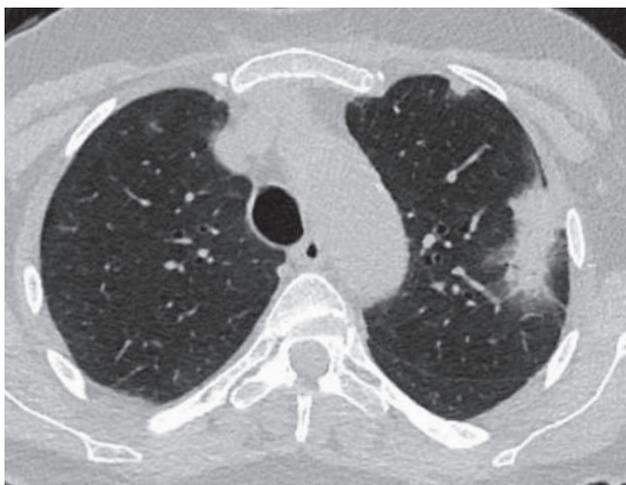
**"At the end of the grant cycle, we foresee having developed a follow-up program that can easily be implemented by other institutions."**

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Sifting through those to identify important messages about their patients can be time-consuming and overwhelming."

Whereas radiology follow-up programs at most other institutions stop at the point of notification, MIR is one of just a few in the nation to take it a step further. Grow keeps track of radiologists' recommended timeframes for follow-up on each patient; when that deadline is reached, she again contacts the physician's office or patient to find out what actions have been taken.

"In cases where an incidental finding involves, for instance, identifying a new tumor in a patient already being treated for cancer, I'll track the oncology notes in a patient's EMR to see if there's mention of the



radiologist's finding," says Grow. "If not, then I take the precaution of making a personal phone call to the oncologist or a staff member."

After contacting a physician or patient two to three times without further action being taken, Grow sends a certified letter outlining the incidental finding and the radiologist's recommendation. Only then does she consider the case closed.

## Expanding the Program at BJC HealthCare and Beyond

In the program's first year of grant funding, incidental findings on radiology reports from Barnes-Jewish Hospital and Barnes-Jewish West County Hospital are being tracked. In the grant's second year, plans call for rolling out the program to the community-based Barnes-Jewish St. Peters Hospital and Progress West Hospital, in St. Charles County and O'Fallon, respectively.

"At the end of the grant cycle, we foresee having developed a follow-up program that can easily be implemented by other institutions using the Epic EMR system, or that can be modified and incorporated into other EMR systems," says Bierhals. "Effectively

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**"We feel the program we are developing features the elements most important to closing the patient-care loop."**

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communicating incidental findings is a recognized challenge for hospital groups throughout the country. We feel the program we are developing features the elements most important to closing the patient-care loop: namely, personal, one-to-one communication and repeated follow-ups that ideally result in actions that promote quality diagnoses and treatments for our patients."

Through the follow-up program, Kent Kiplinger was referred to Michael R. Chicoine, MD, the August A. Busch Jr. Professor of Neurological Surgery at Washington University School of Medicine. After surgery in June 2019 and a two-week hospital stay, Kiplinger went home — tumor-free. //

The follow-up program's grant proposal focused specifically on pulmonary nodules (shown in scan at left) and masses due to the frequency in which they are found incidentally.





# The Annual MIR at RSNA Reception

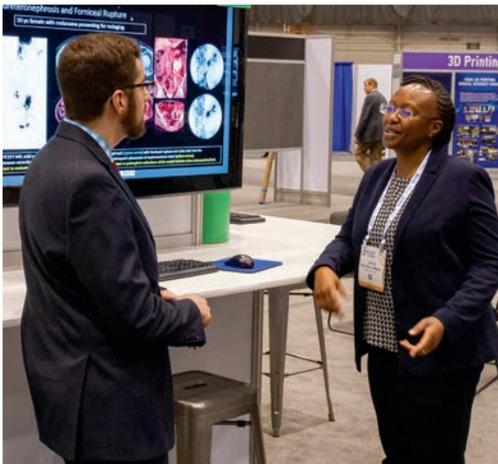
Surrounded by luminous holiday displays and countless colleagues, MIR alumni and current residents, fellows and faculty lit up the Hyatt Regency Crystal Ballroom in Chicago on December 2, 2019. Director Richard L. Wahl, MD, and Sanjeev Bhalla, MD, vice chair for education, MIR's past and present faculty and trainees enjoyed a video of the inaugural Evens Society Alumni Weekend, held in 2018. The second alumni weekend is scheduled for September 11-13, 2020.





# RSNA 2019: MIR in the Windy City

MIR faculty and staff joined radiology professionals from around the world at the RSNA annual meeting on December 1-6 in Chicago. The event — “See Possibilities Together” — was held at McCormick Place Convention Center. Participants celebrated successes in discovery, innovation and research, but were urged to push the boundaries of scientific inquiry. MIR brought home 20 awards and several researchers and educators were honored.



# A Chief Resident's Day at RSNA

Chelsea R. Samson, MD — a diagnostic radiology chief resident at MIR — attended RSNA for the first time, taking in what the annual meeting has to offer a budding trainee. “It’s like a reunion,” she says. “I think everyone has this common interest in innovation and learning, so it’s really motivating to be here.” Samson will remain at MIR for a fellowship in musculoskeletal imaging and intervention.



**a.** MIR supporters, including Jennifer E. Gould, MD, (middle) diagnostic radiology residency program director, watched from the audience as MIR's team — which included Samson — competed in the third annual RSNA Diagnosis Live™ Resident Competition. **b.** At the resident competition, the MIR team consisted of six 4th-year MIR residents. They competed against 14 other programs, diagnosing cases at a rapid pace in front of a crowd of onlookers. **c.** MIR's residency program was well represented at RSNA: (from left) diagnostic radiology residents

Muhammad Naeem, MBBS, Jonathan H. Stein, MD, and Samson; integrated interventional radiology resident Abigail E. Mills, MD; and diagnostic radiology residents Anup K. Bhattacharya, MD, and Austin J. Cail, MD. **d.** Samson and Anup S. Shetty, MD, assistant professor of radiology and former MIR resident, reviewed his poster in RSNA's Digital Presentation System. **e.** Samson (right) spent nearly a week at RSNA, allowing her to connect with colleagues from other institutions as well as fellow MIR residents like Kaitlin M. Marquis, MD (left).

## Alumni Spotlight

by Holly Edmiston

Edward Y. Lee, MD, MPH, is chief of the division of thoracic imaging and associate professor of radiology at Harvard Medical School and Boston Children's Hospital (BCH). He is the past president of the New England Roentgen Ray Society and Medical Staff Organization at BCH. He is the current president of the International Society of Pediatric Thoracic Imaging. An internationally known educator, author and expert in the field of pediatric radiology, Lee has served as a visiting professor or invited speaker in more than 45 countries across six continents.

### How would you describe your training at Mallinckrodt Institute of Radiology?

As a trainee, you just don't realize the truly superb radiology education that you are getting at MIR. I am a strong believer that you build your fundamental knowledge — how good you are as a radiologist — during your residency training, and MIR prepares you for that whether you will be in academic or private practice settings.

### What makes MIR so special?

"Mentorship" and "recognition" are the two best words to use. First, the connections with mentors and their guidance in terms of an academic career are outstanding. Radiology is a relatively small community; you must be very good, but who you know is also important. Secondly, when you are done training at MIR, you get the recognition from other radiologists that you are the "cream of the crop." Perception from outside becomes reality, and confidence that MIR helped built inside of you matters in your career.

Lee traveled to Ukraine to speak at the Center for Pediatric Cardiology and Cardiac Surgery. He credits his travels with providing him international perspective on improving radiology around the world.



Lee was invited to speak at the International Thoracic Imaging Conference in Muscat, Oman, where he connected with radiology counterparts from the Middle East.

### Who were your mentors?

At MIR, I truly had the best of both worlds. I learned how to do scientific research from two of the biggest names in radiology, Drs. Jay Heiken and Marilyn Siegel. Dr. Heiken taught me the importance of accuracy and precision. Dr. Siegel taught me the desire for new advances. And there is Dr. William McAlister, who is the best clinical pediatric radiologist ever.

### Why is international outreach so important to you?

I came to the United States from South Korea when I was 16 for education. My master of public health degree is also in the field of international health. So my background and education have prepared me to look at the world with an international perspective. Unfortunately — even nowadays — many parts of the world are behind in the area of pediatric radiology, and

many sick children are not receiving optimal care. And for training radiologists in other parts of the world, many educational opportunities are not available to them. Some of my past work is related to creating educational resources for them, such as textbooks and international radiology educational conferences.

### What ultimately drives you?

To me, how to live starts with focusing on contributing to society and making human connections. And I can do that through my work, so I feel very lucky. In many ways, I can do what I am doing now because I did my radiology residency training at MIR, so I am very grateful and proud that I had MIR training and experience.

Lee was named the RSNA William R. Eyler Editorial Fellow in 2010. The fellowship provides an opportunity for mid-career radiologists to further their experience in radiologic journalism by working with RSNA journal editors and publications staff.



## Alumni News

### Save the Date: Alumni Weekend 2020

On Sept. 11-13, 2020, past, present and future MIR faculty and family members will come together at the Chase Park Plaza in St. Louis for the second Evens Society Alumni Weekend. The weekend will feature a variety of opportunities to connect with colleagues and classmates from years past: a welcome reception on Friday evening, educational programs and tours of the MIR campus on Saturday, as well as the Evens Society Honors at the gala dinner that evening.



Nearly 200 faculty and alumni attended the inaugural alumni weekend held in 2018. The event was a huge success and, in the end, served as a testament to the lasting legacy of MIR and the joy of “coming home.” Visit [mir.wustl.edu/alumniweekend2020](http://mir.wustl.edu/alumniweekend2020) for more information.

### Got News?

Focal Spot is looking for submissions from MIR alumni. If you've received an award or honor we should know about or have professional news you'd like to share, please email us at [mirmarketing@wustl.edu](mailto:mirmarketing@wustl.edu). 📧

### About the Evens Society

Evens Society members include current full-time and past MIR faculty, as well as trainees who have spent a year in one of MIR's training programs.

## Nickels Named Director of Cyclotron Facility and Nuclear Pharmacy



Michael L. Nickels, PhD, associate professor of radiology, was named the director of the cyclotron facility and nuclear pharmacy. Prior to his appointment, Nickels, who assumed responsibilities June 10, served as an assistant professor in the department of radiology at Vanderbilt University Medical Center. At Vanderbilt,

Nickels oversaw the activities of the Radiochemistry Core, which focused on the development and production of PET and SPECT imaging agents for use in basic preclinical to clinical applications.

Nickels brings with him a research background encompassing radiopharmaceutical development and the labeling techniques used to incorporate radionuclides. He is currently investigating the use of microfluidic chemistry as a means to accomplish fluorine-18 labeling on both model compounds and authentic radiopharmaceutical agents. He also oversees the development of several new agents for imaging with PET radionuclides.

Nickels says MIR is one of the few institutions he'd consider joining. As director of the cyclotron facility, he aims to continue to make MIR a premier location for radiology and radiochemistry, as well as diversify research and radiochemistry innovation.

"The most exciting part about this facility is the people," he says. "I've never been in as energetic of a location. The researchers are really motivated and want to get going quick."

In some ways, Nickels' presence at MIR has been a long time coming. He earned his doctorate from the University of Illinois at Urbana-Champaign, where he studied new techniques for the incorporation of fluoride ion and explored technetium chelate chemistries. Because the university did not have a working cyclotron at the time, Nickels and his lab group traveled to St. Louis to use MIR's — an experience he says taught him the value of strong collaborative relationships in the scientific world.

Nickels says that in his new role, he's most eager to continue producing work that will help others. "The images of the things we can do speak for themselves."

## Precision Radio-Theranostics Translational Laboratories (PRT<sup>2</sup>L) Formed

The PRT<sup>2</sup>L brings together the Radiochemistry and Imaging Lab, the Cardiovascular Imaging Lab and the labs of Richard L. Wahl, MD, and Suresh Vedantham, MD. Zhude (Will) Tu, PhD, (left) serves as chief of the new lab, which has over 20 investigators with scientific interests ranging from radiopharmaceutical development to radioimmunotherapy. The lab is part of the division of radiological sciences, which is led by Robert J. Gropler, MD (right).



## Bierhals Named Vice Chair for Quality and Safety

Andrew J. Bierhals, MD, associate professor of radiology, was named vice chair for quality and safety. Bierhals, who served as MIR's assistant director of quality and safety since 2011, succeeds James R. Duncan, MD, PhD, who founded the Office of Quality and Safety and was named chief of interventional radiology in June.

Bierhals joined MIR's faculty in 2006 following a residency in diagnostic radiology and a cardiopulmonary fellowship. In 2015, he was promoted to associate professor. He has also served as the director of cardiothoracic imaging at Barnes-Jewish West County Hospital since 2009. When MIR began providing radiology services to Phelps Health

in December 2018, Bierhals played a key role in updating quality and safety processes, which included a robust peer review. Along with Duncan, Bierhals also helped secure grant funding to establish a dedicated follow-up program to limit delay in diagnosis for patients with incidental imaging findings.

As a member of the Radiological Society of North America, American College of Radiology and Society of Thoracic Radiology, Bierhals has participated in several educational, scientific and quality committees. He earned his medical degree and a master's degree in public health at the University of Pittsburgh.



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## The Twenty-Seventh Annual G. Leland Melson Memorial Lecture

Bruce L. McClennan, MD, FACR, professor emeritus of radiology and biomedical imaging at Yale School of Medicine, presented "Convergence of Change and Opportunity: AI for Radiologists" at the twenty-seventh annual G. Leland Melson II Memorial Lecture in September. McClennan previously served as chief of abdominal imaging at MIR, then as chair of the

radiology department at Yale School of Medicine before retiring in 2015. He also served as an advisor to the NIH and the FDA, and is currently the chairman of the Senior Radiologists Section of the American Roentgen Ray Society.

Lecture speaker Bruce L. McClennan, MD, (right) with Vincent M. Mellnick, MD, chief of abdominal imaging at MIR.



## The Forty-Eighth Annual Wendell G. Scott Memorial Lecture



James A. Brink, MD, the Juan M. Taveras Professor of Radiology at Harvard Medical School, presented "Will the Art of Medicine Die as We Manage the Health of a Growing Population?" at the forty-eighth annual Wendell G. Scott Memorial Lecture in December. Following residency and

James A. Brink, MD, (right) standing beside a portrait of former MIR Director Juan M. Taveras, MD.

fellowship at Massachusetts General Hospital, Brink came to MIR in 1990 and was an associate professor when he joined Yale in 1997. He went on to lead radiology at Yale for seven years.

Brink's research focuses on the physical and biological principles of computed body tomography. He has served on the editorial board of the Journal of the American College of Radiology for the past ten years.

## Honors/Awards

**Maxwell R. Amurao, PhD**, assistant professor of radiology, was named a 2019 American Association of Physicists in Medicine (AAPM) Fellow. The honor is given to members of AAPM for their work and contributions in research, education and leadership in medical physics.

**Steven Don, MD**, professor of radiology, received the Pioneer Award from the Society of Pediatric Radiology. The award pays homage to early physicians who made considerable contributions to pediatric radiology.

**Daniel D. Picus, MD**, professor of radiology, is the recipient of the 2019 Neville Grant Award. The award is given by Barnes-Jewish Hospital to medical staff who exemplify compassion and excellence in clinical care.

**Anup S. Shetty, MD**, assistant professor of radiology, was inducted into the Academy of Educators at Washington University School of Medicine. The

academy is a collaboration of educators who foster a culture of educational excellence and an institutionally valued community of leaders in health science education.

**Barry A. Siegel, MD**, professor of radiology and former senior vice chair and division director of nuclear medicine, received this year's Minnie award for Most Influential Radiology Researcher from AuntMinnie.com. The site is an online community for radiologists and related professionals in the medical imaging industry.

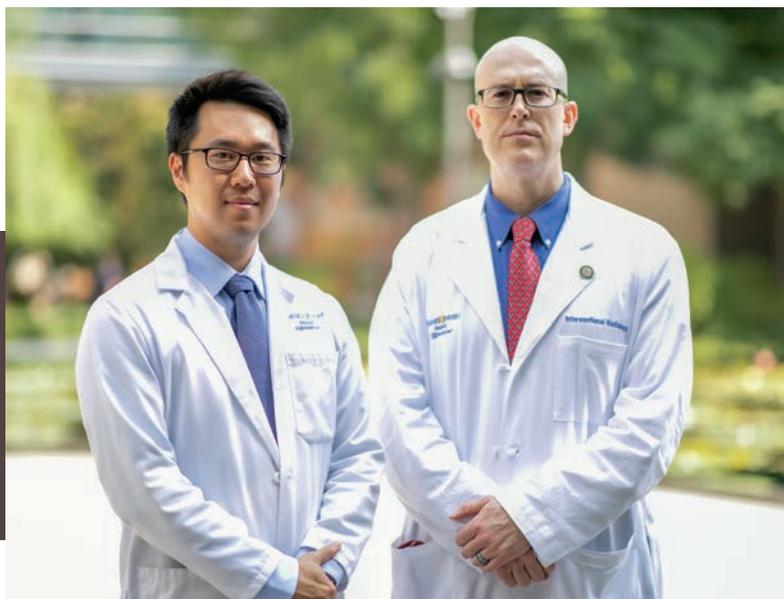
## Grants

**Tammie L.S. Benzinger, MD, PhD**, professor of radiology, and **Vijay Sharma, PhD**, professor of radiology, received a five-year, \$3.7 million grant from the National Institute on Aging for "Development and Translation of a PET Tracer for Specific and Early Detection of Alzheimer's Disease."

**Gretchen M. Foltz, MD**, assistant professor of radiology, was awarded a one-year, \$10,000 grant from the RSNA Research & Education Foundation for "Crisis Management During Image-Guided Procedures: Assessing the Roles of Checklists and Team Training."

**Joseph E. Ippolito, MD, PhD**, assistant professor of radiology, was awarded a three-year, \$783,460 grant from the U.S. Army Medical Research Acquisition Activity for "Developing a MALDI/PET Early Warning Imaging System for Lethal Prostate Cancer." He was also awarded a two-year, \$376,321 grant from the National Cancer Institute for "Understanding Sex Disparities in Gliomas Through Sex Differences in Mitochondrial Activity."

**Joel S. Perlmutter, MD**, the Elliot H. Stein Family Professor of Neurology and professor of radiology, received a five-year, \$465,403 grant from the National Institutes of Health for "Neuroinflammatory Biomarkers for Nigrostriatal Injury." Perlmutter, along with **Zhude (Will) Tu, PhD**, professor of radiology, and **Paul T. Kotzbauer, MD, PhD**, professor of neurology, also received a five-year, \$3.5 million grant as part of the "Center Without Walls



## IR Chief Residents 2019-2020

From left:  
David J. Kim, MD  
Ryan P. Rimer, MD

for Imaging Proteinopathies with PET,” led by Robert H. Mach, PhD, from Perelman School of Medicine at the University of Pennsylvania.

**Malcolm Tobias, PhD**, instructor in radiology, received a \$597,200 award from the National Institutes of Health for the acquisition of a next-generation computing cluster to support computationally intensive NIH-funded research.

**Jie Zheng, PhD**, associate professor of radiology, was awarded a two-year \$157,229 grant from the National Institute of Biomedical Imaging and Bioengineering for “Contrast Free MRI for Imaging Vascular Calcification in Diabetic Lower Extremity.”

## Appointments/ Promotions

**Ajay R. Chapa, MD**  
Chief of Radiology,  
Progress West Hospital

**Arindam R. Chatterjee, MD**  
Assistant Professor of Radiology

**Carlos J. Guevara, MD**  
Assistant Professor of Radiology

**Gloria Guzman, MD**  
Assistant Professor of Radiology

**Lisa M. Oakley, MD**  
Assistant Professor of Radiology

**Kyle A. O’Blanc, MD**  
Assistant Professor of Radiology

**Mohamed Z. Rajput, MD**  
Instructor in Radiology

**Nassir Rostambeigi, MD**  
Assistant Professor of Radiology

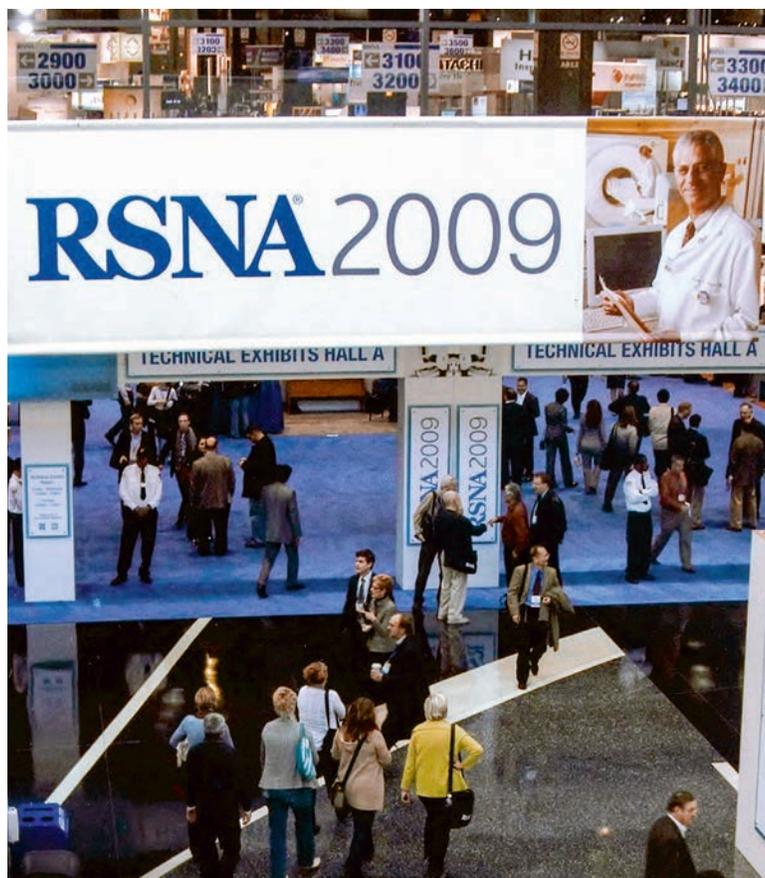
**Ting Y. Tao, MD, PhD**  
Assistant Professor of Radiology

**Theodore L. Vander Velde, MD**  
Assistant Professor of Radiology

**Cornelius J. von Morze, PhD**  
Assistant Professor of Radiology

## FROM THE ARCHIVES

In 2009, Barry A. Siegel, MD, former senior vice chair and division director of nuclear medicine, was featured on the welcome banner at the RSNA Annual Meeting. That year, MIR faculty members presented 41 posters, 46 sessions and courses, and brought home five awards. Recipients of the latter included current faculty Sanjeev Bhalla, MD, Fernando R. Gutierrez, MD, Cylen Javidan-Nejad, MD, and Vincent M. Mellnick, MD.



## A LOOK BACK

# Building a Cutting-Edge Interventional Neuroradiology Service from the Ground Up

by Kristin Rattini

DeWitte T. Cross III, MD, professor emeritus of radiology, describes himself as a tinkerer. “I like to build things, fix things, work on new things.”

Cross arrived at MIR in 1991 to establish the interventional neuroradiology (INR) service. By collaborating closely with colleagues in neuroradiology, neurology and neurosurgery, incorporating the newest techniques and technologies in standard practice, and nurturing talented residents and fellows, Cross kept the INR service at the forefront of a rapidly evolving field.

### Early Years

During his rotations in medical school at the University of Alabama-Birmingham (UAB), Cross found his path repeatedly leading to the radiology department.

“At the time, the UAB radiology department was one of the best in the country,” he says. “The people who ran its various divisions wrote the standard textbooks that were used in residencies across the country, so no matter what rotation I was on — pulmonary, neurology — we would trot down to the radiology department and ask the radiologists to give us the answer of what was going on with a patient.”

After attending medical school on a Navy Health Professions scholarship, completing a medicine residency in San Diego and experiencing some shipboard duty, Cross went on to a residency in diagnostic radiology at the National Naval Medical Center in Bethesda, Maryland. “There were no fellows there at the time, so residents got to do more than usual,” he says. During what was called specials rotation, Cross met Zelig Weinstein, an instructor he credits with solidifying his interest in neuroradiology.

Following his residency, he spent two years as head of radiology at a naval hospital in Memphis. “The Navy gave me more responsibility earlier on in my career than one would get ordinarily.”

From there his path led to New York City, where his wife, Anne H. Cross, MD, professor of neurology, had accepted a fellowship. He completed two fellowships, the second in diagnostic and interventional neuroradiology under Sadek Hilal, MD, at Columbia University. A pioneer in interventional radiology, Hilal invented the first microcoil to be introduced through a microcatheter for the treatment of a cerebral aneurysm.

### MIR Accomplishments

Washington University landed on Cross’ radar after Anne was invited to give a talk. She returned home impressed by what she’d seen. “She told me, ‘You should call them up and see if they’re interested in having an interventional neuroradiologist,’” he recalls. He did; they were. Anne also secured a position in the neurology department.

“Washington University struck us as a very collaborative environment. It was different than the New York experience, where people were competitive,” says Cross. “Here, people were of a high caliber and much more collegial, cooperative and collaborative; that appealed to us.” Once in his post, Cross advanced that spirit of collegiality by establishing a weekly vascular conference together with Ralph G. Dacey Jr., MD, then-chairman of neurosurgery.

“It brought together residents, fellows and the attendings from neuroradiology, neurology and neurosurgery so that everyone could learn from each other,” says Christopher J. Moran, MD, professor of

Interventional neuroradiologist DeWitte T. Cross III, MD, retired in June following a 30-year career in radiology at MIR.





**Above, clockwise from upper left:** A procedure snapshot of Cross; Cross completed residency at the National Naval Medical Center; Cross and Ralph G. Dacey Jr., MD; with Christopher J. Moran, MD and Akash P. Kansagra, MD, examining a study; Cross with his wife Anne H. Cross, MD, on vacation in Venice, Italy.

radiology and neurological surgery. “Cross was smart enough to know that we needed to work together, and he did it seamlessly.”

Moran became one of Cross’ earliest and most frequent collaborators. They were kindred spirits, both enthusiastic and interested in all things new in their fields. “He helped bring medical-grade glue into treatment,” Moran says. “He was one of the first to use coils and balloons in the treatment of aneurysms. He took me to UAB to learn carotid angioplasty and stenting. Cardiologists were doing it, but he became one of the first neuroradiologists to do it.”

As director of interventional neuroradiology for Barnes-Jewish Hospital and St. Louis Children’s Hospital, Cross put those cutting-edge techniques to work for patients of all ages. He developed innovative intra-arterial approaches for delivering medication to shrink congenital vascular malformations in children. “He always shared his technique and approach with all of us,” Moran says. “He didn’t want the spotlight on him. He’d say, “This is what we do as a group.””

Cross is especially proud of his work in advancing stroke intervention. “When I came here, there wasn’t any stroke intervention going on,” he says. “The neurology community at the time fought us tooth and nail on it.” Cross conducted research that showed the efficacy of clot-dissolving drugs delivered intra-arterially and of thrombolysis in the basilar artery. “He provided level 1 evidence that it would work and that it benefitted patients,” Moran says. “He wasn’t a catheter cowboy about it. He had a thoughtful, reasoned approach.”

Cross has always considered teaching to be the best part of his job. He and Moran established the INR fellowship in 1994 and have trained some 40 fellows and even more residents. “It’s fun to meet these young people who are gaining skills, knowledge and maturity through your teaching and guidance,” Cross says.

Cross retired in June as in awe of his specialty as when he first entered it. “The interventional neuroradiology field has gone through a remarkable transformation,” he says. “This evolution has made things better not only for the patients but for us practitioners as well.”

FOCAL SPOT

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