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UNIVERSITY OF MICHIGAN
DEPARTMENT OF RADIOLOGY

NEWS AND NOTES

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The Department of Radiology:
Working Hard to Reduce Radiation Exposure

The use of CT scans and other imaging tests has soared in recent years. In 1980, approximately 3 million CT scans were performed in the U.S. Today, this number is estimated at 62 million (including at least 4 million for children), a twenty-fold increase. CT studies have skyrocketed in popularity because they are an extremely effective tool in the diagnosis and management of disease: CT scans are utilized for everything from identifying areas of the brain affected by strokes and head injuries, to detecting abnormalities of the lungs, to diagnosing abdominal diseases such as appendicitis, to assessing coronary artery disease. In ERs, CT exams are the tool of choice because of their speed and diagnostic accuracy.

Though a highly effective tool that has drastically reduced the need for exploratory surgery, CT scans do carry risks. While no large-scale epidemiologic studies on cancer risks from diagnostic radiation exist, data from the Japanese A-bomb survivors exposed to low levels of radiation suggests that frequent exposure to the low levels of radiation associated with CT scans may increase a patient's risk of eventually developing cancer, particularly if the patient is young.

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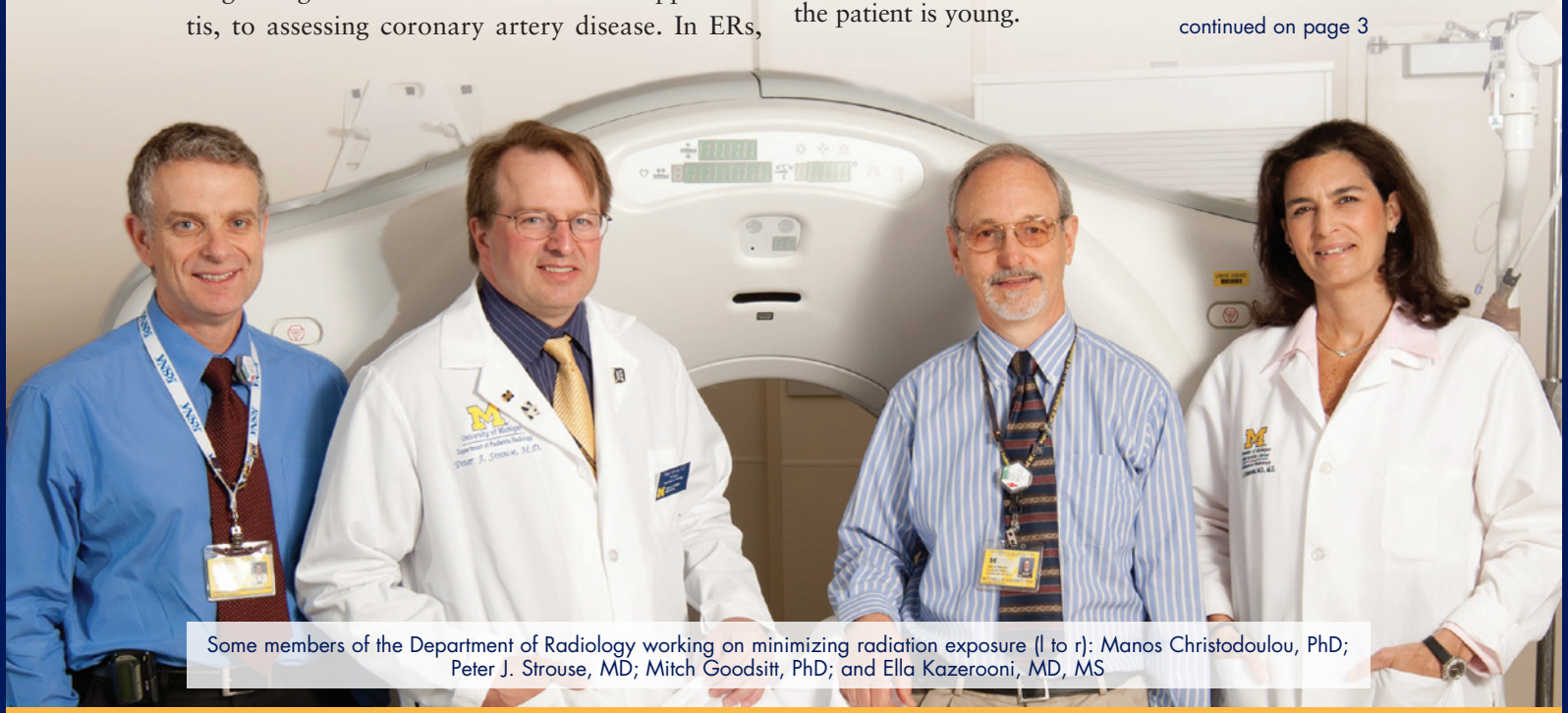

Some members of the Department of Radiology working on minimizing radiation exposure (l to r): Manos Christodoulou, PhD; Peter J. Strouse, MD; Mitch Goodsitt, PhD; and Ella Kazerooni, MD, MS

LETTER FROM THE CHAIR

Dear Michigan Radiology Alumni, Friends, and Family:

We have become accustomed to road closures. Usually the closures are due to a student "move-in" day or maybe road construction. This fall the Department of Radiology was responsible for two of these road closures—we brought three new magnetic resonance (MR) scanners into the new Mott Children's Hospital, which is scheduled to open December 2011.

The C.S. Mott Children's and Von Voigtlander Women's hospitals are located in a wonderful, state-of-the-art, 1.1-million-square-foot building that will enable us to continue our commitment to providing children with the best care possible. The radiology department will open with three MR and two CT scanners, with shelled space to add more. There are two angio suites dedicated to pediatric interventional procedures and a 1.5 Tesla magnet in the operating room for pediatric neurosurgery and potentially other applications. We anticipate that more children will be referred to the new Mott Hospital than ever before and have recruited three of our recent graduates, Jonathan Dillman, Deepa Pai, and Ethan Smith, to bolster our pediatric radiology faculty.

Our faculty continue to be selected for leadership positions in professional radiology organizations. A list of these positions and honors bestowed on our faculty are included in this newsletter (see p. 10). I would like to point out that 41 of our faculty were selected as "Best Doctors" for 2011 and that our faculty are poised to become presidents of the AUR, ARRS, RSNA, and Michigan Radiological Society as well as many of our subspecialty societies.

Radiology residents are active in their own societies as well. Shane Wells completed his service as president of the American Alliance of Academic Chief Residents in Radiology (A3CR2) this year. He was succeeded as A3CR2 president by another Michigan resident, Matt Hammer. Dan Barr continues to serve as the resident member of the Accreditation Council for Graduate Medical Education (ACGME) Radiology Review Committee.

Research remains a high priority and our department ranks third among university radiology departments in NIH funding (Blue Ridge Institute). Imaging technologies can now interrogate at the cellular level, making them useful for the investigation of basic physiology as well as disease pathophysiology. Thus, imaging is now a significant part of research projects for many non-radiology investigators who have become important collaborators.

The opening of the North Campus Research Complex (NCRC) provides new space to expand our research programs. We have had great success increasing our knowledge and understanding (discovery), but have been less successful in applying this new knowledge to patient care (translation). Faculty in our Center for Molecular Imaging, who are working with Cancer Center faculty to develop and evaluate new treatments, were among the first to occupy laboratory space at NCRC. Haile Tecle, a medicinal chemist is working with Judith Leopold, Chris Whitehead, and Marcian Van Dort to develop small molecules for the early detection of cancer. The ability to non-invasively diagnose and molecularly define an individual's tumor will enable the development of personalized therapies.

GO BLUE!!!

Regards,

N. Reed Dunnick, MD

WORKING HARD TO REDUCE RADIATION EXPOSURE

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Peter J. Strouse, MD, director of pediatric radiology, with a patient.

In the Department of Radiology, faculty and staff are taking the issue of radiation exposure very seriously. Over the past several years, they have pursued several important measures to minimize radiation exposure without sacrificing image quality. These range from purchasing new scanners that reduce radiation doses, to limiting the region of the body being scanned to the smallest possible area, to customizing the scanning based on the size and weight of the patient or on the body part being scanned. Perhaps the single most important step is the elimination of unnecessary CT examinations.

"We always try to ask: Is this test really indicated, or is there another examination we can use to diagnose conditions such as an ultrasound or an MRI study, which doesn't involve ionizing radiation," says Peter J. Strouse, MD, professor of radiology and director of pediatric radiology. "All CT scan requests go through us for approval and if we have any questions, we'll contact the physician making the request to make sure we're performing the appropriate test for the question being asked."

Another relatively easy measure radiologists have taken to reduce radiation exposure is to confine CT scanning to prescribed anatomical areas. Leslie Quint, MD, professor of radiology and Mitch Goodsitt, PhD, professor of radiological sciences have found that scanning beyond the area of interest accounts for about a 10 percent extra dose to the patient. "To eliminate this extra dose," says Manos Christodoulou, PhD, diagnostic physicist, "we're working with technologists to restrict the range of the scanning to the area of interest."

A third key radiation-reduction strategy U-M is pursuing is dose customization. This strategy is particularly important with patients who undergo frequent scans, and with children, who are more sensitive to radiation exposure than adults and who in the past were frequently scanned with adult CT settings, and thereby exposed to larger radiation doses than necessary. "Children have young, rapidly dividing cells, which puts them at a higher risk for developing radiation-

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WORKING HARD TO REDUCE RADIATION EXPOSURE

continued from page 3

Physicists Manos Christodoulou, PhD, and Mitch Goodsitt, PhD, test all imaging systems to ensure they are very safe.

related cancers," says Strouse. "And they also have a longer life expectancy than adults, resulting in a larger window of time for a radiation-induced cancer to develop. Because of these risk factors, we customize dose according to the child's weight, age, and the body part being scanned."

The new generation of CT scanners at U-M plays a pivotal role in dose customization. "Our scanners automatically adjust image acquisition to the size of the pediatric or adult patient," says Goodsitt. He explains, "The scanners automatically adjust the X-ray output and exposure according to the thickness of the region of the body being scanned. For example, they utilize smaller exposures for smaller, less dense regions of the body where X-ray penetration is not an issue."

Goodsitt heads up a group—the Physics Quality Control Group—that works in conjunction with radiologists and technologists to identify and purchase imaging systems with features that minimize radiation dose. "We strive to purchase equipment that helps us operate under the radiation safety principle of ALARA (as low as reasonably achievable)," he says, and "we carefully test all systems to ensure they're performing correctly." "The U-M Health System has really invested in software and hardware that helps us achieve a lower radiation dose," adds Ella A. Kazerooni, MD, MS, professor of radiology. "Having the latest software and hardware is a top priority here."

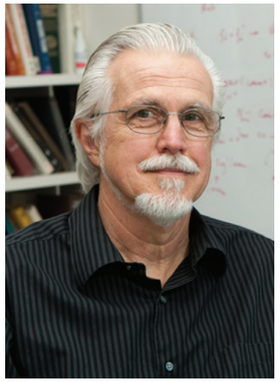
In 2010, Christodoulou also began developing a robust radiation exposure registry, which when completed will provide benchmarks for determining the optimal level of radiation for a particular CT exam. Says Christodoulou: "We are collecting CT radiation dose data based on the gender of patient, the age of the patient (e.g., an infant, child, or adult), and the part of the body being scanned (e.g., lung). Eventually, our scanners will be able to report this dose-related information for all CT exams." "The registry is an important new tool to ensure optimal use of radiation and to standardize CT protocols within the U-M Health System," adds Kazerooni.

Another dose-reduction feature on the General Electric (GE) CT scanners in U-M's hospitals is Adaptive Statistical Iterative Reconstruction (ASIR), a new method of CT image reconstruction. "By using ASIR in combination with the standard filtered back projection [FBP] method of image reconstruction," U-M doctors have managed to cut radiation dose for CT studies by 30 percent, says Goodsitt. He anticipates U-M will have an even better method of image reconstruction—the model-based image reconstruction (MBIR) method—in the near future. Soon to be commercially available, the MBIR method produces high-quality CT images with up to a 75 percent reduction in dose. Jeffrey Fessler, PhD, professor of radiology and biomedical engineering (principal investigator) and co-investigators Kazerooni and Goodsitt recently received a $1.9M grant from the NIH (in collaboration with GE Global Research) to develop and evaluate image reconstruction algorithms for low-dose CT scans used to diagnose and monitor lung disease. "In the future, radiation dose with a chest scan using MBIR reconstruction will be the same as for a chest X-ray," says Kazerooni. "When that happens, radiation exposure may very well become a non-issue."

Peter J. Strouse, MD, and Ella Kazerooni, MD, MS

RESEARCH SPOTLIGHT

THE DIGITAL IMAGING PROCESSING LAB: DEVELOPING LEADING-EDGE IMAGING TECHNIQUES


Chuck Meyer, PhD

The Department of Radiology's Digital Image Processing Laboratory (DIPL) was founded in 1985 in order to develop innovative image processing techniques for use in the clinical and basic research environments. The chair of Radiology at the time, Dr. William Martel, named Chuck Meyer, PhD, as the lab's first director, and Meyer immediately asked Peyton Bland, PhD, to help him in building and running the lab. Early lab efforts focused on interactive visualization, edge detection and linking, liver atlas construction, MRI B1 field inhomogeneity correction, and the development of methods for registration of volume datasets. In 1995, at a meeting on medical image processing, researchers presented a new, revolutionary method of quantifying how geometrically alike two different modality datasets are using mutual information—a development that resulted in automatic 3D registration techniques and changed DIPL's future focus.

Early Lab Successes

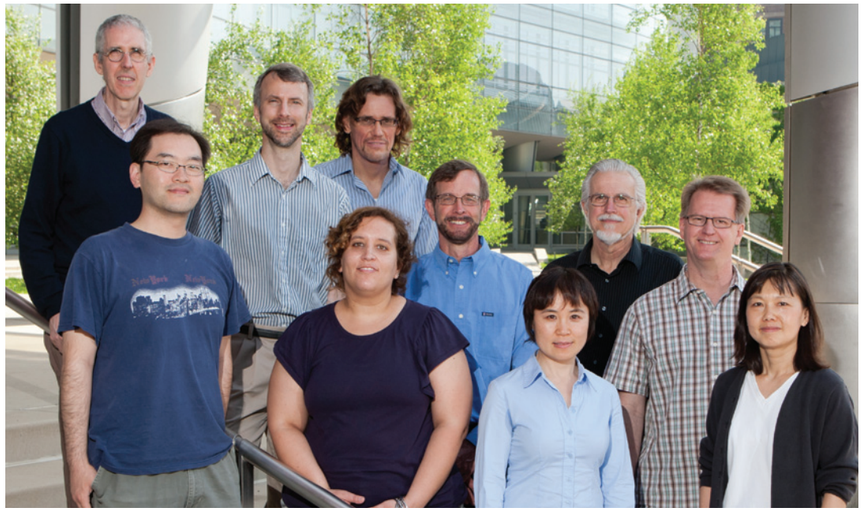
Thanks to team science, the lab has achieved significant success in developing groundbreaking image processing methods. Early on, DIPL collaborated with the Artificial Intelligence (AI) Lab of Electrical Engineering and Computer Science. Using Bayesian statistical methods, scientists from the two labs worked closely to construct a liver atlas and apply the atlas to liver boundary definition in CT datasets. The student who performed this initial work, Jennifer Boes, PhD, later joined the lab as a co-investigator and major registration code developer. Work with the AI lab led to new knowledge on how to segment MRI volume datasets in the presence of severe MRI B1 field inhomogeneities, and consequently on how to model and ameliorate MRI's inhomogeneities. In 1995, Boklye Kim, PhD, joined DIPL to pursue the development of registration methods, initially for in vivo imaging and histology in laboratory animals and, since early 2000, for retrospective correction of patient head motion during fMRI scans. In 2001, Gary Laderach joined DIPL as a senior computing systems manager, and Bing Ma, PhD, came on board in 2004.

Promising NIH Study

In our currently funded NIH National Cancer Institute (NCI) Program Project grant, we are working with co-investigators from other U-M schools, including Jeff Fessler, PhD, Professor of Electrical and Biomedical Engineering and Professor of Radiology; Al Hero, PhD, R. Jamison and Betty Williams Professor of Engineering, Professor of Electrical Engineering and Computer Science, Professor of Biomedical Engineering, and Professor of Statistics; Tim Johnson, PhD, Research Associate Professor and Adjunct Associate Professor in Biostatistics; and Veronica Berrocal, PhD, Assistant Professor of Biostatistics.

The overarching goal of the study— "Automatic 3D Registration for Enhanced Cancer Management"—is to improve current clinical paradigms. In Project 1 of the grant, led by Meyer, researchers are using diffusion and dynamic contrast enhancement MRI along with geometric alignment (i.e., registration of tumors in interval exams) to provide an early estimate of breast cancer response to neoadjuvant chemotherapy. Once these computational techniques show efficacy in clinical testing, oncologists will be able to use them to determine the effectiveness of initial chemotherapeutic agents within the first two weeks of a patient's treatment. If the test shows no response, oncologists can immediately start different agents, sparing patients from enduring long and ineffective treatment regimens.

Led by Boklye Kim, PhD, Project 2 of the grant uses registration tools to increase both the sensitivity and specificity of fMRI by putting each individually acquired echo-planar MRI data slice back into the patient's moving frame of reference before summing activations. Additionally, new adaptive methods are being developed in collaboration with Project 3 for updating magnetic field changes associated with patient motion as well as collaboration with Core B, led by Hero, to develop smooth head motion tracking and filtering. If successful, a candidate for tumor removal from the motor and language cortices can be fully evaluated before, rather than during, surgery using fMRI paradigms involving head motion and active verbalized speech.


NCI Program Project grant personnel (front row) Hiroyuki Takeda, PhD; Veronica Berrocal, PhD; Bing Ma, PhD; Boklye Kim, PhD; (back row) Al Hero, PhD; Jeff Fessler, PhD; Gary Laderach; Peyton Bland, PhD; Chuck Meyer, PhD; Tim Johnson, PhD (Tom Chenevert and Clay Scott are missing from the photo).

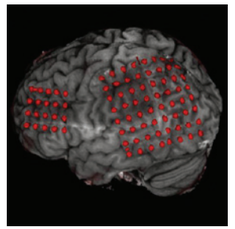
Led by Jeff Fessler, Project 3 addresses the tradeoff in dynamic MRI between obtaining high-spatial or high-temporal resolution imaging data. Researchers are applying model-based image reconstruction methods that avoid k-space interpolation by estimating the object model parameters that best fit the available k-space, parallel imaging-acquired data. If successful, dynamic contrast enhanced MRI data whose spatial and temporal resolution product exceeds current standards will become available, enabling the detection of smaller breast cancers and higher blood flow rates.

Core A, led by Peyton Bland, supports the high performance computing needs of the projects; Core B, led by Al Hero, supports sophisticated image processing and accuracy assessment needs, and Core C, led by Timothy Johnson, supports the myriad statistical analytics required by the projects to demonstrate efficacy.

Other Lab Projects

Currently integrated within the Center for Molecular Imaging (CMI), co-directed by Brian Ross, PhD, and Al Rehemtulla, PhD, the DIPL is currently focusing on developing new roles for registration in radiology. These include the measurement of tumor size change, and diffusion and/or perfusion changes as measured on a voxel-by-voxel basis for heterogeneous tumors across interval exams.

Other DIPL projects include routinely performing registration services for neurology and neurosurgery. For example, the lab provides visualization of electrocortical grid placements for intractable medication-mediated epilepsy patients undergoing surgery.



Within Radiology, the faculty and staff have developed a low-dose, high-spatial resolution non-contrast CT acquisition protocol for scanning the patient after grid implant and surgical closure. This CT scan is then registered by the DIPL with a high-resolution postsurgical MRI scan of the patient's brain that is taken within an hour of the CT acquisition. After automatic software identification of the brain's surface using the MRI, ray casting is used to generate 3D views of (1) the cortex from MRI as non-contrast CT does not differentiate soft tissue well and (2) registered electrode positions from CT as the electrodes are invisible on MRI as seen here.

FACULTY PROFILES

PUTTING RESEARCH FRONT AND CENTER

Myria Petrou, MD, MS
Assistant Professor

"Part of my goal as an academic radiologist is to encourage more residents to pursue careers that involve translational research," says Myria Petrou, MD, MS. "Currently, a number of our residents enter career paths that include teaching responsibilities, but only a few radiology residents decide to make clinical research a primary career focus."

Throughout her own career, Petrou has displayed a deep commitment to medical research. "My priority is neuroimaging research," she explains, "though I also enjoy clinical care and interacting with trainees." According to Petrou, her educational experiences at the University of Cambridge in England and U-M laid the foundation for her highly productive research career. As a medical student at Cambridge, she first became aware of the central role imaging plays in directing patient care, which motivated her to choose radiology as her specialty. "The program there featured a rich and productive collaboration amongst clinicians and radiologists," she says. "Each week medical students, residents, and staff from different specialties discussed the interesting images of the week, and this was always a highly educational process."

In 2006, Dr. Petrou completed the radiology residency program at U-M, which provided her with a solid base in radiology. "The biggest strength of this program," she says, "is the well-rounded education it provides; all our divisions are uniformly staffed with excellent clinical radiologists who are interested in teaching residents." During her fourth year, she also completed a master's degree in clinical research design and statistical analysis at U-M's School of Public Health. "Pursuing my MS was one of the high points of my residency," she says, "as it gave me invaluable expertise in research design and biostatistics and allowed me to interact with a number of translational researchers on campus. I left the program well-equipped to design prospective research studies, analyze data, and write competitive grant proposals."

After completing a one-year neuroradiology fellowship at U-M, Petrou pursued a second year of neuroradiology at Johns Hopkins University (JHU). She then joined the neuroradiology faculty at JHU before returning to U-M in 2009. In recent years, Petrou's research has largely focused on using advanced MR imaging techniques and PET to study neurodegenerative diseases. She is currently involved in an RSNA-funded project focused on translating a novel PET radiotracer to quantify cholinergic neurotransmission in the brain. The cholinergic system plays a key role in cognition and is implicated in a number of neurodegenerative diseases such as Alzheimer's and Parkinson's. Improved noninvasive methods of quantification of cholinergic nerve terminals can assist in earlier diagnosis and monitoring response to established and novel treatments in these patient populations.

Petrou has established a productive collaboration among Radiology, the Chronic Pain and Fatigue Research Center, and Neurology, to assess central neurotransmitter levels in patients with diabetic neuropathy and their alterations in response to treatment. Results from this research (supported by the A. Alfred Taubman Research Institute) are particularly promising. They are expected to provide key information about both the pathogenesis of diabetic neuropathy as well as allow the development of more targeted analgesic strategies based on a patient's central neurotransmitter profile.

In addition, Petrou serves on the planning committee for U-M's Translational Neurosciences Research Institute. The goals of this multidisciplinary initiative include promoting clinical and translational research in the neurosciences and facilitating the exchange of information and resources among faculty from different disciplines within the clinical neurosciences. "To preserve its future as an independent, innovative branch of medicine, radiology must take a leadership role in performing and promoting translational research efforts," she says. "The use of imaging equipment in the research realm is not our birthright: if we do not do it, others will. I hope that maintaining a strong presence within such multidisciplinary teams and leading image-based clinical trials will be instrumental in this respect."

In reflecting upon her career in radiology, Dr. Petrou cites the ability to "perform research that proves a novel concept" as a particularly fulfilling part of her work.

PERFORMING ULTRASOUND RESEARCH THAT COULD IMPROVE DISEASE DIAGNOSIS AND CARE

Jonathan Rubin, MD, PhD
Professor

According to Jonathan Rubin, MD, PhD, a keen interest in physics helped ignite his interest in radiology. "I was attracted to the specialty," says Rubin, "because it concerns the application of physics to medicine and I had a basic interest in physics." This enthusiasm for physics also led him in 1984 to join the Department of Radiology at the University of Michigan. "U-M had a very strong ultrasound physics section led by Paul Carson, whereas the school I was currently at—the University of Chicago—while being excellent in many areas of radiologic physics, had no real expertise in ultrasound."

Before arriving at U-M, Dr. Rubin completed both his medical and doctoral degrees at the University of Chicago, training that laid the foundation for pioneering research in the area of ultrasound. At U-M, Rubin divides his time among three main areas of ultrasound research: using ultrasound elasticity imaging (UEI) to monitor Crohn's disease, a three-dimensional (3D) ultrasound method to measure blood volume flow, and the color Doppler twinkling artifact to help in the detection of renal stones.

Rubin's interest in using elasticity imaging with Crohn's disease developed because of the technique's potential to significantly improve the evaluation and monitoring of the disease. "Crohn's disease," explains Rubin, "involves the periodic swelling and scarring of tissue. By providing an accurate measurement of tissue properties, UEI can help us determine if a bowel obstruction is caused by edema/inflammation or by fibrosis/scarring." He adds, "while the most effective form of treatment for obstructions caused by edema is powerful anti-inflammatory drugs such as steroids, surgery is really the only option for patients with intestinal fibrosis." In short, UEI has the potential to help doctors find the most effective treatment regimen for each patient's individual condition and avoid ineffective regimens.

In another innovative group of studies, Rubin and colleagues at the U-M are using a 3D ultrasound technique to measure blood volume flow. The ability to accurately measure blood flow in real time could prove helpful in a wide variety of clinical applications. "Developing an ultrasound system to measure blood volume flow for clinical use is the holy grail in the world of blood flow imaging," says Rubin. "To take one example: The ability to accurately measure the volume of blood flow to tumors would be quite valuable for assessing the physiology of these tumors and ultimately for determining an accurate diagnosis and the correct therapy regimen. Oftentimes, blood flow changes occur before tumors actually change in size as a consequence of treatment. Thus, a simple, accurate method for measuring blood flow per unit volume could provide an early assessment of whether tumors are responding to therapy or not."

Rubin's third main area of research focuses on twinkling, a color Doppler artifact that appears behind highly reflective objects with rough surfaces. The artifact greatly improves ultrasound's sensitivity in detecting stones, particularly in the kidneys. Dr. Rubin and colleagues have defined a likely cause for the artifact and have described ultrasound machine settings that optimize its visualization. They hope that eventually the artifact may help diagnosticians differentiate background from other highly reflective objects, such as stones in the biliary and urinary tracts, that are often difficult to detect.

Rubin's contributions to ultrasound research have not gone unrecognized. In 2005, he received an Innovations Award from the U-M Medical School for his work on a method that enhances the sensitivity of the power Doppler ultrasound technique. His leading-edge ultrasound work has also earned him a Joseph H. Holmes Pioneer Award from the American Institute of Ultrasound in Medicine. In addition to his research awards, Rubin was named to the Best Doctors in America list on several occasions.

Rubin attributes his ability to perform cutting-edge research in ultrasound, in part, to the University of Michigan. "I have had the good fortune to work with very innovative colleagues and to participate in exciting research projects. The University of Michigan is a great place to do ultrasound research."

FACULTY AWARDS + RECOGNITION

Aaron Baer, MD, received the William Hanafee Award from the American Society of Head and Neck Radiology.

Daniel Barr, MD, was selected to serve on the Radiology Review Committee for the Accreditation Council for Graduate Medical Education.

Nicolaas Bohnen, MD, PhD, was appointed chair of the neuroscience program at the Society of Nuclear Medicine.

Ruth Carlos, MD, is president-elect of the Association of University Radiologists and a member of the executive council of the American Roentgen Ray Society.

Paul Carson, PhD, was named to an honorary professorship as Concurrent Professor, Nanjing University, Nanjing, China.

Reed Dunnick, MD, became chair of the Board of Directors of the Radiological Society of North America.

Brian Fowlkes, PhD, received the Joseph Holmes Award from the American Institute of Ultrasound in Medicine and was named a fellow of the Acoustical Society of America.

Kirk Frey, MD, PhD, is a member of the Board of Directors of the American Board of Nuclear Medicine, where he also serves as vice-chair. He was also selected to serve on the Board of Directors of the American Board of Medical Specialties.

Matthew Hammer, MD, was elected president of the American Alliance of Academic Chief Residents in Radiology.

Mark Helvie, MD, received the Dean's Award as Outstanding Clinician at UMHS, and was elected to serve on the Board of Directors of the Society of Breast Imaging.

Jon Jacobson, MD, received the President's Medal from the International Skeletal Society.

Ella Kazerooni, MD, MS, serves as a trustee of the American Board of Radiology and was appointed to the Executive Committee of the Academy of Radiology Research.

Ken Koral, PhD, was the recipient of the Loevinger-Berman Award from the Society of Nuclear Medicine.

Peter Liu, MD, received the Outstanding Teacher Award from the American Alliance of Academic Chief Residents in Radiology.

Maryam Ghadimi Mahani, MD, received the Caffey Award for the Best Case Report Poster (first author), Society of Pediatric Radiology Annual meeting (2010), Boston, MA.

Kate Maturen, MD, was asked to join the Clinician Educator Development Program of the American Roentgen Ray Society.

Suresh Mukherji, MD, is president of the American Society of Head and Neck Radiology, president of the Michigan Radiological Society, and a member of the Executive Committee of the American Society of Neuroradiology.

Smita Patel, MD, was appointed to the Executive Committee of the Society of Thoracic Radiology.

Leslie Quint, MD, has been elected president-elect of the Society of Computed Body Tomography and Magnetic Resonance and vice president of the International Cancer Imaging Society.

Brian Ross, PhD, received the Outstanding Teaching Award from the International Society of Magnetic Resonance in Medicine.

Peter Strouse, MD, is president of the Society of Pediatric Imaging.

Robert Welsh, PhD, received the Research Faculty Recognition Award.

RESIDENT PROFILE

MAKING THE MOST OF THE RADIOLOGY RESIDENT PROGRAM

Neil Hansen, MD
Resident

Dr. Neil Hansen discovered that radiology was the perfect fit for him as a medical student at the University of Nebraska. "I realized that imaging is playing a larger role than ever before in the field of medicine. All of the interesting diagnostic work is being performed within radiology, and I wanted to be involved in that work."

Hansen received his BS from Creighton University in Omaha, Nebraska, and graduated with high honors from the University of Nebraska College of Medicine. In explaining why he chose to enter U-M's residency program, Hansen says, "My mentor in medical school, Dr. Jud Gurney, steered me to the program, believing that I would receive excellent training at U-M. He also pointed out the program was a good fit for my career ambitions, since I want to practice academic radiology."

Now in his fourth year of the residency program, Hansen has enjoyed his training so far. "Though I experienced a very steep learning curve at first, which was challenging, I've had the good fortune to work on very interesting, cutting-edge clinical care and projects at U-M. In addition, this is a fun place to work. There is a family-like environment with the residents and faculty here." In particular, Hansen feels fortunate to work with faculty such as Drs. Peter Liu, Joel Platt, and Richard Cohan from the Abdominal Division, who inspired him to pursue this subspecialty as a career.

In one recent project, Hansen worked with several members of the Abdominal Division including Drs. Ruth Carlos, William Weadock, and Ajay Morani. They evaluated radiologists' ability to accurately diagnose incidentally discovered liver lesions using magnetic resonance imaging without IV contrast. The subjects were 50 patients who had incidental liver lesions found at ultrasound, but no history of cancer or chronic liver disease. Two radiologists reviewed the cases in two separate sessions—one involving non-contrast MRI, and the other, gadolinium-enhanced MRI. The preliminary results of the study show that non-contrast exams can be effective in detecting and characterizing lesions. In explaining the importance of these findings, Hansen says, "If we don't have to start an IV and give gadolinium, we can decrease the cost of the MRI exam, save time, and improve patient comfort."

The outstanding quality of Hansen's work has been recognized with several awards. As a medical student, he received an Alumni Association Scholarship, a Distinguished Scholar Scholarship, Regent's scholarships, and Medical Student Research scholarships. Most recently, he had the distinction of presenting a Visual Pathways poster at the annual meeting of the Association of University Radiologists.

Following his residency, Dr. Hansen will complete a fellowship in body imaging at U-M. He then expects to pursue a career in academic radiology. He hopes to find a position that is close to where he and his wife Lisa grew up in Omaha.

ALUMNI PROFILES

HELPING TO ADVANCE RADIOLOGY'S LEGISLATIVE OBJECTIVES IN WASHINGTON

Harvey Neiman, MD

As chief executive officer of the American College of Radiology (ACR), Harvey Neiman, MD, has played a critical role in educating elected officials and government agencies about issues important to the future of radiology. "Through our advocacy work, we've been quite successful in getting across the message that imaging is central to good health care," he says. "Establishing an office in Washington, D.C., has proven key to our success," he adds. "Now we have access to the folks making major decisions about health care."

Among Neiman's major achievements with the ACR was the substantial progress made in increasing reimbursement rates for breast imaging. "In the past, radiologists avoided specializing in breast imaging for a variety of reasons. One of the most important was the poor reimbursement. "Medicare payment rates, for example, were much lower for mammography than for other imaging procedures such as CT and MR exams. As a result, women had to wait much too long for mammography appointments."

To address this problem, ACR representatives met with members of the Centers for Medicare & Medicaid Services (CMS) and Congress in 2000–2001 and provided them with key information. Thanks to the efforts of ACR and other national organizations, Medicare increased the reimbursement rates for both screening and diagnostic mammography. "After rates went up to a reasonable level," says Dr. Neiman, "more radiologists chose breast imaging as their subspecialty, improving women's access to mammographic exams."

Under Neiman's leadership, the ACR has also worked hard in the 2000 to 2002 time frame to address the nation's shortage of radiologists. ACR launched a campaign aimed at convincing Congress and academic institutions to help fund resident education in radiology, which, according to Neiman, was relatively successful. "Now, however, we are facing an opposite problem—namely too many radiologists for the available work," he says.

Other ACR initiatives that Neiman feels particularly proud of are the launching of the ACR Education Center and the establishment of the American Institute for Radiologic Pathology (AIRP). The ACR Education Center provides hands-on, immersive, and interactive radiology education in one of the most technologically advanced facilities in the world. Participants have their own workstation and access to both immense datasets and the ACR Case Engine, software that helps them work their way through the curriculum of cases. Upon interpreting a case, they receive immediate feedback to find out if they missed anything. "New educational methods, such as the ACR Case Engine, have enabled us to provide radiologists with the very best training possible," says Neiman.

ACR launched the AIRP in order to take over the sponsorship of the radpath courses given by the Armed Forces Institute of Pathology in Washington, D.C. "The Department of Defense decided to close the Walter Reed Medical Center, where the course was held, but we felt this course was vital to radiology residents' training," explains Neiman. "Now, we're offering it in a facility located just minutes from Walter Reed."

Neiman attributes much of his success as a leader and radiologist to the training and mentorship he received at U-M. He completed both his radiology residency and an angiography fellowship here after receiving his bachelor's and medical degrees from Wayne State University in Detroit. In discussing his decision to attend U-M, he says, "I was very impressed by the outstanding faculty who do it all: teaching, research, and exceptional clinical care."

As a resident, Neiman had the good fortune to study with Bill Martel, Joe Bookstein, Jack Holt, Helen Redman, and other outstanding faculty. "Bill Martel had a talent for defining the salient features of a case," he says. "And he was a real mentor, who had an enormous impact on all of the residents who came to know him.

"For more than 40 years, U-M's radiology faculty have been at the forefront of the field, holding important leadership positions and performing cutting-edge research. They had an overwhelming influence on my entire life."

U-M ALUM BUILDS A DISTINGUISHED CAREER IN RADIOLOGY

Laurie A. Loevner, MD

Thanks to her dedication, passion, and innovation, U-M Radiology resident (1993) Laurie A. Loevner, MD, has carved out a stellar career. She has had the distinction not only of becoming a full professor of radiology at the University of Pennsylvania School of Medicine within a short 10 years, but of becoming the first female clinician and the first neuroradiologist to receive Penn's prestigious I.S. Ravdin Master Clinician Award, given to just one physician in the entire health system each year. The committee who selected Loevner for this honor cited her "tireless advocacy, her gentle compassion, and her fierce determination in the fight against cancer and severe neurological disease" in explaining their decision.

Many of the seeds for Loevner's success were planted during her years as a resident at U-M. "U-M had a fantastic, well-rounded program, and I had the good fortune to encounter amazing educators in Radiology, such as Bill Martel, Leslie and Doug Quint, Jim Ellis, Ramiro Hernandez, Michael DiPietro, and Reed Dunnick. They treated me with dignity and respect, and in Bill Martel's case, had a huge impact on my chosen career path.

"When I began the residency program," explains Loevner, "I was planning to enter private practice, but Bill convinced me I would be making a mistake if I didn't pursue a career in academic radiology. And he was right. I've immensely enjoyed my career." Loevner also feels fortunate to have worked with an amazing group of peers at U-M. "Dr Kazerooni [now a U-M faculty member], for example, provided me with wonderful support when we were both residents, and we remain the best of friends to this day."

After completing her residency at U-M, where she served as chief resident, Loevner pursued a two-year fellowship in neuroradiology at the Hospital of the University of Pennsylvania. In 1995, she joined the radiology department at Penn, where she currently divides her time between clinical care and teaching/research. Her clinical passion and expertise lie in skull base and head and neck imaging. The scope of her responsibilities encompasses all aspects of diagnostic imaging in neuroradiology, as well as interventional procedures. One of the most unusual procedures she performs is the minimally invasive CT-guided deep skull base biopsy: Under imaging guidance, she advances small-gauge needles through the face into the skull base and the back of the head.

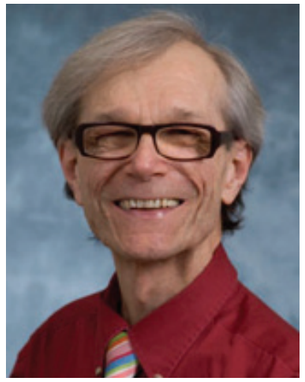
Loevner's research focuses on molecular MR imaging to evaluate squamous cell carcinomas of the head and neck. She began to focus on head and neck cancer research after receiving an RSNA Scholar Grant. Currently, Loevner is evaluating the use of diffusion and perfusion MR imaging for predicting treatment response in head and neck squamous cell carcinomas. She is working with graduate students and specialized clinicians to understand the molecular basis of the responses, so that future therapies can be tailored to each patient. She also participates in thyroid cancer research, and has published on quality control and clinical outcomes using a multidisciplinary framework that includes specialized radiologists and clinical specialists.

Loevner is also invested in educating the next generations. "I'm passionate about teaching," she says. "It requires me to stay on top of my game, and exposes me to inquisitive, intelligent trainees of all levels—a highly stimulating experience." While she also enjoys her robust schedule of national and international lecturing, she finds the day-to-day interaction with the students to be particularly rewarding.

Her exceptional teaching skills have earned Loevner several awards, including the Wallace T. Miller Resident Teaching Award and the Penn Pearls School of Medicine Teaching Award. In discussing her career to date, Loevner cites these awards, as well as the publication of her first book—*Brain Imaging: Case Review Series*—as high points. "Receiving these awards were gratifying experiences," she says, "and are key highlights of my early career."

Loevner is an active member in numerous national medical societies and holds several leadership positions. She has served as president of both the American Society of Head and Neck Radiology (2009), and the Eastern Neuroradiological Society (2001). She is currently the treasurer of the American Society of Neuroradiology, and is the immediate past-president of the American Society of Head and Neck Radiology.

RADIOLOGY FACULTY MEMBER WINS IMPORTANT RESEARCH AWARD



Kenneth F. Koral, PhD, an emeritus professor of Radiology, was named the recipient of the 2011 Loevinger-Berman Award for advancing the understanding of internal dosimetry in relationship to risk and therapeutic efficacy. The award, which was presented at the 2011 Society of Nuclear Medicine annual meeting in San Antonio, Texas, is named in honor of Robert Loevinger, PhD, and Mones Berman, PhD, researchers who formulated the Medical Internal Radiation Dose schema for internal dose calculations.

After earning his BS and PhD (nuclear physics) from Case Western Reserve University in Cleveland, Koral completed postdoctoral training at Queen's University in Belfast, Northern Ireland, and at U-M, where he served as a National Cancer Institute research trainee. In 1979, Dr. Koral joined the Division of Nuclear Medicine at U-M, where he remained until his retirement in 2007.

Koral's research interests include activity quantification with SPECT, estimating radiation dose absorbed by tumors during radiopharmaceutical therapy, scatter correction in SPECT, SPECT of I-131, and reconstruction algorithms. He has published more than 75 articles in peer-reviewed journals as well as more than 65 abstracts. Since retiring from the University, Dr. Koral has continued to publish, and remains active in the dosimetry research community as a reviewer. In recognition of his many contributions to internal dosimetry, the MIRD Committee was delighted to select Kenneth F. Koral as the 2011 Loevinger-Berman Award winner.

UPCOMING EVENTS

U-M Hodges Society RSNA Reception
11/28/2011, 6:30 – 8:30 pm
Chicago, IL

U-M Hodges Society SIR Reception
3/27/2012, 6:30 – 8:30 pm
San Francisco, CA

U-M Hodges Society ARRS Reception
4/30/2012, 6:30 – 8:30 pm
Vancouver, CANADA

U-M Hodges Society SNM Reception
6/11/2012, 6:30 – 8:30 pm
Miami, FL

Centennial Celebration
10/2013
Ann Arbor, MI

Dr. Dunnick with President Clinton at the 2010 RSNA meeting in Chicago, IL.

ALUM KURT MORI, MD, HOSTS U-M FACULTY AND ALUMNI AT THE GATOR BOWL

(first row) Steve Shirley, MD (LSA '73), Konika Schallen, MD (LSA '90, MED '94); (second row) David Mandel, MD (LSA '88, MED '92), Nina Kazerooni, MD (LSA '89, Med '92, MED RES '01), Kurt Mori, MD (MED FEL RAD '80), N. Reed Dunnick, MD, Marilyn Roubidoux, MD, Paul Mori, MD (MED RES '56)

Paul Mori, MD (MD RES RAD '56) and son Kurt Mori, MD (MD FEL RAD '80).

(l–r) Marilyn Roubidoux, MD, N. Reed Dunnick, MD, and Paul Mori, MD.

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You can establish an endowment, educational award, research fund, or professorship in your name in honor of a family member, friend, or faculty.

You can also help by contributing to an already established endowment:

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- Walter M. Whitehouse Memorial Endowment
- William Martel Professorship
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For more information, contact Alisha Faciane at 734.232.3248 or affenty@umich.edu

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