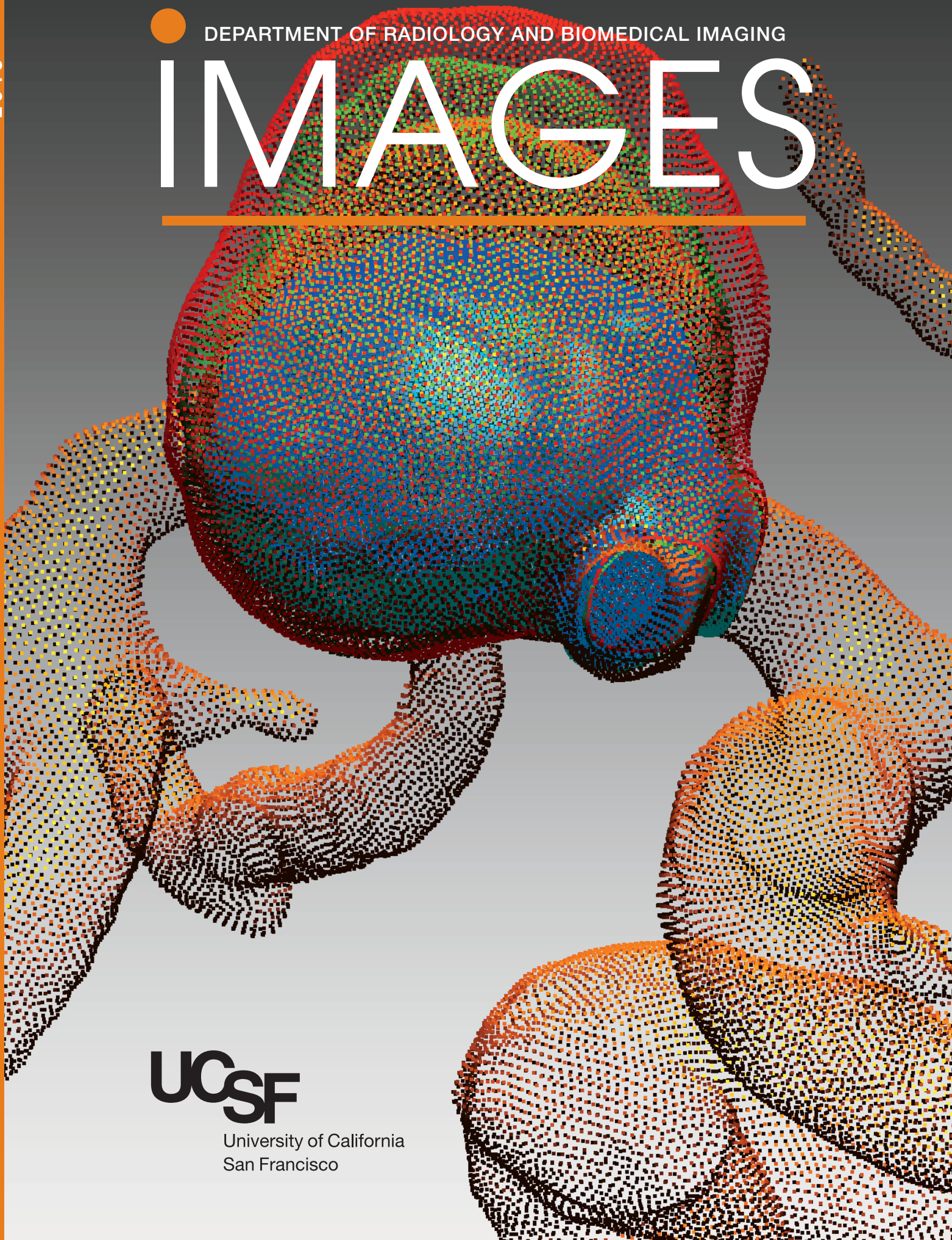
2013

DEPARTMENT OF RADIOLOGY AND BIOMEDICAL IMAGING

IMAGES



UCSF

University of California
San Francisco

About the Cover:

Serial imaging using contrast-enhanced MRA shows the time evolution of an aneurysm of the anterior communicating artery. Studies co-registered in 3D space show changes in the aneurysm surface from baseline (blue), to 6 months (yellow), 12 months (green), and finally to 18 months (red) at which point the patient underwent successful surgical clipping of the aneurysm.

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Dear Colleagues and Friends of Radiology,

Like everyone engaged with the important responsibility of training of residents, we are investing considerable time and thought into the new Milestone criteria. This major change in how we evaluate our residents, their education, and their progress, is a metaphor for many other changes and accomplishments at UCSF this past year. What with health care reform, scientific discovery moving toward personalized, precision medicine, a new EPIC electronic health record system in place, a new generation of faculty to recruit, and many other forces affecting Radiology, adapting to change is our constant. We are constantly setting criteria, evaluating our progress against them, acknowledging success, and making subtle and not-so-subtle changes of direction to stay on track.

This is Dr. Soonmee Cha's second year as director of the Residency Program. Her enthusiasm and incredible organizational skills are serving us well as she takes on the task of re-orienting our faculty and residents to the Milestone criteria with persistence, skill and, yes, a sense of humor! We are all learning from Dr. Cha as she moves us forward toward higher-quality subjective evaluation and more focused feedback that will create some of the world's best radiologists. Of course, no discussion of resident education would be complete without thanking the Margulis Society for its ongoing support for our residents and our educational program. The successful Margulis Society Gala last April, at the Maritime Museum in San Francisco, was enjoyed by all who attended.

I am particularly proud of several faculty milestones in the past year. Dr. James Barkovich was honored as the RSNA "Outstanding Researcher" at last year's RSNA convention, Jim has been a creative, successful, outstanding member of our faculty for more than 27 years, and I am very pleased the RSNA recognized him with this honor. In April, our Executive Vice Chair and Neuroradiology Chief, Dr. Bill Dillon, was honored by the ASNR Foundation with its award for Outstanding Contributions in Research. A few months later, in June, 10 of our faculty were among the 43 recognized nationwide as "Distinguished Investigators" by the Academy of Radiology Research. These faculty—Drs. Jim Barkovich, Nola Hylton, John Kurhanewicz, Tom Lang, Sharmila Majumdar, Sri Nagaranjan, Sarah Nelson, Sabrina Ronen, David Saloner, and Dan Vigneron—represent the best and most creative talent. Congratulations to all!

Earlier this year, I attended the School of Medicine retreat with a theme of "Faculty of Tomorrow." I am proud of the many assistant professors we hired in the past year; please read about them and their accomplishments on page 16. We continue to attract fantastic faculty, many of whom trained with us. We are engaged in market research to understand how to create an even better academic and work environment here at UCSF. I hope to report on the results next year. After working hard to train and recruit these great people, we want them to have a happy and productive work life with us.

Other milestones—I was very happy to welcome Drs. Chris Dowd, Van Halbach, and Randy Higashida back to the full-time faculty after many years of outstanding participation in our department as "without salary faculty." It is just great to have them here, along with our more junior faculty, Drs. Steve Hetts and Dan Cooke. Steve and Dan are creating a center of excellence in Neurointerventional Radiology at the San Francisco VAMC, attracting patients from throughout the western US. I was very pleased to recruit Dr. Ron Zagoria from Wake Forest University as Chief of Abdominal Imaging. Ron brings a wealth of clinical and academic experience to his new role and we look forward to working with him.

Finally, we are in the midst of planning for key University initiatives that will profoundly affect Radiology: the new Benioff Children's Hospital and the women's and cancer hospital at Mission Bay and the future of the Mount Zion and Moffitt/Long campuses once those services move to these new facilities; research programs with our partner GE, focused on PET-MR; a complete upgrade of our PACS; and a move to Epic Radiant as part of our medical center's ongoing adaption of the Epic EMR product line. In August, we reached another milestone with the signing of an affiliation agreement between the UCSF Medical Center and Children's Hospital & Research Center Oakland, which will be finalized in early 2014.

I wish you success in identifying and meeting your own personal and professional milestones.

Please don't forget to join us again this year at our RSNA reception, on Sunday, December 1, 2013, from 6:30–9:00 p.m. at the Chicago Cultural Center on Michigan Avenue. And in the coming year, we are thrilled that William G. Bradley, MD, PhD, Chair of UC San Diego Radiology, will be our guest speaker at the Margulis Society's biennial alumnus lecture, to be held on May 1, 2014. I look forward, as always, to seeing you at our events.

Sincerely,

Ronald L. Arenson, MD

Imaging and Precision Medicine

Sarah Nelson, PhD, and Sharmila Majumdar, PhD

An important goal of precision medicine is to facilitate data integration from many different sources to provide a comprehensive description of individual patient characteristics that can be used in making decisions about clinical care. While a great deal of attention has been placed upon the potential for genomic parameters to provide more specific diagnostic information, there is clearly an important role for state-of-the art physiological, functional, and metabolic imaging data in monitoring disease progression and evaluating treatment effects. In the Department of Radiology and Biomedical Imaging, there is a major focus on developing and integrating these advanced imaging technologies with clinical and molecular data from patients with cancer, vascular, musculoskeletal, and neurological diseases. This article offers examples of where these approaches are making precision medicine a reality at UCSF.

Quantitative Assessment of Aneurysms

Patients with intracranial aneurysms are at substantially increased risk for rupture if the aneurysm is growing rather than quiescent. Non-invasive volumetric imaging makes it possible to monitor the presence, extent, and location of changes in the aneurysm over time. In Figure 1, the image on the left represents serial data from a patient with an untreated aneurysm on the anterior communicating artery. Results from four sequential magnetic resonance angiograpy imaging sessions were co-registered, and changes in the aneurysm geometry were represented from baseline (blue), to 6 months (yellow) 12 months (green) and 18 months (red). The velocity field for the aneurysm can be determined by using the exact geometric boundary conditions from the MR angiography data and flow in the inlet vessels as measured by MR velocimetry. The image in the middle shows the flow streamlines computed for the same patient, and the image on the right side shows the wall-shear stress, which represents the amount of friction exerted on the aneurysm wall by the flowing blood and suggests that areas of low wall-shear stress promote the outward remodeling of aneurysms. This technology has the potential for non-invasively predicting the optimal interval for surveillance scans on a patient-specific basis so that patients at increased risk may be monitored more regularly and those predicted to remain stable may have less frequent imaging.

Biochemical Changes in Osteoarthritis

The quantification of changes in cartilage and bone structure and function that are associated with degeneration due to osteoarthritis is another important application of

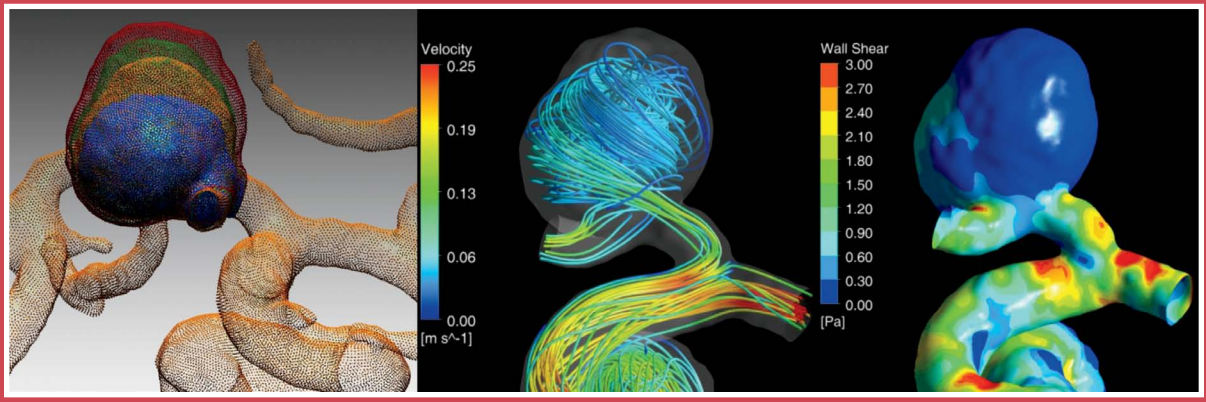


Figure 1 An illustration of the relationship between hemodynamics and aneurysm evolution over time. Left: Serial MR angiography studies of an intracranial aneurysm; Center: Flow streamlines in the aneurysm calculated using geometric and velocity data from patient-specific imaging; Right: Map of wall-shear stress or friction on the aneurysm surface indicating that growth occurs in regions of reduced friction. IMAGE COURTESY OF DRS. VITALIY RAYZ AND DAVID SALONER.

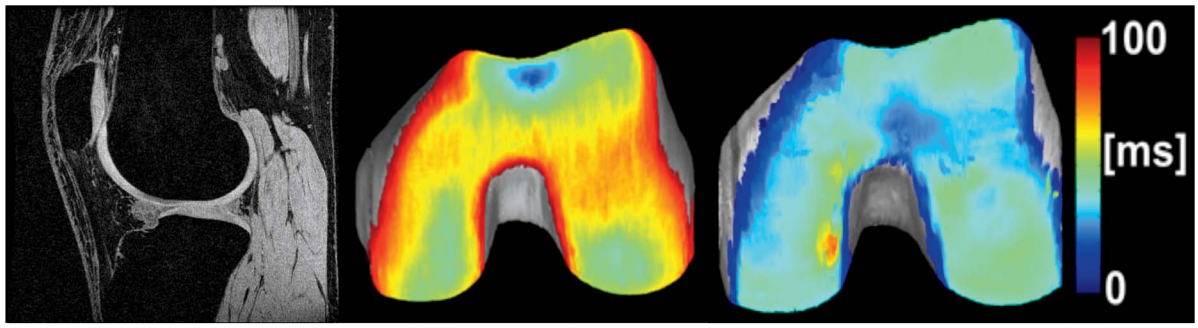


Figure 2 The center image shows variations in cartilage thickness determined from segmentation and quantitative analysis of high resolution anatomic images. The image overlay on the right provides a representation of spatial variations in the biochemical properties of the cartilage, which are thought to be early indicators of degeneration and may be valuable in identifying regions at risk and monitoring therapeutic interventions. IMAGES COURTESY OF DR. SHARMILA MAJUMDAR

non-invasive imaging. In Figure 2, the image on the left is a high-resolution image (400 µm in-plane resolution) of a knee joint, with the cartilage depicted as bright, the muscle having intermediate signal intensity, and the bone appearing darker. Quantitative analysis of these images allows the cartilage to be segmented and its thickness to be estimated. The color overlay in the middle image represents changes in thickness that were estimated from such data and superimposed on the original anatomic image.

In osteoarthritis and joint degeneration, the thickness of cartilage decreases with time, which reduces joint lubrication, affects mobility, and degrades quality of life. Alterations in cartilage biochemistry also occur in the early stages of osteoarthritis. The magnitude of this effect is related to genetic factors, loading of the skeleton, and whether the joint had prior injury, which hastens cartilage thinning and loss. The map on the right shows an overlay of $T_{1\rho}$, a biomarker that reflects changes in joint biochemistry. In this case, high values are in green and red values depict focal areas where cartilage thinning may occur earlier. These signs are seen well before the cartilage is lost and provide non-invasive, patient-specific markers for assessment of early joint degeneration.

Pediatric Development and Evaluation of Birth Injury

Another important application of MR is the generation of tractography maps from high-angular resolution diffusion-weighted images. As shown in Figure 3, results obtained from a baby at 3 and 6 months of age, the evaluation of this data demonstrates the formation of additional connectivity as the brain develops. The analysis of brain maturation with serial MR scans is part of an ongoing NIH-funded

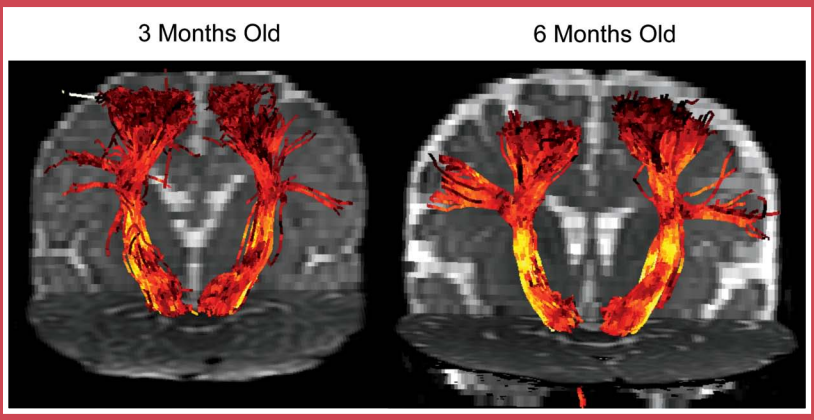


Figure 3 The results of tractography analysis from a subject being studied with follow-up scans at 3 and 6 months of age. The tracts are overlaid in color on the anatomy and indicate that stronger, more organized connections are formed during this period as the brain matures.

DATA COURTESY OF DRS. DUAN XU, JEFF BERMAN, DONNA FERRIERO AND JIM BARKOVICH.

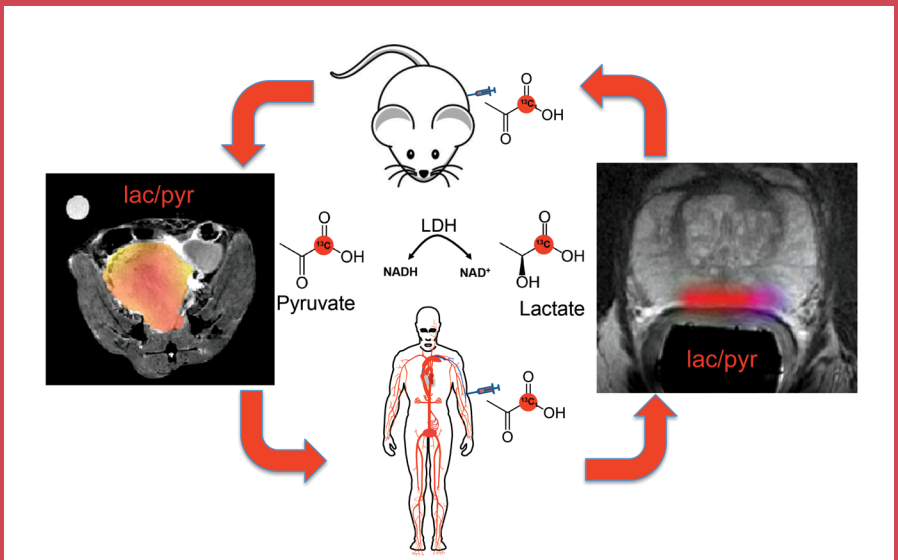


Figure 4 Translation of technology from mouse to man. The images show color overlays of metabolic data obtained following injection of hyperpolarized $^{13}C_1$ –pyruvate from a slice through the tumor in a mouse model of prostate cancer (left) and from a patient study (right).

DATA COURTESY OF DRS. JOHN KURHANEWICZ, DANIEL VIGNERON, PEDER LARSON, ROBERT BOK AND SARAH NELSON.

program at UCSF that started in the early 1990s with the goal of investigating patients with hypoxic ischemic injuries at birth. A more recently funded bioengineering research partnership program has expanded upon the available technology and made it possible to perform advanced, multi-parametric imaging of newborn infants. A combination of custom hardware and software methods have now been developed for assessment of newborn patients and have enabled the implementation of imaging exams that include T1, T2, T2*, diffusion, and spectroscopic imaging. These methods can provide a comprehensive assessment of the severity and potential long-term impact of an injury on development at a relatively short time after birth. These patients also have follow-up imaging exams at 3, 6, or 12 months, with neurological exams at 6, 12, 18 months and at 4-, 8-, and 12-years of age to determine the accuracy of the predictions made by imaging. Additional capabilities now being developed for these very young patients include perfusion imaging, evaluation of resting-state functional networks, and assessment of real-time changes in metabolic activity observed using hyperpolarized carbon-13 agents.

Translation of Hyperpolarized ^{13}C Metabolic Imaging to Patients with Prostate Cancer

Results of pre-clinical studies with hyperpolarized ^{13}C MR metabolic imaging using a transgenic mouse model of prostate cancer indicate that hyperpolarized [1-^{13}C]-pyruvate is an important tool for identifying and characterizing the cancer and for assessing its response to therapy. In this mouse model, the ratio of lactate to pyruvate is directly related to the presence and aggressiveness of the cancer (Figure 4, on the left), and is significantly reduced after therapy. Data acquired in these pre-clinical studies were critical for applying to the FDA to obtain the IND that was used for the first-in-human study of prostate cancer patients at UCSF. The study results were extremely promising not only in confirming the safety of the agent, but showing elevated [1-^{13}C]-lactate/[1-^{13}C]-pyruvate in regions of biopsy-proven cancer (image on the right of Figure 4). While this clinical trial was designed to identify a safe dosage and verify effectiveness, it also lays the groundwork for using the technology to diagnose and characterize a variety of cancers and to track treatment efficacy non-invasively, without the need for repeated biopsies.

Sarah Nelson, PhD, is a professor and director of the Margaret Hart Surbeck Laboratory of Advanced Imaging and Sharmila Majumdar, PhD, is a professor, co-director of the Musculoskeletal and Quantitative Imaging Research Interest Group, and vice-chair of Research in the UCSF Department of Radiology and Biomedical Imaging.

Ultrashort Echo Time Magnetic Resonance Imaging

Peder Larson, PhD, Misung Han, PhD, Roland Henry, PhD, Roland Krug, PhD, Thomas Link, MD, PhD, Sharmila Majumdar, PhD

Introduction

Widely used for clinical imaging, magnetic resonance imaging (MRI) is a non-invasive imaging modality that provides excellent soft tissue contrast. Unlike X-ray or computed tomography (CT) imaging, it requires no ionizing radiation. Instead, it relies on large magnets and radiofrequency (RF) electromagnetic waves to image the magnetic properties of atoms—primarily hydrogen in water. One of these properties that is a major source of contrast in MRI is the transverse, or T_2, relaxation time. This describes the rate at which the MRI signal decays after excitation with RF waves.

In conventional MRI techniques, the minimum delay between RF excitation and data acquisition, or the echo time (TE), is > 1 millisecond (ms). This means that tissues with T_2 relaxation times less than 1 ms will have almost no signal by the time data is acquired, and thus no signal in the resulting MRI. Typically, tissues with $T_2 < 1$ ms are solid or semi-solid; this includes tendons, cortical and trabecular bone, periosteum, and calcified cartilage. Many other connective tissues have fast-relaxing tissue components, such as myelin, cartilage, menisci, ligaments, capsules, falx, meninges (dura matter), membranes, retinaculi, sheaths, aponeuroses, fasciae, and tentorium. Currently, MRI of these tissues and tissue components is done using negative contrast—the absence of signal—or with other imaging modalities such as CT for bone and ultrasound for tendons.

MRI with positive contrast for semi-solid tissues can be performed using advanced techniques, the most common of which is ultrashort echo time (UTE) MRI. UTE MRI uses specialized RF excitation, data acquisition, and image reconstruction schemes to achieve TEs of < 100 microsecond (μs) to detect signals from fast-relaxing tissues (Figure 1). These specialized schemes are more challeng-

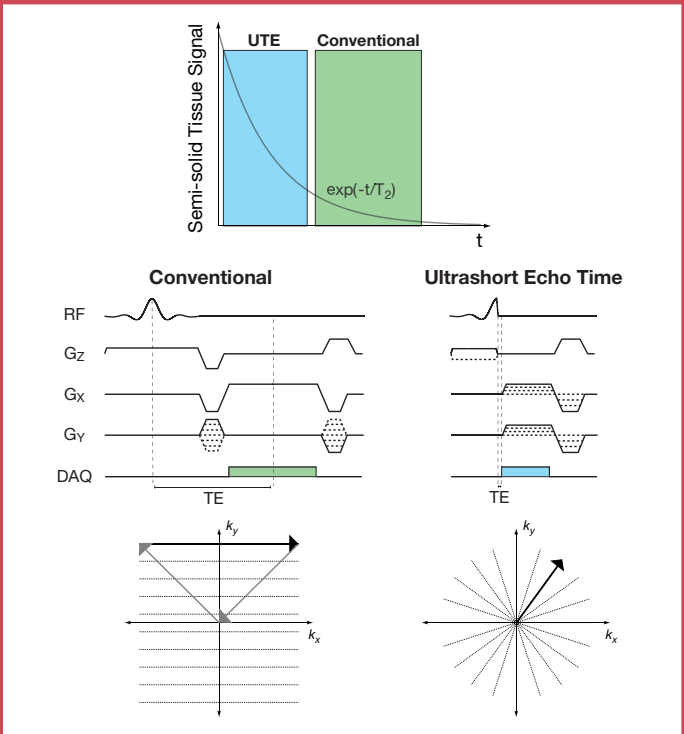


Figure 1 Principles of ultra-short echo time MRI. Semi-solid tissues have fast T_2 relaxation times, which results in little to no signal in conventional MRI. UTE MRI uses specialized RF excitations, data acquisition, and image reconstruction to allow for echo times (TE) < 100 μs. It uses a radial acquisition trajectory instead of the rectilinear trajectories used in conventional MRI (bottom row).

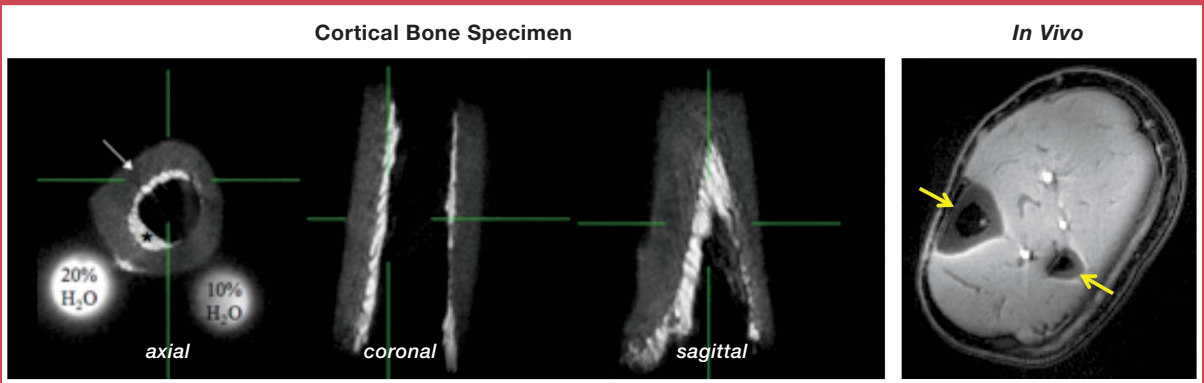


Figure 2 Cortical bone imaging with 3D UTE MRI. Axial, coronal, and sagittal images at 400 micrometer (μm) isotropic resolution show the fine structure in a cortical bone specimen. This can be translated *in vivo*, where UTE MRI in the lower leg shows the cortical bone of the tibia and fibula (yellow arrows).

ing to design and implement than conventional techniques, and UTE MRI also often requires schemes to improve the contrast of semi-solid tissues.

UTE MRI offers the very exciting possibility of improved diagnosis and monitoring of therapy response in semi-solid tissues, thus allowing for more precise care tailored to individual patients. For bone imaging, it has the potential to replace CT, thereby eliminating radiation exposure, particularly for pediatric patients, and improving the capabilities of newly developed PET/MR systems. In musculoskeletal imaging, it can provide higher signal and new tissue information. In brain imaging, it could provide more precise information about myelin, allowing for better assessment of neurodegenerative disorders such as multiple sclerosis, leukodystrophies, acute disseminated encephalomyelitis, and Alzheimer's disease, as well as improving our understanding of brain development.

Musculoskeletal UTE MRI

Our research on musculoskeletal UTE MRI has focused on cortical bone and tendon imaging. Cortical bone porosity has been identified as a major contributor to bone strength and is intimately related to fracture risk. However, it has been difficult to quantify cortical bone porosity *in vivo*, because standard CT and conventional MRI techniques do not visualize cortical porosity. UTE MRI can directly visualize cortical bone, which has a $T_2 \approx 500$ μs, and may be able to provide a measure of cortical bone porosity. Figure 2 shows *ex vivo* and *in vivo* UTE MRI at 7 Tesla, demonstrating clear depiction of the cortical bone.

Direct visualization of tendons, which have a $T_2 \approx 1$ ms, is also possible with UTE MRI. This has the potential to improve diagnosis and monitoring of treatment response in tendons by allowing tissue microstructure to be depicted. This plays a critical role in the strength and health of tendons, and could be a valuable marker of regeneration following injury. Figure 3 shows high resolution *in vivo* 7 Tesla images in the ankle that clearly depict numerous tendons, including exceptional depiction of the fascicular structure in the Achilles tendon.

Brain UTE MRI

The brain contains several semi-solid tissues, including myelin, falx cerebri, and the dura matter. We are particularly interested in imaging myelin, as it is of critical importance in facilitating long-range neural connections between different regions of the brain. Loss or degeneration of myelin is associated with multiple sclerosis, leukodystrophies, and acute disseminated encephalomyelitis, and has been implicated in neurodegenerative diseases such as Alzheimer's.

The semi-solid myelin MRI signal in the brain is much smaller than the signal from water in the cortex, which makes it very challenging to image. We have used an RF-contrast technique called off-resonance saturation contrast to select for semi-solid tissue components, which improves the contrast of myelin in the white matter. Figure 4 shows 7 Tesla UTE MRI with and without this RF-contrast technique. This contrast technique clearly

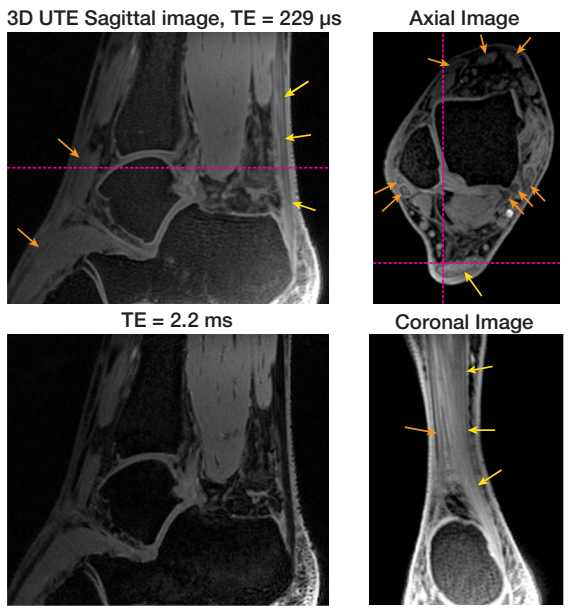


Figure 3 Tendon imaging in the ankle with 3D UTE MRI at 650 µm isotropic resolution. The conventional TE image (TE = 2.2 ms) shows no signal from the tendons, whereas the UTE images (TE = 229 µs) show clear depiction of the fascicular microstructure in the Achilles tendon (yellow arrows), as well as visualization of numerous other tendons in the ankle (orange arrows).

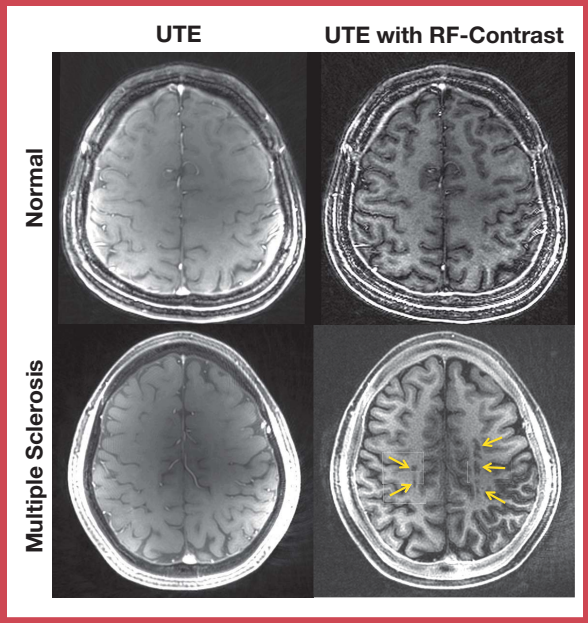


Figure 4 Brain imaging with UTE MRI at 0.8x0.8x2 millimeter (mm) resolution. The UTE images without RF-contrast show high signal from both grey and white matter. The RF-contrast produces UTE images selective for myelin, creating strong grey/white matter contrast and clearly depicting multiple sclerosis lesions (yellow arrows).

depicts demyelinated multiple sclerosis lesions, demonstrating the potential of UTE MRI to provide unique detection of myelination.

Conclusion

Ultrashort echo time MRI offers the unique capability to depict tissues and tissue components with fast T_2 relaxation times, such as cortical bone, tendons, and myelin. It has the potential to provide improved diagnosis and monitoring of therapy response in semi-solid tissues, thus allowing for more precise care tailored to individual patients.

Peder Larson, PhD, is an assistant professor in residence in the Department of Radiology and Biomedical Imaging; Misung Han, PhD, is a post-doctoral scholar; Roland Henry, PhD, is a professor in residence in the Department of Neurology; Roland Krug, PhD, is an assistant professor in residence; Thomas Link, MD, PhD, is a professor of Radiology, co-director of the Musculoskeletal and Quantitative Imaging Research Interest Group, and chief of the Musculoskeletal Section; Sharmila Majumdar, PhD, is a professor, co-director of the Musculoskeletal and Quantitative Imaging Research Interest Group, and vice-chair of Research in the UCSF Department of Radiology and Biomedical Imaging.

Capital Equipment Overview

Robert G. Gould, ScD

After a busy year in 2012, this past year has been relatively quiet while we wait for approval from the state of California on a number of projects. We did complete the installation of a SPECT-CT gamma camera in Long Hospital and a digital radiographic room at Mt Zion. Several major projects on the Parnassus Campus and at China Basin are underway or about to begin. And of course, there is continual progress on the new hospital at Mission Bay, set to open in February 2015.

Since January 2013, we have been working on the replacement of the Department's PACS. We are implementing Agfa version 6.5. While the vendor will not change, we are replacing both the hardware and software. The most noticeable difference will be a new user interface. Even more significant are two changes to the infrastructure supporting the system. The new PACS will store data in a different way. We also are creating a secondary PACS that will be located in the campus IT center at Minnesota Street. These infrastructure changes should make the PACS more reliable and better able to handle the large amount of data that comes into the system daily. The new PACS will scale to handle the data from the new imaging equipment at Mission Bay Hospital.

Parnassus

The first of two projects currently under review by the state of California is the replacement of the radiographic room located in the Emergency Department. This small project is

By November 2013, this construction site will be the home of a PET-MR system from General Electric custom-designed for the department's China Basin facility. One of only three such units in the world, it will facilitate significant research activity.

greatly anticipated, as the existing equipment is at the end of its useful life and is having considerable downtime. The new equipment, manufactured by General Electric, features wireless digital detectors both in the table and in a wall stand. The room should be operational by mid-year 2014.

The second project is much larger and will affect a large portion of the radiology area in Long Hospital. First, we have combined the replacement of an old bi-plane angiographic room used by neurointerventional radiology with a bi-plane Siemens system. This will be the third such unit installed in Long and will deliver manufacturer consistency to this section. The other project is replacement of the last 16-slice CT scanner in our system with a GE 750 HD CT. This is the third such machine to be installed by Radiology and the second on the third floor of Long. The new CT scanner will have dual energy capabilities and a GE Veo reconstruction engine.The locations of both the new angiographic equipment and the CT system will be different from the equipment they are replacing, requiring changes to much of the Long core and elimination of the central Long corridor. We expect construction to begin the first quarter of 2014 and to take more than nine months to complete.

Mt Zion

We completed installation of a GE digital radiographic room on the second floor of Mt Zion within the Radiology Department in August. The room has two detectors and is capable of linear, digital tomography. It is the only radiographic room at Mt Zion and eliminates the use of CR that was used in the previous room, which did not have a digital detector.

A new Hologic DXA bone densitometer on the first floor of Mt Zion went into clinical use on October 1. This unit was put into an old ultrasound room and did not need construction.

China Basin

A year ago, China Basin housed an old research GE "long-bore" 3T, which was at end of its life with no upgrade path, and no clear replacement plans. That changed quickly when the catastrophic failure of the magnetic shield in the ceiling forced the closure of the room and the ramp down of the magnet. The magnet and broken shield were removed, leaving us with an ideal location to place a PET-MR as China Basin is the site of the department's cyclotron. By late summer, the room was nearing readiness for installation of a General Electric system. The PET-MR system should be operational for experimental use by the end of the year. It will be one of only three such units in the world and will be the focus of much future research.

Robert G. Gould, ScD, is a professor of Radiology in residence and vice-chair for Technology and Capital Projects. He oversees the purchase of the department's capital equipment.

Mukherjee Takes Reins at CIND

Pratik Mukherjee, MD, PhD, professor of Radiology and Biomedical Imaging, is the new director of the Center for Imaging of Neurodegenerative Disease (CIND) based at the San Francisco Veterans Affairs Medical Center (VAMC), following the retirement of Michael Weiner, MD. "As a practicing clinical neuroradiologist, Dr. Mukherjee is well qualified to oversee the translation of research performed at the CIND to routine use in the reading room and other clinical arenas, including image guidance in the operating room," said Chair Ron Arenson, MD, in making the announcement. "I want to express my appreciation to Dr. Weiner for his excellent leadership of CIND for so many years."

Mukherjee received his undergraduate degree in Computer Science from Yale University. He earned his MD at Cornell University and a PhD in neuroscience at Rockefeller University. After completing a radiology residency and neuroradiology fellowship at Washington University, St. Louis, Mukherjee joined the faculty at UCSF.

"Dr. Mukherjee has done excellent research on cognitive neuroscience, and is an internationally recognized expert in imaging of structural and functional brain connectivity, including the human connectome as well as imaging of traumatic brain injury (TBI)," noted Arenson. "He also is one of the world's leading experts on diffusion MRI and tractography, having published dozens of papers in this field."

A Stellar Research Reputation

Mukherjee has established a successful research program in advanced neuroimaging of mild TBI—which accounts for the vast majority of TBI in the military population—with several of the most highly cited papers in the TBI literature over the past five years, including one on resting state magnetoencephalography (MEG) of TBI featured on the cover of the June 2013 issue of the *Journal of Neurosurgery*. His research program is funded by grants from the National Institutes of Health, the Department of Defense, and the Brain Trauma Foundation, with past funding from the Dana Foundation and the McDonnell Foundation. He has served as the Neuroimaging Core Director and one of the principal investigators for a $18-million NIH U01 multi-center grant proposal to create an international TBI research collaboration. In August, Mukherjee was an expert panelist for the Institute of Medicine (IOM). The IOM is working to develop standards for diffusion MRI for scientific and clinical applications.

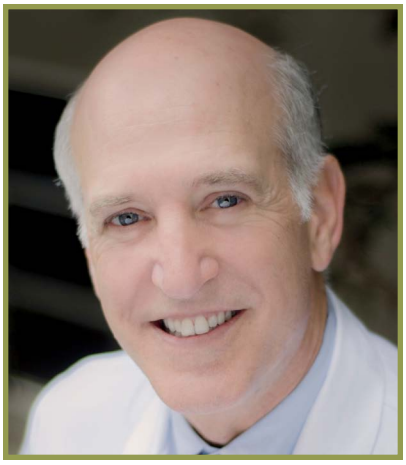
Mukherjee's contributions at UCSF include the development of high-angular resolution diffusion imaging (HARDI) and tractography methods that are used daily for pre-surgical white matter mapping, and the creation of a thriving clinical functional MRI service.

Looking Ahead at CIND

One of the most promising areas for translating research to the reading room is quantitative volumetrics of neurodegenerative diseases, an area of particular strength for the CIND. The integration of structural and physiologic magnetic resonance imaging, metabolic/molecular imaging using FDG-PET and amyloid PET are translational research goals at the CIND," said Arenson. "Given the expertise in machine learning techniques that he has employed with increasing sophistication, Pratik is well qualified to accelerate research in multimodal imaging."

As a UCSF faculty member for more than a decade, Mukherjee has developed extensive clinical and research collaborations with the faculty of departments such as Bioengineering, Neurosurgery, Neurology, and Psychiatry. "I intend to leverage these ties to increase alliances between CIND and non-SFVAMC UCSF faculty for joint research initiatives," he said "This will also give these faculty members access to unique CIND resources, such as the research Siemens 3T and 7T scanners. CIND investigators will also benefit from UCSF campus resources, such as the MEG scanner, the forthcoming PET-MR system, and the Bioengineering computing cluster."

Zagoria Hired as Abdominal Imaging Section Chief



"Dr. Zagoria has an international reputation for uroradiology expertise, including renal tumor ablations," said Department Chair Ron Arenson, MD, in announcing the appointment of Ronald Zagoria, MD, FACR, as chief of the Abdominal Imaging Section of the Department of Radiology and Biomedical Imaging in June 2013. Zagoria joined UCSF from Wake Forest University, where he was chief of Genitourinary Imaging and Intervention and executive vice-chair of the department.

Zagoria received his BA in Chemistry from Johns Hopkins University in Baltimore, Md. in 1979, and earned his MD from the University of Maryland in 1983. He completed a four-year diagnostic radiology residency in 1987, followed by an Abdominal Imaging/Interventional Radiology Fellowship at Wake Forest University's Bowman Gray School of Medicine. He also completed an externship in Uroradiology with Massachusetts General Hospital in Boston. In 1987, Zagoria joined the faculty at Wake Forest University, becoming an associate professor in 1992 and a professor of radiology in 1997. From 2000–2011, Zagoria was vice-chair and head of the Abdominal Radiology Section. From 2011–2012 he served as interim department chair.

Zagoria has presented more than 300 lectures in the United States and abroad, has written more than 130 peer-reviewed manuscripts, a number of chapters in books, and serves on numerous society committees. He is the Editor-in-Chief of *Emergency Radiology*.

Postgraduate Education Committee Leadership Change

In July 2013, Brett Elicker, MD, was appointed Chair of the Postgraduate Education Committee for the Department of Radiology and Biomedical Imaging. Elicker has been a member of the committee since 2011 and follows Lynne Steinbach, MD, who chaired the committee for five years. "I'm not alone in expressing deep gratitude to Dr. Steinbach, for her tenure as chair. Lynne has done a terrific job leading the committee through some tough times for CME courses around the country," said Department Chair Ron Arenson, MD.

"Brett has been a very popular speaker at our courses over the years and he is excited about this new leadership role," said Arenson. "Given his involvement in several educational committees at UCSF, including the Resident Education and Selection Committees, I believe he will transition seamlessly into this role."

Elicker is an associate professor of Clinical Radiology and chief of the Cardiac and Pulmonary Imaging Section. He received his medical degree in 2000 from New York Medical College, and completed a residency in Diagnostic Radiology at Yale New Haven Hospital, Conn., in 2005, and a fellowship in Thoracic Imaging at UCSF in 2006. He joined the faculty of Radiology and Biomedical Imaging in July 2006.

Behr Appointed Director of Fellowships

Spencer Behr, MD, was appointed Director of Fellowships for the Department of Radiology and Biomedical Imaging in September 2013. "Previously, Behr had been serving as fellowship director for the Abdominal Imaging Section; he now has responsibility for the overall operations and activities of ACGME and non-ACGME fellows that are common to all programs," noted Department Chair Ron Arenson, MD, "I would also like to thank Dr. Ben Yeh for his past fellowship program leadership."

Behr's duties include overseeing off-hour call assignments and responsibilities, communicating policies and procedures, assisting hospital sites with timely completion of credentialing and licensing, and oversight of the non-ACGME fellow selection process.

Behr, an assistant clinical professor of radiology since 2012, received his medical degree from Tufts University School of Medicine in 2005. In 2010, he completed a four-year diagnostic radiology residency at the Lahey Clinic Medical Center in Burlington, Mass, followed by two UCSF fellowships: Abdominal Imaging (2011) and Nuclear Medicine (2012).

Qayyum Becomes Chief of Abdominal Imaging at the University of Texas MD Anderson Cancer Center

Aliya Qayyum, MD, former professor of radiology, left UCSF in June to accept a position as leader of the Body Imaging section at the University of Texas MD Anderson Cancer Center in Houston. "Dr. Qayyum will be a terrific leader in her new position," said Chair Ron Arenson, MD, in announcing her departure.

Qayyum joined the UCSF faculty in the Abdominal Imaging Section in 2000, rising to the rank of professor in residence in 2010. She served as program director for the Diagnostic Radiology Residency from 2008–2012. She participated in many UCSF department and school committees and has been involved in national and international professional organizations.

"Dr. Qayyum has been very successful at UCSF over the last decade or so, authoring more than 100 manuscripts in peer-reviewed journals and receiving National Institutes of Health grants, including her own R01 grant on fatty liver disease," noted Arenson. "Please join me in congratulating her on her new position."

Hiramoto now SFGH Radiology Division Administrator

In August 2013, Lorel Hiramoto assumed the role of division administrator for San Francisco General Hospital Radiology. She follows Margaret DiLaura, who is now director of Operations for the UCSF School of Medicine, Dean's Office. "Lorel brings a great depth and breadth of experience at UCSF and SFGH to her new role, and we are looking forward to taking full advantage of her expertise," said Cathy Garzio, administrative director.

Hiramoto previously served as division administrator for the HIV/AIDS Division, the largest Department of Medicine division at SFGH. She also has filled division administrator positions with the Department of Psychiatry at SFGH. Hiramoto is an alumna of the School of Medicine's Leadership Training Program and holds a BA in Economics from Smith College, Northampton, Mass.

Gaines to become Parnassus Division Administrator

In September 2013, Craig Gaines accepted the position of Division Administrator for Radiology at Parnassus, replacing Rossana Gonzalez-Ayala.

"Craig's positive, can-do approach is helpful and supportive," said Administrative Director Cathy Garzio. "I am confident he will work effectively with staff to make sure our faculty have the tools to care for patients, conduct research, and teach."

Gaines started his career in the Department of Radiology and Biomedical Imaging in 2005, as a financial analyst responsible for research recharge cores. Since 2011, he has been the site administrator at China Basin, where he has provided financial and operational oversight and project management for both China Basin and Mission Bay. He will continue to provide project management support to Robert Gould, PhD, at Parnassus and China Basin, and will oversee administrative staff at Parnassus.

Gaines has a Bachelor's degree in Business from San Francisco State University.

New Faculty

Michael J. Evans, PhD

Assistant Professor in Residence
Body Imaging RIG, China Basin

Michael J. Evans completed his PhD in Organic Chemistry at The Scripps Research Institute in La Jolla, Calif., in 2007. From 2007–2012, Evans was a research fellow at Memorial Sloan-Kettering Cancer Center in New York, where he was a Senior Research Scientist in the Human Oncology and Pathogenesis Program from 2012–2013. Among his many awards are the David H. Koch Young Investigator Award from the Prostate Cancer Foundation and a Pathway to Independence Award from the National Cancer Institute. Evans became an assistant professor in the Department of Radiology and Biomedical Imaging in October 2013. He will continue to focus his research on developing novel radiotracers to study treatment responses to targeted therapies in cancer, and applying proteomic technologies to identify novel cancer biomarkers.

UCSF DMM PHOTOGRAPHY

Thomas A. Hope, MD

Assistant Professor in Residence
Abdominal Imaging and Nuclear Medicine, VAMC

In 2007, Thomas A. Hope received his medical degree from Stanford Medical School, Stanford, Calif. In 2008, he completed a one-year internship at Kaiser Permanente, San Francisco, followed by a four-year diagnostic radiology residency at UCSF. He completed a one-year clinical fellowship in Body MRI and Nuclear Medicine at Stanford Medical Center in 2013. Hope's research interests are MRI contrast agents, nephrogenic systemic fibrosis, dynamic contrast enhanced imaging, and PET/MR. In July 2013, Hope joined the faculty of the Abdominal Imaging and Nuclear Medicine sections as an assistant professor in residence at the San Francisco Veterans Affairs Medical Center.

UCSF DMM PHOTOGRAPHY

Tara Morgan, MD

Assistant Professor in Residence
Ultrasound and Abdominal Imaging

Tara Morgan received her medical degree from the University of Maryland School of Medicine, Baltimore, in 2007. The following year, she completed a one-year Internal Medicine internship at Virginia Mason Medical Center, Seattle, Wash. Morgan completed a four-year Diagnostic Radiology residency at the University of Maryland in 2012, followed by an Abdominal Imaging fellowship at UCSF in 2013. Her areas of particular interest include ultrasound-guided interventions, gynecologic ultrasound, female pelvis MRI, and radiology informatics. In July 2013, Morgan accepted the position of assistant professor in residence in Ultrasound and Abdominal Imaging.

UCSF DMM PHOTOGRAPHY

Daria Motamedi, MD

Assistant Professor in Residence
Musculoskeletal Imaging

In 2006, Daria Motamedi received his medical degree from the University of Minnesota, Minneapolis. In 2007 he completed a one-year Transitional Medicine internship at Harbor-UCLA Medical Center, Los Angeles, Calif. Motamedi completed a four-year Diagnostic Radiology residency at Cedars-Sinai Medical Center in Los Angeles in 2011, followed by a Musculoskeletal Imaging fellowship at the University of California, San Diego in 2012. His areas of interest include high-field musculoskeletal MR imaging at 3.0 and 7.0 Tesla, cartilage imaging, sports medicine and sports imaging, minimally invasive therapeutic interventions, and musculoskeletal ultrasound. In 2013, Motamedi joined the Musculoskeletal Imaging section as an assistant professor in residence.

UCSF DMM PHOTOGRAPHY

Michael Ohliger, MD, PhD

Assistant Professor in Residence
Abdominal Imaging, SFGH

Michael Ohliger received his PhD in Medical Physics from the Massachusetts Institute of Technology, Cambridge, in 2005 and his medical degree from Harvard Medical School, Boston, Mass., in 2007. Ohliger completed a four-year Diagnostic Radiology residency at UCSF in 2012, followed by a fellowship in Abdominal Imaging at UCSF in 2013. He is interested in the development and clinical translation of new MRI techniques for the abdomen and pelvis, including imaging of tumor metabolism with hyperpolarized carbon-13 MRI. He also is interested in developing new MR imaging technology for patients with applications to liver, kidney, and prostate cancer. He accepted the position of assistant professor in residence in Abdominal Imaging at UCSF and the San Francisco General Hospital in July 2013.

UCSF DMM PHOTOGRAPHY

Kimberly M. Ray, MD

Assistant Professor of Clinical Radiology
Women's Imaging, Mount Zion

Kimberly M. Ray received her medical degree in 2001 from the University of California, Irvine. She completed a one-year internship at Loma Linda University Medical Center in California, followed by a four-year Diagnostic Radiology residency at the University of California, Irvine, in 2006. Ray completed a one-year Breast Imaging fellowship at UCSF in 2007. From 2007–2013 Ray was a partner in the practice of Moran, Rowen and Dorsey in Orange, Calif. Concurrently, she served as medical director of the Center for Breast Imaging and Diagnosis at St. Joseph Hospital in Orange. Ray's areas of interest are mammography, digital breast tomosynthesis, breast ultrasound, breast MR, and image–guided percutaneous breast biopsy. In July 2013, Ray accepted the position of assistant professor of clinical radiology in Women's Imaging at UCSF Mount Zion.


UCSF DMM PHOTOGRAPHY

Jason Talbott, MD, PhD

Assistant Professor in Residence
Neuroradiology, SFGH

Jason Talbott earned both an MD and a PhD from the University of Louisville Kentucky in 2007, followed by a one-year internship in Internal Medicine at the California Pacific Medical Center, San Francisco. Talbott completed a four-year Diagnostic Radiology residency at UCSF (2008–2012), where he served as chief resident in 2011. He received an NIH-funded training grant under the Radiology and Biomedical Imaging T-32 program, and completed a year of research in 2010–2011. In 2013, he completed a UCSF fellowship in Neuroradiology. Talbott's research interests include advanced spinal cord and peripheral nerve MR imaging techniques utilizing experimental animal models. Talbott joined the Neuroradiology Section at San Francisco General Hospital in July 2013 as assistant professor in residence.


UCSF DMM PHOTOGRAPHY

Jessica C. Tan, MD

Assistant Professor in Residence
Neuroradiology, SFGH

Jessica C. Tan received her medical degree from the University of California, San Francisco in 2006, followed by a transitional internship at Santa Clara Valley Medical Center, Calif. She completed a four-year diagnostic Radiology residency at the University of California, San Diego in 2011. In 2012 she completed a one-year Neuroradiology fellowship at UCSF, followed by a one-year clinical instructorship. Tan's research interests are in stroke imaging and disorders of cerebral spinal fluid flow, such as intracranial hypotension. She also has an interest in vascular imaging in the setting of acute trauma. In June 2013, she accepted the position of assistant professor in residence in the Section of Neuroradiology, SFGH.

New Faculty Welcomed to Department

Posing in the School of Nursing Mezzanine during the welcome reception are new faculty from 2012 and 2013: Back row (left to right) Andrew Phelps, MD, Andrew Taylor, MD, PhD, Spencer Behr, MD, Jung-Jiin (Jason) Hsu, PhD, Buzz Marcovici, MD. Front row (left to right) Daria Motomedi, MD, Jason Talbott, MD, PhD, Tara Morgan, MD, Chair Ronald L. Arenson, MD, Maureen Kohi, MD, Jessica Tan, MD, Kimberly Ray, MD, Ron Zagoria, MD. (Not pictured: Daniel Cooke, MD, Michael Evans, PhD, Thomas Hope, MD, K. Pallav Kolli, MD, and Michael Ohlgher, MD, PhD.)

Faculty new to the Department of Radiology and Biomedical Imaging in 2012 and 2013 were welcomed on August 21 with a UCSF reception that Department Chair Ronald Arenson, MD, described as "the first in what will become an annual summer event." The reception, new to the Department this year, was arranged to give incoming faculty a "way to put names with faces and to meet others from the department in a casual setting," explained Administrative Director Cathy Garzio. In addition to 2012 and 2013 faculty members, the welcome event was also attended by section chiefs, research leaders, departmental colleagues and key administrative staff.

Honors and Awards

Ronald L. Arenson, MD
- 2013 Recipient, Gold Medal, Association of University Radiologists
- Named President-Elect of the Radiological Society of North America (RSNA) Board of Directors

A. James Barkovich, MD
- Named 2013 Distinguished Investigator, Academy of Radiology Research
- Named 2012 RSNA Outstanding Researcher

Soonmee Cha, MD
- Recipient, Hideyo Minagi Teaching Award, 2013

Cynthia T. Chin, MD
- Promoted to Professor of Clinical Radiology

Miles Conrad, MD
- Promoted to Associate Professor of Clinical Radiology
- Recipient, 2013 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF
- Recipient, Minagi Chair Award, UCSF Department of Radiology and Biomedical Imaging

Jesse Courtier, MD
- Recipient, 2013 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF

William P. Dillon, MD
- 2013 Juan Taveras Lecturer, Harvard Medical School, September 2013
- Recipient, 2013 ASNR Outstanding Contributions in Research Award

Timothy C. Durazzo, PhD
- Promoted to Associate Adjunct Professor

Christine Glastonbury, MD
- Invited Lecturer, Kenneth D. Dolan Memorial Lecture, "HPV-Related Oropharyngeal Carcinoma", University of Iowa, October 2012
- Visiting Professor, Department of Radiology, University of Wisconsin, Madison, October 2012
- Editorial Board and Section Editor, ENT, of *Current Radiology Reports*

The Association of University Radiologists bestowed its highest honor, the Gold Medal, on department Chairman Ron Arenson for his outstanding contributions to the research and clinical science of imaging. Arenson (right) is pictured with Stanley Baum, MD, member of AUR's Board of Directors and editor of Academic Radiology at the AUR Awards Banquet on April 12, 2013.

Orit A. Glenn, MD
- Promoted to Professor in Residence

Steven W. Hetts, MD
- Promoted to Associate Professor

Nola Hylton, PhD
- Named 2013 Distinguished Investigator, Academy of Radiology Research

Bonnie N. Joe, MD, PhD
- Editor, *MRI Clinics: Breast Imaging*

Robert K. Kerlan, Jr., MD
- Recipient, Lifetime Service Award, American Board of Radiology

John Kurhanewicz, PhD
- Named 2013 Distinguished Investigator, Academy of Radiology Research

Thomas Lang, PhD
- Named 2013 Distinguished Investigator, Academy of Radiology Research
- Recipient, International Space Station Top Discoveries in Microgravity Award, American Astronautical Society/ NASA
- Citation Prize, Osteoporosis International

Thomas M. Link, MD, PhD

- Certificate of Distinction, *Skeletal Radiology*
- Recipient, George J. Davies—James A. Gould, Excellence in Clinical Inquiry Award, *Journal of Orthopaedic & Sports Physical Therapy*

John MacKenzie, MD

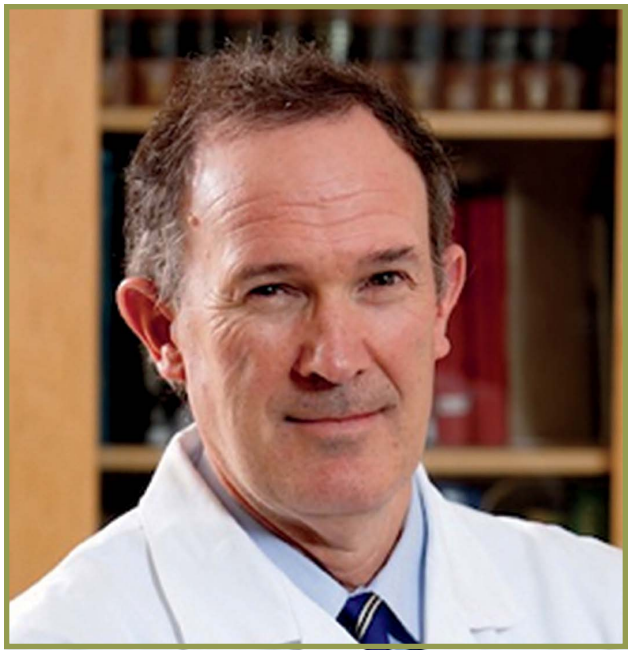
- Invited Lecturer, UCSF Department of Pediatrics Grand Rounds, "Hyperpolarized Carbon-13 MRI for Pediatric Disease," September 2013
- 2012 UCSF-Coro Faculty Leadership Collaborative

Sharmila Majumdar, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

Carina Mari Aparici, MD

- 2013 Board Member, Outreach Council, Co-Chair of the Oncology Outreach Working Group, and Member of the Targeted Radiotreatment Outreach Working Group, Society of Nuclear Medicine and Molecular Imaging
- Member, Editorial Board, *Current Radiology Reports*
- Named Senior Editor, *Biology*, Herbert Open Access Journals
- Named Senior Editor, *Journal of Medical Instrumentation*



In May 2013, William P. Dillon, the Elizabeth A. Guillaumin Professor of Radiology, executive vice-chair of Radiology, and chief of Neuroradiology received the 2013 ASNR Outstanding Contributions in Research Award for his lifelong accomplishments in neuroradiology research.

Neuroradiologist A. James Barkovich, MD, was selected as the RSNA Outstanding Researcher, 2012.

Pratik Mukherjee, MD, PhD

- Promoted to Professor in Residence

Srikantan Nagarajan, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

Sarah J. Nelson, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

Karen Ordovás, MD

- Promoted to Associate Professor in Residence
- Recipient, 2013 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF
- Editor, *Radiology Select, Volume 3: Coronary Artery Disease*

Sabrina S. Ronen, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

David Saloner, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

Maythem Saeed, PhD

- Named to five-year term as Associate Editor-Cardiac Imaging, *Radiology*

Professor Emeritus W. Richard Webb, MD, was awarded the Society of Thoracic Radiology Gold Medal in June 2013. The award honors individuals who have achieved special distinction through a lifetime of service to cardiothoracic imaging.

John Shepherd, PhD

- Recipient, Fulbright Scholarship, 2013
- Recipient, Oscar Gluck Humanitarian Award, International Society for Clinical Densitometry

Lynne S. Steinbach, MD

- Recipient, Editor's Recognition Award with Distinction for the journal *Radiology*
- Distinguished Reviewer, *Journal of Magnetic Resonance Imaging*
- Recipient, Certificate of Distinction, *Skeletal Radiology*
- President-Elect, International Skeletal Society
- Recipient, Certificate of Merit, for Barua R, Umans H, Steinbach L. MRI Evaluation of Adhesive Capsulitis: Key points and new perspectives. Radiological Society of North America 2012

Ruedi F-L Thoeni, MD

- Named Corresponding Fellow of the European Society of Gastrointestingal Radiologists, Barcelona, Spain, June 2013
- Elected Chair, Abdominal Imaging Committee, American College of Radiology, April 2013

Daniel B. Vigneron, PhD

- Named 2013 Distinguished Investigator, Academy of Radiology Research

Duan Xu, PhD

- Promoted to Associate Professor in Residence

Judy Yee, MD

- 2012 Keynote Lecture "Current Status and Future Directions of CT Colonography," RSNA
- 2013 Keynote Lecture "CT Should be Reimbursed Now," American Roentgen Ray Society
- Inducted Fellow of the ACR (FACR) American College of Radiology, 2013
- 2012–2013 Board Member, Society of Abdominal Radiology
- 2013 Editorial Board, *RadioGraphics* and the *Journal of Computer Assisted Tomography*

Z. Jane Wang, MD

- Recipient, Second Place, Basic Science Category, Young Professionals Committee, Society of Nuclear Medicine and Molecular Imaging, Vancouver, BC, June 2013

W. Richard Webb, MD

- Recipient, 2013 Gold Medal Award, Society of Thoracic Radiology

Stefanie Weinstein, MD

- Recipient, 2013 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF

Ronald Zagoria, MD

- Named Editor-in-Chief, *Emergency Radiology*

In May, 2013, Judy Yee, MD, FACR received one of the highest honors the ACR can bestow on a radiologist when she was recognized as a fellow of the American College of Radiology.

Lang Honored for Research on Bone Loss in Space

Professor of Radiology and Biomedical Imaging Thomas Lang, PhD accepted the Top Discoveries in Microgravity Team Award from the American Astronautical Society and NASA in July 2013. The award, presented at the Second Annual International Space Station Research and Development Conference in Denver, recognized innovative research on bone loss prevention in long-duration spaceflights done by Lang, Joyce Keyak, PhD, of UC Irvine, Adrian Leblanc, PhD of the Universities Space Research Association, and Scott M. Smith, PhD, from the Johnson Space Center.

Dr. Thomas Lang, at the House of Representatives Space, Science and Technology Committee offices in Washington, DC.

Lang uses quantitative imaging methods developed in his lab to understand the effect of space flight on the skeletal health of astronauts, specifically at the hip, where the largest loss of bone is found and the most serious fractures occur in people with osteoporosis. "Astronauts lose bone in spaceflight because they are in a microgravity environment where their bones and muscles are not loaded," said Lang. "They also lose muscle, cardiovascular, joint, and balance functions—all of which are adapted to gravity. When they return to Earth and must suddenly readapt to gravity, it puts all of these systems under stress, creating the risk of short-term injury or long-term bone health issues."

Lang collaborated with Leblanc and Keyak in a series of grants funded by NASA to study astronauts from the first eight crews to serve on the International Space Station. "Previously, we knew about bone mass loss, but we didn't know how it was distributed throughout the hip, and whether and how it was recovered," he explained. "We took CT scans of the hip and used my software to study the 3-D characteristics of the bone change. Dr. Keyak's modeling software allowed us to analyze the changes in bone strength. We found that the loss of mass was distributed heterogeneously throughout the hip, and that after recovery, the hip structure was more like that of an older person." The studies indicated that loss of hip bone strength in a microgravity environment was very large on average, and tended to not be fully recovered. Commenting on the results of the research, Lang noted that, "First, it is critical to prevent bone loss. Second, it became clear that current countermeasures for bone loss prevention were not working effectively."

In September, Lang was invited to Washington, DC by the NASA Legislative Affairs Office to be one of three speakers at a Congressional Lunch and Learn Seminar. He discussed the major occupational health risk of bone mass loss for astronauts with members of Congress and their staff. He also met with congressional representatives, including Rep. Lamar Smith (R-Texas), chair of the House Space Science and Technology Committee and Rep. Ralph Hall (R-Texas), former chair of the committee to inform them on bone loss prevention in space.

Retired in 2013

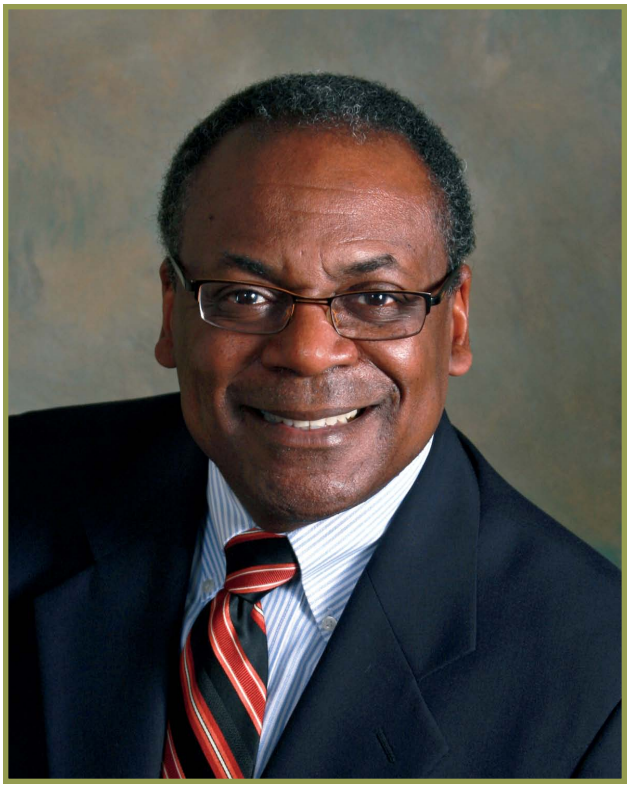
Michael W. Dae, MD

In June 2013, Professor in Residence Michael Dae, MD, retired after more than 29 years in the Department of Radiology and Biomedical Imaging. "I want to congratulate Dr. Dae on his distinguished career and am pleased that he will be able to return to our department with a part-time recall appointment," said Chairman Ron Arenson, MD, in making the announcement.

Dae received his BS in Chemistry from North Carolina State University in 1972. He received his MD from Duke University School of Medicine in 1976 and completed a Pediatrics Residency at Children's Hospital, Boston in 1978. He went on to a fellowship in Pediatric Cardiology, completed in 1982, and another in Nuclear Cardiology completed in 1983, both at UCSF. He earned an MBA at the University of San Francisco in 1998. He began as a UCSF faculty member in 1981 and joined Radiology in 1984.

Dae has published 98 manuscripts in peer-reviewed journals and has written 27 book chapters. He has been the principal investigator on numerous grants, including several from the National Institutes of Health. He holds 13 patents, many related to controlling body temperature through various devices. Dae has extensive experience in the pre-clinical and clinical assessment of new medical devices in cardiovascular medicine. He also is involved in numerous professional organizations.

Calling himself, "more rewired than retired," Dae plans to spend more time with the startup company that he co-founded.



Progress and Accomplishment are the Hallmarks of the Diagnostic Radiology Residency Program 2013

Soonmee Cha, MD
Residency Program Director

The 2012–2013 academic year was a year of exciting changes, tremendous progress, and outstanding accomplishments for our residents and residency program. The oral board examination as we knew it has ended, and a new era of computer-based board examination began in September 2013. Over the past 12 months, we have rebuilt and revamped our resident educational curriculum to match the new CORE curriculum outlined by American Board of Radiology and to provide an intellectually stimulating environment for critical thinking and learning. We also have done much work to prepare for the Milestone Project, which began in July 2013, to systematically evaluate resident performance and provide meaningful feedback.

Working closely with our residents has been fun, exciting, and rewarding. In addition to exemplary work ethics and teamwork, each resident brings something unique and interesting to our program. They care about each other and about defining our program as one of the best in the country. Our faculty's commitment to excellence in teaching has been nothing short of outstanding, from the superb quality of resident conference lectures to teaching during clinical read out, and providing research mentorship.

The 2013–2014 academic year brings the implementation of the new curriculum, new board system, and the Milestone project. Our new online education portal, the CORE website, has been a great resource to centralize and facilitate all learning and administrative material for our residents. This year will be the first and last year where two classes of residents will be taking the new board examination, and our residents have risen to the challenge through focused studying and learning. After six months of preparation, the Milestone Project is underway and residents and

Chief Residents 2012–2013: (l–r) Akash Kansagra, MD, John-Paul Yu, MD, PhD, Dare Olorunsola, MD.

Chair Ron Arenson, MD congratulates 2013 Elmer Ng Award Winner, S. Jarrett Wrenn, MD, PhD.

faculty are working together to enhance interactivity in the learning environment and to promote responsible teaching and learning.

I would like to thank the three past chief residents, Kevin Koo, MD, Victor Sai, MD, and Jarrett Wrenn, MD, PhD, for their outstanding contributions. They worked tirelessly and joyfully to improve the work lives of our residents and the quality of our program. When I thought it would be impossible to find chief residents of this caliber, we have JP Yu, MD, PhD, Akash Kansagra, MD, and Dare Olorunsola, MD, the current chief residents, stepping up to the plate without missing a beat to continue the superb and outstanding work as if they have been doing it all their lives.

Resident Accomplishments 2012–2013

Awards

Ramon F. Barajas, Jr, MD: RSNA Roentgen Resident/Fellow Research Award, 2013; Outstanding Research Award, 2012, UCSF Department of Radiology and Biomedical Imaging for *"Super-Resolution Track Density Imaging of Glioblastoma: Histopathologic Correlation"*

Akash Kansagra, MD: Summa Cum Laude Merit Award, International Society for Magnetic Resonance in Medicine

John Mongan, MD, PhD: Co-recipient, Margulis Society Outstanding Resident Researcher Award, 2013

Anand Patel, MD: Society of Interventional Radiology Poster Award, 2013; UCSF Idea to IPO Course, 2nd Place, 2013; University of California, Berkeley Startup Competition 3rd place, 2013; Stanford BASES Startup Competition 4th place, 2013

Ronnie A. Sebro, MD, PhD: Co-recipient, Margulis Society Outstanding Resident Researcher Award, 2013

S. Jarrett Wrenn, MD, PhD: Elmer Ng Award, presented to outstanding resident, 2013

Service

Marcel Brus-Ramer, MD, PhD: President, Residents and Fellows Section, California Radiological Society

Robert Flavell, MD, PhD: Selected Attendee, *Introduction to Academic Radiology* course at the 2013 American Roentgen Ray Society

Stephanie Hou, MD: Member, UCSF Graduate Medical Education Committee; Member, UCSF Radiation Oversight Committee; Member, UCSF APEX Fellow and Resident Advisory Group

Kimberley Kallianos, MD: Nominee, UCSF Graduate Medical Education Committee and Residents and Fellows Council, 2013-2014

Akash Kansagra, MD: Chief Resident, 2013; Member, New Healthcare Delivery Environment Task Force, Association of University Radiologists' Radiology Research Alliance; Dean's Communications Advisory Board, UCSF School of Medicine; Referee, Academic Radiology; Referee, American Journal of Neuroradiology; Referee, European Journal of Obstetrics & Gynecology and Reproductive Biology; Referee, Neurosurgery

Dare Olorunsola, MD: Chief Resident, 2013; Residents and Fellows Council Representative, UCSF

Anand Patel, MD: MD Coordinator, UCSF Pilot Site for the ImageShare Network, RSNA; President, Residents and Fellows Section, California Radiological Society; Resident Representative, Margulis Society, UCSF Radiology and Biomedical Imaging

Sara K. Plett, MD: Resident Representative, Margulis Society, UCSF Radiology and Biomedical Imaging

Javier Villanueva-Meyer, MD: Resident Representative, Margulis Society, UCSF Radiology and Biomedical Imaging

John-Paul Yu, MD, PhD: Chief Resident, 2013

Presentations and Posters

Vignesh Arasu, MD: *Emergency Radiology Utilization at a Level 1 Trauma Center from 1996-2012.* Arasu VA, Choy G, Abujudeh HH, Biddinger PD, Halpern EF, Thrall JH, Novelline RA. RSNA Chicago, 2013. *Accepted Oral Presentation*

Nicholas Burris, MD: *Systolic Flow Displacement Predicts Future Ascending Aortic Growth in Patients with Bicuspid Aortic Valves Undergoing MR Surveillance.* Burris NS et al. MRA Workshop New York City, 2013. Accepted abstract; *Initial Systolic Flow Displacement in Patients with Bicuspid Aortic Valve Predicts Ascending Aortic Enlargement.* Burris NS et al. RSNA Chicago, 2013. Accepted abstract

Eric Jordan, MD: *Use It or Lose It? The Effect of Step 1 Score on Student's Choice of Residency Specialty*. Johnson JH, Jordan EJ, Cottral J, Tanenbaum E, Burton W, Raff A. American Association of Medical Colleges; Philadelphia, PA, 2013

Robert Flavell, MD, PhD: *Predicting Disease Progression with Multiparametric MRI in Patients with Prostate Cancer Managed by Active Surveillance*, presented at 2012 UCSF Research Day and 2013 Society of Abdominal Radiology Meeting.

Stephanie Hou, MD: *Importing Outside Hospital Imaging is Associated with Shorter Delay to Treatment in Patients Transferred for Acute Ischemic Stroke: A Preliminary Evaluation.* Hou SW, Hetts SW, Avrin DE, Urbania TH. RSNA 2012, Chicago, Ill.

Akash Kansagra, MD: *Academic Radiology in the New Healthcare Delivery Environment.* Qayyum A, Yu JPJ, Kansagra AP, von Fischer N, Heller M, Kantartzis S. Association of University Radiologists 2013; *Early Resident-to-Resident Physics Education in Diagnostic Radiology Residency*. Kansagra AP. Association of University Radiologists 2013; *Computed Tomography Radiation Exposure: Dose Reporting Implementation and Adherence in a Radiology Housestaff Quality Improvement Project*. Yu JPJ, Kansagra AP, Mackenzie JD. Society of Pediatric Radiology 2013; *Current Trends in Endovascular Management of Traumatic Cerebrovascular Injury*. Kansagra AP, Sincic R, English JD, Hetts SW. Society of Neurointerventional Surgery 2012; *Improved Estimation of Cerebral Artery Branch Territories using Cluster-based Segmentation of Vessel-Encoded Pseudocontinuous ASL Data*. Kansagra AP. International Society for Magnetic Resonance in Medicine 2012; *Pancreatitis with a Twist.* Nazareth M, Ng S, Firetag B, Jones K, Kansagra AP, Mathy CB. American College of Gastroenterology 2012

Marc Mabray, MD: *Utility of Intraoperative Duplex Ultrasound during Carotid Endarterectomy*. Mabray M, Weinstein W, McCowin M, Yee J. Society of Radiologists in Ultrasound 22nd Annual Meeting and Postgraduate Course Baltimore, MD, 2012

Dare Olorunsola, MD: *Imaging Assessment of a Portable Hemofiltration Device for Detection of Possible Failure Modes and Monitoring of Functional Performance.* Olorunsola OG, Kim SH, Chang R, Kuo YC, Hetts SW, Heller A, Kant R, Fissell W, Saeed M, Roy S, Wilson MW. Association of University Radiologists (AUR) Annual Meeting, 2013

Anand Patel, MD: *Intravenous Chemotherapy Filter: Initial Design and In-Vitro Proof-of-Concept of a Novel Device for High-Dose Chemotherapy Delivery During Transarterial Chemoembolization.* Patel AS, Yee EJ, Thorne B, Losey AD, Lillaney PV, Saeed M, Wilson M, Hetts SW. SIR Annual Conference. New Orleans, LA. April 2013; *Blood Pool MRI Contrast Agent Use in Pediatric Patients for Vascular Imaging.* Patel AS, Kim JS, Courtier J, Mackenzie JD. SIR Annual Conference. New Orleans, LA. April 2013; *Complex Cervicofacial-Mediastinal Lymphatic Malformation Causing Airway Compromise in Newborn.* Patel AS, Frieden IJ, Dowd C, Hoffman W, Mathes E, Hess CP. 5th Pediatric Interventional Radiology Symposium. Toronto, Canada. November 2012

Ricky Tong, MD, PhD: Oral Presentation, 2013 Association for University Radiologists, Los Angeles, CA; Oral Presentation, 2013, Society of Interventional Radiologists, New Orleans, LA

Javier Villanueva-Meyer, MD: *Feasibility of T1 rho Mapping of Intracranial Tumors and Tumor-Related Edema*. Villanueva-Meyer J, Barajas R, Chen W, Shankaranarayana A, Koon P, Cha S. Scientific poster presented at: 51st Annual American Society of Neuroradiology. May, 2013; San Diego, CA.

Grants

Ramon F. Barajas, Jr, MD: NIH T32 Training Grant; UCSF Radiology Seed Grant

Nicholas Burris, MD: MRA Workshop Meeting NIH Young Investigator Travel Grant

Robert Flavell, MD, PhD: UCSF Radiology and Biomedical Imaging Seed Grant

Akash Kansagra, MD: NIH T-32 Training Grant; UCSF Radiology Seed Grant; UCSF Clinical and Translational Sciences Institute Resident Research Training Program Travel Award

Class of 2013 with Residency Director Soonmee Cha, MD (r).

Yuo-Chen Kuo, MD: UCSF Radiology and Biomedical Imaging Seed Grant

Anand Patel, MD: NIH T32 Training Grant; UCSF Clinical & Translational Science Institute Catalyst Grant

Ricky Tong, MD, PhD: UCSF Radiology Seed Grant; Margulis Society Research Grant

Patents

Anand Patel, MD: *In Vivo* Positionable Filtration Devices and Methods Related Thereto. Hetts SW, Patel AS. U.S. Provisional Application No. 61/784,507 and No. 61/745,183 filed Dec. 2012 and Mar. 2013

Publications

Cardiac Arrest with Impending Circulatory Collapse. **Kansagra AP**, **Yu JPJ**. *Emerg Med J*. 2012 Dec 6. [Epub]

Caval Penetration by Retrievable Inferior Vena Cava Filters: A Retrospective Comparison of Option and Günther Tulip Filters. **Olorunsola OG**, Kohi MP, Fidelman N, Westphalen AC, Kolli PK, Taylor AG, Gordon RL, LaBerge JM, Kerlan RK. *J Vasc Interv Radiol* 2013; 24:566–571;

Clinical Outcomes of Percutaneous Drainage of Breast Fluid Collections after Mastectomy with Expander-based Breast Reconstruction. **Tong RT**, Kohi M, Fidelman N, **Kuo YC**, Foster R, Peled A, Kolli KP, Taylor AG, Laberge JM, Kerlan RK Jr. *J Vasc Interv Radiol.* 2013 Jun 27. [Epub]

Clinical Perfusion MRI: Chapter 11: MR Perfusion Imaging in Oncology: Neuro Applications. **Barajas RF Jr,** Cha S. *Cambridge University Press* 2013, Pages 205-237; NLM ID: 101593150

Combined Diffusion and Perfusion MR Imaging as Biomarkers of Prognosis in Immunocompetent Patients with Primary Central Nervous System Lymphoma. Valles FE, Perez-Valles CL, Regalado S, **Barajas RF Jr**, Rubenstein JL, Cha S. *AJNR Am J Neuroradiol*. 2013 Jan;34(1):35-40.

Comment on Flow Diverter Stent for Ruptured Intracranial Dissecting Aneurysm of Vertebral Artery. **Kansagra AP**. *Neurosurgery*. 2012; 70(4): 988.

Current Trends in Endovascular Management of Traumatic Cerebrovascular Injury. **Kansagra AP**, Cooke DL, English JD, Sincic RM, Amans MR, Dowd CF, Halbach VV, Higashida RT, Hetts SW. *J Neurointerv Surg*. 2013 Jan 15. [Epub]

CXCL13 plus Interleukin-10 are Highly Specific for the Diagnosis of CNS Lymphoma. Rubenstein JL, Wong VS, Kadoch C, Gao HX, **Barajas RF Jr**, Chen L, Josephson SA, Scott B, Douglas V, Maiti M, Kaplan LD, Treseler PA, Cha S, Hwang JH, Cinque P, Cyster JG, Lowell CA. *Blood*. 2013 Jun 6;121(23):4740-8

Density of Thrombus on Admission CT Predicts Revascularization Efficacy In Large Vessel Occlusion Acute Ischemic Stroke. **Moftakhar P**, English JD, Cooke DL, Kim WT, Stout C, Smith WS, Dowd CF, Higashida RT, Halbach VV, Hetts SW. *Stroke*. 2013 Jan;44(1):243-5.

Determinants of Second-order Bile Duct Visualization at CT Cholangiography in Potential Living Liver Donors. **Keedy AW**, Breiman RS, Webb EM, Roberts JP, Coakley FV, Yeh BM. *AJR Am J Roentgenol*. 2013 May;200(5):1028-33.

Distribution of Reported StarClose SE Vascular Closure Device Complications in the Manufacturer and User Facility Device Experience Database. **Johnson DT**, Durack JC, Fidelman N, Kerlan RK, LaBerge JM. *J Vasc Interv Radiol.* 2013 Jul;24(7):1051-6.

Reporting Scan Time Reduces Cardiac MR Examination Duration. Lumish HS, Sidhu MS, **Kallianos K**, Brady TJ, Hoffmann U, Ghoshhajra BB. *J Am Coll Radiol.* 2013 Aug 30. [Epub]

Early Resident-to-Resident Physics Education in Diagnostic Radiology. **Kansagra AP**. *J Am Coll Radiol.* 2013 [In press]

Efficacy of TACE in TIPS Patients: Comparison of Treatment Response to Chemoembolization for Hepatocellular Carcinoma in Patients with and without a Transjugular Intrahepatic Portosystemic Shunt. **Kuo YC**, Kohi MP, Naeger DM, **Tong RT**, Kolli KP, Taylor AG, Laberge JM, Kerlan RK Jr, Fidelman N. *Cardiovasc Intervent Radiol.* 2013 Jul 18 [Epub]

Failure of Filter Re-expansion During Unsuccessful Retrieval of the Option IVC Filter. **Olorunsola OG**, Kohi MP, Fidelman N, LaBerge JM, Kerlan RK. *J Vasc Interv Radiol* 2013;24:1065-1067

FDG PET/CT Evaluation of Pathologically Proven Pulmonary Lesions in an Area of High Endemic Granulomatous Disease. **Sebro R**, Aparici CM, Hernandez-Pampaloni M. *Ann Nucl Med.* 2013 May;27(4):400-5.

Heterogeneous F-18 FDG Uptake in Recurrent Respiratory Papillomatosis. Yu JP, **Barajas RF Jr**, **Olorunsola D**, **Sugrue L**, Pampaloni M. *Clin Nucl Med*. 2013 May;38(5):387-9

Imaging Diagnosis of Brain Metastasis. **Barajas RF Jr**, Cha S. *Prog Neurol Surg*. Jun 2012;25:55-73

Morbidity And Mortality Following Transarterial Liver Chemoembolization In Patients With Hepatocellular Carcinoma And Synthetic Hepatic Dysfunction. **Garwood ER**, Fidelman N, Hoch SE, Kerlan RK, Yao FY. *Liver Transpl.* 2013 Feb; 19(2):164-73.

Pancreatic Imaging Mimics: Part I, Imaging Mimics of Pancreatic Adenocarcinoma. Coakley FV, Hanley-Knutson K, **Mongan J**, **Barajas RF Jr**, **Bucknor M**, Qayyum A. *AJR Am J Roentgenol*. 2012 Aug;199(2):301-8

Radiation Dose Reduction in Pediatric CT Guided Musculoskeletal Procedures. **Patel AS**, Soares BP, Courtier J, Mackenzie JD. *Pediatr Radiol.* 2013 Apr 28. [Epub]

Super-Resolution Track Density Imaging of Glioblastoma: Histopathologic Correlation. **Barajas RF Jr**, Hess C, Phillips J, Von Morze C, **Yu JP**, Chang S, Nelson S, McDermott M, Berger M, Cha S. *AJNR Am J Neuroradiol*. 2013 Jul;34(7):1319-25

Template-Driven Computed Tomography Radiation Dose Reporting: Implementation of a Radiology Housestaff Quality Improvement Project. **Yu JPJ**, **Kansagra AP**, Naeger DM, Gould RG, Coakley FV. *Acad Radiol.* 2013; 20(6): 665-794

Transmantle Sign in Focal Cortical Dysplasia: A Unique Radiological Entity with Excellent Prognosis for Seizure Control. Wang DD, **Deans AE**, Barkovich AJ, Tihan T, Barbaro NM, Garcia PA, Chang EF. *J Neurosurg*. 2013 Feb;118(2):337-44.

Triple-Negative and Non-Triple-Negative Invasive Breast Cancer: Association between MR and Fluorine 18 Fluorodeoxyglucose PET Imaging. **Bolouri MS**, Elias SG, Wisner DJ, Behr SC, Hawkins RA, Suzuki SA, Banfield KS, Joe BN, Hylton NM. *Radiology*. 2013 Jul 22. [Epub]

Incoming Diagnostic Radiology Residents—Class of 2017

Deddeh Ballah, MD

MD 2012 University of Pennsylvania, Perelman School of Medicine, Pittsburgh

2012–2013 Internship, Albert Einstein Medical Ctr., Philadelphia, Penn.

Honors and Awards:

2011–2012 Selected Professions Fellow, American Assoc. of University Women

Research:

2010–2012 Children's Hospital of Philadelphia, Penn.

Selected Publications:

Ballah D, Rabinowitz D, Vossough A, Rickert S, Dunham B, Kazahaya K, Cahill AM. Preoperative Angiography and External Carotid Artery Embolization of Juvenile Nasopharyngeal Angiofibromas in a Tertiary Referral Paediatric Centre. *Clin Radiol.* 2013 Aug 1.

Ballah D, Nijs E, Keller MS, Zhu X, Krishnamurthy G, Cahill AM. Percutaneous CT-Guided Vertebral Bone Biopsy in Children. *Pediatr Radiol.* 2013 Mar;43(5):582-8.

Cahill AM, Ballah D, Hernandez P, Fontalvo L. Percutaneous Retrieval of Intravascular Venous Foreign Bodies in Children. *Pediatr Radiol.* 2012 Jan;42(1):24-31.

Miguel Cabarrus, MD

MD 2012 University of California, San Francisco, School of Medicine

2012–2013 Internship, Kaiser Permanente Medical Ctr., Oakland, Calif.

Research:

2009–2011 University of California, San Francisco, Dept. of Radiology and Biomedical Imaging

2008–2009 University of California, San Francisco, Dept. of Radiation Oncology

Selected Publications:

Varenika V, Fu Y, Gao D, Cabarrus M, Kakar S, Maher J, Yeh B. Hepatic Fibrosis: Evaluation with Semiquantitative Contrast-Enhanced CT. *Radiology*: 2013 Jan;266(1):151-8.

Cabarrus M, Sun YL, Courtier JL, Stengel JW, Coakley FV, Webb EM. The Prevalence and Patterns of Intraluminal Air in Acute Appendicitis at CT. Emerg Radiolo. *Emerg Radiolo*. 2013 Jan; 20(1): 51-6.

William G. Carson III, MD

MD 2012 University of South Florida, College of Medicine, Tampa

2012–2013 Internship, Harbor–UCLA Medical Ctr., Calif.

2011 Alpha Omega Alpha

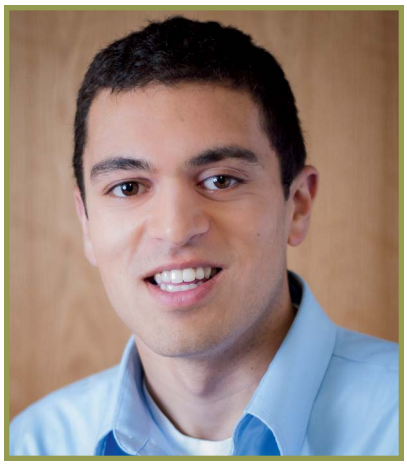
Research:

2009–2012 Tampa General Hospital, Tampa

2007–2008 Vanderbilt University, Psychiatric Neuroimaging Prog., Nashville, Tenn.

Selected Publications:

Massis K, Carson WG 3rd, Rozas A, Patel V, Zwiebel B. Treatment of Type II Endoleaks with Ethylene-vinyl-alcohol Copolymer (Onyx). *Vasc Endovascular Surg.* 2012 Apr;46(3):251-7.



Kavi Devulapalli, MD

MD 2012 Case Western Reserve University School of Medicine, Cleveland, Ohio

2012–2013 Internship, University of Pittsburgh Medical Ctr., Shadyside Hospital, Penn.

MPH 2009 Case Western Reserve University School of Medicine, Cleveland, Ohio

2012 Alpha Omega Alpha

Honors and Awards:

2010 Outstanding MPH Research Capstone Award, Case Western Reserve University School of Medicine, Cleveland, Ohio

Research:

2011–2013 Case Western Reserve University Hospitals, Dept. of Radiology, Cleveland, Ohio

2007–2008 Case Western Reserve University, Dept. of Epidemiology and Biostatistics, Cleveland, Ohio

Selected Publications:

Devulapalli KK, Chowdhury SA, Bambakidis NC, Selman WR, Hsu DP. Endovascular Treatment of Fusiform Intracranial Aneurysms. *J Neurointerv Surg*. 2013 Mar; 5(2): 110-6.

Devulapalli KK, Smith LC. Acute Bilateral Hearing Loss in Peripheral T-cell Lymphoma. *Med Oncol*. 2013 Mar;30(1):427.

Devulapalli KK, Ignacio RV, Weiden P, Cassidy KA, Williams TD, Safavi R, Blow FC, Sajatovic M. Why Do Persons with Bipolar Disorder Stop Their Medication? *Psychopharmacology Bulletin*. 2010 Nov; 43(3): 5-14.

Luis Gutierrez, MD

MD 2012 Stanford University School of Medicine, Calif.

2012–2013 Internship, Santa Clara Valley Medical Ctr., Calif.

Honors and Awards:

2012 Latino Medical Student Assoc. Outstanding Graduating Senior Award

2009 Medical Scholars Research Program Grant, Stanford University, Calif.

Research:

2011–2012 Stanford University, Dept. of Radiology, Calif.

2009–2010 Stanford University, Medical Scholars Research Program, Calif.

2006–2007 SRI International Neuroscience Program, Menlo Park, Calif.

Selected Publications:

Gutierrez LB, Bansal AK, Hovsepian DM. Uteroenteric Fistula Resulting from Fibroid Expulsion After Uterine Fibroid Embolization: Case Report and Review of the Literature. *Cardiovascu Intervent Radiol* 2012 Oct;35(5):1231-6.

Daniel S. Hendry, MD

MD 2012 University of Cincinnati College of Medicine, Ohio

2012–2013 Internship, The Christ Hospital, Cincinnati, Ohio

Honors and Awards:

2008 Iva Dean Scholarship, University of Cincinnati College of Medicine, Ohio

Selected Publications:

Hendry DS, England E, Kenter K, Wissman RD. Femoral Acetabular Impingement. *Seminars in Roentgenology*. 2013 Apr; 48 (2): 158-166

Wissman RD, Ingalls, Hendry DS, Gorman D, Kenter K. Cysts Within and Adjacent to the Lesser Tuberosity: Correlation with Shoulder Arthroscopy. *Skeletal Radiol*. 2012 Sep;41(9):1105-10.

Wissman RD, Ingalls J, Nepute J, Von Fischer N, Radhakrishnan R, Hendry DS, Kenter K. The Trochlear Cleft: The "Black Line" of the Trochlear Trough. *Skelet al Radiol*. 2012 Sep; 41(9): 1121-1126.

Michael G. Holmes, MD

MD 2012 University of Texas Medical School at Houston

2012–2013 Internship, The Methodist Hospital, Houston, Texas

2011 Alpha Omega Alpha

Honors and Awards:

2008–2012 Visiting Students Scholarship

Research:

2009 University of Texas Medical School at Houston

2006–2008 University of Texas Health Science Ctr. at Houston

Brandon M. Ishaque, MD

MD 2012 University of California, Los Angeles, David Geffen School of Medicine

2012–2013 Internship, Kaiser Permanente Medical Ctr., Los Angeles, Calif.

Research:

2011–2012 University of California, Los Angeles, Dept. of Radiology

2008–2012 Harbor-UCLA Medical Ctr., Dept. of Vascular Surgery

Selected Publications:

lshaque B, Zayed M, Miller J, Nguyen D, Kaji A, Lee J, O'Connell J, De Virgilio C. Ethnic Difference in Arm Vein Diameter and Arteriovenous Fistula Creation Rates in Men Undergoing Hemodialysis Access. *J Vase Surg.* 2012 Nov;56(5):1486-7.

Reynolds TS, Zayed M, Kim KM, Lee J, lshaque B, Dukkipati R, Kaji A, de Virgilio C. A Comparison Between One- and Two Stage Brachiobasilic Arteriovenous Fistulas. *J. Vasc Surg.* 2011 Jun; 53(6):1632-8; discussion 1639.

Yaghoubian A, Aboulian A, ChanT, Ishaque B, Wallin D, Stabile B, De Virgilio C. Use of Clinical Triage Criteria Decreases Monitored Care Bed Utilization in Gallstone Pancreatitis. *Am Surg.* 2010 Oct; 76 (10): 1147-9.

Eric Jordan, MD

MD 2012 Albert Einstein College of Medicine, Yeshiva University, Bronx, N.Y.

2012–2013 Internship, Kaiser Permanente Medical Ctr., San Francisco, Calif.

2011 Alpha Omega Alpha

Research:

2012–2013 Kaiser Permanente Medical Ctr., San Francisco, Calif.

2011–2012 Montefiore Medical Ctr., Dept. of Radiology, New York, N.Y.

2011–2012 San Francisco Veteran Affairs Hospital, Dept. of Radiology, Calif.

2011 University of California, San Francisco, Dept. of Radiology

Selected Publications:

Jordan E, Jung A, Courtier J, Poder L, Tsai V, Coakley FV. Imaging of Nontraumatic Adrenal Hemorrhage. AJR Am J Roentgenol. 2012 Jul;199(1):W91-8.

Jordan E, Choe D, Miller T, Chamarthy M, Brook A, Freeman LM. Utility Of Bone Scintigraphy to Determine the Appropriate Vertebral Augmentation Levels. *Clin Nucl Med.* 2010 Sep;35(9):687-91.

Spencer T. Lake, MD

MD 2012 Johns Hopkins University School of Medicine, Baltimore, Md.

2012–2013 Internship, Greater Baltimore Medical Ctr., Towson, Md.

2012 Alpha Omega Alpha

Research:

2011–2012 Johns Hopkins University, Dept. of Radiology, Baltimore, Md.

2010–2011 Johns Hopkins University, Dept. of Otolaryngology, Baltimore, Md.

2009 The James Buchanon Brady Urological Inst., Johns Hopkins, Baltimore, Md.

Selected Publications:

Lake ST, Johnson PT, Kawamoto S, Hruban RH, Fishman EK. CT of Splenosis: Patterns and Pitfalls. *AJR Am J Roentgenol*. 2012 Dec; 199(6): W686-93.

Fan KY, Gogineni H, Zaboli D, Lake ST, Zahurak ML, Best SR, Levine MA, Tang M,

Zinreich ES, Saunders JR, Califano JA, Blanco RG, Pai SI, Messing B, Ha PK. Comparison of Acute Toxicities in Two Primary Chemoradiation Regimens in the Treatment of Advanced Head and Neck Squamous Cell Carcinoma. *Ann Surg Oncol.* 2012 Jun; 19(6): 1980- 7.

Zaboli D, Tan M, Gogineni H, Lake ST, Fan K, Zahurak ML, Messing B, Ulmer K, Zinreich ES, Levine MA, Tang M, Pai SI, Blanco RG, Saunders JR, Best SR, Califano JA, Ha PK. Hyperfractionated Radiotherapy with Concurrent Cisplatin/5-Fluorouracil for Locoregional Advanced Head and Neck Cancer: Analysis of 105 Consecutive Patients. *Int J Otolaryngol.* 2012; 2012:754191.

Zhixi Li, MD

MD 2012 Columbia University, College of Physicians and Surgeons, N.Y.

2012–2013 Internship, Hawaii Residency Programs, Honolulu, Hawaii

Research:

2009–2012 Research Fellow in Neuroradiology, Memorial Sloan-Kettering Cancer Ctr., N.Y.

2007–2008 Research Fellow, National Institutes of Health, Md.

Selected Publications:

Linguraru MG, Sandberg JK, Li Z, Shah F, Summers RM. Automated Segmentation and Quantification of Liver and Spleen from CT Images Using Normalized Probabilistic Atlases and Enhancement Estimation. *Med Phys.* 2010 Feb; 37(2): 771-83.

Linguraru MG, Sandberg JK, Li Z, Shah F, Summers RM. Atlas-Based Automated Segmentation of Spleen and Liver Using Adaptive Enhancement Estimation. *Med Image Comput Comput Assist Interv.* 2009; 12(Pt 2): 1001-8.

Hari Trivedi, MD

MD 2012 Medical College of Georgia, Augusta, Ga.

2012–2013 Internship, Carolinas Medical Ctr., Charlotte, N.C.

2011 Alpha Omega Alpha

Honors and Awards:

2006 Michael Birnbaum Research Scholarship

Research:

2010- 2011 Research Training Program Fellow, National Institutes of Health, Md.

2004–2008 Georgia Institute of Technology, Ga.

Selected Publications:

Trivedi HM, Turkbey B, Rastinehad AR, Benjamin CJ, Bernardo M, Pohida T, Shah V, Merino MJ, Wood BJ, Linehan WM, Venkatesan AM, Choyke PL, Pinto PA. Use of Patient-Specific MRI-Based Prostate Mold for Validation of Multiparametric MRI in Localization of Prostate Cancer. *Urology*. 2012 Jan;79(1):233-9.

Turkbey B, Huang R, Vourganti S, Trivedi HM, Bernardo M, Yan P, Benjamin C, Pinto PA, Choyke PL. Age-Related Changes in Prostate Zonal Volumes as Measured by High-Resolution Magnetic Resonance Imaging (MRI): A Cross-Sectional Study in over 500 Patients. *BJU Int.* 2012 Dec; 110(11): 1642-7.

Venkatesan AM, Trivedi HM, Adams K, Kebebew E, Pacak K, Hughes MS. Comparison of Clinical and Imaging Features in Succinate Dehydrogenase-Positive Versus Sporadic Paragangliomas. *Surgery*. 2011 Dec; 150(6):1186-93.

Vanja Varenika, MD

MD 2012 University of California, San Francisco, School of Medicine

2012–2013 Internship, Kaiser Permanente Medical Ctr., Santa Clara, Calif.

Research:

2010–2011 Howard Hughes Medical Institute, San Francisco, Calif.

2008 UCSF Department of Neurological Surgery, San Francisco, Calif.

Selected Publications:

Varenika V, Fu Y, Gao D, Cabarrus M, Kakar S, Maher J, Yeh, B. Hepatic Fibrosis: Evaluation With Semiquantitative Contrast-Enhanced CT. *Radiology*. 2013 Jan;266(1):151-8.

Varenika V, Blanc PD. A Patient on RIPE Therapy Presenting with Recurrent Isoniazid-Associated Pleural Effusions: A Case Report. *J Med Case Rep.* 2011 Nov 30;5:558.

Richardson R, Varenika V, Forsayeth J, Bankiewicz K. Future Applications: Gene Therapy. *Neurosurg Clin N Am.* 2009 Apr;20(2):205-10.

Jennifer J. Wan, MD

MD 2012 University of California, San Diego, School of Medicine

2012–2013 Internship, Kaiser Permanente, San Francisco, Calif.

Honors and Awards:

2009–2012 Tschirgi Endowed Scholar

2004–2008 Medical Scholar, University of California, San Diego

Research:

2009 NIH Research Training Grant, University of California, San Diego

2007–2008 Pelvic Floor Research Group, University of California, San Diego Medical Ctr.

Selected Publications:

Weinstein MM, Pretorius DH, Jung SA, Wan JJ, Nager CW, Mittal RK. Anal Sphincter Complex Muscles Defects and Dysfunction in Asymptomatic Parous Women. Int *Urogynecol J.* 2011 Sep;22(9):1143-50.

Wan JJ, Schrimmer D, Tache V, Quinn K, Lacoursiere DY, James G, Benirschke K, Pretorius DH. Current Practices in Determining Amnionicity and Chorionicity In Multiple Gestations. *Prenat Diagn.* 2011 Jan;31(1):125-30.

Incoming Diagnostic Radiology Residents—Class of 2016

Scott R. Mahanty, MD

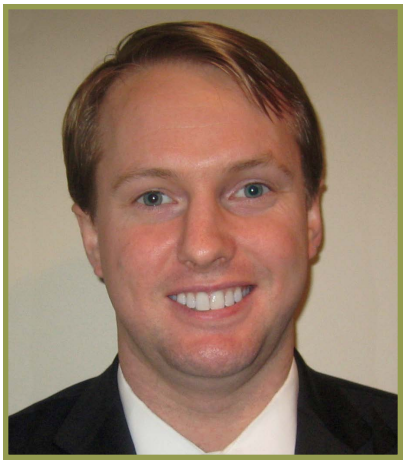
2012–2013 Diagnostic Radiology Residency, Los Angeles County-USC Medical Ctr., Calif.

MD 2006–2011 Boston University School of Medicine, Mass.

2011–2012 Internship, St. Joseph Mercy Hosp., Ann Arbor, Mich.

Research:

2009–2011 Department of Radiology, Boston University School of Medicine, Mass.



Hugh C.J. McGregor, MD

2012–2013 University of North Carolina, Chapel Hill

MD 2007–2011 Royal College of Surgeons in Ireland, Dublin

2011–2012 Internship, University of Hawaii, Honolulu

Honors and Awards:

2010 Editor's Pick, Cover Article; Medical Imaging in the 21st Century: the Promise and Challenges. *Royal College of Surgeons in Ireland Student Medical Journal 2010*; 3:65-69

Research:

2010 Stanford University Molecular Imaging Prog., Calif.

2008 Mayo Clinic, Dept. of Radiology, Rochester, Minn.

Selected Publications:

McGregor HCJ, Chen J, Mariappan YK, Ehman RL. Magnetic Resonance Elastography in Trabecular Bone: Initial Experience. *Skeletal Radiol.* 2009 Jun;38(6):603-31.

Incoming Nuclear Medicine Resident—Class of 2016

Lorenzo Nardo, MD

2007–2011 Diagnostic Radiology Residency, Spedali Civili, Universitas Studiorum Brixiae, Brescia, Italy

MD 2006 Universitas Studiorum Brixiae, Brescia, Italy

Honors and Awards:

2012 Trainee Prize, Radiological Society of North America

Research:

2010–2013 University of California, San Francisco, Dept. of Radiology

Selected Publications:

Baum T, Joseph GB, Arulanandan A, Nardo L, Virayavanich W, Carballido-Gamio J, Nevitt MC, Lynch J, McCulloch CE, Link TM. Association of Magnetic Resonance Imaging-Based Knee Cartilage T2 Measurements and Focal Knee Lesions with Knee Pain: Data from the Osteoarthritis Initiative. *Arthritis Care Res (Hoboken)*. 2012 Feb;64(2):248-55.

Baum T, Yap SP, Karampinos DC, Nardo L, Kuo, Burghardt AJ, Masharani UB, Schwartz AV, Li X, Link TM. Does Vertebral Bone Marrow Fat Content Correlate With Abdominal Adipose Tissue, Lumbar Spine Bone Mineral Density, And Blood Biomarkers In Women with Type 2 Diabetes Mellitus? *J Magn Reson Imaging*. 2012 Jan;35(1):117-24.

Joseph GB, Baum T, Carballido-Gamio J, Nardo, Virayavanich W, Alizai H, Lunch JA, McCulloch CE, Majumdar S, Link TM. Texture Analysis of Cartilage T2 Maps: Individuals with Risk Factors for OA Have Higher and More Heterogeneous Knee Cartilage MR T2 Compared to Normal Controls—Data From The Osteoarthritis Initiative. *Arthritis Res Ther*. 2011;13(5):R153.

Diagnostic Radiology Residents 2013–2014

Second-Year Residents

Mariam Aboian, MD, PhD
Vignesh Arasu, MD
Eric Ehman, MD
Kimberly Kallianos, MD
Rahi Kumar, MD
Yi Li, MD
Scott Mahanty, MD
Hugh McGregor, MD
Christopher Mutch, MD, PhD
Hriday Shah, MD
Christopher Starr, MD, PhD
Javier Villanueva-Meyer, MD
Genevieve Woodard, MD, PhD
Jean Yeh, MD

Third-Year Residents

Jacob D. Brown, MD, PhD
Marcel Brus-Ramer, MD, PhD
Nicholas Burris, MD
Matthew L. Eltgroth, MD
Robert R. Flavell, MD, PhD
Elisabeth Garwood, MD
Patrick C. Gonzales, MD
Ryan Kohlbrenner, MD
Valentin Lance, MD
Marc Mabray, MD
Aaron C. Miracle, MD
Sara K. Plett, MD
David Valenzuela, MD

Fourth-Year Residents

Ramon F. Barajas, Jr., MD
Amaya M. Basta, MD
Nancy J. Benedetti, MD
Stephanie Hou, MD
Akash Kansagra, MD, Chief
Yuo-Chen Kuo, MD
Parham Moftakhar, MD
Dare Olorunsola, MD, Chief
Anand S. Patel, MD
Jay Starkey, MD
Ricky T. Tong MD, PhD
David N. Tran, MD
John-Paul Yu MD, PhD, Chief

Diagnostic Radiology Residency Graduates—Class of 2013

Congratulations to our 2013 graduates. We wish them success in their new fellowship positions.

Marjan S. Bolouri, MD
Fellowship, Breast Imaging/ Ultrasound, UCSF

Matthew D. Bucknor, MD
Fellowship, Musculoskeletal Radiology, Stanford, Calif.

Abby E. Deans, MD, PhD
Fellowship, Neuroradiology, UCSF

Lauren A. Hollowell, MD
Fellowship, Abdominal Imaging/ Breast Imaging, UCSF

D. Thor Johnson, MD, PhD
Fellowship, Interventional Radiology, UCSF

Alexander W. Keedy, MD
Fellowship, Abdominal Imaging/ Breast Imaging, UCSF

Kevin S.H. Koo, MD
Fellowship, Interventional Radiology, UCSF

John T. Mongan, MD, PhD
Fellowship, Abdominal Imaging/ Ultrasound, UCSF

Victor F. Sai, MD
Fellowship, Abdominal Imaging, UCLA

Ronnie A. Sebro, MD, PhD
Fellowship, Musculoskeletal Imaging, Massachusetts General Hospital, Boston

Leo P. Sugrue, MD, PhD
Fellowship, Neuroradiology, UCSF

S. Jarrett Wrenn, MD, PhD
Fellowship, Interventional Radiology, UCSF

Etay Ziv, MD, PhD
Fellowship, Interventional Radiology, UCSF

2013 Diagnostic Radiology Residents (l–r top row) Etay Ziv, MD, PhD, Thor Johnson, MD, PhD, John Mongan, MD, PhD, S. Jarrett Wrenn, MD, PhD, Matthew Bucknor, MD, Leo Sugrue, MD, PhD, Marjan Bolouri, MD (l–r bottom row) Chair Ronald Arenson, MD, Victor Sai, MD, Kevin Koo, MD, Residency Director Soonmee Cha, MD, Lauren Hollowell, MD, Alexander Keedy, MD, Ronnie Sebro, MD, PhD, Abby Deans, MD, PhD.

Clinical Fellows and Instructors 2013–2014

Clinical Fellows:

Bilal Ahmed, MD
Abdominal Imaging

Matthew Amans, MD
Neurointerventional

Sandeep Arora, MBBS
Abdominal Imaging

Marjan Bolouri, MD
Breast Imaging/Ultrasound

Agustin Cardenas, MD
Pediatric Radiology

Alan Chiang, MD, PhD
Breast Imaging

Abby Deans, MD, PhD
Neuroradiology

Niv Decalo, MD
Abdominal Imaging

Emily Deer, MD
Breast Imaging/Ultrasound

Viviane Delaney, MD
Cardiac and Pulmonary Imaging

Brian Everist, MD
Musculoskeletal Radiology

Cameron Gates, DO
Musculoskeletal Radiology

Heather Greenwood, MD
Breast Imaging (SFGH)

Jessica Hayward, MD
Women's Imaging

Mai-Lan Ho, MD
Neuroradiology

Lauren Hollowell, MD
Abdominal Imaging/Breast Imaging

Robert Hom, MD
Abdominal Imaging

D. Thor Johnson, MD, PhD
Interventional Radiology

Nazima, Kathiria, DO
Cardiac and Pulmonary Imaging

Alexander Keedy, MD
Abdominal Imaging/ Breast Imaging

Kevin Koo, MD
Interventional Radiology

Jasmin Koohi, MD
Abdominal Imaging

David Landry, MD
Neuroradiology

Cindy Lee, MD
Breast Imaging/Ultrasound

Sonia Lee, MD
Nuclear Medicine

Joshua Leeman, MD
Musculoskeletal

Mark Mamlouk, MD
Neuroradiology

John Mongan, MD, PhD
Abdominal Imaging/Ultrasound

Jared Narvid, MD
Neurointerventional Radiology

Brian Park, MD
Abdominal Imaging

Phillip Reich, MD
Abdominal Imaging/Ultrasound

Leo Sugrue, MD, PhD
Neuroradiology

Derek Sun, MD
Abdominal Imaging

Cynthia Tan, MD
Pediatric Radiology

William Theodorou, MD
Abdominal Imaging

Penelope Thomas, MD
Neuroradiology

Nathaniel von Fischer, MD
Neuroradiology

S. Jarrett Wrenn, MD, PhD
Interventional Radiology

Etay Ziv, MD, PhD
Interventional Radiology

Clinical Instructors:

Saad Ali, MD
Neuroradiology

Jason Johnson, MD, PhD
Neuroradiology

Greg Punch, MD
Neuroradiology

Benita Tamrazi, MD
Neuroradiology

Master of Science in Biomedical Imaging a "Stepping Stone" for Many Graduates

2012–2013 UCSF MSBI Graduate Class: The second graduating class of the Master of Science in Biomedical Imaging received their diplomas from UCSF's Graduate Division, and were recognized at the Department of Radiology and Biomedical Imaging's 2013 commencement ceremony. They are (l–r), Madhav Agrawal, Hsin-Wei Cheng, Shuyu Tang, Charvi Shetty, Patrick Chuang, Alyssa Zhu, Rupinder Chandi, Yishin Chang, Naeim Bahrami, Program Director David Saloner, PhD. Not pictured: Caleb Tam, Yu-Ling Chang, Lindsay Conner, Dharshan Chandramohan.

Now in its third year, the Master of Science in Biomedical Imaging (MSBI) program has grown and continues to attract students from across the United States and around the world.

For many, the MSBI is a stepping-stone; several members of the class of 2012 are already enrolled in PhD and dental school programs around the United States. Others are using their experience in medical school applications, with the end goal of entering a Radiology residency. Still others are using their advanced degree to launch a career in the medical imaging sciences.

The MSBI program hosts an active exchange with industries that rely on medical imaging technology, such as medical imaging equipment manufacturers, pharmaceutical companies, medical device companies, and start-ups. For the second straight year an MSBI student undertook an internship at Genentech in South San Francisco, and new internship opportunities continue to emerge.

Classroom Learning Supports Hands-On Experiences

The MSBI program core courses deliver in-depth training in the principles of *in-vivo* imaging modalities. Students also choose from a wide set of electives related to imaging applications for major diseases and different organ systems. The program covers all major medical imaging technologies, as well as topics such as Image Processing and Research Study Design. Following their coursework, students bring the various elements of their learning together in applied research projects, working with faculty supervisors or as interns with industry partners.

MSBI students benefited from the wide range of the department's state-of-the-art imaging facilities to obtain hands-on imaging experience. "Students appreciate the high caliber of lectures, not only within the Department of Biomedical Imaging, but across the UCSF campus," said David Saloner, PhD, program director. "They thrive on the small class size, which gives them easy access to the faculty and helps them form a cohesive, collaborative group."

MBSI Looking Ahead

Saloner works closely with Alastair Martin, PhD, Director of Graduate Studies and Robert Smith, MBSI program administrator.

The program welcomed its third and largest class of students in the Fall 2013 semester. It continues to offer students robust training in imaging sciences, with hands-on exposure to medical equipment, research experience, and a high faculty to student ratio.

Goldberg Center

The Goldberg Center is introducing radiology to medical students earlier in their studies and ensuring that student receive the instruction, feedback, and mentorship they need.

This fall marked the start of Radiology Primer (Rad 140.21), a two-week radiology elective for third-year medical students. "Fourth-year electives provide more depth, but can come too late in the application season to inform a student's career path," said David Naeger, MD, who created Radiology Primer along with Nancy Benedetti MD. "This elective provides critical exposure to the daily practice of radiology across a variety of subspecialties."

First-year medical students are seeing ultrasound integrated into their anatomy coursework as a learning aid, thanks to a new ultrasound curriculum. Ultrasound is increasingly incorporated into undergraduate medical education, with small, hand-held units being viewed as a bedside examination tool similar to a stethoscope. "We have an opportunity to teach how to use the technology, simple diagnostics, safe procedure guidance, and ultimately the limitations of point-of-care ultrasound and when a formal diagnostic study should be performed by an imaging expert," said Emily Webb, MD, who helmed the curriculum development process.

These, and all Goldberg Center electives benefit from a comprehensive system for students to provide feedback that permits the Center to tailor courses to fit their needs. While students have always been evaluated by the course director on their participation and exam performance, this year, a new evaluation portal allows all instructors and staff to provide individual feedback to students. This approach to "360 degree" evaluations is intended to allow more constructive and specific feedback.

Naeger and Webb were awarded a one-year Innovations Funding grant starting July 2013 by the Haile T. Debas Academy of Medical Educators to develop digital educational materials to support the radiology curriculum across the four-year program.

Kudos to Committee Members and Long-Time Staff Members

The faculty and resident members of the Medical Student Education Committee supervise the Goldberg Center's academic activities. Naeger became committee co-chair

First-year Medical Students learn about ultrasound in new curriculum.

in 2013 and two new committee members are active and enthusiastic medical student educators: Aaron Miracle, MD, is the Resident Liaison for Medical Student Education, and Andrew Phelps, MD, returns as a faculty member after previous service as Resident Liaison. Continuing members of the committee are: Webb, Benedetti, Brett Elicker MD, Vickie Feldstein, MD, Stefanie Weinstein, MD, Lynne Steinbach, MD, Miles Conrad MD, Elissa Price, MD, and Khai Vu, MD.

Additionally, many UCSF faculty, volunteer faculty, fellows, and residents give generously of their time in our programs. We and the UCSF medical students who benefit directly from their contributions and time appreciate their efforts.

Sadly, we say goodbye to Melinda Parangan-Chu, our amazing Medical Student Education Coordinator, who has taken a position administering the department's fellowship programs. Bren Ahearn is filling her shoes. He has worked in undergraduate medical administration at UCSF, and most recently, at UC Davis.

For more information about the Goldberg Learning Center's activities, please contact Bren Ahearn (*Bren.Ahearn@ucsf.edu*) or visit *radiology.ucsf.edu/education/medical-students*.

The Henry I. Goldberg Center for Advanced Imaging Education is the headquarters for all medical student education in the Department of Radiology and Biomedical Imaging. The Center oversees radiology instruction in the pre-clinical core curriculum, provides imaging workshops during clinical clerkships, offers a variety of radiology electives spanning both clinical applications of Radiology and imaging research, and offers career advising and mentoring to UCSF medical students.

Alumni News 2013

1967

Charles A. Gooding, MD and **Gretchen A.W. Gooding** (**1975**), Mill Valley, Calif., shared a photo of their September 2013 hike in the Narrows, a spectacular gorge16 miles long and up to 2,000 feet deep in the upper reaches of Zion Canyon.

Drs. Gretchen and Charles Gooding, Zion National Park, Utah

1971

Melvyn T. Korobkin, MD, Ann Arbor, Mich., received the Outstanding Alumni Award 2013.

Melvyn T. Korobkin, MD (right) at the Department of Radiology and Biomedical Imaging Commencement with (left) Chair Ron Arenson, MD, and Hideyo Minagi, MD.

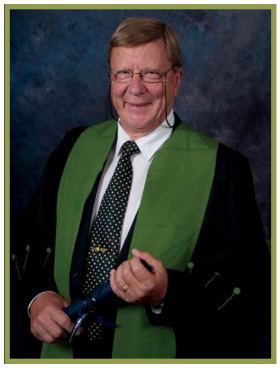
1974

Peter S. Moskowitz, MD, Palo Alto, Calif. shared a photo of a tour of Facebook, Inc., in Palo Alto, Calif.

Peter and Susan Moskowitz tour Facebook.

1975

Hans Ringertz, MD, PhD, Stanford, Calif., received the International Society of Radiology's 2012 Béclère medal; gave the 2012 Takahiro Kuzoka Lecture of the Computer Assisted Radiology and Surgery congress in Pisa, Italy; was awarded the 2012 Gold Medal of the Asian Oceanian Society of Radiology; and was the 2012 inaugural recipient of the Dr. Andrew and Margaret Bruce Visiting Scholarship in Surgical Innovation at Queen's University, Kingston, Ontario, Canada.



Dr. Hans Ringertz, MD, PhD, Gold Medal Recipient, Asian Oceanian Society of Radiology

2013 UCSF Alumni Gathering. Pictured (l to r) are Paul Radosevich, MD (1992), Peggy Lynch, MD (1988), David Woo, MD (2007), Gina Song, MD (2008), Mike Rizzo, MD (1989), Shilpa Kumbhani, MD (2010), Jeff Dieden, MD, Krammie Chan, MD (1996), Sean Hilchey, MD (2003), Lisa Kinoshita, MD (2001), and Dave Spring, MD (retired, 1976). Not pictured are Marianna Caponigro, MD (1998), Jim Chen, MD, PhD, (2008), Geoff Hastings (former faculty), Jacque Jumper, MD (2004), and Chris Sonne, MD (2001).

1986

Jeffrey D. Dieden, MD, Lafayette, Calif., sent this photo of UCSF-trained radiologists working at Kaiser Oakland. They gathered with their families at a Bay Area pool party, Summer 2013.

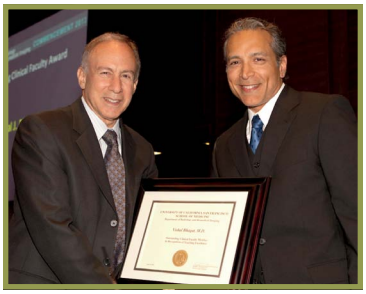
1997

Fergus V. Coakley, MD, Portland, Oregon wrote that, although he misses his friends and colleagues at UCSF, he is enjoying his new role as chair of Diagnostic Radiology at Oregon Health Sciences University, where he is expanding the range of services and academic activities, including the introduction of endorectal multiparametric prostate MRI. He has obtained an R25 grant to support trainee research and is looking forward to the installation of an MR-guided high intensity focused ultrasound system. Outside of work, he and his family are enjoying the many attractions of the Pacific Northwest, including the climate, which is strongly reminiscent of his native Ireland!

The Coakley family enjoying dinner in the Space Needle on a recent visit to Seattle, Wash.

1999

Vishal J. Bhagat, MD, of Ann Arbor, Mich., received the Outstanding Clinical Faculty Award at UCSF's Department of Radiology and Biomedical Imaging commencement.

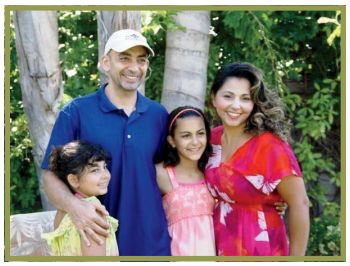


Chair Ron Arenson (l) with VJ Bhagat (r)

Allen B. Nalbandian, MD, of Escondido, Calif., shares a family update: "Our oldest son, Dylan (now a teen) continues his professional theatre career. He will appear, for the fifth year in a row, at the Old Globe Theatre in *How the Grinch Stole Christmas*, at Balboa Park, San Diego, and landed the role of Jem in *To Kill a Mockingbird* at New Village Arts Theatre in Carlsbad. Our younger son Ross finished a successful season of competitive baseball and immediately transitioned into soccer, where I have been coaching his team for the past few years. He is a tenacious defender, similar to his dad! Wendy coordinates both boys' school and extracurricular activities and manages a handful of local properties. I continue in private practice as president of Valley Radiology Consultants, San Diego. We opened three new offices over the past 15 months. Finally, Wendy and I have launched an apparel company called Peace Out (*peaceout.us.com*), which features radiological images printed on apparel and other media. We miss San Francisco and try to get up there anytime we get a chance."

2000

Nazih Farah, MD, was elected to the Board of Directors of his group, Consulting Radiologists Ltd, in May 2013. He was an invited speaker at the Minnesota Radiological Society Spring meeting 2013, lecturing on "Imaging of Thoracic Blunt Trauma." He continues to volunteer teach, and began giving emergency radiology core lectures to University of Minnesota residents in the spring of 2013. In addition, he wrote that: "Caroline and the girls, Isabella and Angelica, are enjoying their new life and schools in St Paul, Minn., especially the change of seasons and associated different outdoor activities. We have been traveling a lot, including a recent trip to Costa Rica."



The Farah family in Costa Rica (l–r) Angelica, Nazih, Isabella, and wife Caroline.

2009

Anna Meyerson, MD, Sandy Spring, Ga.wrote: "Our son Isaac welcomed his little brother Jack in December. We built a home and are finally settled in Sandy Springs. I enjoy my job with Quantum Radiology. Things are good."

2013

Bruno Soares, MD, Atlanta, Ga., received the Department of Radiology and Biomedical Imaging's Outstanding Fellow Teaching Award, presented by the chief residents at the 2013 commencement. He recently accepted a position in Neuroradiology at Emory University in Atlanta.

Outstanding Teaching awardee, Bruno Soares

The Margulis Society

James Chen, MD, PhD

"As the most established radiology alumni network in the nation, for over 20 years the Margulis Society has focused on helping UCSF alumni succeed in radiology's ever-evolving world—fostering community, supporting career development, and extending the UCSF model of excellence by funding trainee education and research," said James S. Chen, MD, PhD, who became president of the Margulis Society Board of Directors in July. Chen follows Diego Ruiz, MD, who served as board president from 2011–2013. "We appreciate and welcome the continued engagement of our alumni, and hope to see you at our next event, the May 1, 2014 biennial Margulis Alumnus lecture, featuring William G. Bradley, MD, PhD, chair of UC San Diego, Dept. of Radiology."

Chen is a diagnostic radiologist at Kaiser Permanente in Oakland, Calif. He received his MD and PhD in 2003 from Boston University School of Medicine in Massachusetts. He completed a one-year internship in internal medicine at UCSF, followed by a UCSF diagnostic radiology residency from 2004–2008. The following year, he completed his clinical fellowship in the areas of Abdominal Imaging and Cardiac/Pulmonary Imaging at UCSF.

Celebratory Gala at Maritime Museum

Alumni, friends, and trainees gathered on April 6, 2013, at the historic Maritime Museum for the Margulis Society Gala. Built in1939, the museum overlooks San Francisco's Aquatic Park Landmark District and the San Francisco Bay. The evening featured a silent auction with exciting prizes donated by faculty, clinical faculty, and departmental sections, outstanding food, and a grand raffle. (See photos, page 45).

Physics Day for Diagnostic Radiology Residents

Funded by the Margulis Society, four physics professors from UC Davis spent a day teaching diagnostic radiology residents in an intensive physics course. On August 12, Clinical Professor of Radiology and Director of Health Physics at UC Davis, Jerrold T. Bushberg, PhD, Professor of Radiology J. Anthony Seibert, PhD, Professor of Radiology Edwin M. Leidholdt, Jr., PhD, and Clinical Associate Professor of Radiology John M. Boone, PhD, provided information geared to the needs of diagnostic radiology residents. In a "mini-course" format, they condensed what would normally be a four-day physics course into a one-day intensive covering the fundamental principles of medical imaging physics, radiation protection, and radiation biology.

Career Evening 2013

Held at UCSF's Parnassus Heights campus this year, the Margulis Society career evening featured a broad sampling of speakers, including Robert Barr, MD, of Mecklenburg Radiology Associates, Charlotte, N.C., Miriam Bredella, MD, of Harvard University, UCSF Residency Program Director Soonmee Cha, MD, Jim Chen, MD, PhD, and Chris Sonne, MD, of Kaiser Permanente Oakland, Jane Kim, MD, of Kaiser Permanente, San Francisco and Christopher Schultz, MD, of Queen of the Valley Hospital, Napa. Thanking the panelists for discussing their career paths with UCSF radiology residents, moderator Erik Gaensler MD noted "We were able to present quite a diverse set of experience thanks to the travels you all made, particularly Miriam coming from Boston, and Bob Barr from Charlotte via Cyberspace!"

Mongan and Sebro are Margulis Society Research Awardees

John Mongan, MD, PhD, and Ronnie Sebro, MD, PhD, were co-recipients of the Margulis Society Outstanding Resident Research Award for their extensive accomplishments in research. The award recognizes senior residents who have been outstanding in the research arena during their residency.

Margulis Research Grant Jumpstarts Innovative Research

Anand Patel, MD

When diagnostic radiology resident Anand S. Patel, MD, received a Margulis Society Research grant during his third year of residency in 2012, it was an early step in developing a device that could be of immense benefit to cancer patients. Patel was a participant in the Department's T-32 program, which allows residents to dedicate a year of their residency to research, when he submitted his proposal to the Margulis Society asking for funding for a project entitled "Intravenous Chemotherapy Filter: A Novel Device for Chemotherapy Delivery During Transarterial Chemotherapy."

The objective of the device — to optimize chemotherapy dosage using an intravenous filter—had been discussed in the Neuro IR research group and had been the subject of input from bioengineering students in the Masters in Translational Medicine Program, a joint collaboration of UCSF and UC Berkeley. The goal was to remove chemotherapy drugs via filter after they exited a cancerous tumor, thus preventing the drugs from being absorbed by other organs in the body. Working with mentor and chief investigator Steven Hetts, MD, professor of radiology and chief of Interventional Neuroradiology at San Francisco General Hospital and San Francisco Veterans Administration Medical Center, development began on an intravenous chemotherapy filter catheter that would enable precise chemotherapy dosages.

In the spring of 2013 UCSF's Clinical and Translational Science Institute (CTSI) awarded the project a CTSI Catalyst Award, given to promote rapid translation of research to improvements in patient health. "The idea moved from vague concepts to a functional reality through Anand's hard work and perseverance during his NIH-supported T32 year in the IR Research Lab, along with significant contributions from Dr. Al Chin, a medical device innovator with whom we were connected through CTSI," said Hetts. Recently, the ChemoFilter project received funding from the Society of Interventional Radiology with a 2013–2015 Resident Research Grant, and a patent has been filed for the device.

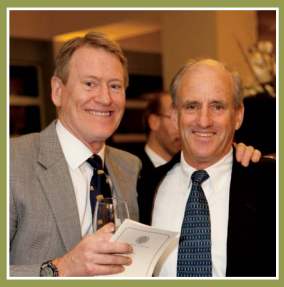
"ChemoFilter is an outstanding example of the multidisciplinary environment at UCSF and our ability to collaborate with partners from industry to make significant innovations in medical devices and pioneer new paradigms in patient care," Hetts added.

"I appreciate that the Margulis Society provided the very first grant for the ChemoFilter project," Patel said. "Thanks to UCSF and CTSI, we have been able to team up with experts in the field and take great strides in bringing the device closer to helping cancer patients."

Margulis Society Gala

April 6, 2013 at the historic Maritime Museum









Alumni, faculty, friends and trainees enjoy the 2013 Margulis Society Gala

The Honor Roll of Donors

The Margulis Society and the Department of Radiology and Biomedical Imaging gratefully acknowledge the following individuals for their generous contributions. This list reflects gifts made between July 1, 2012 and June 30, 2013.

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Radiology Postgraduate Education

2013 Highlights

The June 2013 international course, **Bermuda Shorts: Practical Tips for Covering On-Call,** co-chaired by Brett M. Elicker, MD, chief of Cardiovascular and Pulmonary Imaging, and Christopher P. Hess, MD, PhD, chief of Neuroradiology at the San Francisco Veterans Affairs Medical Center, was huge success. Other fine UCSF faculty lecturers at the course were Liina Poder, MD, Emily M. Webb, MD, and Mark W. Wilson, MD. The guest speaker was Robert A. Novelline, MD, director of Emergency Radiology at Massachusetts General Hospital. The class was held at the Fairmont Southampton Bermuda.

The first Neurointerventional Workshop took place at the China Basin Research Center on September 6, 2013. Co-chairs Steven Hetts, MD, and Daniel Cooke, MD, were joined by presenters Van V. Halbach, MD, Christopher F. Dowd, MD, and Michael T. Lawton, MD. Attendees benefited from an unmatched opportunity to hear fantastic lectures, play with simulators and participate in hands-on labs using Embolectomy devices, coils, stents, and flow diverters.

What to Look Forward to in 2014

The Annual Review course will be held March 2–7 at the Hotel Nikko San Francisco in Union Square, a convenient and lively location. To keep up with ABR continuous certification requirements, this course will offer over 20 self-assessment CME credits. The weeklong, comprehensive review course consistently attracts an increasing percentage of practicing radiologists. It is a perfect opportunity for a

San Francisco, California, site of the *Annual Review* CME course on March 2–7, 2014

Join us in Hungary for the *Imaging in Budapest* CME course on June 16–20, 2014.

thorough review of all systems and modalities presented by our outstanding faculty.

Budapest, Hungary, known as the "Pearl of the Danube" is the setting for our 2014 international course, June 16–20 at the Corinthia Hotel. Course Chair Judy Yee, MD, will be joined by a stellar group of UCSF faculty, including William Dillon, MD, Thomas Link, MD, PhD, Ronald Zagoria, MD, Ruth Goldstein, MD and David Naeger, MD. Make plans to join us in Budapest next summer.

Our Maui course returns to the Fairmont Kea Lani October 26–31, 2014. Come join us in the Wailea side of the island for a week of fun in the sun with Radiology Postgrad.

Our Spring Training course moves to the Arizona Biltmore Hotel in Phoenix on March 9–14. This course is designed for general radiologists and will be chaired by David Wilson, MD. Mark your calendars!

We continue to offer our signature courses in Kona, Yosemite, and the Bay Area. Please visit our website for a complete listing of CME offerings: *radiology.ucsf.edu/postgrad/calendar*

Save When Attending UCSF Courses

Don't forget to take advantage of your alumni discount and our "Frequent Attendance" program. UCSF Radiology alumni qualify for a savings of $50 on the full registration fee for all our courses; if you register by the early registration deadline, your combined savings will be $125. Become a "Frequent Attendee" and save even more by earning a free course registration when you attend just four courses within three consecutive years. Find more details online and be sure to bookmark our website, *radiology.ucsf.edu/postgrad.* We also would like to hear from you if you have suggestions for future course destinations.

Your former teachers and our newer faculty members, look forward to having you, your fellow alumni, and your colleagues join us at a course or two in 2014.

2014 UCSF Radiology CME Calendar

January 12–17, 2014
Breast Imaging & Digital Mammography
The Fairmont Orchid – Kohala Coast, HI

January 19–24, 2014
Practical Body Imaging in Paradise
The Fairmont Orchid – Kohala Coast, HI

January 26–28, 2014
Musculoskeletal MR Imaging
Omni Rancho las Palmas Resort & Spa –
Palm Springs, CA

January 29–31, 2014
Abdominal and Pelvic Imaging
Omni Rancho Las Palmas Resort & Spa –
Palm Springs, CA

February 9–14, 2014
Neuro and Musculoskeletal Imaging
The Fairmont Orchid – Kohala Coast, HI

February 27-March 1, 2014
Virtual Colonoscopy Workshop
UCSF China Basin Research Center –
San Francisco, CA

March 2–7, 2014
UCSF Radiology Annual Review
Hotel Nikko – San Francisco, CA

March 9–14, 2014
Spring Training for Radiologists
The Biltmore – Phoenix, AZ

March 21–23, 2014
Breast Imaging Update
Marriott Union Square – San Francisco, CA

May 18–23, 2014
Practical Applications in Diagnostic Radiology
Tenaya Lodge at Yosemite National Park –
Fish Camp, CA

May 29–31, 2014
Virtual Colonoscopy Workshop
UCSF China Basin Research Center – San Francisco, CA

June 16–20, 2014
Diagnostic Imaging on the Danube
The Corinthia Hotel – Budapest, Hungary

September 18–20, 2014
Virtual Colonoscopy Workshop
UCSF China Basin Research Center, San Francisco, CA

September 15–19, 2014
Interventional Radiology Review
UCSF Parnassus Campus – San Francisco, CA

September or October, 2014 (date to be determined)
Women's Imaging in Wine Country
Northern California

October 12–17, 2014
UCSF Radiology Highlights
Marriott Union Square – San Francisco, CA

October 26–31, 2014
Diagnostic Radiology Seminars
The Fairmont Kea Lani – Maui, HI

November 3–7, 2014
Breast Imaging and Digital Mammography
Rancho Las Palmas – Palm Springs, CA

December 7–12, 2014
Imaging Warm-Up in the Caribbean
Casa de Campo Resort – Dominican Republic

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Course dates, locations and titles are subject to change prior to brochure publication.

Four Honored as Surbeck Young Investigators 2013

The move to more personalized medicine characterizes the research done by the four young investigators honored with the 2013 Surbeck Awards. Galen Reed, Myriam Chaumeil, PhD, Olga Tymofiyeva, PhD, and Gerd Melkus, PhD, presented their work at the seventh annual award ceremony on March 15, 2013 at UCSF Mission Bay's Genentech Hall.

Presenting the awards were Sarah Nelson, PhD, director of the Surbeck Laboratory and Richard Gowen, PhD, president of the INDNJC Foundation, which supports the Surbeck Young Investigator Awards.

Department Chair Ron L. Arenson, MD, (back row, center) and Surbeck Laboratory faculty join INDNJC board members in congratulating the 2013 Surbeck award winners (front row, l–r) Galen Reed, Olga Tymofiyeva, Myriam Chaumeil, and Gerd Melkus.

Reed and Chaumeil Win the Top Two Awards

Galen Reed took first-place honors for his abstract, "High Resolution C-13 SSFP Imaging with Hyperpolarized C-13, N-15 Urea." Reed is working with mentor Dan Vignoron, PhD, and the Advanced Imaging Technologies Resource Group on a promising new method for assessing tumor metabolism and perfusion simultaneously *in vivo*. According to Reed, "this study developed methods to acquire the first angiographic images at sub-millimeter resolution using a completely endogenous contrast agent. Unlike all current perfusion contrast agents, which have some level of nephrotoxicity, hyperpolarized urea has negligible toxicity, making it a potentially safe angiographic agent or a radiation-free perfusion marker."

Reed received his BS in physics from the University of California, Los Angeles. He is a doctoral student in the UCB/UCSF joint graduate bioengineering program.

Second-place winner Myriam Chaumeil, PhD, presented "Hyperpolarized [1-13C] aKetoglutarate: a Novel DNP Probe for Non-invasive Assessment of IDH1 Mutational Status in Glioma." "Gain-of-function mutations of the isocitrate dehydrogenase 1 gene are among the most prevalent in low-grade gliomas and secondary glioblastoma," she explained. "This innovative method could provide another tool for diagnosis, prognosis, drug development, and studies of response to emerging mutant IDH1-targeted therapies."

Chaumeil earned her PhD in Medical Physics from the University of Paris XI.

Two Tie for Third Place

Gerd Melkus, PhD, presented "Using gagCEST and the CEST Effect of Iopromide to Detect pH Changes in Porcine Intervertebral Disc Specimens." Studies have linked low pH and loss of glycosaminoglycan (GAG) in the intervertebral discs (IVDs) of patients with discogenic back pain. The primary purpose of the study was to determine if the chemical exchange saturation transfer (CEST) effect of GAG (gagCEST) was pH dependent and whether it could be used to detect pH changes in IVD specimens. Melkus received his PhD in Physics from the University of Wuerzburg, Germany.

Olga Tymofiyeva, PhD, shared third place for her contribution to "A DTI-based Template-Free Cortical Connectome Study of Brain Maturation." Commenting on Tymofiyeva's research on structural connectivity in the brain, her mentor Duan Xu, PhD, called it, "an important step in developing an objective, quantitative, personalized treatment strategy." He noted that "Olga is a great researcher who excels at explaining her work in personal, simple terms."

Tymofiyeva has worked in the Xu Lab since 2010. She holds a PhD in Physics from the University of Wuerzburg, Germany and an MSc in Electrical Engineering from Karlsruhe University of Applied Sciences.

The Margaret Hart Surbeck Laboratory of Advanced Imaging is dedicated to advancing imaging techniques for biological and medical applications. The Young Investigator Awards provide small grants for career development and are funded through the INDNJC Foundation honoring Margaret Hart Surbeck.

Sollitto and Lanna Lee Awards Honor Caring Staff Members

The Department of Radiology and Biomedical Imaging now has two awards to honor support staff members for their contributions to patient care.

In 2012, Luisa Saunders received the first Richard A. Sollitto Award, given to an outstanding medical administrative and support staff member. Paula Baker, RT earned the annual Lanna Lee award.

Inaugural Sollitto Award

Saunders works in the Film Library at Mount Zion, where she also supports patients and providers in the Mammography Department. "Luisa is a perfect example of why healthcare workers choose to work with patients as a career," said Operations Director Kathy Knoerl. "Her primary goal is to provide the best customer service so that our patients have a wonderful experience at UCSF." Saunders has worked in the department since 1988.

The Richard A. Sollitto Award was established in memory of Dr. Sollitto, a radiologist who cared deeply for all staff and patients in the department. It will be presented annually to the outstanding medical administrative and support staff member to honor Sollitto's memory and his dedication to patient care.

Lee Award Honors Technologist

Paula Baker RT, has ample opportunity to deliver high-tech, quality care to patients in the Interventional Suite at Mount Zion. "Paula participates in every aspect of the interventional procedures, from assisting at the front desk in scheduling procedures to helping co-workers with interventional procedures," said Knoerl. "She is dedicated to her profession and has excellent knowledge of the interventional procedures, anatomy, and supply management.

Her caring approach earned Baker the 2012 Lanna Lee Award, given annually to the outstanding technologist in the Department of Radiology and Biomedical Imaging.

Baker joined the department in 1984. Over her years of service in Interventional Radiology, she has gained a keen understanding what needs to be done to provide outstanding patient care. She has excellent patient care skills and problem-solving skills. Her positive attitude and sharing of knowledge exemplify the qualities that the Lanna Lee Award represents.

The Lanna Lee Award honors Lanna Lee, a senior radiology technologist who died on her way home from work in 1989 during the Loma Prieta earthquake. Lee was a role model for others, always working with a smile and delivering excellent care to her patients.

Luisa Saunders (center), 2012 Sollitto Award Recipient

Paula Baker, RT

Three in Department Earn Awards

Joel de vera Moncada

Melinda Parangan-Chu

Katie Murphy

Three individuals in the Department of Radiology and Biomedical Imaging earned awards for outstanding service in 2013. Joel de vera Moncada, an administrative assistant, and Melinda Parangan-Chu, an administrative analyst, received the School of Medicine's Great People Awards, recognizing those who inspire others to excel by "serving as a role model for teamwork, customer service, and making the School of Medicine and the Department a better place to work by demonstrating a positive, helpful attitude." In addition, Katie Murphy, event and communications manager received a Chancellors Award for University Service at the annual Founder's Day Lunch in May.

Moncada was nominated for a Great People Award for his role scheduling patients at the UCSF Neurosurgery Spine Center. "Joel is a point of contact for many of our patients and his professional manner is really wonderful," said Cynthia Chin, MD, a neuroradiologist in the Spine Center. "Patients, physicians, and administrative staff all love working with Joel because of his compassion, efficiency, and determination to work above and beyond what is expected."

Parangan-Chu, formerly the medical student coordinator at the Goldberg Center, was nominated after playing a key administrative role there related to the 2010 restructuring under the Medical Student Education Committee. "Melinda not only hit the ground running in terms of getting our medical student education programs in proper order, her vision was essential to defining the role of the department's medical student coordinator position," said Emily Webb, MD, director of the Goldberg Center. "Melinda implemented numerous new systems including electronic scheduling, converted our internal evaluation and attendance systems to an online format, and streamlined our admission and grading procedures." In August, Melinda was promoted to Fellowship Coordinator, a role where she has responsibility for ensuring proper credentialing of all clinical fellows in the department.

Murphy, who has 20 years of service at UCSF, was honored as a staff member who has consistently performed at a level beyond what is ordinarily expected. "I am very appreciative of Katie's efforts, her willingness to push beyond the boundaries of her job description to make Radiology better, and the fact that she goes through her day, regardless of work load, with a smile!" noted Administrative Director Cathy Garzio. The Chancellor's Award was created in 1978 by then-Chancellor Francis Sooy to recognize staff who have made outstanding contributions to UCSF.

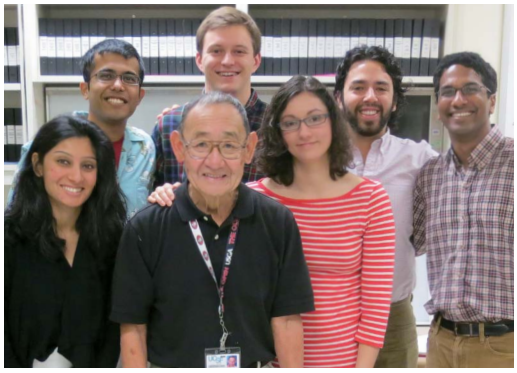
The Year in Pictures





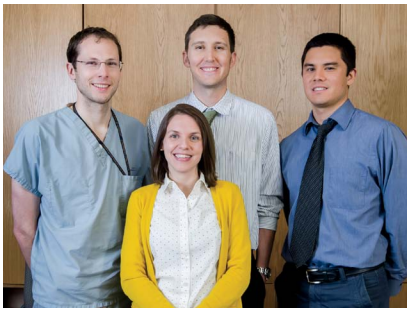




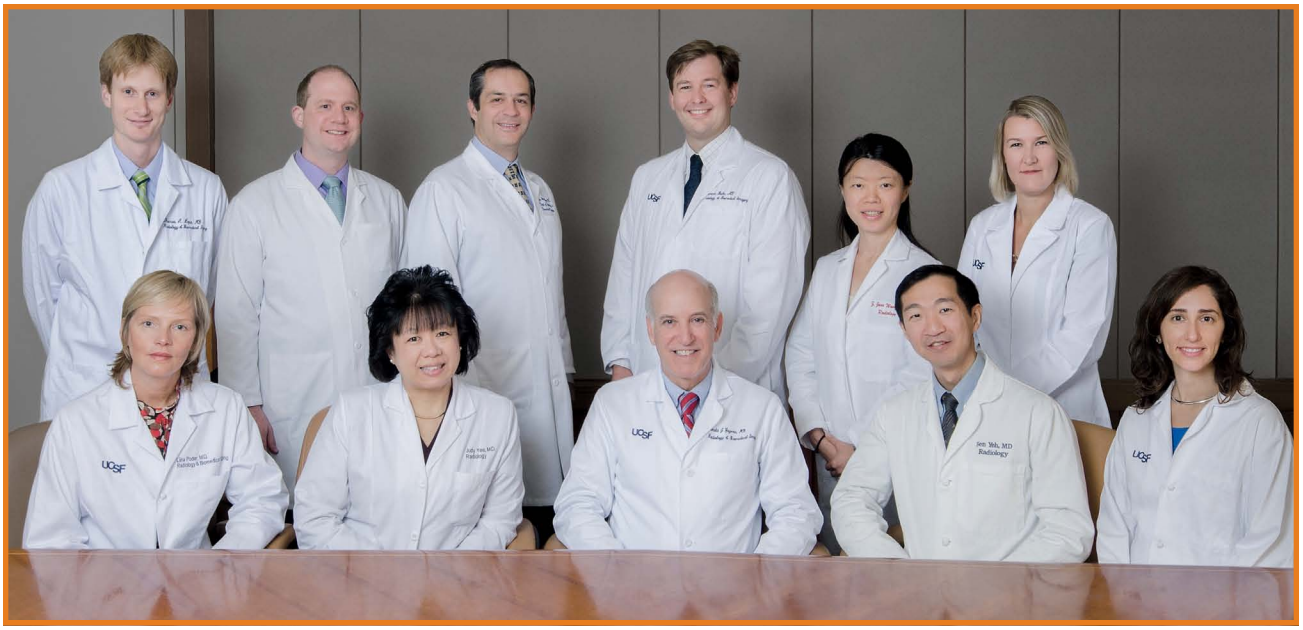




CT Station
Systemic Arteries



Research Directions 2013



ABDOMINAL IMAGING

Ronald Zagoria, MD, Chief

Research Directions:

- The promotion of evidence-based abdominal imaging, including systematic validation of commonly held opinions and assumptions
- Developing MRI and CT techniques to optimize assessment of hepato-biliary, GI tract, and GU diseases.
- Optimizing multiparametric MRI scanning for detection and staging of prostate cancer
- High-intensity focused ultrasound of uterine fibroids and prostate cancer
- Advanced hepatic imaging, including multi-detector CT, CT cholangiography, new hepatobiliary MR contrast agents, and MR cholangiopancreatography
- Radiological evaluation of diffuse liver disease, including cirrhosis, pseudocirrhosis, and nonalcoholic steatohepatitis
- Dynamic contrast-enhanced MRI and CT for assessment of solid organs and tumors in the abdomen and pelvis
- 3D rendering of CT and MR images, including projectional and volumetric applications, and CT colonography
- Expanding image-guided percutaneous thermal ablation applications in the abdomen

Recent Key References:

Allen BC, Chen MY, Childs DD, Zagoria RJ. Imaging-guided radiofrequency ablation of cystic renal neoplasms. AJR Am J Roentgenol. 2013 Jun; 200(6):1365-9.

Behr SC, Courtier JL, Qayyum A. Imaging of Müllerian Duct Anomalies. *Radiographics.* 2012 Oct;32(6):E233-50. Review.

Ellis S, Rieke V, Kohi M, Westphalen AC. Clinical Applications for Magnetic Resonance Guided High Intensity Focused Ultrasound (MRgHIFU): Present and Future. *J Med Imaging Radiat Oncol.* 2013 Aug; 57(4):391-9.

Keshari KR, Sriram R, Koelsch BL, Van Criekinge M, Wilson DM, Kurhanewicz J, Wang ZJ. Hyperpolarized ^{13}C-Pyruvate Magnetic Resonance Reveals Rapid Lactate Export in Metastatic Renal Cell Carcinomas. *Cancer Res.* 2013 Jan 15; 73(2):529-38.

Mongan J, Rathnayake S, Fu Y, Gao DW, Yeh BM. Extravasated Contrast Material in Penetrating Abdominopelvic Trauma: Dual-Contrast Dual-Energy CT for Improved Diagnosis—Preliminary Results in an Animal Model. *Radiology.* 2013Sep;268(3):738-42.

Ohliger MA, Larson PE, Bok RA, Shin P, Hu S, Tropp J, Robb F, Carvajal L, Nelson SJ, Kurhanewicz J, Vigneron DB. Combined Parallel and Partial Fourier MR Reconstruction Foraccelerated 8-Channel Hyperpolarized Carbon-13 *In Vivo* Magnetic Reso-

nance Spectroscopic Imaging (MRSI). *J Magn Reson Imaging.* 2013 Sep;38(3):701-13.

Shum DJ, Kim K, Poder L. Sonographic Evaluation of Abdominal Transplants: A Practical Approach. *Applied Radiology* 2013 July; 42 (7): 8–18.

Webb EM, Wang ZJ, Westphalen AC, Nakakura EK, Coakley FV, Yeh BM. Can CT Features Differentiate Between Inferior Vena Cava Leiomyosarcomas and Primary Retroperitoneal Masses? *AJR Am J Roentgenol.* 2013 Jan; 200(1):205-9.

ADVANCED IMAGING TECHNOLOGIES SPECIALIZED RESOURCE GROUP

Daniel B. Vigneron, PhD, Director

Research Directions:

The Advanced Imaging Technologies SRG works to advance imaging science to benefit human disease studies. This includes everything from development of new techniques, to the translation of existing techniques, to the improvement of quality, speed, information-content, and applicability of existing methods.

Basic development => Translation => Optimization => Validation

Our expertise and research focus on various areas including: basic physics, basic engineering, bioengineering, initial patient testing, clinical single and multi-site trials of new techniques, and training.

Our goal is to excel in imaging science in each of the three UCSF mission areas:

- Scholarship: publications, grants, patents, conference presentations
- Training: formal UCSF courses, informal training, CME courses, international Society educational courses
- Services: clinical patient studies support, UCSF committee service, and grant reviews for NIH and other funding agencies

The key missions of the Advanced Imaging Technologies SRG are to: (a) be world leaders in cutting-edge imaging techniques for studying human disease, (b) collaborate with RIGS to get these and other basic techniques into application studies for testing and optimization, (c) work with clinical to translate the new techniques and to improve state-of-art methods, and (d) train and educate personnel in advanced imaging techniques.

Recent Key References:

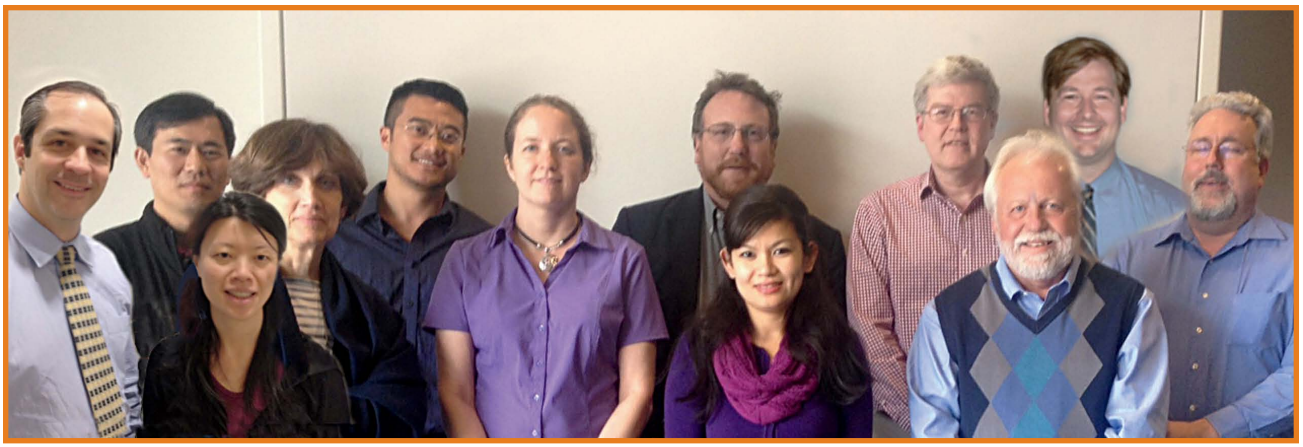
Ellis S, Rieke V, Kohi M, Westphalen AC. Clinical applications for magnetic resonance guided high intensity focused ultrasound (MRgHIFU): present and future. *J Med Imaging Radiat Oncol.* 2013 Aug;57(4):391-9.

Larson PE, Hurd RE, Kerr AB, Pauly JM, Bok RA, Kurhanewicz J, Vigneron DB. Perfusion and diffusion sensitive (13)C stimulated-echo MRSI for metabolic imaging of cancer. *Magn Reson Imaging.* 2013 Jun; 31(5):635-42

Li Y, Wang C, Yu B, Vigneron D, Chen W, Zhang X. Image homogenization using pre-emphasis method for high field MRI. *Quant Imaging Med Surg.* 2013 Aug; 3(4):217-23.

Ohliger MA, Larson PE, Bok RA, Shin P, Hu S, Tropp J, Robb F, Carvajal L, Nelson SJ, Kurhanewicz J, Vigneron DB. Combined parallel and partial fourier MR reconstruction for accelerated 8-channel hyperpolarized carbon-13 in vivo magnetic resonance spectroscopic imaging (MRSI). *J Magn Reson Imaging.* 2013 Sep;38(3):701-13.

Nelson SJ, Kurhanewicz J, Vigneron DB, Larson PE, Harzstark AL, Ferrone M, van Criekinge M, Chang JW, Bok R, Park I, Reed G, Carvajal L, Small EJ, Munster P, Weinberg VK, Ardenkjaer-Larsen JH, Chen AP, Hurd RE, Odegardstuen LI, Robb FJ, Tropp J, Murray JA. Metabolic Imaging of Patients with Prostate Cancer Using Hyperpolarized [1-13C]Pyruvate. *Sci Transl Med.* 2013 Aug 14; 5(198):198ra108.



Seo Y, Gustafson WC, Dannoon SF, Nekritz EA, Lee CL, Murphy ST, Vanbrocklin HF, Hernandez-Pampaloni M, Haas-Kogan DA, Weiss WA, Matthay KK. Tumor Dosimetry Using [(124)I]m-iodobenzylguanidine MicroPET/CT for [(131)I]m-iodobenzylguanidine Treatment of Neuroblastoma in a Murine Xenograft Model. *Mol Imaging Biol.* 2012 Dec; 14(6):735-42.

BODY IMAGING RESEARCH INTEREST GROUP

John Kurhanewicz, PhD, Director

Research Directions:

- Developing an optimized and clinically feasible multiparametric MR protocol for prostate cancer and diseases of the kidney and liver
- Rigorous histopathological correlative studies for validation of MR biomarkers
- Developing ways to analyze multiparametric imaging data
- Developing clinical predictive nomograms that incorporate imaging variables
- Image-guided biopsy and therapy (HIFU, radiation)
- Identifying, validating and implementing robust, quantitative, noninvasive magnetic-resonance-based metabolomic biomarkers of human disease and therapeutic response using *ex vivo* tissues, biofluids, and preclinical cell and murine models of human disease
- Developing targeted contrast agents for prostate cancer and other urogenital diseases
- Developing and implementing hyperpolarized 13C magnetic resonance imaging in patients

Recent Key References:

Keshari KR, Sai V, Wang ZJ, Vanbrocklin HF, Kurhanewicz J, Wilson DM. Hyperpolarized [1-13C] Dehydroascorbate MR Spectroscopy in a Murine Model of Prostate Cancer: Comparison with 18F-FDG PET. *J Nucl Med.* 2013 Jun;54(6):922-8.

Keshari KR, Sriram R, Van Criekinge M, Wilson DM, Wang ZJ, Vigneron DB, Peehl DM, Kurhanewicz J. Metabolic Reprogramming and Validation of Hyperpolarized C Lactate as a Prostate Cancer Biomarker using a Human Prostate Tissue Slice Culture Bioreactor. *Prostate.* 2013 Aug;73(11):1171-81.

Keshari KR, Sriram R, Koelsch BL, Van Criekinge M, Wilson DM, Kurhanewicz J, Wang ZJ. Hyperpolarized 13C-Pyruvate Magnetic Resonance Reveals Rapid Lactate Export in Metastatic Renal Cell Carcinomas. *Cancer Res.* 2013 Jan 15;73(2):529-538.

Noworolski SM, Lam MM, Merriman RB, Ferrell L, Qayyum A. Liver Steatosis: Concordance of MR Imaging and MR Spectroscopic Data with Histologic Grade. *Radiology.* 2012 Jul; 264(1):88-96.

Westphalen AC, Reed GD, Vinh PP, Sotto C, Vigneron DB, Kurhanewicz J. Multiparametric 3T Endorectal MRI after External Beam Radiation Therapy for Prostate Cancer. *J Magn Reson Imaging.* 2012 Aug; 36(2):430-437.

BRAIN RESEARCH INTEREST GROUP

Sarah Nelson, PhD, Director
Srikantan Nagarajan, PhD, Co-Director

Research Directions:

The scope of research conducted by the Brain RIG encompasses all aspects of brain-related inquiry.

Brain Tumors: Evaluating patients with brain tumors is a major focus for imaging research at UCSF and is an important application for the development of novel MR imaging and spectroscopy techniques. Key methodologies being applied to understand the underlying mechanisms of response to therapy and to validate *in vivo* parameters include the *ex vivo* analysis of image-guided tissue samples and the use of NMR spectroscopy in cell and pre-clinical model systems.

Brain-Behavior: Our goal is to understand the relationship between brain and behavior in health and disease, to integrate information from molecules to mind, and to translate neuroimaging advances to the clinic. Our specific mission is to map and analyze functional activation in the brain and functional network connectivity in the brain, and to identify neurophysiological and neuroanatomical correlates of behavior in health and disease.

Recent Key References:

Hashizume R, Smirnov I, Liu S, Phillips JJ, Hyer J, McKnight TR, Wendland M, Prados M, Banerjee A, Nicolaides T, Mueller S, James CD, Gupta N. Characterization of a Diffuse Intrinsic Pontine Glioma Cell Line: Implications for Future Investigations and Treatment. *J Neurooncol.* 2012 Dec; 110(3):305-13.

Li Y, Lupo JM, Parvataneni R, Lamborn KR, Cha S, Chang SM, Nelson SJ. Survival Analysis in Patients with Newly Diagnosed Glioblastoma using Pre- And Postradiotherapy MR Spectroscopic Imaging. *Neuro Oncol.* 2013 May; 15(5):607-17.

Lupo JM, Essock-Burns E, Molinaro AM, Cha S, Chang SM, Butowski N, Nelson SJ. Using Susceptibility-Weighted Imaging to Determine Response to Combined Anti-Angiogenic, Cytotoxic, and Radiation Therapy in Patients With Glioblastoma Multiforme. *Neuro Oncol.* 2013 Apr; 15(4):480-9.

Tarapore PE, Findlay AM, Lahue SC, Lee H, Honma SM, Mizuiri D, Luks TL, Manley GT, Nagarajan SS, Mukherjee P. Resting State Magnetoencephalography Functional Connectivity in Traumatic Brain Injury. *J Neurosurg.* 2013 Jun; 118(6):1306-16.

Vinogradov S, Fisher M, Nagarajan S. Cognitive Training in Schizophrenia: Golden Age or Wild West? *Biol Psychiatry.* 2013 May 15; 73(10):935-7.

BREAST CANCER RESEARCH INTEREST GROUP

Nola Hylton, PhD, Co-Director
Bonnie N. Joe, MD, Co-Director

Research Directions:

The Breast RIG's research aims are to advance imaging-based approaches for breast cancer diagnosis, leading to earlier detection, reduction of disease recurrence, and improved survival. Our major research areas include:

- MRI and spectroscopy to assess breast tumor response to neoadjuvant chemotherapy. UCSF is the lead institution for the national ACRIN 6657/I-SPY breast cancer clinical trial testing MRI and molecular biomarkers for the prediction of treatment response and survival for women receiving neoadjuvant chemotherapy for locally advanced breast cancer
- Computer-aided tools for real-time measurement of MRI biomarkers for breast cancer
- MRI of ductal carcinoma *in situ* (DCIS) for staging and assessing response to hormonal treatment
- Quantitative mammographic breast density measurement for breast cancer risk assessment
- MRI-directed tissue biopsy for radiologic-pathologic correlation of imaging and molecular biomarkers
- MRI measurement of breast density and tissue composition

UCSF DMM PHOTOGRAPHY

UCSF DMM PHOTOGRAPHY

Recent Key References:

Dorgan JF, Klifa C, Deshmukh S, Egleston BL, Shepherd JA, Kwiterovich PO, Van Horn L, Snetselaar LG, Stevens VJ, Robson AM, Lasser NL, Hylton NM. Menstrual and Reproductive Characteristics and Breast Density in Young Women. *Cancer Causes Control.* 2013 Aug 10. [Epub]

Caswell JL, Kerlikowske K, Shepherd JA, Cummings SR, Hu D, Huntsman S, Ziv E. High Mammographic Density in Women of Ashkenazi Jewish Descent. *Breast Cancer Res.* 2013 May 13; 15(3):R40.

Kohi MP, Brasic N, Vohra P, Price ER, Joe BN. Breast Metastasis from Testicular Leiomyosarcoma. *Breast J.* 2013 May; 19(3):336-7.

Wilmes LJ, McLaughlin RL, Newitt DC, Singer L, Sinha SP, Proctor E, Wisner DJ, Saritas EU, Kornak J, Shankaranarayanan A, Banerjee S, Jones EF, Joe BN, Hylton NM. High-resolution Diffusion-weighted Imaging for Monitoring Breast Cancer Treatment Response. *Acad Radiol.* 2013 May; 20(5):581-9.

Yitta S, Joe BN, Wisner DJ, Price ER, Hylton NM. Recognizing Artifacts And Optimizing Breast MRI at 1.5 and 3 T. *AJR Am J Roentgenol*. 2013 Jun; 200(6):W673-82.

CARDIAC AND PULMONARY IMAGING

Brett M. Elicker, MD, Chief

Research Directions:

- Cardiac CT angiography (CTA)
  - CTA assessment of coronary allograft vasculopathy after heart transplantation
  - Use of cardiac CTA for pre-surgical clearance
  - Use of cardiac CTA for definitive emergency room evaluation of atypical chest pain
  - Evaluation of coronary atherosclerosis in patients with HIV infection
- Cardiac CT
  - Evaluation of pulmonary venous anatomy in atrial fibrillation
  - Characterization of myocardial ischemic injury by contrast-enhanced MRI and CT
- Chest CT/High-resolution CT
  - High-resolution CT diagnosis of lung disease
  - Clinical outcomes following negative CT for acute pulmonary embolism
  - Predictors of poor outcome in patients with acute PE diagnosed by helical CT
- Cardiac MRI
  - Use of novel cardiac MRI techniques and computational modeling for the quantitative assessment of ventricular performance in congenital heart disease
  - Use of multidimensional flow techniques for quantitative assessment of flow dynamics in congenital heart disease
  - MRI to assess cardiac function after repair of tetralogy of Fallot ; correlation with clinical outcomes
  - MRI to assess cardiac function in the single ventricle patient after Fontan palliation; correlation with clinical outcomes
  - Endovascular therapy and hemodynamic assessment using MRI guidance

Recent Key References:

Elicker BM, Schwartz BS, Liu C, Chen EC, Miller SA, Chiu CY, Webb WR. Thoracic CT findings of novel influenza A (H1N1) infection in immunocompromised patients. Emerg Radiol. 2010 Jul; 17(4):299-307.

Hope MD, Hope TA. Functional and molecular imaging techniques in aortic aneurysm disease. Curr Opin Cardiol. 2013 Sep 18. View in: PubMed

Mooney JJ, Elicker BM, Urbania TH, Agarwal MR, Ryerson CJ, Nguyen ML, Woodruff PG, Jones KD, Collard HR, King TE, Koth LL. Radiographic fibrosis score predicts survival in hypersensitivity pneumonitis. Chest. 2013 Aug; 144(2):586-92.

Moraes GL, Higgins CB, Ordovas KG. Delayed enhancement magnetic resonance imaging in nonischemic myocardial disease. J Thorac Imaging. 2013 Mar; 28(2):84-95. View in: PubMed

Ordovas KG, Muzzarelli S, Hope MD, Naeger DM, Karl T, Reddy GP, Marchiori E, Higgins CB. Cardiovascular MR Imaging after Surgical Correction of Tetralogy of Fallot: Approach Based on Understanding of Surgical Procedures. Radiographics. 2013 Jul; 33(4):1037-52. View in: PubMed

Ryerson CJ, Hartman T, Elicker BM, Ley B, Lee JS, Abbritti M, Jones KD, King TE, Ryu J, Collard HR. Clinical features and outcomes in combined pulmonary fibrosis and emphysema in idiopathic pulmonary fibrosis. Chest. 2013 Jul 1; 144(1):234-40.

CARDIOVASCULAR RESEARCH INTEREST GROUP

Karen Ordovás, MD, Co-Director
David Saloner, PhD, Co-Director

Research Directions:

The Cardiovascular RIG aims to provide leadership to the Radiology community in developing and implementing state-of-the-art methods for providing early diagnosis and improved outcomes for patients suffering from cardiovascular diseases. The CVRIG works closely with physician/scientists from other disciplines to develop and evaluate methods that include numerical modeling, physical *in vitro* models, and animal and human models of cardiovascular disease. The combination of these elements, together with a program for educating and training practitioners and scientists, will provide measurable benefits to patients.

In summary, our mission is to:

- Use state-of-the-art imaging for understanding the etiology of multiple cardiovascular diseases
- Investigate the scientific basis for new imaging modalities and their applications
- Apply cardiovascular imaging modalities to evaluate the physiologic, pharmacologic, and molecular basis of disease
- Develop tools for early detection of cardiovascular diseases
- Assess the role of cardiac imaging to predict cardiovascular outcomes to reduce overall and cardiac-related mortality

Recent Key References:

Cabarrus M, Yang B, Schiller N, Miller DC, Ordovas K. Iatrogenic giant coronary artery pseudoaneurysm with “daughter aneurysm” formation: serial imaging findings and natural history. *J Thorac Imaging*. 2012 Nov; 27(6):W185-7.

Dyverfeldt P, Hope MD, Tseng EE, Saloner D. Magnetic resonance measurement of turbulent kinetic energy for the estimation of irreversible pressure loss in aortic stenosis. *JACC Cardiovasc Imaging*. 2013 Jan; 6(1):64-71.

Kuo YC, Kohi MP, Naeger DM, Tong RT, Kolli KP, Taylor AG, Laberge JM, Kerlan RK, Fidelman N. Efficacy of TACE in TIPS Patients: Comparison of Treatment Response to Chemoembolization for Hepatocellular Carcinoma in Patients With and Without a Transjugular Intrahepatic Portosystemic Shunt. Cardiovasc Intervent Radiol. 2013 Oct; 36(5):1336-43.

Ordovas KG, Muzzarelli S, Hope MD, Naeger DM, Karl T, Reddy GP, Marchiori E, Higgins CB. Cardiovascular MR Imaging after Surgical Correction of Tetralogy of Fallot: Approach Based on Understanding of Surgical Procedures. *Radiographics.* 2013 Jul; 33(4):1037-52.

Spincemaille P, Liu J, Nguyen T, Prince MR, Wang Y. Z Intensity-Weighted Position Self-Respiratory Gating Method for Free-Breathing 3D Cardiac CINE Imaging. *Magn Reson Imaging.* 2011 Jul; 29(6):861-8.

UCSF DMM PHOTOGRAPHY

INTERVENTIONAL RADIOLOGY

Robert K. Kerlan, Jr., MD, Chief

Research Directions:

- Joint project with Transplant Service for implantation of pancreatic islet cells
- Joint project with Transplant Service for downstaging hepatocellular carcinoma in potential transplant candidates
- Joint project with Abdominal Imaging using MR diffusion imaging to differentiate flow abnormalities from hepatocellular carcinoma
- Joint project with Pediatric Surgery to create gastrojejunostomies and percutaneous jejunostomies using magnets
- Assessing the role of interventional radiology in managing complications related to the creation of ileal pouches following proctectomy
- Use of expandable metallic stents in the airways
- Joint project with Urology on RF ablation of small renal masses
- Assessing the safety of transdiaphragmatic drainages

Recent Key References:

Kuo YC, Kohi MP, Naeger DM, Tong RT, Kolli KP, Taylor AG, Laberge JM, Kerlan RK, Fidelman N. Efficacy of TACE in TIPS Patients: Comparison of Treatment Response to Chemoembolization for Hepatocellular Carcinoma in Patients With and Without a Transjugular Intrahepatic Portosystemic Shunt. *Cardiovasc Intervent Radiol.* 2013 Oct; 36(5):1336-43.

Kohi MP, Fidelman N, Kerlan RK. Reply to ? re: Hepatotoxicity After Transarterial Chemoembolization and Transjugular Intrahepatic Portosystemic Shunt: Do Two Rights Make a Wrong? *J Vasc Interv Radiol.* 2013 Jul; 24(7):1076.

Olorunsola OG, Kohi MP, Fidelman N, Laberge JM, Kerlan RK. Failure of Filter Reexpansion during Unsuccessful Retrieval of Option Inferior Vena Cava Filter. *J Vasc Interv Radiol.* 2013 Jul; 24(7):1065-7.

Johnson DT, Durack JC, Fidelman N, Kerlan RK, Laberge JM. Distribution of Reported StarClose SE Vascular Closure Device Complications in the Manufacturer and User Facility Device Experience Database. *J Vasc Interv Radiol.* 2013 Jul; 24(7):1051-6.

Tong RT, Kohi M, Fidelman N, Kuo YC, Foster R, Peled A, Kolli KP, Taylor AG, Laberge JM, Kerlan RK. Clinical Outcomes of Percutaneous Drainage of Breast Fluid Collections after Mastectomy with Expander-based Breast Reconstruction. *J Vasc Interv Radiol.* 2013 Sep; 24(9):1369-74.

Veal DR, Lee AY, Kerlan RK, Gordon RL, Fidelman N. Outcomes Of Metallic Biliary Stent Insertion In Patients With Malignant Bilobar Obstruction. *J Vasc Interv Radiol.* 2013 Jul; 24(7):1003-10.

IMAGE GUIDED SURGERY SPECIALIZED RESOURCE GROUP

Alastair Martin, PhD, Co-Director
Steven Hetts, MD, PhD, Co-Director
Mark Wilson, MD, Co-Director

Research Directions:

The mission of the Image Guided Surgery specialized resource group is serve as a world leader in developing new and improved guidance for a wide array of clinical applications. We aim to:

- Improve guidance and evaluation of therapy
- Perform interventions and deliver therapy in a more minimally invasive fashion
- Develop applications in evolving medical therapies for which there presently does not exist an acceptable delivery mechanism
- Perform pre-clinical device development in collaboration with industrial partners
- Conduct clinical trials that provide guidance to the medical community as to best practice in the therapeutic management of patients.

In line with our mission statement, the IGT SRG has projects that explore several key areas of therapy delivery, including (1) active catheter guidance and tissue ablation within an MR scanner (2) evaluation of innovative endovascular neurointerventional procedures (3) MR guidance of minimally invasive neurosurgical procedures and (4) the application of high intensity focused ultrasound to treat uterine fibroids, bone metastasis, and prostate cancer.

Recent Key References:

Hetts SW, Saeed M, Martin A, Lillaney P, Losey A, Yee EJ, et al. Magnetically-Assisted Remote Controlled Microcatheter Tip Deflection under Magnetic Resonance Imaging. *J Vis Exp.* 2013 Apr 4;(74). doi:10.3791/50299

Larson PS, Starr PA, Bates G, Tansey L, Richardson RM, Martin AJ. An Optimized System for Interventional MRI Guided Stereotactic Surgery: Preliminary Evaluation of Targeting Accuracy. *Neurosurgery.* 2012 Mar;70(1 Suppl Operative):95-103; discussion 103.

Losey AD, Lillaney P, Martin AJ, Halbach VV, Cooke DL, Dowd CF, Higashida RT, Saloner DA, Wilson MW, Saeed M, Hetts SW. Safety of Retained Microcatheters: An Evaluation of Radiofrequency Heating in Endovascular Microcatheters with Nitinol, Tungsten, and Polyetheretherketone Braiding at 1.5T And 3T. *J Neurointerv Surg.* 2013 May 18. [Epub]

Rosenbluth KH, Martin AJ, Bringas J, Bankiewicz KS. Evaluation of Pressure-Driven Brain Infusions in Nonhuman Primates by Intra-Operative 7 Tesla MRI. *J Magn Reson Imaging.* 2012 Dec;36(6):1339-46.

Wilson MW, Martin AB, Lillaney P, Losey AD, Yee EJ, Bernhardt A, Malba V, Evans L, Sincic R, Saeed M, Arenson RL, Hetts SW. Magnetic Catheter Manipulation in the Interventional MR Imaging Environment. *J Vasc Interv Radiol.* 2013 Jun;24(6):885-91.

MARGARET HART SURBECK LABORATORY OF ADVANCED IMAGING

Sarah J. Nelson, PhD, Director
Daniel B. Vigneron, PhD, Associate Director

Research Directions:

Development of high-field, 3 Tesla (3T) and 7 Tesla (7T) Magnetic Resonance (MR) techniques with improved sensitivity and specificity that more effectively address fundamental problems in biology and medicine, most notably:

- New algorithms for reconstructing spatial and temporal responses of biological systems and quantifying the resultant multi-dimensional and multi-spectral images
- New strategies for designing high-frequency RF coils and coil arrays that address electromagnetic problems and computational electromagnetism in *in vivo* MR at high fields using the FDTD and other finite element methods
- Applications of novel RF coils designs for *in vivo* MRI and spectroscopy
- Implementing parallel imaging strategies for anatomic, vascular, and spectroscopic imaging sequences in the musculoskeletal system, prostate, and brain
- Dynamic contrast-enhanced and perfusion-weighted imaging
- Phase and susceptibility-weighted imaging
- High-resolution angiography of neurovascular disease
- Developing faster, more reliable methods to acquire and process diffusion MRI
- Integrating studies on the human scanners with *ex vivo* analyses of tissue samples using high-resolution magic angle spinning NMR spectroscopy
- Improving and translating 3T MR spectroscopy sequences for prostate and brain in routine clinical use
- Applying and developing high-resolution MRI, MR spectroscopy, and MR diffusion imaging techniques at 7T
- Developing hyperpolarized C-13 agents and integrating novel data acquisition and analysis procedures
- Applying hyperpolarized C-13 metabolic imaging in cell systems and pre-clinical models to evaluate cancer and other diseases
- Developing new methods for hyperpolarized C-13 metabolic imaging in patients

Scientists in the Surbeck Lab continue to develop hands-on educational programs in high-field MR that are available to undergraduate and graduate students, medical students, and research fellows.

Recent Key References:

Bian W, Harter K, Hammond-Rosenbluth KE, Lupo JM, Xu D, Kelley DA, Vigneron DB, Nelson SJ, Pelletier D. A serial *in vivo* 7T magnetic resonance phase imaging study of white matter lesions in multiple sclerosis. *Mult Scler.* 2013 Jan; 19(1):69-75.

Essock-Burns E, Phillips JJ, Molinaro AM, Lupo JM, Cha S, Chang SM, Nelson SJ. Comparison of DSC-MRI Post-Processing Techniques in Predicting Microvascular Histopathology in Patients Newly Diagnosed With GBM. *J Magn Reson Imaging.* 2013 Aug;38(2):388-400.

Hu S, Larson PE, Vancriekinge M, Leach AM, Park I, Leon C, Zhou J, Shin PJ, Reed G, Keselman P, von Morze C, Yoshihara H, Bok RA, Nelson SJ, Kurhanewicz J, Vigneron DB. Rapid Sequential Injections of Hyperpolarized [1-(13)C]Pyruvate *In Vivo* using a Sub-Kelvin, Multi-Sample DNP Polarizer. *Magn Reson Imaging*. 2013 May;31(4):490-6.

Nelson SJ, Ozhinsky E, Li Y, Park IW, Crane J. Strategies for Rapid *In Vivo* (1)H and Hyperpolarized (13)C MR Spectroscopic Imaging. *J Magn Reson.* 2013 Apr; 229:187-97.

Pang Y, Yu B, Zhang X. Hepatic Fat Assessment Using Advanced Magnetic Resonance Imaging. *Quant Imaging Med Surg.* 2012 Sep; 2(3):213-8.

Swisher CL, Larson PE, Kruttwig K, Kerr AB, Hu S, Bok RA, Goga A, Pauly JM, Nelson SJ, Kurhanewicz J, Vigneron DB. Quantitative Measurement of Cancer Metabolism using Stimulated Echo Hyperpolarized Carbon-13 MRS. *Magn Reson Med.* 2013 Feb 14. [Epub]

Ward CS, Eriksson P, Izquierdo-Garcia JL, Brandes AH, Ronen SM. HDAC Inhibition Induces Increased Choline Uptake and Elevated Phosphocholine Levels in MCF7 Breast Cancer Cells. PLoS One. 2013; 8(4):e62610.

MUSCULOSKELETAL AND QUANTITATIVE IMAGING RESEARCH

Sharmila Majumdar, PhD, Director
Thomas M. Link, MD, PhD, Clinical Director

Research Directions:

The Mission of MQIR is to pursue research and teaching in quantitative tissue characterization focused on the musculoskeletal system by building collaborations between basic scientists, clinical scientists, and physicians, thus establishing a strong resource for musculoskeletal imaging-based research at UCSF. MQIR strengthens and nurtures partnership not only within the Department of Radiology and Biomedical Imaging, but also with the Departments of Orthopaedic Surgery, Medicine and Bioengineering at UCSF and UC Berkeley.

- Identification of biomarkers for degeneration in bone, cartilage, and inter-vertebral disc, and diseases such as osteoporosis, spinal disorders, and osteoarthritis.
- Improve musculoskeletal health by using Computed Tomography (CT), High Resolution Peripheral Quantitative CT (HR-pQCT) and Positron Emission Tomography (PET)/CT imaging to study risk factors for age-related fractures, to quantify deterioration of bone structure and strength as result of aging and disease, and to analyze the anatomy and function of skeletal muscle in relation to mobility loss.
  - Effects of reduced weight-bearing on skeletal geometry, micro-structure, and strength
  - Effects of exercise on bone quality in HIV positive individuals
  - Mechanisms of increased cortical porosity in the peripheral skeleton
  - Use of advanced image analysis techniques such as finite element modeling and voxel-based morphometry to study age-related bone loss and predict hip fracture.
  - Use of CT to study muscle mass and fat infiltration as risk factors for hip fracture
  - Development of acquisition and analysis methods to standardize scanning and analytic methods for multicenter studies in osteoporosis and sarcopenia
  - Development of PET/CT to study protein synthesis in skeletal muscle
- Magnetic Resonance (MR) Imaging and Spectroscopy methods for characterizing muscle and bone in diabetes, HIV disease, and other diseases.
  - Bone marrow fat quantification in the proximal femur and spine using high-resolution water-fat imaging, and the relationship of marrow adiposity to bone quantity and quality.
  - Fat infiltration in the rotator cuff muscles as a predictor of surgical outcome

- Detection of early joint degeneration using quantitative metrics (T_{1r} and T_2), and radiological grading methods in osteoarthritis of the knee and hip and correlating them with biomechanical function, biochemical changes, clinical findings, and function.
  - Contact mechanics, neuromuscular control, and cartilage composition in knee OA
  - Changes in knee contact mechanics and cartilage composition following meniscectomy
  - Characterization of Cartilage using MR and kinematics in hip osteoarthritis
  - Running biomechanics and overuse injuries of the lower extremity
  - Development of osteoarthritis in anterior cruciate ligament (ACL)-injured and reconstructed knees
  - Investigating the impact of physical activity, obesity, weight loss and gain on longitudinal development of cartilage and meniscal degeneration
- *In vivo* MR Imaging in the presence of metal implants
- MRI Temperature measurements of bone during MR guided focused ultrasound.
- Multimodality imaging (MRI and HR-pQCT) and hyperpolarized 13C MRI of rheumatoid arthritis
- Radiation dose reduction in CT

Key Publications:

Atkinson EJ, Therneau TM, Siggeirsdottir K, Cheng X, Melton LJ, Keyak J, Gudnason V, Khosla S, Harris TB, Lang TF. Proximal Femoral Density Distribution and Structure in Relation to Age and Hip Fracture Risk in Women. *J Bone Miner Res.* 2013 Mar; 28(3):537-46.

Kazakia GJ, Nirody JA, Bernstein G, Sode M, Burghardt AJ, Majumdar S. Age- and Gender-related Differences in Cortical Geometry and Microstructure: Improved Sensitivity by Regional Analysis. *Bone.* 2013 Feb;52(2):623-31.

Nardo L, Karampinos DC, Lansdown DA, Carballido-Gamio J, Lee S, Ma CB, Link TM, Krug R. Quantitative Assessment of Fat Infiltration in the Rotator Cuff Muscles using Water-fat MRI. *J Magn Reson Imaging.*13 Sep 24.

Patel AS, Soares B, Courtier J, Mackenzie JD. Radiation Dose Reduction in Pediatric CT-guided Musculoskeletal Procedures. Pediatr Radiol. 2013 Oct;43(10):1303-8.

Prasad AP, Nardo L, Schooler J, Joseph GB, Link TM. $T_{1\rho}$ and T_2 Relaxation Times Predict Progression of Knee Osteoarthritis. *Osteoarthritis Cartilage.* 2013 Jan;21(1):69-76.

Souza RB, Baum T, Wu S, Feeley BT, Kadel N, Li X, Link TM, Majumdar S. Effects of Unloading on Knee Articular Cartilage T1rho and T2 MRI Relaxation Times. *J Orthop Sports Phys Ther.* 2012; 42: 511-20.

Valentinitsch A, C Karampinos D, Alizai H, Subburaj K, Kumar D, Link TM, Majumdar S. Automated Unsupervised Multi-Parametric Classification of Adipose Tissue Depots In Skeletal Muscle. *J Magn Reson Imaging.* 2013 Apr;37(4):917-27.

UCSF DMM PHOTOGRAPHY

MUSCULOSKELETAL RADIOLOGY

Thomas M. Link, MD, PhD, Chief

Research Directions:

Imaging of Osteoarthritis and Cartilage

- New morphological pulse sequences for cartilage imaging
- Biochemical, quantitative imaging of the cartilage matrix
- Analysis of the Osteoarthritis Initiative Cohort
- Osteoarthritis, obesity, and physical activity
- Cartilage imaging of marathoners and physically active people
- Assessing menisci and cartilage with matrix-sensitive MRI sequences

Bone Marrow Imaging

- Monitoring the progress of the treatment of Gaucher's disease
- MRI of bone marrow changes in osteoarthritis
- Disuse osteopenia-related bone marrow changes

Osteoporosis Imaging

- Evaluating insufficiency fractures of the pelvis, CT vs. MRI
- Contrast-enhanced, multi-slice-spiral CT for assessing bone density and structure
- Diabetic bone disease: cortical porosity and increase in fracture risk

Imaging of the Shoulder

- Optimizing MRI for visualizing metal-on-metal surface replacements
- Evaluating fatty infiltration of muscles of the rotator cuff

Imaging of the Spine

- Imaging at 1.5T and 3T
- Clinical implications of lumbosacral segmentation abnormalities

MR Arthrography

- Evaluating the complications of MR arthrography

High-field MRI for Musculoskeletal Applications

- *In vitro* and *in vivo* comparison of cartilage imaging at 1.5T, 3T, and 7T
- Comparing 1.5T with 3T MRI for the evaluation of smaller joints
- Optimizing MR protocols for the knee at 3T and 7T

New MRI Techniques

- Use of CUBE and IDEAL sequences at 3T to image the knee
- Application of metal suppression MAVRIC sequences for assessment of total joint replacements
- *In vitro* and *in vivo* assessment of metal suppression sequences at 1.5 and 3T
- MR neurography

Recent Key References:

Dimmick SJ, Goh AC, Cauzza E, Steinbach LS, Baumgartner I, Stauffer E, Voegelin E, Anderson SE. Imaging Appearances of Buerger's Disease Complications in the Upper and Lower Limbs. *Clin Radiol.* 2012 Dec; 67(12):1207-11.

Lin W, Alizai H, Joseph GB, Srikhum W, Nevitt MC, Lynch JA, McCulloch CE, Link TM. Physical Activity In Relation To Knee Cartilage T2 Progression Measured with 3 T MRI over a Period of 4 Years: Data from the Osteoarthritis Initiative. Osteoarthritis Cartilage. 2013 Oct;21(10):1558-66.

Ries MD, Link TM. Monitoring and Risk of Progression of Osteolysis after Total Hip Arthroplasty. *J Bone Joint Surg Am.* 2012 Nov 21; 94(22):2097-105.

Srikhum W, Nardo L, Karampinos DC, Melkus G, Poulos T, Steinbach LS, Link TM. Magnetic Resonance Imaging of Ankle Tendon Pathology: Benefits of Additional Axial Short-Tau Inversion Recovery Imaging to Reduce Magic Angle Effects. *Skeletal Radiol.* 2013 Apr; 42(4):499-510.

Steinbach LS, Stevens KJ. Imaging of Cysts and Bursae about the Knee. *Radiol Clin North Am.* 2013 May; 51(3):433-54.

NEURODEGENERATIVE DISEASES RESEARCH INTEREST GROUP

Pratik Mukherjee, MD, PhD, Director
Norbert Schuff, PhD, Co-Director

Research Directions:

- Studying the causes and effects of neurodegenerative and psychiatric disorders, using MRI as a surrogate marker
- Developing powerful, new brain MR techniques for early detection, improved diagnosis, and assessment of therapeutic interventions of neurodegenerative and psychiatric disorders
- Developing more powerful multimodal brain image processing and multivariate statistical imaging analysis techniques
- Highlights include:
  - Ultra-high resolution structural MRI
  - Diffusion spectrum imaging
  - Dynamic, arterial-spin-labeling imaging
  - Susceptibility-weighted imaging
  - Spectroscopic imaging and j-modulated spectroscopy
  - Bayesian image reconstruction
  - Multivariate image analysis methods
  - MRI protocols and processing pipelines for multicenter trials
  - Standards for imaging neurodegenerative diseases that can be transferred into clinical practice and multi-center clinical trials

Recent Key References:

Abé C, Mon A, Hoefer ME, Durazzo TC, Pennington DL, Schmidt TP, Meyerhoff DJ. Metabolic Abnormalities in Lobar and Subcortical Brain Regions of Abstinent Polysubstance Users: Magnetic Resonance Spectroscopic Imaging. *Alcohol Alcohol.* 2013 Sep-Oct; 48(5):543-51.

Cardenas VA, Tosun D, Chao LL, Fletcher PT, Joshi S, Weiner MW, Schuff N. Voxel-Wise Co-analysis of Macro- and Microstructural Brain Alteration in Mild Cognitive Impairment and Alzheimer's Disease Using Anatomical and Diffusion MRI. *J Neuroimaging.* 2013 Feb 19. [Epub]

Durazzo TC, Abadjian L, Kincaid A, Bilovsky-Muniz T, Boreta L, Gauger GE. The Influence of Chronic Cigarette Smoking on Neurocognitive Recovery after Mild Traumatic Brain Injury. *J Neurotrauma*. 2013 Jun 1; 30(11):1013-22.

Meyerhoff DJ, Durazzo TC, Ende G. Chronic Alcohol Consumption, Abstinence And Relapse: Brain Proton Magnetic Resonance Spectroscopy Studies in Animals and Humans. *Curr Top Behav Neurosci.* 2013; 13:511-40.

Naylor MG, Cardenas VA, Tosun D, Schuff N, Weiner M, Schwartzman A. Voxelwise Multivariate Analysis of Multimodality Magnetic Resonance Imaging. *Hum Brain Mapp.* 2013 Feb 13. [Epub]

Tarapore PE, Findlay A, LaHue SC, Lee HA, Cooper SC, Honma SM, Mizuiri D, Luks TL, Manley GT, Nagarajan SS, Mukherjee P. Resting state MEG functional connectivity in traumatic brain injury. *J Neurosurg* 2013; 118:1306-1316

Tosun D, Joshi S, Weiner MW. Neuroimaging Predictors of Brain Amyloidosis in Mild Cognitive Impairment. *Ann Neurol.* 2013 May 18. [Epub]

NEURO INTERVENTIONAL RADIOLOGY

Randall Higashida, MD, Chief

Research Directions:

Advances in the field of Neuro Interventional Radiology require the constant development of new skills and techniques, and the Neuro Interventional Radiology researchers within the UCSF Department of Radiology and Biomedical Imaging have been involved in designing, conducting, and publishing research regarding current trends and techniques for patient care. In particular, we are focused on developing new and innovative techniques to treat a variety of neurovascular disorders including aneurysms, vascular malfor-

mations, tumors, and vasospasm in animal models and in active clinical practice within the interventional neurovascular radiology section at UCSF.

We work closely with the Institutional Review Board at UCSF Medical Center to oversee new products and procedures. We are working with several sponsor companies to assess the use and outcome of new intravascular stents. We have been involved in a multicenter study regarding outcomes after placement of carotid artery stents to treat carotid artery atherosclerotic disease. We conduct translational research in remote-controlled catheter guidance, percutaneous ablation, intra-arterial chemotherapy, and endovascular biopsy. We are working closely with other collaborators at UCSF in MRI modeling of unruptured cerebral aneurysm and MRI-assisted embolization of brain tumors. In addition, we conduct long-term clinical research on pediatric neurovascular diseases.

Recent Key References:

Cooke DL, Meisel KM, Kim WT, Stout CE, Halbach VV, Dowd CF, Higashida RT. Serial Angiographic Appearance of Segmental Arterial Mediolysis Manifesting as Vertebral, Internal Mammary and Intra-Abdominal Visceral Artery Aneurysms in a Patient Presenting with Subarachnoid Hemorrhage and Review of the Literature. *J Neurointerv Surg.* 2013 Sep 1; 5(5):478-82.

Hetts SW, Keenan K, Fullerton HJ, Young WL, English JD, Gupta N, Dowd CF, Higashida RT, Lawton MT, Halbach VV. Pediatric Intracranial Nongalenic Pial Arteriovenous Fistulas: Clinical Features, Angioarchitecture, and Outcomes. *AJNR Am J Neuroradiol.* 2012 Oct; 33(9):1710-9.

Higashida R, Alberts MJ, Alexander DN, Crocco TJ, Demaerschalk BM, Derdeyn CP, Goldstein LB, Jauch EC, Mayer SA, Meltzer NM, Peterson ED, Rosenwasser RH, Saver JL, Schwamm L, Summers D, Wechsler L, Wood JP. Interactions within Stroke Systems of Care: A Policy Statement From the American Heart Association/American Stroke Association. *Stroke.* 2013 Oct; 44(10):2961-84.

Meisel K, Yee A, Stout C, Kim W, Cooke D, Halbach V. Arteriovenous Fistula after Ventriculostomy in Aneurysmal Subarachnoid Hemorrhage. *Neurology.* 2013 Jun 4; 80(23):2168.

Vogel SA, Hess CP, Dowd CF, Hoffman WY, Kane AJ, Rajaii R, Frieden IJ. Early Versus Later Presentations of Venous Malformations: Where and Why? *Pediatr Dermatol.* 2013 Sep; 30(5):534-40.

NEURORADIOLOGY

William P. Dillon, MD, Chief

Research Directions:

Neuropediatrics

- Cause of cerebellar hypoplasia in some prematurely born neonates and the effects of brain cooling on CNS injury in term neonates suffering hypoxic-ischemic injury
- Embryogenesis of disorders of the midbrain and hindbrain
- Normal and abnormal development of the cerebral cortex
- Fetal MR Neuroimaging: development and application of advanced MRI techniques to study normal and abnormal fetal brain development

Traumatic Brain Injury

- DTI and fiber tractography, fMRI, 3D MRSI, and deformation morphometry as imaging biomarkers for mild TBI to predict clinical outcomes in post-concussive syndrome, with correlation to neurocognitive testing and genomic analysis for TBI susceptibility genes such as ApoE
- DTI and fiber tractography processing for a multi-center consortium study of mild TBI

Cardiovascular Disease and Stroke

- Use of 64-slice CT to detect cardiovascular disease and stroke and a functional mapping and scoring system for predicting the outcome of ischemic stroke
- Use of perfusion and CTA imaging to detect ongoing hemorrhages in the brain of patients presenting with acute intracerebral hematoma
- Use of permeability image mapping to detect stroke patients at risk of subsequent hemorrhage
- Automated software for the outcome classification of patients with acute subarachnoid hemorrhage

Brain Tumors

- Use of permeability and perfusion imaging to guide operative biopsy
- Correlation of genetic markers and imaging markers from tissue obtained by image-guided biopsy

Head and Neck

- The utility of PET/CT in follow-up of patients with head and neck cancer
- The use of advanced imaging techniques in the detection of recurrent head and neck cancer

Spine

- CT-guided back pain management
- Use of image guidance to improve the accuracy of injections
- Utility of gadolinium MR myelography to detect CSF leaks
- MR neurography for peripheral nerve diagnosis

Neurodegenerative Diseases

- New imaging biomarkers for neurodegenerative diseases using 7T MRI
- 7T imaging of patients with intractable epilepsy
- Characterization of multimodal diffusion data using high-angular, resolution-diffusion imaging

Recent Key References:

Glastonbury CM, Salzman KL. Pitfalls in the staging of cancer of nasopharyngeal carcinoma. *Neuroimaging Clin N Am.* 2013 Feb; 23(1):9-25.

Glenn OA, Cuneo AA, Barkovich AJ, Hashemi Z, Bartha AI, Xu D. Malformations of Cortical Development: Diagnostic Accuracy of Fetal MR Imaging. *Radiology.* 2012 Jun; 263(3):843-55.

Jafri NF, Clarke JL, Weinberg V, Barani IJ, Cha S. Relationship of Glioblastoma Multiforme to the Subventricular Zone is Associated with Survival. *Neuro Oncol.* 2013 Jan; 15(1):91-6.

Hess CP, Dillon WP. Imaging the Pituitary and Parasellar Region. *Neurosurg Clin N Am.* 2012 Oct; 23(4):529-42.

Keshari KR, Sriram R, Koelsch BL, Van Criekinge M, Wilson DM, Kurhanewicz J, Wang ZJ. Hyperpolarized 13C-Pyruvate Magnetic Resonance Reveals Rapid Lactate Export in Metastatic Renal Cell Carcinomas. Cancer Res. 2013 Jan 15;73(2):529-38.

Toossi S, Josephson SA, Hetts SW, Chin CT, Kralik S, Jun P, Douglas VC. Utility of MRI in Spinal Arteriovenous Fistula. *Neurology.* 2012 Jul 3; 79(1):25-30.

Yuh EL, Mukherjee P, Lingsma HF, Yue JK, Ferguson AR, Gordon WA, Valadka AB, Schnyer DM, Okonkwo DO, Maas AI, Manley GT; TRACK-TBI Investigators. Magnetic Resonance Imaging Improves 3-month Outcome prediction in Mild Traumatic Brain Injury. *Ann Neurol.* 2013 Feb;73(2):224-35.

NUCLEAR MEDICINE

Miguel Hernandez Pampaloni, MD, PhD, Chief

Research Directions:

- Cardiac and vascular applications of clinical SPECT-CT, PET, and PET-CT
  - Applications of SPECT-CT for cardiac synchrony
  - Dementia imaging with SPECT-CT
  - Clinical PET and PET-CT studies of cancer, cardiovascular, and neurological diseases
  - Feasibility of PET and MRI to characterize myocardial metabolism and flow
  - Use of PET to monitor therapy for breast and ovarian cancers
  - Conformal radiation treatment planning with PET-CT
  - Imaging structure and function in small animals with CT/SPECT
  - Molecular probe development for SPECT and PET

Key Recent References:

Mari Aparici C, Seo Y. Functional Imaging for Prostate Cancer: Therapeutic Implications. *Semin Nucl Med.* 2012 Sep; 42(5):328-42.

Pampaloni MH, Win AZ. Prevalence and Characteristics of Incidentalomas Discovered by Whole Body FDG PETCT. *Int J Mol Imaging.* 2012;2012:476763.

Porzig A, Matthay KK, Dubois S, Pampaloni M, Damon L, Hawkins R, Goldsby R, Hollinger F, Fitzgerald P. Proteinuria in Metastatic Pheochromocytoma is Associated with an Increased Risk of Acute Respiratory Distress Syndrome, Spontaneously or after Therapy with 131I-Meta-Iodobenzylguanidine (131I-MIBG). *Horm Metab Res.* 2012 Jun; 44(7):539-42.

Sebro R, Aparici CM, Pampaloni MH. Frequency and Clinical Implications of Incidental New Primary Cancers Detected on True Whole-Body 18F-FDG PET/CT Studies. *Nucl Med Commun.* 2013 Apr;34(4):333-9.

Vaquero JJ, Gao DW, García-Villaba C, Bacharach S, Vanbrocklin H, Fang Q, Desco M, Lee R, Dae M. Approach to Assessing Myocardial Perfusion in Rats Using Static [13N]-Ammonia Images and a Small-Animal PET. *Mol Imaging Biol.* 2012 Oct; 14(5):541-5.

PEDIATRIC/FETAL RESEARCH INTEREST GROUP

A. James Barkovich, MD, Director

Research Directions:

- Developing new imaging techniques to assess normal and abnormal development, including MRSI and DTI
- Developing new technology for imaging fetuses and neonates and adapting state-of-the-art techniques for application in the developing fetus and infant
- Using imaging techniques to diagnose and study malformations of the brain
- Using imaging to assess injury in premature and term neonates
- Using imaging to assess new therapies for injured fetuses and neonates
- Using imaging to assess brain injury in neonates and infants with severe congenital heart disease

Recent Key References:

Burger IM, Filly RA, Bowie J, Barkovich AJ. The Grand Unifying Theory of Bright Echoes in the Fetal and Neonatal Brain. *J Ultrasound Med.* 2012 Oct; 31(10):1665-73.

Glenn OA, Cuneo AA, Barkovich AJ, Hashemi Z, Bartha AI, Xu D. Malformations of Cortical Development: Diagnostic Accuracy of Fetal MR Imaging. *Radiology.* 2012 Jun; 263(3):843-55.

Doherty D, Millen KJ, Barkovich AJ. Midbrain and Hindbrain Malformations: Advances in Clinical Diagnosis, Imaging, and Genetics. *Lancet Neurol.* 2013 Apr; 12(4):381-93.

Owen JP, Marco EJ, Desai S, Fourie, E, Harris J, Hill S, Arnett AB, Mukherjee P. Abnormal White Matter Microstructure in Children with Sensory Processing Disorders. *Neuroimage: Clinical.* 2013; 2:844-853.

Saadai P, Jelin EB, Nijagal A, Schecter SC, Hirose S, MacKenzie TC, Rand L, Goldstein R, Farrell J, Harrison M, Lee H. Long-term Outcomes after Fetal Therapy for Congenital High Airway Obstructive Syndrome. *J Pediatr Surg.* 2012 Jun; 47(6):1095-100.

Scott JA, Hamzelou KS, Rajagopalan V, Habas PA, Kim K, Barkovich AJ, Glenn OA, Studholme C. 3D Morphometric Analysis of Human Fetal Cerebellar Development. *Cerebellum.* 2012 Sep; 11(3):761-70.

Shue E, Bolouri M, Jelin EB, Vu L, Bratton B, Cedars E, Yoke L, Byrne F, Hirose S, Feldstein V, Miniati D, Lee H. Tumor Metrics and Morphology Predict Poor Prognosis in Prenatally Diagnosed Sacrococcygeal Teratoma: A 25-year Experience at a Single Institution. *J Pediatr Surg.* 2013 Jun; 48(6):1225-31.

Toossi S, Josephson SA, Hetts SW, Chin CT, Kralik S, Jun P, Douglas VC. Utility of MRI in spinal arteriovenous fistula. *Neurology.* 2012 Jul 3; 79(1):25-30.

Xu D, Mukherjee P, Barkovich AJ. Pediatric Brain Injury: Can DTI Scalars Predict Functional Outcome? *Pediatr Radiol.* 2013 Jan; 43(1):55-9.

PEDIATRIC RADIOLOGY

John Mackenzie, MD, Chief

Research Directions:

The mission of the Pediatric Radiology section is to improve the health of children through advanced clinical imaging and research. The section studies pediatric disease through the lens of imaging and is focused on the development of new imaging technologies. Several ongoing basic science and clinical studies are underway with collaborations with MRI physics, pediatric oncology, pediatric gastroenterology and pediatric surgery. Examples of research in the Pediatric Radiology section include:

- Study of novel diffusion weighted imaging (DWI) techniques to better identify inflammation and monitor treatment changes in children with inflammatory bowel disease (ulcerative colitis and Crohn disease).
- Testing and improving motion-resistant MRI with pulse sequences such as PROPELLER for use in infants and non-sedated children.
- Examining the strengths and limitations of high-resolution, 3D MRI sequences such as CUBE and SPACE for complex pediatric diseases in the chest, abdomen, and pelvis, including diseases of the liver, bile ducts, kidneys, and pelvic organs.
- Studying bowel motion (peristalsis) of bowel and the changes in motion that occur in disease using MRI pulse sequences such as real-time CINE FIESTA.

Recent Key References:

Courtier J, Schauer GM, Parer JT, Regenstein AC, Callen PW, Glenn OA. Polymicrogyria in a Fetus with Human Parvovirus B19 Infection: A Case with Radiologic-Pathologic Correlation. *Ultrasound Obstet Gynecol.* 2012 Nov; 40(5):604-6.

Courtier J, Ohliger M, Rhee SJ, Terreblanche O, Heyman MB, Mackenzie JD. Shooting a Moving Target: Use of Real-Time Cine Magnetic Resonance Imaging in Assessment of the Small Bowel. J Pediatr Gastroenterol Nutr. 2013 Oct; 57(4):426-31.

Koc G, Courtier JL, Kim JS, Miniati DN, Mackenzie JD. Intra-Abdominal Inverted Umblical Cord in Gastroschisis: A Unique Ultrasound Finding. *Pediatr Radiol.* 2013 Aug 2. [Epub]

Patel AS, Soares B, Courtier J, Mackenzie JD. Radiation Dose Reduction in Pediatric CT-Guided Musculoskeletal Procedures. *Pediatr Radiol.* 2013 Apr 28. [Epub]

Phelps A, Naeger DM, Marcovici P. Embedding 3D Radiology Models in Portable Document Format. *AJR Am J Roentgenol.* 2012 Dec; 199(6):1342-4.

RADIOLOGY OUTCOMES RESEARCH LABORATORY

Rebecca Smith-Bindman, MD, Director

Research Directions:

The main objective of the Radiology Outcomes Research Laboratory (RORL) is to rigorously evaluate the benefits and the harms of medical imaging that uses ionizing radiation in order to identify ways to improve patient safety.

- Demonstrate, through high-quality clinical and observational research the impact of medical imaging on patient health, both beneficial and harmful
- Improve the performance of diagnostic imaging tests by conducting clinical trials that provide the evidence for appropriate and safe use
- Identify problematic trends in imaging, their potential impacts on patient safety and the healthcare system, and propose solutions

- Educate health care professionals on the current evidence-based techniques for maximizing image quality while simultaneously improving patient safety
- Engage health care providers in purposeful quality initiatives that have an immediate positive impact on the healthcare system and patient safety

The RORL is dedicated to providing rigorous evidence on the value of medical imaging that uses ionizing radiation to allow patients and their providers to engage in meaningful shared decision making around medical imaging. Our goal is to understand the impacts of diagnostic medical imaging and lessen the impacts of imaging when the costs outweigh the benefits.

Recent Key References:

Fazel R, Curtis J, Wang Y, Einstein AJ, Smith-Bindman R, Tsai TT, Chen J, Shah ND, Krumholz HM, Nallamothu BK. Determinants of Fluoroscopy Time for Invasive Coronary Angiography and Percutaneous Coronary Intervention: Insights from the NCDR® Catheter Cardiovasc Interv. 2013 May 22.

Fenton JJ, Zhu W, Balch S, Smith-Bindman R, Lindfors KK, Hubbard RA. External Validation of Medicare Claims Codes for Digital Mammography and Computer-Aided Detection. Cancer Epidemiol Biomarkers Prev. 2012 Aug; 21(8):1344-7.

Fenton JJ, Onega T, Zhu W, Balch S, Smith-Bindman R, Henderson L, Sprague BL, Kerlikowske K, Hubbard RA. Validation of a Medicare Claims-based Algorithm for Identifying Breast Cancers Detected at Screening Mammography. Med Care. 2013 Aug 6. [Epub]

Miglioretti DL, Johnson E, Williams A, Greenlee RT, Weinmann S, Solberg LI, Feigelson HS, Roblin D, Flynn MJ, Vanneman N, Smith-Bindman R. The Use of Computed Tomography in Pediatrics and the Associated Radiation Exposure and Estimated Cancer Risk. JAMA Pediatr. 2013 Aug 1;167(8):700-7.

Smith-Bindman R, Lebda P, Feldstein VA, Sellami D, Goldstein RB, Brasic N, Jin C, Kornak J. Risk of Thyroid Cancer Based on Thyroid Ultrasound Imaging Characteristics: Results of a Population-Based Study. JAMA Intern Med. 2013 Aug 26. [Epub]

SAN FRANCISCO GENERAL HOSPITAL

Mark W. Wilson, MD, Chief

Research Directions:

- Imaging evaluation of pulmonary embolism, particularly the ability of CT pulmonary angiography to predict outcomes in patients
- Utility of imaging for diagnosis in AIDS patients
- Functional evaluation of pulmonary nodules in patients with suspected lung carcinoma, imaging of mesothelioma
- Imaging recurrent pyogenic cholecystitis and cholangitis
- Imaging trauma to the spine and spinal cord, chest, abdomen, and extremitites
- Exploring MR sequences before and after gadolinium for focal hepatic lesions
- Neutral versus positive oral contrast in abdominal imaging
- Evaluating and maintaining atypical dialysis access grafts and fistulas
- Outcomes of transcatheter embolization for treatment of hemorrhagic complications of pregnancy termination
- Evaluating evolving techniques for transcatheter embolization for pelvic trauma
- Magnetic catheter manipulation in the MRI environment
- Proliferation of ultrasound in underdeveloped countries
- Global health care initiatives
- Internet applications in radiology
- Evaluating patterns of infection by atypical mycobacteria
- Evaluating HRCT features of interstitial lung disease in the setting of hypersensitivity pneumonitis
- Imaging and computer-aided assessment of traumatic brain injury
- Optimizing hepatic MRI and CT imaging parameters
- Transcatheter treatment of pelvic hemorrhage: post-traumatic, post-partum, and post-abortion.

Recent Key References:

Dams-O'Connor K, Spielman L, Gordon W, Manley GT, Puccio AM, Singh A, Valadka A, Yue JK, Yuh EL, Casey SS, Cooper SR, Cheong M, Hricik AJ, Knight EE, Lingsma H, Maas A, Menon D, Morabito DJ, Mukherjee P, Okonkwo DO, Pacheco JL, Schnyer DM, Sinha TK, Vassar MJ. The Impact of Prior Traumatic Brain Injury on Health and Functioning: A TRACK-TBI study. *J Neurotrauma.* 2013 Aug 7.

Naeger DM, Conrad M, Nguyen J, Kohi MP, Webb EM. Students Teaching Students: Evaluation of a"Near-Peer" Teaching Experience. *Acad Radiol.* 2013 Sep; 20(9):1177-82.

Saeed M, Hetts SW, Do L, Wilson MW. Coronary Microemboli Effects in Preexisting Acute Infarcts in a Swine Model: Cardiac MR Imaging Indices, Injury Biomarkers, and Histopathologic Assessment. *Radiology.* 2013 Apr 16.

Siao D, Thoeni R, Grenert JP, Day LW. A Rare Presentation of Abdominal Pain: Idiopathic Mesenteric Phlebosclerosis. *Am J Gastroenterol.* 2012 Nov; 107(11):1759-60.

Thoeni RF. The Revised Atlanta Classification of Acute Pancreatitis: Its Importance For The Radiologist and its Effect On Treatment. *Radiology.* 2012 Mar; 262(3):751-64.

ULTRASOUND

Ruth B. Goldstein, MD, Chief

Research Directions:

- Prenatal diagnosis of CNS anomalies with ultrasound and MRI
- Further investigation of clinical manifestations and treatment of twin transfusion syndrome
- Prospective, randomized trial of repair of fetal myelomeningocele
- Prospective, randomized trial for selective ablation of connecting vessels in twin transfusion syndrome

Recent Key References:

Courtier J, Schauer GM, Parer JT, Regenstein AC, Callen PW, Glenn OA. Polymicrogyria in a fetus with human parvovirus B19 infection: a case with radiologic-pathologic correlation. *Ultrasound Obstet Gynecol.* 2012 Nov; 40(5):604-6.

Doubilet PM, Benson CB, Bourne T, Blaivas M, Barnhart KT, Benacerraf BR, Brown DL, Filly RA et al., Diagnostic Criteria for Nonviable Pregnancy Early in the First Trimester. Society of Radiologists in Ultrasound Multispecialty Panel on Early First Trimester Diagnosis of Miscarriage and Exclusion of a Viable Intrauterine Pregnancy. *N Engl J Med.* 2013 Oct 10;369(15):1443-51.

Harari A, Sippel RS, Goldstein R, Aziz S, Shen W, Gosnell J, Duh QY, Clark OH. Successful Localization of Recurrent Thyroid Cancer in Reoperative Neck Surgery Using Ultrasound-Guided Methylene Blue Dye Injection. *J Am Coll Surg.* 2012 Oct; 215(4):555-61.

Perito ER, Tsai PM, Hawley S, Lustig RH, Feldstein VA. Targeted Hepatic Sonography During Clinic Visits for Detection of Fatty Liver in Overweight Children: A Pilot Study. *J Ultrasound Med.* 2013 Apr; 32(4):637-43.

VETERANS AFFAIRS MEDICAL CENTER: DIAGNOSTIC RADIOLOGY

Judy Yee, MD, Chief

Research Directions:

- Dose reduction for screening and diagnostic CT colonography
- Stereoscopic 3D imaging- clinical applications
- Spectral imaging, dual energy, and low kVp CT imaging
- CT and MR contrast timing and delivery in the abdomen and pelvis
- Eovist MR for the detection of hepatocellular carcinoma
- High-field MR imaging of the prostate
- Stroke prediction using intimal thickness on carotid ultrasound

Recent Key References:

Chang KJ, Yee J. Dose reduction strategies in CT Colonography. *Abdom Imaging* 2013; 38:224-232.

Dachman AH, Yee J. The Challenges of CT Colonography Reimbursement. *J Am Coll Radiol* 2013.

Avital I, Langan RC, Summers TA, Steele SR, Waldman SA, Backman V, Yee J, Nissan A,Young P, Womeldorph C, Mancusco P, Mueller R, Noto K, Grundfest W, Bilchik AJ, Protic M, Daumer M, Eberhardt J, Man YG, Brücher BLDM, Stojadinovic A. Evidence-based Guidelines for Precision RIsk Stratification-Based Screening (PRSBS) for Colorectal Cancer:Lessons learned from the US Armed Forces: Consensus and Future Directions. *J Cancer.* 2013;4(3):172-92.

Mongan J, Rathnayake S, Fu Y, Gao DW, Yeh BM. Extravasated Contrast Material in Penetrating Abdominopelvic Trauma: Dual-Contrast Dual-Energy CT for Improved Diagnosis—Preliminary Results in an Animal Model. *Radiology. 2013* Sep; 268(3):738-42.

Lalani T, Couto CA, Rosen MP, Baker ME, Blake MA, Cash BD, Fidler JL, Greene FL, Hindman NM, Katz DS, Kaur H, Miller FH, Qayyum A, Small WC, Sudakoff GS, Yaghmai V, Yarmish GM, Yee J. ACR Appropriateness Criteria Jaundice. *J Am Coll Radiol* 2013;10:402-409.

Varenika V, Fu Y, Maher JJ, Gao D, Kakar S, Cabarrus MC, Yeh BM. Hepatic Fibrosis: Evaluation with Semiquantitative Contrast-enhanced CT. *Radiology.* 2013 Jan; 266(1):151-8.

Weinstein S, Oseibensu S, Aslam R, Yee J. Mutli-detector CT Findings of the Post-operative Colon. *RadioGraphics* 2013;33:515-532.

Yee J, Weinstein S, Morgan T, Alore, P, Aslam R. Advances in CT Colonography. Journal of Cancer 2013;4:200-209.

Yee J, Keysor K, Kim D. The Time Has Arrived For National Reimbursement of Screening CT Colonography. *AJR* 2013; 201:73-79.

VETERANS AFFAIRS MEDICAL CENTER: CENTER FOR IMAGING OF NEURODEGENERATIVE DISEASES

Pratik Mukherjee, MD, PhD, Director

Research Directions:

The Center for Imaging of Neurodegenerative Diseases (CIND) is a research center dedicated to studying the causes and effects of neurodegenerative and psychiatric disorders, using imaging instruments such as MRI and PET machines. We currently have nine full-time faculty performing studies in various fields, including imaging of Alzheimer's disease, Parkinson's disease, depression, traumatic brain injury, post traumatic stress-disorder, Gulf War illness, and substance abuse. We also work on the development of novel powerful methods for brain MR, including spiral imaging and new approaches for processing and multivariate statistical analysis of brain imaging. Our center is located at the San Francisco VA Medical center and has a Bruker 4T MRI scanner, a Siemens 3T Skyra that was recently placed into operation and a new Siemens 7T that is expected to be operational early 2014.

Our faculty is also involved in large international imaging trials, such as the Alzheimer's Disease Neuroimaging Initiative (ADNI) and the Parkinson's Progression Marker Initiative (PPMI). More recently the Center has also been involved in the development of new strategies for the prevention of neurodegenerative diseases. We started an initiative, directed by Dr. Michael Weiner, aimed at developing a registry of aging individuals that reside in the San Francisco Bay Area. The Registry will be available over the web and all instruments used will be available to the public. Data collected will be stored in the cloud. The ultimate goal for this project is the prevention of Alzheimer's and Parkinson's disease.

In the area of MRI and image processing, we work with different techniques including:

- Ultra-high resolution structural MRI
- Diffusion spectrum imaging
- Dynamic, arterial-spin-labeling imaging
- Resting-state functional MRI
- Susceptibility-weighted imaging
- Spectroscopic imaging and j-modulated spectroscopy
- Bayesian image reconstruction
- Multivariate image analysis methods

Recent Key References:

Abé C, Mon A, Hoefer ME, Durazzo TC, Pennington DL, Schmidt TP, Meyerhoff DJ. Metabolic Abnormalities in Lobar and Subcortical Brain Regions of Abstinent Polysubstance Users: Magnetic Resonance Spectroscopic Imaging. *Alcohol Alcohol.* 2013 Sep-Oct; 48(5):543-51.

Cardenas VA, Tosun D, Chao LL, Fletcher PT, Joshi S, Weiner MW, Schuff N. Voxel-Wise Co-analysis of Macro- and Microstructural Brain Alteration in Mild Cognitive Impairment and Alzheimer's Disease Using Anatomical and Diffusion MRI. *J Neuroimaging.* 2013 Feb 19. [Epub]

Durazzo TC, Abadjian L, Kincaid A, Bilovsky-Muniz T, Boreta L, Gauger GE. The Influence of Chronic Cigarette Smoking on Neurocognitive Recovery after Mild Traumatic Brain Injury. *J Neurotrauma*. 2013 Jun 1; 30(11):1013-22.

Meyerhoff DJ, Durazzo TC, Ende G. Chronic Alcohol Consumption, Abstinence And Relapse: Brain Proton Magnetic Resonance Spectroscopy Studies in Animals and Humans. *Curr Top Behav Neurosci.* 2013; 13:511-40.

Naylor MG, Cardenas VA, Tosun D, Schuff N, Weiner M, Schwartzman A. Voxelwise Multivariate Analysis of Multimodality Magnetic Resonance Imaging. *Hum Brain Mapp.* 2013 Feb 13. [Epub]

Tarapore PE, Findlay A, LaHue SC, Lee HA, Cooper SC, Honma SM, Mizuiri D, Luks TL, Manley GT, Nagarajan SS, Mukherjee P. Resting state MEG functional connectivity in traumatic brain injury. *J Neurosurg* 2013; 118:1306-1316

Tosun D, Joshi S, Weiner MW. Neuroimaging Predictors of Brain Amyloidosis in Mild Cognitive Impairment. *Ann Neurol.* 2013 May 18. [Epub]

VETERANS AFFAIRS MEDICAL CENTER: VASCULAR IMAGING RESEARCH CENTER

David Saloner, PhD, Director

Research Directions:

- Development of methods for visualization of complex flow in intracranial aneurysms
- Assessment of novel contrast agents in MR angiography
- Development of patient-specific models for review of endovascular therapies
- Analysis of plaque vulnerability using patient-specific image based computational methods
- Development of 4-D MR velocimetry methods for determination in analyzing the impact of hemodynamics on vascular disease progression

Recent Key References:

Hasan DM, Amans M, Tihan T, Hess C, Guo Y, Cha S, Su H, Martin AJ, Lawton MT, Neuwelt EA, Saloner DA, Young WL. Ferumoxytol-enhanced MRI to Image Inflammation within Human Brain Arteriovenous Malformations: A Pilot Investigation. *Transl Stroke Res.* 2012

Jaussaud N, Chitsaz S, Meadows A, Wintermark M, Cambronero N, Azadani AN, Saloner DA, Chuter TA, Tseng EE . Acute Type A aortic Dissection Intimal Tears by 64-Slice Computed Tomography: A Role For Endovascular Stent-Grafting? *J Cardiovasc Surg (Torino)*. 2013 Jun;54(3):373-81.

Shimkunas R, Zhang Z, Wenk JF, Soleimani M, Khazalpour M, Acevedo-Bolton G, Wang G, Saloner D, Mishra R, Wallace AW, Ge L, Baker AJ, Guccione JM, Ratcliffe MB. Left Ventricular Myocardial Contractility is Depressed in the Borderzone after Posterolateral Myocardial Infarction. *Ann Thorac Surg.* 2013 May;95(5):1619-25

Sigovan M, Rayz V, Gasper W, Alley HF, Owens CD, Saloner D. Vascular Remodeling in Autogenous Arterio-Venous Fistulas by MRI and CFD. *Ann Biomed Eng.* 2013 Apr;41(4):657-68.

Sigovan M, Gasper W, Alley HF, Owens CD, Saloner D. USPIO-enhanced MR Angiography of Arteriovenous Fistulas in Patients with Renal Failure. *Radiology.* 2012 Nov;265(2):584-90.

WOMEN'S IMAGING

Bonnie N. Joe, MD, PhD, Chief

Research Directions:

- MRI, optical imaging and X-ray mammography for breast cancer screening and surveillance, diagnosis and tissue characterization for risk assessment, cancer staging, and treatment response assessment
- New techniques in MRI-guided biopsy and imaging protocols
- Quantitative assessment of breast density and breast cancer risk models
- Digital breast tomosynthesis
- MRI/MRS for assessing tumor response to neo-adjuvant chemotherapy for patients with locally advanced breast cancer
- Biomarker development using advanced breast MR techniques

Recent Key References:

Bolouri MS, Elias SG, Wisner DJ, Behr SC, Hawkins RA, Suzuki SA, Banfield KS, Joe BN, Hylton NM. Triple-Negative and Non-Triple-Negative Invasive Breast Cancer: Association between MR and Fluorine 18 Fluorodeoxyglucose PET Imaging. *Radiology.* 2013 Jul 22.

Brasic N, Wisner DJ, Joe BN. Breast MR Imaging for Extent of Disease Assessment in Patients with Newly Diagnosed Breast Cancer. *Magn Reson Imaging Clin N Am.* 2013 Aug; 21(3):519-32.

Harvey JA, Yaffe MJ, D'Orsi C, Sickles EA. Density and Breast Cancer Risk. *Radiology.* 2013 May; 267(2):657-8.

Price ER. Magnetic Resonance Imaging-Guided Biopsy of The Breast: Fundamentals And Finer Points. *Magn Reson Imaging Clin N Am.* 2013 Aug; 21(3):571-81.

Price ER, Hargreaves J, Lipson JA, Sickles EA, Brenner RJ, Lindfors KK, Joe BN, Leung JW, Feig SA, Bassett LW, Ojeda-Fournier H, Daniel BL, Kurian AW, Love E, Ryan L, Walgenbach DD, Ikeda DM. The California Breast Density Information Group: A Collaborative Response to the Issues of Breast Density, Breast Cancer Risk, and Breast Density Notification Legislation. *Radiology.* 2013 Sep 10. [Epub].

Grants and Fellowships

Grants

Rizwan Aslam, MD

- Bayer Healthcare; Evaluation of Cirrhosis and Malignant Hepatic Lesions Using Novel MR Contrast Agents, 2010–2013, $75,000.00

Nicholas Fidelman, MD

- Nordion Inc.; A Phase III Clinical Trial Evaluating TheraSphere in Patients with Metastatic Colorectal Carcinoma of the Liver who have Failed First Line Chemotherapy, 02/07/13–02/07/17, $200,573.99

Miguel Hernandez Pampaloni, MD, PhD

- American College of Radiology; ACRIN 6684 Case Reimbursement Study, 03/01/13–02/28/14, $32,500.00

Christopher P. Hess, MD, PhD

- Children's Hospital Medical Center of Oakland; Phase I/II, Randomized Blinded Safety Trial of Deferiprone in NBIA/PKAN, 09/15/12–08/31/13, $11,622.00

Steven W. Hetts, MD

- SNIS Foundation; SNIS Foundation Award, 03/31/13–06/30/13, $19,500.00

Nola M. Hylton, PhD

- American College of Radiology; ACRIN 6698 DWI Imaging Analysis, 06/01/12–12/31/12, $47,168.00

Galateia J. Kazakia, PhD

- NIH National Institute Arthritis, Musculoskeletal and Skin Diseases; Visualizing Cortical Pore Space Constituents, 07/16/13–06/30/16, $186,117.00

John Kurhanewicz, PhD

- NIH National Cancer Institute; Novel Hyperpolarized MR Markers of Advanced Prostate Cancer Therapy, 09/30/12–07/31/17, $3,018,784.00
- Agios Pharmaceuticals; GLS Inhibition Pilot Studies: Hyperpolarized 13C MR ("Research Program"), 12/04/12–12/03/14, $129,211.00

Thomas F. Lang, PhD

- NIH National Institute Arthritis, Musculoskeletal and Skin Diseases; CT-based Modeling to Analyze Variation in Skeletal Response To Osteoporosis Drugs, 08/01/13–05/31/17, $1,112,772.00
- NIH/NIAMS PET/CT of Skeletal Muscle Amino Acid Kinetics, 08/17/2012–08/16/2014, $350,000.00

Thomas M. Link, MD, PhD

- InSightec Ltd.; BM-010 A Feasibility Study to Evaluate the Safety and Initial Effectiveness of ExAblate MR Guided Focused Ultrasound Surgery in the Treatment of Pain Resulting from Metastatic Bone Tumors with the ExAblate 2100 Conformal Bone System, 10/26/12–10/31/14, $139,197.80

Jing Liu, PhD

- NIH National Institute of Biomed Imaging and Bioengineering; 4D MRI Development for Cardiovascular Imaging, 09/30/12–08/31/17, $842,170.00

Sharmila Majumdar, PhD

- Bell Biosystems, Inc.; Validation of the MRI Properties of Magnelles, 05/15/13–05/14/14, $41,780.00
- Arthritis Foundation; A Multicenter Feasibility Trial Establishing Imaging and Biochemical Technologies as Measures of Knee Cartilage Composition Following Acute ACL Injury, 08/01/13–06/30/15, $1,000,000.00

Tracy R. McKnight, PhD

- Valerion Pharmaceuticals, LLC; Characterization of Novel Antibody Constructs for Targeted Drug Delivery, 07/17/13–01/16/14, $74,014.00

Pratik Mukherjee, MD, PhD

- Brain Trauma Foundation, Inc.; EYE TRAC Therapy, 08/01/12–07/31/13, $155,820.00
- Wallace Research Foundation; White Matter Microstructure and Connectivity in Sensory Processing Disorders, 10/01/12–09/30/13, $40,000.00

Susanne Mueller, MD

- UCSF Resource Allocation Program; Improved non-invasive Focus Localization in Partial Epilepsy with DSASL MRI, 01/01/13–12/31/13, $30,000.00

Sarah Nelson, PhD

- American College of Radiology; ACRIN Advanced DCE MRS Imaging Core Lab, 01/01/12–12/31/12, $5,000.00
- General Electric Company; Ultra high field MR for Patients with Neurological and Musculoskeletal Disease: Phase II Improved Imaging and Contrast Mechanisms using the MR950 Platform, 07/01/12–06/30/14, $654,014.00

Elissa R. Price, MD

- Mount Zion Health Fund; Maximizing Breast Cancer Identification while Minimizing False Positive Biopsies: Defining the BI-RADS 3 Category on Breast MRI, 07/01/13–06/30/14, $10,000.00

Sabrina M. Ronen, PhD

- University of Calgary; MR Studies of Glioma Cells, 02/01/13–01/31/14, $26,082.00
- NIH National Cancer Institute; Metabolic Reprogramming in Brain Tumors, 02/05/13–01/31/18, $3,138,225.00

David A. Saloner, PhD

- University of Washington; MRI of High-Risk Carotid Plaque, 05/09/12–05/08/14, $15,000.00

Norbert Schuff, PhD

- Michael J Fox Foundation for Parkinson's Research; Parkinson's Progression Markers Initiative Extension, 09/10/13–09/09/18 $600,000.00

John A. Shepherd, PhD

- Children's Hospital of Philadelphia; Genome Wide Association Study of Bone Mineral Accretion During Childhood, 02/01/12–01/31/14, $10,000.00
- George Washington University; STOPP-T2D, 03/01/12–02/28/14, $87,572.00
- Johns Hopkins University; International Maternal Pediatric Adolescent AIDS Clinical Trials Group Leadership Award, 06/01/12–05/31/13, $114,371.00
- California Breast Cancer Research Program; Compositional Mammography for Breast Cancer Detection, 08/01/12–01/31/14, $100,000.00
- University of Vermont; P2: Breast Density and Collagen Alignment as Predictors of DCIS Progression To Invasive Breast Cancer, 09/01/12–05/31/13, $18,540.00
- University of Hawaii; Obesity, Body Fat Distribution and Cancer Risk in the Multiethnic Cohort (Core C), 09/01/12–08/31/13, $130,923.00
- Medimaps Group SA; TBS Study, 11/13/12–11/12/14, $20,000.00
- Brigham and Women's Hospital; Predictors of Mammary Gland Development and Breast Fibroglandular Volume At Puberty, 09/13/12–07/31/13, $14,486.00
- National Foundation for the Center Disease Control and Prevention, Inc.; Tenofovir in Pregnancy (TIP) Study, 12/01/12–11/30/13, $28,770.00
- California Breast Cancer Research Program; 6th International Workshop on Breast Cancer Risk Assess, 01/15/13–07/07/13, $25,000.00
- NIH National Cancer Institute; Lesion Composition and Quantitative Imaging Analysis on Breast Cancer Diagnosis, 03/06/13–02/28/18, $2,964,633.00

Rebecca Smith-Bindman, MD

- University of California, Berkeley; PEDS CT-DOSE: Pediatric CT Dose Optimization and Standardization Endeavor, 09/30/12–09/29/13, $213,781.00
- American Cancer Society, Inc.; Research and Evaluation of the Virtual Symposium on Radiation Safety in Computed Tomography (CT), 05/08/13–05/07/14, $20,000.00
- Patient Centered Outcomes Research Institute, UCSF CT Radiation Dose Registry to Ensure a Patient-Centered Approach for Imaging, 12/01/2013–11/30/2016, $1,881,241.00
- UC Center for Health Quality and Innovation Standardization and Optimization of Computed Tomography, 7/1/12–6/30/14, $500,000.00

Wyatt Tellis, PhD

- Radiological Society of North America; Health Policy Research, 03/30/12–09/29/12, $35,000.00
- Radiological Society of North America; Patient Recruitment, 03/30/12–09/29/12, $34,000.00
- Radiological Society of North America; Medical Image Sharing Through a Patient Controlled Exchange System, 09/30/12–09/30/14, $597,504.00

Henry F. VanBrocklin, PhD

- CellSight Technologies; PET Imaging of Activated T Cells During Cancer Treatment, 09/01/13–08/31/15, $200,221.00

Daniel B. Vigneron, PhD

- DOD Misc. Department of Defense Agencies; Preclinical Testing of a New MR Imaging Approach to Distinguish Aggressive from Indolent Disease, 05/10/13–05/09/15, $589,813.00
- NIH National Institute of Biomedical Imaging and Bioengineering; New Instrumentation and Techniques for Hyperpolarized Metabolic and Perfusion MRI, 07/15/13–05/31/17, $2,836,885.00
- NIH National Institute of Biomedical Imaging and Bioengineering; Development and Translation of Hyperpolarized C-13 Prostate Cancer MRI Methods, 08/15/13–07/31/18, $5,931,418.00

Zhen J. Wang, MD

- Society Of Abdominal Radiology; Noninvasive Evaluation of Renal Oxidative Stress in Diabetes Using Hyperpolarized 13C MR Spectroscopic Imaging, 03/01/13–03/31/14, $15,000.00
- NIH National Institute Diabetes and Digestive and Kidney; Hyperpolarized 13C Markers of Diabetic Nephropathy and Treatment Response, 09/20/2013–7/31/2018, $1,185,938.00

Michael Weiner, MD

- United States Department of Veterans Affairs; Longitudinal Assessment of Gulf War Veterans with Suspected Sarin Exposure, 10/01/13–09/30/17, $1,392,810.00
- United States Department of Defense; Effects of Traumatic Brain Injury and Posttraumatic Stress Disorder on Alzheimer's Disease AD in Veterans with Mild Cognitive Impairment MCI using the Alzheimer's Disease Neuroimaging Initiative, 10/01/13–09/30/2016, $6,400,000.00
- Eli Lilly Company; Predicting Amyloid Positivity In Subjects With Mild Alzheimer's Disease From An Automated MRI Classifier, 12/01/12–04/30/13, $241,599.00

Duan Xu, PhD

- NIH National Institute of Child Health and Human Development; Towards Baby Brain Connectome: a Study of Newborn Brain Networks, 01/04/13–11/30/17, $2,958,423.00

Judy Yee, MD

- Echopixel; Stereoscopic 3D CT Colonography: Phase 1, 02/01/11–02/18/13, $25,000.00
- ACRIN- ECOG Cancer Research Group; ACRIN 7151: Incidence and Significance of Extracolonic Findings on CT Colonography: retrospective analysis of national CT Colonography Trial Data, 03/16/12–06/30/14, $27,000.00
- Echopixel; Stereoscopic 3D CT Colonography: Phase 2, 02/01/13–02/18/15, $225,000.00
- Bracco; A User Preference Study to Assess the Ease Of Use, Benefit and efficiency of the ProtoCO2L Touch, CO2 Insufflator, 02/04/13–06/30/14, $25,000.00

Benjamin Yeh, MD

- GE Global Research; Nanoparticle CT Contrast Agents for Reduced Radiation Dose and New Imaging Applications, 05/01/13–04/30/14, $110,054.00
- General Electric Healthcare; Is the Risk For Contrast-Induced Nephropathy Lower for High-Risk Patients Receiving Intravenous Iodixanol Administration Compared to Low- and High Risk Patients Receiving Intraarterial Iodixanol, 07/01/13–06/30/14, $75,000.00

Fellowships

Aaron Lebeau, PhD

- Prostate Cancer Foundation; Targeting Active Urokinase Plasminogen Activator for Therapy Using An Internalizing Human Antibody, 05/20/13–05/19/14, $75,000.00

Toran D. Macleod, PT, PhD

- NIH National Institute Arthritis, Musculoskeletal and Skin Diseases; Knee Osteoarthritis: Meniscus Kinematics and Articular Cartilage Degeneration, 07/01/13–06/30/14, $52,190.00

Yong Pang, PhD

- NIH National Institute of Biomedical Imaging and Bioengineering; Technical Development of High Resolution In-vivo Imaging of Human Liver at 7T, 04/01/13–03/31/14, $89,192.00

Renuka Sriram, PhD

- DOD United States Army Medical Research Acquisition; Hyperpolarized 13C MR Markers of Renal Tumor Aggressiveness, 09/15/12–09/14/13, $81,249.00

Department of Radiology and Biomedical Imaging Faculty

Chairman

Ronald L. Arenson, MD
Alexander R. Margulis Distinguished Professor

Executive Vice-Chair

William P. Dillon, MD
Professor of Radiology
Elizabeth A. Guillaumin Chair in Neuroradiology

Vice-Chairs

David E. Avrin, MD, PhD
Professor of Clinical Radiology
Vice-Chair, Informatics

Robert G. Gould, ScD
Adjunct Professor
Vice-Chair, Technology and Capital Projects

Sharmila Majumdar, PhD
Professor
Vice-Chair, Research

Susan D. Wall, MD
Professor Emeritus
Vice-Chair, Academic Affairs

Mark W. Wilson, MD
Professor in Residence
Vice-Chair, San Francisco General Hospital

Judy Yee, MD
Professor in Residence
Vice-Chair, Veterans Affairs Medical Center

Abdominal Imaging

David E. Avrin, MD, PhD
Professor of Clinical Radiology

Spencer Behr, MD
Assistant Professor of Clinical Radiology

Thomas A. Hope, MD
Assistant Professor in Residence

Bonnie N. Joe, MD, PhD
Associate Professor in Residence

Tara Morgan, MD
Assistant Professor in Residence

Liina Poder, MD
Associate Professor of Clinical Radiology

Michael Ohliger, MD, PhD
Assistant Professor in Residence

Z. Jane Wang, MD
Assistant Professor in Residence

Emily (Emma) M. Webb, MD
Associate Professor of Clinical Radiology

Stefanie Weinstein, MD
Assistant Clinical Professor

Antonio C. Westphalen, MD
Associate Professor in Residence

Judy Yee, MD
Professor in Residence

Benjamin M. Yeh, MD
Professor in Residence

Ronald J. Zagoria, MD
Professor in Residence and Chief

Advanced Imaging Technologies Specialized Resource Group

Nola M. Hylton, PhD
Professor in Residence

Roland Krug, PhD
Assistant Professor in Residence

John Kurhanewicz, PhD
Professor in Residence

Peder Larson, PhD
Assistant Professor in Residence

Xiaojuan Li, PhD
Associate Professor in Residence

Jing Liu, PhD
Assistant Adjunct Professor

Sharmila Majumdar, PhD
Professor

Alastair J. Martin, PhD
Adjunct Professor

Pratik Mukherjee, MD, PhD
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"My years at UCSF were the most rewarding time of my academic career. Now that I am starting my professional career, I am so grateful for the incredible training I received as a resident and fellow. I had incredible mentors and made what will be lifelong friendships. The opportunity to train at an outstanding institution like UCSF is something I will never take for granted. The best way for me to give back is by helping to make sure others can have one of the best experiences of their life, just like mine!"

—Reema Munir, MD, Residency '10, Fellowship '11
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