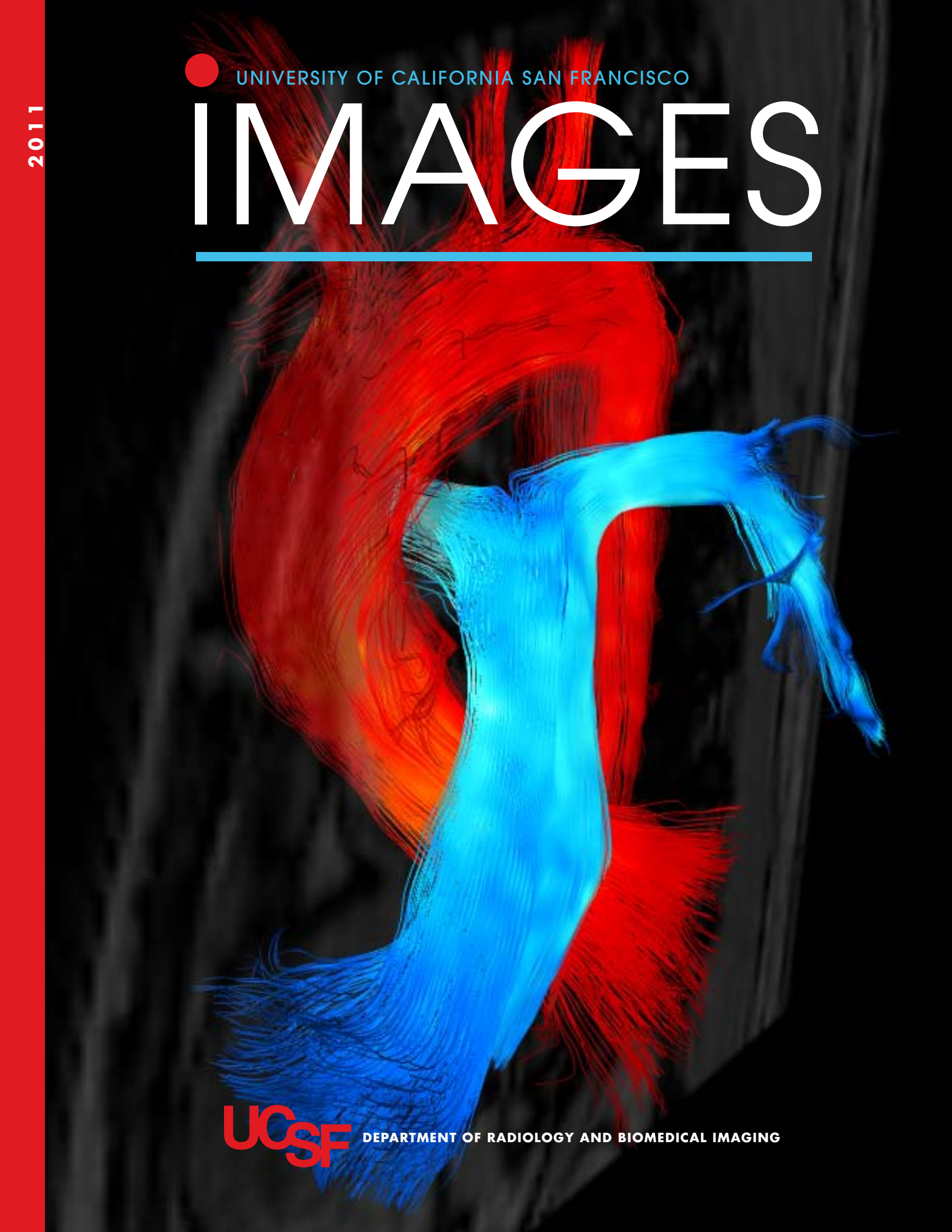
2011

UNIVERSITY OF CALIFORNIA SAN FRANCISCO

IMAGES



UCSF DEPARTMENT OF RADIOLOGY AND BIOMEDICAL IMAGING

About the Cover:

Systolic blood flow in the great vessels of a normal volunteer visualized by 4D Flow. The 3D streamlines align with the local velocity vector field at a given moment in time, and provide a 3D perspective of instantaneous flow. Red = aorta, blue = pulmonary artery. The data for this image was collected in a single acquisition of approximately 15 minutes. Cover image provided by Petter Dyverfeldt, PhD, a postdoctoral scholar, and Michael D. Hope, MD, an assistant professor in residence in the Department of Radiology and Biomedical Imaging.

Design: Irene Nelson Design Copyediting: DEF Communications Editorial Coordinator: Katie Murphy Printing: Advanced Printing, Pleasanton, Calif.

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Dear Colleagues and Friends,

Another successful year has flown by in Radiology and Biomedical Imaging, and I am happy to report that we have successfully navigated significant change across the university and across the specialty of radiology, although much more is to come. As I sat down to write this year's letter, I reflected on what I wrote last year: first, that change is certain, although the form it will take is not; and second, that focus on excellence in patient care, translational research, and education will help us evolve and remain relevant and valuable in the future. In this edition of *Images,* our 18th since 1994, you will read about the Department's achievements in all of these areas, and I want to highlight a few notable accomplishments over the last year.

This past year our Chancellor challenged us to excel in translational research and I am happy to report that Radiology more than contributed by achieving remarkable accomplishments in moving research from bench to bedside. In late 2010, John Kurhanewicz, PhD, and Sarah Nelson, PhD, unveiled the first Phase 1 clinical trials using hyper-polarized C13 and MRI to track the progress or inhibition of prostate cancer. This new MRI technique allows tumor changes to be measured and visualized in real time, as the tumor responds or fails to respond to treatment. Their announcement at last year's RSNA generated wide media and public interest, and rightly so, as it will allow oncologists and patients to make quicker and better decisions tailored to each patient's tumor type.

Continuing with metabolic imaging, Daniel Vigneron, PhD, received a center grant to create a resource focused on pushing the boundaries of hyper-polarized C13 for various types of cancer imaging. These techniques will allow significant improvement in decision making and treatment choices for cancer patients. Sharmila Majumdar, PhD, our Vice-Chair for Research, obtained a Center for Research Translation grant to use imaging in osteo-arthritis. She collaborates closely with Thomas Link, MD, PhD, and with colleagues at UCSF's new Orthopedic Institute (OI). Dr. Link's efforts to establish excellent clinical service at the OI have not only improved patient care, but also opened up new avenues of translational research for imaging in musculoskeletal applications.

Finally, I am very proud to report that Dr. Fergus Coakley received an NIH grant to purchase High Intensity Focused Ultrasound (HIFU) for use with MRI, and has established a program at China Basin to investigate the use of HIFU in uterine fibroid treatment. He looks forward to future collaborations with Dr. Link in the use of HIFU for metastatic bone cancer treatment, alleviating pain, and with Dr. Kurhanewicz for prostate cancer treatment.

I announce these cutting-edge translational breakthroughs with great pride not only because of their scientific and clinical implications, but because they were achieved in the context of a tremendously difficult NIH funding environment. I am grateful to our entire faculty for the tremendous effort that keeps us at the highest level of NIH rankings for radiology departments nationwide.

This year, we also made our first exploratory steps into social media marketing. I invite you to read our blog at *blog.radiology.ucsf.edu* where you will find faculty comments on topics as diverse as "the thyroid shield controversy courtesy of the Dr. Oz Show" by Bonnie Joe, MD, PhD, to "radiology's role in evaluating and treating obesity" from Aliya Qayuum, MBBS. We also used our blog, Twitter, and Facebook pages to educate our patients and the public on the radiation scare that followed the terrible earthquake and

tsunami in Japan earlier this year. I invite you to read our blog, to "like" us on Facebook (*facebook.com/UCSFimaging*) and to follow us on Twitter (*twitter.com/UCSFimaging*).

I can't finish remarks about our year without complimenting our tremendous residents and thanking the Margulis Society for their steadfast and loyal support of our residency program. This year we were very fortunate to have a wildly successful Gala event, marking the Margulis Society's 20th anniversary and celebrating Dr. Alex Margulis' 90th birthday! What an event—if you could not attend, you will find pictures and details in this magazine. In the coming year, we are thrilled that Herbert Kressel, MD, the editor of *Radiology*, will be our guest speaker at the Margulis Society's biennial alumnus lecture, to be held on April 3, 2012 at UCSF.

I hope you enjoy this edition of *Images*, and please don't forget to join us, as usual, at our RSNA reception for alumni and friends. We have a new and exciting venue this year, a Chicago landmark building, the Chicago Cultural Center at the corner of East Washington Street and Michigan Avenue. Please join us on Sunday, November 27 at 6:30 p.m.in the GAR Rotunda.

Thank you for your ongoing interest and dedication to the Department of Radiology and Biomedical Imaging. I wish you success and good health for 2012, and I hope to see you at RSNA.

Sincerely,

Ronald L. Arenson, MD

4D Flow MR Imaging of the Thoracic Aorta

Michael D. Hope, MD; Petter Dyverfeldt, PhD; Monica Sigovan, PhD; Jing Liu, PhD; Karen Ordovas, MD; Jarrett Wrenn, MD, PhD; Elyse Foster, MD; Elaine Tseng, MD; Maythem Saeed, PhD; David Saloner, PhD

Blood flow imaging with 4D Flow (time-resolved, 3D phase-contrast MRI) is an innovative method for studying cardiovascular disease that allows for striking blood flow visualization (Figure 1). The full power of the technique has yet to be exploited in managing patients with cardiovascular disease. Currently, a less robust, 2D phase-contrast technique is used in select clinical scenarios to quantify blood velocity and flow in the cardiovascular system. For many patients, it is an adjunct to echocardiography, which is widely available and performed routinely. But echocardiography has weaknesses, including limited acoustic windows and quantitative abilities, while 4D Flow has unique advantages.

Because its high-resolution 3D acquisition is unhindered by acoustic windows, 4D Flow allows unrivaled visualization of dynamic secondary blood flow features, including helices and vortices. It also allows key secondary vascular parameters, including turbulence and vessel wall shear stress, to be quantified. We seek to capitalize on these advantages and to change the paradigm for risk-stratifying patients with cardiovascular disease. Today, cardiovascular patients are risk-stratified most often using vessel dimensions. Altered blood flow is rarely considered, although substantial evidence demonstrates a link between abnormal flow and disease. Our projects focus on characterizing the role of abnormal flow in promoting or exacerbating aortic pathology.

Vessel Wall Shear Stress

Vessel wall shear stress (WSS) refers to the force per unit area exerted on the vascular wall by blood moving in a tangential plane. It can be estimated from the near-wall velocity

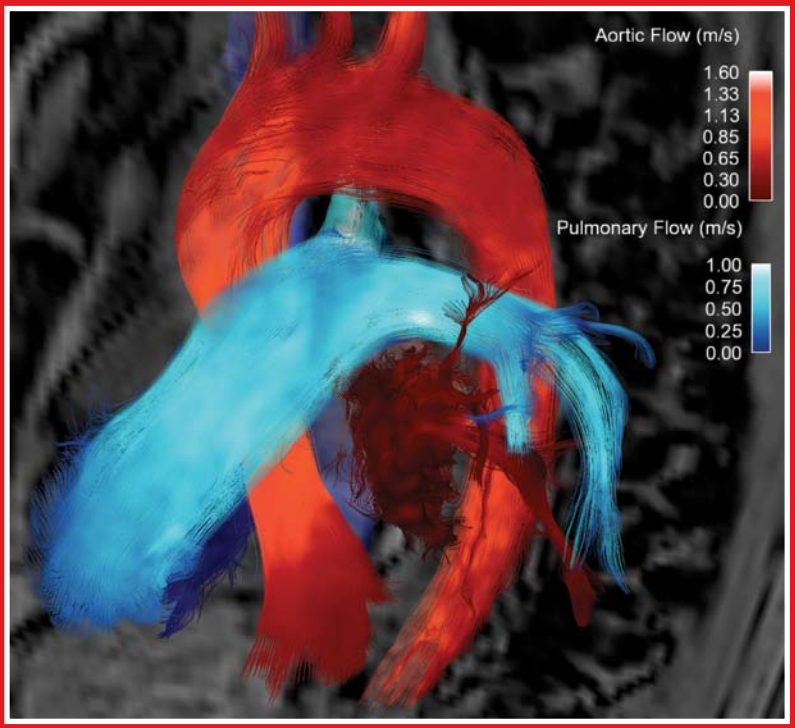


Figure 1 Systolic blood flow in the great vessels of a normal volunteer visualized by 4D Flow. The 3D streamlines align with the local velocity vector field at a given moment in time, and provide a 3D perspective of instantaneous flow. Red = aorta, blue = pulmonary artery, maroon = pulmonary veins. The data for this image was collected in a single acquisition of approximately 15 minutes.

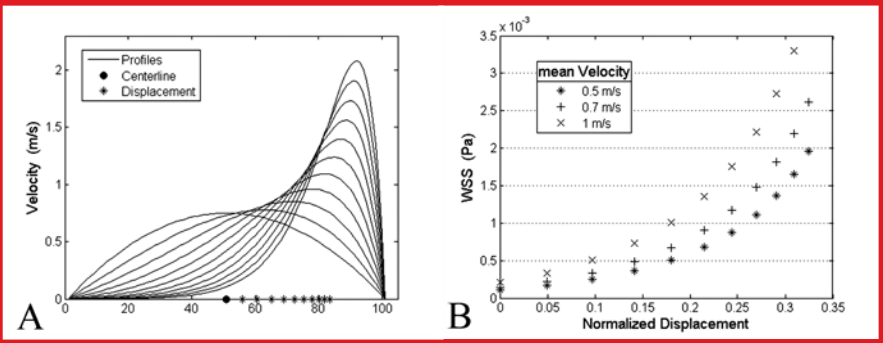


Figure 2 (A) Simulated flow profiles with a mean velocity of 0.5 m/s and different degrees of eccentricity. The centerline (•) and calculated displacements (*) are plotted on the abscissa. (B) WSS values plotted against normalized displacement for different mean velocities: 0.5 m/s (*) corresponding to profiles in A, 0.7 m/s (+), and 1 m/s (×).

gradients captured by 4D Flow data sets. These gradients are a function of both velocity and flow eccentricity (Figure 2).

Wall shear stress is strongly linked to vascular disease. Low WSS promotes atherosclerosis through many well-documented mechanisms. High WSS, especially positive shear gradients, contributes to pathologic vascular remodeling that leads to aneurysm formation. Although MRI-derived shear stress values are routinely lower than true values, a comparison of relative values allows altered shear stress profiles to be identified and characterized. We are studying the link between altered shear profiles and the progression of aortic aneurysm.

Turbulence Imaging

The normal cardiovascular system maintains fluid transport at high efficiency. Disturbed and turbulent blood flow, however, is present with many cardiovascular diseases, and may contribute to their progression. For example, turbulence is the major cause of the pressure drop seen across a stenotic vessel or valve. Exposure of blood constituents to turbulent forces has been associated with hemolysis, platelet activation, and aggregation.

Turbulence is a complex phenomenon, but one that commonly occurs in nature: seen in smoke coming out of a chimney or experienced on an airplane. The presence of apparently random velocity fluctuations is a typical feature of turbulence. The intensity of these velocity fluctuations can be quantified by their standard deviation. Traditionally, *in vivo* measurements of turbulence intensity have only been possible using invasive approaches. As a result, the extent and role of turbulence has not been fully investigated in humans. We recently extended the 4D Flow imaging technique to estimate mean velocities and turbulence intensity within each image volume element. Turbulence intensity can be estimated from the data acquired in a standard 4D Flow acquisition. We are using this approach to assess the hemodynamic impact of a wide range of vascular disease states, including aortic coarctation, carotid atherosclerosis, and aortic stenosis (Figure 3).

Thoracic Aorta Flow Imaging

Dynamic blood flow imaging in the thoracic aorta with phase-contrast MRI has been a focus of considerable research interest for over 20 years. Starting in the late 1980s, normal blood flow in the thoracic aorta was studied in detail throughout the cardiac cycle. Synthesizing observations from 2D imaging planes acquired from multiple volunteers, "typical" flow patterns were reported, including a right-handed twist to flow in the ascending aorta during late systole, and retrograde flow streams during diastole. With the advent of 3D phase-contrast techniques, more compelling visualization of complex flow patterns became possible. Software extended analysis beyond visualization of aortic flow by allowing the estimation of secondary vascular parameters that can be correlated with aberrant flow patterns. The goal of current research is to understand how abnormal flow may promote or worsen vascular disease so 4D Flow imaging can be used to evaluate and manage patients with aortic disease.

Recent work has focused on gross pathologies of the thoracic aorta, such as coarctation and aneurysm. MRI flow evaluation has long been a component of the clinical management of patients with aortic coarctation. Our recent studies suggest that 4D Flow imaging may expand this role.

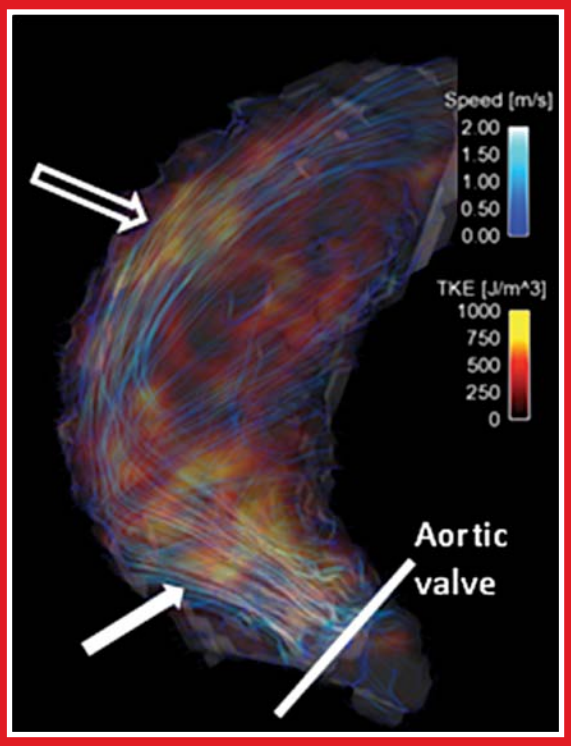


Figure 3 Flow visualization at peak systole in the ascending aorta of a 90-year-old male with severe aortic stenosis. The solid line indicates the location of the aortic valve. Sparse streamlines (blue) outline the velocity field and volume-rendered turbulence intensity maps (red/yellow) show regions and degrees of flow turbulence. Elevated turbulence intensity is seen in the proximal ascending aorta (solid arrow) where the post-stenotic flow jet becomes incoherent. Turbulence intensity is elevated at the outer wall of the distal ascending aorta (hollow arrow).

Not only can collateral flow be reliably calculated and aortic flow profiles readily assessed, abnormal 3D flow patterns can be identified that correlate with post-repair complications, including aneurysm and rupture.

Aneurysms of the thoracic aorta are associated with complex abnormal flow patterns, mostly helical in nature. The significance of these patterns has been debated. Are they simply the consequence of a dilated aorta, or do they play an active role in the progression of disease? In a subset of cases with aortic valve disease, our recent work suggests that flow may play an active role. Flow similar to that seen within aortic aneurysms has been demonstrated in aortas that are not (yet) dilated (Figure 4).

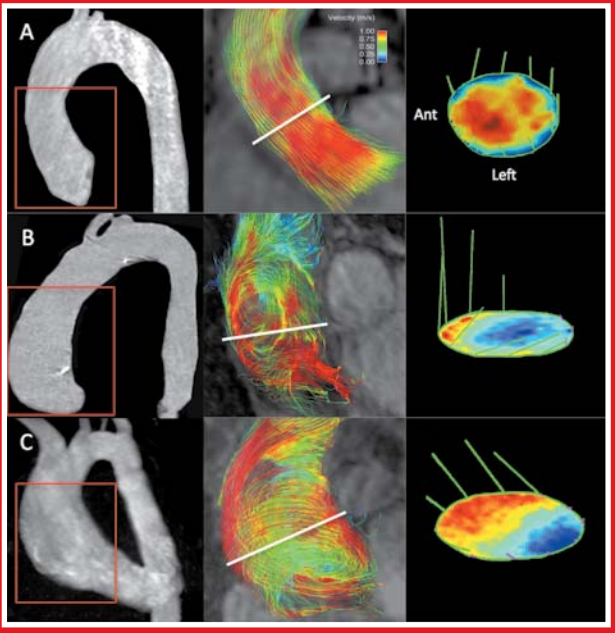
Valve-Related Aortic Disease

Evaluating valve-related disease of the ascending aorta with 4D Flow is a promising clinical application. Many studies have assessed flow alterations in patients who have undergone aortic valve and/or ascending aortic replacement. Pre-surgically, 4D Flow may prove useful by risk-stratifying patients and guiding the timing of intervention. Aortic valve disease is relatively common, especially in the elderly, and is associated with the long-observed phenomenon of post-stenotic dilation. The mechanism is presumed to be flow-related. Without 4D Flow, however, the altered hemodynamics have not been well characterized. The detailed assessment of 4D Flow reveals altered systolic flow resulting from eccentric flow jets with stenotic and deformed aortic valves (Figure 4). The degree of flow eccentricity can be quantified, and has been shown to correlate with focally elevated WSS and aortic dilation.

We have focused our efforts on patients with bicuspid aortic valve (BAV), a defect found in 1-2% of the population that frequently results in significant aortic pathology, including aneurysm and dissection. We hypothesize that eccentric systolic flow jets with BAV, through the mechanism of elevated WSS, promote aortic dilation. The clinical relevance of proving this mechanism would be considerable, as it would allow a non-invasive means of risk-stratifying the sizable population of patients with BAV (up to four million in the U.S. alone). For example, 4D Flow assessment could be performed for patients with BAV before valve or aortic disease manifests. If normal systolic flow were identified, patients would need only occasional follow-up. If eccentric flow were identified, 1) closer follow-up with MRI would be indicated, as follow-up echocardiography may be inadequate to assess the entire ascending aorta; 2) medication with beta-blockers, which lower WSS, could be initiated; and 3) depending on interval growth rates and the degree of eccentricity, earlier intervention may be warranted (e.g., at 4.5 cm for high-risk patients).

With the help of our collaborators in Cardiology and Cardiothoracic Surgery, we are collecting data on whether increased aortic growth rates are seen as a consequence of the elevated hemodynamic burden experienced by the aortic wall because of eccentric systolic flow. We are developing a time-resolved MRA sequence that will enable follow-up studies to be co-registered spatially and temporally, so aortic dimensions can be evaluated at identical locations and orientations. We also are investigating animal models of

PART 1



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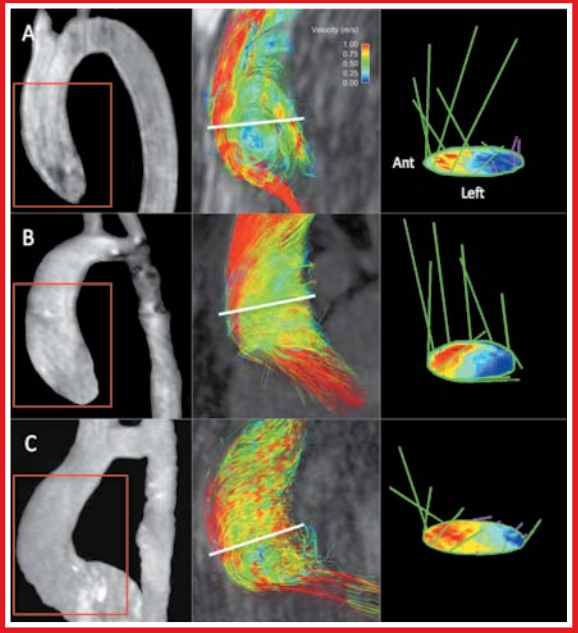


Figure 4 PART 1 Abnormal systolic blood flow with post-stenotic aortic dilation. *Panel A* exhibits normal blood flow in a healthy volunteer. From left to right, magnetic resonance angiography (MRA), systolic streamlines in the ascending aorta, and cross-sectional analysis at the plane depicted in the proximal ascending aorta are provided.(The same sequence is found in each image panel.) The MRA shows normal aortic geometry, the streamlines normal laminar systolic flow, and the cross-sectional analysis central fast flow and an even distribution of WSS around the aortic lumen; the green bars represent the relative magnitude of WSS. *Panel B* is from a 90-year-old man with severe aortic stenosis and aneurysmal dilation of the ascending aorta up to 5.3 cm. Systolic flow is eccentric with streamlines that course through the ascending aorta in a right-handed helix. The cross-sectional analysis shows marginalized flow to the right-anterior quadrant where WSS is focally elevated. *Panel C* is from a 34-year-old woman with BAV, aortic stenosis, and dilation of the ascending aorta up to 4.6 cm. Similar eccentric flow with a right-handed helix of systolic streamlines is demonstrated. Shear stress is focally elevated where flow is marginalized against the aortic wall.

PART 2 Similar eccentric systolic flow in patients without aortic dilation or aortic stenosis. *Panel A* is from a 64-ear-old man with TAV, aortic stenosis, and normal aortic dimensions. Eccentric flow and asymmetrically elevated shear stress is demonstrated. Without aortic dilation, it is more convincing that the aortic valve, and not aortic geometry, is causing the aberrant systolic flow. The helical streamlines appear to be in a more vertical orientation in cases of TAV compared to BAV. *Panel B* is from a 19-year-old woman with BAV, aortic stenosis, and normal aortic dimensions; the loss of MRA signal in the proximal descending aorta is due to a stent placed for aortic coarctation. The abnormal flow pattern is seen without aortic dilation. *Panel C* is from a 19-year-old man with BAV, no aortic stenosis, and aneurysmal dilation of his aortic root up to 5.4 cm. The same abnormal systolic flow pattern is identified, suggesting that post-stenotic dilation can be seen in patients with BAV without aortic stenosis by conventional echocardiography criteria.

valve-related aortic disease. If we can demonstrate accelerated growth with abnormal flow, 4D Flow would become a clinically useful tool for risk-stratifying the sizable population of patients with aortic valve disease for the likelihood of developing an aneurysm.

Michael D. Hope, MD, is an assistant professor in residence in the Cardiac and Pulmonary Imaging section; Petter Dyverfeldt, PhD, and Monica Sigovan, PhD, are postdoctoral scholars; Jing Liu, PhD, is an assistant adjunct professor; Karen Ordovas, MD, is an assistant professor in residence in the section of Cardiac and Pulmonary Imaging; Jarrett Wrenn, MD, PhD, is a PGY-4 diagnostic radiology resident ; Maythem Saeed, PhD, is an adjunct professor and David Saloner, PhD is a professor in residence in the Department of Radiology and Biomedical Imaging. Elyse Foster, MD, is a professor of Medicine and director of the Adult Echocardiography Laboratory and Adult Congenital Heart Disease Service in the Department of Cardiology; Elaine Tseng, MD, is an assistant professor in residence in the Department of Surgery.

MR-Guided Focused Ultrasound (MRg-FUS) Comes to UCSF

Fergus V. Coakley, MD; Christian Diederich, PhD; Vanessa Jacoby, MD; Thomas M. Link, MD, PhD

What is MR-Guided Focused Ultrasound?

MR-guided focused ultrasound (MRg-FUS), also known as high-intensity focused ultrasound, refers to the use of tightly focused high-energy ultrasound waves to heat and ultimately kill tissue. Targeted and sustained energy deposition with focused ultrasound waves heat the tissue at the focal zone to a threshold temperature of 65 to 85°C, resulting in coagulative necrosis. The use of focused ultrasound for medical therapy is not new. Frontal lobotomy using focused ultrasound through burr holes in animals was first described in 1954. The FDA approved the use of extracorporeal shockwave lithotripsy (ESWL), also a form of focused ultrasound, in 1984. The use of focused ultrasound combined with MRI for guidance and monitoring reemerged in the 1990s due to advances in imaging, ultrasound technology, and focal therapy. MRI guidance provides three critical advantages during focused ultrasound treatment that can be summarized as the "three Ts": Targeting, Thermometry, and (stereo)Taxis. The excellent soft tissue and multiparametric contrast properties of MRI allow for precise delineation and characterization of the target lesion. Real-time MR thermal imaging during the procedure allows for immediate assessment of treatment success and adequacy. The physical linkage of the transducer within the fixed geometry of the MRI scanner provides a stereotactic environment in which the three-dimensional location of the treated lesion is known, so treatment volume can be accurately planned and the cumulative treatment volume can be mapped and displayed. To date, MRg-FUS has been used primarily to treat uterine fibroids, but ongoing research and developments promise much wider usage in tumor and cancer treatment, including applications in brain, prostate, and bone disease. The recent acquisition of

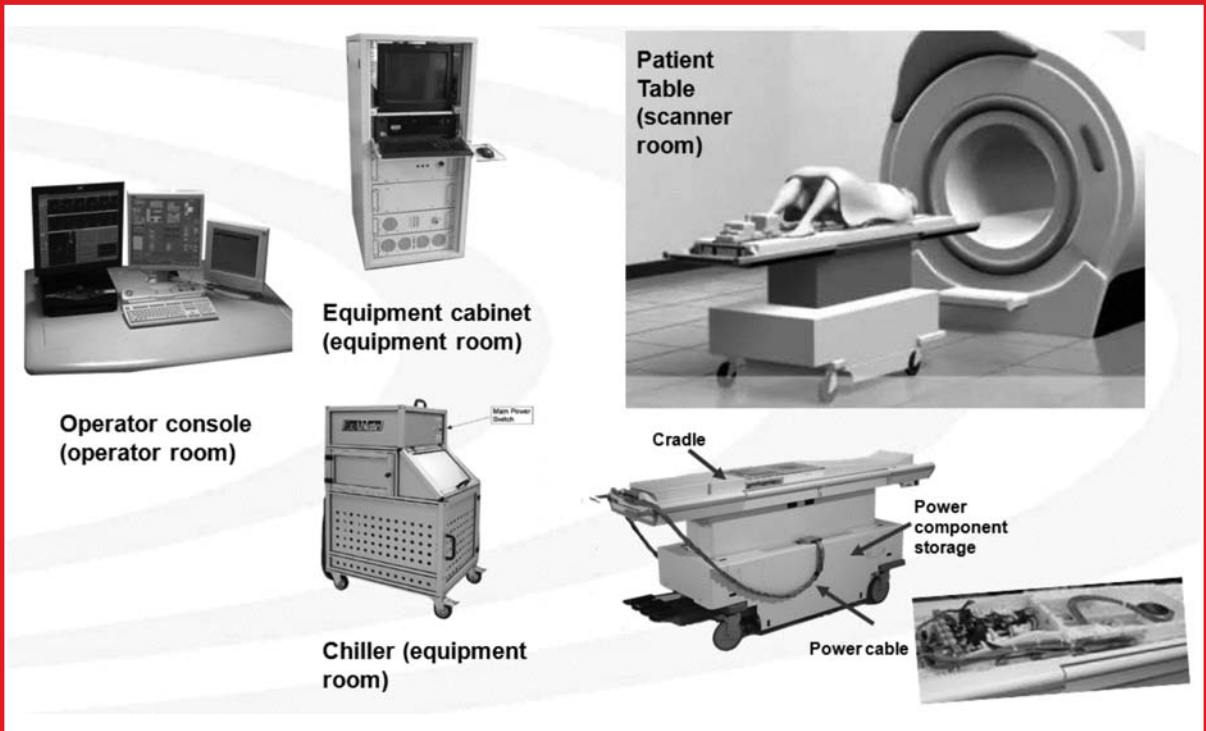


Figure 1 Components of the MRg-FUS system.

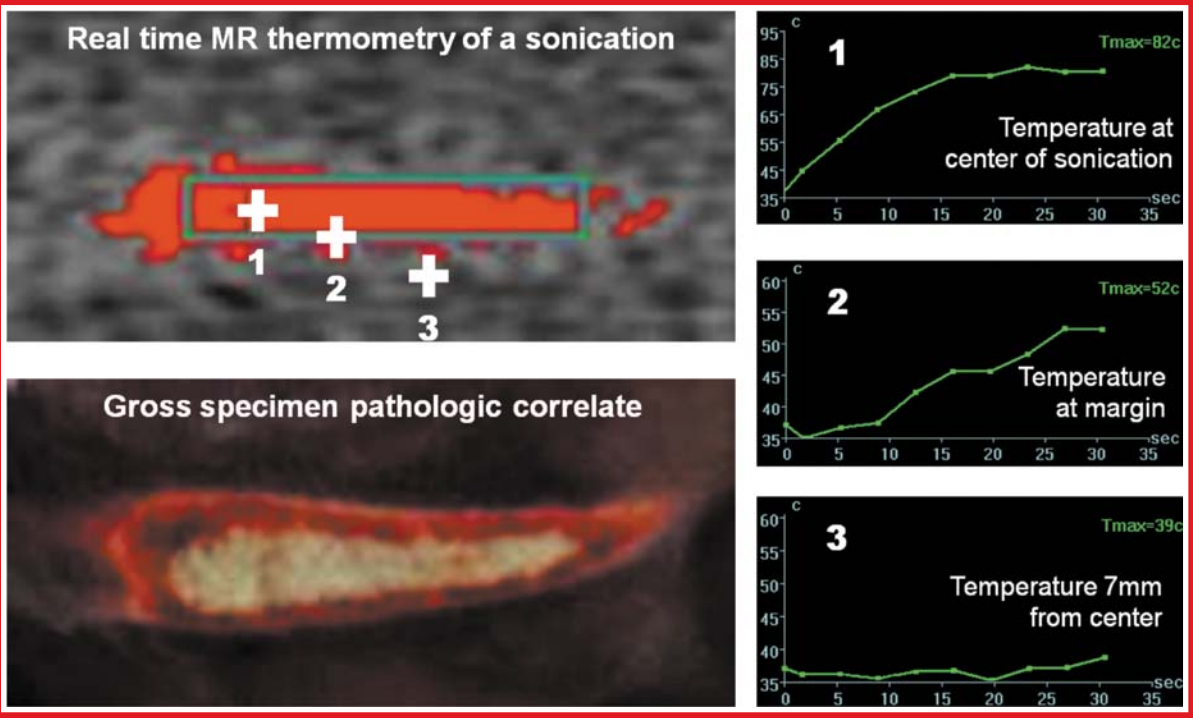


Figure 2 Photomontage showing a real-time MR thermal map obtained during a sonication, the temperature at three different points in the field-of-view during the sonication, and the corresponding gross pathological specimen. Note the real-time, pixel-by-pixel temperature tracking and the excellent correlation between the temperature map and ablation zone.

an MRg-FUS system at UCSF places us at the forefront of this exciting and cutting-edge technology.

How Did We Get MRg-FUS at UCSF?

The department has been interested in MR-g FUS for several years. In 2007, Dr. Fergus Coakley spent a six-week visiting observership, funded by the Focused Ultrasound Foundation, with Dr. Wady Gedroyc, one of the recognized international leaders in this field, at St. Mary's Hospital in London. In 2009, with the encouragement of Dr. Ron Arenson, a team of multidisciplinary and interdepartmental investigators applied for an S10 high-end instrumentation grant from the National Center for Research Resources for money under PAR 09-118, a competitive program to support the purchase a single major item of equipment for biomedical research. In 2010, the department received $1,368,750 from the NCRR to purchase the MRg-FUS system. The system was installed at China Basin in early 2011 and the first patient was treated on April 25, 2011.

What Are We Doing With MRg-FUS?

The MRg-FUS system installed at China Basin consists of three modules, for treatment of fibroids, prostate cancer, and painful bony metastases.

- The fibroid module combines a standard, dockable MRI tabletop with a built-in, high-intensity focused ultrasound transducer. Patients lay prone in a water bath over the transducer in the tabletop during imaging and treatment, which can take three to five hours. Patients receive conscious sedation and a Foley catheter during the procedure. Each focal treatment, known as a sonication, lasts 20 to 30 seconds. Patients may experience some discomfort or a sensation of heating during sonication. Complications include skin burns in the near field and nerve stimulation, which may cause back or leg pain, in the far field. Published studies indicate that treatment results in significant improvement in both the bulk and bleeding symptoms related to fibroids. However, the existing data is derived

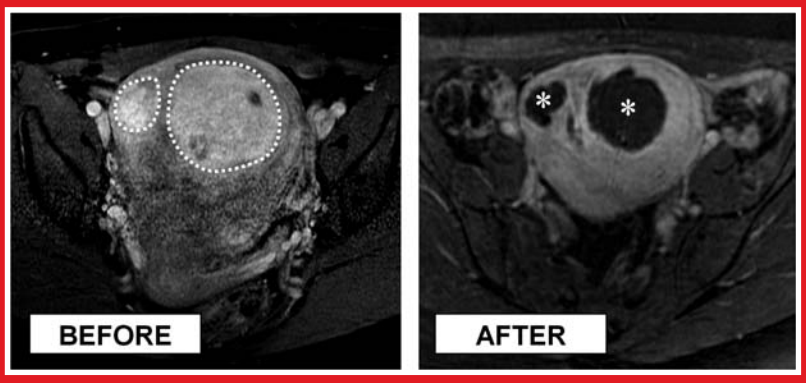


Figure 3 Photomontage of two gadolinium-enhanced T1-weighted images before and after MRg-FUS treatment of two intramural uterine fibroids (outlined by dotted lines on the before image) in a 54-year-old woman complaining of both bulk symptoms and menorrhagia. Successful treatment is demonstrated as non-enhancement (asterisks) of most of the fibroid volume after therapy. At follow-up after three months, the patient reported significant reduction in both bleeding and bulk symptoms.

primarily from industry-funded single-arm trials, and the potential biases of such data have limited community acceptance of this management option by gynecologists and also has limited widespread reimbursement by payers. Accordingly, in the summer of 2011, working in collaboration with Dr. Vanessa Jacoby from the Department of Obstetrics, Gynecology, and Reproductive Sciences, UCSF opened a Committee on Human Research-approved and independently funded randomized double-arm sham-controlled study known as the PROMISe trial (Pilot Randomized trial Of MRI-guided focused ultrasound In Symptomatic uterine fibroids). Twenty patients will be recruited and randomized to active or sham treatment in a ratio of 2:1. The first patients in this trial were treated in July 2011. Patients will be unblinded after three months, and those who underwent sham treatment will be offered free active treatment.

- The prostate module consists of an endorectal transducer which combines a phased-array ultrasound transducer for precisely targeted treatment, an imaging coil, and a cooling system to prevent rectal damage. A protocol for treating selected patients with low-risk prostate cancer is under FDA review, and treatment of patients at UCSF will likely not occur until 2012.
- The bone module consists of a dedicated circular transducer that can be strapped to the body part being treated. Though external beam radiation is currently the standard of care for patients with localized bone pain, and results in the palliation of pain for many of these patients, 20 to 30% of patients treated with radiation therapy do not experience pain relief. In addition to relapse and re-treatment, there is an increased risk of pathologic fracture in the peri-radiation period. The fracture rate reported in radiation studies is generally in the range of 1% to 8%. Furthermore, patients who have recurrent pain at a site previously irradiated may not be eligible for further radiation therapy secondary to limitations in normal tissue tolerance. MRg-FUS may offer a viable treatment alternative in these cases, where external beam radiation encounters limitations. A previous study showed that MRg-FUS can be used to treat painful bony metastases that have failed radiation treatment with highly successful results. It is thought that the therapeutic mechanism is primarily that of periosteal necrosis and denervation, although histopathological changes can also be seen in the underlying bone. A protocol for treating patients with painful bony metastases has been approved by the FDA and the CHR at UCSF, and we plan to begin enrolling patients in the second half of 2011.

Fergus V. Coakley, MD, is a professor of Radiology and Urology, chief of Abdominal Imaging and vice-chair of clinical affairs for the Department of Radiology and Biomedical Imaging. Christian Diederich, PhD, is a professor in residence in the Department of Radiation Oncology, Vanessa Jacoby, MD, is an assistant adjunct professor in the Department of Obstetrics and Gynecology and Reproductive Sciences. Thomas M. Link, MD, PhD, is a Professor in Residence, chief of the Musculoskeletal Section, and co-director of the Musculoskeletal and Quantitative Imaging Research Interest Group in the Department of Radiology and Biomedical Imaging.

High-Resolution Imaging of the Hippocampus in Temporal Lobe Epilepsy: Clinical and Functional Implications

Susanne G. Mueller, MD, Kenneth D. Laxer, MD

Its high concentration of glutamateric neurons, high plasticity, and life-long ability for neurogenesis render the hippocampus particularly vulnerable to all kinds of insults. Consequently, hippocampal atrophy is a hallmark not only of many brain diseases (Alzheimer's disease, epilepsy, depression, and post-traumatic stress syndrome), but also of many non-brain diseases, such as diabetes and hypertension. In contrast to its macroscopic appearance, the hippocampus is not a homogeneous structure. Rather, it consists of several histologically and functionally distinct, tightly interconnected subfields: Subiculum, cornu ammonis (CA) sectors 1–3 and dentate gyrus (DG). Histopathological studies show that these subfields vary in their vulnerability to different pathological processes, which produce characteristic hippocampal atrophy patterns. For example, early Alzheimer's is predominantly associated with neuron loss

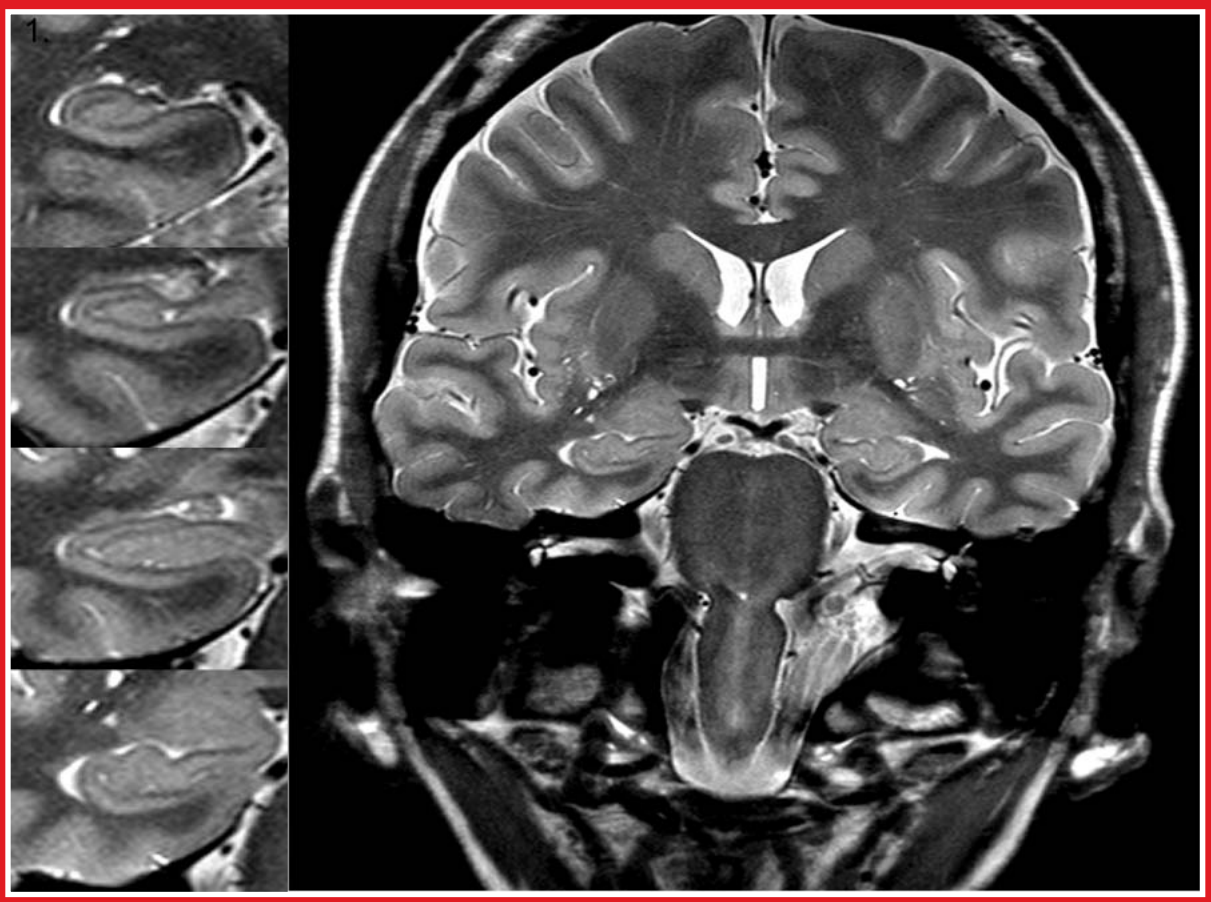


Figure 1 4T high-resolution image of the hippocampus of a healthy 60-year-old woman. Fast spin echo sequence (TR/TE: 3500/19 ms, echo train length 15, 18.6 ms echo spacing, 160° flip angle, 100% oversampling in ky direction, 0.4 x 0.4 mm in plane resolution, 2 mm slice thickness, 24 interleaved slices without gap, acquisition time 5:30 min.)

in CA1, while PTSD is characterized by neuron loss in CA3 and dentate gyrus. The ability to distinguish among different patterns of hippocampal atrophy *in vivo* on a MRI could provide valuable information regarding the etiology of hippocampal atrophy.

Progress of Structural Imaging of the Hippocampus

On conventional whole brain T1 or FLAIR images at 1.5 T or 3T, the resolution (typically around 1×1×1 mm) and contrast are usually not sufficient to appreciate subtle differences within the hippocampus. Consequently, it appears to be globally shrunken, often accompanied by an increased FLAIR signal, regardless of the underlying disease process. If discernible at all, the internal structure often seems to be blurred or even lost. In comparison, the appearance of an atrophied hippocampus on a dedicated, high-resolution T2 or PD-weighted fast-spin echo image obtained at 3 T or higher is strikingly different, depicting details of its internal structure (Figure 1). Even though the resolution is far from that of a histological preparation, a hypointense line representing the myelinated fibers in the stratum lacunare, moleculare, and vestiges of the hippocampus sulcus are easily and reliably recognized. The distance between this hypointense line and the outer boundary of the hippocam-

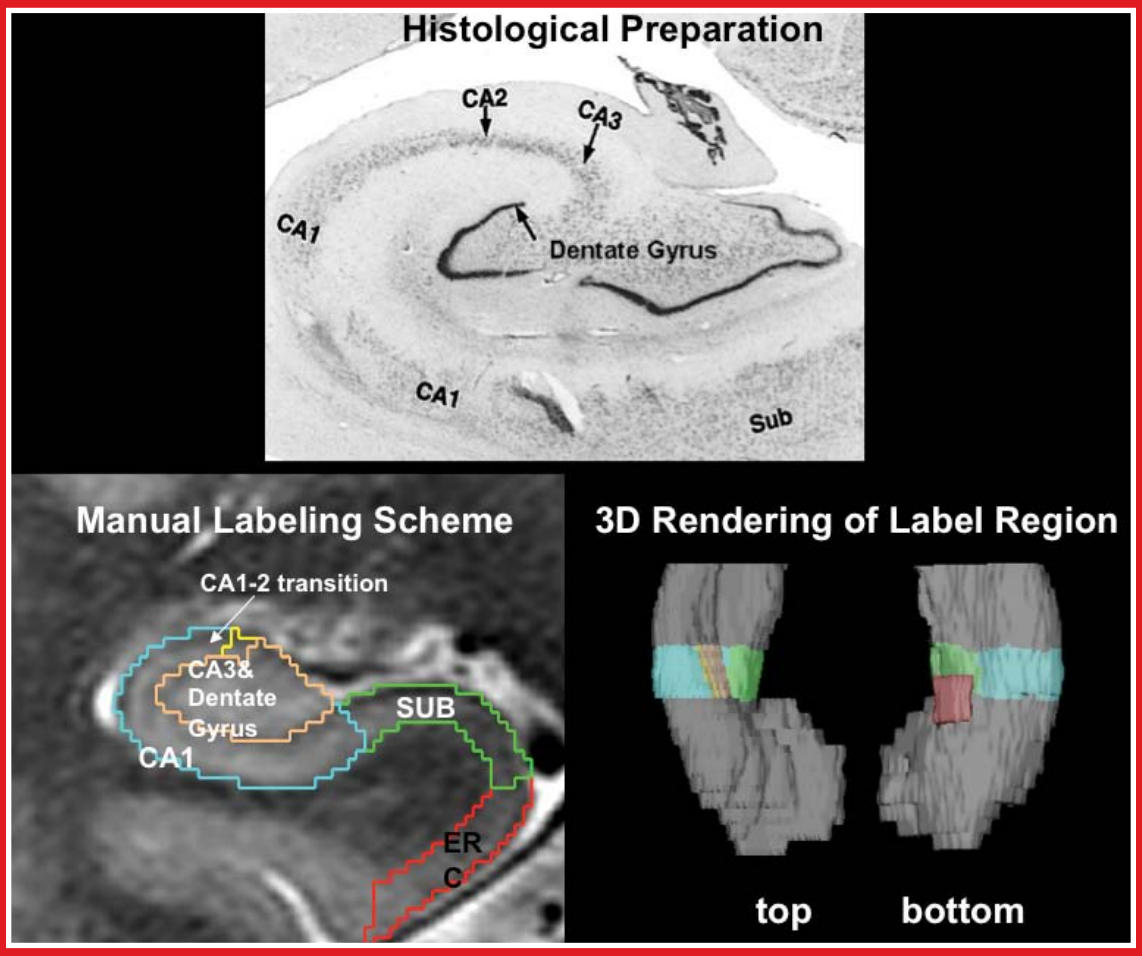


Figure 2 Upper panel: Histological preparation of the hippocampus showing the hippocampal subfields. Lower panel: Manual labeling scheme used for subfield volumetry. The manual parcellation shows a reasonable correspondence with the histological image. Some deviations from the histological scheme, e.g., part of the subiculum included in CA1, allow for more consistent marking between raters.

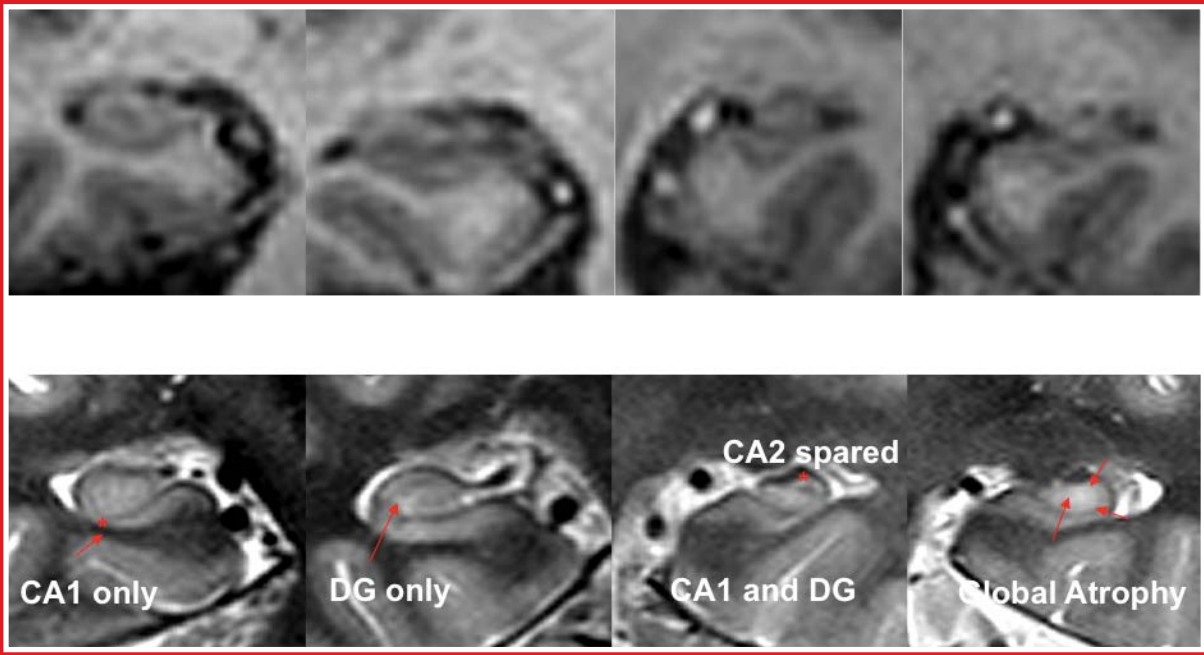


Figure 3 Side-by-side comparison (T1 ((MPRAGE) TR/TE/TI = 2300/3/950 ms, 7° flip angle, 1.0 × 1.0 × 1.0 mm^3 resolution, acquisition time 5.17 min) with high resolution image) of the four atrophy types of MST seen in TLE.

pus provides an excellent estimate of the thickness of the hippocampal cortex at this point. This permits identification of circumscribed regions of hippocampal atrophy, particularly if they are combined with patchy hypointensities. This hypointense line, along with external hippocampal landmarks, can also be used to subdivide the hippocampus into subsections. These subsections correspond to the histological subfields (Figure 2), so the volumes obtained by this procedure can be used as surrogate subfield volumes.

Clinical Applications of Hippocampal High-Resolution Imaging

In some diseases the hippocampal volume losses are so characteristic that their regional selectivity is easily detected on visual inspection. A typical example is temporal lobe epilepsy (TLE) with mesial temporal sclerosis (TLE-MTS). In TLE-MTS the seizures arise from the hippocampus and neighboring mesial temporal structures, e.g., parahippocampus. Mesial temporal sclerosis (MTS), a specific form of hippocampal atrophy, is the hallmark of TLE-MTS. Large histopathological studies of surgical specimens have shown that MTS is not homogenous, but has four major subtypes: isolated DG atrophy, isolated CA1 atrophy, CA1 and DG atrophy with sparing of CA2, and global atrophy. CA1 and DG is the most common and is often referred to as "classical type" MTS.

Figure 3 shows a side-by-side comparison of the hippocampus in a standard 4T T1 whole brain image and a dedicated high-resolution image. While all four atrophy types are easily identifiable by visual inspection in the high-resolution image, this is difficult to do on the conventional T1 image, despite the fact that the hippocampal atrophy is obvious to the experienced reader. A quantitative assessment using statistical thresholds to distinguish atrophied subfields from those in the normal range confirmed the existence of atrophy patterns in a larger population of TLE-MTS patients.

The ability to distinguish among different MTS patterns on a MRI is not solely of academic interest. Large histopathological series have shown that the different atrophy patterns may represent different clinicopathological TLE subtypes and may even have predictive value for the

outcome of epilepsy surgery. Patients with severe CA1 and DG atrophy or global atrophy have a considerably better chance of becoming seizure-free after temporal lobe resection (about 80% seizure-free) than patients with isolated CA1 or DG atrophy (about 50% seizure-free). Since TLE is often difficult to control with antiepileptic drugs alone, for some patients surgery is sometimes the best chance for lasting seizure control. Any information that helps predict the surgical success is highly welcome.

Other forms of epilepsy also benefit from high-resolution imaging. Temporal lobe epilepsy with temporolateral focus and other forms of neocortical epilepsy with extratemporal onset can be associated with more subtle, but still significant, volume loss in the hippocampus and adjacent structures; up to 20% in the entorhinal cortex, even though the hippocampus is not involved in seizure generation and looks normal on visual inspection of conventional or high-resolution MRI. Depending on the lateralization of this structural abnormality in regard to the origin of the electrophysiological seizure and the type of epilepsy, such abnormalities can be a sign of subtle hippocampal pathology and of possible suboptimal postsurgical outcomes in patients if the hippocampus cannot be resected.

Insight into the Functional Organization of the Hippocampus

Evidence also exists for direct functional consequences of different atrophy patterns. Many TLE patients have subtle cognitive deficits compared to age- and education-matched controls. Given the important role of the hippocampus in memory function, it is not surprising that memory impairment is one of the most prominent findings. Animal studies and computational models using sophisticated memory paradigms to tease out different aspects of memory processing suggest a functional specialization of the subfields in the normal hippocampus. These studies found that CA3 and DG might be primarily responsible for learning and early retrieval of new information, while CA1 has a major role in delayed retrieval and recognition of already processed information. We tested whether this type of functional specialization could be demonstrated in TLE-MTS patients using a standard clinical cognitive test. We chose the auditory immediate recall test of the Wechsler Memory Scale-III to measure learning/early retrieval, i.e., a task influenced by CA3 and DG atrophy, and the auditory delayed recognition test to measure delayed retrieval/recognition, which requires an intact CA1. All subfield volumes correlated to some degree with memory function. However, the CA3 and DG volumes showed the strongest correlation with the immediate auditory recall performance. These volumes explained about 20% of the variation of this score in a group of healthy controls and people with TLE-MTS. The CA1 showed the strongest correlation with the auditory delayed recognition task and explained about 12% of its variation A similar relationship between CA3 and DG and immediate auditory recall was found for TLE with temporo lateral focus, even though the subjects' CA3 and DG sectors were completely normal on visual inspection and the quantitative assessment excluded subtle atrophic changes

It is astonishing to be able to demonstrate this rather complex association using structural MRI and a simple clinical test. Such questions are usually investigated using fMRI and specially designed, sophisticated activation paradigms. Because many TLE patients have more or less frequent, isolated subclinical epileptic discharges in the larger hippocampal region—which complicates functional studies—a simple structural-functional correlation approach might be more advantageous for this patient population.

Summary and Outlook

Patients with TLE are not the only ones to benefit from this type of high-resolution imaging, particularly when combined with quantitative measurements. This technique has been used successfully to differentiate between hippocampal volume loss due to normal aging and early stage Alzheimer's disease and to establish a hippocampal signature of post-traumatic stress syndrome. At the moment, quantitative hippocampal volumetry still relies on an expert rater who identifies the crucial landmarks and labels the subfields manually. This is likely to change in the future, due to ongoing development and evaluation of a more automated approach in a collaboration with the Penn Image and Computing & Science Lab at the University of Pennsylvania. This facilitates processing large data sets and introducing these techniques into routine, clinical application.

Susanne G. Mueller, MD, is an associate adjunct professor in the Department of Radiology and Biomedical Imaging and a research scientist in radiology at the San Francisco Veterans Affairs Medical Center. Kenneth D. Laxer, MD, is a professor in the Department of Neurology, University of California, San Francisco and the Medical Director for the California Pacific Medical Center Epilepsy Program.

Capital Equipment and Technology: Past Year Overview

Robert G. Gould, ScD

This was a year in which we did relatively little site preparation construction; rather we spent time planning and preparing documents, and waiting for state government approval for construction. Radiology continues to succeed in obtaining Medical Center approval to replace imaging equipment, but it requires at least 18 months, and frequently longer, to install new hospital-based equipment. However, by mid-summer of 2011, construction was underway on the replacement of the inpatient CT scanner at Mt. Zion. With this and other projects, we will be in a constant state of site preparation through at least midyear 2012.

Parnassus Area

Construction has begun on the third floor of the Ambulatory Care Building along the main corridor of the Radiology facility to create a suite of ultrasound (US) rooms. When complete, there will be three new imaging rooms added to the two that already exist (formerly mammographic rooms) and a new, large US reading room. This will allow us to close the cramped, outpatient US facility located on the Plaza Level of the ACC complex. This third-floor space has not been remodeled in more than 30 years; the proof is two old film darkrooms within the construction zone. When the construction is complete by the end of 2011, the space will match the décor of the surrounding area.

Ultrasound also took delivery of 2 new GE Logig 9 US units that will be used for inpatient imaging in Moffitt/Long. This allowed two existing units to be moved from the hospital into the new exam rooms in the ACC. The GE units have wireless connectivity and are relatively small and portable.

Not easily seen, and not detectable, a significant improvement in the reliability of the PACS computer room, located on the first floor of the Kalmanovitz Library, was achieved by replacing the Uninterruptable Power Supply (UPS). This project cost in excess of $200,000 and should prevent power outages from causing PACS to shut down. The UPS will sustain the PACS for more than 40 minutes, by which time backup power should have been provided.

In October, construction will begin to replace the 8-slice CT scanner within Radiology on the third floor of Long Hospital. A GE 750HD CT scanner with dual energy capability will be installed and in operation in the first quarter of 2012. The scanner room will have a display and allow tableside operation of the scanner for use in CT-guided interventional procedures.

Late fall is also when construction should begin to prepare the space in the Nuclear Medicine area of Long for a new SPECT-CT scanner, to replace two old gamma cameras. The new device is a GE Discovery 670, a true multimodality device with a dual-head gamma camera combined with a 16-slice CT. This unit should be operational in the first quarter of 2012.

Mt. Zion Campus

Mt. Zion's projects have also been primarily in the planning stages. The exception is the installation of a new inpatient, GE 750HD CT scanner. The first patient scan was in mid-September. Like the planned CT scanner for Long, this unit will be equipped for interventional procedure use, with display in the scan room and tableside scanning control. The Mt. Zion area now has two 64-slice GE CT scanners, one an outpatient unit. Both have GE's radiation dose-reducing reconstruction software, ASiR.

Two replacement radiographic rooms are in the planning stage. A radiographic unit located in the Divisadero Street Medical Office Building will be upgraded with two DR detectors, one in the table and the second in a wall stand. The equipment manufacturer is Philips. The detector currently used in this radiographic room is CR (computed radiography) and the new equipment will be the first DR (digital radiography) room in the Mt. Zion area.

The second replacement is of the only dedicated inpatient radiographic room at Mt. Zion Hospital. It will be replaced by a GE Definium 6000 with digital tomographic capabilities. This installation also switches the digital detector from CR to DR.

Finally at Mt. Zion, the image intensifier-based body interventional room on the second floor will be replaced by a single-plane, Siemens Artis Zee angiographic unit that has a flat panel detector. The plans for this installation have been reviewed by the state and this is another construction project that will start this fall with completion in the second quarter of 2012.

Figure 1 The new inpatient, GE 750HD CT scanner at Mt. Zion Campus.

China Basin

The second nuclear camera for China Basin, a GE Infinia Hawkeye, is the final project we anticipate completing before the end of 2011. Construction will start in October, and patients will be imaged early in December. The reading room at China Basin has been re-arranged so it is now the primary reading location for nuclear medicine studies.

We also installed an Insightec ExAblate high-intensity, focused ultrasound (HIFU) unit on the research GE 3T magnet at China Basin. HIFU is a treatment device used with MR guidance for ablation procedures in a variety of tissues. It has FDA approval for ablation of uterine fibroids and these procedures are currently being done.

Approved Projects

Two major projects have been funded by the Medical Center in Moffitt/Long. The first is replacement of the last remaining Radiology CT scanner with less than 64 slices. A GE 750HD will be installed, the third such unit purchased by Radiology. Its installation will involve a significant change to the central area of the Radiology Department within Long Hospital. Architects have been hired and project planning has begun.

The second project is to replace an old bi-plane neuroangiographic room, also located in Long. This will be the third neurointerventional bi-plane room to be replaced in the last two years and will eliminate all image-intensifier-based imaging for this group.

Lastly, the Department is actively working on replacing the current PACS system, which uses an old version of software. No decision has been made on a vendor.

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.

Jung Becomes VAMC Chief of MRI

Adam Jung, MD, PhD

In July 2011, Adam Jung, MD, PhD, assistant professor of clinical radiology, was appointed Chief of the MRI section in the Department of Radiology at the San Francisco Veterans Affairs Medical Center. According to Chairman Ron Arenson, MD, one of his goals is to develop a prostate imaging program at the VAMC.

Jung completed his medical degree at the Texas A & M Health Science Center, College Station, Texas, in 2003. He then participated in the American Board of Radiology's Holman Pathway for Radiology residency. He completed both his PhD and a diagnostic radiology residency at the Texas A & M Health Science Center at San Antonio, where he was chief resident, in 2009. Jung came to UCSF for an abdominal imaging fellowship, completed in 2010. He accepted an assistant professor of Clinical Radiology position in 2010. His area of research interest is prostate MRI, including endorectal MRI and MR spectroscopy of prostate cancer.

New Faculty

Natasha Brasic, MD

Assistant Professor of Clinical Radiology, SFGH

In 2004, Natasha Brasic earned her medical degree from the Pritzker School of Medicine, University of Chicago, Illinois. The following year, she completed a transitional year at MacNeal Hospital in Berwyn, Illinois, followed by a four-year diagnostic radiology residency at UCSF, where she served as chief resident from 2008-2009. Brasic completed two UCSF fellowships following her residency, a Women's Imaging fellowship in 2010 and an Interventional Radiology fellowship in 2011. Brasic plans to "pursue more in the field of women-based interventions, particularly in the area of breast cancer diagnosis and minimally invasive treatment."

David M. Naeger, MD

Assistant Professor of Clinical Radiology
Cardiac and Pulmonary Imaging
Nuclear Medicine

David M. Naeger received his medical degree in 2005 from Duke University School of Medicine in Durham, North Carolina. He followed this with a one-year internship in Medicine at the California Pacific Medical Center in San Francisco. During his diagnostic radiology residency at UCSF, Naeger completed a research fellowship as a recipient of the NIH/NIBIB T32 Training Grant (2009–2010), and served as chief resident (2009–2010). In 2010, he received the Department of Radiology and Biomedical Imaging's Elmer Ng Award. After completing his residency in 2010, Naeger did a fellowship in both Cardiac and Pulmonary Imaging and Nuclear Medicine sections at UCSF. In July 2011, Naeger accepted the position of assistant professor of clinical radiology at UCSF.

Elissa R. Price, MD

Assistant Professor of Clinical Radiology
Women's Imaging, Mt. Zion

Elissa R. Price received her medical degree in 2004, followed by a diagnostic radiology residency completed in 2009, both at the University of Toronto Medical School, Canada. In 2010, she completed a year-long fellowship in Breast and Body Imaging at Memorial Sloan-Kettering Cancer Center in New York, New York. From 2010–2011 she was an attending radiologist in Breast Imaging at Maimonides Medical Center in Brooklyn, New York. In July 2011, she accepted an assistant professor of clinical radiology position in Women's Imaging, UCSF. Her areas of interest include breast cancer, mammography, BRCA, breast ultrasound, and medical education.

Viola Rieke, PhD

Assistant Professor in Residence
Image-Guided Therapy Special Resource Group, China Basin

Viola Rieke, PhD, received her MS in Electrical Engineering from the University of Rhode Island, Providence, RI in 1999. In 2005, she received a PhD in Electrical Engineering from Stanford University, Palo Alto, Calif., where she worked in the Department of Radiology as a research assistant (2000–2005), a research associate (2005–2010), and senior research associate (2011). While at Stanford, she received the Electrical Engineering Diversity Doctoral Fellowship in 2000. In particular, Rieke's research focuses on magnetic resonance guided focused ultrasound and MRI-guided cardiac FUS. "This is a new and very promising methodology for noninvasive treatment of various diseases, but there are still many technological challenges that have to be overcome for a widespread adoption of FUS into clinical routine," she says. In November 2011, Rieke accepted a position as assistant professor in residence at China Basin.

Dorothy J. Shum, MD

Assistant Clinical Professor
Ultrasound, SFGH

Dorothy J. Shum, MD, received her medical degree from the Dartmouth-Brown Medical School in Hanover, New Hampshire and Providence, Rhode Island in 2005. After a one-year transitional internship at Kaiser Hospital in Los Angeles, Calif., she completed a four-year diagnostic radiology residency there in 2010. A year later, she completed an advanced body imaging fellowship at the University of Southern California in Los Angeles in 2011. She was a staff radiologist at Kaiser Hospital in Los Angeles prior to accepting a position at UCSF as an assistant clinical professor in September 2011. Shum's research interests are in the areas of body MRI and ultrasound for oncologic imaging, hepatobiliary imaging, and female pelvis imaging.

Duygu Tosun, PhD

Assistant Adjunct Professor, VAMC

Duygun Tosun, PhD, is an associate research scientist under the mentorship of Michael Weiner, MD, at the Center of Imaging of Neurodegenerative Diseases. In 1999, she received her BSc in Electrical and Electronics Engineering from Bilkent University, Turkey. Tosun earned an MA in Mathematics (2003) and a PhD (2005) in Electrical and Computer Engineering from Johns Hopkins University, Maryland. She completed her postdoctoral training at the Laboratory of Neuro-Imaging, University of California Los Angeles. Tosun's research focuses on the use of multi-modality neuroimaging to improve the diagnostic accuracy in dementia and to study the biology of aging and neurodegenerative diseases. She received the AFAR-GE Healthcare Junior Investigator Award for Excellence in Imaging and Aging Research in 2010 and 2011 and the deLeon NeuroImaging Prize for Junior Investigator at the 2011 Alzheimer's Association International Conference. Tosun joined the Department of Radiology and Biomedical Imaging in September 2011 as an assistant professor.

Alina Uzelac, DO

Assistant Clinical Professor
Neuroradiology, SFGH

In 2001, Alina Uzelac received her Doctor of Osteopathic Medicine degree from the Western University of Health Sciences in Pomona, Calif. This was followed by a one-year internship at Chino Valley Medical Center in Chino, Calif. Uzelac completed a four-year diagnostic radiology residency in 2006 at Los Angeles County+University of Southern California Medical Center in Los Angeles and completed a two-year clinical fellowship in Neuroradiology at UCSF in 2011. In July 2011, she became an assistant clinical professor in the Neuroradiology Section, UCSF. Her areas of interest are trauma and central nervous system infection.

UCSF Launches New Master's Degree Program in Biomedical Imaging

A new master's degree program in Biomedical Imaging (MBI), which launched in September 2011, gives UCSF students the opportunity to broaden their investigative projects with a comprehensive understanding of imaging.

One of the first programs of its kind, the MBI is intended for students with bachelor's degrees, advanced pre-doctoral students, postdoctoral fellows, residents, researchers, and faculty seeking a deeper knowledge of imaging techniques.

"We are the leading health science campus for the UC system and are uniquely positioned to offer the MBI degree because of our resources and faculty expertise. Technology has greatly progressed in the last 20 years, increasing the speed and quality of imaging and driving a greater need for advanced education. Today, imaging technology is applied to measure not just tissue structure, but also functionality," said Sharmila Majumdar, PhD, professor of radiology and biomedical imaging and co-chair of the MBI program committee, along with Professor David Saloner, PhD.

Course work includes instruction in core theory drawn from imaging physics, engineering, and mathematics linked to physiology and disease. In addition to learning the fundamentals of image formation, students will participate in hands-on laboratory courses with experiments relevant to identifying disease, assessing underlying causes, and monitoring response to therapy. The program may be completed in one year of full-time study or on a part-time schedule over not more than three years.

"The blend of theory with practical applications is important," said Alastair Martin, PhD, professor of radiology and biomedical imaging and director of graduate studies for the MBI program. "We want students to gain both an understanding of imaging principles and a strong feel for how it is applied in the real world."

Professors (left to right) David Saloner, Sharmila Majumdar, and Alastair Martin, chair the master's degree program in biomedical imaging, which launched in September 2011. Photo credit: Susan Merrell.

Because imaging is a major component of research efforts in many disciplines at UCSF, students will have "a wealth of material to provide context for defining the requirements and challenges of using cutting-edge imaging methods in relevant conditions," said Saloner.

Graduates of the MBI program will be well prepared for career options at the increasing number of companies using imaging in research design, quality control, and in analyzing large trials that have major imaging components. Imaging scientists also are needed to support research programs in radiology departments and other disciplines.

Incoming MBI program students, September 2011.

Honors and Awards

Carina Mari Aparici, MD
Promoted to Associate Professor in Residence

A. James Barkovich, MD
Awarded Honorary Membership, Turkish Society of Neuroradiology, Antalya, Turkey, April 2011

Member, Scientific Board, European Society of Magnetic Resonance in Neuropediatrics

Member, MRI Safety Committee, American College of Radiology

Chair, Honorary Member Committee, American Society of Neuroradiology

Co-Chair, Diagnostics and Therapeutics Commission, National Institute of Child Health and Development

Member, Gold Medal Committee, American Society of Neuroradiology

Jay R. Catena, MD
Recipient, First Prize, Education Exhibit Presentation, American Society of Head and Neck Radiology, 2010

Soonmee Cha, MD
Promoted to Professor in Residence

William P. Dillon, MD
Recipient, 2011 J. Elliott Royer Award

Member, Research Committee, American Society of Neuroradiology

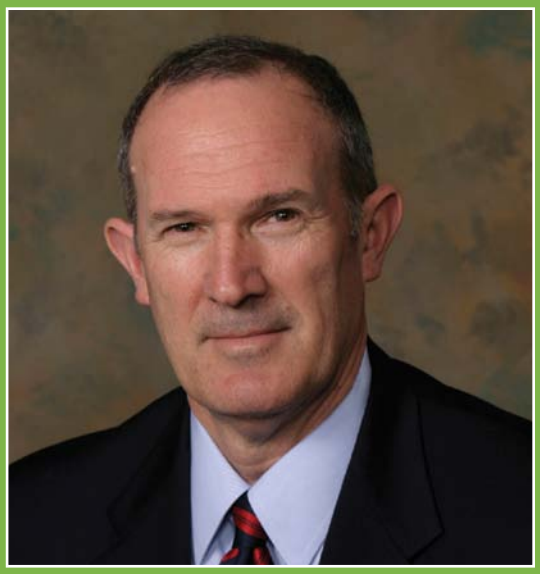
Senior Editor, *American Journal of Neuroradiology*

Roy A. Filly, MD
Keynote Speaker, Society of Radiologists in Ultrasound, 2011 Annual Meeting

Christine Glastonbury, MBBS
Recipient, First Prize, Scientific Exhibit, Combined Otolaryngology Spring Meeting, 2010

Recipient, First Prize, Education Exhibit Presentation, American Society of Head and Neck Radiology, 2010

Recipient, *Cum Laude* Award, Radiological Society of North America Meeting, 2010



William P. Dillon, MD, received the J. Elliott Royer Award for his outstanding contributions to clinical neurology.

Recipient, Bronze Award, Education Exhibit, American Roentgen Ray Society Meeting, 2011

Recipient, *Summa Cum Laude* award, American Society of Neuroradiology, 2011

Orit Glenn, MD
Recipient, Outstanding Teacher Award, ISMRM Annual Meeting, 2011

Nominating member, Executive Committee, American Society of Pediatric Neuroradiology, June 2011

Member, Editorial Board, *American Journal of Neuroradiology*

Gretchen A.W. Gooding, MD
Member, Editorial Advisory Board, *Journal of Ultrasound in Medicine*

Christopher P. Hess, MD, PhD
Member, Editorial Board, *American Journal of Neuroradiology*

Hideyo Minagi award recipient, Terry C.P. Lynch, MD, selected by senior residents as 'outstanding teacher'

Steven W. Hetts, MD

Recipient, American Society of Neuroradiology Foundation Scholar Award

Recipient, First Prize Poster Award, ISMRM Annual Meeting, Interventional Category

Member, Research, Clinical Practice, Audiovisual Committees, ASNR

Member, Neuroradiology Guidelines and Practice Standards Committee ASNR/ACR

Chair, Nominating Committee, Western Neuroradiological Society

Secretary, Scientific Committee, International Consortium of Neuroendovascular Centres

Charles Higgins, MD

Recipient, Gold Medal, The Society for Cardiovascular Magnetic Resonance, 2011

Nola Hylton, PhD

Appointed, NIH NIBIB Council

Bonnie N. Joe, MD, PhD

Visiting Professor, Grand Rounds, Emory University, Atlanta, Ga.

Adam Jung, MD, PhD

Promoted to Chief of MRI, San Francisco Veterans Affairs Medical Center

Chief, Gastrointestinal Subcommittee, American Roentgen Ray Society

Robert K. Kerlan, Jr., MD

Recipient, Distinguished Reviewer Award, JVIR

Recipient, Distinguished Service Award, American Board of Radiology

Jeanne M. LaBerge, MD

Member, ACGME Residency Review Committee for Diagnostic Radiology

2011 Dotter Lecturer, Society of Interventional Radiology

Thomas Lang, PhD

Member, Editorial Board, *Journal of Bone and Mineral Research*

Peder Larson, PhD

Recipient, Junior Fellow Award, International Society for Magnetic Resonance in Medicine, May 2011

Thomas M. Link, MD, PhD

Recipient, Editors Award, *Skeletal Radiology*, 2011

Recipient, Editor's Recognition Award with distinction, *Radiology*, 2011

Member, Editorial Board, *Skeletal Radiology*, 2011

Chair-elect, Musculoskeletal Study Group, ISMRM, 2011

Recipient, Certificate of Distinction, *Skeletal Radiology*, 2011

Member, RSNA Musculoskeletal Scientific Program Committee

Terry C.P. Lynch, MD

Recipient, Hideyo Minagi Outstanding Teacher Award, 2011

John D. Mackenzie, MD

Recipient, Pacific Coast Pediatric Radiology Association Annual Award for Research, August 2011

Sarah J. Nelson, PhD
NIBIB Innovation Lecturer, World Molecular Imaging Congress, San Diego, Calif., September 2011

Susan M. Noworolski, PhD
Distinguished Reviewer, Journal of Magnetic Resonance Imaging, 2011

Karen Ordovás, MD
Recipient, American Roentgen Ray Society Scholar Award

Aliya Qayyum, MBBS
Author, *MRI of the Liver, An Issue of Magnetic Resonance Imaging Clinics,* Saunders (December 2010)

John A. Shepherd, PhD, CCD, CDT
Promoted to Associate Adjunct Professor

Program Chair, 2011 Annual Meeting, International Society for Clinical Densitometry, Miami, Fl

Co-Chair, 5th Breast Densitometry and Breast Cancer Risk Workshop , San Francisco, Calif., 2011

Lynne S. Steinbach, MD
Recipient, Editor's Recognition Award with Distinction, *Radiology*

Distinguished Reviewer, *Journal of Magnetic Resonance Imaging*

Recipient, Certificate of Distinction, *Skeletal Radiology*

Secretary, International Skeletal Society

Chair, Residency and Fellowship Education Committee, Society of Skeletal Radiology

Ruedi F-L.Thoeni, MD
Member, Committee on Abdominal Imaging for the American College of Radiology

Thomas H. Urbania, MD
Member, Medical Imaging Resource Center Subcommittee of the Radiology Informatics Committee, RSNA

Henry VanBrocklin, PhD
Editor-in-Chief, *Molecular Imaging, 2012*

Susan D. Wall, MD
Recipient, Cannon Medal, Society for Gastrointestinal Radiology

Judy Yee, MD (left) and Susan D. Wall, MD (right) on the occasion of Wall being awarded the Cannon Medal, awarded annually to a distinguished gastrointestinal radiologist who has made an outstanding contribution to the field of gastrointestinal and abdominal radiology.

W. Richard Webb, MD
Isaac Sanders Honorary Lecture, Los Angeles Radiological Society, February 2011

Michael Weiner, MD
Recipient, Gold Medal of Paul Sabatier University, Toulouse, France

Recipient, Gold Medal, City of Toulouse, France

Recipient on behalf of the Alzheimer's Disease Neuroimaging Initiative, Ronald and Nancy Reagan Award, Alzheimer's Association

Named 2010 "Rock Star of Science" by the Geoffrey Beene Foundation, featured in *GQ Magazine,* November 23, 2010. The Rock Stars of Science campaign brings rock stars and "rock star" scientists together to raise awareness of the important role of scientific research in our society.

Judy Yee, MD
Director-at-Large, Society of Gastrointestinal Radiologists

Benjamin M. Yeh, MD
Recipient, Visiting Professorship Award, The Society of Gastrointestinal Radiologists, 2011

Partnership Brings Students to UCSF for Bioengineering Research

Tracy Richmond McKnight, PhD

Associate Professor in Residence Tracy Richmond McKnight, PhD, will mentor two students in the UCSF-Tuskegee Summer Internship in 2012. The internship is supported by a $22,000 grant from the University of California-Historically Black Colleges and Universities Initiative. The interns, both students at Tuskegee University's School of Engineering and Physical Sciences, will be part of UCSF's highly successful Summer Research Training Program. This funding is significant in that of the 10 highly competitive grants awarded, it is 1 of only 2 grants geared toward science.

"The strong mentorship, research experience, and exposure to biomedical applications of physics and engineering disciplines that I received as a student at Spelman College, and Howard University—both historically black institutions—and in the UC system at Davis and San Francisco, had a profound impact on my career path and was the impetus for applying for this grant," McKnight said. "I hope that the UCSF-Tuskegee Summer Internship in Bioengineering will have a similar impact on the interns and will forge an ongoing relationship between UCSF and Tuskegee University."

Weiner Accepts Reagan Research Award

On April 6, 2011, Michael W. Weiner, MD, director of the Center for Imaging of Neurodegenerative Diseases at the SF Veterans Affairs Medical Center's accepted the 2011 Ronald and Nancy Reagan Research Award from the Alzheimer's Association on behalf of the Alzheimer's Disease Neuroimaging Initiative (ADNI).

The Association presented the award to ADNI "for its collaborative and innovative approaches to furthering Alzheimer's treatment, prevention and care," citing Dr. Weiner for his "extraordinary leadership [which] has helped make ADNI the largest public-private Alzheimer's disease research partnership in our country."

ADNI is a $140,000,000, multi-year clinical trial involving more than 1,000 patients at 55 centers in the US and Canada. It seeks to establish biomarkers for the progression of Alzheimer's disease based on markers in the brain, spinal fluid, and blood. Much of the project's funding is administered by NCIRE-The Veterans Health Research Institute. Weiner is the ADNI's principal investigator.

"Of course, none of this would be possible without the huge support that our research group and I have received during the past decades from the leadership of the VA, NCIRE, and UCSF," said Dr. Weiner, who is a professor of Radiology, Medicine, Psychiatry, and Neurology at the University of California, San Francisco.

Michael Weiner (right) accepts the Ronald and Nancy Reagan Research Award from Virginia Governor Bob McDonnell at the 2011 National Alzheimer's Gala in Washington, DC. The award pays tribute to the Reagans for their courage and leadership in the fight against Alzheimer's, and honors researchers who are leading the way in promising and innovative approaches to Alzheimer's treatment, prevention, and care.

The award is "wonderful recognition of the great contribution to Alzheimer's disease neuroimaging research made by Dr. Weiner and his group," said Judy Yee, MD, professor and vice-chair of Radiology and Biomedical Imaging at UCSF and chief of Radiology at SFVAMC. "We are very proud of Dr. Weiner's achievements and look forward to his continued research success in this very important field. I also commend the dedication and hard work of the excellent investigators of ADNI."

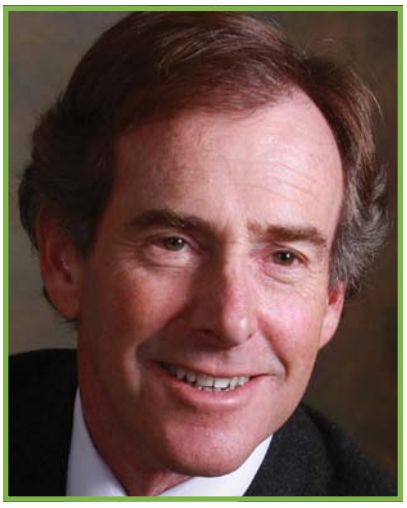
Retired in 2011

Richard S. Breiman, MD

Richard S. Breiman, MD, retired in October 2011 after 10 years of service to the Department of Radiology and Biomedical Imaging.

Breiman received his medical degree from UCSF in 1973. He completed a Diagnostic Radiology residency at Stanford University in 1979, followed by CT and Ultrasound fellowships, also at Stanford University, in 1976 and 1978. From 1979-1981, Breiman was an assistant professor of radiology at Duke University, Durham, North Carolina, and a Clinical Instructor of Radiology at UC Berkeley from 1982-1994. Concurrently he served as volunteer clinical faculty at UCSF from 1984-1987. He worked in private practice as a radiologist and partner at Pacific Imaging Consultants from 1989-2001. He was appointed assistant clinical professor in the Department of Radiology and Biomedical Imaging in July 2001, became an associate clinical professor in 2003, and was promoted to a clinical professor in 2007. He served as director of the Henry I. Goldberg Center for Advanced Imaging Education, and more recently on the faculty at San Francisco General Hospital.

"Dr. Breiman joined the Radiology faculty here at SFGH at a time of need for our department. His willingness to cover several niches helped us navigate through a rocky period and to emerge as strong as ever," said Mark Wilson, MD, chief of Radiology at SFGH. "His warm demeanor, consummate professionalism, and dedication to radiology education will be greatly missed at SFGH." Breiman will return to the department part-time on a recall appointment to provide clinical coverage at the UCSF Ambulatory Care Center.



Robert C. Brasch, MD

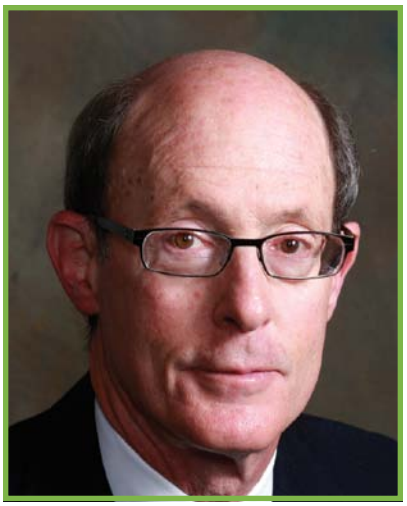
After 25 years in the Department of Radiology and Biomedical Imaging, Dr. Robert C. Brasch, professor in residence, Radiology and Pediatrics, retired in July 2011.

Brasch completed a medical degree at Washington University, St. Louis, Missouri, in 1970. From 1973-1976, he was a UCSF Radiology resident, concurrent with an NIH-sponsored research fellowship. Brasch joined the UCSF faculty in 1976 as a clinical instructor in the Pediatric Radiology section, becoming an assistant professor the following year. In 1982 he became an associate professor, and in 1986 was promoted to full professor in residence.

Brasch directed the Center for Pharmaceutical and Molecular Imaging Laboratory (CPMI), which he created in the early 1980s. In this capacity, he trained numerous research fellows from the United States and around the world in contrast medical research. He received the RSNA 2003 Outstanding Researcher Award and in 2004 was the invited keynote speaker for the Madame Curie Lecture for the European Congress of Radiology, in Austria. He received the prestigious Caffey Award for Outstanding Research from the Society of Pediatric Radiology on two occasions, 1992 and 1997, and in 1998 was named Alumnus of the Year by the Department of Radiology. He published extensively, with more than 300 peer-reviewed manuscripts, and numerous book chapters in print. Brasch also served in many capacities for UCSF's Koret Family House, a not-for-profit organization providing temporary housing to families of seriously ill children receiving treatment at the

University of California San Francisco Benioff Children's Hospital.

Announcing Brasch's retirement, Department Chairman Ron Arenson, MD, praised his "outstanding service as a faculty member in our department," indicating that Brasch will return to the department part-time on a recall appointment to provide clinical coverage. Asked what he planned to do when not at work, Brasch noted that he plans to spend time "improving his golf game."



Philip A. Brodey, MD, FACR

Philip A. Brodey, MD, FACR, professor of radiology, retired in July 2011 after more than 35 years in the Department of Radiology and Biomedical Imaging. In announcing Brodey's retirement, Chairman Ron Arenson, MD, noted Brodey's "excellent professional competence and very dedicated service to patient care and radiology at UCSF-Mt. Zion Hospital over many years."

Brodey received his medical degree from Indiana University School of Medicine, Indianapolis, Ind. in 1968. His postgraduate training included a one-year internship in Radiology in 1968 at Western Reserve University, University Hospitals of Cleveland, Ohio, and a three-year radiology residency, from 1969-72, completed at Wadsworth VA Hospital/UCLA Medical Center, which also included Harbor General Hospital and Los Angeles Children's Hospital. From 1972-74, Dr. Brodey served as a member of the US Public Health Service in the Department of Diagnostic Radiology at the Clinical Center, National Institutes of Health. From 1974-1985, he was Associate Chief of Radiology at Mt. Zion Hospital in San Francisco, before becoming Chief of Radiology at Mt. Zion in 1985, a position he held until 2003. Concurrently, Dr. Brodey joined the UCSF Radiology Department as clinical faculty in 1975. He was promoted to assistant clinical professor in 1980 and associate clinical professor in 1986. Brodey joined the full-time faculty in 1992 as part of the integration of the Department of Radiology and Mt. Zion Hospital and Medical Center.

Remarking on Brodey's retirement, Executive Vice-Chair William Dillon praised his "tireless work in the reading rooms at Mt. Zion Hospital and clinics" adding "We will miss him and his wry sense of humor. I believe you will find him tending his grapes in Napa!"

Steven H. Ominsky, MD

After more than 25 years in the Department of Radiology and Biomedical Imaging. Steven H. Ominsky, MD, professor of radiology, retired in July 2011. Widely regarded as a superb clinical radiologist, Ominsky earned extensive praise for his thorough knowledge of radiology.

"Dr. O was a dedicated, long-time member of the UCSF radiology faculty who served as chief of the Ambulatory Care Center for nearly 30 years," said Helen Galvin, MD, clinical professor of radiology. "A tireless and astute radiologist, he loved to teach. He was a compassionate physician and colleague and not least of all, a great friend and advocate for those of us who worked with him for many years."

Ominsky received his medical degree at the University of Pennsylvania, Philadelphia, Penn., in 1966. He interned at Mt. Zion Hospital, San Francisco, Calif. anad served two years at Oak Ridge Associated University as a nuclear medicine fellow. He completed a diagnostic radiol-

ogy residency at Beth Israel Hospital, Harvard University, where he served as chief resident during the last year of his residency in 1972. Ominsky served on the faculty at Hahnemann Medical School in Philadelphia, from 1973-1976. He joined the UCSF faculty in 1976, becoming a full professor in 1986. He served as chief of radiology for the ACC from 1978 to 2007, where he had wide-ranging responsibilities for patient care, equipment evaluation, and the extensive ramifications of a large outpatient facility.

"Dr. Ominsky was known for his impeccable standards and the great concern he had for his patients," noted Chairman Ron Arenson, MD. "We wish him an enjoyable and fulfilling retirement."

Susanna Lanzarin

Sue Lanzarin, academic personnel analyst, has retired after more than 13 years in the Department of Radiology and Biomedical Imaging, and nearly 30 years at UCSF.

Soon after her 1981 graduation from San Francisco State University, where she earned a BS in Health Education, Lanzarin accepted a medical secretary position in the Gastroenterology Clinic at UCSF where she remained until 1989. Lanzarin then worked for one year in the hospital's Ambulatory Care Center, where she was an input specialist for the STOR clinical database system.

From 1990–1998, Lanzarin served as a program representative, administering the day-to-day operations of the

Student Programs Office in the School of Medicine and coordinating fourth year block electives at nine different hospital sites.

In 1998, Lanzarin took on new duties when she joined the Department of Radiology and Biomedical Imaging—first as an administrative assistant, then, starting in 2002, as an academic personnel analyst. In this role, Lanzarin provided critical support and backup to the Academic Personnel Manager, applying her comprehensive skills and knowledge to all areas of personnel, including recruitment, appointments, merits and promotions, payroll, appointments to medical staff, salary and benefits administration, and visa issues. Throughout her career, Lanzarin received many performance awards as well as praise for her contributions.

"I will miss the colleagues I had here in Radiology" said Lanzarin. "it was great to work with people who were supportive and positive. I have the honor to say that I established great friendships with my co-workers and look forward to keeping in touch".

"We are so fortunate in Radiology to have outstanding employees who have a successful career in the department. We definitely benefited from Sue's long tenure in the department and her depth of knowledge," said Cathy Garzio, administrative director. "I appreciated and relied on Sue, and we will miss her, but we wish her well in retirement!"

Lanzarin looks forward to relaxing and spending time with her husband Ed, her son Eddie and daughter Amanda and her family.

In Memoriam: Patricia Byrd

The Department of Radiology and Biomedical Imaging lost a dear friend and colleague with the passing of Pat Byrd, special projects administrator for the Musculoskeletal and Quantitative Imaging Group, who died suddenly on December 30.

Pat's long history at UCSF began in 1976 in the Veterans Affairs Medical Center's Department of Medicine, where she served as a staff research associate and grants manager for more than 20 years. In 1988, while in the Department of Medicine, Pat received the Chancellor's Award for Exceptional University Service. In 1998 she joined the Department of Radiology and Biomedical Imaging as a research administrator, and was instrumental in organizing and developing the department's research administration infrastructure.

"As many of you know, Pat was the department's first research administrator. She 'tutored' a huge number of radiology investigators in the intricacies of applying for and managing grants, and she was highly respected by faculty, staff, and colleagues across campus," said Cathy Garzio, administrative director for the Department of Radiology and Biomedical Imaging. "We are deeply saddened that this bright, funny, warm and intelligent woman has been taken from us too soon."

After retiring in 2005 after more than 30 years of service, Pat returned part-time to assist Sharmila Majumdar, PhD, and Thomas Link, MD, PhD, with the organization and operations of their Musculoskeletal and Quantitative Imaging Research group and continued to be deeply involved with the department administration.

Pat was known for her love of travel, her spirit of adventure, and her enjoyment of good food and good wine. She is survived by her husband of 38 years, David William "Bill" Byrd and her sister, Michele Demkowicz.

In Memoriam: Gary Glazer, MD

Ron Arenson, MD

Gary Glazer, MD, was an extraordinary man, a visionary and a pioneer in the field of radiology. Until earlier this year, Glazer served as chairman of the Department of Radiology at the Stanford University School of Medicine and the Emma Pfeiffer Merner Professor in the Medical Sciences. He passed away on October 16, 2011, at age 61, after a long battle with prostate cancer.

Glazer received his undergraduate degree from the University of Michigan in 1972, then attended medical school at Case Western Reserve University in Cleveland, Ohio, graduating in 1976. It is no surprise that he was both Phi Beta Kappa in undergraduate school and Alpha Omega Alpha in medical school. He came to UCSF in 1976 for a medicine internship and completed his diagnostic radiology residency here in 1980. He stayed at UCSF for a body CT and ultrasound fellowship—both exciting new modalities at that time.

During his fellowship year (1980–81) at UCSF, Glazer served as the Clarence Heller Fellow and the American Cancer Society Fellow. After finishing his fellowship at UCSF, he joined the faculty at the University of Michigan. He became chairman of the Stanford department of radiology in 1989.

His prestigious awards include gold medals from the Association of University Radiologists in 2011 and the Radiological Society of North America in 2009. He held honorary membership in the Japanese Radiological Society, French Radiological Society, German Radiological Society, and the Chicago Radiological Society. He was the past-president of the International Society of Strategic Studies in Radiology from 2003–2005. Glazer received the Outstanding Teacher Award from the Department of Radiology at the University of Michigan in 1982, and the Outstanding Alumnus Award from the UCSF Department of Radiology in 1991.

Glazer will be remembered for many outstanding contributions to our field and to medicine. At Stanford, he was instrumental in establishing the Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging, and for bringing molecular imaging to Stanford. With those programs and many others, Stanford is now among the top departments in the country in NIH funding.

His long publication list and major scientific contributions to our field—especially regarding chest disease and, most recently, magnetic resonance imaging—ensure his legacy. Recently he published several very important editorials, including "Creating a patient-centered imaging service: determining what patients want," "Decades of perceived mediocrity: prestige and radiology," and "The invisible radiologist."

Perhaps most importantly, Gary Glazer was a devoted family man and a caring, compassionate individual. His close friends all over the world already miss him dearly.

Diagnostic Radiology Residency Program 2011

By Aliya Qayyum, MBBS
Residency Program Director

As I write this, our new class is three weeks into their residency, and we have sent almost half of our graduating seniors off to exciting opportunities in Boston, New York, and Stanford, with many staying home at UCSF. Our graduating class all entered fellowships in a range of subspecialties, including Interventional Radiology, Neuroradiology, Musculoskeletal, Pediatric Radiology, Nuclear Medicine, and Abdominal Imaging. Eight graduates of this unusually large class are staying with us in IR, Neuro, Breast Imaging/Ultrasound, and Nuclear Medicine. You can read about the incoming residency class on page 34.

Chief residents Jason Talbott, MD, PhD, Nazia Jafri, MD, Ingrid Burger, MD, PhD

Highlights

The new chief residents for 2011–2012 are Ingrid Burger, MD, PhD, Nazia Jafri, MD, and Jason Talbott, MD, PhD, who have already demonstrated their talent for organization and diplomacy. The outgoing triumvirate of Andrew Phelps, MD, Fabio Settecase, MD, and Vinil Shah, MD, set a high bar. One of their enduring accomplishments was the acquisition and installation of an Audience Response System (ARS) to enhance the engagement and educational value of our resident conferences. There is a modest adaptation and training requirement for faculty, and the results have been impressive.

We had another very successful recruitment season for the class to begin next year. It seems that the most attractive features of the program are the clinical involvement, independence, and research opportunities. We had three residents pursue a full year of T32 research training, with four more beginning this academic year. Many other residents designed projects with mentors and received up to six months of research time. As you can see from the list at the end of this article, the research productivity of the residents this year has been amazing.

A nice by-product of this research is the huge resident participation at RSNA, which is a great experience. Twelve residents attended, the vast majority involved with presentations, posters, exhibits, special programs, or awards.

One major change this year is transitioning the residency education and schedule to mesh with the new American Board of Radiology examination schedule, which consists of a comprehensive, computer-based exam at the end of the third year. This will include physics "in context"; the separate physics exam is being discontinued. The final, and somewhat subspecialty-specific, examination will be at the end of fellowship or first year of practice. Our current first- and second-year residents will follow this new ABR exam plan.

The absolute highlight of the year was the warm welcome reception that included the entire residency group including spouses, babies, toddlers, and others, hosted by Chairman Ron Arenson, MD, and his gracious wife Ellen at their home.

The year was capped by a wonderful graduation dinner with parents from all over the country and the world in attendance. Vinil Shah, MD, was selected for the Elmer Ng award, and Gloria Chiang, MD, received the Margulis Society research award. Resident teaching awards went to SFGH faculty Terry Lynch, MD, (who was really surprised, speechless almost!) and Garney Fendley, MD, Abdominal Imaging fellow at the VAMC. Philip Goodman, MD, professor of

radiology, Division of Cardiac and Thoracic Imaging, Duke University, Residency Class of 1975 and former UCSF faculty, received the outstanding alumni award. I was touched by a special recognition from the outgoing senior class.

It was a really good year. I love this crew, and thoroughly enjoy watching them transition from rookies to accomplished radiologists.

Resident Accomplishments 2010–11

Awards

Gloria Chiang, MD: Margulis Society Resident Research Award, 2011

Akash Kansagra, MD: American Alliance of Academic Chief Residents in Radiology Advisor's Award, Association of University Radiologists

Thomas A. Hope, MD: MRA Poster Award, The Effect of Omniscan on Hypoxia inducible Factor-1α (HIF-1α) in Macrophages, MR Angio Club, 2010. Certificate of Merit, Clinical Evaluation of Cardiovascular Disease Using 4D Flow, RSNA, 2010

Fabio Settecase, MD: RSNA Roentgen Resident/Fellow Research Award, 2011

Vinil Shah, MD: Elmer Ng Award, presented to outstanding resident, 2011

Timothy M. Shepherd, MD, PhD: Gabriel H. Wilson Award for best paper, "Reducing Patient Radiation Exposure During CT-Guided Injections for Spinal Pain," Western Neuroradiological Society, 2010

Grants

Ania Azziz, MD: National Institute of Biomedical Imaging and Bioengineering, T32 Training Grant. Clinical and Translational Science Institute Resident Research Award, 2010–1011

Thomas A. Hope, MD: RSNA Presidents Circle Research Resident Grant, Validation of an NSF Model in Renal Failure Rats and Evaluation of Imatinib as a Potential Treatment, 2010–2011

D. Thor Johnson, MD, PhD: National Institute of Biomedical Imaging and Bioengineering T32 Training Grant

Yuo-Chen Kuo, MD: 2011 Society of Interventional Radiology (SIR) Annual Scientific Meeting Resident-in-Training Scholarship

Gloria Chiang, MD, Margulis Society Resident Research Awardee

Michael Lu, MD: CTSI Resident Research Grant, "Does Importing Outside Imaging to PACS Reduce the Rate of Repeat Imaging?"

Judong Pan, MD: RSNA Trainee Research Prize, November 2010

Anand Patel, MD: 2011 Society of Interventional Radiology (SIR) Annual Scientific Meeting Resident-in-Training Scholarship

Jason Talbott, MD, PhD: National Institute of Biomedical Imaging and Bioengineering T32 Training Grant

Posters

Ania Azziz, MD: Quantitative and Qualitative Assessment of Breast MRI Background Enhancement in a Non-Cancer Patient Population. Imaging Research Symposium, Radiology and Biomedical Imaging, UCSF, 2011

Marcel Brus-Ramer, MD: Idiopathic Thoracic Spinal Cord Herniation: Retrospective Analysis Supporting a Mechanism of Dural Injury and Subsequent Tamponade. Imaging Research Symposium, Radiology and Biomedical Imaging, UCSF, 2011

Matthew Bucknor, MD: Extraspinal Sciatica in the Setting of Proximal Hamstring Injury: An Under Diagnosed Clinical Syndrome. Imaging Research Symposium, Radiology and Biomedical Imaging, UCSF, 2011

Thomas A. Hope, MD: Evaluation of Gadolinium Accumulation and Fibrosis within the Liver after the Administration

of Gadoxetate in a Rat Model of Cirrhosis. Imaging Research Symposium, Radiology and Biomedical Imaging, UCSF, 2011

Akash Kansagra, MD: Simulation of Flow Mixing in the Vertebrobasilar System. Bockman MD, Kansagra AP, Wong EC, et al. CFD American Society of Mechanical Engineers Summer Bioengineering Conference, 2010

Michael Lu, MD: Asymmetric Ascending Aortic Dilation with Bicuspid Aortic Valve. Imaging Research Symposium, Radiology and Biomedical Imaging, UCSF, 2011

John Mongan, MD: Methods for Radiation Dose Reduction in Abdominopelvic CT Imaging. Mongan J, Aslam R, Coakley F, Gould R, Shepherd J, Yeh B. RSNA, 2010

Presentations

Ania Azziz, MD: Normal Variability of the Quantitative Assessment of Breast Tissue by MRI. ISMRM, 2011

Ramon Barajas, MD: Barajas RF Jr, Philips J, Hodgson JG, Chang JS, Vandenberg SR, Yeh RF, Parsa AT, McDermott MW, Berger MS, Dillon WP, Cha S. Anatomic and Physiologic MR Imaging Characterizes Cellular and Genetic Expression Pattern of Angiogenesis in Glioblastoma Multiforme. RSNA, 2010. Barajas RF Jr, Butowski N, Phillips J, Nelson S, Aghi M, Chang S, Berger M, Cha S. Recurrent Glioblastoma Multiforme Following Bevacizumab Therapy: Unmasking of Highly Invasive Phenotype Differentiated By Diffusion Weighted Imaging. RSNA, 2010. Barajas Jr. RF, Yu JP, Hess CP, von Morze C, Cha S. Super-Resolution White Matter Track Density Imaging Correlates With *In-Vivo* Histopathologic Features of Glioblastoma Multiforme Aggressiveness. RSNA, 2011. Barajas Jr. RF, Hess CP, von Morze C, Cha S. Super Resolution White Matter Track-Density Imaging: Initial Clinical Feasibility Study in Human Brain. ASNR, 2011

Marjan Bolouri, MD: Bolouri, M, Courtier, J, Steinbach, L. To Touch or Not to Touch? Top 10 Normal Pediatric Musculoskeletal Variants That Simulate Disease with Their Mimickers. RSNA, 2011

Thomas A. Hope, MD: Hope TA, Brunwell AN, Wheeler SE, Brasch RC, Chapman H. The Effect of Omniscan on Hypoxia Inducible Factor-1α (HIF-1α) in Macrophages. MR Angio Club, Oct 2010. Hope TA, Hope MD, Miller DC, Markl M, Kvitting JE, Higgins CB, Herfkens RJ. Long Term Follow-Up of Patients Status Post Valve-Sparing Aortic Surgery with 4D-Flow. ISMRM, 2010. Hope TA, Hope MD, Muzzarelli S, Ohliger M, Lu MT, Ordovas KG, Higgins CB. Clinical Evaluation of Cardiovascular Disease Using 4D Flow. RSNA, 2010

Nazia Jafri, MD: Jafri NF, Clark J, Barani I, Weinberg V, Cha S. Relationship of Glioblastoma Multiforme (GBM) to the Subventricular Zone Predicts Survival. ASNR, 2011

Vinil Shah, MD: Structured Reporting Versus Conventional Dictation for Complex Head and Neck Neoplasms: Which do Clinicians Prefer? ASNR, 2011

Akash Kansagra, MD: Kansagra AP. A Novel Image-Guided Balloon Vaginoplasty Method to Treat Obstructive Vaginal Anomalies. Association of University Radiologists, 2011

Michael Lu, MD: Lu MT, Crook S, Hope MD. Asymmetric Aortic Dilation with Bicuspid Aortic Valve. RSNA, 2011. Lu MT, Tellis W, Avrin DE. Impact of Importing Outside Imaging to PACS on Repeat Imaging. RSNA, 2011. Lu MT, Tellis W, Avrin DE. Three-year Experience Importing Outside Hospital Imaging to PACS: Utilization, Storage, and Formal Reinterpretation. RSNA, 2010

Judong Pan, MD, PhD: Pan J, Stehling C, Muller-Hocker C, Schwaiger BJ, Lynch J, Link TM. Vastus Lateralis/Vastus Medialis Ratio Impacts Presence and Degree of Knee Joint Abnormalities and Cartilage T2 Determined with 3T MRI—An Analysis from the Incidence Cohort of the Osteoarthritis Initiative. RSNA, 2010. Pan J, Pialat J, Joseph T, Kuo D, Nevitt MC, Link TM. Knee Cartilage T2 Characteristics and Evolution In Relation To Morphological Abnormalities Detected By 3T MRI—A Longitudinal Study of The Normal Control Cohort from the Osteoarthritis Initiative. RSNA, 2010

Publications

Ramon Barajas, MD: Barajas RF Jr, Cha S. Diagnosis of Brain Metastasis. Current and Future Management of Brain Metastasis. *Karger.* Pending Publication. Barajas Jr. RF, Cha S. MR Perfusion Imaging in Oncology: Neuro Applications. Clinical Perfusion MRI. *Cambridge University Press.* Pending Publication.

Ingrid Burger, MD, PhD: "Minimal Menstrual Age" as a measure to help assess early pregnancy failure. Accepted. *J Ultrasound in Med.*

Thomas A. Hope, MD: Hope MD, Hope TA, Crook SE, Ordovas KG, Urbania TH, Alley MT, Higgins CB. 4D Flow

CMR in Assessment of Valve-Related Ascending Aortic Disease. *JACC Imaging*. 2011 Jul;4(7):781-787.

Nazia Jafri, MD: Jafri NF, Nadgir R, Slanetz PJ. Student-Facilitated Radiology-Pathology Correlation Conferences: An Experiential Educational Tool to Teach Multidisciplinary Patient Care. *J Am Coll Radiol.* 2010 Jul;7(7):512-6.

Akash Kansagra, MD: Coufal NG, Kansagra AP, Doucet J, et al. Gastric Trichobezoar. Causing Intermittent Small Bowel Obstruction: Report of a Case and Review of the Literature. *Case Report Med.* 2011;2011:217570. Epub Jun 7. Kansagra AP, Miller CB, Roberts AC. A Novel Image-Guided Balloon Vaginoplasty Method to Treat Obstructive Vaginal Anomalies. *J Vasc Interv Radiol.* 2011;22(5):691-694.

Alexander Keedy, MD: Keedy AW, Durack JC, Sandhu P, Chen EM, O'Sullivan PS, Breiman RS. Comparison of Traditional Methods with 3D Computer Models in the Instruction of Hepatobiliary Anatomy. *Anat Sci Educ.* 2011 Mar-Apr;4(2):84-91. Keedy AW, Yeh BM, Kohr JR, Hiramoto JS, Schneider DB, Breiman RS. Evaluation of Potential Outcome Predictors in Type II Endoleak: A Retrospective Study With CT Angiography Feature Analysis. *AJR Am J Roentgenol*. 2011; 197:234-240. Keedy AW, Yee J, Aslam R, Weinstein S, Landeras LA, Shah JN, McQuaid KR, Yeh BM. Reduced Cathartic Bowel Preparation for CT Colonography: A Prospective Comparison of Two-Liter Polyethylene Glycol and Magnesium Citrate. *Radiology.* 2011. Article in press.

Marc Laberge, MD: Laberge, MA, Baum, T, Virayavanich, W, Nardo, L, Nevitt, MC, Lynch, J, McCulloch, CE, Link, TM. Obesity Increases the Prevalence and Severity of Focal Knee Abnormalities Diagnosed Using 3T MRI In Middle-Aged Subjects—Data from The Osteoarthritis Initiative. *Skeletal Radiol.* Accepted.

Michael Lu, MD: Lu MT, Tellis W, Fidelman N, Qayyum A, Avrin DE. Importing Outside Imaging to PACS Reduces Repeat Imaging. *AJR Am J Roentgenol.* 2011. Article in press. Lu MT, Demehri S, Cai T, Parast L, Hunsaker AR, Goldhaber SZ, Rybicki FJ. Axial and Reformatted 4-Chamber RV/LV Diameter Ratios on CT pulmonary Angiography as Predictors of Death after Acute Pulmonary Embolism. *AJR Am J Roentgenol.* 2011. Article in press.

Judong Pan, MD, PhD: Pan J, Pialat J, Joseph T, Kuo D, Nevitt MC, and Link TM. Knee Cartilage T2 Characteristics and Evolution in Relation to Morphological Abnormalities Detected by 3T MRI—a Longitudinal Study of the Normal

Elmer Ng awardee Vinil Shah, MD, with Aliya Qayyum, MBBS, and David Avrin, MD

Control Cohort from the Osteoarthritis Initiative. *Radiology*. Article in press. Pan J, Stehling C, Muller-Hocker C, Schwaiger BJ, Lynch J, McCulloch CE, Nevitt MC, Link TM. Vastus Lateralis/vastus Medialis Cross-sectional Area Ratio Impacts Presence and Degree of Knee Joint Abnormalities and Cartilage T2 Determined with 3T MRI—An Analysis from the Incidence Cohort of the Osteoarthritis Initiative. *Osteoarthritis Cartilage.* 2011 Jan;19(1):65-73. Stehling C, Luke A, Stahl R, Baum T, Joseph G, Pan J, Link TM. Meniscal T1rho and T2 Measured with 3.0T MRI Increases Directly after Running a Marathon. *Skeletal Radiol.* 2011 Jun;40(6):725-35.

Anand Patel, MD: Patel AS, Duan Q, Robson PM, McKenzie CM, Sodickson DK. A Simple Noniterative Principal Component Technique for Rapid Noise Reduction in Parallel MR Images. *NMR Biomed.* 2011 May 4. doi: 10.1002/nbm.1716. Epub. Nguyen ML, Patel AS. Images in Clinical Medicine: Plasmacytoma of the Skull. *N Engl J Med.* 2010 Nov 25;363(22):e33.

Service

Nazia Jafri, MD: Editorial Board, RSNA News Magazine. 2011–2012 Secretary, AUR American Alliance of Academic Chief Residents in Radiology

Michael Lu, MD: American Roentgen Ray Society (ARRS) Scientific Program Subcommittee, Cardiopulmonary representative. UCSF Fellows and Residents Advisory Group, APEX EMR. Webmaster, UCSF diagnostic radiology residency website, *www.ucsfrad.com*

Anand Patel, MD: President-elect of the California Radiological Society (CRS), Residents and Fellows Section

First-Year Diagnostic Radiology Residents 2011

Mariam S. Aboian, MD, PhD

MD 2010 Mayo Clinic, College of Medicine, Rochester, Minn.

2010–2011 Internal Medicine Internship, Dartmouth-Hitchcock Medical Center, Lebanon, NH

PhD 2008 Mayo Clinic, College of Medicine, Pediatric and Adolescent Medicine, Rochester, Minn.

Research:

2009 Mayo Clinic, Rochester, Minn.

Selected Publications:

Aboian MS, Wong-Kisiel LC, Rank M, Wetjen NM, Wirrell EC, Witte RJ. SISCOM in children with tuberous sclerosis complex-related epilepsy. Pediatr Neurol. 2011 Aug;45(2):83-8.

Aboian MS, Daniels DJ, Rammos SK, Pozzati E, Lanzino G. The putative role of the venous system in the genesis of vascular malformations. *Neurosurg Focus.* 2009 Nov;27(5):E9. Review.

Aboian MS, Junna MR, Krecke KN, Wirrell EC. Mesial temporal sclerosis after posterior reversible encephalopathy syndrome. *Pediatr Neurol.* 2009 Sep;41(3):226-8.

Jacob D. Brown, MD

MD 2010 Georgetown University, School of Medicine, Washington, DC

PhD 2010 Georgetown University, School of Medicine, Washington, DC

2010–2011 Internal Medicine Internship, University of Utah, Salt Lake City, Utah

Research:

2009 Georgetown University, Department of Radiology, Washington DC

2005–2008 National Institutes of Health, Bethesda, MD

Selected Publications:

Zeeberg BR, Liu H, Kahn AB, Ehler M, Rajapakse VN, Bonner RF, Brown JD, Brooks BP, Larionov VL, Reinhold W, Weinstein JN, Pommier YG. RedundancyMiner: De-replication of redundant GO categories in microarray and proteomics analysis. *BMC Bioinformatics.* 2011 Feb 10;12:52.

Brown JD, Dutta S, Bharti K, Bonner RF, Munson PJ, Dawid IB, Akhtar AL, Onojafe IF, Alur RP, Gross JM, Hejtmancik JF, Jiao X, Chan WY, Brooks BP. Expression profiling during ocular development identifies 2 Nlz genes with a critical role in optic fissure closure. Proc Natl Acad Sci U S A. 2009 Feb 3;106(5):1462-7.

Karai L, Brown DC, Mannes AJ, Connelly ST, Brown J, Gandal M, Wellisch OM, Neubert JK, Olah Z, Iadarola MJ. Deletion of vanilloid receptor 1-expressing primary afferent neurons for pain control. *J Clin Invest.* 2004 May;113(9):1344-52.

Marcel Brus-Ramer, MD

MD 2009 Columbia University, College of Physicians and Surgeons, New York, NY

PhD 2009 Columbia University, College of Physicians and Surgeons, New York, NY

2010–2011 Transitional Internship, St Luke's Roosevelt Medical Center, New York, NY

Research:

2009–2010 University of California, San Francisco, Department of Radiology and Biomedical Imaging, Neuroradiology Section

2007–2010 New York Presbyterian Hospital, New York, NY

Selected Publications:

Carmel JB, Berrol LJ, Brus-Ramer M, Martin JH. Chronic electrical stimulation of the intact corticospinal system after unilateral injury restores skilled locomotor control and promotes spinal axon outgrowth. *J Neurosci.* 2010 Aug 11;30(32):10918-26.

Brus-Ramer M, Starke RM, Komotar RJ, Meyers PM.Radiographic evidence of cerebral hyperperfusion and reversal following angioplasty and stenting of intracranial carotid and middle cerebral artery stenosis: case report and review of the literature. *J Neuroimaging.* 2010 Jul;20(3):280-3.

Brus-Ramer M, Carmel JB, Martin JH. Motor cortex bilateral motor representation depends on subcortical and interhemispheric interactions. *J Neurosci.* 2009 May 13;29(19): 6196-206.

Nicholas Burris, MD

MD 2010 University of Maryland, School of Medicine, Baltimore, MD

2010–2011 Internal Medicine Internship, Mercy Medical Center, Baltimore, MD

Honors and Awards

2010 Joseph E. Whitley Memorial Award for Academic Excellence in Radiology, University of Maryland, School of Medicine, Baltimore, MD

2010 Dean's Award for Excellence in Research, University of Maryland

Research:

2005–2009 University of Maryland School of Medicine, Division of Cardiac Surgery, Baltimore, MD

2004–2005 University of Maryland, School of Medicine, Division of Neurology, Baltimore, MD

Selected Publications:

Brown EN, Burris NS, Kon ZN, Grant MC, Brazio PS, Xu C , Laird P , Gu J , Kallam S , Desai P , Poston RS. Intraoperative detection of intimal lipid in the radial artery predicts degree of postoperative spasm. *Atherosclerosis.* 2009; 205(2):466-71.

Brazio PS , Laird PC , Xu C , Gu J, Burris NS , Brown EN , Kon ZN , Poston RS. Harmonic scalpel versus electrocautery for harvest of radial artery conduits: reduced risk of spasm and intimal injury on optical coherence tomography. *J Thorac Cardiovasc Sur.* 2008;136:1302-1308

Grant MC , Kon Z , Joshi A , Christenson E , Kallam S , Burris NS , Gu J , Poston RS. Is Aprotinin Safe to Use in a Cohort at Increased Risk for Thrombotic Events: Results From A Randomized, Prospective Trial in Off Pump Coronary Artery Bypass. *Ann Thorac Surg.* 2008 Sep;86(3):815-22.

Matthew L. Eltgroth, MD

MD 2010 University of California, San Francisco, School of Medicine

2010–2011 Transitional Internship, Santa Clara Valley Medical Center, San Jose, Calif.

Research:

2008–2010 University of California, San Francisco, Department of Radiology and Biomedical Imaging

2006–2008 Dean's Summer Research Fellowship, University of California, San Francisco

Selected Publications:

Chou D, Eltgroth M, Yang I, Lu D, Manley G. Rib head disarticulation for multilevel transpedicular thoracic corpectomies and expandable cage reconstruction. *Neurol India.* 2009 Jul–Aug;57(4):469-74.

Peng L, Eltgroth ML, LaTempa TJ, Grimes CA, Desai TA.The effect of TiO2 nanotubes on endothelial function and smooth muscle proliferation. *Biomaterials.* 2009 Mar;30(7):1268-72.

Popat KC, Eltgroth M, Latempa TJ, Grimes CA, Desai TA. Decreased Staphylococcus epidermis adhesion and increased osteoblast functionality on antibiotic-loaded titania nanotubes. *Biomaterials.* 2007 Nov;28(32):4880-8.

Robert R. Flavell, MD, PhD

MD 2010 Weill Cornell Medical College, New York, NY

2010–2011 Transitional Internship, Memorial Sloan-Kettering Cancer Center, New York, NY

PhD 2009 The Rockefeller University, New York, NY

Research:

2009–2010 Memorial Sloan-Kettering Cancer Center, New York, NY

2004–2008 The Rockefeller University, Dr. Tom Muir Laboratory, New York, NY

Selected Publications:

Ceccarini G, Flavell RR, Butelman ER, Synan M, Willnow TE, Bar-Dagan M, Goldsmith SJ, Kreek MJ, Kothari P, Vallabhajosula S, Muir TW, Friedman JM. PET imaging of leptin biodistribution and metabolism in rodents and primates. *Cell Metab.* 2009 Aug;10(2):148-59.

Flavell RR, Muir TW. Expressed protein ligation (EPL) in the study of signal transduction, ion conduction, and chromatin biology. *Acc Chem Res.* 2009 Jan 20;42(1):107-16. Review.

Flavell RR, Kothari P, Bar-Dagan M, Synan M, Vallabhajosula S, Friedman JM, Muir TW, Ceccarini G.Site-specific (18)F-labeling of the protein hormone leptin using a general two-step ligation procedure. *J Am Chem Soc.* 2008 Jul 16;130(28):9106-12.

Elisabeth Garwood, MD

MD 2010 Pennsylvania State University College of Medicine, Hershey, Penn.

2010–2011 Internal Medicine Internship, George Washington University Hospital, Washington DC

2009 Alpha Omega Alpha

Research:

2007–2008 Doris Duke Clinical Research Fellowship, University of California, San Francisco, Department of Surgery

2006 University of California, San Francisco, Department of Surgery, Carol F. Buck Breast Care Center

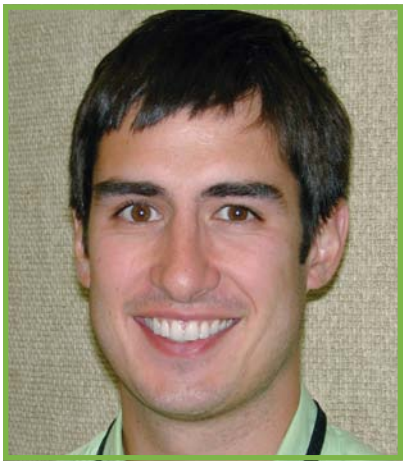
Selected Publications:

Christine CW, Garwood ER, Schrock LE, Austin DE, McCulloch, CE. Parkinsonism in patients with a history of amphetamine exposure. *Mov Disord*. 2010 Jan 30;25(2):228-31.

Garwood ER, Kumar AS, Baehner Fl, Moore DH, Au A, Flowers CI, Garber J, Lesnikoski B, Olopade 0, Hylton N, Rush-Port E, Campbell M, Esserman LJ

Fluvastatin reduces proliferation and increases apoptosis in women with high grade breast cancer. *Breast Cancer Res Treat*. 2010 Jan;119(1):137-44.

Buchsbaum R, Kaufmann P, Barsdorf AI, QALS Study Group (115 collaborators incl. Garwood E). Web based data management for a phase II clinical trial in ALS. *Amyotroph Lateral Scler.* 2009 Oct–Dec;10(5-6):374-7.



Patrick C. Gonzales, MD

MD 2010 Emory University School of Medicine, Atlanta, Georgia

2010–2011 Transitional Internship, Kaiser Permanente, Oakland, Calif.

Selected Publications:

Dhanasekaran R, West JK, Gonzales PC, Subramanian R, Parekh S, Spivey JR, Martin LG, Kim HS.Transjugular intrahepatic portosystemic shunt for symptomatic refractory hepatic hydrothorax in patients with cirrhosis. *Am J Gastroenterol.* 2010 Mar;105(3):635-41.

Fornwalt BK, Gonzales PC, Delfino JG, Eisner R, Leon AR, Oshinski, IN. Quantification of left ventricular internal flow from cardiac magnetic resonance images in patients with dyssynchronous heart failure. *J Magn Reson Imaging.* 2008 Aug;28(2):375-81.

Ryan Kohlbrenner, MD

MD 2010 University of Chicago, Pritzker School of Medicine, Chicago, Ill.

2010–2011 Internal Medicine Internship, Washington University in St. Louis/Barnes-Jewish Hospital, St. Louis, Mo.

2009 Alpha Omega Alpha

Research:

2007–2010 University of Chicago, Department of Radiology, Chicago, Ill.

2004–2006 University of Southern California, Neurocognitive Development Laboratory, Los Angeles, Calif.

Selected Publications:

Suzuki K., Kohlbrenner R., Obajuluwa A. M., Epstein M. L., Garg S., Hori M., and Baron R. L. Computer-aided measurement of liver volumes in CT by means of geodesic active contour segmentation coupled with level-set algorithms. *Medical Physics* 37(5), pp. 2159-2166, May 2010

Valentin Lance, MD

MD 2010 University of California, Los Angeles, David Geffen School of Medicine

2010–2011 Transitional Internship, Scripps Mercy Hospital, San Diego, Calif.

Research:

2009–2010 University of California, Los Angeles, David Geffen School of Medicine, Department of Radiology

2007 University of California, Los Angeles, David Geffen School of Medicine, Division of Cardiology

Selected Publications:

London SE, Itoh Y, Lance VA, Wise PM, Ekanayake PS, Oyama RK, Arnold AP, Schlinger BA. Neural expression and post-transcriptional dosage compensation of the steroid metabolic enzyme 17beta-HSD type 4. *BMC Neurosci.* 2010 Apr 1;11:47.

Lance V, Poommipanit P, Child JS, Aboulhosn J. Surgical Outcomes in Adults with Ebstein's Anomaly of the Tricuspid Valve. *Journal of Investigative Medicine.* 2008 Jan; 56(1):256-257.

Marc C. Mabray, MD

MD 2010 University of New Mexico, School of Medicine, Albuquerque, New Mexico

2010–2011 Transitional Surgery Internship, University of New Mexico, Department of Surgery, Albuquerque, New Mexico

2009 Alpha Omega Alpha

Research:

2007–2010 University of New Mexico, School of Medicine, Department of Neurology

2005–2009 University of New Mexico, School of Medicine, Departments of Otolaryngology, Orthopaedics and Internal Medicine

Aaron C. Miracle, MD

MD 2010 University of Michigan Medical School, Ann Arbor, Mich.

2010–2011 Preliminary Medicine Internship, St. Mary's Medical Center, San Francisco, Calif.

2010 Roger A. Berg Prize in Radiology, University of Michigan Medical School, Ann Arbor, Mich.

Selected Publications:

Miracle AC, Fox MA, Ayyangar RN, Vyas A, Mukherji SK, Quint DJ. Imaging evaluation of intrathecal baclofen pump-catheter systems. *AJNR Am J Neuroradiol*. 2011 Aug;32(7):1158-64.

Miracle AC, Mukherji SK. Conebeam CT of the head and neck, part 1: physical principles. *AJNR Am J Neuroradiol*. 2009 Jun;30(6):1088-95.

Miracle AC, Mukherji SK. Conebeam CT of the head and neck, part 2: clinical applications. *AJNR Am J Neuroradiol*. 2009 Aug;30(7):1285-92.

Sara K. Plett, MD

MD 2010 Columbia College of Physicians and Surgeons, New York, NY

2010–2011 Transitional Medicine Internship, Cottage Hospital, Santa Barbara, Calif.

Research:

2007–2008 Columbia Kreitchman PET Center, Columbia University, New York, NY

2008 St. Luke's-Roosevelt Hospital Center, Department of Radiation Oncology, New York, NY

Publications:

Saeed M, S Plett, GE Kim, H Daldrup-Link, J Courtier. Radiological-pathological correlation of pleomorphic liposarcoma of the anterior mediastinum in a 17-year-old girl. *Pediatric Radiology*. 2010 Dec; 40 Suppl 1:S68-70.

Plett, SK, WE Berdon, RA Cowles, R Oklu, JB Campbell. Cushing proximal symphalangism and the *NOG* and *GDF5* genes. *Pediatric Radiology*. 2008 Feb; 38(2):209-15.

Plett, SK, DK Leung, A Jurewicz, MD Farwell, M Slifstein, R Manchanda, D Skovronsky, RL Van Heertum, HF Kung, M Ichise. Quantification of vesicular monoamine transporters in the primate brain with [^{18}F]9-fluoropropyl-(+)-DTBZ. *Journal of Nuclear Medicine*. 2008; 49 (Supplement 1):80P

Second-, Third-, and Fourth-Year Diagnostic Radiology Residents 2011–2012

Second-Year Residents

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

Third-Year Residents

Marjan Bolouri, MD
Matthew Bucknor, MD
Abby Deans, MD, PhD
D. Thor Johnson, MD, PhD
Lauren Hollowell, MD
Alexander Keedy, MD
Kevin Koo, MD
John Mongan, MD, PhD
Victor Sai, MD
Ronnie Sebro, MD
Leo Sugrue, MD, PhD
S. Jarrett Wrenn, MD, PhD
Etay Ziv, MD, PhD

Fourth-Year Residents

Vishal Agarwal, MD
Ania J. Azziz, MD
Ingrid Burger, MD, PhD, Chief
Renu Chundru, MD
Thomas Hope, MD
Nazia Jafri, MD, Chief
Marc A. Laberge, MD
Michael T. Lu, MD
Ginger Merry, MD, MPH
Michael A. Ohliger, MD, PhD
J. Gabe Schneider, MD
Jason F. Talbott, MD, PhD, Chief
Kiarash Vahidi, MD

Clinical Fellows and Instructors 2011–2012

Clinical Fellows

Matthew Amans, MD
Neuroradiology

Spencer Behr, MD
Nuclear Medicine

John Berry, MD
Abdominal Imaging, SFGH/VAMC

Jonathan Blevins, MD
Musculoskeletal

Wesley Chan, MD
Abdominal Imaging, SFGH/VAMC

Maison Chen, MD
Breast Imaging, SFGH/Ultrasound

Gloria Chiang, MD
Neuroradiology

Daniel Cooke, MD
Neurointerventional

Trien Dang, MD
Abdominal Imaging, SFGH/VAMC

Rob Dhillon, MD
Cardiac and Pulmonary Imaging

Ryan Downey, MD
Abdominal Imaging, SFGH/VAMC

Adam Farkas, MD
Interventional

Nidhi Gupta, MD
Abdominal Imaging, SFGH/VAMC

Joshua Hanelin, MD
Musculoskeletal

James Hecksel, DO
Abdominal Imaging, SFGH/VAMC

Warren Kim, MD, PhD
Neurointerventional

Maureen Kohi, MD
Breast Imaging/Ultrasound

Pallav Kolli, MD
Interventional

Gerritt Lagemann, MD
Neuroradiology

Grace Lee, MD
Breast Imaging/Ultrasound

Sonia Lee, MD
Musculoskeletal

Shlomo Leibowich, MD
Pediatrics

Jason Liu, MD, PhD
Neuroradiology

Norna Luderman, MD
Breast Imaging

Monica Mishra, MD
Breast Imaging, SFGH/Ultrasound

Moira O'Riordan, MD
Breast Imaging/Ultrasound

Trushar Patel, MD
Interventional

Vijay Rao, MD
Breast Imaging, SFGH

Srikant Sadda, MD
Abdominal Imaging, SFGH/VAMC

Fabio Settecase, MD
Neuroradiology

Timothy Shepherd, MD, PhD
Neuroradiology

Bruno Soares, MD
Pediatric Radiology

Young Song, MD
Abdominal Imaging, SFGH/VAMC

Charles Stout, MD
Neurointerventional

Jessica Tan, MD
Neuroradiology

Andrew Taylor, MD, PhD
Interventional

Huy Tran, MD
Abdominal Imaging, SFGH/VAMC

Max Wu, MD, PhD
Nuclear Medicine

Silaja Yitta, MD
Breast Imaging/Ultrasound

Clinical Instructors

Jay Catena, MD
Neuroradiology

Benjamin Cohen, MD
Neuroradiology

Peter Jun, MD
Neuroradiology

Nayela Keen, MD
Neuroradiology

Ramin Naeini, MD
Neuroradiology

Peter Shen, MD, PhD
Neuroradiology

Diagnostic Radiology Residency Graduates–Class of 2011

Program Director: Aliya Qayyum, MBBS

Congratulations to our 2011 graduates. We wish them success in their new fellowship positions.

Gloria Chiang, MD
Fellowship, Neuroradiology, UCSF

Jose Diaz-Hernandez, MD
Fellowship, Interventional Radiology, Mt. Sinai Hospital, NY

Adam Farkas, MD
Fellowship, Interventional Radiology, UCSF

Jeffrey Hom, MD
Fellowship, Body Imaging, Stanford, Calif.

K. Pallav Kolli, MD
Fellowship, Interventional Radiology, UCSF

Moira O'Riordan, MD
Fellowship, Breast Imaging/Ultrasound, UCSF

Judong Pan, MD, PhD
Fellowship, Musculoskeletal Radiology, Massachusetts General Hospital, Boston, Mass.

Maria Parayno, MD
Fellowship, Joint Program in Nuclear Medicine, Harvard University/ Brigham and Women's Hospital, Boston, Mass.

Andrew Phelps, MD
Fellowship, Pediatric Radiology, Children's Hospital, Boston, Mass.

Fabio Settecase, MD
Fellowship, Neuroradiology, UCSF

Vinil Shah, MD
Fellowship, Neuroradiology, Massachusetts General Hospital, Boston, Mass.

Timothy Shepherd, MD, PhD
Fellowship, Neuroradiology, UCSF

Divya Sridhar, MD
Fellowship, Interventional Radiology, Mt. Sinai Hospital, New York, NY

Andrew Taylor, MD, PhD
Fellowship, Interventional Radiology, UCSF

Max Wu, MD, PhD
Fellowship, Nuclear Medicine, UCSF

2011 Diagnostic Radiology Residency Graduates: (l–r, top row) Andrew Phelps, MD, Andrew Taylor, MD, PhD, K. Pallav Kolli, MD, Divya Sridhar, MD, Timothy Shepherd, MD, PhD, Moira O'Riordan, MD, Max Wu, MD, PhD, (l–r, bottom row) Judong Pan, MD, PhD, Fabio Settecase, MD, Maria Parayno, MD, Gloria Chiang, MD, Jeffrey Hom, MD, Jose Diaz-Hernandez, MD, Vinil Shah, MD, Adam Farkas, MD

The Margulis Society

Diego E. Ruiz, MD

"For 20 years, the Margulis Society has existed as a unique and successful organization supporting the department, trainees, and graduates," said Diego E. Ruiz, MD, the new president of the Margulis Society. "We look forward to the next 20 years of service and invite the participation of all."

Ruiz's two-year term follows that of Christopher J. Schultz, MD, who served from July 2009 to June 2011. Ruiz received his MD from UCSF in 1999, then completed a four-year diagnostic radiology residency at UCSF. He completed a one-year fellowship in Thoracic Imaging at UCSF in 2005. Ruiz is department head of radiology at the Palo Alto Medical Clinic, and is an assistant clinical professor in Radiology and Biomedical Imaging at UCSF.

Festive 20th Anniversary Gala

On March 12, the Margulis Society celebrated its 20th Anniversary at the Olympic Club in San Francisco. It also was a celebration of the 90th birthday of former department Chairman Alexander R. Margulis, MD. He was accompanied by his wife, Hedvig Hricak, MD, PhD, former Chief of Abdominal Imaging at UCSF.

Margulis said he was "deeply moved" to see so many friends and former colleagues among the party-goers. Reflecting on his time as chairman, he focused on the importance of the UCSF radiology family. "Together," he said, "we achieved much, but the most important accomplishment was that so many of the people that trained here carried their acquired knowledge and the UCSF culture throughout our country and the world. The positive relationships and achievements from that time are still present in the department today."

Five of the alumni who have led the Margulis Society, Peter S. Moskowitz, MD, Edward Baker, MD, Richard Sollitto, MD, Donna Hoghooghi, MD, and Christopher Schultz, MD, presented Margulis with a plaque honoring his service and recognizing him as a "visionary leader, scholar, mentor, and friend."

The next Margulis Gala will be held in 2013, complete with dinner, dancing, and a silent auction.

Informative Career Evening

More than 40 trainees gathered on August 10 for the 2011 Margulis Society Career Evening for Residents and Fellows, held at the home of board member Donna Hoghooghi, MD. Lively discussions covered private practice and academic career options and the current job climate for radiologists.

This year, two panelists, Maitray Patel, MD, of the Mayo Clinic in Arizona and Anna Meyerson, MD, of Atlanta, Georgia, connected via Skype. According to panel moderator Erik Gaensler, MD, their participation, "allowed us to tell trainees about opportunities far afield. As the Bay Area job market has gotten tighter, it's important to keep trainees informed about opportunities in other locations."

San Francisco panelists included Ron Arenson, MD, David Avrin, MD, PhD, Jim Chen, MD, PhD, Gina Song, MD, Chris Sonne MD, Aliya Qayyum, MBBS, and Stephanie Weinstein, MD.

Audience Response System Installed

The Society's big project for the year was the purchase of an audience response system for the residency program. The system, which arrived in June 2011, allows residents to give immediate feedback and reply to multiple-choice questions during a lecture.

"The goal is to engage residents in active learning during conferences. While the art of oral case taking will always be an important part of resident case conferences, we felt that engaging the entire resident audience in critical thinking, especially during didactic conferences, will go a long way in enforcing key concepts," said Vinil Shah, MD, former senior resident. "Furthermore, in 2013 the [diagnostic

radiology] board exam will be all multiple choice; this system will help residents prepare for that."

The $3,000 system operates at the Parnassus campus, the Veterans Affairs Medical Center, and San Francisco General Hospital.

Chiang Receives Resident Research Award

Senior resident Gloria Chiang, MD, was honored with the 2011 Margulis Society Outstanding Resident Research Award, presented at the commencement dinner on June 3. Chiang accomplished an impressive amount of research during her time as a resident with multiple published papers in peer-reviewed journals, a research grant, and several presentations.

20th Anniversary Margulis Gala

March 12, 2011








The 2011 Gala honored Dr. Alexander Margulis and celebrated 20 years of Margulis Society support for the Department of Radiology and Biomedical Imaging.

The Margulis Society Honor Roll of Donors

The Margulis Society gratefully acknowledges the following individuals for their generous contributions. This list reflects gifts made between July 1, 2010 and June 30, 2011.

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*Donation of $1000 or more

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Kathryn L. Pearson Peyton, MD
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Derk Purcell, MD
Aliya Qayyum, MBBS
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Yee-Li Sun, MD
Daniel Y. Sze, MD
Judy K. Tam, MD
Frank R. Tamura, MD
Robert C. Taylor, DDS
Ronald R. Townsend, MD
Kim H. Tran-Fontaine, MD
Hilda Tso, MD
Volney F. Van Dalsem, III, MD
Susan D. Wall, MD
Nikunj P. Wasudev, MD
Antonio Westphalen, MD
A. Alan White, MD
Michael Williams, MD
Benjamin M. Yeh, MD
Kyle K. Yu, MD *
Gregory G. Zaharchuk, MD, PhD

Alumni News

1972

Gretchen A.W. Gooding, MD, Mill Valley, Calif, writes that she and husband **Charles Gooding, MD**, (1967) spent two weeks in England and Wales in late spring "visiting castles and gardens and having a great time."

The Goodings at the historic Astor home, Cliveden, England.

1975

Paul R. Carpenter, MD, Whitefish, Montana, continues to practice diagnostic neuroradiology at Mercy Medical Center in Sioux City, Iowa and its associated CNOS Imaging Center in nearby Dakota Dunes, South Dakota. Working on a high-tech workstation in his home office allows him to keep up with his very active outdoor lifestyle. He and his wife of 42 years, Penny, hike, snow shoe, ride mountain and road bikes, kayak, ski, and swim with their Montana pals, and visiting "kids" and grandkids. Daughter Dawn practices real estate law in Atlanta, Ga, and is a busy mom to 3 boys, ages 9, 7, and 3. Dana is now an assistant professor in Biomechanical Engineering at the University of Colorado, Denver, where he, his wife and 2-year-old daughter are looking for a new home. Younger son Graham is a vice president with a real estate group in Atlanta.

Philip Goodman, MD, Chapel Hill, North Carolina, professor of radiology at Duke University, received the Outstanding Alumni Award at UCSF's Department of Radiology and Biomedical Imaging 2011 commencement.

Department Chairman Ron Arenson presenting the Outstanding Alumni Award to Goodman.

1979

R. James "Jim" Brenner, MD, JD, FACR, FCLM, San Francisco, Calif., survived the B'nai Mitvah of his twin sons and continues to serve as director of Breast Imaging for Bay Imaging Consultants, a consortium of radiologists in the East Bay. He volunteers faculty time at UCSF as a professor of Radiology. Jim is working on the third novel of a trilogy and remains open to offering a finder's fee if someone can secure a desirable publishing contract.

1981

Irene Balcar, MD, San Francisco, Calif., retired in 2011 from Kaiser Permanente, Oakland, Calif. Her colleague at Kaiser Oakland, Jeffrey Dieden, MD, described the "wonderful surprise party at Spruce restaurant in Laurel Heights, SF, featuring a rendition of Katie Perry's 'Teenage Dream' with appropriately altered lyrics."

The Carpenters in Napa: (l–r) Dana holding Layla, MaryBeth, Penny, and Paul.

(l–r) UCSF Radiology alumni Marianna Caponigro, MD, (1998), Krammie Chan, MD, (1996), Jeff Dieden, MD, (1986), Peggy Lynch, MD, (1988) celebrate with Irene Balcar.

1989

Jeffrey S. Klein, MD, Williston, Vt., former fellow in Thoracic Imaging and faculty member at UCSF and SFGH (1989-1993), is the editor-designate of RadioGraphics, the RSNA's continuing education journal.

1992

Eric Stern, MD, Seattle, Wash, is the editor GO RAD, a global outreach project developed by the International Society of Radiology. Its purpose is to advance radiology education by aggregating current radiology literature with content dedicated to developing nations and underserved populations. While most major radiology journals publish online, open access to just-published content is often available only to subscribers. The GO RAD platform provides open access to a limited amount of otherwise restricted-access content. Learn more at *http://www.isradiology.org/gorad.*

1993

Howard A. Rowley, MD, Madison, Wis., was appointed to the 2011 RSNA's International Visiting Professor program. His first destination is Myanmar (formerly Burma), on a visit for the RSNA Committee on International Relations and Education.

2001

D. Chris Sonne, MD, of San Francisco, Calif. received the Outstanding Clinical Faculty Award at the Department of Radiology and Biomedical Imaging 2011 commencement. This summer, Sonne relocated from Scottsdale Medical Imaging in Scottsdale, Ariz, to accept a position at Kaiser Permanente, Oakland.

Sonne receiving the Outstanding Clinical Faculty Award from Chairman Ron Arenson.

2002

Harold Litt, MD, PhD, Wynnewood, Penn., was promoted to associate professor of Radiology and Medicine at Perelman School of Medicine of the University of Pennsylvania, Philadelphia, where he is chief of the Cardiovascular Imaging Section.

2006

Brian Ching, MD, Honolulu, Hawaii, former fellow in Abdominal Imaging, sent a recent family photo and writes "tell everyone I say *Aloha.*"

Virginie and Brian Ching with sons Mattias (6) and Carsten (4).

2008

Derk Purcell, MD, Mill Valley, Calif., and his wife Kristen McCarthy announce the birth of their son, August McCarthy Purcell, who was born March 27, 2011.

Gus Purcell with big sister Eliza.

2009

Sapna Jain Palrecha, MD, Los Angeles, Calif., writes "After my residency and neuro fellowship at UCSF, I did a musculoskeletal radiology fellowship at the Hospital for Special Surgery in New York City. I then got married in June (in Michigan). Now I'm an attending at Renaissance Imaging Medical Associates in Los Angeles."

Sapna Jain and Gagan Palrecha were married in a traditional ceremony.

2010

Reema Munir, MD, Pasadena, Calif., accepted a position as a radiologist at Huntington Memorial Hospital in Pasadena.

2011

Garney Fendley, MD, New Orleans, La, received the Outstanding Fellow/Clinical Fellow Teaching Award, presented by the chief residents, at UCSF's Department of Radiology and Biomedical Imaging 2011 commencement. He has accepted a staff position at the Oschner Clinic in New Orleans.

Fendley with chief residents.

The Henry I. Goldberg Center for Advanced Imaging Education

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. Under the steady hand of Education Coordinator Melinda Parangan-Chu, 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 and imaging research, and offers career advising and mentoring to UCSF medical students.

The year kicked off with extensive physical renovations to the Goldberg Center. Ongoing digitization of the film-based teaching file made it possible to replace light boxes and hardcopy films with new computers and a state-of-the-art digital projection system. New furniture and new paint created an attractive, modern, and comfortable space for medical students to gather and learn.

The Medical Student Education Committee supervises the Goldberg Center's academic activities. The committee's members, both faculty and resident educators, are dedicated to integrating Radiology into physician training at UCSF. New faculty members on the Committee this year include Stefanie Weinstein, MD, and Jeremy Durack, MD, both of whom have demonstrated dedication to medical student teaching in their clinical work and academic pursuits. We are excited to work with Victor Sai, MD, the new Resident Liaison for Medical Student Education over the coming year. He brings an impressive teaching background to his position. Continuing committee members are Brett Elicker, MD, Vickie Feldstein, MD, Christine Glastonbury, MBBS, David Naeger, MD, Gabe Schneider, MD, Lynne Steinbach, MD, Khai Vu, MD, PhD, and Emily Webb, MD. A big thanks to this team for their continued efforts.

David Naeger, MD, teaching medical students in the 140.03 radiology elective.

Minagi Chair Update

Recently, the committee has undertaken an exciting project: conceptualizing an innovative use of the Hideyo Minagi Endowed Chair in Radiology. Traditionally, this position has been awarded to a senior faculty member who is an established and well-regarded medical student educator. In the next two years, the funds will instead be used to support a group of selected faculty on a rotating basis. This will help develop a new Radiology curriculum for the School of Medicine, foster the development of teaching skills, and promote educational research. Just as importantly, it will leverage the varied and multiple talents of our diverse faculty to the benefit of medical student education at UCSF. The ultimate goal of this award program is to develop a cadre of skilled educators who want to pursue medical education as a primary focus in their career.

Many UCSF faculty, volunteer faculty, fellows, and residents give generously of their time in the programs administered by the Goldberg Learning Center. All of their efforts are very appreciated by the members of the Medical Student Education Committee and by the UCSF medical students who benefit directly from their contributions and time.

For more information about the Goldberg Learning Center's activities, please contact Melinda Parangan-Chu (**melinda.parangan-chu@ucsf.edu**), or visit our website at: **www.radiology.ucsf.edu/education/medical-students**.

Radiology Postgraduate Education

2011 Highlights

In 2011, Postgraduate Education revisited popular destinations—Hawaii, St. John, Scottsdale, and Yosemite—and added offerings in two new locations. The June international **Body and Bone Imaging** course took place in Vancouver, British Columbia. Chaired by Thomas M. Link, MD, PhD, chief of Musculoskeletal Imaging, the course featured three speakers from the University of British Columbia, including the head of its Radiology Department, Bruce B. Forster, MSc, MD. Forster's keynote address recounted his experiences as the head of radiology services for the 2010 Winter Olympics, which interested both attendees and their families.

An additional summer offering in August took us to Jackson Hole, Wyoming to enjoy the natural beauty and grandeur of the Grand Tetons National Park. **Tutorials in the Tetons: Neuroradiology, Thoracic Imaging, Ultrasound** was chaired by Christopher P. Hess, MD, PhD, chief of Neuroradiology, VAMC and featured some of our most experienced and well-known faculty members.

Looking Ahead to 2012

The **UCSF Radiology Annual Review** (March 4–9, 2012) is moving to Union Square. The course will be held at the newly renovated Grand Hyatt San Francisco. The Grand Hyatt offers completely updated meeting space and sleeping rooms and is conveniently located close to numerous restaurants, attractions, and public transportation. This flagship course is perfect for senior residents and practicing radiologists who are interested in a thorough review of radiology fundamentals. It's also a convenient venue for earning 46 CME credits in just one week.

Canada beckons us once again for our June international meeting, but this time we will journey east to Québec, the historic heart of the country. **Quintessential Imaging in Québec** will be held at the Fairmont Le Château Frontenac from June 17–22, 2012 and chaired by Cynthia Chin, MD, neuroradiology section. Standing high on a bluff overlooking the mighty St. Lawrence River, the Fairmont Le Château Frontenac is one of Québec's most historic and well-known landmarks. Old Québec has been designated as a UN World Heritage Site, and the Fairmont is conveniently located in its center within easy walking distance of all of the wonderful sites and experiences that Old Québec has to offer.

The majestic Fairmont Le Château Frontenac overlooks Cap Diamant, Québec.

Our faculty continues to develop and offer new ABR-approved SAMs (self-assessment modules). This year, new SAM activities in ultrasound, pulmonary, skeletal, and neuro imaging are included in our course offerings at no additional charge. As the number of radiologists certified since 2002 continues to increase, we look forward to expanding our SAM offerings in 2012 and beyond.

Opportunities to Save

UCSF Radiology alumni are eligible for a $50 savings on the full registration fee and if you register by the early registration deadline, your combined savings will be $125.We also offer a $100 discount per course for attendees who register for our back-to-back January Hawaii courses: **Breast Imaging** (January 8–13), followed by **Body Imaging** (January 15–20, 2012). Both courses will be held at the Fairmont Orchid Resort on the sunny west Kohala Coast of the Big Island of Hawaii.

Become a "Frequent Attendee" and save even more by earning a free course registration. Attend just four courses within three consecutive years and your enrollment for the fifth course is free. Find more details online at our website, **www.radiology.ucsf.edu/postgrad** or email us at **cme@radiology.ucsf.edu.**

Your former teachers, as well as our newer faculty members, look forward to having you, your fellow alumni, and your colleagues join us at one of our courses.

Radiology CME Calendar 2012

January 8–13, 2012
Breast Imaging and Digital Mammography
The Fairmont Orchid – Kohala Coast, HI

January 15–20, 2012
Body Imaging: Hot Topics in the Tropics
The Fairmont Orchid – Kohala Coast, HI

January 29–31, 2012
Musculoskeletal MRI
Miramonte Resort and Spa – Indian Wells, CA

February 1–3, 2012
Abdominal and Pelvic Imaging: CT/MR/US
Miramonte Resort and Spa – Indian Wells, CA

February 9–11, 2012
Virtual Colonoscopy Workshop
UCSF China Basin Research Center – San Francisco, CA

February 19–24, 2012
Neuro and Musculoskeletal Imaging
The Fairmont Orchid – Kohala Coast, HI

March 4–9, 2012
UCSF Radiology Annual Review
Grand Hyatt San Francisco – San Francisco, CA

March 12–16, 2012
Spring Training for Radiologists
The Fairmont Scottsdale Resort – Scottsdale, AZ

March 23–25, 2012
Breast Imaging Update
The Westin San Francisco Market St. – San Francisco, CA

May 20–25, 2012
Practical Applications in Diagnostic Radiology
Tenaya Lodge at Yosemite National Park – Fish Camp, CA

May 31–June 2, 2012
Virtual Colonoscopy Workshop
UCSF China Basin Research Center – San Francisco, CA

June 17–22, 2012
Quintessential Imaging in Québec
Fairmont Le Château Frontenac – Québec, Canada

September 10–13, 2012
Neuroradiology Update
Grand Hyatt San Francisco – San Francisco, CA

September 10–14, 2012
Interventional Radiology Review
UCSF Parnassus Campus – San Francisco, CA

September 20–22, 2012
Virtual Colonoscopy Workshop
UCSF China Basin Research Center – San Francisco, CA

September 30–October 5, 2012
Women's Imaging in Wine Country
The Fairmont Sonoma Mission Inn & Spa – Sonoma, CA

October 22–26, 2012
UCSF Radiology Highlights
San Francisco, CA

October 28–November 2, 2012
Diagnostic Radiology Seminars
The Fairmont Kea Lani Resort – Maui, HI

November 5–9, 2012
Breast Imaging and Digital Mammography
Rancho Las Palmas Resort – Rancho Mirage, CA

December 2–7, 2012
Imaging Warm-Up in the Caribbean
The Westin Resort St. John – St. John, US Virgin Islands

FOR FURTHER INFORMATION PLEASE CONTACT:

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3333 California Street, Suite 375, San Francisco, CA 94143-0629
Tel: 415/476-5731 Fax: 415/476-9213 E-mail: ***cme@radiology.ucsf.edu*** Web: ***http://radiology.ucsf.edu/postgrad***

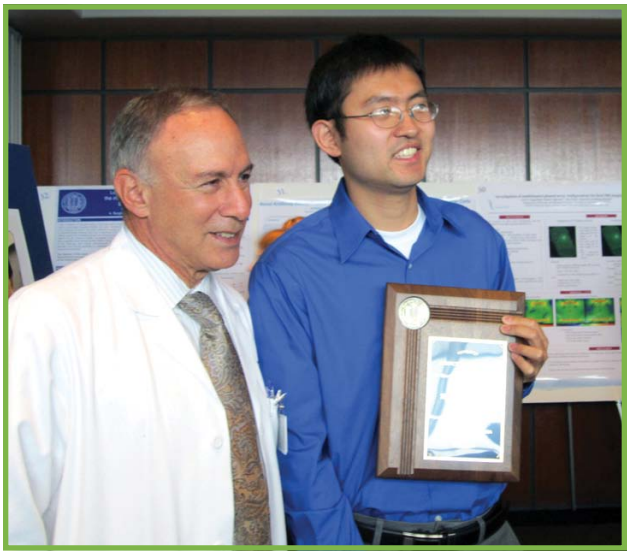
Course dates and locations are subject to change without notice before publication of a final brochure.
Please visit our website for the most current information.

Cutting-Edge Research and Hasegawa Award Highlighted at Annual Symposium

The Department of Radiology and Biomedical Imaging held its eighth annual imaging research symposium on August 31, 2011. The symposium has grown in scope each year, serving as a touchstone for the array of research performed in the department. Moderated by faculty Valerie Cardenas-Nicholson, PhD, Galateia Kazakia, PhD, Z. Jane Wang, MD, and Esther Yuh, MD, PhD, this year's oral presentations covered a variety of research focused on imaging of cancer, the brain reward system, traumatic brain injury, cartilage degeneration, aging, white matter injury, and other topics. The symposium's oral component, attended by 180, was followed by a large poster session in UCSF's Millberry Union, where the Bruce Hasegawa Award, as well as oral presentations and poster awards, were presented at a catered reception.

Third Annual Hasegawa Award Presented to Hu

Simon Hu, PhD, a postdoctoral scholar, received the third annual Hasegawa Award for Excellence in Biomedical Imaging. Hu, who received his PhD from UCSF in 2009, was selected for his accomplished research on hyperpolarized carbon-13 techniques for cancer imaging. Hasegawa, a scientist, teacher, and mentor in the department, died in 2008.



Simon Hu accepts the Hasegawa Award from Chair Ron Arenson.

Symposium organizers (l–r) Xiaojuan Li, PhD, Esther Yuh, MD, PhD, and Galateia Kazakia, PhD, with Valerie Cardenas-Nicholson, PhD, moderator and committee member.

Dr. Gordon Honda, a childhood friend, generously funds the award in honor of Hasegawa.

In accepting the award, Hu spoke about Bruce Hasegawa, describing him as "a warm caring individual, whose enthusiasm for science was evident to anyone who saw him bouncing around in the hallways. He was a pioneer in combining anatomical imaging and functional imaging with SPECT-CT." Hu's work follows along the same lines and continues Hasegawa's vision by combining MR anatomic imaging and hyperpolarized C-13 metabolic imaging. "As is the case with most scientific endeavors, I'm only a small part of a larger effort," Hu said. "My work would not be possible without the support of the Department, my co-workers at QB3, research collaborators, and my advisor Dan Vigneron."

Oral Presentation and Poster Awards

Jason Talbott, MD, PhD, a senior resident and Olga Tymofiyeva, PhD, a postdoctoral scholar, received awards for outstanding oral presentations for their symposium talks. Llewelyn (Trey) Jalbert, a staff research associate, and Janine Lupo, PhD, an assistant research scientist, received poster awards.

Surbeck Young Investigator Awards

Three talented and intrepid researchers shared top honors in the 2011 Surbeck Young Investigators Awards, presented by Professor Sarah Nelson, PhD, Department of Radiology and Biomedical Imaging and Dr. Richard Gowen, president, INDNJC Foundation, at a ceremony held on March 11 in Genentech Hall on the Mission Bay Campus.

4th Annual Surbeck Young Investigators Awards, March 11, 2011

The top three papers were authored by:

- Myriam Chaumeil, PhD, "Hyperpolarized 13C MR spectroscopic imaging can be used to monitor Everolimus treatment *in vivo* in an orthotopic rodent model of glioblastoma," Myriam Chaumeil, Tomoko Ozawa, Il Woo Park, Kristen Scott, C. David James, Sarah Nelson, Sabrina Ronen. Chaumeil is a post-doctoral scholar in the lab of Sabrina Ronen, PhD, since 2008. She received her PhD in Medical Physics from the University of Paris XI, France.
- Peder Larson, PhD, "Stimulated-Echo 13C Metabolic Imaging of Transgenic Murine Cancer Models," Peder Larson, Ralph Hurd, Adam Kerr, John Pauly, Robert Bok, John Kurhanewicz, Daniel Vigneron. Larson graduated from Stanford University's Department of Electrical Engineering, and has worked as a post-doctoral scholar in the lab of Daniel Vigneron, PhD, since 2007. This is his third consecutive Surbeck Award.
- Eugene Ozhinsky, "Improved Spatial Coverage for Brain 3D PRESS MRSI by Automatic Placement of Outer-Volume Suppression Saturation Bands," Eugene Ozhinsky, Daniel Vigneron, Sarah Nelson. Ozhinsky, a fifth-year graduate student in the UCSF/UCB Program in Bioengineering, studied Applied Mathematics at St. Petersburg State Polytechnical University, Russia and received his bachelor's degree in Computer Science from UC Berkeley in 2001.

Second place awards were given to three authors of two papers:

- Adam Elkhaled and Llewellyn (Trey) Jalbert, "Presence of 2-Hydroxyglutarate in IDH-mutated Low-grade Glioma," Adam Elkhaled, Llewellyn (Trey) Jalbert, Joanna Phillips, Hikari Yoshihara, Rupa Parvataneni, Radhika Srinivasan, Gabrielle Bourne, Susan Chang, Soonmee Cha, Sarah Nelson. Jalbert is a research associate in the laboratory of Dr. Sarah Nelson and a graduate of UC Berkeley. He is continuing his research as a student in the UCSF/UCB Bioengineering PhD program this fall. Elkhaled is a research associate in the Nelson laboratory who received his BS in Bioengineering from UC San Diego. He plans to attend medical school in the future.
- Olga Tymofiyeva, PhD, "Baby Connectome: Mapping the Structural Connectivity of the Newborn Brain," Olga Tymofiyeva, Christopher Hess, Nan Tian, Sonia Bonifacio, Hannah Glass, Patrick McQuillen, Donna Ferriero, A. James Barkovich, Duan Xu. Tymofiyeva, a post-doctoral scholar, has worked in the lab of Duan Xu, PhD, 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. She earned her BSc from the NTUU "KPI" in Kyiv, Ukraine.

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.

Department of Radiology Hosts Imaging Services Workshop

A group of 35 post-docs, clinical fellows, and junior faculty from across UCSF—all of them early-stage investigators—learned about the use of *in vivo* preclinical and clinical imaging as a tool in translational research in an August 24 workshop presented by the UCSF Clinical and Translational Science Institute (CTSI), the Department of Radiology and Biomedical Imaging, and the HIV Research Section of the San Francisco Department of Public Health.

The workshop was organized by the Methods in eLearning for Translational Science Project (METiS), which supports collaborative workshops for early-stage investigators who may be unaware of the availability and utility of emerging laboratory technologies. METiS is funded through a grant from the NIH/National Center for Research Resources.

A panel of imaging experts, John Gore, PhD, of Vanderbilt University, Nashville, Tenn., and Pratik Mukherjee, MD, PhD, Henry VanBrocklin, PhD, and David Saloner, PhD, of UCSF's Department of Radiology and Biomedical Imaging, discussed various imaging modalities, such as MR, US, PET- and SPECT-CT, quantitative micro-imaging, and high-field NMR. Other topics also covered imaging applications for cardiovascular disease, neuroscience, and oncology/drug development research.

Attendees at the collaborative imaging services workshop

Participants toured the department's facilities at China Basin, with emphasis given to the imaging equipment available for research.

"We are excited about this collaboration with CTSI and with the opportunity to expose early-stage investigators from other research areas across UCSF to the services and equipment available through our department," said Ella Jones, PhD, assistant adjunct professor.

CTSI is a cross-school, campus-wide institute at UCSF, whose goal is to translate research into improvements in patient and community health.

Juanita Nevarez Honored with 2010 Lanna Lee Award

Patients at the Mount Zion Breast Imaging Center are in the caring hands of Juanita Nevarez, RT, the 2010 recipient of the Lanna Lee Award, given annually to the outstanding technologist in the Department of Radiology and Biomedical Imaging. "Juanita is not only an excellent mammography technologist who produces high-quality images, she demonstrates caring and sensitivity when dealing with patients," said Operations Director Kathy Knoerl.

Juanita joined the department in 1998 as a mammography technologist. Over her years of service at the mammography center, many patients have requested her for their examinations because of her skill in mammography and her friendly approach to patient care. Extremely sensitive to patient needs, Juanita always knows the right thing to say.

She contributed to the UCSF Mammography Department's transition from a film-based department to a digital department. She serves as a quality control technologist and generously applies her knowledge and dedication to the field of mammography in the mammography accreditation process.

Juanita Nevarez (left) with Nemia Ah, Lanna Lee's sister

The Lanna Lee Award was established in memory of 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. Since her death, this award is given annually in her honor at the department's Holiday Party. Her family regularly attends the award celebration to share in the knowledge that her spirit lives on.

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Sabrina M. Ronen, PhD
Associate Professor in Residence

Daniel B. Vigneron, PhD
Professor in Residence

Duan Xu, PhD
Assistant Professor in Residence

Xiaoliang Zhang, PhD
Associate Professor in Residence

Ultrasound

Peter W. Callen, MD
Professor in Residence

Vickie A. Feldstein, MD
Professor of Clinical Radiology

Roy A. Filly, MD
Professor Emeritus

Ruth B. Goldstein, MD
Professor and Chief

Liina Poder, MD
Associate Professor of Clinical Radiology

Dorothy Shum, MD
Assistant Clinical Professor

Rebecca Smith-Bindman, MD
Professor in Residence

Lori M. Strachowski, MD
Clinical Professor

Veterans Affairs Medical Center

Rizwan Aslam, MD
Associate Clinical Professor and Chief of CT

Linda L. Chao, PhD
Associate Adjunct Professor

Timothy Durazzo, PhD
Assistant Adjunct Professor

Adam Jung, MD
Assistant Professor of Clinical Radiology

Christine M. Glastonbury, MBBS
Associate Professor and Chief of Neuroradiology

Virginia J. Griswold, MD
Associate Clinical Professor

Carina Mari Aparici, MD
Associate Professor in Residence

Marcia J. McCowin, MD
Clinical Professor

Dieter J. Meyerhoff, PhD
Professor in Residence

Susanne Mueller, MD
Associate Adjunct Professor

David A. Saloner, PhD
Professor in Residence

Rajiv Sawhney, MD
Clinical Professor

Norbert Schuff, PhD
Adjunct Professor

Colin Studholme, PhD
Associate Professor in Residence

Michael W. Weiner, MD
Professor in Residence

Stefanie Weinstein, MD
Assistant Clinical Professor

Judy Yee, MD
Professor in Residence and Chief

Benjamin M. Yeh, MD
Associate Professor in Residence and Assistant Chief

Women's Imaging at Mt. Zion

Belinda Chang, MD
Assistant Professor of Clinical Radiology

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

Elissa R. Price, MD
Assistant Professor of Clinical Radiology

Edward A. Sickles, MD
Professor Emeritus

Dorota Wisner, MD, PhD
Assistant Professor in Residence

The Year in Pictures












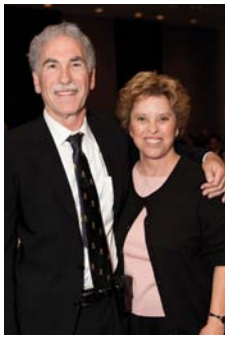




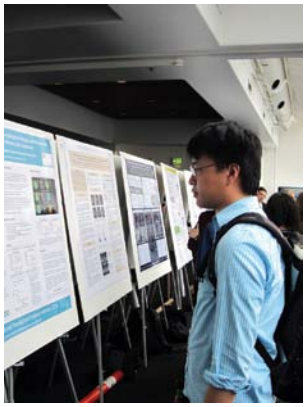













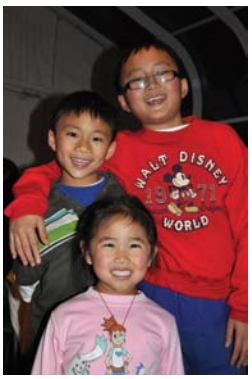
WALT DISNEY
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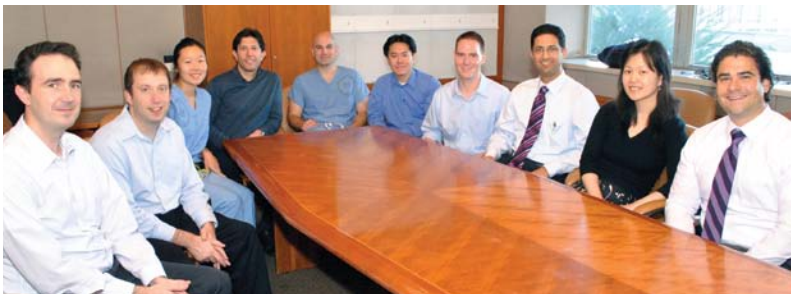

Research Directions

ABDOMINAL IMAGING

Fergus V. Coakley, MD, Chief

Research Directions:

- The promotion of evidence-based abdominal imaging, including systematic validation or debunking of commonly held opinions and assumptions
- Advanced modifications of MRI and CT techniques to optimize assessment of hepatic, biliary, and renal disease
- Combined MRI and MR spectroscopic imaging (MRSI) in localizing and staging 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 hepatosis
- 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

Recent Key References:

Keedy AW, Yee J, Aslam R, Weinstein S, Landeras LA, Shah JN, McQuaid KR, Yeh BM. Reduced Cathartic Bowel Preparation for CT Colonography: Prospective Comparison of 2-L Polyethylene Glycol and Magnesium Citrate. *Radiology.* 2011 Oct;261(1):156-64.

Naeger DM, Phelps A, Shah V, Avrin D, Qayyum A. Clinician-educator pathway for radiology residents. *Acad Radiol.* 2011 May;18(5):640-4.

Webb EM, Nguyen A, Wang ZJ, Stengel JW, Westphalen AC, Coakley FV. The Negative Appendectomy Rate: Who Benefits From Preoperative CT? *AJR Am J Roentgenol.* 2011 Oct;197(4):861-6.

Westphalen AC, Koff WJ, Coakley FV, Muglia VF, Neuhaus JM, Marcus RT, Kurhanewicz J, Smith-Bindman R. Prostate Cancer: Prediction of Biochemical Failure after External-Beam Radiation Therapy—Kattan Nomogram and Endorectal MR Imaging Estimation of Tumor Volume. *Radiology.* 2011 Aug 24. [Epub ahead of print]

BRAIN BEHAVIOR RESEARCH INTEREST GROUP

Srikantan Nagarajan, PhD, Co-Director
Pratik Mukherjee, MD, PhD, Co-Director

Research Directions:

The vision of the Brain-Behavior RIG is to:

- Understand the relationship between brain and behavior in health and disease
- Integrate information from molecules to mind
- Translate neuroimaging advances to the clinic

Our specific mission is to:

- Map and analyze functional activation in the brain
- Map and analyze structural and functional network connectivity in the brain
- Identify neurophysiological and neuroanatomical correlates of behavior in health and disease

Specific projects involve:

- Understanding the neural bases of sensory and motor function, speech, language, learning, memory, attention, executive function, and social cognition as measured by brain structure, function, and connectivity in the healthy and in a variety of diseases
- Developing biological, brain-based markers for diagnosis, monitoring disease progression, and response to therapies
- Developing and disseminating powerful, state-of-the-art computational tools and resources for multimodal structural and functional brain imaging
- Developing novel brain-based therapies

The RIG's activities are currently involved with these specific populations:

- Healthy young adults, normally developing children, and normal aging adults

- Patients with:
  - Epilepsy
  - Traumatic brain injury
  - NeuroENT (tinnitus, spasmodic dysphonia)
  - Neuropsychiatric illnesses (schizophrenia, depression, PTSD, lupus, Gulf War Syndrome)
  - Multiple sclerosis, movement disorders (Parkinson's disease, focal hand dystonia), prion diseases (CJD)
  - Neurodevelopmental disorders (autism, agenesis of the corpus callosum, cerebral palsy)
  - Neurodegenerative diseases (Alzheimer's/MCI, FTD, ALS, semantic dementia, PPA)
  - Brain tumors
  - Cerebrovascular disease (stroke, AVM, sickle cell disease)

Recent Key References:

Galantucci S, Tartaglia MC, Wilson SM, Henry ML, Filippi M, Agosta F, Dronkers NF, Henry RG, Ogar JM, Miller BL, Gorno-Tempini ML. White matter damage in primary progressive aphasias: a diffusion tensor tractography study. *Brain.* 2011 Jun 11. [Epub]

Hinkley LB, Vinogradov S, Guggisberg AG, Fisher M, Findlay AM, Nagarajan SS. Clinical symptoms and alpha band resting-state functional connectivity imaging in patients with schizophrenia: implications for novel approaches to treatment. *Biol Psychiatry.* 2011 Aug 19. [Epub]

Li YO, Yang FG, Nguyen CT, Cooper SR, Lahue SC, Venugopal S, Mukherjee P. Independent component analysis of DTI reveals multivariate microstructural correlations of white matter in the human brain. *Hum Brain Mapp.* 2011 May 12. [Epub]

Martino J, Honma SM, Findlay AM, Guggisberg AG, Owen JP, Kirsch HE, Berger MS, Nagarajan SS. Resting functional connectivity in patients with brain tumors in eloquent areas. *Ann Neurol.* 2011 Mar;69(3):521–32. [Epub]

Raj A, Hess C, Mukherjee P. Spatial HARDI: improved visualization of complex white matter architecture with Bayesian spatial regularization. *Neuroimage.* 2011 Jan 1;54(1):396–409.

BREAST CANCER RESEARCH INTEREST GROUP

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

Recent Key References:

Arasu VA, Chen RC, Newitt DN, Chang CB, Tso H, Hylton NM, Joe BN. Can signal enhancement ratio (SER) reduce the number of recommended biopsies without affecting cancer yield in occult MRI-detected lesions? *Acad Radiol.* 2011 Jun;18(6):716–21.

McLaughlin R, Hylton N. MRI in breast cancer therapy monitoring. *NMR Biomed.* 2011 Jul;24(6):712–20.

Partridge SC, Singer L, Sun R, Wilmes LJ, Klifa CS, Lehman CD, Hylton NM. Diffusion-weighted MRI: influence of intravoxel fat signal and breast density on breast tumor conspicuity and apparent diffusion coefficient measurements. *Magn Reson Imaging.* 2011 Sep 13. [Epub]

Peng C, Chang CB, Tso HH, Flowers CI, Hylton NM, Joe BN. MRI appearance of tumor recurrence in myocutaneous flap reconstruction after mastectomy. *AJR Am J Roentgenol.* 2011 Apr;196(4):W471–5.

Shepherd JA, Kerlikowske K, Ma L, Duewer F, Fan B, Wang J, Malkov S, Vittinghoff E, Cummings SR. Volume of mammographic density and risk of breast cancer. *Cancer Epidemiol Biomarkers Prev.* 2011 Jul;20(7):1473–82.

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
- Cardiac CT
  - Evaluation of pulmonary venous anatomy in atrial fibrillation
  - Characterization of myocardial ischemic injury by contrast-enhanced MRI and 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:

Hope MD, Dyverfeldt P, Acevedo-Bolton G, Wrenn J, Foster E, Tseng E, Saloner D. Post-stenotic dilation: Evaluation of ascending aortic dilation with 4D flow MR imaging. *Int J Cardiol.* 2011 Sep 8. [Epub]

Hope MD, Hope TA, Crook SE, Ordovas KG, Urbania TH, Alley MT, Higgins CB. 4D flow CMR in assessment of valve-related ascending aortic disease. *JACC Cardiovasc Imaging.* 2011 Jul;4(7):781-7.

Lee JS, Ryu JH, Elicker BM, Lydell CP, Jones KD, Wolters PJ, King Jr TE, Collard HR. Gastroesophageal Reflux Therapy is Associated with Longer Survival in Idiopathic Pulmonary Fibrosis. *Am J Respir Crit Care Med.* 2011 Jun 23. [Epub]

Muzzarelli S, Ordovas KG, Cannavale G, Meadows AK, Higgins CB.Tetralogy of Fallot: impact of the excursion of the interventricular septum on left ventricular systolic function and fibrosis after surgical repair. *Radiology.* 2011 May;259(2):375-83.

Muzzarelli S, Ordovas KG, Cannavale G, Naeger D, Michaels AD, Higgins CB. Potential of Delayed Gadolinium Enhancement Magnetic Resonance Imaging for Quantification of Reverse Remodeling of the Peri-Infarct Zone in Patients With Ischemic Cardiomyopathy Treated With Chronic Vasodilator Therapy: Initial Experience. *J Thorac Imaging.* 2011 May 5. [Epub]

CARDIOVASCULAR IMAGING RESEARCH INTEREST GROUP

Karen Ordovás, MD, Co-Director

David Saloner, PhD, Co-Director

The overall vision of the Cardiovascular Imaging RIG is to serve as a world leader in providing early diagnosis and improved outcomes for patients suffering from cardiovascular diseases. The CVRIG will develop evolving imaging technologies and apply currently used imaging methods to determine the etiology of cardiovascular conditions and to provide early diagnosis of cardiovascular diseases, with the ultimate goal of reducing

overall and cardiovascular mortality. 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 to understand 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:

Hope MD, Dyverfeldt P, Acevedo-Bolton G, Wrenn J, Foster E, Tseng E, Saloner D. Post-stenotic dilation: Evaluation of ascending aortic dilation with 4D flow MR imaging. *Int J Cardiol.* 2011 Sep 8. [Epub].

Muzzarelli S, Meadows AK, Ordovas KG, Hope MD, Higgins CB, Nielsen JC, Geva T, Meadows JJ. Prediction of Hemodynamic Severity of Coarctation by Magnetic Resonance Imaging. *Am J Cardiol.* 2011 Aug 20. [Epub]

Ordovás, KG, Carlsson, M, Lease, KE, Foster, E, Meadows, AK, Martin, AJ, Hope, M, Do, L, Higgins, CB, Saeed, M. Impaired regional left ventricular strain after repair of tetralogy of fallot. *JMRI* (in press).

Saeed M, Saloner D, Martin A, Wilson M. Cardiovascular magnetic resonance imaging in delivering and evaluating the efficacy of hepatocyte growth factor gene in chronic infarct scar *Cardiovasc Revasc Med.* 2011 Mar-Apr;12(2):111-22.

Sayre GA, Bacharach SL, Dae MW, Seo Y. Combining dynamic and ECG-gated 82Rb-PET for practical implementation in the clinic. *Nucl Med Commun.* 2011 Sep 19. [Epub]

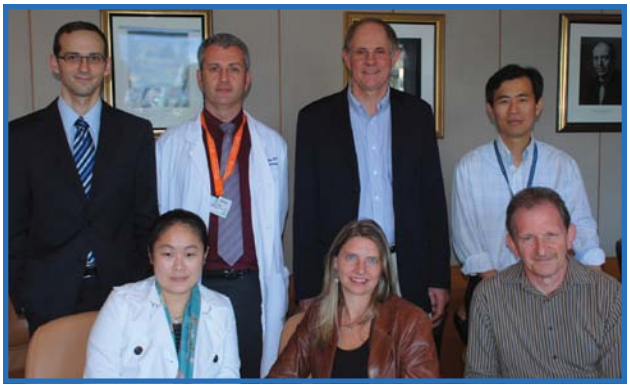

IMAGE-GUIDED THERAPY SPECIALIZED RESOURCE GROUP

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

Research Directions:

The IGT SRG aims to be a world leader in developing new and improved guidance for a wide array of surgical and interventional procedures. The administration of therapy is evolving and several common themes are emerging: (1) therapies must be delivered in an efficacious manner; (2) therapies must be administered in a minimally invasive fashion; (3) novel therapies must achieve demonstrable benefits over existing approaches; and (4) therapy delivery must be cost effective. Imaging is central to all these goals and the IGT SRG aims to bring together the clinical and technical expertise within our department and in collaboration with external departments, institutions, and industrial partners to develop delivery methods that achieve optimized therapeutic results.

Our key objectives are to:

- Provide improved guidance and evaluation of therapy
- Perform interventions and therapy delivery in a more minimally invasive fashion
- Develop image guidance for evolving medical therapies for which there may not now exist acceptable delivery mechanisms
- Develop pre-clinical devices in collaboration with industrial partners
- Conduct clinical trials that provide guidance to the medical community as to best practices in the therapeutic management of patients

Recent Key References:

Bernhardt AF, Wilson MW, Settecase F, Evans L, Malba V, Martin AJ, Saeed M, Roberts TPL, Arenson RL, Hetts SW. Steerable

catheter microcoils for interventional MRI: reducing resistive heating. *Acad Radiol.* (in press).

Dicks D, Saloner D, Martin A, Carlsson M, Saeed M. Percutaneous transendocardial VEGF gene therapy: MRI guided delivery and characterization of 3D myocardial strain. *Int J Cardiol.* 2010; 143, 255–263.

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.* Jul 25, 2011. [Epub]

Settecase F, Hetts SW, Martin AJ, Roberts TP, Bernhardt AF, Evans L, Malba V, Saeed M, Arenson RL, Kucharzyk W, Wilson MW. Heating of MRI-assisted catheter steering coils for interventional MRI. *Acad Radiol.* 2011 Mar;18(3):277–85.

Starr PA, Martin AJ, Ostrem JL, Talke P, Levesque N, Larson PS. Subthalamic nucleus deep brain stimulator placement using high-field interventional magnetic resonance imaging and a skull-mounted aiming device: technique and application accuracy. *J Neurosurg.* 2010 Mar;112(3):479–90.

INFORMATICS AND IMAGE PROCESSING/DISPLAY SPECIAL RESOURCE GROUP

David E. Avrin, MD, PhD, Director

Research and Development Directions:

Our group encompasses three areas of applied research and development:

- PACS, RIS, Workflow, and Integration: Software development related to acquiring, storing, and displaying digital images in clinical radiology and health care enterprise environments. Developing tools and integrating with other components of the electronic medical record are two specific focuses. Integrated tools for education and research, such as the UCSF Teaching File and the wet-read module are examples of successful projects. We are also one of the five institutions participating in the NIBIB-supported RSNA contract demonstration project on cross-enterprise patient controlled image sharing. We also oversee research PACS to support collaborative projects that involve imaging.
- Informatics: The intersection of the broad category of informatics with medical imaging. Examples include knowledge management, clinical decision support, standards such as RadLex and XDS-i, informatics for patient safety and quality, translational imaging, and datamining (including natural language processing).
- Image Processing: The broad range of post-acquisition image processing for MR and CT that is not specific to other RIGs. Examples include deformable anatomic modeling and fitting, statistical/probabilistic pattern matching, 3D visualization, and diffusion techniques.

Recent Key References:

Avrin DE, Flanders AE. Moving the mission forward: annual report from the RSNA Radiology Informatics Committee for 2010. *Radiographics.* 2011. Jul-Aug;31(4):1169–72.

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 in 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:

Durack JC, Westphalen AC, Kekulawela S, Bhanu SB, Avrin DE, Gordon RL, Kerlan RK. Perforation of the IVC: Rule Rather Than Exception After Longer Indwelling Times for the Günther Tulip and Celect Retrievable Filters. *Cardiovasc Intervent Radiol.* 2011 Mar 30. [Epub]

Durack JC, Thor Johnson D, Fidelman N, Kerlan RK, Laberge JM. Entrapment of the StarClose Vascular Closure System After Attempted Common Femoral Artery Deployment. *Cardiovasc Intervent Radiol.* 2011 Sep 23. [Epub]

Farrelly C, Fidelman N, Durack JC, Hagiwara E, Kerlan RK Jr. Transcatheter arterial embolization of spontaneous life-threatening extraperitoneal hemorrhage. *J Vasc Interv Radiol.* 2011 Oct;22(10):1396–402.

Kwan SW, Fidelman N, Durack JC, Roberts JP, Kerlan RK Jr. Rex shunt preoperative imaging: diagnostic capability of imaging modalities. *PLoS One.* 2011;6(7):e22222.

Tan JH, Fidelman N, Durack JC, Hays SR, Leard LL, Laberge JM, Kerlan RK, Golden JA, Gordon RL. Management of recurrent airway strictures in lung transplant recipients using AERO covered stents. *J Vasc Interv Radiol.* 2010 Dec;21(12):1900–4.

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 coil 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:

Chaumeil MM, Ozawa T, Park I, Scott K, James CD, Nelson SJ, Ronen SM.(13)C MR spectroscopic imaging can be used to monitor Everolimus treatment *in vivo* in an orthotopic rodent model of glioblastoma. Neuroimage. 2011 Jul 23. [Epub]

Hu S, Balakrishnan A, Bok RA, Anderton B, Larson PE, Nelson SJ, Kurhanewicz J, Vigneron DB, Goga A. 13C-pyruvate imaging reveals alterations in glycolysis that precede c-Myc-induced tumor formation and regression. *Cell Metab.* 2011 Jul 6;14(1):131–42.

Hu S, Zhu M, Yoshihara HA, Wilson DM, Keshari KR, Shin P, Reed G, von Morze C, Bok R, Larson PE, Kurhanewicz J, Vigneron DB. In vivo measurement of normal rat intracellular pyruvate and lactate levels after injection of hyperpolarized [1-(13)C]alanine. *J Magn Reson Imaging.* 2011 Oct;29(8):1035–40.

Ozhinsky E, Vigneron DB, Nelson SJ. Improved spatial coverage for brain 3D PRESS MRSI by automatic placement of outer-volume suppression saturation bands. *J Magn Reson Imaging.* 2011 Apr;33(4):792–802.

Park I, Bok R, Ozawa T, Phillips JJ, James CD, Vigneron DB, Ronen SM, Nelson SJ. Detection of early response to temozolomide treatment in brain tumors using hyperpolarized 13C MR metabolic imaging. *J Magn Reson Imaging.* 2011 Jun;33(6):1284–90.

MUSCULOSKELETAL AND QUANTITATIVE IMAGING RESEARCH INTEREST GROUP

Sharmila Majumdar, PhD, Co-Director
Thomas M. Link, MD, PhD, Co-Director

Research Directions:

- High-field and high-resolution MRI for quantitative characterization of the morphology and function of the musculoskeletal system
- Identification of biomarkers for degeneration in bone, cartilage, and inter-vertebral disc, and diseases such as osteoporosis, spinal disorders, and osteoarthritis
- MR spectroscopy methods for characterizing muscle in diabetes, HIV disease, and other diseases
- Strategies for non-invasive monitoring of cartilage and disc regeneration
- Microscopic characterization of bone, cartilage, disc, and other tissues, using methodologies such as computed tomography, Fourier Transform Infra-red imaging, high-resolution NMR spectroscopy, and confocal laser microscopy
- Development of high-resolution and quantitative computed tomography for characterizing bone geometry, micro-architecture, and density aimed at understanding aging, ethnic differences in the skeleton, osteoporosis, metal artifact reduction, and orthopedic implants

Recent Key References:

Joseph GB, Baum T, Carballido-Gamio J, Nardo L, Virayavanich W, Alizai H, Lynch 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 Sep 20;13(5):R153. [Epub]

Karampinos DC, Yu H, Shimakawa A, Link TM, Majumdar S. T(1)-corrected fat quantification using chemical shift-based water/fat separation: Application to skeletal muscle. *Magn Reson Med.* 2011 Mar 30. [Epub]

Krug R, Larson PE, Wang C, Burghardt AJ, Kelley DA, Link TM, Zhang X, Vigneron DB, Majumdar S. Ultrashort echo time MRI of cortical bone at 7 tesla field strength: A feasibility study. *J Magn Reson Imaging.* 2011 Jul 18. [Epub]

Zuo J, Joseph GB, Li X, Link TM, Hu SS, Berven SH, Kurhanewitz J, Majumdar S. *In-vivo* intervertebral disc characterization using magnetic resonance spectroscopy and T1ρimaging: association with discography and Oswestry disability index and SF-36. *Spine* (Phila Pa 1976). 2011 Jun 20. [Epub]

MUSCULOSKELETAL RADIOLOGY

Thomas M. Link, MD, PhD, Chief

Research Directions:

Bone Marrow Imaging

- Monitoring the progress of the treatment of Gauchers disease
- Cartilage and osteoarthritis MRI
- Imaging osteoarthritis-related changes in the Osteoarthritis Initiative cohorts
- Osteoarthritis, obesity, and physical activity
- Cartilage imaging of marathoners and physically active people
- Optimizing MR protocols for the knee at 3T and 7T
- Assessing menisci and cartilage with matrix-sensitive MRI sequences

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 and the spine

Imaging of the Knee
- ACL grafts and popliteomeniscal fascicle tears with arthroscopic correlation

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

MR Arthrography
- Evaluating the complications of MR arthrography

Osteopaorosis 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 and bone structure
- CT and radiograph-based trabecular bone structure measures to predict implant failure in patients undergoing internal fixation of proximal femur fractures

New MRI Techniques
- Use of CUBE and IDEAL sequences at 3T to image the knee
- Application of MAVRIC sequence for metal suppression
- MR neurography

Recent Key References:

Giaconi JC, Link TM, Vail TP, Fisher Z, Hong R, Singh R, Steinbach LS. Morbidity of Direct MR Arthrography. *AJR Am J Roentgenol.* 2011 Apr;196(4):868-74.

Hovis KK, Stehling C, Souza RB, Haughom BD, Baum T, Nevitt M, McCulloch C, Lynch JA, Link TM. Physical activity is associated with MR-based knee cartilage T2 measurements in asymptomatic subjects with and without osteoarthritis risk factors. *Arthritis Rheum.* 2011 May 2. [Epub]

Keen NN, Chin CT, Engstrom JW, Saloner D, Steinbach LS. Diagnosing ulnar neuropathy at the elbow using magnetic resonance neurography. *Skeletal Radiol.* 2011 Aug 16. [Epub]

Pan J, Pialat JB, Joseph T, Kuo D, Joseph GB, Nevitt MC, Link TM. Knee Cartilage T2 Characteristics and Evolution in Relation to Morphologic Abnormalities Detected at 3-T MR Imaging: A Longitudinal Study of the Normal Control Cohort from the Osteoarthritis Initiative. *Radiology.* 2011 Sep 7. [Epub]

Virayavanich W, Ringler MD, Chin CT, Baum T, Giaconi JC, O'Donnell RJ, Horvai AE, Jones KD, Link TM. CT-guided Biopsy of Bone and Soft-tissue Lesions: Role of On-site Immediate Cytologic Evaluation. *J Vasc Interv Radiol.* 2011 May 12. [Epub]

NEURODEGENERATIVE DISEASES RESEARCH INTEREST GROUP

Norbert Schuff, PhD, Co-Director
Michael W. Weiner, MD, 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:

Chao LL, Abadjian L, Hlavin J, Meyerhoff DJ, Weiner MW. Effects of low-level sarin and cyclosarin exposure and Gulf War Illness on brain structure and function: a study at 4T. *Neurotoxicology.* 2011 Jun 29. [Epub]

Chiang GC, Insel PS, Tosun D, Schuff N, Truran-Sacrey D, Raptentsetsang ST, Jack, CR, Weiner MW. Identifying cognitively

healthy elderly individuals with subsequent memory decline by using automated MR temporoparietal volumes. *Radiology.* 2011 Jun;259(3):844–851.

Durazzo TC, Tosun D, Buckley S, Gazdzinski S, Mon A, Fryer SL, Meyerhoff D. Cortical thickness, surface area, and volume of the brain reward system in alcohol dependence; relationships to relapse and extended abstinence. *Alcoholism: Clinical and Experimental Research.* 2011 Jun. 32 (6) 1–14.

Duygu Tosun, Norbert Schuff, Chester A. Mathis, William Jagust, Michael W. Weiner, and Alzheimer's Disease NeuroImaging Initiative. spatial patterns of brain amyloid-b burden and atrophy rate associations in MCI. *Brain* 2011 Apr;134(Pt 4):1077–88.

Mueller SG, Chao LL, Berman B, Weiner MW. Evidence for functional specialization of hippocampal subfields detected by MR subfield volumetry on high resolution images at 4 T. *Neuroimage.* 2011 Jun 1;56(3):851–7.

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 to predict 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:

Corbett-Detig J, Habas PA, Scott JA, Kim K, Rajagopalan V, McQuillen PS, Barkovich AJ, Glenn OA, Studholme C. 3D global and regional patterns of human fetal subplate growth determined in utero. *Brain Struct Funct.* 2011 Jan;215(3-4):255–63.

Hess CP, Mukherjee P, Barbaro NM. Epileptic foci. *J Neurosurg.* 2011 Jun;114(6):1691–2; discussion 1692.

Hu S, Zhu M, Yoshihara HA, Wilson DM, Keshari KR, Shin P, Reed G, von Morze C, Bok R, Larson PE, Kurhanewicz J, Vigneron DB. *In vivo* measurement of normal rat intracellular pyruvate and

lactate levels after injection of hyperpolarized [1-13C]alanine. *Magn Reson Imaging.* 2011 Oct;29(8):1035-40.

Li Y, Lupo JM, Polley MY, Crane JC, Bian W, Cha S, Chang S, Nelson SJ. Serial analysis of imaging parameters in patients with newly diagnosed glioblastoma multiforme. *Neuro Oncol.* 2011 May;13(5):546-57.

Patel ND, van Zante A, Eisele DW, Harnsberger HR, Glastonbury CM. Oncocytoma: the vanishing parotid mass. *AJNR Am J Neuroradiol.* 2011 Jul 14. [Epub]

Shepherd TM, Hess CP, Chin CT, Gould R, Dillon WP. Reducing patient radiation dose during CT-guided procedures: demonstration in spinal injections for pain. *AJNR Am J Neuroradiol.* 2011 Sep 15. [Epub]

Yuh EL, Dillon WP. Intracranial hypotension and intracranial hypertension. *Neuroimaging Clin N Am.* 2010 Nov;20(4):597-617. Review.

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 in monitoring 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:

Aparici CM, Bains S. Hypertrophic Osteoarthropathy Seen With NaF18 PET/CT Bone Imaging. *Clin Nucl Med.* 2011 Oct;36(10):928-9.

Kumar R, Hawkins RA, Yeh BM, Wang ZJ. Focal fluorine-18 fluorodeoxyglucose-avid lesions without computed tomography correlate at whole-body positron emission tomography-computed tomography in oncology patients: how often are they malignant? *Nucl Med Commun.* 2011 Sep;32(9):802-7.

Sayre GA, Bacharach SL, Dae MW, Seo Y. Combining dynamic and ECG-gated 82Rb-PET for practical implementation in the clinic. *Nucl Med Commun.* 2011 Sep 19. [Epub]

Seo Y, Aparici CM, Chen CP, Hsu C, Kased N, Schreck C, Costouros N, Hawkins R, Shinohara K, Roach Iii M. Mapping of lymphatic drainage from the prostate using filtered 99mTc-sulfur nanocolloid and SPECT/CT. *J Nucl Med.* 2011 Jul;52(7):1068-72. Epub 2011 Jun 16.

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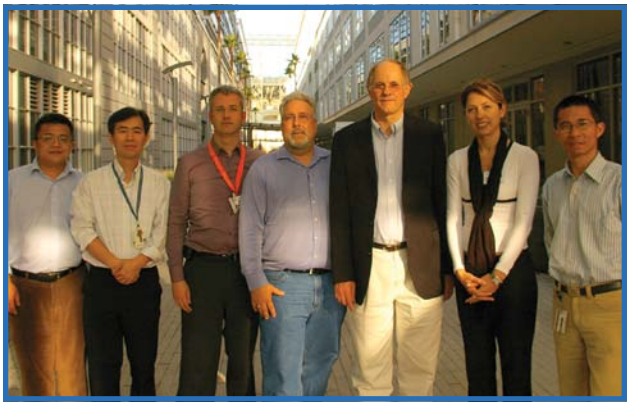


NUCLEAR-OPTICAL SPECIALIZED RESOURCE GROUP

Henry F. VanBrocklin, PhD, Co-Director
Carina Mari Aparici, MD, Co-Director

Research Directions:

- Evaluation of molecular probes for mesothelioma imaging
- Preparation of phosphoramidate imaging agents for prostate cancer
- Identifying breast cancer premalignancy with molecular probes
- Noninvasive detection of heart transplant rejection with molecular probes

- Characterization of atherosclerotic plaques
- Hypoxia as a biomarker for breast cancer and gliomas
- Development of an automated system for the preparation of fluorine-18 fluorine gas for PET radiochemistry
- Development of a quantitative multipinhole SPECT/CT technology for highly sensitive targeted volume imaging
- Quantitative SPECT/CT and PET/CT imaging of prostate cancer using molecular probes
- Development of a patient-specific pretherapy dosimetry tool for targeted radiotherapy of neuroblastoma
- Development of quantitative dynamic SPECT/CT and PET/CT techniques for myocardial perfusion imaging
- Development of dual isotope simultaneous acquisition of myocardial perfusion imaging
- Development of novel radionuclide detector technologies for small animal imaging
- Development of quantitative dynamic imaging techniques for microPET/CT imaging of cardiovascular and cancer research
- Molecular imaging of metastatic lymph nodes in breast cancer
- Preparation of tungsten-based nanomaterials for imaging applications
- Tracking distribution of labeled stem cells targeting the myocardium and assessment of their physiologic effects on myocardial perfusion and function

Recent Key References:

Junttila MR, Karnezis A, Garcia D, Madriles F, Kortlever RM, Rostker F, Brown-Swigart L, Pham DM, Seo Y, Evan GI, Martins CP. Selective activation of p53-mediated tumor suppression in high grade tumours. *Nature*. 2010;468:567-571. (Journal Article)

Iyer AK, Su Y, Feng J, Lan X, Zhu X, Liu Y, Gao D, Seo Y, VanBrocklin HF, Broaddus VC, Liu B, He J. The effect of internalizing human single chain antibody fragment on liposome targeting to epithelioid and sarcomatoid mesothelioma. *Biomaterials*. 2011;32:2605-2613.

Iyer AK, Zhu X, Su Y, Feng J, Gao D, Seo Y, VanBrocklin HF, Broaddus VC, Liu B, He J. Novel human single chain antibody fragments that are rapidly internalizing effectively target epithelioid and sarcomatoid mesotheliomas. *Cancer Res*. 2011;71:2428-2432. (Journal Article)

More SS, Itsara M, Yang X, Geier EG, Tadano MK, Seo Y, VanBrocklin HF, Weiss WA, Mueller S, Haas-Kogan DA, DuBois SG, Matthay KK, Giacomini KM. Vorinostat increases expression of functional norepinephrine transporter in neuroblastoma *in vitro* and *in vivo* model systems. *Clin Cancer Res*. 2011;17:2339-2349. (Journal Article)

Seo Y, Mari Aparici C, Chen P, Hsu C, Kased N, Schreck C, Costouros N, Hawkins R, Shinohara K, Roach M. Lymphatic drainage mapping of prostate using filtered 99mTc-sulfur nanocolloid and SPECT/CT. *J Nucl Med*. 2011;52:1068-1072.

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:

Duhaime AC, Gean AD, Haacke EM, Hicks R, Wintermark M, Mukherjee P, Brody D, Latour L, Riedy G; Common Data Elements Neuroimaging Working Group Members, Pediatric Working Group Members. Common data elements in radiologic imaging of traumatic brain injury. *Arch Phys Med Rehabil*. 2010 Nov;91(11):1661-6. Review.

Esakoff TF, Sparks TN, Kaimal AJ, Kim LH, Feldstein VA, Goldstein RB, Cheng YW, Caughey AB. Diagnosis and morbidity of placenta accreta. *Ultrasound Obstet Gynecol*. 2011 Mar;37(3):324-7.

Glass HC, Berman JI, Norcia AM, Rogers EE, Henry RG, Hou C, Barkovich AJ, Good WV. Quantitative fiber tracking of the optic radiation is correlated with visual-evoked potential amplitude in preterm infants. *AJNR Am J Neuroradiol*. 2010 Sep;31(8):1424-9.

Jacob FD, Habas PA, Kim K, Corbett-Detig J, Xu D, Studholme C, Glenn OA. Fetal hippocampal development: analysis by magnetic resonance imaging volumetry. *Pediatr Res*. 2011 May;69(5 Pt 1):425-9.

Xu D, Bonifacio SL, Charlton NN, P Vaughan C, Lu Y, Ferriero DM, Vigneron DB, Barkovich AJ. MR spectroscopy of normative premature newborns. *J Magn Reson Imaging*. 2011 Feb;33(2):306-11.

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:

- Novel contrast media for use in tumor detection and angiogenesis
- Hyperpolarized 13C MRSI for detection and treatment monitoring of inflammatory arthritis
- High-resolution MRI for characterization of congenital rectal floor abnormalities

Recent Key References:

Courtier J, Poder L, Wang ZJ, Westphalen AC, Yeh BM, Coakley FV. Fetal tracheolaryngeal airway obstruction: prenatal evaluation by sonography and MRI. *Pediatr Radiol.* 2010 Nov;40(11):1800–5.

Cyran CC, Sennino B, Fu Y, Rogut V, Shames DM, Chaopathomkul B, Wendland MF, McDonald DM, Brasch RC, Raatschen HJ. Permeability to macromolecular contrast media quantified by dynamic MRI correlates with tumor tissue assays of vascular endothelial growth factor (VEGF). *Eur J Radiol.* 2011 Sep 1. [Epub]

MacKenzie JD, Yen YF, Mayer D, Tropp JS, Hurd RE, Spielman DM. Detection of inflammatory arthritis by using hyperpolarized 13C-pyruvate with MR imaging and spectroscopy. *Radiology.* 2011 May;259(2):414–20.

Shin DS, Poder L, Courtier J, Naeger DM, Westphalen AC, Coakley FV. CT and MRI of early intrauterine pregnancy. *AJR Am J Roentgenol.* 2011 Feb;196(2):325–30.

PROSTATE CANCER RESEARCH INTEREST GROUP

John Kurhanewicz, PhD, Co-Director

Fergus V. Coakley, MD, Co-Director

Research Directions:

- Developing an optimized and clinically feasible multiparametric MR protocol for prostate cancer and diseases of the 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
- 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 diseases
- Developing and implementing hyperpolarized 13C magnetic resonance spectroscopic imaging in prostate cancer patients

Recent References:

Chitkara M, Westphalen A, Kurhanewicz J, Qayyum A, Poder L, Reed G, Coakley FV. Magnetic resonance spectroscopic imaging of benign prostatic tissue: findings at 3.0 T compared to 1.5 T-initial experience. *Clin Imaging.* 2011 Jul-Aug;35(4):288–93.

Chung HT, Noworolski SM, Kurhanewicz J, Weinberg V, Roach III M. A pilot study of endorectal magnetic resonance imaging and magnetic resonance spectroscopic imaging changes with dutasteride in patients with low risk prostate cancer. *BJU Int.* 2011 Mar 24. [Epub]

Ratiney H, Albers MJ, Rabeson H, Kurhanewicz J. Semi-parametric time-domain quantification of HR-MAS data from prostate tissue. *NMR Biomed.* 2010 Dec;23(10):1146–57.

Tiwari P, Viswanath S, Kurhanewicz J, Sridhar A, Madabhushi A. Multimodal wavelet embedding representation for data combination (MaWERiC): integrating magnetic resonance imaging and spectroscopy for prostate cancer detection. *NMR Biomed.* 2011 Sep 30. [Epub]

Westphalen AC, Koff WJ, Coakley FV, Muglia VF, Neuhaus JM, Marcus RT, Kurhanewicz J, Smith-Bindman R. Prostate Cancer:

Prediction of Biochemical Failure after External-Beam Radiation Therapy—Kattan Nomogram and Endorectal MR Imaging Estimation of Tumor Volume. *Radiology.* 2011 Aug 24. [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 with pulmonary embolism
- 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
- Exploring MR sequences before and after gadolinium for focal hepatic lesions
- Imaging and computer-aided assessment of traumatic brain injury
- Optimizating hepatic MRI and CT imaging parameters
- Transcatheter treatment of pelvic hemorrhage: post-traumatic, post-partum, and post-abortion.

Recent Key References:

Gean AD, Fischbein NJ. Head trauma. *Neuroimaging Clin N Am.* 2010 Nov;20(4):527-56. Review.

Keedy AW, Yeh BM, Kohr JR, Hiramoto JS, Schneider DB, Breiman RS. Evaluation of potential outcome predictors in type II Endoleak: a retrospective study with CT angiography feature analysis. *AJR Am J Roentgenol.* 2011 Jul;197(1):234-40.

Kim JJ, Gean AD. Imaging for the diagnosis and management of traumatic brain injury. *Neurotherapeutics.* 2011 Jan;8(1):39-53. Review.

Naeger DM, Chang SD, Kolli P, Shah V, Huang W, Thoeni RF. Neutral vs positive oral contrast in diagnosing acute appendicitis with contrast-enhanced CT: sensitivity, specificity, reader confidence and interpretation time. *Br J Radiol.* 2011 May;84(1001):418-26.

Rybkin AV, Wilson M. A web-based flexible communication system in radiology. *J Digit Imaging.* 2011 Oct;24(5):890-6.

Saeed M, Hetts SW, Ursell PC, Do L, Kolli KP, Wilson MW. Evaluation of the acute effects of distal coronary microembolization using multidetector computed tomography and magnetic resonance imaging. *Magn Reson Med.* 2011 Sep 28. [Epub]

Yuh EL, Cooper SR, Ferguson AR, Manley GT. Quantitative CT improves outcome prediction in acute traumatic brain injury. *J Neurotrauma.* 2011 Oct 4. [Epub]

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:

Aziz S, Wild Y, Rosenthal P, Goldstein RB. Pseudo gallbladder sign in biliary atresia—an imaging pitfall. *Pediatr Radiol.* 2011 May;41(5):620–6; quiz 681–2.

Courtier J, Poder L, Wang ZJ, Westphalen AC, Yeh BM, Coakley FV. Fetal tracheolaryngeal airway obstruction: prenatal evaluation by sonography and MRI. *Pediatr Radiol.* 2010 Nov;40(11):1800–5.

Esakoff TF, Sparks TN, Kaimal AJ, Kim LH, Feldstein VA, Goldstein RB, Cheng YW, Caughey AB. Diagnosis and morbidity of placenta accreta. *Ultrasound Obstet Gynecol.* 2011 Mar;37(3):324–7.

Filly RA, Baskin LS. Multifocal nephrogenic adenoma of the bladder in a pediatric patient. *J Ultrasound Med.* 2010 Aug;29(8):1239–41.

Jelin EB, Schecter SC, Gonzales KD, Hirose S, Lee H, Machin GA, Rand L, Feldstein VA. Guide wire assisted catheterization and colored dye injection for vascular mapping of monochorionic twin placentas. *J Vis Exp.* 2011 Sep 5;(55).

Shoo BA, Kangelaris G, Callen PW, Kashani-Sabet M, Leong SP. Detection of occult melanoma by preoperative positron emission tomography-computed tomography and intraoperative ultrasonography. *J Cutan Med Surg.* 2010 May-Jun;14(3):130–5.

VETERANS AFFAIRS MEDICAL CENTER
DIAGNOSTIC RADIOLOGY

Judy Yee, MD, Chief

Research Directions:

- Iterative reconstruction for radiation dose reduction
- Dose reduction for screening and diagnostic CT colonography
- Spectral imaging, dual energy, and low kVp CT imaging
- Perfusion imaging in the abdomen and pelvis
- 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
- Advances in quantification of bone mineral density
- Stroke prediction using intimal thickness on carotid ultrasound
- Quantification of myocardial perfusion with multipurpose advanced SPECT/CT

Recent Key References:

Bao DH, Mari C, Tseng JR, Quon A, Rosenberg J, Biswal S. Pattern of 18F-FDG uptake in the spinal cord in patients with non-central nervous system malignancy. *Spine* 2011 Feb 9. [Epub].

Berland LL, Silverman SG, Gore RM, Mayo-Smith WW, Megibow AJ, Yee J et al. Managing incidental findings on abdominal CT: white paper of the ACR incidental findings committee. *J Am Coll Radiol* 2010; 7:754–773.

Berrington de Gonzalez A, Kim PK, Knudsen AB, Lansdorp-Vogelaar I, Rutter FM, Smith-Bindman R, Yee J, Kuntz KM, van Ballegooijen M, Zauber AG, Berg CD. Radiation-rated cancer risks from CT colonography screening: a risk-benefit analysis, *AJR* 2011; 196:816–823.

Chou SH, Wang ZJ, Kuo J, Cabarrus M, Fu Y, Aslam R, Yee J, Zimmet JM, Shunk K, Elicker B, Yeh BM. Persistent renal enhancement after intra-arterial versus intravenous iodixanol administration. *Eur J Radiol.* 2011 Apr 4. [Epub].

Chu L, Weinstein S, Yee J. Colorectal cancer screening in women: an underutilized life saver. *AJR* 2011; 196:303–310.

Keedy A, Yee J, Aslam R, Weinstein S, Landeras L, Shah J, McQuaid K, Yeh B. Reduced Cathartic Bowel Preparation for CT Colonography: Prospective Comparison of 2-L Polyethylene Glycol and Magnesium Citrate. *Radiology* 2011; 261:156–64.

Prevrhal S, Forsythe CH, Harnish RJ, Saeed M, Yeh BM. CT Angiographic Measurement of Vascular Blood Flow Velocity by Using Projection Data. *Radiology* October 3, 2011. [Epub]

VETERANS AFFAIRS MEDICAL CENTER
CENTER FOR IMAGING OF NEURODEGENERATIVE DISEASES

Michael W. Weiner, MD, 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:

Chao LL, Abadjian L, Hlavin J, Meyerhoff DJ, Weiner MW. Effects of low-level sarin and cyclosarin exposure and Gulf War Illness on brain structure and function: a study at 4T. *Neurotoxicology*. 2011 Jun 29. [Epub]

Chiang GC, Insel PS, Tosun D, Schuff N, Truran-Sacrey D, Raptentsetsang ST, Jack, CR, Weiner MW. Identifying cognitively healthy elderly individuals with subsequent memory decline by using automated MR temporoparietal volumes. *Radiology*. 2011 Jun;259(3):844-851.

Durazzo TC, Tosun D, Buckley S, Gazdzinski S, Mon A, Fryer SL, Meyerhoff D. Cortical thickness, surface area, and volume of the brain reward system in alcohol dependence; relationships to relapse and extended abstinence. *Alcoholism: Clinical and Experimental Research*. 2011 Jun. 32 (6) 1-14.

Duygu Tosun, Norbert Schuff, Chester A. Mathis, William Jagust, Michael W. Weiner, and Alzheimer's Disease NeuroImaging Initiative. spatial patterns of brain amyloid-b burden and atrophy rate associations in MCI. *Brain* 2011 Apr;134(Pt 4):1077-88.

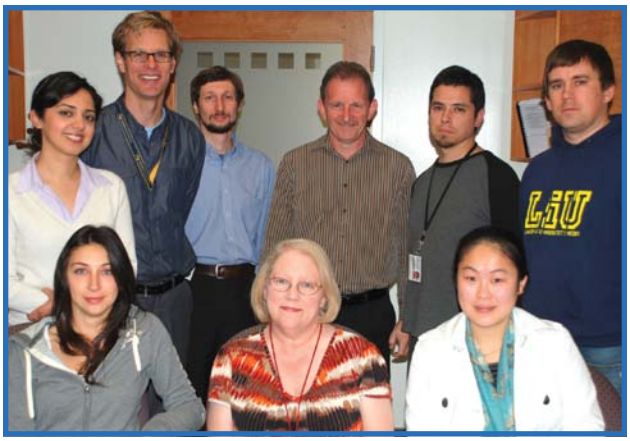
Mueller SG, Chao LL, Berman B, Weiner MW. Evidence for functional specialization of hippocampal subfields detected by MR subfield volumetry on high resolution images at 4 T. *Neuroimage*. 2011 Jun 1;56(3):851-7.

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



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Rayz VL, Boussel L, Ge L, Leach JR, Martin AJ, Lawton MT, McCulloch C, Saloner D. Flow residence time and regions of intraluminal thrombus deposition in intracranial aneurysms. *Ann Biomed Eng.* 2010 Oct;38(10):3058-69.

Sigovan M, Hope MD, Dyverfeldt P, Saloner D. Comparison of four-dimensional flow parameters for quantification of flow eccentricity in the ascending aorta. *J Magn Reson Imaging.* 2011 Sep 16. [Epub]

Soleimani M, Khazalpour M, Cheng G, Zhang Z, Acevedo-Bolton G, Saloner DA, Mishra R, Wallace AW, Guccione JM, Ge L, Ratcliffe MB. Moderate mitral regurgitation accelerates left ventricular remodeling after posterolateral myocardial infarction. *Ann Thorac Surg.* 2011. Ann Thorac Surg. 2011 Sep 24. [Epub]

Sughrue ME, Saloner D, Rayz VL, Lawton MT. Giant intracranial aneurysms: evolution of management in a contemporary surgical series. *Neurosurgery.* 2011 Jun 30 [Epub]

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:

Doyle GP, Onysko J, Pogany L, Major D, Caines J, Shumak R, Wadden N, Carney PA, Sickles EA, Monsees BS, Bassett LW, Miglioretti DL. Limitations of minimally acceptable interpretive performance criteria for screening mammography. *Radiology.* 2011 Mar;258(3):960-1.

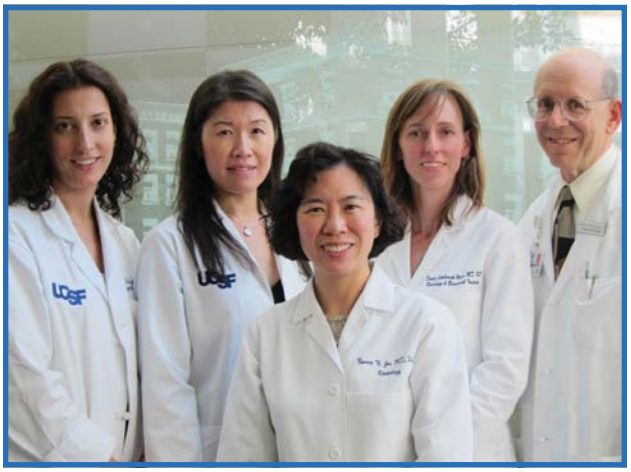
Houssami N, Abraham LA, Miglioretti DL, Sickles EA, Kerlikowske K, Buist DS, Geller BM, Muss HB, Irwig L. Accuracy and outcomes of screening mammography in women with a personal history of early-stage breast cancer. *JAMA.* 2011 Feb 23;305(8):790-9.

Itakura K, Lessing J, Sakata T, Heinzerling A, Vriens E, Wisner D, Alvarado M, Esserman L, Ewing C, Hylton N, Hwang ES. The impact of preoperative magnetic resonance imaging on surgical treatment and outcomes for ductal carcinoma in situ. *Clin Breast Cancer.* 2011 Mar;11(1):33-8.

Meyerson AF, Lessing JN, Itakura K, Hylton NM, Wolverton DE, Joe BN, Esserman LJ, Hwang ES. Outcome of long term active surveillance for estrogen receptor-positive ductal carcinoma in situ. Breast. 2011 Aug 13. [Epub]

Price ER, Morris EA. Magnetic resonance imaging-guided breast biopsies: tips and tricks. *Can Assoc Radiol J.* 2011 Feb;62(1): 15-21.

Sickles EA. The use of breast imaging to screen women at high risk for cancer. *Radiol Clin North Am.* 2010 Sep;48(5):859-78. Review.



Grants and Fellowships

GRANTS

Elias H. Botvinick, MD

- Lawrence Berkeley National Laboratory; Dynamic Cardiac SPECT Imaging, 7/1/11–4/30/12, $238,109.

Fergus V. Coakley, MD

- InSightec Ltd.; MR-Guided Focused Ultrasound Treatment of Uterine Fibroids, 5/11/11–5/10/14, $247,900.

Michael W. Dae, MD

- UC Discovery-Sonogenix, Inc.; Shear Stress Mediated Renal Protection, 4/1/11–3/31/12, $432,073.

Jeremy C. Durack, MD

- Society of Interventional Radiology; Radiation Dose Associated with Renal Ablation Procedures, 5/1/11–4/30/12, $97,512.

Nicholas Fidelman, MD

- MDS Nordion; Safety and Efficacy of Selective Internal Radiation Therapy, 11/24/10–10/31/11, $40,540.

Steven W. Hetts, MD

- NIH National Institute of Biomedical Imaging and Bioengineering; Endovascular Magnetic Catheter for Interventional MRI, 8/1/11–5/31/12, $543,353.

Nola M. Hylton, PhD

- Susan G. Komen Breast Cancer Foundation; MR Imaging Phenotypes of Breast Cancer, 7/1/10–6/30/11, $250,000.
- NIH National Cancer Institute; Quantitative Imaging for Assessing Breast Cancer Response, 9/26/11–8/31/12, $635,744.

John Kurhanewicz, PhD

- GE Global Research; UCSF Radiology Pathology Linkage for Prostate Cancer Studies, 3/31/11–12/31/11, $26,078.

Jeanne M. Laberge, MD

- W.L. Gore & Associates, Inc.; The GORE® VIATORR® TIPS Endoprosthesis versus Large-Volume Paracentesis for the Treatment of Ascitesin in Patients with Chronic Liver Disease, 5/24/11–5/23/14, $116,000.

Thomas F. Lang, PhD

- Columbia University, Bone Properties in Hypoparathyroidism: Effects of PTH, 7/1/10–6/30/11, $11,996.
- Mayo Foundation/Mayo Clinic; Epidemiology of Age-Related Bone Loss and Fractures, 7/2/10–5/31/11, $62,021.
- NIH National Institute of Arthritis and Musculoskeletal and Skin; Bone quality by vQCT and HR-pQCT: Translation to Multi-Center Clinical Research, 8/1/11–7/31/12, $557,851.

John D. Mackenzie, MD

- National Academies Keck Futures Initiative, Multiscale Biomedical Imaging for Autoimmune Disease, 5/3/11–4/30/13, $50,000.

Sharmila Majumdar, PhD

- Merck & Co., Inc.; Non-invasive Assessment of Bone Microarchitecture and Strength Changes in Androgen Deprivation Therapy in Prostate Cancer as a Model for Male Secondary Osteoporosis, 5/9/11–5/8/13, $112,140.
- NIH National Institute of Arthritis and Musculoskeletal and Skin; Loaded and Unloaded MR Imaging of Meniscus-Cartilage-Trabecular Bone in OA, 6/20/11–5/31/12, $550,360.
- NIH National Institute of Arthritis and Musculoskeletal and Skin; Translation of Quantitative Imaging in Osteoarthritis, 8/1/11–7/31/12, $1,301,037.

Tracy R. McKnight, PhD

- NIH National Cancer Institute; Impact of Molecular Phenotype on Glioma Metabolism and Growth, 4/1/11–3/31/12, $414,281.

Dieter Meyerhoff, PhD

- NIH; Neuroimaging and Cognition for Predicting Tobacco Dependence Treatment Outcomes, 09/30/10–05/31/12, $819,858.

Srikantan S. Nagarajan, PhD

- NIH National Institute of Neurological Disorders and Stroke; Fusion of Electromagnetic Brain Imaging and fMRI, 9/1/11–8/31/12, $231,750.

Sarah J. Nelson, PhD

- American College of Radiology; ACRIN Advanced DCE MRS Imaging Core Lab, 1/1/10–12/31/10, $14,977.

Susan Noworolski, PhD

- Touro University; Metabolic Impact of Fructose Restriction in Obese Children, 7/1/10–6/30/11, $64,429.

Sabrina M. Ronen, PhD

- NIH National Cancer Institute; MR Metabolic Imaging of Response to Targeted Therapies iin GBM (Glioblastoma), 9/8/11–6/30/12, $639,992.

Norbert Schuff, PhD

- Department of Defense; Multivariate Brain Imaging Analysis in PTSD, 9/30/10–10/1/12, $249,700.
- NIH; 4R Tauopathy Clinical Trial Biomarker Development, 12/1/10–8/31/15, $548,541.
- Michael J. Fox Foundation for Parkinson's Research; Diffusion Tensor Imaging Processing and Group Analysis, 9/9/10–9/8/15, $519,599.
- Michael J. Fox Foundation for Parkinson's Research; MRI Signature of Parkinson's Disease Heterogeneity, 8/15/11–8/14/12, $241,415.
- Michael J. Fox Foundation for Parkinson's Research; MRI Signature of Parkinson's Disease Heterogeneity, 1/1/12–12/31/17 $487,209.

Youngho Seo, PhD

- GE Healthcare; Characterization and Analysis of Pinhole Collimation for Cardiac Imaging, 9/1/10–10/15/11, $97,103.
- NIH National Cancer Institute; Pretherapy 124I-MIBG Dosimetry for Planning 131I-MIBG Neuroblastoma Therapy, 4/1/11–3/31/12, $376,486.
- NIH National Institute of Biomedical Imaging and Bioengineering; Energy-Independent Single Photon Molecular Imaging Technology, 5/1/11–4/30/12, $589,394.

John A. Shepherd, PhD

- California Breast Cancer Research Program; Fifth International Workshop on Breast Cancer Risk Assessment, 1/15/11–1/14/12, $20,000.
- California Pacific Medical Center Research Institute, Mammography-Based Risk Assessment for Breast Cancer, 1/1/11–6/30/11, $29,117.
- Merck & Co., Inc.; Advanced Body Composition Signatures Related to Fracture, 3/3/11–3/2/13, $85,680.
- Social & Scientific Systems, Inc.; PROMISE P1084, 6/1/10–5/31/11, $95,745.
- PHS Centers for Disease Control; Dual Energy X-Ray Absorptiometry (DXA) Scan Analysis and Contract, 4/12/11–12/31/11, $146,715.

Rebecca Smith-Bindman, MD

- PHS Agency for Healthcare Research and Quality; RCT of US versus CT for Patients in the ED with Suspected Renal Colic, 9/30/10–9/29/13, $9,154,210.

Richard B. Souza, PhD

- NIH National Institute of Arthritis and Musculoskeletal and Skin; Mechanics, Neuromuscular Control, and Cartilage Composition in Knee OA, 9/1/11–8/31/12, $280,974.

Henry F. VanBrocklin, PhD

- University of Montana; *In vivo* Disposition of Biologically Potent Phosphonate Chemical Agents, 9/30/10–8/31/11, $74,354.
- Cancer Targeted Technology, LLC; Probe Development for Prostate Cancer, 2/1/11–7/1/11, $89,271.
- UC Davis; CARE California Alliance Radiotracer Education, 3/1/11–8/31/11, $131,151.
- Bayer Schering Pharma AG; BSP Research Agreement, 11/17/10–11/16/12, $1,018,210.

Daniel B. Vigneron, PhD

- NIH National Institute of Biomedical Imaging and Bioengineering; Hyperpolarized MRI Technology Resource Center, 8/1/11–7/31/12, $1,576,106.

Z. Jane Wang, MD

- Department of Defense, US Army Medical Research Acquisition Activity; Noninvasive Assessment of Renal Tumor Aggressiveness Using Hyperpolarized 13C MR, 6/15/11–6/14/12, $115,875.

Michael Weiner, MD

- NIH; Alzheimer's Disease Neuroimaging Initiative 2, 9/1/10–8/31/15, $41,130,459.
- Department of Defense; 4T Magnet Upgrade, 10/1/10–09/30/12, $3,393,000.

Benjamin M. Yeh, MD

- American College of Radiology; ACRIN 6690 A Prospective, Multicenter Comparison of Multiphase, Contrast-Enhanced CT and Multiphase Contrast-Enhanced MRI for Diagnosis of Hepatocellular Carcinoma and Liver Transplant Allocation, 5/1/11–5/1/13, $130,010.

FELLOWSHIPS

Myriam M. Chaumeil, PhD

- American Brain Tumor Association; Imaging Response to P13K Pathway Inhibition in Glioblastoma, 7/1/11–6/30/12, $50,000.

Shorouk F. Dannoon, PhD

- Department of Defense, US Army Medical Research Acquisition Activity; Phosphoramidate-based Peptidomimetic Prostate Cancer PET; 6/20/11–6/19/12, $60,207.

Frederick W. Duewer, PhD

- NIH, National Cancer Institute; Subregional Measurements of Breast Features to Assess Breast Cancer Risk, 8/1/11–7/31/12, $65,462.

Il Woo Park, PhD

- American Brain Tumor Association; ABTA Biomarker of MGMT using C13 MRI, 7/1/11–6/30/12, $50,000.

The Department of Radiology and Biomedical Imaging is grateful to the many alumni who give back with a gift to the department.

"I feel lucky to have been a part of UCSF Radiology for my residency and fellowship. I think about all the ways the Margulis Society supported me during residency, and I just like to return the favor by supporting the current residents. I only wish I could teach more, too."

—Greg Sabo, MD, '07
Diagnostic Radiologist
Kaiser Permanente
Hayward, California

"I give because the training I received has helped my career tremendously. UCSF remains a leading radiology department, where the faculty teach with a combination of cutting-edge equipment and knowledge, and integrity. Residents leave knowledgeable, of course, and with a sense of how radiology fits in the overall scheme of compassionate medicine. I have remained friends with several of my 'attendings' and frequently reflect on how they affected my professional life. There is no better way to say thank you than to support a program that helped develop the basis of one's own career."

—Patricia Hudgins, MD, FACR, '85
Professor of Radiology/Otolaryngology
Director of Head and Neck Radiology, Department of Radiology,
Emory University School of Medicine, Atlanta, Georgia

"UCSF Radiology and Biomedical Imaging has always been an enduring leader in clinical excellence. I feel so fortunate for the privilege of spending my formative training years there. The residents and fellows are the face of our future, and their contributions greatly enhance the UC experience. Giving back is an honor that keeps me connected with this incredible institution."

—Avanti Ambekar, MD, '06
Diagnostic Radiologist
California Advanced Imaging Medical Associates
Burlingame, California

University of California
San Francisco

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