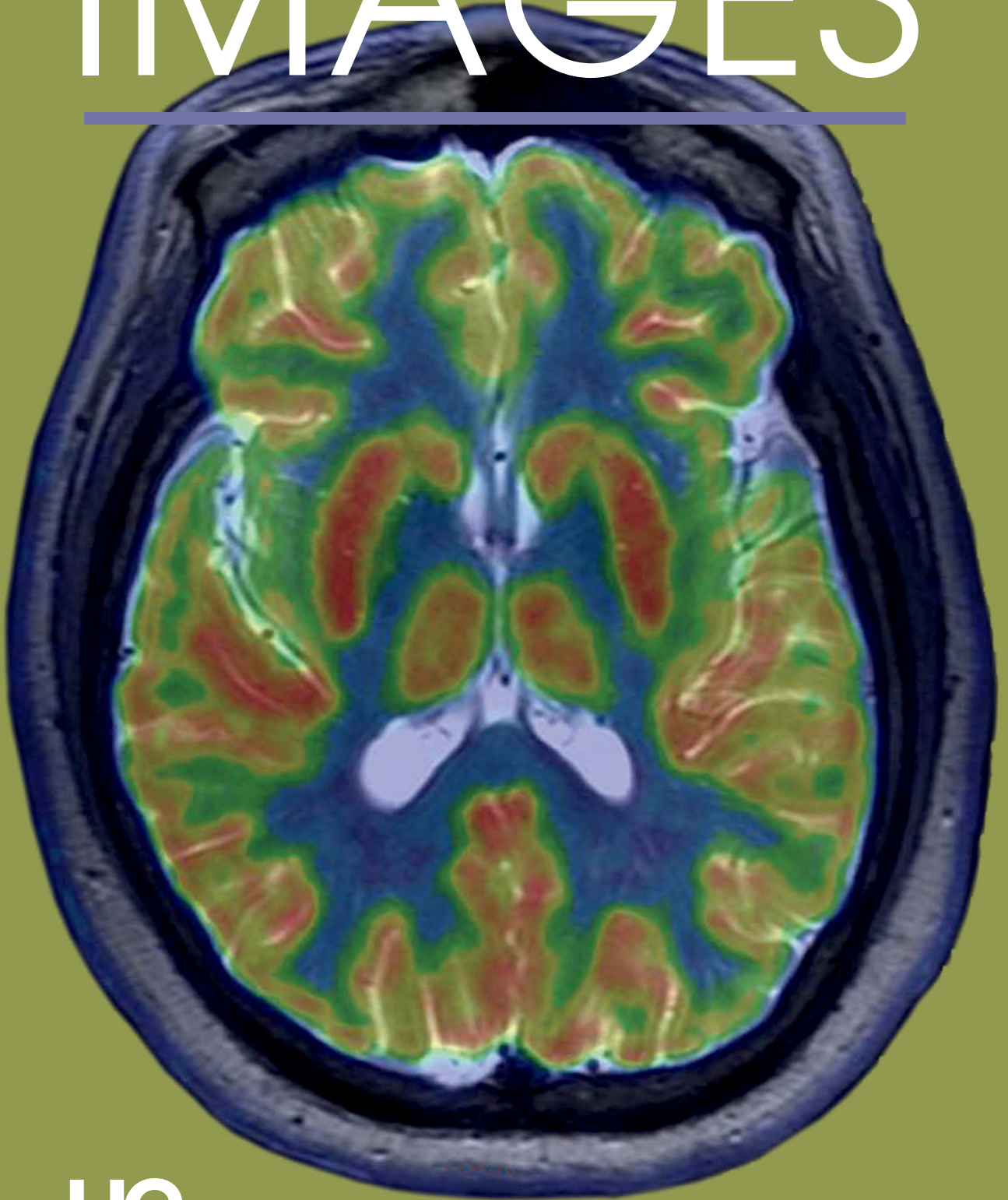


2014

DEPARTMENT OF RADIOLOGY AND BIOMEDICAL IMAGING

# IMAGES

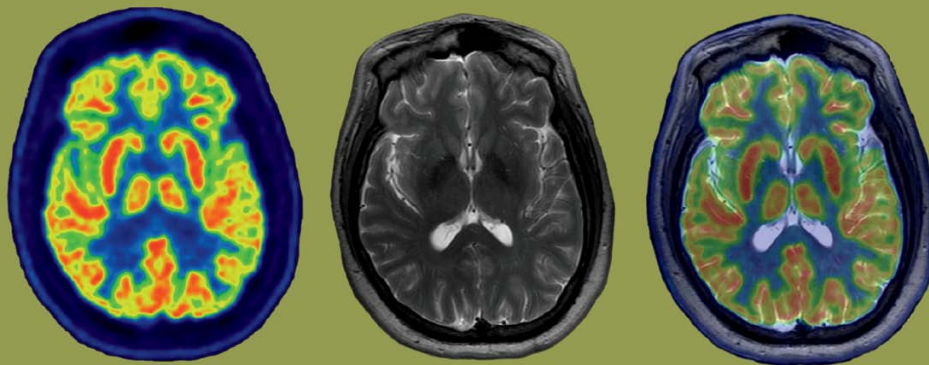


**UCSF**

University of California  
San Francisco

### About the Cover:

The cover figure shows a fused FDG PET-MR image of the normal brain obtained using a single modality GE PET-MR scanner. Simultaneous acquisition allows for the precise co-registration of physiologic PET with morphologic MR images. The accuracy of image fusion is exemplified by the co-localization of FDG activity (red and yellow color) superimposed upon the brains grey matter anatomical locations as demonstrated on a T2 weighted MRI sequence. The image is courtesy of Ramon Barajas Jr., MD, a clinical fellow in the Neuroradiology Section, Spencer Behr, MD, an assistant professor of Clinical Radiology in the sections of Abdominal Imaging and Nuclear Medicine, Miguel Hernandez Pampaloni, MD, PhD, an assistant professor of Radiology and chief of Nuclear Medicine, Youngho Seo, PhD, an associate professor in residence and director of Nuclear Imaging Physics and Soonmee Cha, MD, a professor In residence of Radiology and Neurological Surgery.



Above:

(l-r) an FDG-PET image, T2 MRI image, and a fused PET-MRI image of a normal brain.

*CAUTION - Investigational Device. Limited by United States law to investigational use.  
At time of publication, the GEHC PET-MR device is pending 510(k) review at US FDA.*

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## Dear Colleagues,

What might our Department of Radiology and Biomedical Imaging have in common with a tech titan like Google? The answer is summed up in a word we hear in many different contexts these days—engagement. Behind the amenities it offers—climbing walls, childcare, and free food—Google has a very data-driven approach to employee engagement and job satisfaction. Clearly, our budget does not lend itself to much of this. However, this year we have gathered data to help us focus on those intangible qualities that create a great department and make faculty and staff want to stay for a very long time: appreciation, acknowledgement, flexibility, feedback, career development, for example.

Our data gathering started with engaging a wonderful consultant to conduct nearly 100 confidential interviews with our faculty and trainees at every level. Through development of a qualitative questionnaire, and with carte blanche to probe issues “off script,” our consultant gathered substantial, subjective feedback on our faculty’s perception of their work and life in the department. Reading through pages and pages of verbatim comments, I admit that I felt conflicted. Many comments about the quality of our residents, our research and teaching and the dedication to patient care made me extremely proud. Other comments—suggesting we could do a lot better in acknowledging accomplishments, appreciating contributions, and providing feedback in a less critical style—were harder to read and absorb. However, as we began organizing our results into categories of tasks that we could work on collectively, I realized the incredible power of just asking these simple engagement questions.

I want to acknowledge Dr. Bill Dillon, our Executive Vice-Chair, and Dr. Susan Wall, our Vice-Chair of Academic Affairs for their incredible openness and hard work in help-

ing me sort through issues and identify faculty leaders who could tackle the subject areas we needed to work on, and who were unwavering in their desire to make this department even better.

A number of faculty members brought together groups of their colleagues around themes such as improving business processes, fostering community, career development, and research administration. These groups developed a series of white papers and suggestions which informed a faculty retreat at the end of March. I had not realized that, as our department grew from 30 people to 150, and from 2 sites to 6 (soon to be 8 when the Mission Bay Hospitals open in 2015), we had never gathered all the faculty in one room to exchange thoughts and information. This event was spectacular, and out of it, we pledged to accomplish as much as we could in the first “100 Days” after our retreat.

While we have more work to do, I strongly believe that having this data will positively impact the department for many years to come. It already has helped us change our recruiting strategy and approach; it has helped us adapt and improve an existing strong mentoring program; and it has helped me remember to acknowledge the contributions of our tremendous faculty “in the moment.” One additional change was the decision to create better links between our MD and PhD faculty and to provide hard money support for a larger percentage of our PhD faculty salaries. As a department that has built its reputation on translational research, I believe this was the right thing to do. I am very proud that once again, we had three superb researchers recognized by the Academy of Radiology Research: Drs. Michael Weiner, Dieter Meyerhoff, and Xiaoliang Zhang. In addition, the World Molecular Imaging Society awarded its 2014 Gold Medal to Drs. Sarah Nelson, Daniel Vigneron, and John Kurhanewicz for their work on hyperpolarized carbon-13 imaging.

Our faculty recruitment and engagement begins with our residency and fellowship training programs. I want to thank and acknowledge the superb accomplishments of Dr. Soonmee Cha, our Program Director, and Dr. Spencer Behr, our Fellowship Director. I am pleased to share that when Doximity teamed with US News and World Report in September to publish rankings of United States residency programs in 20 specialties, our diagnostic radiology residency was ranked in first place! As always, thank you to the Margulis Society for its ongoing engagement with our program and support of our residents. We plan another Margulis Gala at the downtown San Francisco Olympic Club on March 28, 2015, at 7 p.m. I hope to see you there.

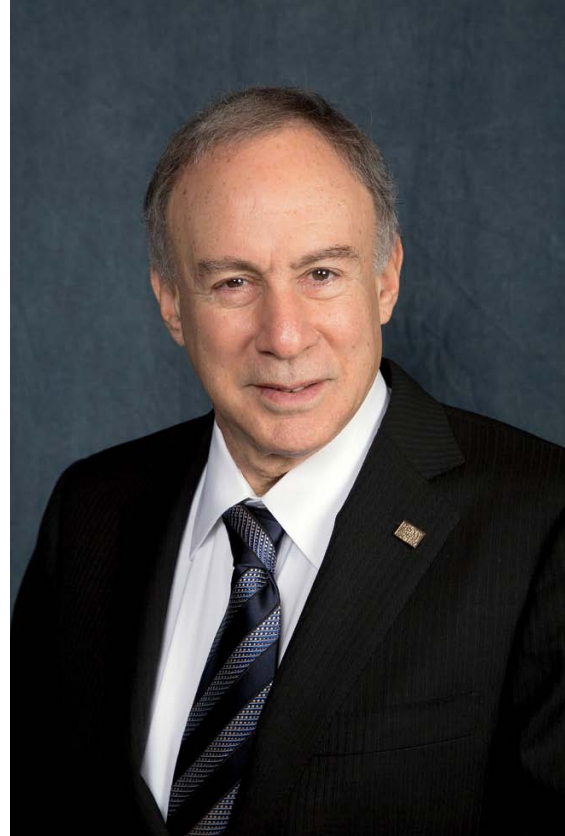
This year, our annual RSNA reception will be held on Monday, December 1, 2014 from 6:30–9:00 p.m. at the Fairmont Millennium Park, Crystal Room. I look forward to seeing you there and at all of the events in Chicago this year celebrating 100 years of the RSNA!

Finally, I hope you continue to feel deeply engaged in your practice and dedicated to making Radiology even more rewarding for those we teach and mentor. They really are the future and deserve our guidance and encouragement. I look forward, as always, to seeing many of you in 2015.

Sincerely,



Ronald L. Arenson, MD



## Magnetic Resonance-Guided Focused Ultrasound Shows Promise in Treating Uterine Fibroids

Maureen Kohi, MD

### Background

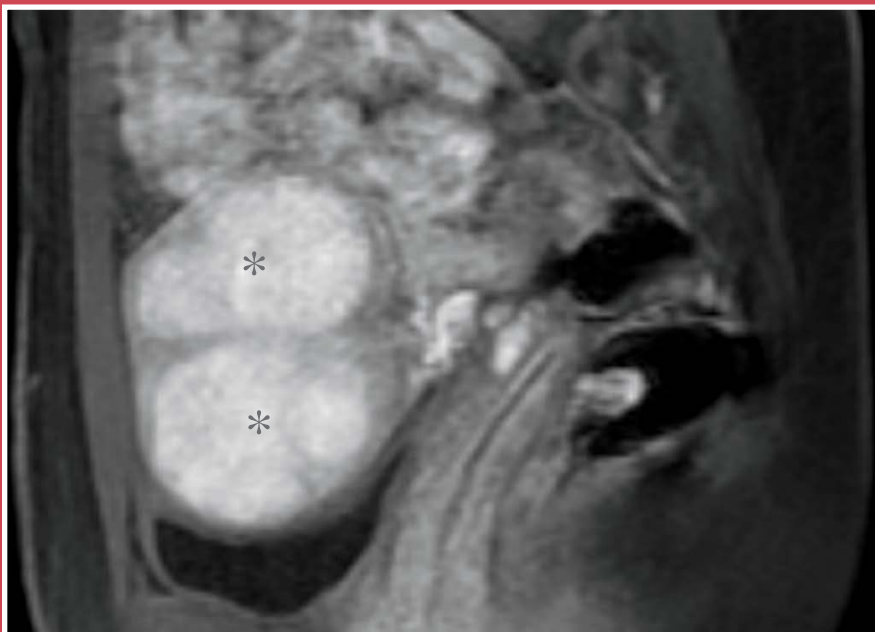
Uterine leiomyomas, or fibroids, are the most common benign neoplasm of the female pelvis. These tumors arise from the smooth muscle cells of the uterus and occur in up to 60% of women by age 45. Depending on size, location, and number of fibroids, common symptoms include heavy menstrual bleeding (menorrhagia) which may lead to anemia, pelvic pressure or pain, mass effect on the bladder or bowel resulting in frequent urination and constipation, infertility, and obstetrical complications.

Treatment is commonly surgical, through either myomectomy or hysterectomy, resulting in hospitalization and several weeks of recovery. While hysterectomy provides definitive symptom relief, women often want uterine-sparing therapies that will allow them to recover and resume usual activities more rapidly and to preserve their future fertility.

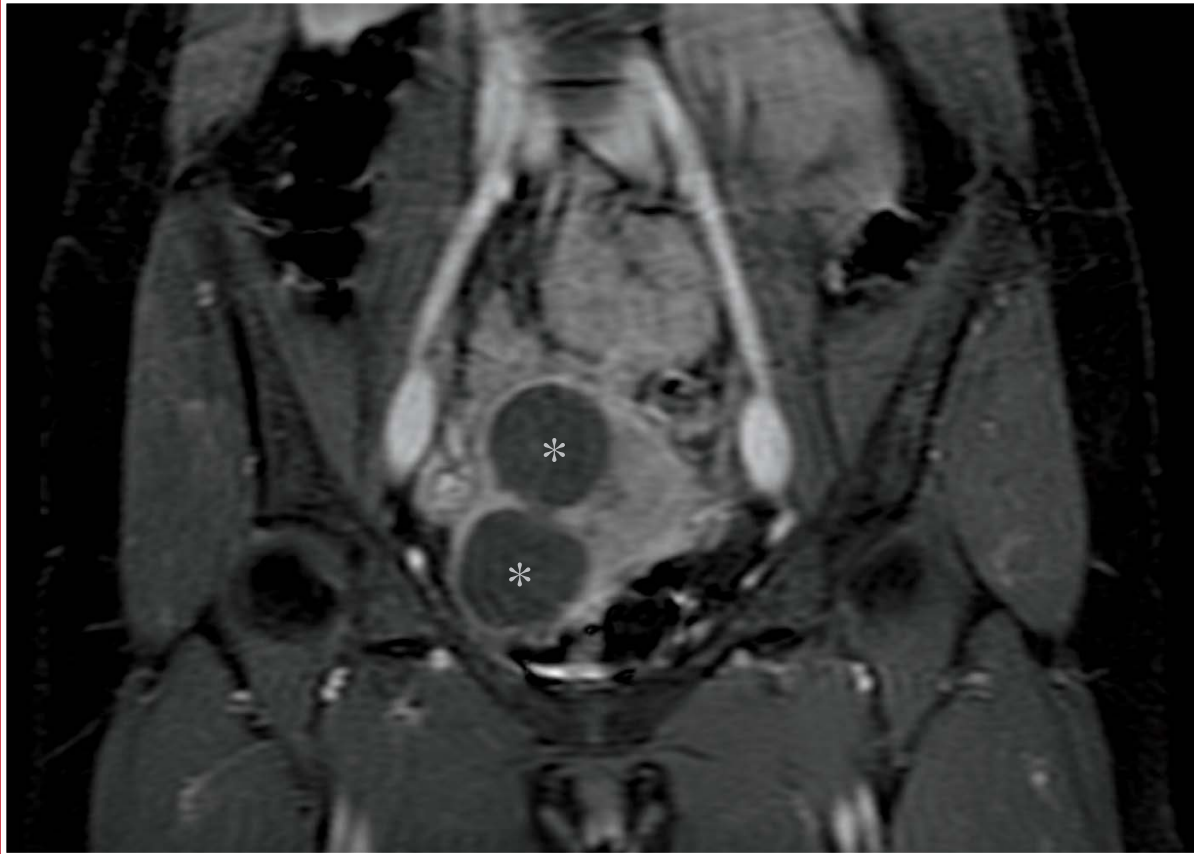
Uterine artery embolization (UAE) is a minimally invasive alternative to hysterectomy or myomectomy. This

procedure delivers small beads that occlude the arteries supplying the fibroid, causing its necrosis and death. While patients recover more quickly after UAE compared to surgery, the procedure involves arterial access and catheterization, exposure to ionizing radiation, and one-night hospitalization.

Magnetic resonance-guided focused ultrasound (MRg-FUS), also known as high intensity focused ultrasound or HIFU, is a novel, noninvasive, non-surgical treatment for symptomatic uterine fibroids. Approved by the Food and Drug Administration (FDA) for the commercial treatment of uterine fibroids in 2004, this innovative procedure delivers tightly focused high-energy ultrasound waves transcutaneously into the fibroid, heating and ultimately destroying the tissue with MR guidance. With proper focusing and sustained energy input, a targeted focus of heating (up to temperatures of 65–85°C/149–185°F) is achieved in the tissue, resulting in coagulative necrosis.



**Figure 1** Sagittal gadolinium-enhanced T1-weighted MR image of a 46-year-old woman complaining of menorrhagia demonstrates large, enhancing fibroids (asterisks) that are appropriate for treatment with MRgFUS.



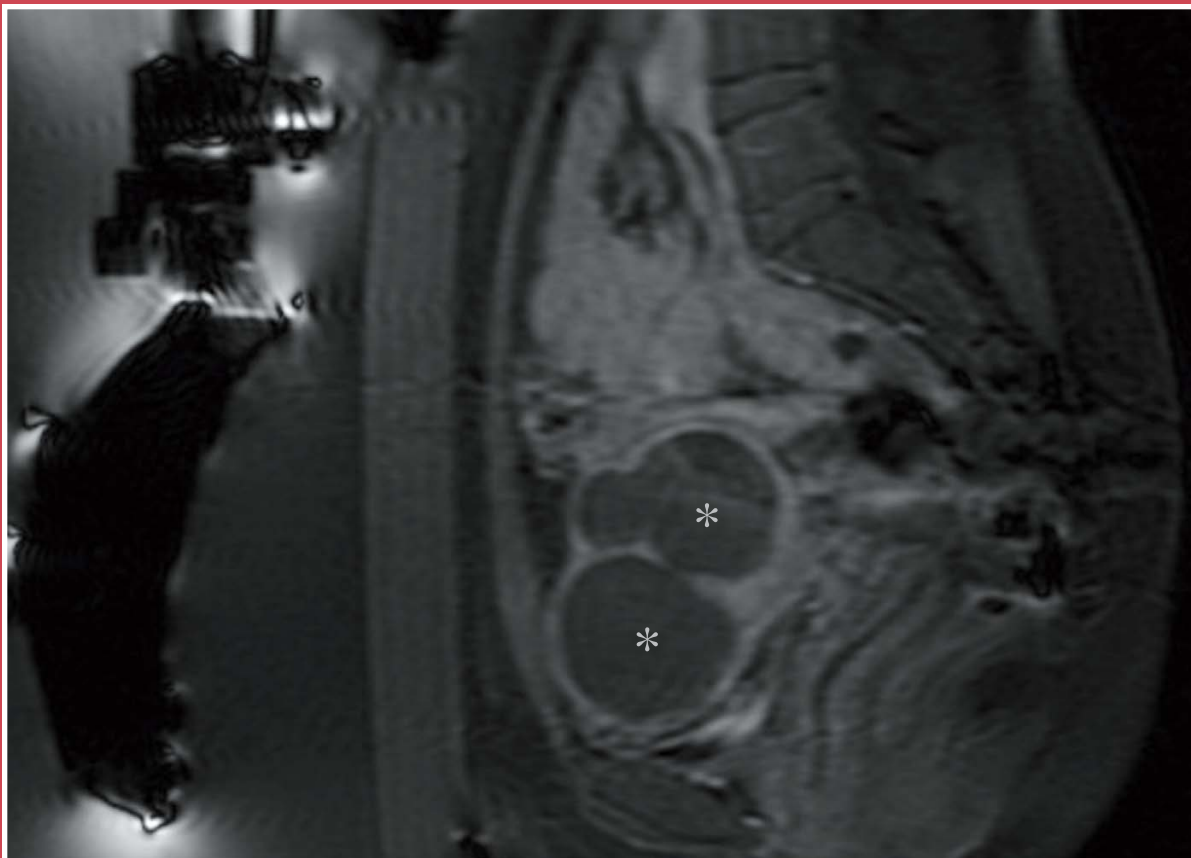
**Figure 2** Coronal gadolinium-enhanced T1-weighted MR image immediately after MRgFUS. The large fibroids (asterisks) demonstrate almost complete non-enhancement, indicating successful treatment.

Unlike laparoscopic myomectomy or hysterectomy, UAE or MRgFUS do not morcellate the fibroid. Morcellation refers to the division of tissue into smaller pieces or fragments and is often used during laparoscopic surgeries to facilitate the removal of tissue through small incision sites. During this process, fibroid cells are displaced into the abdomen and pelvis. If power morcellation is performed in cases of unsuspected uterine sarcoma, mimicking a fibroid, there is a risk that the procedure will spread the cancerous tissue within the abdomen and pelvis, significantly worsening the patient's likelihood of long-term survival. Because both UAE and MRgFUS cause tissue necrosis and kill the fibroid, they do not displace its particles to any other parts of the body.

MRI guidance allows for excellent soft tissue resolution and anatomical detail to delineate and characterize the targeted fibroid. In addition, MR thermometry, using

specialized, phase imaging techniques, offers real-time temperature monitoring and mapping of the ablated tissue. This hybrid technology provides a stereotactic environment in which the operator can identify the three-dimensional location of the fibroid, ablate the tissue volume, and through temperature mapping, receive real-time assessment of treatment success and adequacy.

Currently, the ExAblate system (InSightec, Haifa, Israel) is the only FDA-approved MRgFUS device for uterine fibroid treatment. The system is coupled to a 1.5T or 3T MRI scanner manufactured by General Electric (GE Medical System, Milwaukee, WI). The patient is positioned prone on a water bath or gel pad over the transducer in the tabletop within the MRI scanner. Similar to diagnostic ultrasound, acoustic coupling is achieved by using a layer of gel and degassed water. The pelvic or body MR coil is then placed on the patient's back and imaging is obtained.



**Figure 3** Sagittal gadolinium-enhanced T1-weighted MR image immediately after MRgFUS. The large fibroids (asterisks) demonstrate almost complete non-enhancement, indicating successful treatment.

Once appropriate patient positioning is confirmed, initial T2-weighted fast spin-echo planning images of the pelvis are acquired in the sagittal, axial, and coronal planes. These images are subsequently transferred to the ExAblate workstation and are used to plan treatment. At this time, care is taken to mark vital surrounding organs such as bowel and skin, to avoid non-targeted heating and injury. Treatment is delivered through a number of individual focused ultrasound pulses, called sonications, each lasting 20–30 seconds. During each sonication, real-time temperature mapping of the tissue ensures adequate tissue response and is used to track cumulative treatment volume. Typically, a treatment lasts for several hours (up to 3–4 hours) and involves up to 100 sonications. During this time, the patient receives moderate sedation to help with pain relief and anxiety. Following treatment, the patient is observed in the recovery area until she is stable

for discharge. Most women return to their normal activities within 1–2 days.

Serious complications are uncommon after MRgFUS. There is a potential risk of damage to adjacent organs, such as the bowel and ovaries. Since internal organs can move or be displaced, it is important for the operator to actively monitor the position of the uterus and the surrounding organs. Other potential complications include overheating and injury to the skin, causing burns or to peripheral nerves, causing temporary neuropathy.

The primary measure of treatment success is the demonstration of non-enhancement in the treated fibroid on post-gadolinium images obtained immediately after treatment is completed. The non-perfused volume of the treated volume indicates early technical success and correlates with long-term symptom improvement and fibroid involution. The most recent data demonstrates 86% symptom



improvement after 3 months and 93% improvement after 6 months. At 12-month follow up, 88% symptom improvement has been demonstrated.

### **UCSF Acquires a MRgFUS System**

In 2009, with the support and encouragement of Chairman Ron Arenson, MD, a team of multidisciplinary and interdepartmental investigators applied for a high-end instrumentation grant, which allowed for the purchase of an MRgFUS system in 2010. The system was installed at China Basin and the first patient was treated on April 25, 2011.

In July 2011, in collaboration with Vanessa Jacoby, MD, from the Department of Obstetrics, Gynecology, and Reproductive Sciences, we began a prospective, randomized, placebo-controlled trial for patients with symptomatic uterine fibroids. The Pilot Randomized trial Of MRI-guided focused ultrasound In Symptomatic uterine fibroids (PROMISe) randomized 20 patients in a 2:1 ratio to actual MRgFUS or sham treatment. The purpose of this study was to determine the feasibility of conducting a prospective, randomized, placebo-controlled trial of MRgFUS for women with symptomatic uterine fibroids, with an ultimate goal of performing a definitive trial to determine its safety and efficacy.

Of the 338 women screened: 303 (90%) were ineligible to participate and 35 (10%) were invited for a screening visit, which included a pelvic MRI and medical evaluation; 15 of these 35 women failed to meet the study criteria. The remaining 20 women were randomized to undergo MRgFUS (13 patients), or a placebo procedure of matched duration (7 patients). Patients were followed for three months. Study outcomes included change in fibroid symptoms and quality of life using a well-established questionnaire and uterine and fibroid volumes at routine pelvic MRI performed three months following the procedure.

The study was successfully completed in July 2012 and the initial results were presented at the third annual internal symposium of the Focused Ultrasound Foundation in Bethesda, Maryland in October 2012. Final results were reported at the annual meeting of the Society of Interventional Radiology in San Diego, CA in March 2014.

The PROMISe trial conclusions demonstrate that it is feasible to perform a randomized, placebo-controlled trial of MRgFUS for the treatment of symptomatic uterine fibroids. While no definitive conclusions were drawn on clinical outcomes due to small sample size, preliminary data suggest that there was a trend of improved outcome and quality of life at three months in patients undergoing MRgFUS, compared to the placebo control group.

### **Ongoing MRgFUS Use and Research**

Following the completion of the PROMISe trial, we provided MRgFUS, outside of the research setting, to patients who had symptomatic uterine fibroids and did not want surgery or UAE. Through a multidisciplinary approach combining OBGYN and Radiology, patients were evaluated for candidacy for MRgFUS. A good candidate for MRgFUS is a patient with total fibroid volume less than 500c (approximately 10cm x 10cm x 10cm), homogeneously enhanced following gadolinium contrast administration, and positioned within 12cm of the anterior abdominal wall. The patient cannot have dominant adenomyosis, pelvic inflammatory disease, or suspected malignancies. Finally, as the effects of MRgFUS are not known on pregnancy, patients who want MRgFUS should not desire future fertility.

In August 2013, we joined the first prospective, randomized multicenter clinical trial comparing MRgFUS to UAE for women with symptomatic fibroids in the United States. The Fibroid Interventions: Reducing Symptoms Today and Tomorrow (FIRSTT) trial included UCSF, the Mayo Clinic, and Duke. It randomized 220 women to MRgFUS or UAE and was completed in August 2014. The women will undergo follow up for 36 months.

Currently, we are participating in a multicenter trial evaluating the safety and efficacy of a new version of the ExAblate system. In addition, we will soon launch a pilot study evaluating the feasibility of performing MRgFUS in the regions of the fibroid with rich vascular supply. This trial is supported through a grant from the Focused Ultrasound Foundation and a seed grant from the Department of Radiology & Biomedical Imaging.

### **Conclusion**

MRgFUS is an exciting new technology for noninvasive fibroid tissue targeting and ablation. Over the past several years, we have participated in multiple trials to evaluate the safety and efficacy of this technology. Our goal is to remain among the leaders in the treatment of uterine fibroids through noninvasive or minimally invasive therapies, using technology that is readily available at UCSF.

*Maureen Kohi, MD, is an assistant professor of Clinical Radiology in the Vascular and Interventional Radiology section of the UCSF Department of Radiology & Biomedical Imaging. She serves as principal investigator and/or co-investigator for a number of fibroid-related clinical trials.*

# Complexity Landscape of Resting-State BOLD Fluctuations

Lindsay Conner, MS, and Norbert Schuff, PhD

## Resting-State BOLD Signals

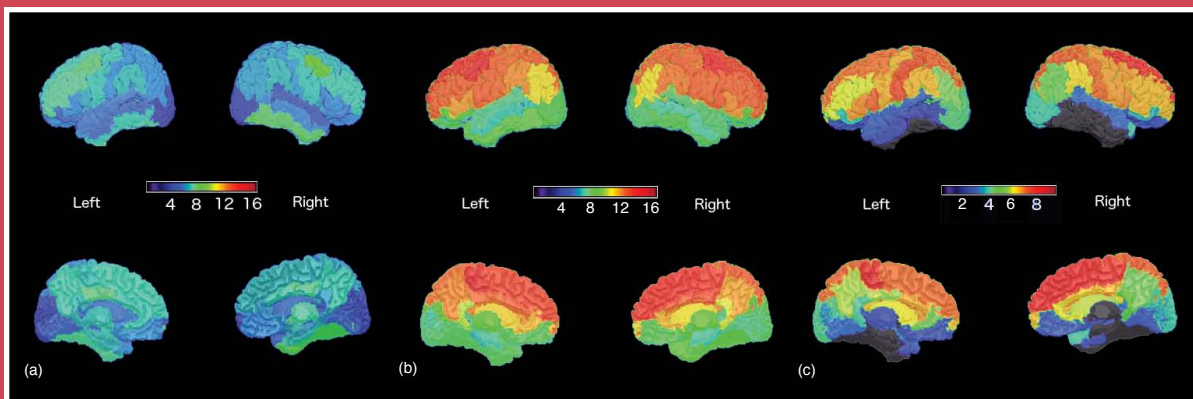
Resting-state functional magnetic resonance imaging (rs-fMRI), also known as task-free fMRI, has become a powerful tool in the study of functional brain networks in health and in disease. The sporadic fluctuations of the blood-oxygen-level dependent (BOLD) signal in rs-fMRI are thought to reflect spontaneous functional brain activity. Conventionally, functional connectivity between brain regions is inferred from the degree of temporal correlation between the BOLD fluctuations from these regions. rs-fMRI has been useful for studies of the overall organization of functional communication in brain networks, as well as for the detection of abnormal brain function in various neurodegenerative diseases, including Alzheimer's disease and Parkinson's disease. A principle limitation of these investigations is that they are anchored in a deterministic model of the brain, i.e., one in which spontaneous brain activity—and accordingly, sporadic BOLD fluctuations—are predictable. However, given that stochastic, or

unpredictable, processes are at the core of brain activity, an approach that takes stochastic components in BOLD fluctuations into consideration might offer new insight.

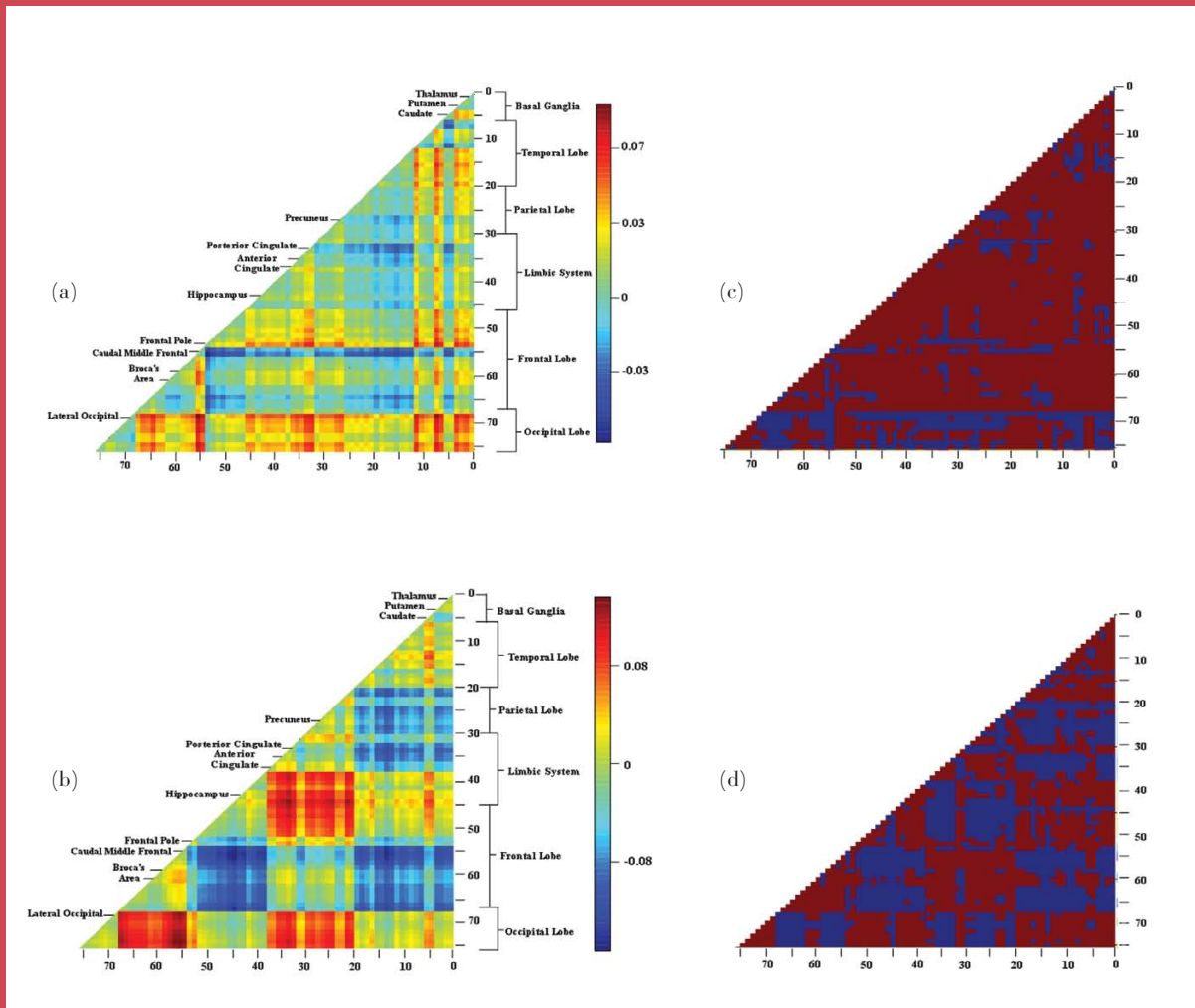
## Transient Information (TI) as a BOLD

### Signal Complexity Measure

We developed a new approach that specifically deals with the stochasticity of resting-state BOLD fluctuations. To quantify a stochastic BOLD signal whose attributes are “hidden,” in the sense that there is no *a priori* information for temporal patterns, we utilized the framework of information theory, a branch of mathematics that was developed to find fundamental limits in signal processing. Specifically, we quantified the “difficulty” of recognizing temporal patterns in sporadic BOLD fluctuations based on how quickly a specific pattern can be identified while observing the BOLD signal. Taking also into consideration that the uncertainty in pattern distributions adds to the difficulty in recognition, we believe that this measure



**Figure 1** Surface-rendered maps of mean regional transient information (TI) in (a) the control subjects and (b) Alzheimer's disease (AD) patients; lateral (top) and medial (bottom) views. The color scale ranges from 0 to 16 bits\*symbol, the physical unit of TI. Warmer colors indicate higher TI values, i.e., a higher degree of complexity, in the stochastic BOLD patterns. Overall, the BOLD signal complexity is shown to increase in the AD group, particularly in the parietal and frontal lobes. (c) Map of the difference in TI values between the control and AD groups, with a range of 0 to 10 bits\*symbol. Warmer colors indicate a greater difference in the selected region, with regions of no significant change in dark gray.



**Figure 2** (a) Matrix of pairwise regional differences in TI values across the normal (CN) subjects. Warmer colors indicate a greater difference. (b) Matrix of the corresponding statistical significance. Red indicates a significant difference; blue indicates no statistical significance at a false discovery rate level of  $q \leq 0.05$ . (c) and (d) represent the AD group pairwise regional differences and statistical significance, respectively.

of difficulty in sporadic BOLD fluctuations is a suitable definition of BOLD complexity. To quantify complexity, we use transient information (TI), an established information theoretic measure. Voxel-wise computations of TI in rs-fMRI therefore yield a complexity landscape of BOLD fluctuations across the brain.

### Preliminary Findings

As a proof-of-concept, we analyzed rs-fMRI data of 11 patients diagnosed with Alzheimer's disease (AD; mean age  $\pm$  SD:  $77 \pm 7$  years) and 17 age-matched healthy controls

(mean age  $\pm$  SD:  $76 \pm 6$  years), who participated in the Alzheimer's Disease Neuroimaging Initiative (ADNI) study.

First, we found that rs-BOLD fluctuations are significantly more complex than what is expected from random patterns. This implies that the intrinsic brain activity underpinning BOLD fluctuations cannot be explained by randomness alone. The intrinsic brain activity also cannot be largely periodic, since—similar to randomness—periodicity has very low complexity.

Second, we found that BOLD fluctuations of gray matter exhibit, on average, less complex patterns, and a more

narrow distribution of the degree of complexity, than those of white matter. Both findings may seem surprising, given that gray matter is associated with high cognitive functions. However, since the hemodynamics of the BOLD signal are regarded to reflect local field potentials of neuronal cell bodies and dendrites, which are more abundant in gray matter than white matter, one needs to recognize that short, irregular fluctuations are averaged to zero at the time-scale of rs-fMRI. Therefore, our approach mainly measures the complexity of long-term patterns in sporadic brain activity. Accordingly, we interpret the finding of less complexity of gray matter than white matter BOLD patterns to reflect the dominance of short-term temporal dynamics in gray matter.

Third, we observed that the degree of BOLD complexity is generally elevated in AD patients compared to normal, as shown in Figure 1. The finding implies that transient information is a potentially useful metric for detecting abnormal brain function in neurodegenerative conditions. An increase in BOLD complexity is also consistent with EEG studies in AD patients that found increased complexity of electrophysiological brain signals at long time scales (i.e., 0.5–20 Hz). This has been interpreted as an indication of pathophysiological mechanisms toward greater irregularity, i.e., due to disturbances in functional interactions between neuronal brain networks. It is also interesting that the most prominent increase in BOLD complexity in AD patients, relative to healthy subjects, involves large areas of the frontal cortex, as shown in Figure 1c. This is consistent with clinical observations of abnormal behavioral and psychological symptoms in AD.

Fourth, we found characteristic landscapes of BOLD complexity for both healthy subjects and AD patients. On average, healthy subjects showed a relatively smooth landscape of BOLD complexity across the brain (Fig 2a). In contrast, AD patients had a regionally more variable landscape of BOLD complexity (Fig 2c). Particularly, several frontal cortex areas (e.g., orbitofrontal area) in AD patients had lower BOLD complexity relative to parietal cortex areas, whereas other frontal regions (e.g., middle

frontal gyri and Broca's area) showed higher complexity. In addition, parietal cortex areas generally had higher BOLD complexity than limbic areas, the basal ganglia, and areas of the temporal cortex.

Overall, these results support the hypothesis that brain function becomes more unpredictable in the presence of neurodegeneration. We found abnormally increased BOLD complexity in AD in several brain regions involved in higher cognitive functions, especially in the anterior and posterior cingulate, and the inferior temporal cortex. Both the anterior and posterior cingulate areas are within the default mode network (DMN), which is known to become hyperactive during AD progression. The increase in BOLD complexity in these areas, meaning their BOLD patterns become more unpredictable, is consistent with the view of AD as a disconnectivity syndrome. However, further investigations are required to validate the plausibility of this interpretation.

#### Further Outlook and Conclusion

The variations in BOLD complexity require validation. We are currently investigating changes in BOLD complexity in Parkinson's patients who received rs-fMRI scans on- and off-medication. We predict that BOLD complexity will be increased in the off-medication state. We are also working on expansions of the information theory algorithms. For one, we aim to quantify the degree of stationarity, i.e., time-independence, of stochastic brain function. Another extension will use cross-complexity and mutual-complexity measures to determine whether the complexity patterns synchronize between brain regions. In conclusion, BOLD complexity is proposed as a new and sensitive marker of abnormal brain function in neurodegenerative disease states.

*Lindsay Conner, MS, holds a Master of Science in Biomedical Imaging from UCSF and works with Dr. Schuff as a research staff associate at the Center for Imaging of Neurodegenerative Diseases (CIND) at the VA Medical Center. Norbert Schuff, PhD, is a professor of Radiology and co-director of the Neurodegeneration Research Interest Group.*

# UCSF Leading the RSNA Image Share Revolution

Anand S. Patel, MD

Imagine a system that made scans accessible to patients—and to every physician who needed to see them—regardless of where the scans were performed. Even better, imagine that the system didn't rely on CDs or films. Do you think patients would be interested in this?

The answer to the last question is a resounding yes, and the system, called Image Share, is far from imaginary. UCSF recently completed a pilot study of RSNA Image Share, a revolutionary cloud-based, patient-controlled image network. The 20-month study was led by Ronald Arenson, MD, Anand Patel, MD, David Avrin, MD, PhD, and Wyatt Tellis, PhD.

"Patients are becoming more in tune with their health. They want to control their health records, analyze them and find out what the information means," said Patel, UCSF's physician coordinator for RSNA Image Share. "This is an example of medicine embracing the technological advances of online communication platforms." Patel presented UCSF's results at the 2012 and 2013 RSNA Conferences.

One of the motivators behind Image Share is the unprecedented Medicare expenditures for duplicated imaging exams—estimated at 10 to 20% of all imaging expenditures. RSNA launched the Image Share Network in 2009 with funding from the National Institute of Biomedical Imaging and Bioengineering.

## A Secure System with a Friendly Interface

Image Share gives patients direct control of their images and interpretations via a cloud-based electronic personal health record. It also allows patients to share access to their images with any provider, regardless of institutional affiliation. Images, reports, and other data can be shared across different vendors' systems, using standard protocols. In addition, the Image Share Network seeks to eliminate the CD—prone to being lost, damaged, difficult to obtain, and often incompatible across systems—as the primary transfer mode for images.

Patients receive a secure log-in via email for a website, accessible through a computer or mobile device where they can view their images and radiology reports, download, and share them with their physicians via a secure link. The user interface is simple, like Flickr or Facebook. Users can change the contrast or zoom in on specific areas of the image.

## Image Share Gets High Marks from Patients and Physicians

Patient Recruiter Mary Torosyan enrolled nearly 900 patients in Image Share when they requested a CD copy of their scans. The study looked at completed surveys from 252 patients and 81 physicians. In both groups, 95 percent expressed the need for a patient-controlled electronic personal health record. Four out of five patients and nine out of ten physicians were satisfied with the network. Two-thirds of the patients agreed or strongly agreed that health record privacy is important, and 90 percent were comfortable with the amount of privacy provided by RSNA Image Share.

There is some potential selection bias in the surveyed group, given that more than 90 percent of the patients reported residing in the tech-savvy Bay Area. Nonetheless, patients were receptive and eager to have the opportunity to view and share their images. For instance, one patient wanted to be able to see the scan of his brain along with a sample comparison normal—in essence learning radiology.



The RSNA Image Share Network is a national imaging informatics endeavor enabling patients to control and share their medical images via a cloud solution.

IMAGE COURTESY OF LIFEIMAGE®

Indeed, making images and radiology reports directly available to patients will sharpen the debate around how health information should be communicated, and by whom, according to Patel. This provides an opportunity for radiologists to extend their presence and identity among patients as experts in imaging and diagnosis. A very small number of patients reported more potential ease in hearing their imaging results from their referring physicians; however, given the choice between immediate availability and none, the great majority of patients preferred to have the option of accessing their own information.

UCSF is one of five pilot sites where the network is being tested with physicians and patients, and was awarded the HealthImaging 2013 Imaging 3.0 Patient-Centric Award. The work has been featured in the Wall Street Journal and other publications. The other pilot sites are the University of Maryland, the University of Chicago, the Mayo Clinic, and the Mount Sinai School of Medicine.

#### Extending the Reach of Image

##### Share at UCSF and Beyond

Currently at UCSF, several clinical departments are discovering how useful Image Share is for patients who live far away and require complex coordination of care among multiple providers and institutions. With the enthusiasm of clinical faculty from each Radiology section, the Image Share Network aims to expand its presence at UCSF and among our referring medical centers and neighboring hospitals in California and beyond. As of September 2014, enrollment had topped 2,700 patients and 14,000 imaging exams. Approximately 50 new patients enroll per week.

#### RSNA Image Share Champions:

- **Abdominal Imaging and Nuclear Medicine:** Spencer Behr, MD
- **Cardiothoracic Imaging:** Karen Ordovás, MD
- **Interventional Radiology:** Pallav Kolli, MD
- **Musculoskeletal Radiology:** Rizwan Aslam, MD
- **Neurointerventional:** Matthew Amans, MD
- **Neuroradiology:** Christine Glastonbury, MBBS
- **Pediatric Radiology:** Andrew Phelps, MD
- **Ultrasound:** Liina Poder, MD
- **Women's Imaging:** Elissa Price, MD

Patel concludes, “No doubt patient-controlled, cloud-based imaging platforms, such as the RSNA Image Share Network, will evolve to be an integral part of modern health care very soon. The UCSF Department of Radiology and Biomedical Imaging will continue to be on the forefront of innovation in radiology IT.”

*Anand S. Patel, MD, is a PGY-VI Interventional Radiology Fellow in the Department of Radiology and Biomedical Imaging and the physician coordinator at UCSF for the RSNA Image Share Network.*

# The BrainHealthRegistry.org: A Powerful New Tool for Neuroscience Clinical Research

Rachel L. Nosheny, PhD, R. Scott Mackin, PhD, Philip Insel, MS, Diana Truran, Derek Flennikan, and Michael W. Weiner, MD

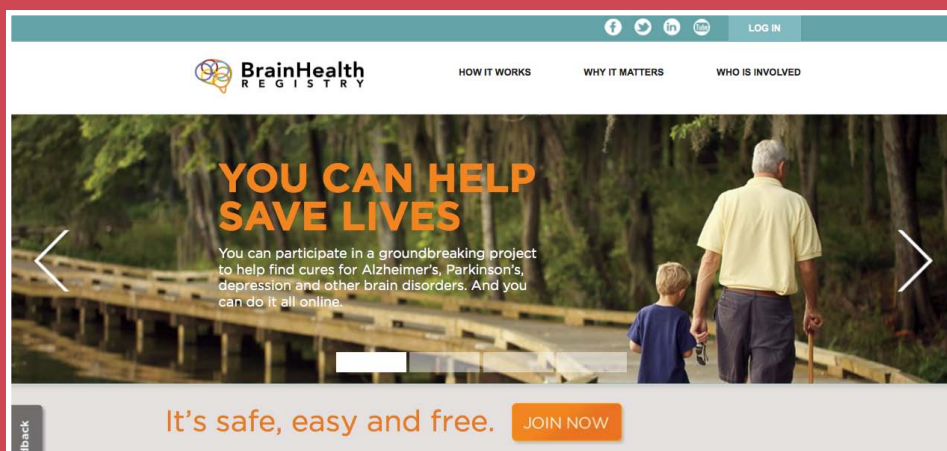
The high cost of identifying, recruiting, screening, and assessing eligible participants for clinical trials is a significant obstacle to developing effective treatments for brain diseases. In the setting of radiology clinical research, radiologists often have little contact with their patients once they leave the Radiology suite, making it difficult to obtain detailed patient information or to follow patients longitudinally. For clinical trials focused on normal or mildly impaired subjects, such as current Alzheimer's disease (AD) clinical trials, subjects are difficult to recruit because they are unlikely to seek treatment in memory clinics. In addition, many subjects must be screened to find those who meet common inclusion criteria. Getting over these hurdles delays or precludes many clinical trials.

The BrainHealthRegistry.org (BHR) aims to facilitate the research needed to develop treatments for AD and other brain diseases. Launched in April 2014 by Radiology Professor Michael Weiner, MD, and colleagues, the BHR collects detailed health information and cognitive data online from a large pool of registrants interested in participating in neuroscience research, creating a well-characterized cohort that can be used for future clinical trials. To date, more than 10,200 people have registered with the BHR (Fig. 2), and 36% of those who visit the website enroll.

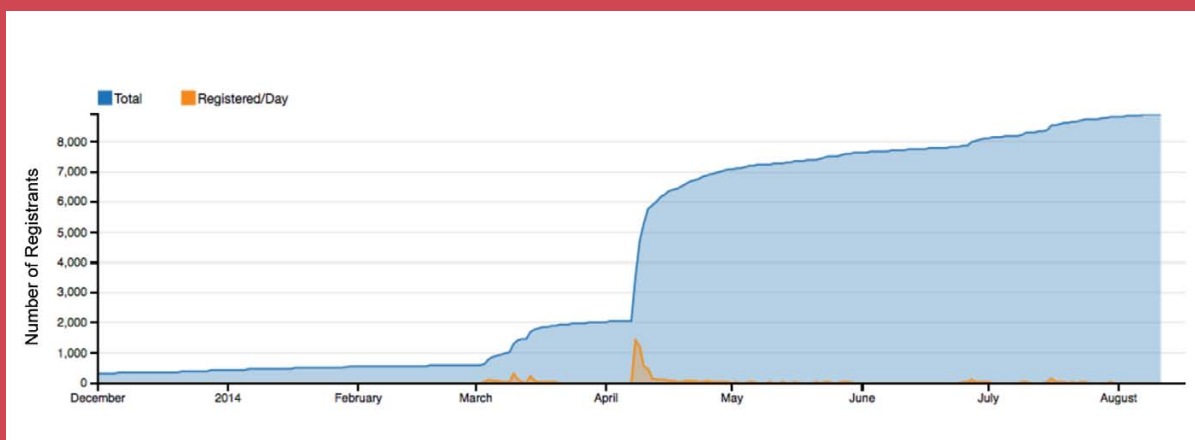
By gathering a wealth of information about patients who have brain scans, facilitating access to medical records, and increasing opportunities for longitudinal follow-up, the BHR is an innovative approach to accelerate neuro-radiology research.

After registration and consent, participants complete a series of questionnaires, including measures of demographics, overall health, medication use, memory, family history of AD, mood, sleep, diet, and exercise. Participants also complete online neuropsychological tests, including the Cogstate Brief Battery (CBB) and the Lumos Brain Performance Test. All tests and questionnaires are administered online with no supervision. Enrollees return to the site every six months to complete online questionnaires and neuropsychological tests, allowing us to identify subjects undergoing cognitive decline. The BHR functions within UCSF under Institutional Review Board approval, allowing BHR investigators and collaborators to access data, contact subjects for further information, and enroll them in studies.

The current demographic profile of registrants demonstrates the usefulness of the cohort for clinical trials of neurodegenerative diseases. The mean age of BHR enrollees is 58.3 (SD=14.8), 67% are female, 75% have completed a 4-year college degree, 18% are taking antidepressants,



**Figure 1** The website (brainhealthregistry.org) educates people about the toll brain disorders takes on individuals and families and makes it easy for them to participate in developing new treatments.



**Figure 2** Participation in the Brain Health Registry spiked after its official, nationwide launch and has been growing steadily since.

and 0.9% are taking AD medications. Five percent report memory problems and 44% report family history of memory problems or dementia. For participants who completed the unsupervised online CBB, test scores matched normative data for the CBB taken in a supervised setting. In multivariate regression analyses, there was a significant association between age and poorer cognitive performance on all tests ( $p < 0.01$ ). Participant endorsement of memory complaints was associated with poorer performance on all tests ( $p < 0.01$ ), and family history of AD was associated with poorer attention and learning ( $p < 0.01$ ). Less than 0.3% of the tests showed completion failure, and less than 3% were excluded due to data integrity.

These preliminary results suggest a high rate of enrollment in the BHR and a significant proportion of older adult registrants who may be eligible for AD clinical trials. The integrity of unsupervised online CBB demonstrates the feasibility of obtaining quantitative measures of cognitive functioning online. These results suggest that the BHR has the potential to accelerate the speed of completion and reduce the cost of neuroscience clinical trials, including those for AD and other brain diseases.

#### Coordinated Efforts Extend the BHR's Reach

Ongoing efforts to recruit registrants from UCSF outpatient clinics and other medical school sites will increase BHR enrollment and provide the UCSF clinical research community with a new tool for enrolling subjects into their studies. BHR is currently being promoted at UCSF in the Memory and Aging Clinic, the Multiple Sclerosis Center,

the Radiology Clinic at China Basin, and the Center for Imaging of Neurodegenerative Diseases at the VA Medical Center. In the near future, all patients who are scheduled for brain MRI, CT, and PET scans at UCSF outpatient radiology clinics may be asked to enroll in the BHR.

BrainHealthRegistry.org data and subjects will be shared with qualified academic investigators at UCSF and elsewhere. Since the BHR enrolls adults of all ages, both healthy and with brain disease, it may facilitate many types of neuroscience clinical research, such as studies on stroke, Parkinson's disease, multiple sclerosis, frontotemporal dementia, and depression.

Enrolling patients from UCSF clinics and greater collaboration with UCSF researchers will expand BHR enrollment and provide researchers with a large, well-characterized cohort for future trials.

Learn more at [BrainHealthRegistry.org](http://BrainHealthRegistry.org).

*Rachel L. Nosheny, PhD, is a research scientist at the Center for Imaging of Neurodegenerative Diseases and an associate research scientist in Radiology and Biomedical Imaging, UCSF. R. Scott Mackin, PhD, is an associate professor in the UCSF School of Psychiatry. Philip Insel, MS, is a statistician, Diana Truran, is a research manager, and Derek Flenniken is a data manager with the Center for Imaging of Neurodegenerative Diseases at the Veterans Affairs Medical Center. Michael W. Weiner, MD, is a professor in residence in Radiology and Biomedical Imaging, Medicine, Psychiatry, and Neurology at the University of California, San Francisco.*



## Capital Projects

Robert G. Gould, ScD

Our most consequential changes in 2014 were not physical, but electronic: We replaced the PACS and the Radiographic Information System. Another exciting project was the installation of a GE PET-MR in the research space at our China Basin Imaging Center. We also started several large projects at Parnassus and in new ambulatory buildings where Radiology previously had no presence. Finally, equipment was delivered and installed at the new hospital at Mission Bay, set to open in February 2015.

### PACS

The Department has used an Agfa PACS system for more than 15 years, upgrading software versions periodically. The Agfa component was used for acquiring and display-

ing imaging studies and its storage capacity was limited to about a year's volume. Long-term storage was done in an electronic archive developed and maintained by the PACS group within Radiology; it was referred to as the UCSF archive. This archive was fully DICOM compliant, in effect being the type of 'vendor neutral archive (VNA)' so in vogue today, but built in the mid 1990s by Radiology. The UCSF archive evolved over time from tape and optical storage to spinning disks. The software was reworked numerous times, always without using a commercial vendor. The archive had a Sybase database, and used a freely available DICOM library. We are justifiably proud of this development, but support, lack of redundancy, and the increasing complexity of new classes of imaging studies led



Our latest configuration, seen in the Pediatric Radiology reading room: a 6Mpixel single monitor with adjacent text monitor.

us to conclude that we needed to replace it with a commercial long-term storage system. This replacement occurred simultaneously with our latest Agfa software upgrade to Impax version 6.5 in March 2014. An Agfa VNA product replaced the UCSF archive.

This PACS upgrade took two years of planning and implementation and changed the user interface for the radiologist. As part of this implementation, we created a secondary PACS location in a building at Mission Bay near the new hospital. This is a fully redundant Agfa PACS and long-term archive. It is an active configuration, meaning study ingestion into PACS can occur both at Parnassus and the new Montgomery Street location and data is shared between the two sites. All studies are stored at both locations and the PACS can run from either location should a problem occur in either center.

### **Radiographic Information System**

IDX (later purchased by GE) commercialized the radiographic information system (RIS) used by Radiology for 20 years. The system worked well, but was no longer supported by GE. With the implementation of Epic as the hospital's health information system last year, the Department decided to replace the IDX RIS with Radiant, the Epic RIS system. This implementation occurred in August. Thus, as of September 2014, the electronic infrastructure supporting Radiology is completely new. Radiant links to the parent Epic information system simplify study scheduling, but is very different from IDX and we are still on the learning curve for this complex system.

### **China Basin**

In February, we completed installation of an experimental GE PET-MR, one of only three in the world. China Basin is where our PET-CT scanners and cyclotron are located, making it an ideal setting for comparison studies between PET-MR and PET-CT, and allowing for the use of experimental isotopes for new applications.

### **New Imaging Locations**

While not yet completed, we anticipate the opening of two new imaging centers close to the end of 2014. One is located in the Cardiac Clinic in the Smith Cardiovascular Building at Mission Bay. Construction is underway to install a GE SPECT-CT nuclear camera there as part of a joint venture among Cardiology, Radiology, and the Medical Center. This state-of-the-art camera will be used exclusively for cardiac imaging, with the CT component delivering excellent attenuation correction for the images.

The second location is an entirely new one for UCSF, not just Radiology. The new Women's Imaging Montgomery Street facility, located just below Telegraph Hill, is under construction in a building that also houses a private obstetrics and gynecology practice. The facility will have three ultrasound units, mammography, and bone densitometry equipment. When it opens in December, it will be a beautiful center in a nice location within San Francisco.

### **Parnassus**

The largest construction project within the main Radiology Department in Moffitt/Long in more than five years is underway. It will completely change the center core in Long on the third floor, eliminating a corridor and replacing the last of our 16-slice CT scanners and image intensifier-based angiographic equipment. The CT scanner will be a GE 750HD system with dual energy capabilities and GE's model-based iterative reconstruction system, Veo. Until the opening of Mission Bay Hospital, all of Radiology's CT scanners will be  $\geq 64$  slice systems with 4 cm of Z-axis beam coverage. The project will also install a Siemens Artis Zee biplane system to be used by the neurointerventional section. It will be the third such system in this location. This project will require nine months of construction and should be completed in February 2015.

### **Mission Bay**

This new hospital will have all new equipment: three CT, four MR, two angio, nine ultrasound, three radiographic and fluoroscopic rooms, SPECT-CT, and PET-CT. The equipment was delivered and installed this fall. The equipment is all state-of-the-art, indeed, so new that we are waiting for some of it to be put into commercial production!

*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.*

## UCSF Named Center of Excellence for Hereditary Hemorrhagic Telangiectasia

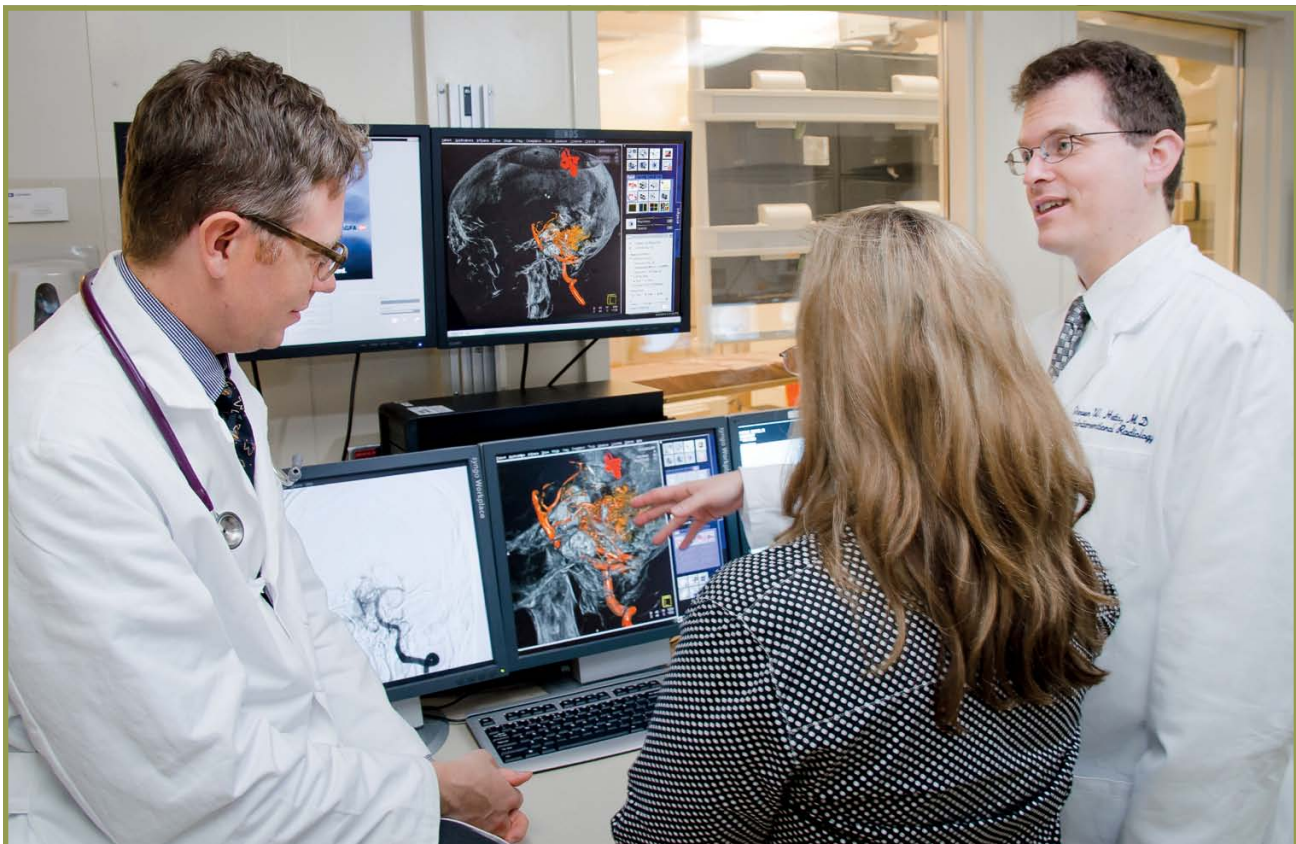
Two years of effort culminated in May 2014 with UCSF being certified as Northern California's only facility specializing in the diagnosis and treatment of hereditary hemorrhagic telangiectasia (HHT). Also called Osler-Weber-Rendu disease, HHT is a genetic disorder of the blood vessels that affects approximately 1 in 5,000 people. Patients develop vascular malformations in the brain, lungs, liver, GI tract, and nose. Steven Hetts, MD, neurointerventional radiology, Miles B. Conrad, MD, interventional radiology, Mark Wilson, MD, interventional radiology, and the late Bill Young, MD, of the Center for Cerebrovascular Research spearheaded the initiative to obtain certification from the HHT Foundation International.

If not recognized and treated, the vascular malformations in the brain can hemorrhage and cause death and pulmonary malformations can lead to stroke and brain abscess, according to Conrad. "Steve and I assembled a

multidisciplinary team of HHT experts at UCSF to coordinate care for patients whose medical management is challenging and requires a broad set of talents for optimal care. Our team includes experts in pediatrics, genetics, otolaryngology and head and neck surgery, hematology, neurology, pediatrics, gastroenterology, dermatology, pulmonology, neurological surgery, and cardiology. Center staff also includes a nurse practitioner/coordinator, Melissa Dickey, RN, NP. Our clinic at China Basin streamlines patient visits by scheduling imaging studies and consultations on the same day."

### HHT Causes Vascular Abnormalities

The disorder is caused by a mutation in one of several genes. HHT is autosomal dominant, which means that if one parent or a sibling has HHT, there is a 50/50 chance that the disease will be passed on.



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Drs. Miles Conrad and Steven Hetts discussing a cerebral AVM with a patient.

HHT genetic mutations lead to abnormal development of blood vessels that tend to be very fragile and can bleed. An abnormality in a small blood vessel is called a telangiectasia. These occur most commonly on the face, hands, fingers, and the lining of the nose and mouth. Telangiectasias in the lining of the nose often cause recurrent nosebleeds, the most common symptom of HHT. They also can occur in the digestive tract, particularly in the stomach and small bowel.

Abnormalities in larger blood vessels are called arteriovenous malformations, or AVMs. AVMs can occur in one or more organs such as the brain, lungs, and liver, and can lead to serious complications. Screening tests are available to detect AVMs. If discovered, there are many minimally invasive, safe, and effective treatment options.

There are many benefits to being screened at an HHT Center, with two of the most important being help in tracing the patient's genetic history of HHT and guidance for the referring physician. After a patient has been seen at the UCSF HHT Center of Excellence, the referring physician can contact UCSF HHT specialists about the patient's specific condition, discuss treatment recommendations, get second opinions, and clarify diagnosis and management options.

### **UCSF HHT Center of Excellence Offers**

#### **Well-Rounded Resources**

Due to the rarity and complexity of HHT, treatment requires coordination among multiple medical specialists. The UCSF HHT Center of Excellence features a team of nationally

recognized and specially trained physician experts from multiple subspecialties. Each has extensive knowledge about HHT and takes a comprehensive approach to the screening, diagnosis, and treatment of HHT.

The UCSF HHT Center of Excellence provides:

- Patient education and proactive management of the symptoms and complications of HHT
- A state-of-the-art medical center, children's hospital, and clinics for patient care
- World-renowned interventional and neurointerventional radiology treatment facilities where minimally invasive treatment options are available
- Pioneering physicians in HHT treatment and the development of devices used to treat AVMs

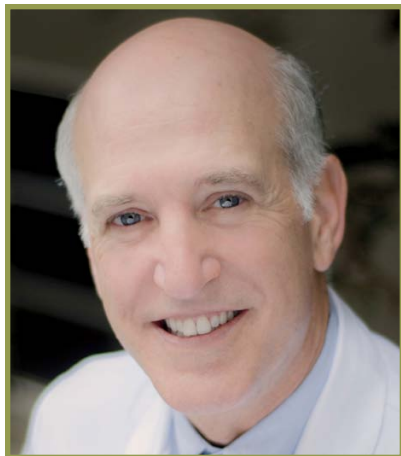
UCSF's HHT Center of Excellence works in partnership with the Center for Cerebrovascular Research (CCR), a core group of faculty and staff pursuing the integrative and interdisciplinary study of cerebrovascular disease, with a focus on vascular malformations of the brain. The CCR has a special interest HHT, which is one of the few inherited causes of brain AVM.

Starting in 2015, HHT patients also will benefit from the resources at UCSF's Pediatric Brain Center, which will be part of the UCSF Benioff Children's Hospital on the Mission Bay campus.

The UCSF HHT Center of Excellence is located at 185 Berry Street, Suites 190, Lobby 6 at UCSF Imaging Center at China Basin, across the street from AT&T Park.

*See more at: <http://tiny.ucsf.edu/na74tQ>*

## Zagoria New Clinical Affairs Vice-Chair



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In January 2014, Ron Zagoria, MD, FACR, became the Vice-Chair of Clinical Affairs for the Department of Radiology and Biomedical Imaging.

He will continue to serve as Chief of Abdominal Imaging, a position he has held since coming to UCSF in 2013 from Wake Forest University, where he was Chief of Genitourinary Imaging and Intervention and Executive Vice-Chair.

Zagoria received his BA in Chemistry from Johns Hopkins University in 1979 and earned his MD from the University of Maryland in 1983. He completed a Diagnostic Radiology Residency in 1987 and an Abdominal Imaging/Interventional Radiology Fellowship at Wake Forest's Bowman Gray School of Medicine. Zagoria also completed a Uroradiology externship at Massachusetts General Hospital.

He joined the faculty at Wake Forest's Bowman Gray School of Medicine in 1987 as an instructor and later served as a professor, chief of Genitourinary Imaging and Intervention and executive vice-chair.

Known internationally for his uroradiology expertise including renal tumor ablations, he also serves as editor-in-chief of *Emergency Radiology*. Zagoria has presented more than 300 lectures in the U.S. and abroad, has written more than 130 peer-reviewed manuscripts, a number of book chapters, and serves on numerous society committees.

## Ray Appointed Associate Chief of Women's Imaging, SFGH



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In May 2014, Kimberley Ray, MD, was named Associate Chief of Women's Imaging at SFGH. In her new

position, Ray is working closely with Chief of Women's Imaging, Bonnie N. Joe, MD, PhD, to shape the new integrated breast imaging services at San Francisco General Hospital-Avon and Mt. Zion sites.

Ray earned her bachelor's degree from Stanford University and her medical degree from the University of California, Irvine where she also completed her Diagnostic Radiology residency. She followed this with a clinical fellowship in Breast Imaging at UCSF, completed in 2007. From 2007–2013, Ray was the medical director of the Center for Breast Imaging and Diagnosis and a staff

radiologist at St. Joseph Hospital in Orange, CA, where she was named a "Physician of Excellence" before being recruited to return to UCSF. She joined the Women's Imaging Section in 2013 as an assistant professor of Clinical Radiology.

In her new role at SFGH, Ray is the lead interpreting physician for the Mammography Quality Standards Act at the Avon Breast Center, where she is focusing on enhancements such as improving the IT infrastructure, establishing a digital breast tomosynthesis program, and expanding the breast MRI clinical and research programs.

## Ordovás Becomes Director of Cardiac Imaging



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Associate Professor Karen Gomes Ordovás, MD, MAS, was appointed director of Cardiac Imaging for the Cardiac and Pulmonary Imaging Section in May 2014. She will work alongside the section's chief, Brett Elicker, MD.

"Dr. Ordovás has been functioning informally in this role for some time," said Chairman Ron Arenson, MD. "This new appointment identifies her as the point person for referring clinicians regarding cardiac MR and coronary CTA imaging. In this capacity she will facilitate scheduling, protocols, and other clinical issues related to cardiac studies."

Ordovás received her MD from Universidade Federal do Rio Grande do Sul, Brazil, in 1998. Her diagnostic radiology residency, completed in 2001, was at the Instituto de Cardiologia do Rio Grande do Sul and Hospital Mãe de Deus. Ordovás came to UCSF as a postdoctoral scholar in cardio-thoracic radiology, remaining in this position until 2006. She completed a one-year clinical fellow-

ship in cardio-thoracic radiology the following year, and joined the UCSF Radiology Section of Cardiac and Pulmonary Imaging as a faculty member in June 2007. She completed a Masters degree in clinical research at the UCSF Department of Epidemiology and Biostatistics in 2011. Ordovás is co-director of the Cardiovascular Imaging Research Interest Group.

"Advanced cardiac MRI and CT imaging is a rapidly growing field, offering many options to improve the cardiac care of patients, including early detection and improved management through non-invasive imaging," Ordovás said. "I'm excited to be taking on this new role in the section."

## Talbott Named Assistant Residency Program Director, SFGH



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Jason Talbott, MD, PhD, is the new assistant residency program director at San Francisco General Hospital.

"Jason had a spectacular trainee career at UCSF as a resident, a chief resident and a neuroradiology fellow," said Residency Director Soonmee Cha, MD, in making the announcement in May 2014. "As a faculty member, he has shown great interest in and dedication to teaching and mentoring our students."

Talbott earned his MD and a PhD from the University of Louisville, KY,

in 2007. He completed a one-year internship at California Pacific Medical Center in San Francisco, followed by a four-year Diagnostic Radiology residency at UCSF (2008–2012), completing a National Institute of Health T32 research fellowship in his third year of residency. In 2013, Talbott completed a UCSF Neuro-radiology fellowship and joined the Neuroradiology faculty.

## Hess Assumes Safety Leadership



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In March 2014, Associate Professor Christopher Hess, MD, PhD, was appointed Associate Chair for Quality and Safety in the Department of Radiology and Biomedical Imaging, following several years of successful leadership by Roy Gordon, MD, who retired in 2014. Hess oversees all aspects of patient safety and leads the bi-weekly departmental safety committee charged with routine monitoring of patient safety measures throughout the department. The safety committee handles any

concerns regarding patient safety, and is committed to maintaining the highest possible standards of safety for all tests performed in Radiology and Biomedical Imaging.

Hess received both his PhD and his medical degree from the University of Illinois at Urbana. He completed a four-year Diagnostic Radiology Residency at UCSF in 2007, serving as chief resident. In 2008, he completed a fellowship in Neuroradiology at UCSF and joined the faculty.

## McKnight Leaves to Join Tobacco-Related Diseases Research Program



In August, Tracy Richmond McKnight, PhD, an associate professor in Radiology and Biomedical Imaging whose research has focused on cancer metabolism, accepted a position as

the Program Officer for Cancer and Neuroscience Grants with the California Tobacco-Related Diseases Research Program. The TRD research program is administered by the UC Office of the President. It is funded from state taxes on tobacco products (Proposition 99 funds) and any investigator in the state of California may apply for them.

“I am extremely excited about my new position, but having been here for 16 years—starting in 1998 as a postdoctoral researcher at the Magnetic Resonance Science Center—I’ll miss the people here at UCSF,” said McKnight. She plans to retain a clinical appointment in the department and will continue to direct the UCSF-

Tuskegee Partnership in Bioengineering which brings students from Historically Black Colleges and Universities (HBCUs) to UCSF’s highly successful summer scientific research training program.

McKnight’s responsibilities in her new position include researching and advising on research priorities, generating new requests for awards, convening review panels, and communicating with grant awardees. She also is working with partners in the Department of Public Health and Department of Education to advise the California State Legislature on tobacco policy.

## Administrative Appointments



Rosanna Horton, EdD, joined the department in January 2014 as the new Division Administrator for China Basin/Mission Bay. “Rosanna’s varied administrative and financial background is an excellent fit for the operational priorities we have at China Basin and Mission Bay,” noted Administrative Director Cathy Garzio.

Horton worked for several years at UC Irvine as a practice and division administrator in the UCI School of Medicine, and as a senior financial and administrative analyst. She has experience with clinical program development and management, post-graduate education, special projects, and financial planning. Prior to coming to UCSF, she was a projects administrator for the Jewish Home in San Francisco, where she did grant preparation and management, financial reporting, and grant policy compliance.

Horton received a Bachelor’s degree in Health Sciences/Education and a Master’s degree in Education from San Francisco State University. Her doctorate in Education is from Fielding Graduate University in Santa Barbara, CA.



In November 2013 Enrique Menendez, MD, joined the department as Director of Research Administration. He previously served as Director of Administration in the Center for Imaging of Neurodegenerative Diseases (CIND) at the San Francisco VA Medical Center, where he administered a large research portfolio, including National Institutes of Health, Northern California Institute for Research and Education, Veterans Affairs, and private funds.

“My primary goal will be to improve the systems for award submissions, monitoring, and expenditures to ensure that they are up to date,” Menendez said. He also intends to support principal investigators by providing the guidance, suggestions, and assistance they need to succeed in their efforts.

Menendez holds a medical degree from the Universidad de San Carlos in Guatemala, where he was a practicing physician. He spent a year doing research at Stanford University. A UCSF staff member since 1995, Menendez worked in the UCSF Medical Center, Department of Medicine, and the School of Nursing before joining CIND in 2008.



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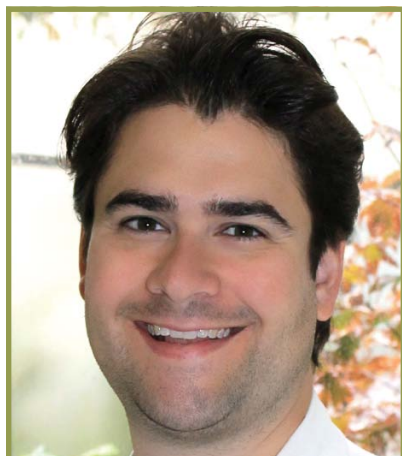
In January 2014, Amy Pradhan, MS, MPH, became the department’s Academic Personnel Liaison. “Amy is the ‘go to’ person for all academic human resources assistance,” said Administrative Director Cathy Garzio. “We especially appreciate Amy’s background in medical academic HR.”

As liaison between department faculty and UCSF Human Resources, Pradhan works with the Vice-Chair of Academic Affairs Susan Wall, MD, Director of Research Enrique Menendez, and Garzio. Her position has four components: faculty merits and promotions, faculty reappointments, new faculty recruitment and hiring, and faculty on-boarding.

Pradhan began her UCSF career in 2008, in an administrative role in Neuroradiology. This was followed by a position as program coordinator in UCSF’s Helen Diller Family Cancer Center. She then served as a program analyst at Global Health Sciences. She received her MS degree from California State University, East Bay in 2008 and completed her MPH at San Jose State University in 2013.



## New Faculty



### **Matthew Amans, MD**

*Assistant Professor of Clinical Radiology*

*Neuroradiology; SFGH*

Matthew Amans received his medical degree from Wayne State University School of Medicine, Detroit, MI, in 2006. In 2007, he completed a one-year internship at the New York School of Medicine, St. Vincent's Hospital in Manhattan, followed by a four-year Diagnostic Radiology residency at Weill Cornell Medical College, completed in 2011. From 2011–2012, Amans was a Diagnostic Neuroradiology fellow at UCSF and then worked as an attending neuro-radiologist at SFGH for six months. Subsequently, he did a two-year Neurointerventional Radiology fellowship at UCSF. His areas of interest include cerebral angiography, stroke, aneurysm, arteriovenous malformation and fistula, pediatric vascular malformations, and pediatric stroke. In January 2015, Amans will become assistant professor of radiology in Neurointerventional Radiology and Neuroradiology.



### **Matthew Bucknor, MD**

*Assistant Professor in Residence Musculoskeletal Imaging*

In 2008, Matthew Bucknor received his medical degree from Stanford University, and completed a one-year internship at Kaiser Permanente in San Francisco, in 2009. From 2009–2013, Bucknor completed his residency at UCSF, serving as an NIH T32 research fellow in his final year of residency. In 2014, he finished a Musculoskeletal Imaging and Intervention fellowship at Stanford University. His areas of interest include MR-guided high intensity focused ultrasound, minimally invasive interventions, cartilage imaging, and musculoskeletal applications of PET/MR. In July 2014, Bucknor joined the Musculoskeletal Imaging faculty as an assistant professor in residence in Radiology and Biomedical Imaging.



### **Viviane Delaney, MD**

*Assistant Professor of Clinical Radiology*

*Cardiac and Pulmonary Imaging, SFGH*

In 1997, Viviane Delaney received her medical degree from Federal University of Minas Gerais, Brazil, where she also completed a four-year Diagnostic Radiology residency in 2001. In 2002, Delaney completed an MRI fellowship at Albert Einstein Hospital, Brazil, followed by the completion of a MRI imaging chief fellowship in 2003. In 2009, Delaney completed a one-year general surgery internship, followed by a second Diagnostic Radiology residency in 2013 at Santa Barbara Cottage Hospital in California. In 2014, she completed a Cardiothoracic Imaging fellowship at UCSF. In July 2014, Delaney accepted an assistant professor of clinical radiology position in the Cardiac and Pulmonary Imaging section in Radiology and Biomedical Imaging.



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**Heather Greenwood, MD**

*Assistant Professor of Clinical Radiology*

*Women's Imaging, SFGH and Mount Zion*

Heather Greenwood obtained her medical degree from Northwestern University, Chicago, IL, in 2008, followed by a one-year transitional internship at MacNeal Hospital, Berwyn, IL. Greenwood completed a four-year Radiology residency at New York University Hospital in 2013, followed by a Women's Imaging fellowship at UCSF in 2014. Her clinical work includes diagnostic and screening mammography examinations, breast MRI, performing breast ultrasound examinations, image guided wire localizations prior to surgery, and percutaneous breast biopsies. She also is interested in resident/medical student education. In July 2014, Greenwood accepted the position of assistant professor of clinical radiology in Women's Imaging at SFGH and UCSF Mount Zion.



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**Benjamin L. Franc, MD**

*Professor of Clinical Radiology Nuclear Medicine*

Benjamin Franc received his medical degree from the University of Southern California, Keck School of Medicine in 2000, and completed an internship at Stanford University Medical Center, California, in 2001. From 2001–2003, He completed a nuclear medicine residency and chief residency at Stanford. His interests include molecular imaging, positron emission tomography, dual modality imaging, radiotracer development for protease detection, radioimmunotherapy, targeted radiotherapy, prostate cancer therapy and imaging, breast cancer therapy and imaging, protein engineering, proteomics, pharmacogenomics. Franc was an assistant professor in residence at UCSF from 2003–2007. From 2007–2014 he worked at Radiological Associates of Sacramento Medical Group, serving as its chairman from 2009–2014. Franc returns to UCSF's Nuclear Medicine section as a professor of clinical radiology in December 2014.



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**Jessica Hayward, MD**

*Assistant Professor of Clinical Radiology*

*Women's Imaging, SFGH*

Jessica Hayward received her medical degree from Dartmouth Medical School in Hanover, NH, in 2008. In 2009, she completed a one-year internal medicine internship at Lenox Hill Hospital, New York, NY. From 2009–2013, Hayward completed a Diagnostic Radiology residency at NYP/Weill Cornell Medical Center in New York, followed by a Women's Imaging fellowship at UCSF in 2014. Her areas of interest are breast imaging, breast ultrasound, and obstetrics and gynecology ultrasound. In August 2014, Hayward accepted an assistant professor of clinical radiology position in Women's Imaging at SFGH.



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**Cindy Lee, MD**

*Assistant Professor in Residence  
Ultrasound and Women's Imaging,  
UCSF and SFGH*

In 2008, Cindy Lee received her medical degree from State University of New York in Stony Brook followed by an internal medicine internship at Winthrop University Hospital, NY. During her Diagnostic Radiology Residency training from 2009–2013 at the Johns Hopkins Hospital in Baltimore, MD, she also completed the ACR's Stephen Amis Quality and Safety fellowship in 2012. This was followed by a breast and ultrasound fellowship at UCSF in 2013–2014. Her areas of interest are ultrasound-guided interventions, quality improvement, screening mammography, and database analysis. In July 2014, Lee accepted the position of assistant professor of radiology in Ultrasound and Women's Imaging.



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**John Mongan, MD, PhD**

*Assistant Professor in Residence  
Abdominal Imaging and Ultrasound*

In 2008, John Mongan received his MD and PhD from the University of California, San Diego. He completed a one-year internal medicine internship at Kaiser Oakland Medical Center, CA, in 2009. Mongan finished his four-year UCSF Radiology residency in 2013, serving as a T32 research fellow in his third year. He was a recipient of the Margulis Society Outstanding Resident Research Award in 2013. This was followed by a UCSF fellowship in Abdominal Imaging and Ultrasound in 2014. His areas of research interest include informatics, electronic medical records, improving imaging efficacy, dual-energy computed tomography, and contrast media. In August 2014, Mongan accepted the position of assistant professor in the Abdominal Imaging and Ultrasound sections at UCSF.



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**Bhavya Rehani, MD**

*Assistant Professor in Residence  
Neuroradiology, SFGH*

In 2004, Bhavya Rehani received her medical degree from Kasturba Medical College in Manipal, India, followed by two years as a volunteer physician at All India Institute of Medical Sciences. She completed a two-year research fellowship in Molecular Imaging at Kettering Medical Center, Dayton, OH, in 2007, followed by a one-year internship. From 2008–2012, Rehani was a Diagnostic Radiology resident at the University of Cincinnati Medical Center. Her Neuroradiology fellowship was at Massachusetts General Hospital, Boston, MA. Her areas of interest include MRI and CT imaging of stroke, CNS infections, head trauma, development of imaging biomarkers, molecular imaging, stem cell research, health information technology and mobile health care solutions, and health policy. In October 2014, Rehani joined Neuroradiology as an assistant professor in residence at SFGH.



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**Vinil Shah, MD**

*Assistant Professor in Clinical Radiology  
Neuroradiology*

In 2006, Vinil Shah received his medical degree from the University of Pittsburgh School of Medicine in Pennsylvania and completed a one-year internship at the Memorial Sloan Kettering Cancer Center in New York in 2007. Shah did his Radiology residency from 2007–2011 at UCSF, serving as chief resident in 2010. From 2011–2013, he completed a clinical fellowship and a Chief fellowship in Neuroradiology at Massachusetts General Hospital in Boston. From July 2013–June 2014, Shah was a clinical fellow in Musculoskeletal Imaging and Intervention at the same institution. In August 2014, Shah accepted the position of assistant professor of clinical radiology in Neuroradiology at UCSF.



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**Leo Sugrue, MD, PhD**

*Assistant Professor in Residence  
Neuroradiology*

Leo Sugrue received his medical degree from The Johns Hopkins University School of Medicine in 2007. In 2008, he completed his PhD in Neuroscience at Stanford University, where he also completed a one-year internship. In 2009, Sugrue finished a post-doctoral fellowship at Howard Hughes Medical Institute, Stanford University, and in 2013 he completed a four-year Diagnostic Radiology residency at UCSF. Sugrue finished a mini-fellowship in diagnostic neuroradiology in 2013, followed by an ACGME Neuroradiology fellowship at UCSF in 2014. Sugrue’s interests focus on using electrophysiological and imaging-based tools to study the brain networks responsible for decision making and cognition, developing imaging biomarkers to diagnose and treat neuropsychiatric disease, and evaluating brain stimulation and brain-machine interface technologies. In September 2014, he accepted the position of assistant professor in residence in Neuroradiology at UCSF.



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**Derek Sun, MD**

*Assistant Professor of Clinical Radiology  
Abdominal Imaging*

Derek Sun received his medical degree from Albert Einstein College of Medicine, Bronx, New York, in 2008. In 2009, he completed a one-year internship at the same institution. In 2013, Sun completed a four-year Diagnostic Radiology residency, serving as chief resident in 2012–2013 at Jacobi Medical Center, Albert Einstein College of Medicine. This was followed by an Abdominal Imaging fellowship at UCSF, completed in 2014. In August 2014, Sun became an assistant professor of clinical radiology in the Abdominal Imaging section at UCSF.

## Honors and Awards

### **Ronald L. Arenson, MD**

- Named President of the Radiological Society of North America (RSNA)

### **Soonmee Cha, MD**

- Recipient, UCSF Excellence and Innovation in Graduate Medical Education Award, 2014

### **Jesse Courtier, MD**

- Nominated, American Roentgen Ray Society, Clinician Educator Development Program

### **William P. Dillon, MD**

- UCSF Exceptional Physician Award, honorable mention “For displaying characteristics most highly valued at UCSF Medical Center: professionalism, respect, integrity, diversity, and excellence,” 2013

### **Michael Evans, PhD**

- Co-founder, Bay Area biotechnology company, ORIC, Inc. (Overcoming Resistance in Cancer); New drug development to address cancer resistance to standard-of-care therapy, identification of new drug targets for cancer that has acquired resistance to standard-of-care therapy

### **Nick Fidelman, MD**

- Promoted to Associate Professor

### **Christine Glastonbury, MD**

- Recipient, Educational Exhibit Certificate of Merit: Christine Glastonbury, Ulrich Rassner (neuroradiologist, University of Utah), Paul Larson (UCSF neurosurgery), Karen Salzman (neuroradiologist, University of Utah). Titled: Deep Brain Stimulation - A Practical Guide to Indications, Imaging and Safety
- Recipient, Educational Exhibit, 3rd Prize for an Education Exhibit: David Landry, Christine Glastonbury. Titled: Collateral Damage - Brain Necrosis from H&N Radiation Therapy. ASHNR Sept 2014, Seattle, WA
- Lecture, Grand Rounds UCSF “The Perfect Radiologist,” Sept 3, 2014

### **Ruth B. Goldstein, MD**

- UCSF Radiology and Biomedical Imaging, Outstanding Alumnus Award, 2014



UCSF DOCUMENTS & MEDIA - MARCO SANCHEZ

Chief of Ultrasound Ruth B. Goldstein, MD, recipient of the 2014 Outstanding Alumnus Award

### **Randall Higashida, MD**

- Luminary Lectureship, Annual Meeting of the Society of Neurointerventional Surgery, Colorado Springs, CO, July 2014
- Distinguished Professor Lecture, International Neurology Symposium, Santiago, Chile, August 2014

### **Michael Hope, MD**

- Visiting Professor, University of Wisconsin, Department of Radiology, June 2014

### **Thomas Hope, MD**

- Recipient, Wylie J. Dodds Research Award, The Society of Abdominal Radiology, 2014

### **Bonnie N. Joe, MD, PhD**

- Fellow, Society of Breast Imaging

### **Robert K. Kerlan, Jr., MD**

- President-Elect of the UCSF Medical Staff
- Distinguished Reviewer Award JVIR
- Selected as 2015 Dotter Lecturer (Keynote Address) for the Society of Interventional Radiology



Alexander Margulis, MD, professor and former chairman of the Department of Radiology and Biomedical Imaging, was appointed in 2014 to the rank of *Chevalier de la Légion d'Honneur*, the highest decoration in France, by the French President François Hollande for his service educating leaders of French radiology during his years as chairman at UCSF.

**Maureen Kohi, MD**

- Recipient, 2014 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF

**John Kurhanewicz, PhD**

- Recipient, World Molecular Imaging Society Gold Medal, Seoul, Korea, 2014

**Thomas Lang, PhD**

- Elected Fellow of the American Institute of Medical and Biological Engineering

**Thomas Link, MD, PhD**

- Certificate of Special Distinction, Skeletal Radiology, 2013
- Editorial Board, American Journal of Roentgenology, 2014

**John MacKenzie, MD**

- Promoted to Associate Professor

**Alexander R. Margulis, MD**

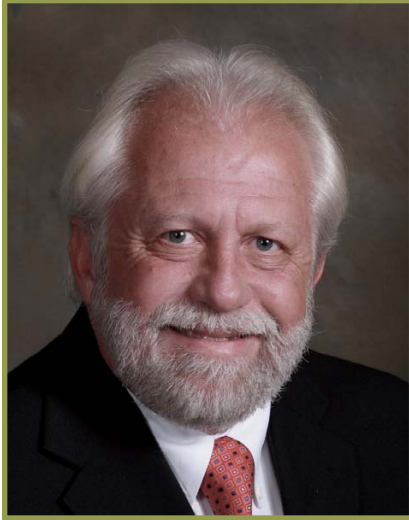
- Appointed to the rank of *Chevalier de la Légion d'Honneur* by the president of France



David Naeger, MD (center) following his induction into the Haile T. Debas Academy of Medical Educators with (l) School of Medicine Vice Dean for Education Catherine Lucey, MD, and (r) Director of the Academy of Medical Educators, Helen Loeser, MD, MSc.



(l) Maureen Kohi, MD and (r) Andrew Phelps, MD, recipients of 2014 Haile T. Debas Academy Teaching Awards. Kohi's nomination indicated that she "consistently ranks as one of our top teachers based on her highly rated reviews by our residents." She was also praised for her "active role in improving and refining the curriculum of interventional radiology." Phelps' nomination noted that "he teaches foundational material in the essential core, and does it in a thought out and engaging way, always making the content memorable." Phelps was also commended for his "exemplary preparation, engaging demeanor, and clear enthusiasm for his subject matter."



UCSF DOCUMENTS & MEDIA - MARGO SANCHEZ

(l-r) John Kurhanewicz, PhD, Sarah Nelson, PhD, and Dan Vigneron, PhD, recipients of the World Molecular Imaging Society Gold Medal, presented in Seoul Korea, September 2014. WMIS, an organization dedicated to developing and promoting preclinical and clinical multi-modal molecular imaging, presented the Gold Medal to the UCSF Radiology and Biomedical Imaging research team for their work in the area of hyper-polarized <sup>13</sup>C MRI metabolic imaging, an important tool they have developed for identifying and characterizing cancer and its response to therapy.

**Dieter J. Meyerhoff, PhD**

- Recipient, Academy of Radiology Research, Distinguished Investigator Award, Washington, DC, 2014

**Pratik Mukherjee, MD, PhD**

- Appointed to the Editorial Board of the journal *Brain Connectivity*
- Appointed, to the Medical Advisory Board of the GE Healthcare - National Football League (GE-NFL) Head Health Initiative
- Member, Institute of Medicine Expert Panel for Standardization of DTI/DSI for Scientific and Clinical Applications
- Lecture, 19th Annual Lawrie B. Morrison Memorial Lecture, Beth Israel - Deaconess Medical Center, Harvard Medical School

**David Naeger, MD**

- Inducted as member, Haile T. Debas Academy of Medical Educators, UCSF

**Sarah J. Nelson, PhD**

- Recipient, World Molecular Imaging Society Gold Medal, Seoul, Korea, 2014

**Susan Noworolski, PhD**

- Recipient, UCSF Founders' Day Award for significant volunteer public service, for providing and enhancing science education in a public elementary school

**Andrew Phelps, MD**

- Recipient, 2014 Excellence in Teaching Award, Haile T. Debas Academy of Medical Educators, UCSF

**Viola Rieke, PhD**

- Awarded Hellman Fellowship in support of Junior Faculty Research, 2014

**Rebecca Smith-Bindman, MD**

- Paper Honored as one of the Top 10 Publications in 2013 Funded by NCI's Epidemiology and Genomics Research Program
- Invited Editor, *Journal of the American College of Radiology* March 2014 issue, Radiation Dose Optimization
- Affiliate Member, Philip R. Lee Institute for Health Policy Studies
- Among 26 Philip R. Lee Institute for Health Policy Studies faculty videos posted on UCTV between 2009 and 2014; her talk, "Is Medical Imaging Harmful to Health: Opportunities to Influence Health Policy," was the most frequently downloaded and watched (N = 409,937)

**Lori Strachowski, MD**

- Recipient, Consultant of the Year Award, UCSF Department of Obstetrics and Gynecology graduating class, 2014

**Lynne S. Steinbach, MD**

- President, International Skeletal Society
- Recipient, Editor's Recognition Award with Special Distinction, *Radiology*
- Recipient, Certificate of Distinction, *Skeletal Radiology*
- Distinguished Reviewer, *Journal of Magnetic Resonance Imaging*

**Thomas Urbania, MD**

- Recipient, Hideyo Minagi Outstanding Teaching Award 2014

**Daniel B. Vigneron, PhD**

- Recipient, World Molecular Imaging Society Gold Medal, Seoul, Korea, 2014

**Z. Jane Wang, MD**

- Promoted to Associate Professor

**W. Richard Webb, MD**

- Authored High-Resolution CT of the Lung, 5th Edition. Webb WR, Muller NL, Naidich DP, Lippincott Wolters Kluwer, 2015
- Authored Fundamentals of Body CT, 4th Edition. Webb WR, Brant WE, Major NM, Saunders Elsevier, 2015

**Michael W. Weiner, MD**

- Recipient, Academy of Radiology Research, Distinguished Investigator Award 2014

**Judy Yee, MD**

- Recipient, Editor's Recognition Award for Reviewing with Distinction, *Radiology*
- Recipient, Best MR Safety Poster Award, ISMRM, Milan, Italy
- 2014 President-Elect, Society of Abdominal Radiology

**Benjamin M. Yeh, MD**

- UCSF Catalyst Award, 2013

**Esther Yuh, MD, PhD**

- Team Award, GE Healthcare - National Football League (GE-NFL) Head Health Initiative

**Xiaoliang Zhang, PhD**

- Recipient, Academy of Radiology Research, Distinguished Investigator Award, Washington, DC, 2014
- Recipient, Distinguished Editorial Board Member Award, *Quantitative Imaging in Medicine and Surgery*
- Recipient, Springer Medical Fund Award for Established Investigator in Basic and Clinical/Translational Sciences



Thomas Urbania, MD, accepts the Hideyo Minagi Outstanding Teaching Award after being selected by the residency class of 2014.

**Fellow Honors:**

**Mai-Lan Ho, MD**

- Author, *Neuroradiology Signs*, Ho, Eisenberg, McGraw Hill Medical (2014)
- Recipient, Research Fellow Award, Society for Pediatric Radiology, 2014
- Member, MR Committee, Society for Pediatric Radiology
- Faculty Advisor, Volunteers in Asia
- Pathway to Discovery, Clinical and Translational Research, UCSF

**Mark Kovacs, MD**

- Recipient, American Roentgen Ray Society (ARRS) Executive Council Award, 2014, for "Evaluation of Lossy Data Compression in Primary Interpretation for Full-Field Digital Mammography" (accepted, AJR)
- Recipient, Roentgen Resident/Fellow Research Award, June 2014 in recognition of outstanding Radiologic Research by the RSNA, Research & Education Foundation



## Cha Honored for Contributions to Graduate Medical Education

In June 2014, Soonmee Cha, MD, professor in residence and program director of the Diagnostic Radiology residency program, received the UCSF Excellence and Innovation in Graduate Medical Education Award in recognition of “exemplary efforts to improve graduate medical education.”

Cha assumed the role of program director at a time of dramatic change. In 2013, the American Board of Radiology replaced the familiar oral boards with a new “Core exam” taken at the end of the PGY-4 year of residency. That same year, the American Council of Graduate Medical Education implemented the Milestones program for radiology, completely redefining the method used to measure and report resident competency.

In her two years as program director, Cha has implemented sweeping reforms to bring the residency program to the cutting edge of radiology education. These updates include redesigned didactic curricula for boards preparation, call preparation, and physics training; a standardized clinical experience during PGY-2 through PGY-4 years, with a largely elective PGY-5 year; new web- and video-based educational content and self-assessment tools; and ongoing quality improvement initiatives, including relocation of the on-call reading room to the Emergency Department during peak hours.

“The scope of her vision and the pace at which she has been able to implement improvements to our training is unparalleled,” said Akash Kansagra, MD, a former chief resident. “At the most recent meeting of the Association of University Radiologists, it seemed like every program director and chief resident in the nation wanted to know how we managed to do so much in such little time. The answer, of course, was Soonmee.”

When presenting the award, Robert Baron, MD, MS, associate dean of Graduate Medical Education, noted Cha also has had an indelible impact on resident enthusiasm and culture. Resident-run initiatives in research,



Soonmee Cha, MD

quality improvement, and peer education are thriving, and departmental relationships with other hospital services are stronger than ever. “Soonmee’s dedication to our success is clearly evident in her attention to detail; it’s not uncommon to get an email response at 4 a.m., and her town hall meetings allow us an avenue to provide feedback and help shape the future of our program,” said Javier Villanueva-Meyer, MD, a third-year resident.

## Janet Napolitano Visits UCSF, Meets with UCSF-Tuskegee Partnership in Bioengineering

The University of California Office of the President (UCOP) recognizes the UCSF-Tuskegee Partnership as an “exemplary program.” An August 2014 visit to UCSF by UC President Janet Napolitano to meet with program directors and students underscored her commitment to the program. It is one of several housed under UCSF’s highly successful Summer Research Training Program.

“The UCSF-Tuskegee Partnership plays a significant role in bringing students into science careers,” said Tracy Richmond McKnight, PhD, program director. “The Partnership exposes African-American undergraduate students majoring in engineering and the physical sciences at Tuskegee University to the field of bioengineering and provides

them experience in scientific research and communication. Their training continues at Tuskegee during the school year through collaborative research experiences and course lectures incorporating research topics and UCSF faculty participation.”

The Partnership, supported by a grant from the University of California-Historically Black Colleges and Universities (UC-HBCU) initiative, seeks to improve the representation of African-Americans in UC graduate programs, particularly PhD programs, by investing in academic relationships between the UC and historically Black colleges and universities.



UCSF-Tuskegee Partnership students Kelli Lacy (l) and Akili Smith-Washington (r) with UC President Janet Napolitano.

## Hasegawa Award Recipient is Ilwoo Park

First author of six publications. Co-author of seven more. Co-investigator on close to 50 abstracts. These accomplishments earned Ilwoo Park, PhD, the 2014 Bruce Hasegawa Award, presented annually to an outstanding researcher in the Department of Radiology and Biomedical Imaging.

The award committee also made note of Park's important recent paper, "Changes in Pyruvate Metabolism detected by Magnetic Resonance Imaging are Linked to DNA Damage and Serve as a Sensor of Temozolomide Response in Glioblastoma Cells," that appeared in the journal *Cancer Research* in October 2014.

In presenting the award, committee leader David Saloner, PhD, noted that Park established a strong research basis first as a graduate student and then as a postdoctoral fellow in the laboratory of Sarah Nelson, PhD. Park

has made important contributions to the development of techniques that use advanced MR capabilities, including spectroscopic imaging and hyperpolarized C13 methods, to explore the underlying physiology of cancer in different organ systems, including the brain and the prostate.

Park, who completed his undergraduate work at the University of California Berkeley and earned his PhD in the UCSF/UCB Joint Graduate Program in Bioengineering, noted that Bruce Hasegawa had been his instructor, and that he was "honored to have had the opportunity to know him." He noted Hasegawa's "availability to students, his warmth, and his smile."

*The Hasegawa Award is generously funded by Hasegawa's childhood friend, Dr. Gordon Honda.*



Ron Arenson, Ilwoo Park, and David Saloner.

## Chancellor Diversity Award Presented to Garzio

Cathy Garzio, MBA, administrative director of the Department of Radiology and Biomedical Imaging received the Chancellor Diversity Award for the Advancement of Women on October 30, 2014. “Cathy has demonstrated outstanding leadership as staff co-chair of the UCSF Committee on the Status of Women for five years,” commented Chair Ron Arenson in making the announcement. “This award is certainly well deserved”

A UCSF manager since 1991, Garzio has held a variety of positions at the UCSF Medical Center and School of Medicine, including administrative director of the Clinical Cancer Center at UCSF and practice manager in UCSF’s Medical Specialties Clinics. Garzio serves on a variety of campus and community committees, task forces related to practice management, research administration, academic personnel and clinical operations. Since 2009, she has served as staff co-chair of the UCSF Committee on the Status of Women.

“It is a particular honor to win this award at this point in my UCSF career,” noted Garzio. “Over the last 20-plus years it has been my privilege to mentor and guide exceptional women and men, and to give the best advice possible to faculty and chairs. It does indeed take a village and a network to succeed at UCSF, and I have been very proud to play a small role in creating some success for those I work with.”

The 2014 Chancellor Diversity Awards celebrate outstanding individuals who are leaders, activists and pioneers in their respective fields and to the communities in which they serve.



UCSF DOCUMENTS & MEDIA - MARCO SANGHIEZ

Cathy Garzio

# First-Place Ranking, New CORE Curriculum and Milestone Project Make it a Year to Remember for the Diagnostic Radiology Residency Program

Soonmee Cha, MD  
Residency Program Director

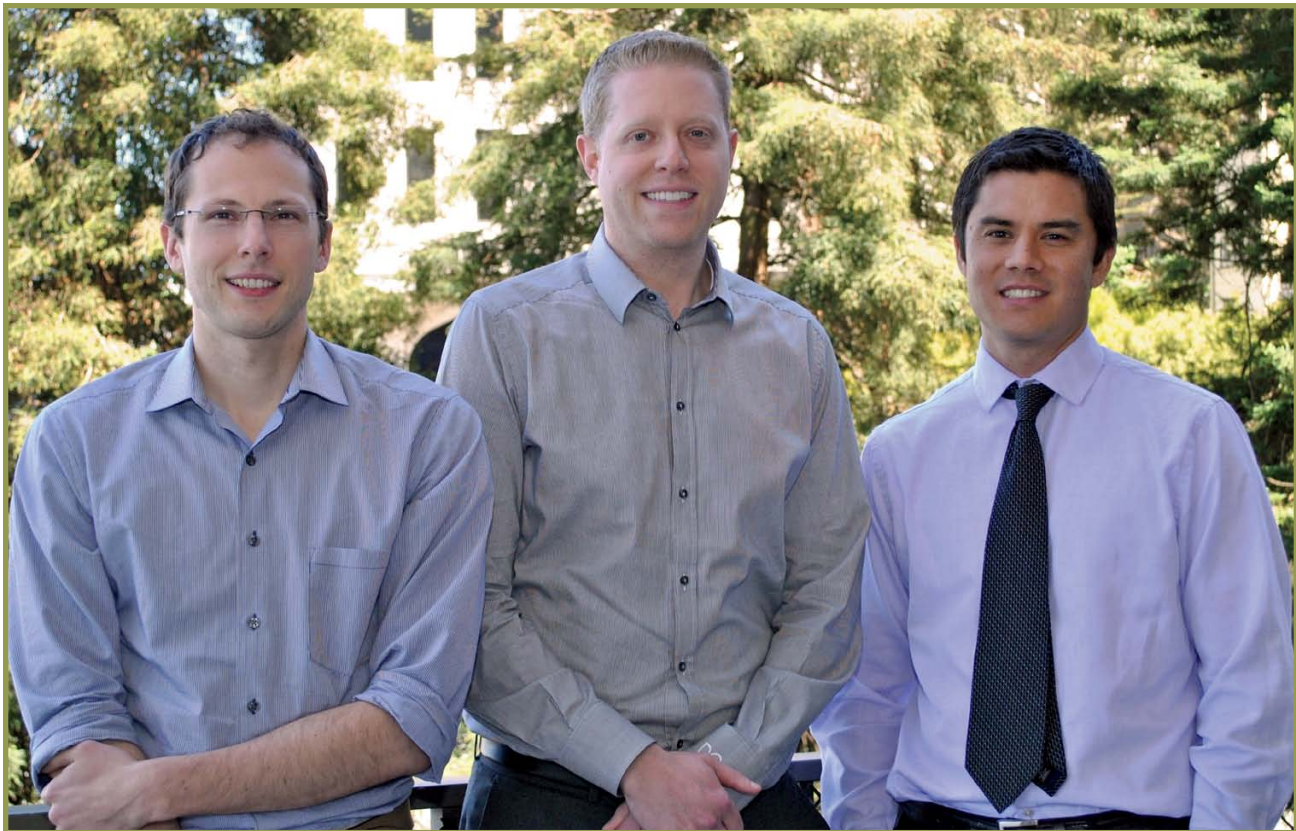
The 2013–2014 academic year was one of outstanding accomplishments and tremendous progress for our residents and residency program.

In September, the UCSF Diagnostic Radiology Residency Program was ranked #1 among the top-rated national Radiology programs in 2014 by U.S. News and World Report and Doximity in a peer-review process by board-certified physicians.

The new CORE Curriculum, new board system, and Milestone project were fully implemented into the residency program. This was the first and last year where two classes of residents, our fourth and third years, took the new board

examination. Both classes passed! These exceptional residents did a fine job preparing for the exam with a deep sense of appreciation for the great learning opportunity they received throughout their residency training. This achievement would not have been possible without the commitment to resident education from our department faculty. I want to thank the faculty for the outstanding quality of the new ABR CORE curriculum outline presentations given twice in last year to prepare our residents for the exam.

This year's third-year residents will take the exam in June, giving them the opportunity to focus on clinical



Chief Residents 2013–2014: (l–r) Aaron Miracle, MD, Ryan Kohlbrenner, MD, and Valentin Lance, MD.

subspecialties in their final year of residency. Together with our new Program Evaluation Committee, we are improving the fourth-year curriculum to provide the best opportunity to master their skills and boost their already exceptional potential.

Launched in July 2013 the Milestone project is now fully integrated in our residency program and has brought about some exciting changes. We reported our first set of Milestone scores for all our residents to the ACGME after gathering meaningful feedback from the members of the Clinical Competency Committee. The Milestone project has changed the way we think about resident evaluation and learning, and opened the door to new educational tools and improvements. It's a true pleasure to see residents and faculty working together to enhance our interactive learning environment and to promote responsible teaching and learning.

Working closely with our residents is always rewarding. In addition to exemplary work ethics, each resident brings a unique quality to our program. They care about each other and work cohesively as a group. They propel us forward as one of the best residency programs in the country.

I was proud to be among the faculty working alongside our residents at the 62nd annual meeting of the Association of University Radiologists, where we took first place in the 2014 Phillips Vydareny Imaging Interpretation Competition! It was truly a team effort, the residents worked hard. We look forward to the 12th annual Philips Vydareny competition at the AUR meeting in New Orleans, Louisiana in April 2015.

We made some administrative changes to the program last year. After 14 years as the Diagnostic Radiology Program Coordinator, Terry Brosnan is now manager of the department's newly formed Education Unit. After working alongside Terry for 10 years, Sandria Wong stepped into the coordinator position and Cindy Flores Gaytan joined the team as the Milestone and Education coordinator. After more than a decade of service scheduling resident conferences, Katie Murphy handed over this important duty to Cindy. Katie will focus on managing special events, lectures, and communications.

In conclusion, I would like to thank the three past chief residents, Akash Kansagra, MD, Dare Olorunsola, MD, and JP Yu, MD, PhD, for their outstanding leadership and contributions to our program in 2012–2013. They worked tirelessly by my side to improve our curriculum and the residency experience. We would not have been able to implement our new curriculum, the Milestone project, and new evaluation tools without their support and exem-

plary work ethic. Our current chiefs, Ryan Kohlbrenner, MD, Valentin Lance, MD, and Aaron Miracle, MD, are enthusiastic about continuing the great track record set by the graduating chief residents. I look forward to working with them in the coming year.

**Resident Accomplishments 2013–2014**

**Awards:**

**Ramon F. Barajas, Jr., MD:** Margulis Society Resident Research Award 2014

**Nancy J. Benedetti, MD,** Goldberg Center Award 2014 for Outstanding Medical Student Teaching

**Marcel Brus-Ramer, MD, PhD:** 3rd Place, Mentor Paper Presentation, ASSR, 2014

**Nicholas Burris, MD:** Best Podium Presentation; Radiology Imaging Research Symposium; UCSF, 2013

**Eric Ehman, MD:** Educational Exhibit Certificate of Merit, RSNA, 2013

**Akash Kansagra, MD:** Surbeck Young Investigator Award, UCSF Department of Radiology and Biomedical Imaging, 2014. AUR Scholar Program, Association of University Radiologists

**Aaron Miracle, MD:** Educational Exhibit Certificate of Merit, RSNA, 2013

**Dare Olorunsola, MD:** Elmer Ng Award presented to Outstanding Resident, 2014

**Anand Patel, MD:** Margulis Society Resident Research Award 2014; HealthImaging 3.0 Award (team award for implementation of the RSNA ImageShare Network at UCSF), 2013

**Jay Starkey, MD:** RSNA Cum Laude Award, "It's Not a Tumor: How to Recognize Brain Tumor Mimics Using 5 MR Imaging Features" RSNA, 2013

**John-Paul J. Yu, MD, PhD:** RSNA Roentgen Resident/Fellow Research Award, 2014

**Service:**

**Mariam Aboian, MD, PhD:** Scientific Volunteer, UCSF Radiology and Biomedical Imaging Exhibit at the Bay Area Science Festival 2013

**Elisabeth Garwood, MD:** Resident Liaison for the Alpha Omega Alpha national office; Review Committee Member, AOA postgraduate awards

**Luis Gutierrez, MD:** Margulis Society, Class Representative

**Stephanie Hou, MD:** Course Instructor, UCSF SOM Radiology 140.03; Member, Dept. of Radiology and Biomedical Imaging Radiation Oversight Committee; Member, APEX Fellow and Resident Advisory Group; Member, UCSF Graduate Medical Education Committee

**Akash Kansagra, MD:** Chief Resident, Diagnostic Radiology Residency Program, UCSF (Feb 2013–Jun 2014)

**Dare Olorunsola, MD:** Chief Resident, Diagnostic Radiology Residency Program, UCSF (Feb 2013–Jun 2014); Resident Curriculum Coordinator, Diagnostic Radiology Residency Program, UCSF (Apr 2013–June 2014); Residency Program Evaluation Committee Member, Department of Radiology and Biomedical Imaging, UCSF (Feb 2014–Jun 2014)

**Anand Patel, MD:** Margulis Society, Class Representative

**Sara K. Plett, MD:** Margulis Society, Class Representative; Resident and Fellows Representative, UCSF School of Medicine Dean's Communication Advisory Board

**Javier Villanueva-Meyer, MD:** Margulis Society, Class Representative; AUR Radiology Resident Academic Leadership Program Representative

**John-Paul J. Yu, MD, PhD:** Chief Resident, Diagnostic Radiology Residency Program, UCSF (Feb 2013–Jun 2014); Quality Process Resident, Dept. of Radiology and Biomedical Imaging

#### Publications:

O-016 Development and Validation of an Endovascular Chemotherapy Filter Device For Removing High-Dose Doxorubicin from the Blood: *In Vivo* Porcine Study. **Patel A**, Chin A, Yang J, Thorne B, Saeed M, Wilson M, Hetts S. *J Neurointerv Surg*. 2014 Jul;6 Suppl 1:A9

Abnormal Findings on Multiparametric Prostate MRI Predict Subsequent Biopsy Upgrade in Patients with Low Risk Prostate Cancer Managed with Active Surveillance. **Flavell RR**, Westphalen AC, Liang C, Sotto CC, Noworolski SM, Vigneron DB, Wang ZJ, Kurhanewicz J. *Abdom Imaging*. 2014 Apr 17. [Epub]

Academic Radiology in the New Health Care Delivery Environment. Qayyum A, **Yu JP**, **Kansagra AP**, Fischer Nv, Costa D, Heller M, Kantartzis S, Plowman RS, Itri J. *Acad Radiol*. 2013 Dec;20(12):1511-20

Cerebral Arterial Fenestrations. Cooke DL, Stout CE, Kim WT, **Kansagra AP**, Yu JP, Gu A, Jewell NP, Hetts SW,



Dare Olorunsola, MD, accepts the 2014 Elmer Ng Award from Chairman Ronald Arenson, MD.

Higashida RT, Dowd CF, Halbach VV. *Interv Neuroradiol*. 2014 May–Jun;20(3):261-74

Congenital Midline Cervical Cleft. **Villanueva-Meyer J**, Glastonbury, CM, Marcovici, PA. *J Radiol Case Rep*. Accepted 7/23/2014

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

Development and Validation of Endovascular Chemotherapy Filter Device For Removing High-Dose Doxorubicin: Preclinical Study. **Patel AS**, Saeed M, Yee EJ, Yang J, Lam GJ, Losey AD, Lillaney PV, Thorne B, Chin AK, Malik S, Wilson MW, Chen XC, Balsara NP, Hetts SW. *Journal of Medical Devices*. 2014

Establishing a New Radiology Residency Research Track. Costello JR, Mullins ME, Votaw JR, Karolyi DR, Kalb B, **Gonzales P**, et al. *Acad Radiol*. 2013 Feb;20(2):243-8.

Genetic Epidemiology And Genome-Wide Linkage Analysis Of Carotid Artery Ultrasound Traits In Multigenerational African Ancestry Families. Kuipers AL, Kammerer CM, Miljkovic I, **Woodard GA**, Bunker CH, Patrick AL, Wheeler VW, Newman AB, Zmuda JM. *Atherosclerosis*. 2013 Nov; 231(1):120-3



Diagnostic Radiology Residency, Class of 2014.

Imaging Assessment of a Portable Hemodialysis Device: Detection of Possible Failure Modes and Monitoring of Functional Performance. **Olorunsola OG**, Kim SH, Chang R, Kuo Y, Hets SW, Heller A, Kant R, Saeed M, Roy S, Wilson MW. *Medical Instrumentation* 2014;2:2

The Incidence of Pulmonary Embolism and Associated FDG-PET Findings in IV Contrast-Enhanced PET/CT. **Flavell RR**, Behr SC, Brunsing RL, Naeger DM, Pamploni MH. *Acad Radiol.* 2014 Jun; 21(6):718-25

Influence of Patient Age on Angioarchitecture of Brain Arteriovenous Malformations. Hets SW, Cooke DL, Nelson J, Gupta N, Fullerton H, Amans MR, Narvid JA, **Moftakhar P**, McSwain H, Dowd CF, Higashida RT, Halbach VV, Lawton MT, Kim H. *AJNR Am J Neuroradiol.* 2014 Jul;35(7):1376-80

Isolated Intracerebral Light Chain Deposition Disease: Novel Imaging and Pathologic Findings. **Yu JP**, Wilson DM, Chang EF, Cotter J, Perry A, Mahindra A, Glastonbury CM. *Clin Imaging.* 2014 Jul 2. [Epub]

Magnetic Resonance Imaging (MRI)-Guided Transurethral Ultrasound Therapy of the Prostate: A Preclinical Study with Radiological and Pathological Correlation Using Customised MRI-Based Moulds. Partanen A, Yerram NK, **Trivedi H**, et al. *BJU Int.* 2013 Aug;112(4):508-16

Mesenteric Inflammatory Venous Occlusive Disease: Radiographic and Histopathologic Evaluation Of 2 Cases. **Miracle AC**, Behr SC, Benhamida J, Gill RM, Yeh BC. *Abdom Imaging.* 2014 Feb; 39(1):18-24

Methods for Clinical Evaluation of Noise Reduction Techniques in Abdominopelvic CT. **Ehman EC**, Yu L, Manduca A, Hara AK, Shiung MM, Jondal D, Lake DS, Paden RG, Blezek DJ, Bruesewitz MR, McCollough CH, Hough DM, Fletcher JG. *Radiographics.* 2014 Jul-Aug; 34(4):849-62

MRI of CNS Fungal Infections: Review of Aspergillosis to Histoplasmosis and Everything in Between. **Starkey J**, Moritani T, Kirby P. *Clin Neuroradiol.* 2014 Sep;24(3):217-30

Pain Sensitivity is Inversely Related to Regional Grey Matter Density in the Brain. Emerson NM, Zeidan F, Lobanov OV, Hadsel MS, Martucci KT, Quevedo AS, **Starr CJ**, Nahman-Averbuch H, Weissman-Fogel I, Granovsky Y, Yarnitsky D, Coghill RC. *Pain.* 2014 Mar;155(3):566-73

Pairwise Comparison versus Likert Scale for Biomedical Image Assessment. Phelps AS, Naeger DM, Courtier JL, Lambert JW, Marcovici PA, **Villanueva-Meyer JE**, MacKenzie JD. *Am J Roentgenol.* Accepted

Pediatric Spinal Vascular Malformations: Diagnosis and Treatment. **Moftakhar P**, Hets SW. *Journal of Pediatric Neuroradiology.* 2013 2(3): Special Issue-Neurointerventions in Children



Prevalence and Significance of Perivascular Soft Tissue Surrounding the Hepatic Artery after Liver Transplantation. Weinstein S, **Jordan E**, Sajewicz A, **Barajas R**, Yee J. *J Comput Assist Tomogr*. 2014 Mar–Apr;38(2):242-8

Prognostic Role of MRI in Nonischemic Myocardial Disease. Magnetic Resonance Imaging Clinics of North America (2014). **Kallianos K**, Moraes GL, Ordovas KG. Elsevier. *In press*

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

Radiology Primer: A Novel Radiology Course for Undecided Medical Students. **Benedetti NJ**, Naeger DM, Webb EM. *J Am Coll Radiol*. 2014 Jul 8. [Epub]

Reporting Scan Time Reduces Cardiac MR Examination Duration. Lumish HS, Sidhu MS, **Kallianos K**, Brady TJ, Hoffmann U, Ghoshhajra BB. *J Am Coll Radiol*. 2014 Apr; 11(4):425-8

Systolic Flow Displacement Correlates With Future Ascending Aortic Growth in Patients With Bicuspid Aortic Valves Undergoing Magnetic Resonance Surveillance. **Burris NS**, Sigovan M, Knauer HA, Tseng EE, Saloner D, Hope MD. *Invest Radiol*. 2014 Apr 30

The Radiologist's Workflow Environment: Evaluation of Disruptors and Potential Implications. **Yu JP**, **Kansagra AP**, **Mongan J**. *J Am Coll Radiol*. 2014 Jun;11(6):589-93

#### Grants:

**Jacob Brown, MD:** RSNA Resident Research Grant; UCSF Radiology Department Seed Grant

**Akash Kansagra, MD:** Educational Stipend, International Society for Magnetic Resonance in Medicine 2014; Research Grant, Margulis Society 2013; NIH T32 Fellowship, UCSF

**Anand Patel, MD:** 2014 NCI funded NIH-STTR R41 Phase 1, ChemoFilter: A Novel Catheter Device to Enable High-Dose Chemotherapy Treatment (PI: Patel) 2013–2014; Society of Interventional Radiology Foundation Resident Research Grant, ChemoFilter: A Novel Catheter Device to Enable High-Dose Chemotherapy Treatment (PI: Patel)

**John-Paul Yu, MD:** Radiological Society of North America (RSNA) R&E Research Fellow Grant (July 2014–June 2015); ACR/RRA/RAHSR Association of University Radiologists Scholar Award, Baltimore, MD, 2014

#### Patents:

**Anand Patel, MD:** Hetts SW, Patel AS, Wilson MW. *In Vivo* Positionable Filtration Devices and Methods Related Thereto. US/PCT Patent Application. PCT/US2013/076159 filed Dec 2013

## Incoming Diagnostic Radiology Residents—Class of 2018



**Matthew J. Barkovich, MD**

**2013–2014** Internship, Alameda County Medical Ctr., Oakland, CA

**MD 2013** University of California, San Diego, School of Medicine

**Research:**

**2009–2012** UCSD, Radiology and Radiation Oncology

**2008** UCSF-UC Berkeley Joint Biomedical Engineering Program

**2007** UCSF, Neonatal Brain Disorders Laboratory

**Selected Publications:**

Rusay RJ, McCombs MR, **Barkovich MJ**, Larsen DS. Enhancing Undergraduate Chemistry Education with the Online Dynamic ChemWiki Resource. *J. Chem. Educ.* 2011 Jun; 88(6): 840-840.

Xu D, Lee MC, Carballido-Gamio J, **Barkovich M**, Majumdar S, Vigneron DB, Nelson SJ. Quantitative Analysis of Spatial Distortions of Diffusion Techniques at 3T. *Magn Reson Imaging.* 2010 Apr; 28(3): 451-454.



**Lindsay Busby, MPH, MD**

**2013–2014** Internship, Alameda County Medical Ctr., Oakland, CA

**MD 2013** New York Medical College, Valhalla, New York

**MPH 2008** Yale School of Public Health, New Haven, CT

**Research:**

**2010** Westchester County Dept. of Health, Division of Disease Control, NY

**2008–2009** Kaiser Permanente, Division of Research, Oakland, CA

**2007** UCSF



**Kevin R. Connolly, MD**

**2013–2014** Internship, University of Texas, Southwestern-Austin, University Medical Ctr., Brackenridge

**MD 2013** University of Texas, Southwestern Medical School, Dallas

**Honors and Awards:**

**2012** Alpha Omega Alpha

**2008–2008** University Distinguished Scholar, University of Texas, Austin Research:

**2014** University of Texas, Austin, Dell Pediatric Research Inst.

**2010** University of Texas, Southwestern Medical Ctr., Simmons Comprehensive Cancer Ctr., Dallas

**2007–2008** University of Texas, MD Anderson Cancer Ctr., Smithville

**Selected Publications:**

Kitamura T, **Connolly K**, Ruffino L, Ajiki T, Lueckgen A, DiGiovanni J, Kiguchi K. The Therapeutic Effect of Histone Deacetylase Inhibitor PCI-24781 on Gallbladder Carcinoma in BK5.erbB2 Mice. *J Hepatol.* 2012 Jul; 57(1):84-91.



**Jason Curtis, MD**

**2013–2014** Internship, John Peter Smith Hospital, Fort Worth, TX

**MD 2013** Washington University in St. Louis, School of Medicine, MO

**Honors and Awards:**

**2009–2013** Washington University Scholars in Medicine Scholarship, MO

**Research:**

**2010** Mallinckrodt Inst. of Radiology, Summer Research Program

**2009–2010** Barnes Retina Inst., Center for Advanced Medicine, St. Louis, MO

**Selected Publications:**

**Curtis JW**, Lesniak DC, Wible JH, Woodard PK. Cardiac Magnetic Resonance Imaging Safety following Percutaneous Coronary Intervention. *Int J Cardiovasc Imaging*. 2013 Oct;29(7):1485-90.



**Anuradha Devabhaktuni, MD**

**2013–2014** Internship, UPMC Mercy Hospital, Pittsburgh, PA

**MD 2013** The George Washington University, School of Medicine and Health Sciences, Washington, DC

**Honors and Awards:**

**2011** Alpha Omega Alpha

**2009** The George Washington University Health Services Scholarship

**Research:**

**2012–2013** The George Washington University, Breast Imaging and Intervention Ctr.

**2011–2013** The George Washington University, Dept. of Ophthalmology

**Selected Publications:**

Bitar, GJ, Osunsade O, **Devabhaktuni A**. Non-surgical Rhinoplasty with Radiessê. *Advanced Surgical Facial Rejuvenation*. Ch. 56, 625-639. Springer-Verlag. 2012.

Bitar, GJ, Osunsade, O, **Devabhaktuni, A**. Injection/filler Rhinoplasty. *Aesthetic Medicine*. Ch. 33, 371-389. Springer-Verlag 2011.



**Emily Edwards, MD**

**2013–2014** Internship, Exempla St. Joseph Hospital, Denver, CO

**MD 2013** Alpert Medical School, Brown University, Providence, RI

**Research:**

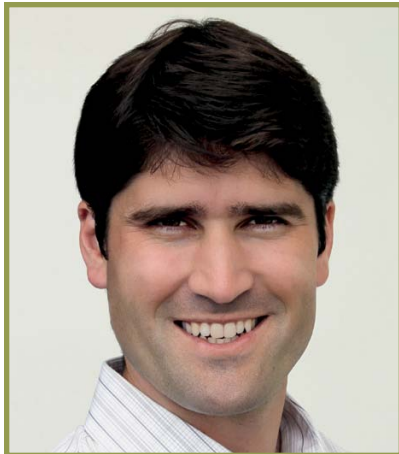
**2007–2009** Seattle Biomedical Research Institute, WA

**2005–2007** University of Washington, Dept. of Biochemistry, Seattle

**Selected Publications:**

Gullingsrud J, Saveria T, **Amos E**, Duffy PE, Oleinikov AV. Structure-function-Immunogenicity Studies of PfEMP1 domain DBL2bPF11\_0521, a Malaria Parasite Ligand for ICAM-1. *PLoS One*. 2013 Apr 12; 8(4):e61323.

Oleinikov AV, Voronkova VV, Frye IT, **Amos E**, Morrison R, Fried M, Duffy PE. A Plasma Survey using 38 PfEMP1 Domains Reveals Frequent Recognition of the Plasmodium Falciparum Antigen VAR2CSA among Young Tanzanian Children. *PLoS One*. 2012;7(1):e31011.



**Craig P. Giacomini, MD, PhD**

**2013–2014** Internship, St. Mary’s Medical Ctr., San Francisco, CA

**MD 2013** Stanford University School of Medicine, CA

**PhD 2013** Stanford University School of Medicine, CA

**Honors and Awards:**

**2008–2009** Howard Hughes Medical Inst., Medical Fellows Program Fellowship

**Selected Publications:**

Shain AH, Salari K, **Giacomini CP**, Pollack JR. Integrative Genomic And Functional Profiling Of The Pancreatic Cancer Genome. *BMC Genomics*. 2013 Sep 16;14:624.

**Giacomini CP**, Jeffrey RB, Shin LK. Ultrasonographic Evaluation of Malignant and Normal Cervical Lymph Nodes. *Semin Ultrasound CT MR*. 2013 Jun;34(3):236-47.



**Michael B. Heller, MD**

**2013–2014** Internship, Massachusetts General Hospital, Boston, MA

**MD 2013** Northwestern University, Feinberg School of Medicine, Chicago, IL

**Honors and Awards:**

**2012** Alpha Omega Alpha

**2011** Top 10 Medical Student Abstract, Academic Surgical Congress

**Research:**

**2010–2013** Northwestern University, Dept. of Surgery, Chicago, IL

**2008–2009** Northwestern University, Dept. of Neurobiology, Chicago, IL

**Selected Publications:**

**Heller M**, Elaraj D, Aleppo G, Sturgeon C. Novel Germline SDHB Mutation in a 35-Year-Old Male with Malignant Bladder Paraganglioma. *World Journal of Endocrine Surgery*. Sep-Dec 2010; 2(3):135-138.

**Heller M**, Zanocco K, Zydowicz S, Elaraj D, Nayar R, Sturgeon C. Cost-Effectiveness Analysis of Repeat Fine-Needle Aspiration for Thyroid Biopsies Read as Atypia of Undetermined Significance. *Surgery*. Sep 2012; 152(3): 423-430.



**R. Phelps Kelley, MD**

**2013–2014** Internship, Brigham and Women’s Hospital, Boston, MA

**MD 2013** Harvard Medical School, Boston, MA

**Research:**

**2010** Brigham and Women’s Hospital, Center for Neurologic Disease, Boston, MA

**2007–2009** Beth Israel Deaconess Medical Ctr., Viral Pathogenesis Division, Boston, MA

**Honors and Awards**

**2009** Thomas T. Hoopes Prize, Harvard College, Cambridge, MA

**Selected Publications:**

Rhee EG, **Kelley RP**, Agarwal I, Lynch DM, La Porte A, Simmons NL, Clark SL, Barouch DH. TLR4 Ligands Augment Antigen-Specific CD8+ T Lymphocyte Responses Elicited by a Viral Vaccine Vector. *J Virol*. 2010 Oct;84(19):10413-9.

Rhee EG, Blattman JN, Kasturi SP, **Kelley RP**, Kaufman DR, Lynch DM, La Porte A, Simmons NL, Clark SL, Pulendran B, Greenberg PD, Barouch DH. Multiple Innate Immune Pathways Contribute to the Immunogenicity of Recombinant Adenovirus Vaccine Vectors. *J Virol*. 2011 Jan;85(1):315-23.



**Mai Le, MD**

**2013–2014** Internship, Banner Good Samaritan Medical Ctr., Phoenix, AZ

**MD 2013** University of California San Francisco, School of Medicine

**Research:**

**2010–2014** UCSF, Dean’s Research Fellow

**2012–2013** UCSF, Department of Radiology and Biomedical Imaging

**Selected Publications:**

Gore J, Bryant Z, Nöhlmann M, Le MU, Cozzarelli NR, Bustamante C. DNA Overwinds When Stretched. *Nature*. 2006 Aug 17;442(7104):836-9.



**Joseph R. Leach, MD, PhD**

**2013–2014** Internship, California Pacific Medical Ctr., San Francisco

**MD 2013** University of California San Francisco, School of Medicine

**PhD 2009** University of California Berkeley/San Francisco

**MS 2003** Miami University of Ohio, Oxford

**Honors and Awards:**

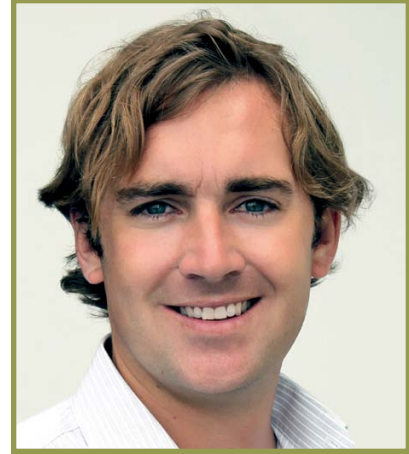
Alpha Omega Alpha

**2007–2009** American Heart Association Pre-doctoral Fellow

**Selected Publications:**

Tsai M, Kita A, **Leach J**, Rounsevell R, Huang JN, Moake J, Ware RE, Fletcher DA, Lam WA. *In vitro* Modeling of the Microvascular Occlusion and Thrombosis that occur in Hematologic Diseases using Microfluidic Technology. *J Clin Invest*. 2012 Jan 3;122(1):408-18.

**Leach, JR**, Mumba, M, Rice, PR. Quantum Fluctuations in a Cavity QED System with Quantized Center-of-Mass Motion *Phys. Rev. A* 83, 063844 (2011).



**Patrick R. Mulligan, MD**

**2013–2014** Internship, St. Mary’s Medical Ctr., San Francisco, CA

**MD 2013** Emory University School of Medicine, Atlanta, GA

**Research:**

**2012** UCLA, Dept. of Radiology, Interventional

**2012** Emory University, Dept. of Radiology, Interventional and Image-Guided Medicine

**2012** Emory University, Dept. of Neurosurgery

**Selected Publications:**

**Mulligan PR**, Prajapati HJ, Martin LG, Patel TH. Vascular Anomalies: Classification, Imaging Characteristics And Implications For Interventional Radiology Treatment Approaches. *Br J Radiol*. 2014 Mar; 87(1035): 20130392.

**Mulligan P**, Raore B, Liu S, Olson JJ. Neurologic and Functional Outcomes of Subdural Hematoma Evacuation in Patients over 70 Years of Age. *Journal of Neuroscience in Rural Practice*. 2013 July;4(3):250-56.



**Adi J. Price, MD**

2013–2014 Internship, Kaiser Permanente, San Francisco, CA

MD 2013 University of California San Diego, School of Medicine

**Honors and Awards:**

2010 UCSD Arnold P. Gold Foundation Scholarship Fellow

**Research:**

2009–2011 UCSD, Dept. of Medicine

2012 UCSF, Dept. of Radiology and Biomedical Imaging

2012 UCSD, Dept. of Radiology



**Daniel B. Sonshine, MD**

2013–2014 Santa Clara Valley Medical Ctr., San Jose, CA

MD 2013 Weil Cornell Medical College, New York, NY

**Honors and Awards:**

2009 Okemo Mountain Medical Student Scholarship

**Research:**

2011–2012 UCSF, Orthopaedic Trauma Institute at SFGH

2008 Weill Cornell Global Health Summer Research Scholar, Kilimanjaro Christian Medical Ctr., Orthopedic Surgery, Moshi, Tanzania

**Selected Publications:**

Sonshine DB, Caldwell A, Gosselin RA, Born CT, Coughlin RR. Critically Assessing the Haiti Earthquake Response and the Barriers to Quality Orthopaedic Care. *Clin Orthop Relat Res.* 2012 Oct;470(10):2895-904.

## Residents 2014–2015

**Second-Year Residents**

- Deddeh Ballah, MD
- Micky Cabarrus, MD
- Billy Carson, MD
- Kavi Devulapalli, MD
- Luis Gutierrez, MD
- Daniel Hendry, MD
- Michael Holmes, MD
- Brandon Ishaque, MD
- Eric Jordan, MD
- Spencer Lake, MD
- Zhixi Li, MD
- Hari Trivedi, MD
- Vanja Varenika, MD
- Jennifer Wan, MD

**Third-Year Residents**

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

**Fourth-Year Residents**

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

**Nuclear Medicine Resident**

- Lorenzo Nardo, MD

# Diagnostic Radiology Residency Graduates—Class of 2014

Congratulations to our 2014 graduates. We wish them success in their new fellowship positions.

**Ramon F. Barajas, Jr., MD**

Fellowship, Neuroradiology, UCSF

**Amaya M. Basta, MD**

Fellowship, Women's Imaging,  
Oregon Health and Science  
University, Portland, OR

**Nancy J. Benedetti, MD**

Fellowship, Neuroradiology, UCSF

**Stephanie W. Hou, MD**

Fellowship, Musculoskeletal  
Imaging, New York University, NY

**Akash Kansagra, MD**

Fellowship, Diagnostic/  
Interventional Neuroradiology  
Mallinckrodt Institute of Radiology,

Barnes-Jewish Hospital, Washington  
University, St. Louis, MO

**Yuo-Chen Kuo, MD**

Fellowship, Diagnostic and  
Interventional Neuroradiology,  
UCSF

**Parham Mofakhar, MD**

Fellowship, Diagnostic and Inter-  
ventional Neuroradiology, UCSF

**Dare Olorunsola, MD**

Fellowship, Vascular Interventional  
Radiology, UCSF

**Anand S. Patel, MD**

Fellowship, Vascular Interventional  
Radiology, UCSF

**Jay Starkey, MD**

Attending Physician (General/  
Neuroradiology), St. Luke's  
International Hospital, Tokyo, Japan

**Ricky Tong, MD, PhD**

Fellowship, Vascular Interventional  
Radiology, UCSF

**David N. Tran, MD**

Fellowship, Vascular Interventional  
Radiology, UCSF

**John-Paul J. Yu, MD, PhD**

Fellowship, Neuroradiology, UCSF



ELISABETH FALL PHOTOGRAPHY

2014 Diagnostic Radiology Residency Graduates (l-r, top row) David Tran, MD, Dare Olorunsola, MD, Akash Kansagra, MD, Ramon Barajas, Jr., MD, Jay Starkey, MD, Amaya Basta, MD (l-r, bottom row) Chairman Ron Arenson, MD, Nancy Benedetti, MD, Anand Patel, MD, Stephanie Hou, MD, John-Paul Yu, MD, PhD, Yuo-Chen Kuo, MD, Parham Mofakhar, MD, Ricky Tong, MD, PhD, Program Director Soonmee Cha, MD.

## Clinical Fellows and Instructors 2014–2015

### Clinical Fellows:

Hakeem Afuwape, DO  
*Abdominal Imaging*

Saveen Ahuja, MD  
*Pediatric Radiology*

Matthew Amans, MD  
*Neurointerventional*

Mark Ashkan, MD  
*Musculoskeletal Radiology*

Ramon F. Barajas, Jr., MD  
*Neuroradiology*

Laura Barkley, MD  
*Women's Imaging*

Nancy J. Benedetti, MD  
*Neuroradiology*

Michelle Black, MD  
*Women's Imaging*

Jeremiah Boyd, MD  
*Abdominal Imaging*

Audra Brunelle, MD  
*Women's Imaging/Ultrasound*

Bianca Carpentier, MD  
*Women's Imaging/Ultrasound*

Joshua Clayton, MD  
*Cardiac and Pulmonary Imaging*

Harpreet Dhatt, MD  
*Abdominal Imaging*

Shital Gandhi, MBBS  
*Abdominal Imaging/Ultrasound*

Brian Haas, MD  
*Cardiac and Pulmonary Imaging*

Janice Hsu, MD  
*Women's Imaging/Ultrasound*

Nabia Ikram, MD  
*Abdominal Imaging*

Priyanka Jha, MD  
*Abdominal Imaging*

Jeffrey Kao, MD  
*Abdominal Imaging*

Dean Kolnick, MD  
*Pediatric Radiology*

Mark Kovacs, MD  
*Abdominal Imaging*

David Landry, MD  
*Neuroradiology*

Amie Lee, MD  
*Women's Imaging*

Kevin K. Lee, MD  
*Musculoskeletal Radiology*

Evan Lehrman, MD  
*Abdominal Imaging*

Parham Moftakhar, MD  
*Neuroradiology*

Andrew Nicholson, MD  
*Neuroradiology*

Dare Olorunsola, MD  
*Interventional Radiology*

Rina Patel, MD  
*Musculoskeletal Radiology*

Anand Patel, MD  
*Interventional Radiology*

Shilpa Puppala, MBBS  
*Abdominal Imaging*

Alireza Radmanesh, MD  
*Neuroradiology*

Fabio Settecase, MD  
*Neurointerventional Radiology*

Margaret Taghavi, MD  
*Women's Imaging/Ultrasound*

Cynthia Tan, MD  
*Abdominal Imaging/Ultrasound*

Ashesh Thaker, MD  
*Neuroradiology*

Ricky Tong, MD, PhD  
*Interventional Radiology*

David Tran, MD  
*Interventional Radiology*

Brent Weinberg, MD, PhD  
*Neuroradiology*

Rebecca, Wu, MD  
*Nuclear Medicine*

John-Paul (JP) Yu, MD, PhD  
*Neuroradiology*

### Clinical Instructors:

Mai-Lan Ho, MD  
*Neuroradiology*

Mark Mamlouk, MD  
*Neuroradiology*

Penelope Thomas, MD  
*Neuroradiology*

Nathaniel von Fischer, MD  
*Neuroradiology*

Amuradha Rao, MD  
*Neuroradiology*



## Master of Science in Biomedical Imaging Continues to Grow

Now in its fourth year, the department's Master of Science in Biomedical Imaging (MSBI) program continues to attract students from across the United States and around the world. The incoming class is the largest yet and includes 20 students from as far away as China, Taiwan, Iran, and the Philippines. It also includes a strong showing from undergraduate UC programs, which account for 50% of the 2015 class.

The MSBI faculty features 13 professors from the department, under the leadership of Program Director Dr. David Saloner and Director of Graduate Studies Dr. Alastair Martin. The many guest lectures from clinical faculty give the students a much-appreciated perspective on how imaging technology is applied in the clinical setting. Program Administrator Robert Smith acts as a liaison for the students, guiding them from the initial application process all the way through graduation.

### Classroom Learning Supports Hands-On Experiences

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

MSBI students benefit from the wide range of state-of-the-art imaging facilities in the department. The students consistently report that the hands-on activities, where they actually get to operate and perform experiments using



2013–2014 UCSF MSBI Graduate Class. Back Row (l–r) Ruby Kuang, Khaled Dostzada, Yuxin Sun, Alastair Martin, Ruobin Wu, Leon Hsueh, Alex Yeh, Collin Ma, Molly Gibson, Sonam Machingal, David Saloner, and Natalie Korn. Front Row (l–r) FX Jin, Bowen Xie, and Nabeel Al-Aziz.

ELISABETH FALL PHOTOGRAPHY

these imaging systems, are the highlight of the MSBI program. A very high percentage of MSBI students remain through the summer academic quarter to apply their newly honed skills on a wide range of research projects under the supervision of UCSF faculty. These projects culminate in an MSBI imaging symposium that is held in late August to highlight the students' research accomplishments.

### MBSI Graduates Move On

The MSBI program has graduated more than 40 students in its first three years, many of whom have continued on to PhD and MD programs. Others have continued the research work they began as students in labs throughout the department. Aditi Guha, a 2012 graduate of the MSBI program and research associate in Dr. Sharmila Majumdar's lab, placed first in the 2014 Annual Surbeck Awards for her work on "Feasibility of a Stimulated Echo-Based Diffusion Sequence for Early Diagnosis of Osteoarthritis." This exemplary work is a shining example of the training provided by the MSBI program.

## Goldberg Center

The Goldberg Center continues to explore innovative ways to teach radiology to medical students across all four years of their medical training.

Our primary senior radiology elective, often referred to simply as the “Learning Center elective,” helmed by Center Co-Director and Course Director David Naeger, MD, has rapidly become the most popular elective in the UCSF School of Medicine with competitive enrollment by lottery and a lengthy waiting list. In 2014, we implemented new strategies to increase enrollment to meet the increased demand. We appreciate our talented instructors’ willingness to give a bit more so we can continue our progress toward our goal of reaching as many students as possible. After all, educating the next generation of radiologists and

future referring physicians is essential to the future of radiology.

We have also expanded efforts to expose students to clinical radiology earlier during their medical studies. Our new “Radiology Primer” elective, a unique two-week experience designed to help undecided third-year students explore a career in radiology, has grown in popularity. To our knowledge, this is the first course in the United States with this structure and intent. We have also expanded the ultrasound program, which was first integrated into students’ anatomy coursework. Nationwide, ultrasound is being increasingly incorporated into undergraduate medical education, employing small, hand-held units as a bedside examination tool similar to a stethoscope. Center



Students in the Diagnostic Radiology elective participate in the 3D teaching session.

BRAD NAKANO

Co-Director Emily Webb MD, is designing an expanded curriculum in conjunction with the longitudinal Foundations of Patient Care course, in which students will learn to integrate bedside ultrasound into their physical exam skillset.

UCSF's School of Medicine is in the planning stages of a complete curricular overhaul. The new Bridges Curriculum, expected to debut in 2016, is designed to train physicians committed to providing the highest quality care for today's patients, while also promoting scientific inquiry to advance medicine and health care for future generations of patients. Webb and Naeger both serve on Bridges Curriculum steering committees and are helping ensure that students will continue to learn important radiology fundamentals.

We continue to bring ideas and curricular innovations to the national radiology education community through lectures, meeting programming, and committee participation. Both Webb and Naeger are now members of the Alliance of Medical Student Educators in Radiology Executive Board. In this forum they are able to exchange ideas with other education leaders and have an impact on national education policy.

#### **Kudos to Committee Members and Staff Members**

The faculty and resident members of the Medical Student Education Committee supervise the Goldberg Center's academic activities. Our resident representatives include Kimberly Kallianos, MD, our new Resident Liaison for Medical Student Education, and Aaron Miracle, MD, who remains on the committee as the new Resident Director for the Radiology Primer elective. In addition to Naeger and Webb, faculty members include Andrew Phelps, MD, Brett Elicker MD, Vickie Feldstein, MD, Stefanie Weinstein, MD, Lynne Steinbach, MD, Miles Conrad MD, Elissa Price, MD, Judy Yee, MD, and Khai Vu, MD.

The Haile T. Debas Academy of Medical Educators at UCSF recently announced that Naeger will be inducted into the Academy in 2014, in recognition of his accomplishments in medical education. This is a significant accomplishment bestowed on only five percent of the medical school's faculty. Phelps was also honored with an Academy Excellence in Teaching Award in 2014 in recognition of his outstanding medical student teaching.

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



LAO THAO

Bren Ahearn, Medical Student Education Coordinator

The biggest change to the Goldberg Center over the past year was the naming of Bren Ahearn as Medical Student Education Coordinator. He is the backbone of all the Center's activities and programs. Without his tireless efforts, everything would likely screech to a halt.

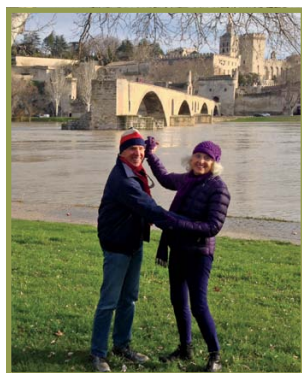
For more information about the Goldberg Learning Center's activities, please contact Bren Ahearn (*Brendan.Ahearn@ucsf.edu*) or visit *radiology.ucsf.edu/education/medical-students*.

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

## Alumni News 2014

1967

**Charles A. Gooding, MD, and Gretchen A.W. Gooding (1975)**, Mill Valley, CA write that they visited France twice in 2014, “We spent the entire June 2014 trip in Paris because in January we were in Avignon and wine country environs. Do you remember the song translated from French, ‘On the bridge of Avignon, we dance...’”



Charles and Gretchen Gooding share photos of their visits to (l) Avignon and (r) Paris, France.



1971

**Stanley Handel, MD**, Tulsa, OK, writes, “I retired from practice in Houston in 2005. The next day I began a relationship with the Oklahoma State University Medical Center in Tulsa as an attending radiologist. I work part time, no call, holidays or weekends and exclusively with the residents who keep me on my toes. My wife, Carolyn works with me except when she is doing grandmotherly or other duties. We have four great kids and three wonderful grandkids.



Stan and Carolyn Handel

“With with my young resident colleagues, I am aware how I transfer concepts, approaches and philosophy that were inculcated in me by my mentors at UCSF: Alex Margulis, Hideyo Minagi, Doug Sheft, Malcolm Jones, Hans Newton, Charles Gooding, John Amberg, Dick Greenspan and Dick Gold. From them and others at UCSF I saw

knowledge, quest for truth, humanity and humility; moral guides to transmit as best I can.

“Current projects include writing my autobiography, an on-again-off-again project and assembling a short collection of my poetry. Carolyn and I have the serious business of trying to stay alive and intact through healthy life style (nutrition, physical fitness and mental activity). We travel, visit with family and served our Home Owners’ Association as treasurer and then president, I’m still swimming pool director.”

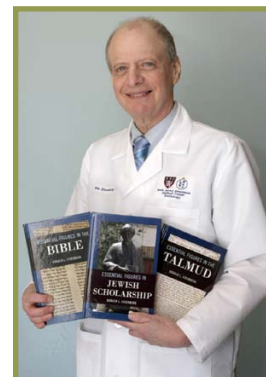
1975

**Ronald Eisenberg, MD**, Boston, MA writes “I am now a Professor of Radiology at Harvard Medical School and last year earned a doctorate in Jewish Studies from Spertus Institute in Chicago.” In March 2014,

he finished writing *Essential Figures in Jewish Scholarship*, the third installment of his *Essential Figures* series, a trilogy of books describing major individuals in the almost 4,000-year history of the Jews. Eisenberg says that he “began the process several years ago, when searching for information about a Biblical personality.” The other titles are: *Essential Figures in the Bible* and *Essential Figures in the Talmud*. Eisenberg added that “those who remember my violinist wife, Zina Schiff, might be interested in her recent recording of the Sibelius and Barber Concertos with the MAV Orchestra of Budapest conducted by our daughter, Avlana Eisenberg (who was born at UCSF’s Moffitt Hospital). In June 2014, *Neuroradiology Signs* authored by Mai-Lan Ho, MD, Neuroradiology chief fellow at UCSF and former Beth Israel Deaconess Medical Center Resident and Eisenberg was published by McGraw Hill Education.



Avlana Eisenberg and Zina Schiff’s new CD.



Ron Eisenberg with his trilogy.

1976

**Herbert Y. Kressel, MD**, Boston, MA was named an honorary member of the Société Française de Radiologie (SFR) at its Journées Françaises de Radiologie in Paris. Kressel is the editor of the journal *Radiology* and radiologist-in-chief emeritus of the Department of Radiology at Beth Israel Hospital in Boston and the Miriam H. Stoneman Professor of Radiology at Harvard Medical School.

1979

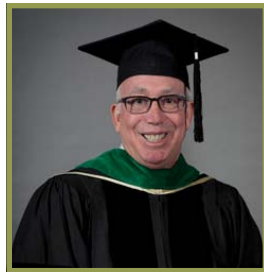
**Michael Federle, MD** of Menlo Park, CA received the 2014 Gold Medal for Distinguished Service to Radiology from the American Roentgen Ray Society. The ARRS Gold Medal is the society's highest honor. Federle was a fellow in Abdominal Imaging at UCSF and received UCSF Radiology and Biomedical Imaging's outstanding alumni award in 1990. He was on faculty from 1979–89.



Michael Federle with wife Lynne Federle.

1985

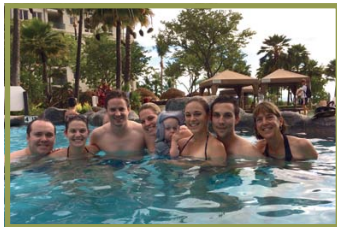
**David Steinberg, MD, FACR**, Las Vegas, NV, is the Managing Partner of Steinberg Diagnostic Medical Imaging with six imaging centers located in the Las Vegas and Henderson, Nevada area. A seventh is under construction and scheduled to open in 2015. In April 2014, the American College of Radiology recognized Steinberg as a Fellow of the American College of Radiology.



David L. Steinberg

1986

**Jeffrey D. Dieden, MD**, Lafayette, CA writes "I just turned 60, and was fortunate enough to convince my three girls to join Melinda and me in Maui for a week last month—accompanied by their men (one husband, two boyfriends, and one grandson). It was the best week of my life."



The Dieden family in Maui.

1989

**William Bradley, MD**, of San Diego, CA writes "I was honored to be asked to give the Margulis Alumnus Lecture on May 1, 2014. It was great to return to UCSF and see so many old friends. Five weeks later I had dinner with Alex Margulis and Hedi Hricak in conjunction with a lecture at Sloan-Kettering. At age 93, he is still amazing."

**Roland De Marco, MD, FACR**, Granite Bay, CA, was inducted as a Fellow in the American College of Radiology in April 2014 in Washington, DC. DeMarco is vice president at Radiological Associates Medical Group of Sacramento. He is also a radiologist at Sutter Medical Group in Sacramento and is a member of the medical executive committee at Mercy San Juan Medical Center in Carmichael.



Theresa DeMarco, MD (a graduate of UCSF's diagnostic radiology residency and Musculoskeletal fellowship alumna, 1990) and Roland DeMarco.

1991

**Eric J. Stern, MD**, Seattle, WA, was selected as Chair of the International Commission on Radiology Education for the International Society of Radiology.



Eric J. Stern

1994

**Scott R. Schultz, MD, FACR**, Edina MN, was inducted as a Fellow in the American College of Radiology in 2014 in Washington, D.C. Schultz is president at Minneapolis Radiology and Minneapolis Vascular Physicians in Plymouth, MN.

2002

**Michael Carducci, MD**, Las Vegas, NV sent a recent family photo.



Rafael, Michael, Dana, and Annie Carducci.

2004

**Miriam Bredella, MD**, Boston, MA, received both the President’s Medal of the International Skeletal Society and the Distinguished Investigator Award from the Academy of Radiology Research. She writes that she recently “obtained a R01 grant from the NIH on the effects of obesity on bone.” Bredella was invited to present her research on brown fat and bone at the NIH. Bredella is a musculoskeletal radiologist at the Massachusetts General Hospital and an associate professor of Radiology at Harvard Medical School.



Miriam Bredella

2006

**Brian H. Ching, MD**, Honolulu, HI received the Department of the Army Achievement Medal for Civilian Service for resident teaching in Radiology at Tripler Army Medical Center for the 2013–2014 academic year. “Believe it or not, it’s an actual medal! If I was in the military, I would wear it on my uniform. Unfortunately, it does not go well with aloha shirts!”



Brian Ching with son Carsten, age 7 (son Mattias, not pictured, is 9).



Brian Ching’s award for outstanding resident teaching at TAMC.

**Max Wintermark, MD**, Palo Alto, CA has been appointed professor of Radiology and section chief of Neuroradiology in the Department of Radiology, Stanford School of Medicine. He was previously the section chief of Neuroradiology at the University of Virginia.

2008

**James S. Chen, MD, PhD**, San Francisco, CA sends a photo of summer vacation in Lake Tahoe, CA.



Jim and Sandy Chen with daughters Lila, 11 and Elise, 2.

**Joseph Stengel, DO**, Olympia, WA, received the Outstanding Clinical Faculty Award at UCSF’s Department of Radiology and Biomedical Imaging Commencement.



Chair Ron Arenson with Joe Stengel.

2009

**Amita Kamath, MD**, New York, NY and husband Sanjay Pamnani announce the arrival of their daughter, Aarya Pamnani on October 2, 2013. She joins her older brother, Vikash, and sister Sanaya. Kamath continues to practice as an attending in Body Imaging at Mount Sinai Hospital, New York, NY.



Aarya Pamnani, 2014.

2010

**David M. Carlson, MD**, Santa Barbara, CA writes that he and wife Sarah Jane Carlson “had our second son, Noah, in July and Wyatt is two now. We are truly enjoying parenthood.” He continues to practice in Santa Barbara at Cottage Hospital and the Cancer Center, and retains a clinical “volunteer” faculty position at UCSF.



David and Sarah Jane Carlson with Noah and Wyatt.

**Ranier N. Poley, MD**, Austin, TX, writes: “In December 2013, I climbed Mt. Kilimanjaro in Tanzania, the highest mountain in Africa.” Poley is a vascular and interventional radiologist with the Austin Radiological Association.



Ranier Poley at 19,341 feet, the summit of Mt. Kilimanjaro.

**Shilpa Kumbhani, MD** of Oakland, CA sent a recent photo. She continues to work as a practicing radiologist at Kaiser Permanente, Oakland.



Shilpa Kumbhani and family at Inspiration Point in Tilden Park.

**Sharon Kwan, MD** Seattle, WA writes, “I just completed a half-century ride to support cancer research.” Kwan is an assistant professor of Radiology at the University of Washington.



Sharon Kwan, before her 50-mile ride, “as you might surmise from the smile and lack of sweat.”

2012

**Ingrid Burger, MD**, Los Angeles, CA writes that as of February 2014, she has a full time job at the West Los Angeles Veterans Administration, where she is an assistant professor in the Body Imaging division and Chief of Breast Imaging. She moonlights one day a week at Kaiser Permanente, Los Angeles Medical Center doing breast imaging.

2013

**Bruno P. Soares, MD**, Atlanta, GA, received the Teacher of the Year Award from the Department of Radiology and Imaging Sciences at Emory University in Atlanta, where he just completed his first year as a Neuroradiology faculty member.

2014

**Brian M. Everist, MD**, Kansas City, KS received the UCSF Radiology and Biomedical Imaging Outstanding Fellow Award at Commencement 2014. He recently accepted the position of assistant professor of Radiology at the University of Kansas Hospital.



Mac Everist with Department Chair Ron Arenson, MD.

## The Margulis Society

“Fostering community is an important part of the Margulis Society’s mission,” said Jim Chen, MD, Margulis Society president, in announcing the March 28, 2015 Margulis Society Alumni Gala. “We look forward to bringing alumni together again at this festive gathering of classmates, colleagues, faculty, and trainees. We hope all of you can attend.” The Gala will be held at the downtown San Francisco Olympic Club.

### 15th Annual Career Evening Provides Information to Trainees

“Our goal is to connect trainees with radiologists in private practice or academic careers so that they will gain insight into what is still a challenging job market,” said Erik Gaensler, MD, who moderated the 2014 Career Evening. “Informational interviewing is key to decisions, and having access to UCSF Radiology’s diverse alumni is incredibly useful. The established radiologists who share their information are providing an important service for our trainees as they make career choices.”

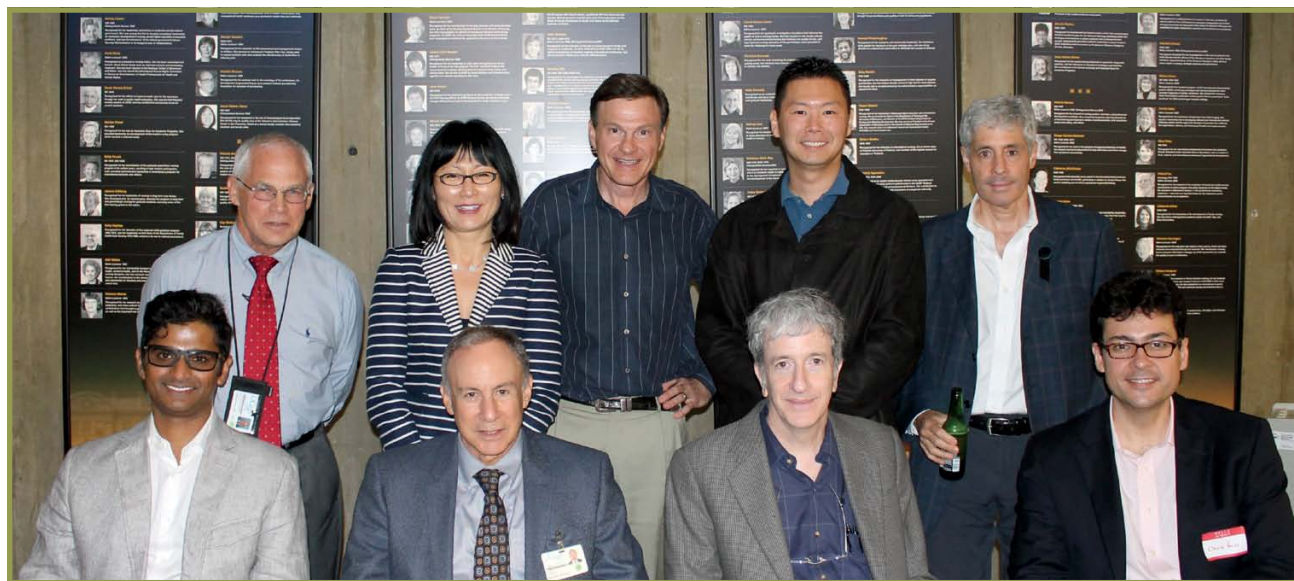
The annual Career Evening was held Sept. 10 at the main Parnassus campus. UCSF panelists included Residency Director Soonmee Cha, MD, Chairman Ron Arenson,

MD, David Avrin, MD, PhD, and Christopher Hess, MD, PhD. Panelists from private practice settings were Peter Jun, MD, of Kaiser Permanente and Bart Dolmatch, MD, of Palo Alto Medical Foundation. Two guests from outside the Bay Area addressed the national perspective—Robert Barr, MD, of Mecklenburg Radiology Associates, who discussed the career decisions that brought him to North Carolina and Saravanan Krishnamoorthy, MD, of Columbia University Medical Center in New York, who spoke about the complexities of the New York radiology scene.

### Bradley Returns to the Department as Alumnus Speaker

William Bradley, Jr., MD, PhD, chair of the UC San Diego Radiology Department returned to UCSF in May, 2014 to give the Margulis Society Alumnus Lecture. His lecture, entitled “MRI in the Next Decade: Quo Vadis,” attracted a number of alumni to UCSF who welcomed the opportunity to hear him and reconnect. “We appreciate the strong ongoing connection Bill has maintained with the department and were honored to have him back as the Margulis Lecturer,” said Ron Arenson, MD.

Bradley has deep roots at UCSF. He is a 1982 alumnus of the UCSF radiology residency and completed his MD at



Margulis Society Career Conference Panelists: (l-r, back row) Drs. David Avrin, Soonmee Cha, Erik Gaensler, Peter Jun and Bart Dolmatch, (l-r, bottom row) Drs. Saravanan Krishnamoorthy, Ron Arenson, Robert Barr and Christopher Hess.





Chairman Ron Arenson, MD, Margulis Society Alumnus Lecturer William Bradley, MD, PhD, and Margulis Society President James Chen, MD, PhD on May 1, 2014.

UCSF, along with all of his subsequent medical training: internship, diagnostic radiology residency, and neuro fellowship in UCSF’s Department of Radiology and Biomedical Imaging. While training at UCSF in the late 1970s, Dr. Bradley became involved in magnetic resonance imaging, initially “translating” the physics of MRI for other radiologists. Subsequently, his research has focused on MRI of flow phenomena, hemorrhage, stroke, multiple sclerosis, and normal pressure hydrocephalus.

**Olympic Club Gala scheduled for March 28, 2015**  
 Put a star on your calendars for Saturday, March 28, 2015, the date of the next Margulis Society Gala. “We are the most successful radiological alumni association in the country, and the Gala is our signature event, bringing together faculty, alumni, and trainees,” said Chen, “We hope to see you there!”

The biennial Margulis Lecture honors an outstanding alumnus of the Department of Radiology and Biomedical Imaging.

**Resident Research Receives Support and Honors**

The Margulis Society selected two grant recipients in 2014: Javier Villanueva-Meyer, MD, for his research project “T1 Rho Mapping of Brain Tumors and Tumor-Related Edema,” and Akash Kansagra, MD, for his research project “Development and Implementation of Arterial Spin Labeling MRI in Humans.”

Two senior residents, Ramon Barajas, Jr., MD, and Anand Patel, MD, were honored as “outstanding researchers” at Commencement 2014 as co-recipients of the Margulis Society Research Award. The award recognizes research excellence among members of the residency program.



Outstanding research awardees: (l) Anand Patel, MD and (r) Ramon Barajas, Jr., MD with Ron Arenson, MD at Commencement 2014.

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The Margulis Society and the Department of Radiology and Biomedical Imaging gratefully acknowledge the following donors for their generous contributions. This list reflects gifts made between July 1, 2013 and June 30, 2014.

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**The Brain Health Registry acknowledges  
the support of the following generous donors:**

The Rosenberg Alzheimer's Project

The Ray and Dagmar Dolby Family Fund

Connie and Kevin Shanahan

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\*Donation of \$1000 or more

## Radiology Postgraduate Education

### 2014 Highlights

The June 2014 international course, **Diagnostic Imaging on the Danube**, held at the Corinthia Hotel in Budapest was a tremendous success. The course was chaired by Judy Yee, MD, chief of Radiology Services at the Veterans Affairs Medical Center. Other UCSF faculty in attendance were William Dillon, MD; Ruth Goldstein, MD; Thomas Link, MD, PhD; David Naeger, MD; and Ron Zagoria, MD, FACR.

### Elicker Appointed Chair of Postgraduate Education

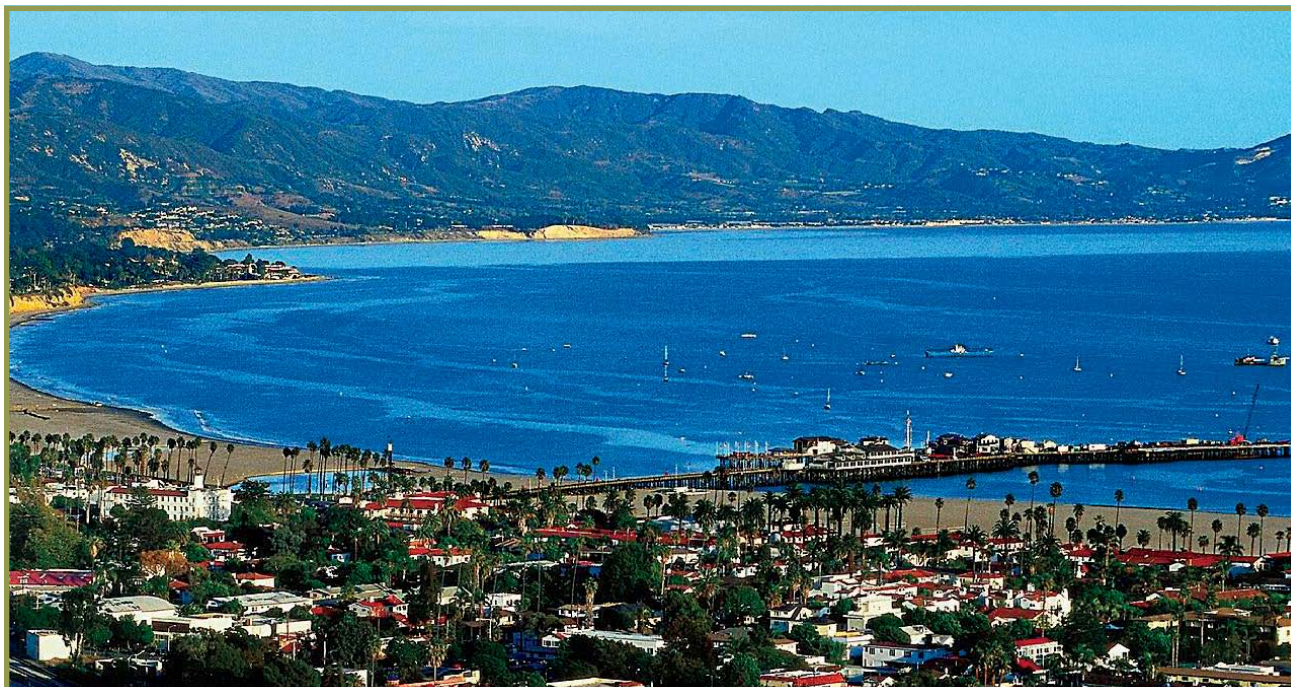
In July 2013, Brett Elicker, MD, was selected to lead the Postgraduate Education Committee and oversee the CME activities of the Department of Radiology and Biomedical Imaging. Under his leadership, Postgrad CME is pioneering the inclusion of both CME and SAM offerings at live courses. He also plans to add other exciting destinations to the already attractive course locations, and to invigorate the course content.

Elicker earned his medical degree in 2000 from New York Medical College, and completed a residency in Diag-



Postgraduate Education Staff (l-r) Nancy Mutnick, Cindy Cheng, Silvia Montano de Jiménez, Dave Stewart.

nostic Radiology at Yale New Haven Hospital, CT in 2005, followed by a fellowship in Thoracic Imaging from UCSF in 2006. He came to UCSF in 2005 as a Clinical Fellow in Cardiac and Pulmonary Imaging and joined the faculty of Radiology and Biomedical Imaging in July 2006.



Santa Barbara, California, site of the May 17–22, 2015 CME meeting.



Sydney, site of the June 15–19, 2015 CME course

### What to Look Forward to in 2015

The Annual Review course returns to the Hotel Nikko San Francisco in Union Square, February 22–27, 2015. Attendees will have the opportunity to earn over 20 self-assessment SAM credits at this course, therefore satisfying the ABR continuous certification requirements. This comprehensive review course continues to attract a vast number of practicing radiologists. It offers a detailed review of all systems and modalities, presented by world-renowned UCSF Radiology faculty.

Our 2015 international course will take place in Sydney, Australia on June 15–19, at the Four Seasons Sydney Hotel. Rizwan Aslam, MD, and Ron Zagoria, MD, FACR, will co-chair the course, joined by an outstanding group of UCSF faculty, including Brett Elicker, MD; Christopher Hess, MD, PhD; Bonnie Joe, MD, PhD; Antonio Westphalen, MD; and Judy Yee, MD. Make plans to join us in Australia in the summer of 2015 (which, of course, is winter in Australia).

Our Maui course returns to the Hyatt Regency November 1–6, 2015. Lahaina awaits you for some serious CME learning and relaxing afternoons on the beautiful blue Hawaiian waters. Hope to see you there!

Santa Barbara is the exciting, new destination for our Practical Diagnostic Imaging course. We selected the beautiful Bacara Resort & Spa to host the course on May 17–22, 2015. The program will target the general radiologist and will be chaired by Michael Hope, MD. Mark your calendars!

In 2015, registrants will have the chance to attend our signature courses in Kona, Hawaii, as well as many other CME opportunities in the Bay Area. The calendar below offers a complete listing of 2015 CME offerings, or visit [radiology.ucsf.edu/postgrad/calendar](http://radiology.ucsf.edu/postgrad/calendar).

### Save When Attending UCSF Courses

UCSF Radiology Postgraduate Education is excited to announce the new UCSF Radiology CME Loyalty Program. Starting July 1, 2014, registrants obtain a status based on the frequency of their attendance in past CME courses. The Loyalty Program offers three reward levels: Silver, Gold, and Platinum. Each level offers a 10%, 20% or 30% discount off registration fees for EVERY course attended. We will continue to offer the “early bird” discount for those who register by the deadline. Learn more about the Loyalty Program at [radiology.ucsf.edu/postgrad/loyalty-program](http://radiology.ucsf.edu/postgrad/loyalty-program).

We hope to see you at future CME courses!

## 2015 UCSF Radiology Continuing Medical Education Calendar

### January 11–16, 2015

Breast Imaging and Emerging Technologies—Hawaii  
Fairmont Orchid Kona, HI

### January 18–23, 2015

Practical Body Imaging  
Fairmont Orchid, Kona, HI

### January 25–27, 2015

Thoracic Imaging: Cardiac and Pulmonary  
Omni Rancho Las Palmas, Palm Springs, CA

### January 28–30, 2015

Abdominal and Pelvic Imaging  
Omni Rancho Las Palmas, Palm Springs, CA

### February 8–13, 2015

Neuro and Musculoskeletal Imaging  
Fairmont Orchid, Kona, HI

### February 22–27, 2015

UCSF Radiology Annual Review  
Nikko Hotel, San Francisco, CA

### February 26–28, 2015

Virtual Colonoscopy Workshop  
UCSF China Basin, San Francisco, CA

### March 13–15, 2015

Breast Imaging Update  
Marriott Union Square, San Francisco, CA

### May 2, 2015

Sonography for Sonographers  
UCSF Laurel Heights, San Francisco, CA  
(RDMS credits only)

### May 17–22, 2015

Imaging on the California Coast  
Bacara Resort & Spa, Santa Barbara, CA

### May 28–30, 2015

Virtual Colonoscopy Workshop  
UCSF China Basin, San Francisco, CA

### June 15–19, 2015

Diagnostic Imaging Down Under  
Four Seasons Sydney, Australia

### August 5–9, 2015

UCSF/UCSD Musculoskeletal Imaging  
San Diego Marriott La Jolla, CA

### August 24–28, 2015

UCSF Radiology Highlights  
Marriott Union Square, San Francisco, CA

### September 14–18, 2015

Interventional Radiology Review  
UCSF Parnassus Campus, San Francisco, CA

### September 17–19, 2015

Virtual Colonoscopy Workshop  
UCSF China Basin, San Francisco, CA

### November 1–6, 2015

Diagnostic Radiology Seminars  
Hyatt Regency Maui, HI

### November 8–13, 2015

Breast and Women's Imaging  
Hyatt Indian Wells, Palm Springs, CA

### December 6–11, 2015

Imaging in the Caribbean  
Marriott Los Sueños, Playa Herradura, Costa Rica

#### FOR FURTHER INFORMATION PLEASE CONTACT:

UCSF Radiology Postgraduate Education

Tel: 415-476-5731 E-mail: [cme@radiology.ucsf.edu](mailto:cme@radiology.ucsf.edu) Website: <http://radiology.ucsf.edu/postgrad>  
*Course dates, locations, and course titles are subject to change prior to brochure publication.*

## Surbeck Young Investigator Awards 2014



Aditi Guha, MS



Christine Leon Swisher, MS



Akash Kansagra, MD

Three young investigators working in the Margaret Hart Surbeck Laboratory were honored for their outstanding research at the 8th Annual Surbeck Awards on March 7, 2014 at UCSF. The Director of the Surbeck Laboratory, Sarah J. Nelson, PhD, and the Director of the IND-NJC Board supporting the Surbeck Laboratory, Richard Gowen, PhD, welcomed UCSF's scientific community to the research presentations and award ceremony. Attendees enjoyed research presentations showcasing the work of each winning scholar.

Aditi Guha, MS, was the first place award recipient for her abstract "Feasibility of a Stimulated Echo Based Diffusion Sequence for Early Diagnosis of Osteoarthritis" with co-authors Cory Wyatt, PhD, Dimitrios Karampinos, Lorenzo Nardo, MD, Thomas Link, MD, PhD and Sharmila Majumdar, PhD. "Aditi is an excellent researcher" noted her mentor, Vice-Chair of Research Sharmila Majumdar, PhD. "Following Aditi's training in the UCSF Masters of Science in Biomedical Imaging Program from 2011-2012, we were very fortunate that she chose to remain at UCSF and pursue research in the field of osteoarthritis."

Christine Leon Swisher, MS, earned Surbeck's second place award for "Localized, Non-invasive In Vivo Measurement of Enzymatic Activity using MAD-STEAM Hyperpolarized Carbon-13 MR Spectroscopic

Imaging" with co-authors Peder Larson, PhD, Robert Bok, PhD, Justin Delos Santos, Romelyn Delos Santos, Adam Kerr, John Pauly, PhD, Sarah Nelson, PhD, John Kurhanewicz, PhD, and Daniel Vigneron, PhD. Leon Swisher received concurrent BS and MS degrees in Biomedical Engineering from Arizona State University prior to coming to UCSF. "Christine Leon Swisher developed remarkable new MRI techniques to measure the rate constants of cell metabolism with an unprecedented accuracy" commented her mentor Daniel Vigneron, PhD. Leon Swisher is currently a Postdoctoral Fellow at MGH and Harvard Medical School in Boston, MA.

Akash Kansagra, MD received Surbeck's third award for his authorship on "Microstructural Maturation of White Matter Tracts in the Neonatal Brain using NODDI" with co-authors Marc Mabray, MD, Donna Ferriero, MD, A. James Barkovich, MD, Duan Xu, PhD and Christopher Hess, MD, PhD. His mentor, Christopher Hess, MD, PhD, praised Kansagra's "scientific pursuits in developing computational approaches to addressing problems in brain imaging." Kansagra was a resident in the Department of Radiology and Biomedical Imaging from 2010-2014 and completed undergraduate and graduate training in physics at the Massachusetts Institute of Technology and University of California, Irvine, respectively, followed by  
*(continued on next page)*

## Borodina Receives School of Medicine Great People Award



UCSF DOCUMENTS & MEDIA - WAFCO SANCHEZ

Lena Borodina (center), with Nola Hylton (left), co-director of the Breast Imaging Research Interest Group, and Bonnie Joe (right).

Having a “a rare combination of attention-to-detail and big-picture-understanding,” not only makes Lena Borodina, an analyst supervisor in the Mt. Zion Women’s Imaging Center, invaluable, it earned her a School of Medicine Great People award in 2014. The award honors employees whose commitment and values make their jobs a positive experience and the School of Medicine a great place to work.

Lena was nominated by Bonnie Joe, MD, PhD, Women’s Imaging section chief, who commented that “Lena has been part of the supporting cast for our department at Mt. Zion for over a decade. She is admired by her colleagues

and sets an example of efficiency and hard work for the Business Office staff in suite C250. Lena is the go-to person no matter what the challenge; whether it’s a complex IT or scheduling issue or pigeons invading an office, she can figure out a solution. Lena also excels at predicting—and preventing—potential problems.”

“I have come to depend on Lena’s insight and knowledge of Mount Zion and appreciate her skill, knowledge of the ins and outs of the hospital, and ability to work with faculty and staff at every level: campus, medical center, clinical, and research,” added Administrative Director Cathy Garzio.

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### Surbeck Young Investigator Awards 2014 *(continued from page 61)*

medical school and a one-year surgical internship at the University of California, San Diego. Kansagra is continuing his training as a fellow in Diagnostic and Interventional Neuroradiology at Mallinckrodt Institute of Radiology in St. Louis, MO.

*The Margaret Hart Surbeck Laboratory of Advanced Imaging is dedicated to advancing imaging techniques for biological and medical applications. The Surbeck Young Investigator Awards are funded through the INDNJCFoundation.*



## Department Honors Isbandi and Wise for Excellence



Markim Isbandi, RT, 2013 Lanna Lee honoree.

The 2013 Holiday Party was the occasion to honor two outstanding members of the Department of Radiology and Biomedical Imaging staff. Markim Isbandi, RT, received the annual Lanna Lee Award and Brent Wise received the Richard A. Sollitto Award.

### **Outstanding Technologist Earns Lanna Lee Award**

Professionalism, caring and technology are equally important when Markim Isbandi, RT, works with patients in the Diagnostic Radiology Department at Moffitt Long. That approach to his work earned Isbandi the 2013 Lanna Lee Award, given annually to the department's outstanding technologist.

"Mark participates in every aspect in Diagnostic Radiology. He delivers excellent care and compassion to patients, and has a reputation for providing assistance to anyone in need," said Operations Director Kathy Knoerl.

Isbandi joined the department in 2008 and is known for his dedication and comprehensive knowledge of the diagnostic procedures, operating room, fluoroscopy, and portables. Over the years, he has gained a keen understanding of what needs to be done to provide outstanding patient care. He has excellent patient care and problem-solving skills. Isbandi's positive attitude and sharing of



Brent Wise received the Richard A. Sollitto award in 2013.

knowledge exemplify the qualities that the Lanna Lee Award represents.

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

### **Wise Receives the Sollitto Award**

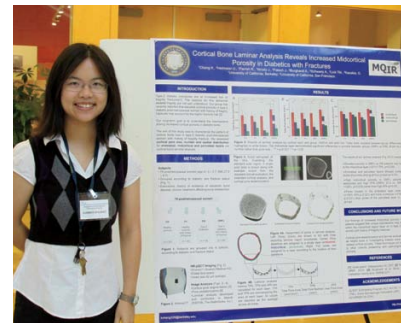
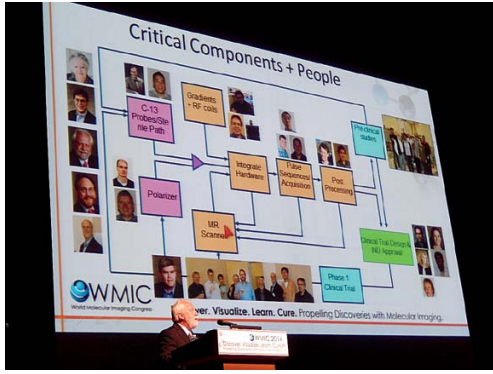
Brent Wise is a caring member of the support staff in the Women's Imaging Center at Mount Zion. He has worked for UCSF for 33 years and has always supported the patients, his co-workers, other departments, and the providers at Mount Zion. Unfailingly kind and considerate, Wise goes out of his way to assist patients. His primary goal is to provide the best service so that our patients have a wonderful experience at UCSF.

The Richard A. Sollitto Award honors Dr. Sollitto, a radiologist in the department who cared deeply for all of the department's staff and patients. It honors his memory and his dedication to patient care. Since his death in 2011, the award is presented annually to the outstanding administrative and support staff member.

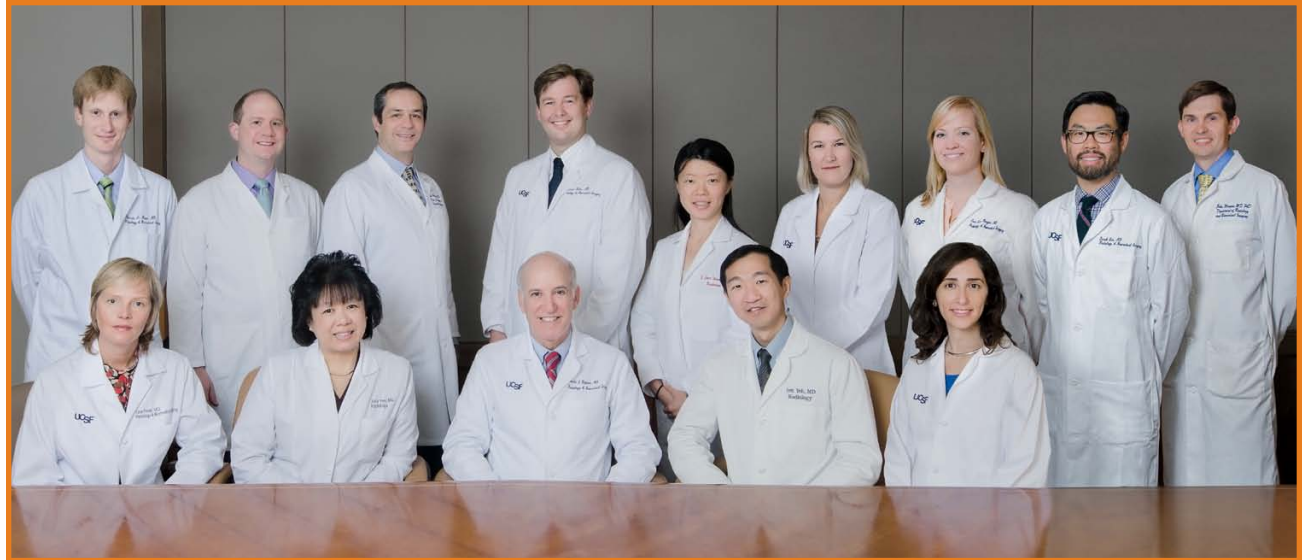
UCSF DOCUMENTS & MEDIA - MARCO SANCHEZ

# The Year in Pictures





## Research Directions 2014



### ABDOMINAL IMAGING

Ronald Zagoria, MD, Chief

#### Research Directions:

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

#### Recent Key Publications:

Childs DD, Clingan MJ, Zagoria RJ, Sirintrapun J, Tangtiang K, Anderson A, Leyendecker JR. In-Phase Signal Intensity Loss in Solid Renal Masses on Dual-Echo Gradient-Echo MRI: Association With Malignancy and Pathologic Classification. *AJR Am J Roentgenol*. 2014 Oct; 203(4):W421-8.

Hope TA, Ohliger MA, Qayyum A. MR Imaging of Diffuse Liver Disease: From Technique to Diagnosis. *Radiol Clin North Am*. 2014 Jul; 52(4):709-24.

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Miracle AC, Behr SC, Benhamida J, Gill RM, Yeh BC. Mesenteric Inflammatory Veno-Occlusive Disease: Radiographic and Histopathologic Evaluation of 2 Cases. *Abdom Imaging*. 2014 Feb; 39(1):18-24.

Sebro R, Aslam R, Muglia VF, Wang ZJ, Westphalen AC. Low Yield of Chemical Shift MRI for Characterization of Adrenal Lesions with High Attenuation Density on Unenhanced CT. *Abdom Imaging*. 2014 Aug 6.

Webb EM, Cotton JB, Kane K, Straus CM, Topp KS, Naeger DM. Teaching Point of Care Ultrasound Skills in Medical School: Keeping Radiology in the Driver's Seat. *Acad Radiol*. 2014 Jul; 21(7):893-901.

Zissen MH, Wang ZJ, Yee J, Aslam R, Monto A, Yeh BM. Contrast-Enhanced CT Quantification of the Hepatic Fractional Extracellular



Space: Correlation With Diffuse Liver Disease Severity. *AJR Am J Roentgenol.* 2013 Dec; 201(6):1204-10.

### ADVANCED IMAGING TECHNOLOGIES SPECIALIZED RESOURCE GROUP

Daniel B. Vigneron, PhD, Director

#### Research Directions:

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

Basic development => Translation => Optimization => Validation

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

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

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

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

#### Recent Key References:

James SL, Ahmed SK, Murphy S, Braden MR, Belabassi Y, Van-Brocklin HF, Thompson CM, Gerdes JM. A Novel Fluorine-18  $\beta$ -Fluoroethoxy Organophosphate Positron Emission Tomography Imaging Tracer Targeted to Central Nervous System Acetylcholinesterase. *ACS Chem Neurosci.* 2014 Jul 16; 5(7):519-24.

Han M, Larson PE, Liu J, Krug R; Depiction of Achilles Tendon Microstructure in vivo Using High-Resolution 3-Dimensional Ultra-short Echo-Time Magnetic Resonance Imaging at 7 T.; *Investigative Radiology*; 2014

Huang SY, Bolch WE, Lee C, Van Brocklin HF, Pampaloni MH, Hawkins RA, Sznawajs A, DuBois SG, Matthay KK, Seo Y. Patient-Specific Dosimetry Using Pretherapy [ $^{124}$ I]m-iodobenzylguanidine ([ $^{124}$ I]mIBG) Dynamic PET/CT Imaging Before [ $^{131}$ I]mIBG Targeted Radionuclide Therapy for Neuroblastoma. *Mol Imaging Biol.* 2014 Aug 22. [Epub]

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Pang Y, Yu B, Vigneron DB, Zhang X. Quadrature Transmit Array Design Using Single-Feed Circularly Polarized Patch Antenna For Parallel Transmission In MR Imaging. *Quant Imaging Med Surg.* 2014 Feb; 4(1):11-8.

Seo Y, Jiang H, Franc BL. Preclinical SPECT and SPECT/CT. *Recent Results Cancer Res.* 2013; 187:193-220.

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von Morze C, Bok RA, Reed GD, Ardenkjaer-Larsen JH, Kurhanewicz J, Vigneron DB. Simultaneous multiagent hyperpolarized ( $^{13}$ C) perfusion imaging. *Magn Reson Med.* 2013 Dec 31.



### BODY IMAGING RESEARCH INTEREST GROUP

John Kurhanewicz, PhD, Co-Director

Z. Jane Wang, MD, Co-Director

#### Research Directions:

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

#### Recent Key References:

Carroll V, Michel BW, Blecha J, VanBrocklin H, Keshari K, Wilson D, Chang CJ. A Boronate-Caged [(18)F]FLT Probe for Hydrogen Peroxide Detection Using Positron Emission Tomography. *J Am Chem Soc.* 2014 Oct 13. [Epub]

Childs DD, Clingan MJ, Zagoria RJ, Sirintrapun J, Tangtiang K, Anderson A, Leyendecker JR. In-Phase Signal Intensity Loss in Solid Renal Masses on Dual-Echo Gradient-Echo MRI: Association With Malignancy and Pathologic Classification. *AJR Am J Roentgenol.* 2014 Oct;203(4):W421-8.

Doran MG, Spratt DE, Wongvipat J, Ulmert D, Carver BS, Sawyers CL, Evans MJ. Cabozantinib Resolves Bone Scans in Tumor-naïve Mice Harboring Skeletal Injuries. *Mol Imaging.* 2014 Sep 1;13(0):1-5.

Keshari KR, Wilson DM, Sai V, Bok R, Jen KY, Larson P, Van Criekinge M, Kurhanewicz J, Wang ZJ. Non-invasive *in vivo* Imaging of Diabetes-Induced Renal Oxidative Stress and Response to Therapy Using Hyperpolarized <sup>13</sup>C Dehydroascorbate Magnetic Resonance. *Diabetes.* 2014 Sep 3. [Epub]

Korn N, Kurhanewicz J, Banerjee S, Starobinets O, Saritas E, Noworolski SM. Reduced-FOV Excitation Decreases Susceptibility Artifact in Diffusion-Weighted MRI with Endorectal Coil for Prostate Cancer Detection. *Magn Reson Im.* 2014 Sept 5. [Epub].

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

Wang AS, Lodi A, Rivera LB, Izquierdo-Garcia JL, Firpo MA, Mulvihill SJ, Tempero MA, Bergers G, Ronen SM. HR-MAS MRS of the Pancreas Reveals Reduced Lipid and Elevated Lactate and Taurine Associated with Early Pancreatic Cancer. *NMR Biomed.* 2014 Sep 9. [Epub]

## BRAIN RESEARCH INTEREST GROUP

Sarah Nelson, PhD, Director

Srikantan Nagarajan, PhD, Co-Director

### Research Directions:

Our specific mission is to map and analyze brain structure, activity, metabolism, connectivity and function in health and disease, and to identify biochemical, physiological and anatomical correlates of behavior in health and in disease. The scope of research conducted by the Brain RIG encompasses all aspects of brain-related inquiry, including the development of state-of-the-art brain imaging techniques.

The evaluation of patients with brain tumors is a major focus for applying these technologies. Key strategies that are being used to understand the underlying mechanisms of response to therapy and malignant transformation include analyzing the relationship between ex vivo histological, genomic and metabolic properties of image-guided tissue samples and investigation of specific hypotheses using in vivo studies of cell and pre-clinical model systems.

Other critical focus areas that form the basis for collaborative research are to understand the relationship between brain and behavior in a wide range of neurological and psychiatric diseases, to integrate information from molecules to mind, and to translate advances in neuroimaging methodology to the clinic.

### Selected Key References:

Bollen AW, Gustafson WC, Charron E, Weiss WA, Smirnov IV, Song JS, Olshen AB, Cha S, Zhao Y, Moore RA, Mungall AJ, Jones SJ, Hirst M, Marra MA, Saito N, Aburatani H, Mukasa A, Berger MS,

Chang SM, Taylor BS, Costello JF. Mutational Analysis Reveals The Origin And Therapy-Driven Evolution of Recurrent Glioma. *Science*. 2014 Jan 10; 343(6167):189-93.

Barajas RF, Hess CP, Phillips JJ, Von Morze CJ, Yu JP, Chang SM, Nelson SJ, McDermott MW, Berger MS, Cha S. Super-resolution Track Density Imaging of Glioblastoma: Histopathologic Correlation. *AJNR Am J Neuroradiol*. 2013 Jul; 34(7):1319-25.

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Johnson BE, Mazor T, Hong C, Barnes M, Aihara K, McLean CY, Fouse SD, Yamamoto S, Ueda H, Tatsuno K, Asthana S, Jalbert LE, Nelson SJ, Krieg SM, Tarapore PE, Picht T, Tanigawa N, Houde J, Sollmann N, Meyer B, Vajkoczy P, Berger MS, Ringel F, Nagarajan S. Optimal Timing of Pulse Onset for Language Mapping with Navigated Repetitive Transcranial Magnetic Stimulation. *Neuroimage*. 2014 Jun 17; 100C:219-236.

Subramaniam K, Luks TL, Garrett C, Chung C, Fisher M, Nagarajan S, Vinogradov S. Intensive Cognitive Training in Schizophrenia Enhances Working Memory and Associated Prefrontal Cortical Efficiency in a Manner that Drives Long-Term Functional Gains. *Neuroimage*. 2014 Oct; 99:281-92.

Owen JP, Chang YS, Pojman NJ, Bukshpun P, Wakahiro ML, Marco EJ, Berman JI, Spiro JE, Chung WK, Buckner RL, Roberts TP, Nagarajan SS, Sherr EH, Mukherjee P; Simons VIP Consortium. Aberrant White Matter Microstructure in children with 16p11.2 deletions. *J Neurosci*. 2014 Apr 30;34(18):6214-23.





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**BREAST CANCER RESEARCH INTEREST GROUP**

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

**Research Directions:**

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

Our major research areas include:

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

- Quantitative mammographic breast density measurement for breast cancer risk assessment
- MRI-directed tissue biopsy for radiologic-pathologic correlation of imaging and molecular biomarkers
- MRI measurement of breast density and tissue composition

**Recent Key References:**

Aliu SO, Jones EF, Azziz A, Kornak J, Wilmes LJ, Newitt DC, Suzuki SA, Klifa C, Gibbs J, Proctor EC, Joe BN, Hylton NM. Repeatability of Quantitative MRI Measurements in Normal Breast Tissue. *Transl Oncol.* 2014 Feb; 7(1):130-7.

Drukker K, Duewer F, Giger ML, Malkov S, Flowers CI, Joe B, Kerlikowske K, Drukteinis JS, Li H, Shepherd JA. Mammographic Quantitative Image Analysis and Biologic Image Composition for Breast Lesion Characterization and Classification. *Med Phys.* 2014 Mar; 41(3):031915.

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pression in Breast Cancer: A Systematic Review and Meta-Analysis. *Cancer Epidemiol Biomarkers Prev.* 2014 Aug; 23(8):1464-83.

Newitt DC, Aliu SO, Witcomb N, Sela G, Kornak J, Esserman L, Hylton NM. Real-Time Measurement of Functional Tumor Volume by MRI to Assess Treatment Response in Breast Cancer Neoadjuvant Clinical Trials: Validation of the Aegis SER Software Platform. *Transl Oncol.* 2014 Feb; 7(1):94-100.

Wisner DJ, Rogers N, Deshpande VS, Newitt DN, Laub GA, Porter DA, Kornak J, Joe BN, Hylton NM. High-resolution Diffusion-Weighted Imaging for the Separation of Benign from Malignant BI-RADS 4/5 Lesions Found on Breast MRI at 3T. *J Magn Reson Imaging.* 2014 Sep; 40(3):674-81.

## CARDIAC AND PULMONARY IMAGING

Brett M. Elicker, MD, Chief

### Research Directions:

- Cardiac CT angiography (CTA)
  - CTA assessment of coronary allograft vasculopathy after heart transplantation
  - Use of cardiac CTA for pre-surgical clearance
  - Use of cardiac CTA for definitive emergency room evaluation of atypical chest pain
  - Evaluation of coronary atherosclerosis in patients with HIV infection
- Cardiac CT
  - Evaluation of pulmonary venous anatomy in atrial fibrillation
  - Characterization of myocardial ischemic injury by contrast enhanced MRI and CT

- Chest CT/High-resolution CT
  - High-resolution CT 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
  - T1 mapping techniques for assessment of pulmonary hypertension cardiomyopathy

### Recent Key References:

Boiselle PM, Bremerich J, de Roos A, Greenberg SB, Ordovas K. Expert Opinion: Computed Tomography Versus Magnetic Resonance Imaging for Young Adults with Congenital Heart Disease. *J Thorac Imaging.* 2013 Nov; 28(6):331.

Hope MD, Sigovan M, Wrenn SJ, Saloner D, Dyverfeldt P. MRI Hemodynamic Markers of Progressive Bicuspid Aortic Valve-Related Aortic Disease. *J Magn Reson Imaging.* 2013 Oct 29.

Kohi MP, Ordovas KG, Naeger DM, Meadows AK, Foster E, Higgins CB. CMR Assessment of Right Ventricular Function in Patients with Combined Pulmonary Stenosis and Insufficiency after Correction of Tetralogy of Fallot. *Acta Radiol.* 2013 Dec 1; 54(10):1132-7.



UCSF DOCUMENTS & MEDIA - MARCO SANCHEZ

Ley B, Elicker BM, Hartman TE, Ryerson CJ, Vittinghoff E, Ryu JH, Lee JS, Jones KD, Richeldi L, King TE Jr, Collard HR. Idiopathic Pulmonary Fibrosis: CT and Risk of Death. *Radiology*. 2014 Jun 12;130216. [Epub ahead of print] PubMed PMID: 24927326.

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## CARDIOVASCULAR RESEARCH INTEREST GROUP

Karen Ordovás, MD, Co-Director

David Saloner, PhD, Co-Director

### Research Directions:

The Cardiovascular RIG aims to provide leadership to the Radiology community in developing and implementing state-of-the-art methods for providing early diagnosis and improved outcomes for patients suffering from cardiovascular diseases.

The CVRIG works closely with physician/scientists from other disciplines to develop and evaluate methods that include numerical modeling, physical *in vitro* models, and animal and human models of cardiovascular disease.

The combination of these elements, together with a program for educating and training practitioners and scientists, will provide measurable benefits to patients. In summary, our mission is to:

- Use state-of-the-art imaging for understanding the etiology of multiple cardiovascular diseases
- Investigate the scientific basis for new imaging modalities and their applications

- Apply cardiovascular imaging modalities to evaluate the physiologic, pharmacologic, and molecular basis of disease
- Develop tools for early detection of cardiovascular diseases
- Assess the role of cardiac imaging to predict cardiovascular outcomes to reduce overall and cardiac-related mortality

### Recent Key References:

Alhassen F, Nguyen N, Bains S, Gould RG, Seo Y, Bacharach SL, Song X, Shao L, Gullberg GT, Aparici CM. Myocardial Blood Flow Measurement with a Conventional Dual-Head SPECT/CT with Spatiotemporal Iterative Reconstructions - a Clinical Feasibility Study. *Am J Nucl Med Mol Imaging*. 2013; 4(1):53-9.

Burriss NS, Sigovan M, Knauer HA, Tseng EE, Saloner D, Hope MD. Systolic Flow Displacement Correlates With Future Ascending Aortic Growth in Patients With Bicuspid Aortic Valves Undergoing Magnetic Resonance Surveillance. *Invest Radiol*. 2014 Apr 30.

Genet M, Lee LC, Nguyen R, Haraldsson H, Acevedo-Bolton G, Zhang Z, Ge L, Ordovas K, Kozerke S, Guccione JM. Distribution of Normal Human Left Ventricular Myofiber Stress at End-Diastole and End-Systole—A Target For In Silico Design of Heart Failure Treatments. *J Appl Physiol*. 2014 May 29.

Haraldsson H, Hope M, Acevedo-Bolton G, Tseng E, Zhong X, Epstein FH, Ge L, Saloner D. Feasibility of Asymmetric Stretch Assessment in the Ascending Aortic Wall with DENSE Cardiovascular Magnetic Resonance. *J Cardiovasc Magn Reson*. 2014; 16(1):6.

Liu J, Dyverfeldt P, Acevedo-Bolton G, Hope M, Saloner D. Highly Accelerated Aortic 4D Flow MR Imaging with Variable-Density Random Undersampling. *Magn Reson Imaging*. 2014 May 17.





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## INTERVENTIONAL RADIOLOGY

Robert K. Kerlan, Jr., MD, Chief

### Research Directions:

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

### Recent Key References:

Alshehri A, Emil S, Laberge JM, Elkady S, Blumenkrantz M, Mayrand S, Morinville V, Nguyen VH. Lower Esophageal Sphincter Augmentation By Endoscopic Injection of Dextranomer Hyaluronic

Acid Copolymer in a Porcine Gastroesophageal Reflux Disease Model. *J Pediatr Surg.* 2014 Sep; 49(9):1353-9.

Burke C, Taylor AG, Ring EJ, Kerlan RK. Creation of a Percutaneous Mesocaval Shunt to Control Variceal Bleeding in a Child. *Pediatr Radiol.* 2013 Sep; 43(9):1218-20.

Kohi MP, Agarwal VK, Naeger DM, Taylor AG, Kolli KP, Fidelman N, LaBerge JM, Kerlan RK Jr. The Inferior Emissary Vein: A Reliable Landmark For Right Adrenal Vein Sampling. *Acta Radiol.* 2014 Mar 28. [Epub]

Kohi MP, Naeger DM, Lorenson MJ, Taylor AG, Kolli KP, Fidelman N, Kerlan RK. Hook, Line, and Sinker: Hook Wire Localization of a Retained Suture Needle in the Perineum. *J Vasc Interv Radiol.* 2014 Sep; 25(9):1479-80.

Fidelman N, Kerlan RK, Hawkins RA, Taylor AG, Kohi MP, Kolli KP, Bergsland EK, Kelley RK, Ko AH, Korn WM, McWhirter RM, Luan J, Venook AP. (90)Y Glass Microspheres for the Treatment of Unresectable Metastatic Liver Disease from Chemotherapy-Refractory Gastrointestinal Cancers: A Pilot Study. *J Gastrointest Cancer.* 2014 Jun; 45(2):168-80.

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### IMAGE-GUIDED SURGERY SPECIALIZED RESOURCE GROUP

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

#### Research Directions:

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

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

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

#### Recent Key References:

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

Jablonowski R, Wilson MW, Joudi N, Hetts SW, Saeed M. Three-dimensional MRI Assessments of Patchy and Large Myocardial Infarction in Beating and Nonbeating Swine Hearts: Validation with Microscopy. *Acad Radiol*. 2014 Aug; 21(8):1048-55.

Losey AD, Lillaney P, Martin AJ, Halbach VV, Cooke DL, Dowd CF, Higashida RT, Saloner DA, Wilson MW, Saeed M, Hetts SW. Safety of Retained Microcatheters: An Evaluation of Radiofrequency Heating in Endovascular Microcatheters with Nitinol, Tungsten, And Polyetheretherketone Braiding at 1.5 T and 3 T. *J Neurointerv Surg*. 2014 May 1; 6(4):314-9.

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Sincic RS, Caton CJ, Lillaney P, Goodfriend S, Ni J, Martin AJ, Losey AD, Shah N, Yee EJ, Evans L, Malba V, Bernhardt AF, Settecase F, Cooke DL, Saeed M, Wilson MW, Hetts SW. System Architecture for a Magnetically Guided Endovascular Microcatheter. *Biomed Microdevices*. 2014 Feb; 16(1):97-106.

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## MARGARET HART SURBECK LABORATORY OF ADVANCED IMAGING

Sarah J. Nelson, PhD, Director

Daniel B. Vigneron, PhD, Associate Director

### Research Directions:

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

- New algorithms for reconstructing spatial and temporal responses of biological systems and quantifying the resultant multi-dimensional and multi-spectral images
- New strategies for designing high-frequency RF coils and coil arrays that address electromagnetic problems and computational electromagnetism in *in vivo* MR at high fields using the FDTD and other finite element methods
- Applications of novel RF coils designs for *in vivo* MRI and spectroscopy
- Implementing parallel imaging strategies for anatomic, vascular, and spectroscopic imaging sequences in the musculoskeletal system, prostate, and brain

- Dynamic contrast-enhanced and perfusion-weighted imaging Phase and susceptibility-weighted imaging
- High-resolution angiography of neurovascular disease
- Developing faster, more reliable methods to acquire and process diffusion MRI
- Integrating studies on the human scanners with *ex vivo* analyses of tissue samples using high-resolution magic angle spinning
- NMR spectroscopy
- Improving and translating 3T MR spectroscopy sequences for prostate and brain in routine clinical use
- Applying and developing high-resolution MRI, MR spectroscopy, and MR diffusion imaging techniques at 7T
- Developing hyperpolarized C-13 agents and integrating novel data acquisition and analysis procedures
- Applying hyperpolarized C-13 metabolic imaging in cell systems and pre-clinical models to evaluate cancer and other diseases
- Developing new methods for hyperpolarized C-13 metabolic imaging in patients

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

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## MUSCULOSKELETAL AND QUANTITATIVE IMAGING RESEARCH

Sharmila Majumdar, PhD, Director

Thomas M. Link, MD, PhD, Clinical Director

### Research Directions:

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

- Identification of biomarkers for degeneration in bone, cartilage, and inter-vertebral disc, and diseases such as osteoporosis, spinal disorders, and osteoarthritis.
- Improve musculoskeletal health by using Computed Tomography (CT), High Resolution Peripheral Quantitative CT (HR-pQCT) and Positron Emission Tomography (PET)/CT imaging to study risk factors for age-related fractures, to quantify deterioration of bone structure and strength as result of aging and disease, and to analyze the anatomy and function of skeletal muscle in relation to mobility loss.
  - Effects of reduced weight-bearing on skeletal geometry, micro-structure, and strength
  - Effects of exercise on bone quality in HIV positive individuals



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- Mechanisms of increased cortical porosity in the peripheral skeleton
- Use of advanced image analysis techniques such as finite element modeling and voxel-based morphometry to study age-related bone loss and predict hip fracture.
- Use of CT to study muscle mass and fat infiltration as risk factors for hip fracture
- Development of acquisition and analysis methods to standardize scanning and analytic methods for multicenter studies in osteoporosis and sarcopenia
- Development of PET/CT to study protein synthesis in skeletal muscle
- Magnetic Resonance (MR) Imaging and Spectroscopy methods for characterizing muscle and bone in diabetes, HIV disease, and other diseases.
  - Bone marrow fat quantification in the proximal femur and spine using high-resolution water-fat imaging, and the relationship of marrow adiposity to bone quantity and quality.
  - Fat infiltration in the rotator cuff muscles as a predictor of surgical outcome
- Detection of early joint degeneration using quantitative metrics (T1ρ and T2), and radiological grading methods in osteoarthritis of the knee and hip and correlating them with biomechanical function, biochemical changes, clinical findings, and function.
  - Contact mechanics, neuromuscular control, and cartilage composition in knee OA
  - Changes in knee contact mechanics and cartilage composition following meniscectomy
  - Characterization of cartilage using MR and kinematics in hip osteoarthritis
  - Running biomechanics and overuse injuries of the lower extremity
  - Development of osteoarthritis in anterior cruciate ligament (ACL)-injured and reconstructed knees
  - Investigating the impact of physical activity, obesity, weight loss and gain on longitudinal development of cartilage and meniscal degeneration
- *In vivo* MR Imaging in the presence of metal implants
- MRI temperature measurements of bone during MR guided focused ultrasound
- Multimodality imaging (MRI and HR-pQCT) and hyperpolarized <sup>13</sup>C MRI of rheumatoid arthritis
- Radiation dose reduction in CT

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## MUSCULOSKELETAL RADIOLOGY

Thomas M. Link, MD, PhD, Chief

### Research Directions:

Imaging of Osteoarthritis and Cartilage

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

Bone Marrow Imaging

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



#### Osteoporosis Imaging

- Evaluating insufficiency fractures of the pelvis, CT vs. MRI
- Contrast-enhanced, multi-slice-spiral CT for assessing bone density and structure
- Diabetic bone disease: cortical porosity and increase in fracture risk
- Imaging of the Shoulder
- Optimizing MRI for visualizing metal-on-metal surface replacements
- Evaluating fatty infiltration of muscles of the rotator cuff
- Imaging of the Spine
- Imaging at 1.5T and 3T
- Clinical implications of lumbosacral segmentation abnormalities

#### MR Arthrography

- Evaluating the complications of MR arthrography

#### High-field MRI for musculoskeletal applications

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

#### New MRI Techniques

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

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## NEURO INTERVENTIONAL RADIOLOGY

Randall Higashida, MD, Chief

### Research Directions:

Advances in the field of Neuro Interventional Radiology require the constant development of new skills and techniques, and the Neuro Interventional Radiology researchers within the UCSF Department of Radiology and Biomedical Imaging have been involved in designing, conducting, and publishing research regarding current trends and techniques for patient care. In particular, we are focused on developing new and innovative techniques to treat a variety of neurovascular disorders including aneurysms, vascular malformations, tumors, and vasospasm in animal models and in active clinical practice within the interventional neurovascular radiology section at UCSF.

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

### Recent Key References:

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## NEURODEGENERATIVE DISEASES RESEARCH INTEREST GROUP

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

### Research Directions:

Studying the causes and effects of neurodegenerative and psychiatric disorders, using MRI as a surrogate marker

Developing powerful, new brain MR techniques for early detection, improved diagnosis, and assessment of therapeutic interventions of neurodegenerative and psychiatric disorders

Developing more powerful multimodal brain image processing and multivariate statistical imaging analysis techniques

Highlights include:

- Ultra-high resolution structural MRI
- Diffusion spectrum imaging
- Dynamic, arterial-spin-labeling imaging
- Susceptibility-weighted imaging
- Spectroscopic imaging and j-modulated spectroscopy
- Bayesian image reconstruction
- Multivariate image analysis methods
- MRI protocols and processing pipelines for multicenter trials
- Standards for imaging neurodegenerative diseases that can be transferred into clinical practice and multi-center clinical trials

### Recent Key References:

Chang YS, Owen JP, Desai SS, Hill SS, Arnett AB, Harris J, Marco EJ, Mukherjee P. Autism and Sensory Processing Disorders: Shared White Matter Disruption in Sensory Pathways But Divergent Connectivity in Social-Emotional Pathways. *PLoS One*. 2014; 9(7):e103038.

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## NEURORADIOLOGY

William P. Dillon, MD, Chief

### Research Directions:

Neuropediatrics

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

Traumatic Brain Injury

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

Cardiovascular Disease and Stroke

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

Brain Tumors

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

Head and Neck

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



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### 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

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### NUCLEAR MEDICINE

Miguel Hernandez Pampaloni, MD, PhD, Chief

### Research Directions:

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





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Koc G, Courtier JL, Phelps A, Marcovici PA, MacKenzie JD. Computed Tomography Depiction of Small Pediatric Vessels with Model-Based Iterative Reconstruction. *Pediatr Radiol.* 2014 Jul; 44(7):787-94.

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Effects of Treatment Observed on Subsequent Imaging. *Pediatr Rheumatol Online J.* 2014; 12:25.

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**RADIOLOGY OUTCOMES RESEARCH LABORATORY**

Rebecca Smith-Bindman, Director

**Research Directions:**

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

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



- Engage healthcare providers in purposeful quality initiatives that have an immediate positive impact on the healthcare system and patient safety.

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

## Recent Key References:

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## 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 extremities
- Exploring MR sequences before and after gadolinium for focal hepatic lesions
- Neutral versus positive oral contrast in abdominal imaging
- Evaluating and maintaining atypical dialysis access grafts and fistulas
- Outcomes of transcatheter embolization for treatment of hemorrhagic complications of pregnancy termination



- Evaluating evolving techniques for transcatheter embolization for pelvic trauma
- Magnetic catheter manipulation in the MRI environment
- Proliferation of ultrasound in underdeveloped countries
- Global health care initiatives
- Internet applications in radiology
- Evaluating patterns of infection by atypical mycobacteria
- Evaluating HRCT features of interstitial lung disease in the setting of hypersensitivity pneumonitis
- Imaging and computer-aided assessment of traumatic brain injury
- Optimizing hepatic MRI and CT imaging parameters
- Transcatheter treatment of pelvic hemorrhage: post-traumatic, post-partum, and post-abortion.

#### Recent Key References:

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#### 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



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UCSF DOCUMENTS & MEDIA - MARCO SANCHEZ

- Prospective, randomized trial of repair of fetal myelomeningocele
- Prospective, randomized trial for selective ablation of connecting vessels in twin transfusion syndrome

**Recent Key References:**

Burger IM, Filly RA. Overlapping Sutures: a New Sign of a Marked Pressure Effect in Twin-Twin Transfusion Syndrome. *J Ultrasound Med.* 2014 Mar; 33(3):547-9.

Derderian SC, Iqbal CW, Goldstein R, Lee H, Hirose S. Fetoscopic approach to amniotic band syndrome. *J Pediatr Surg.* 2014 Feb;49(2):359-62.

Derderian SC, Trivedi S, Farrell J, Keller RL, Rand L, Goldstein R, Feldstein VA, Hirose S, MacKenzie TC. Outcomes of Fetal Intervention for Primary Hydrothorax. *J Pediatr Surg.* 2014 Jun; 49(6):900-4.

Hu M, Poder L, Filly RA. Impact of New Society of Radiologists in Ultrasound Early First-Trimester Diagnostic Criteria for Nonviable Pregnancy. *J Ultrasound Med.* 2014 Sep; 33(9):1585-8.

Peyvandi S, Feldstein VA, Hirose S, Rand L, Brook MM, Moon-Grady AJ. Twin Reversed Arterial Perfusion Sequence Associated With Decreased Fetal Cerebral Vascular Impedance. *Ultrasound Obstet Gynecol.* 2014 Aug 26.[Epub]

Smith-Bindman R, Lebda P, Feldstein VA, Sellami D, Goldstein RB, Brasic N, Jin C, Kornak J. Risk of Thyroid Cancer based on Thyroid Ultrasound Imaging Characteristics: Results of a Population-Based Study. *JAMA Intern Med.* 2013 Oct 28; 173(19):1788-96.

**VETERANS AFFAIRS MEDICAL CENTER:  
DIAGNOSTIC RADIOLOGY**

Judy Yee, MD, Chief

**Research Directions:**

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

**Recent Key References:**

Aparici CM, Aslam R, Win AZ. Initial Experience of Utilizing Real-Time Intra-Procedural PET/CT Biopsy. *J Clin Imaging Sci.* 2014 Sep 29;4:54.

Hope TA, Fowler KJ, Sirlin CB, Costa EA, Yee J, Yeh BM, Heiken JP. Hepatobiliary Agents and Their Role in LI-RADS. *Abdom Imaging.* 2014 Oct 7. [Epub]

Jacobs MA, Weinstein S, Hope TA, Aslam R, Yee J, Coakley F. Neuroendocrine Tumors: Beyond the Abdomen. *J Comput Assist Tomogr.* 2014 Aug 26. [Epub]

Levine MS, Yee J. History, Evolution, and Current Status of Radiologic Imaging Tests for Colorectal Cancer Screening. *Radiology.* 2014 Nov;273(2S):S160-S180.



Schneider JG, Wang ZJ, Wang W, Yee J, Fu Y, Yeh BM. Patient-tailored scan delay for multiphase liver CT: improved scan quality and lesion conspicuity with a novel timing bolus method. *AJR Am J Roentgenol.* 2014 Feb;202(2):318-23.

Somsouk M, To'o K, Ali M, Vittinghoff E, Yeh BM, Yee J, Monto A, Inadomi JM, Aslam R. Esophageal Varices on Computed Tomography and Subsequent Variceal Hemorrhage. *Abdom Imaging.* 2014 Apr;39(2):251-6.

Weinstein S, Jordan E, Sajewicz A, Barajas R, Yee J. Prevalence and significance of perivascular soft tissue surrounding the hepatic artery after liver transplantation. *J Comput Assist Tomogr.* 2014 Mar-Apr;38(2):242-8.

**VETERANS AFFAIRS MEDICAL CENTER:  
CENTER FOR IMAGING OF NEURODEGENERATIVE  
DISEASES**

Pratik Mukherjee, MD, Director

**Research Directions:**

The Center for Imaging of Neurodegenerative Diseases (CIND) is a Research Center dedicated to studying the causes and effects of neurodegenerative and psychiatric disorders, using imaging such as MRI and PET. We currently have eight full-time faculty per-

forming studies in various fields, including imaging of Alzheimer's disease, Parkinson's disease, Depression, Post-traumatic Stress-Disorder, Gulf War Illness, and substance abuse. We also work on the development of novel powerful methods for brain MR, including spiral imaging and new approaches for processing and multivariate statistical analysis of brain imaging. CIND is located at the San Francisco VA Medical center and has a Bruker 4T MRI scanner, a Siemens 3T Skyra that was recently placed into operation and a 7T scanner.

Aside from studies at the CIND, faculty are also involved in large international imaging trials, such as the Alzheimer's Disease Neuroimaging Initiative (ADNI) and the Parkinson's Progression Marker Initiative (PPMI). CIND has also been involved in the development of new strategies for the prevention of neurodegenerative diseases. In addition, we have started an initiative, directed by Dr. Michael Weiner, The Brain Health Registry. The purpose of the BHR is to promote healthy brain function through the prevention of brain diseases, disorders and injuries that affect brain function in adults. This is the first neuroscience project to leverage online possibilities in this way and on this large scale.

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

- Ultra-high resolution structural MRI



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

## Recent Key References:

Chao LL, Kriger S, Buckley S, Ng P, Mueller SG. Effects of Low-Level Sarin And Cyclosarin Exposure On Hippocampal Subfields in Gulf War Veterans. *Neurotoxicology*. 2014 Sep; 44:263-9.

Durazzo TC, Meyerhoff DJ, Nixon SJ. Interactive Effects of Chronic Cigarette Smoking and Age on Hippocampal Volumes. *Drug Alcohol Depend*. 2013 Dec 1; 133(2):704-11.

Friedman EJ, Young K, Asif D, Jutla I, Liang M, Wilson S, Landsberg A, Schuff N. Directed Progression Brain Networks in Alzheimer's Disease: Properties and Classification. *Brain Connect*. 2014 Jun 5.

Friedman EJ, Landsberg AS, Owen JP, Li YO, Mukherjee P. Stochastic Geometric Network Models for Groups of Functional and Structural Connectomes. *Neuroimage*. 2014 Jul 24.

Liu X, Tosun D, Weiner MW, Schuff N. Locally Linear Embedding (LLE) for MRI Based Alzheimer's Disease Classification. *Neuroimage*. 2013 Dec; 83:148-57.

Mattsson N, Tosun D, Insel PS, Simonson A, Jack CR, Beckett LA, Donohue M, Jagust W, Schuff N, Weiner MW. Association of Brain Amyloid- $\beta$  with Cerebral Perfusion and Structure in Alzheimer's Disease and Mild Cognitive Impairment. *Brain*. 2014 May; 137(Pt 5):1550-61.

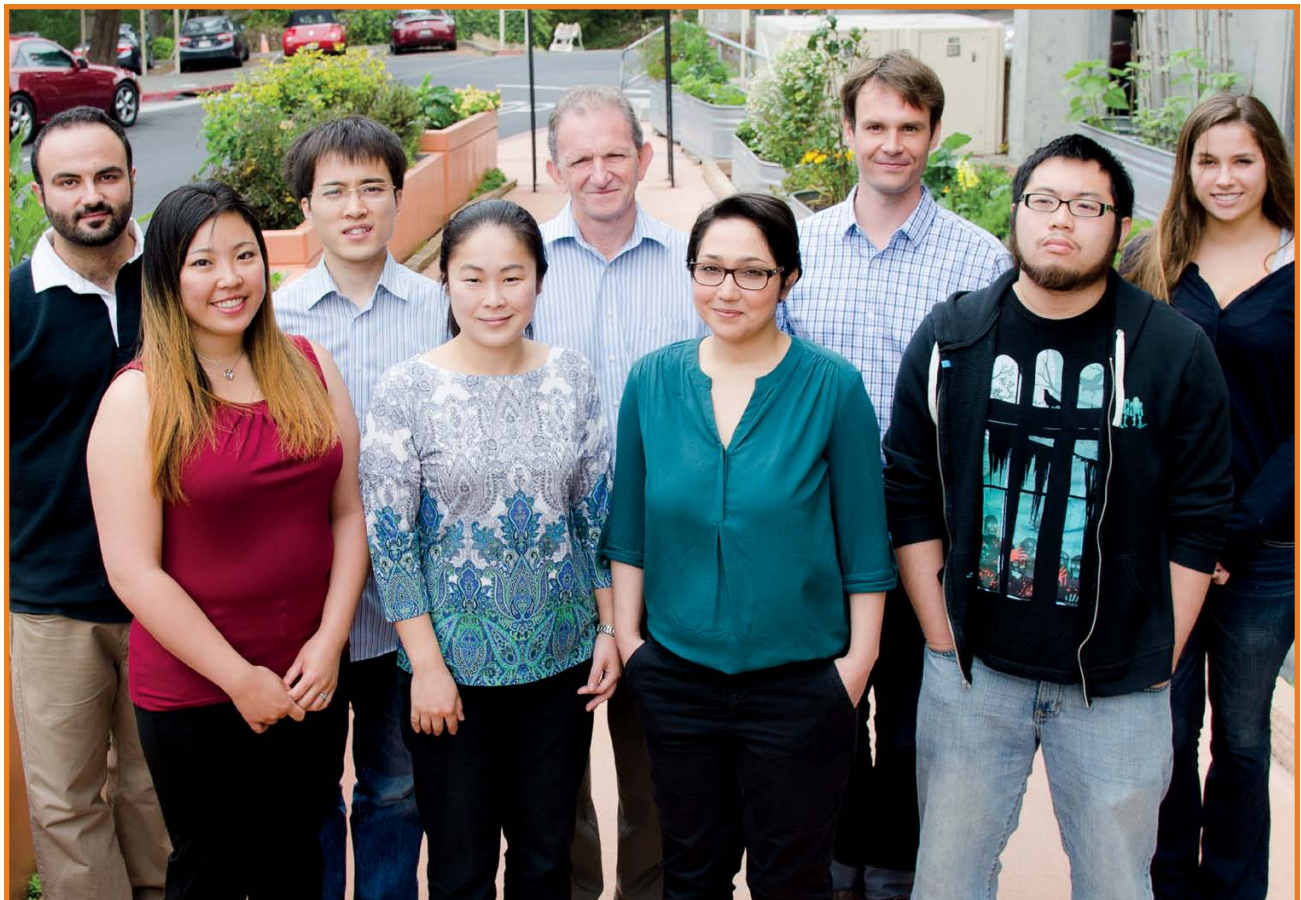
Meyerhoff DJ, Mon A, Metzler T, Neylan TC. Cortical Gamma-aminobutyric Acid and Glutamate in Posttraumatic Stress Disorder and their Relationships to Self-Reported Sleep Quality. *Sleep*. 2014; 37(5):893-900.

## 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



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- Development of patient-specific models for review of endovascular therapies
- Analysis of plaque vulnerability using patient-specific image based computational methods
- Development of 4-D MR velocimetry methods for determination in analyzing the impact of hemodynamics on vascular disease progression

**Recent Key References:**

Hope MD, Sigovan M, Wrenn SJ, Saloner D, Dyverfeldt P. MRI Hemodynamic Markers of Progressive Bicuspid Aortic Valve-Related Aortic Disease. *J Magn Reson Imaging*. 2014 Jul;40(1):140-5.

Liu J, Nguyen TD, Zhu Y, Spincemaille P, Prince MR, Weinsaft JW, Saloner D, Wang Y. Self-Gated Free-Breathing 3D Coronary CINE Imaging with Simultaneous Water and Fat Visualization. *PLoS One*. 2014; 9(2):e89315.

Liu J, Saloner D. Accelerated MRI with CIRCular Cartesian UnderSampling (CIRCUS): A Variable Density Cartesian Sampling Strategy for Compressed Sensing and Parallel Imaging. *Quant Imaging Med Surg*. 2014 Feb; 4(1):57-67.

Velez E, Boyer N, Acevedo-Bolton G, Hope MD, Boyle A. CT-Reconstructed Three-Dimensional Printed Models of the Right Subclavian Artery and Aorta Define Age-Related Changes and Facilitate Benchtop Catheter Testing. *J Invasive Cardiol*. 2014 Oct;26(10):E141-4.

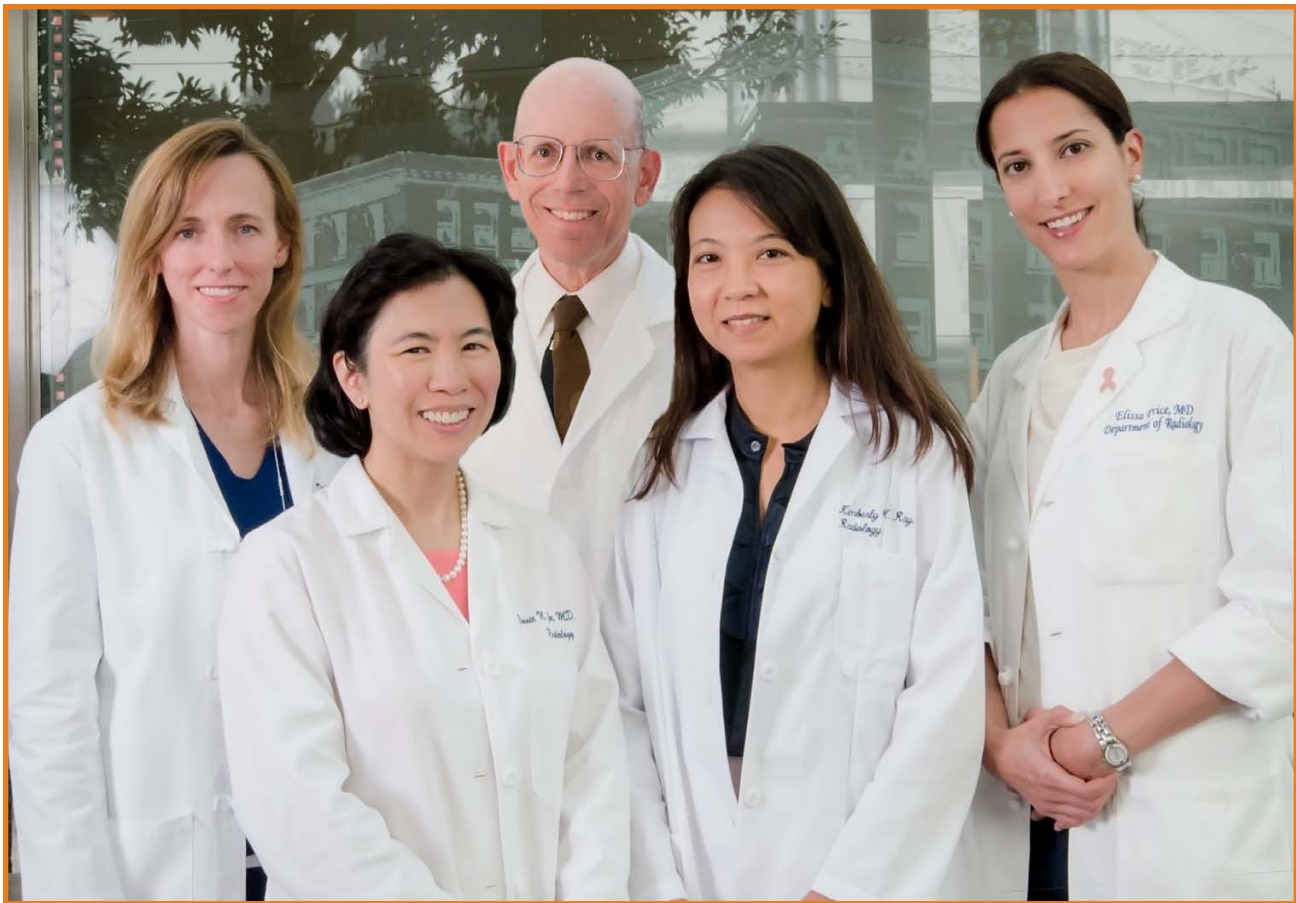
Walker JP, Nosova E, Sigovan M, Rapp J, Grenon MS, Owens CD, Gasper WJ, Saloner DA. Ferumoxytol Enhanced Magnetic Resonance Angiography is a Feasible Method for the Clinical Evaluation of Lower Extremity Arterial Disease. *Ann Vasc Surg*. 2014 Sep 27.

**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



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- 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:

Sickles EA, D'Orsi CJ. How Should Screening Breast US Be Audited? The BI-RADS Perspective. *Radiology*. 2014 Aug; 272(2):316-20.

Price ER, Brooks JD, Watson EJ, Brennan SB, Comen EA, Morris EA. The impact of bilateral salpingo-oophorectomy on breast MRI background parenchymal enhancement and fibroglandular tissue. *Eur Radiol*. 2014 Jan; 24(1):162-8.

Heller SL, Elias K, Gupta A, Greenwood HI, Mercado CL, Moy L. Outcome of high-risk lesions at MRI-guided 9-gauge vacuum- assisted breast biopsy. *AJR Am J Roentgenol*. 2014 Jan;202(1):237-45.

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



and Breast Density Notification Legislation. *Radiology*. 2013 Dec; 269(3):887-92.

Wisner DJ, Hwang ES, Chang CB, Tso HH, Joe BN, Lessing JN, Lu Y, Hylton NM. Features of Occult Invasion in Biopsy-Proven DCIS at Breast MRI. *Breast J*. 2013 Nov; 19(6):650-8.

# Grants and Fellowships

## Grants

### Spencer Behr, MD

- General Electric Company; Comparison of 18F FDG PET/CT to PET/MRI, 01/17/14–01/16/15, \$146,204.00

### Jesse Courtier, MD

- Society for Pediatric Radiology; Diffusion Tensor Imaging in Pediatric Renal Transplants: A Potential Non-Invasive Alternative to Biopsy, 07/01/14–06/30/15, \$10,000.00

### Michael J. Evans, PhD

- Memorial Sloan-Kettering Cancer Center; Annotating Onco-gene Status in Prostate Cancer with Zr-89-transferrin PET, 04/01/14–03/31/18, \$424,101.00
- Prostate Cancer Foundation; Exploiting the Genetics of Advanced Prostate Cancer for Tumor Detection and Therapy with Transferrin-Based Radionuclides, 05/20/13–05/20/16, \$225,000.00
- NIH National Cancer Institute; Noninvasive measurement of oncogenic signaling pathways with 89Zr-transferrin, 04/15/14–12/31/16, \$728,269.00

### Robert G. Gould, ScD

- Philips Healthcare; Patient dose indicator levels for common interventional radiographic procedures subsequent to implementation of image processing software (Clarity), 07/17/13–12/31/14, \$50,000.00

### Randall Hawkins, MD, PhD

- Sonogenix, Inc.; Evaluation of the Effect of Low Frequency Ultrasound (LOTUS) on Kidney Function in Chronic Kidney Disease, 12/01/13–10/30/16, \$140,043.00

### Steve W. Hetts, MD

- Microvention, Inc; Pivotal Study of the MicroVention, Inc. Flow Re-Direction Endoluminal Device Stent System in the Treatment of Wide-Necked Intracranial Artery Aneurysms, 02/10/14–12/31/16, \$360,588.00

### Thomas A. Hope, MD

- Society of Abdominal Radiology; Utility of combined Ga-68 DOTA-TATE PET and Eovist MRI utilizing PET/MR, 03/15/14–03/15/16, \$15,000.00

### Nola M. Hylton, PhD

- American College of Radiology; ACRIN 6691: Monitoring and Predicting Breast Cancer Neoadjuvant Chemotherapy Response Using Diffuse Optical, 07/01/13–02/28/14, \$5,000.00

### Maureen Kohi, MD

- Focused Ultrasound Surgery Foundation; Accelerated ultrasound ablation of uterine fibroids with MR guided vascular targeting A pilot study, 06/01/14–05/31/15, \$50,000.00

### Peder Larson, PhD

- UC Cancer Research Coordinating Committee; Rapid Measurement of Enzyme Conversion Rates in Liver Tumors with Hyperpolarized 13C MRI, 07/01/14–06/30/15, \$55,000.00
- NIH National Institute of Biomedical Imaging & Bioengineering; Hyperpolarized C-13 Diffusion MRI Measures of Cellular Transport and Metabolism, 09/17/14–05/31/18, \$2,000,000.00

### Xiaojuan Li, PhD

- Ferring Group; Quantifications of biochemical changes of synovial fluid and cartilage matrix in osteoarthritic knee after hyaluronic acid injection using novel MRI and NMR techniques, 12/10/13–12/10/16, \$163,533.00
- UCB Pharmacy, Inc.; Novel Imaging Markers for Rheumatoid Arthritis, 09/05/13–09/04/18, \$171,952.00

### Thomas Link, MD, PhD

- O.N. Diagnostics, LLC; Robust BCT for Clinical Use - Phase II, 05/06/14–04/30/17, \$146,150.00
- NIH National Institute Arthritis and Musculoskeletal and Skin Diseases; Impact of Weight loss on Knee Joint Biochemical and Structural Degeneration, 08/01/14–07/31/19, \$1,586,327.00

### Sharmila Majumdar, PhD

- GE Healthcare; Improved Quantitative and Real Time MR Imaging, 03/27/14–04/30/16, \$499,456.00
- GE Healthcare; PET/MR Technology Development, PET/MR Workflow and Visualization, PET/MR Prostate Cancer Imaging, Combined Inflammatory and Hemodynamic Assessment of Vascular Disease with PET/MRI, PET/MR Imaging of Glioma: Feasibility of Combined Single Modality Physiologic and Morphologic Imaging, and MR PET for Pediatric Disease, 04/02/14–04/30/16, \$1,260,144.00

### Alastair J. Martin, PhD

- MRI Interventions, Inc.; UCSF ClearPoint Training Course, 12/01/13–11/30/14, \$30,361.00
- MRI Interventions, Inc.; Technical Evaluation of Novel Hardware and Software Developments, 12/01/13–11/30/14, \$55,409.00
- MRI Interventions, Inc.; Optimized Methodology for Implantation of DBS Electrodes, 11/01/13–10/31/14, \$232,859.00

## Tara A. Morgan, MD

- Leidos Biomedical Research, Inc.; Transfer radiological imaging data from cases identified as being part of the Cancer Genome Atlas (TCGA), 05/22/14–05/21/15, \$4,500.00

## Susanne Mueller, MD

- Epilepsy Foundation; Brainstem atrophy: A SUDEP biomarker, 07/01/14–06/30/15, \$50,000.00

## Pratik Mukherjee, MD, PhD

- GE Healthcare; Advanced MRI Applications for Mild Traumatic Brain Injury - UCSF - GE - NFL, 07/01/14–07/01/15, \$548,333.00

## Srikantan S. Nagarajan, PhD

- NIH National Institute Deafness and Communication Disorders; Imaging sensorimotor adaptation and compensation in speech, 07/01/14–06/30/19, \$1,683,002.00
- National Science Foundation; Function of Auditory Feedback Processing During Speech, 09/15/13–06/30/17, \$530,000.00

## Sarah Nelson, PhD

- NIH National Cancer Institute; MR Metabolic Markers for Evaluation of Patients with Recurrent Glioma, 08/13/13–05/31/18, \$1,736,544.00

## Susan Noworolski, PhD

- Touro University; Lipogenesis, Lipoprotein Flux & CVD Risk: Role of Meal Composition & Frequency, 06/01/13–05/31/18, \$193,388.00

## Michael A. Ohliger, MD, PhD

- RSNA Research and Education Foundation; Non-invasive Monitoring of Liver Inflammation and Fibrosis, 07/01/14–06/30/16, \$150,000.00

## Anand S. Patel, MD

- SIR Foundation; ChemoFilter: A Novel Catheter Device to Enable High-Dose Chemotherapy Treatment, 10/01/13–04/01/14, \$5,000.00

## Vitaliy L. Rayz, PhD

- NIH National Heart, Lung and Blood Institute; Image-Based Numerical Predictions of Hemodynamics following Vascular Intervention, 09/03/13–05/31/17, \$1,553,861.00

## John A. Shepherd, PhD

- Amgen, Inc.; Appearance modeling of hip bone density and soft tissue composition for fracture discrimination, 09/29/14–09/29/16, \$95,000.00
- Cincinnati Children's Hospital Medical Center; Bone Mineral Accretion in Young Children, 10/01/13–07/31/14, \$108,141.00

## Rebecca Smith-Bindman, MD

- NIH National Cancer Institute; CT DOSE Collaboratory, 09/12/14–08/31/19, \$6,215,485.00

## Duygu Tosun-Turgut, PhD

- UC Davis; Determinants and Consequences of White Matter Degeneration in Alzheimer's Disease, 07/01/13–06/30/16, \$154,003.00

## Henry F. Vanbrocklin, PhD

- DOD US Army Medical Research Acquisition Activity; Development of a PET prostate specific membrane antigen imaging agent: Preclinical translation for future clinical application, 07/01/14–06/30/16, \$1,421,999.00

## Daniel B. Vigneron, PhD

- NIH National Cancer Institute; Translating HP 13C MRI as a Novel Paradigm for Assessing Drug Target Inhibition, 05/12/14–02/28/19, \$3,262,654.00

## Cornelius J. Von Morze, PhD

- NIH National Institute Diabetes and Digestive and Kidney; Molecular Imaging of Renal Transport and Metabolism using Hyperpolarized C-13 MRI, 04/01/14–03/31/19, \$820,108.00

## Michael Weiner, MD

- DOD; Effects of Traumatic Brain Injury and Post-Traumatic Stress Disorder on Alzheimer's Disease (AD) in Veterans with Mild Cognitive Impairment (MC) using the Alzheimer's Disease Neuroimaging Initiative (ADNI), 09/30/2013–09/26/2016, \$6,346,795.00
- DOD (subaward); Validating Biomarkers for PTSD, 04/01/2014–03/31/2015, \$177,851.00
- Janssen Pharmaceuticals, Inc.; Online Neuropsychological Test Validation Project with Imaging Pilot, 03/01/2014–02/28/2017, \$911,805.00

## Dorota J. Wisner, MD, PhD

- UC Irvine; Development of a Quantitative Tissue Optical Index of Breast Density for Prediction of Hormone Therapy Response, 03/01/14–11/30/15, \$21,038.00

## Fellowships

### Jacob D. Brown, MD, PhD

- RSNA Research and Education Foundation; Image-guided selective analgesia produced by intraganglionic injection of resiniferatoxin, 07/01/14–06/30/15, \$30,000.00

### Mai-Lan Ho, MD

- Society for Pediatric Radiology Research and Education Foundation; Characterization of Cerebro-Cerebellar Functional Connectivity in Preterm Infants, 07/01/14–06/30/15, \$30,000.00

### John-Paul Yu, MD, PhD

- RSNA Research and Education Foundation; Combined Biochemical, Genetic, and Metabolomic Efforts Towards Neuroimaging Schizophrenia and Psychiatric Disease, 07/01/14–06/30/15, \$50,000.00

## Department of Radiology and Biomedical Imaging Faculty

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Alexander R. Margulis Distinguished  
Professor

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Elizabeth A. Guillaumin Chair in  
Neuroradiology

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Vice-Chair, Informatics

#### Robert G. Gould, ScD

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Vice-Chair, Technology and Capital  
Projects

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Vice-Chair, Research

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**Maythem Saeed, PhD**

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**The Department of Radiology and Biomedical Imaging  
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who give back with a gift to the department.**



“When I joined the residency program in 1974, it was an incredibly fun and exciting time to be transitioning from fundamental radiology and to be working with the pioneers of CT and ultrasound at UCSF. Since then, I’ve continued to benefit from the extensive and excellent postgraduate education opportunities UCSF offers. I feel I am a member of an exclusive club that has experienced the best training available. I want to continue supporting that club.”

—*Jim DeMartini, MD, Residency '78*  
*California Advanced Imaging*  
*Marin County, California*



“Giving to the Margulis Society is a way of saying ‘thank you’ to a program that has contributed so much to my professional development. It’s also a way to stay connected with the department and ensure that future residents enjoy the same rich training that I experienced.”

—*Chloe Chhor, MD, Residency '08, Women's Imaging Fellowship '09*  
*Assistant Professor of Radiology*  
*NYU School of Medicine*



“In the '90s, I was the first radiology resident UCSF sent to Washington, D.C. to attend the American Institute for Radiologic Pathology, when it was called AFIP. It was a fantastic learning experience, where I met future colleagues and made friends with whom I still stay in touch. This was all made possible through the generous support of our alumni in the Margulis Society. I give to the Margulis Society to ensure that future residents will benefit from that legacy of outstanding training that sets our program apart.”

—*Mark Wilson, MD*  
*Resident '95, Interventional Fellow '96,*  
*Professor in Residence and Vice-Chair, UCSF*



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