

POSTDOCTORALRESEARCHFELLOWSHIPS

Advanced Techniques for Cancer Imaging and Detection

An NIH Training Program

Gary M. Glazer, M.D., Director

Department of Radiology

School of Medicine

Stanford University

Program Overview

The Department of Radiology at Stanford University is offering qualified individuals a unique research opportunity through our Advanced Techniques for Cancer Imaging and Detection Program. The goal of our program is to provide M.D. and Ph.D. research fellows with training in cancer-related imaging research. Fellows have the opportunity to work with our world-renowned faculty who are committed to sharing their knowledge and mentoring the future leaders in radiology.

This two-year program is funded by the National Institutes of Health and supports research in magnetic resonance imaging and spectroscopy using 1.5T, 3.0T, and 7T whole-body magnets; advanced CT imaging; computational modeling; visualization and image reconstruction; molecular imaging; and nanotechnology. Research fellows also have access to a fully equipped, state-of-the-art, small animal imaging suite that includes a 7T small animal magnet; a PET system; microCT; microSPECT/CT; ultrasound; bioluminescence; fluorescence; and cryomicrotome and cryomacrotome for autoradiography. Fellows also have access to whole-body patient imaging modalities, including CT multi-slice imaging, PET/CT, SPECT, ultrasound, and all other standard imaging systems. Imaging systems are located in multiple sites in the medical school including the Lucas Center, the main Radiology Department, the Comprehensive Cancer Center, the Blake Wilbur Outpatient Clinic, and the Grant building.

Our program allows basic scientists in medical imaging (Ph.D.s) and clinical scientists (M.D.s past residency) to collaborate in an unparalleled environment that combines medical imaging sciences, clinical sciences, a strong cancer focus, and an institutional commitment to training academic radiologists and basic scientists in imaging science.

Program Design & Requirements

Each fellow's research represents at least eighteen months of the training program and is supervised by a preceptor. The clinical exposure for the M.D. is six months and is supervised by the same preceptor who oversees the fellow's research. Both Ph.D. and M.D. fellows benefit from core courses, lectures, seminars, journal clubs, and weekly research and clinical conferences in radiology, radiological sciences, oncology, radiation oncology, cancer biology, molecular pharmacology, and biostatistics. All fellows have access to the wide variety of facilities in the Department of Radiology and campus community.

The program requires that research fellows audit the equivalent of more than a full-quarter course load (six classes) over the duration of the two-year program. In consultation with their preceptors, research fellows will plan their required coursework, which will vary according to their previous experience, from courses in the clinical sciences, cancer sciences, basic sciences, imaging/medical physics, biostatistics, and medical ethics. Fellows are also required to attend at least one conference per week, choosing from the many conferences, symposia, journal clubs, and other relevant activities that compose the academic life of the radiological sciences and related departments and programs. All fellows and their preceptors will be expected to attend quarterly dinners that include a lecture series focused on cutting-edge interdisciplinary research in cancer studies.

Faculty

Upon entering the program, trainee fellows will choose a short research project and identify an initial preceptor from among the group of basic and clinical research preceptors. After a four- to six-month orientation period, fellows will make a final selection of their research topic and their preceptor, who will work with them on the design of their training program and research project. Preceptors drawn from the Stanford Radiology and Radiation Oncology Departments include the following:

Christopher Beaulieu, M.D., Ph.D.
R. Kim Butts Pauly, Ph.D.
Xiaoyuan (Shawn) Chen, Ph.D.
Christopher Contag, Ph.D.
Bruce Daniel, M.D.
Sanjiv Sam Gambhir, M.D., Ph.D.
Gary M. Glazer, M.D.
Craig Levin, Ph.D.
Sylvia Plevritis, Ph.D.
Geoffrey Rubin, M.D.
F. Graham Sommer, M.D.
Daniel M. Spielman, Ph.D.
Lei Xing, Ph.D.

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Qualifications

The ideal candidates will be individuals who have received a Ph.D. or an M.D. degree. Ph.D. candidates must have completed their degree in physics, engineering, or an imaging-related field from an approved doctoral program within four years of acceptance to this training program. Experience in imaging is preferred. M.D. candidates must have completed at least two years in an approved radiology residency program.

The Stanford University Medical School is committed to increasing the representation of women and members of minority groups. All qualified candidates are encouraged to apply. In accordance with NIH regulations, applicants must be citizens, permanent residents, or naturalized citizens of the United States.

Application Materials

Applicants should send:

1. A curriculum vitae
2. Letters from three referees
3. A written statement no longer than 1,000 words (i.e., no more than four pages, double-spaced, with 12-point type) describing:
 - your research background as it relates to cancer imaging,
 - your current research project(s),
 - your career goals, and
 - your interest in this program (i.e., how this program fits into your research and career goals)

Although your statement must be brief, you should attempt to be as specific as possible. Address the imaging modalities, the body and disease areas, and/or the faculty and laboratory resources that are of particular relevance to your application. The application information will be used to evaluate which candidates will be able to make the most of the fellowship opportunity and thereby receive the greatest advantages from the program.

Send All Materials to:

Training Program Administrator
Richard M. Lucas Center for Imaging, Room P-162A
Radiological Sciences Laboratory
Department of Radiology
Stanford University School of Medicine
Stanford, CA 94305-5488

For Further Information: <http://rsl.stanford.edu/education/nci.html>

POSTDOCTORAL RESEARCH FELLOWSHIPS

Resources & Environment

The Department of Radiology at Stanford University has five 1.5T GE Signa MR systems, one 3T scanner, and one 7T high-field system. These imagers are maintained with software/hardware configurations that are as compatible as possible (currently LX) so that new and improved techniques developed on the full-time research machines can be rapidly transferred to the clinical imagers. In addition to the 1.5T, 3T, and 7T scanners, an open configuration 0.5T GE Signa SP System is sited in a surgical suite in the Hospital, in proximity to the inpatient MR scanners. This scanner has the “double doughnut” configuration for use in developing minimally invasive therapy procedures. <http://radiology.stanford.edu/>

The Radiological Sciences Laboratory (RSL), directed by Professor Gary Glover, Ph.D., is the major research arm of the Radiology Department at Stanford. The RSL is one of the few centers in the world with major centralized resources devoted to research in the radiological sciences for both basic and clinical scientists. There is an ethos in which research and clinical practice are integrally connected; the Radiology Department’s clinical faculty and the RSL’s scientific staff collaborate with and provide support for each other’s research endeavors. In this environment, researchers’ innovations in technologies and treatments are integrated into clinical practice rapidly and smoothly. The RSL also has close ties to many other academic departments and schools. Radiology Department faculty and students closely collaborate and are involved in a number of shared projects with the Departments of Bioengineering, Electrical Engineering (EE), Psychology, Psychiatry, Neurobiology, and Computer Science. For example, the RSL and EE groups have a common monthly scientific group meeting, which often numbers 50 or more participants and attracts many extramural attendees. <http://rsl.stanford.edu/>

The Richard M. Lucas Center for Imaging (“The Lucas Center”) houses the RSL, the offices for the Radiology Department chair, and over a dozen clinical and research faculty members and their complement of approximately 50 postdoctoral fellows and students. Magnet facilities in the Lucas Center include a 1.5T GE Signa whole-body research MR system, a GE 3T whole-body system with high-performance gradients, and a GE 7T whole-body MR system. Each whole-body suite is equipped with facilities for research in MRI and fMRI. In addition to a full range of whole-body MRI systems and CT development facilities, the Lucas Expansion, which opened in 2005, has added more than 20,000 square feet of research and office space. The Lucas Expansion is home to the only cyclotron for the production of positron emitting radionuclides on campus; radiochemistry facilities for radiopharmaceutical production; faculty office space for both RSL and MIPS faculty; and the technologically sophisticated Radiology Learning Center (RLC). http://rsl.stanford.edu/research/lucas_center.html

The 3D Medical Imaging Laboratory, codirected by Professors Sandy Napel, Ph.D., and Geoffrey Rubin, M.D., is located in the Lucas Center and is dedicated to the clinical and research applications of advanced computer graphics for the visualization of medical data. All devices are networked, and the laboratory is connected to the campus network backbone. Through this connection, the lab has access to data from all of our CT, MR, and networked US scanners as well as our 1.5 TB PACS tape library. The laboratory is the site of all of our clinical 3D work and is staffed by three full-time 3D technologists. <http://3dradiology.stanford.edu/>

The Magnetic Resonance Systems Research Laboratory (MRSRL) is directed by Professors Dwight Nishimura, Ph.D., and Albert Macovski, Ph.D., within the Department of Electrical Engineering and the Information Systems Laboratory and has approximately twenty students and fellows. MRSRL contains a sixth research system: a 1.5T MR scanner. <http://www-mrsrl.stanford.edu/>

The National Center for Advanced MR Technology (CAMRT) is an NIH program funded by the National Center for Research Resources (NCRR) with Dr. Glover as PI and other members of RSL and MRSRL as coinvestigators in six core areas. The CAMRT sponsors the development of novel MR imaging and spectroscopy technology; the collaboration of center scientists with extramural users; the support of users in the community; the dissemination of technology and information; and the training of students and others. One of the components of this center is devoted to fMRI development, with Dr. Glover as the core director. <http://rsl.stanford.edu/research/camrt.html>

The Blake Wilbur Outpatient Clinic is a clinical facility one block from the Stanford University Hospital and the Lucas Center entirely dedicated to outpatient medicine. The Radiology Department operates space for

outpatient imaging, including two GE 1.5T MR scanners, an independent console, a Siemens Somatom Plus-S CT scanner, three general radiology rooms, ultrasound, and mammography. The facility is networked via fiber optic cable for the routine transfer of imaging studies between the various facilities.

The Molecular Imaging Program at Stanford (MIPS), directed by Sanjiv Sam Gambhir, M.D., Ph.D., is an interdisciplinary program that brings together faculty from different disciplines to explore new methods of diagnosing diseases and monitoring patients through the development of novel molecular probes, instrumentation, assays for living subjects, and translation strategies for clinical imaging. The MIPS employs a multimodality approach by using imaging technologies such as positron emission tomography (PET), single photon emission computed tomography (SPECT), digital autoradiography, magnetic resonance imaging (MRI), magnetic resonance spectroscopy (MRS), optical bioluminescence, optical fluorescence, and ultrasound. <http://mips.stanford.edu/>

The In Vivo Cellular and Molecular Imaging Center at Stanford (ICMIC@Stanford) is an NIH program funded by the National Cancer Institute (NCI) and is led by Dr. Sam Gambhir. As one of only eight NCI-funded centers nationwide, the ICMIC is a unique program. The goal of the ICMIC@Stanford is to provide better links between preclinical models of cancer and the clinical management of cancer patients by novel research in multimodality molecular imaging. NCI trainees will have the opportunity to work with scientists and clinicians developing molecular imaging models, many of which will be used in the clinic to further patient treatment. Radiology molecular imaging labs can be found in several sites on the medical school campus with the main labs located in the Clark Center and the Lucas Expansion.

The Center for Cancer Nanotechnology Excellence Focused on Therapy Response (CCNE-TR) is also an NIH program funded by the NCI with Dr. Gambhir as PI. The CCNE-TR brings together scientists and physicians from six academic centers and three industry partners in a novel proposal to use nanotechnology for the benefit of cancer patient management. Faculty from Radiology, Bioengineering, Materials Science, Oncology, and numerous other departments across campus and across the country are involved in this project and provide wide-ranging opportunities for NCI trainees to focus on molecular imaging and nanotechnology as applied to diagnostics and therapy.

The Diagnostic Radiology Center (DRC) is located on the Veterans Affairs (VA) medical center campus approximately three miles from Stanford University and serves as a key portion of the radiology service at the VA. This facility has a state-of-the-art GE 1.5T Signa MRI scanner, one GE CT/i CT scanner, and another GE CT scanner currently being upgraded to GE's 64-slice, state-of-the-art model. A 3T MRI scanner and an additional 64-slice CT scanner are planned for the near future. A brand new GE integrated angiography/CT suite is presently being installed and will be the third such system in place in the U.S. Three Acuson Sequoia ultrasound machines are sited in the DRC, and the nuclear medicine division will be installing a GE Discovery PET/64-slice CT this year. The department is entirely filmless, utilizing a well-functioning PACS system that interfaces directly with a digital voice-recognition transcription system. All imaging modalities at the VA are connected via high-speed networks to reading stations throughout the hospital complex and to the other facilities described above.

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