SCHOOL OF MEDICINE

RADIOLOGY

Emeriti: (Professors) Herbert L. Abrams, Barton Lane, Gerald Friedland, David A. Goodwin, Henry H. Jones, Albert Macovski, I. Ross McDougall, Robert E. Mindelzun, William H. Northway, Lewis Wexler, Leslie M. Zatz

Chair: Gary M. Glazer

Professors: Scott W. Atlas, Richard A. Barth, Christopher F. Beaulieu, Sanjiv Sam Gambhir, Gary M. Glazer, Gary H. Glover, Michael L. Goris, Robert J. Herfkens, Debra M. Ikeda, R. Brooke Jeffrey, Ann Leung, Michael Marks, Michael Moseley, Sandy Napel, Matilde Nino-Murcia, Norbert J. Pelc, Geoffrey Rubin, George Segall, F. Graham Sommer

Associate Professors: Patrick D. Barnes, Francis Blankenberg, Bruce Daniel, Terry Desser, Huy M. Do, Nancy Fischbein, Dominik Fleischmann, Garry E. Gold, Lawrence Hofmann, Beverley Newman, Eric W. Olcott, Daniel M. Spielman, Daniel Y. Sze

Associate Professors (Research): Kim Butts-Pauly, Craig Levin, Sylvia Plevritis

Assistant Professors: Sandip Biswal, Frandics P. Chan, Nishita Kothary, William Kuo, Andrew Quon, Jiaanghong Rao, Justus Roos, Lewis Shin, Kathryn J. Stevens, Shreyas Vasanawala, Joseph Wu, Greg Zaharchuk

Assistant Professors (Research): Roland Bammer, Xiaoyuan Chen, Rebecca Fahrig, Samira Guccione, Brian Hargreaves, David Paik

Web Site: http://www-radiology.stanford.edu

Courses offered by the Department of Radiology are listed under the subject code RAD on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Radiology does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Undergraduates may also arrange individual research projects under the supervision of the department's faculty. This discipline focuses on the use of radiation, ultrasound, and magnetic resonance as diagnostic, therapeutic, and research tools. The fundamental and applied research within the department reflects this broad spectrum as it relates to anatomy, pathology, physiology, and interventional procedures. Original research and development of new clinical applications in medical imaging is supported within the Radiological Sciences Laboratory.

RADIOLOGY (RAD)

UNDERGRADUATE COURSES IN RADIOLOGY

RAD 72Q. Flouresence Imaging in Living Cells
(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Basic principles of fluorescent probes and their applications for live-cell imaging. Topics include: general classes of flourescent probes together with their fluorescence mechanisms; strategies and methods for live cell labeling and imaging of specific proteins. Examples of applications of fluorescence imaging are presented. Provides students first-hand experience in fluorescence imaging research, and exploration of cutting edge techniques. Readings include current reviews and key original articles.
2 units, Win (Staff)

RAD 101. Readings in Radiology Research
Prerequisite: consent of instructor.
1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

RAD 199. Undergraduate Research
Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.
1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

GRADUATE COURSES IN RADIOLOGY

RAD 200. Imaging Anatomy and Pathology
Supplements traditional disectional anatomy with modern cross-sectional imaging, and traditional examination of the cadaver with study of live subjects. Chest-abdominal and pelvic anatomy; congenital, traumatic, and neoplastic processes that affect these structures. Preparation for encounters with imaging tests in clinical medicine and surgery. Also open to graduate students in fields related to imaging sciences.
2 units, Win (Staff), Spr (Federle, M; Penner, R)

RAD 203. Introduction to Interventional Radiology
Designed to expose pre-clinical and clinical MD studentsto minimally-invasive procedures using image guidance through a combination of didactics, simulation, and cathlab observation. Weekly organ-based and/or disease-based lectures are followed by simulation and faculty shadowing. Daily case-based presentations by faculty, technical demonstrations, and informal discussions reinforce the learning experience.
1 unit, Aut (Kothary, N; Hwang, G; Louie, J), Spr (Hwang, G; Louie, J; Kothary, N)

RAD 220. Imaging Anatomy
(Same as BIOE 220) The physics of medical imaging and human anatomy through medical images. Emphasis is on normal anatomy, contrast mechanisms, and the relative strengths of each imaging modality. Labs reinforce imaging techniques and anatomy. Prerequisites: basic biology, physics.
3 units, Win (Pauly, K; Gold, G)

RAD 222A. Multimodality Molecular Imaging in Living Subjects
(Same as BIOE 222A) Focuses on instruments and chemistries for imaging of cellular and molecular processes in vivo. Basics of instrumentation physics, chemistry of molecular imaging probes, and an introduction to preclinical and clinical molecular imaging modalities.
4 units, Aut (Contag, C; Xing, L; Rao, J)

RAD 222B. Chemistry of Molecular Probes for Imaging in Living Subjects
(Same as BIOE 222B) Focuses on molecular probes that target specific disease mechanisms. The ideal characteristics of molecular probes; how to optimize their design for use as effective imaging reagents that target specific steps in biological pathways and reveal the nature of disease through noninvasive assays.
4 units, Win (Contag, C; Rao, J; Xing, L)

RAD 222C. Topics in Multimodality Imaging in Living Subjects
(Same as BIOE 222C) Focuses on emerging chemistries and instruments that address unmet needs for improved diagnosis and disease management in cancer, neurological disease, cardiovascular medicine and musculoskeletal disorders. Objective is to identify problems or controversies in the field, and to resolve them through understanding the relevant primary literature.
4 units, Spr (Contag, C; Xing, L; Rao, J)

RAD 226. In Vivo Magnetic Resonance Spectroscopy and Imaging
Collections of identical independent nuclear spins are described by the classical vector model of magnetic resonance imaging (MRI); however, interactions among spins, as occur in many in vivo processes, require a more complete description. Physics and engineering principles of these in vivo magnetic resonance phenomena with emphasis on current research questions and clinical applications. Topics: quantum mechanical description of magnetic resonance, density matrix theory, product operator formalism, relaxation theory and contrast mechanisms, spectroscopic imaging, spectral editing, and multinuclear studies. Prerequisites: EE 369B or familiarity with magnetic resonance, working knowledge of linear algebra.
3 units, Win (Spielman, D)

RAD 227. Functional MRI Methods
(Same as BIOPHYS 227) Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended.
3 units, Aut (Glover, G)

RAD 228. Magnetic Resonance Imaging Programming Topics
Primarily for students working on research projects involving MRI pulse sequence programming. Introductory and student-initiated topics in seminars and hands-on labs. Image contrast mechanisms achieved by pulse sequences that control radiofrequency and gradient magnetic fields in real time, while acquiring data in an organized manner for image reconstruction. Prerequisites: EE 369B and consent of instructor.
3 units, Sum (Staff)

RAD 299. Directed Reading in Radiology
Prerequisite: consent of instructor.
1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

RAD 370. Medical Scholars Research
Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.
4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

RAD 399. Graduate Research
Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.
1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)