Chairman

Edward M. Stolper, Ph.D.

Academic Officer

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In the division of geological and planetary sciences, faculty members study the earth and planets in order to understand their origin, constitution, and development, and the effect of the resulting physical and chemical environments on the history of life, and on man. The approach to these problems is made with strong reliance on the basic sciences. Programs of study and research are pursued in geology, geobiology, geochemistry, geophysics, and planetary science. The curriculum is flexible so that students with degrees in biology, chemistry, engineering, or physics may carry out graduate work within the division. Interdisciplinary studies are encouraged and students may carry out academic and research programs within and between different divisions.

Assistantships, scholarships, fellowships

Each year the Division awards a number of graduate teaching and research assistantships. In 1998-99, they provide stipends of up to $17,088 annually. The holder of such an appointment also receives a tuition scholarship and is permitted to carry a full academic program.

Also available are a number of fellowships that require no departmental duties. These provide tuition, an initial academic-year stipend of up to $15,900 (plus supplemental assistance to raise the amount to the graduate assistant level). Special fellowships such as the Beno Gutenberg Fellowship, awarded to an outstanding first-year student in geophysics, provide a stipend of $17,088 in addition to tuition.

Aims and scope of graduate studies

Graduate students in the Division of Geological and Planetary Sciences enter with very diverse undergraduate preparation -- majors in astronomy, biology, chemistry, mathematics, and physics, as well as in geochemistry, geology, and geophysics. Graduate study and research within the division are equally diverse, and the graduate program aims to provide for students a depth of competence and experience in their major field, sufficient strength in the basic sciences to allow them to continue self-education after their formal training has been completed, and the motivation and training to keep them in the forefront of their field through a long and productive career.

Applying for Admission

Complete applications for admission and financial aid should be received before January 15. Applicants will be notified of the results before April 1. Applicants are required to submit Graduate Record Examination (GRE) scores for the aptitude tests and the advanced test in their field of undergraduate specialty. Applicants from non-English-speaking nations are required to submit Test of English as a Foreign Language (TOEFL) scores. Applications are available from the Dean of Graduate Studies, MC 02-31, California Institute of Technology, Pasadena, CA 91125, or from the Institute Graduate Admissions home page

www.gps.caltech.edu

division of geological and planetary sciences

CALIFORNIA INSTITUTE OF TECHNOLOGY

Mark Simons

Assistant Professor of Geophysics; Ph.D., MIT, 1995. Theoretical and observational geodynamics, especially crustal deformation and mantle convection; radar interferometry; gravity field analysis; modeling of materials with complex rheologies.

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Hiroo Kanamori

John E. and Hazel S. Smits Professor of Geophysics; Ph.D., Tokyo, 1964. Physics of earthquakes; interaction of atmosphere and lithosphere; real-time application of seismology to hazard mitigation; long-term crustal processes associated with earthquakes.

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Thomas J. Ahrens

W.M. Keck Professor of Geophysics; Ph.D., RPI, 1962. Origin, differentiation and evolution of the Earth and planets. Laboratory and spacecraft-based measurements of the physical properties of planetary materials. Impact processes on planetary surfaces and atmospheres.

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Egill Haukkson

Senior Research Associate in Geophysics; Ph.D., Columbia University, New York, 1981. Seismotectonics; state of stress in the crust; stress triggering of earthquakes; crustal tomography; seismicity studies; instrumentation and software for real-time earthquake monitoring.

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Arden L. Albee

Professor of Geology; Ph.D., Harvard, 1957. Petrologic, mineralogic, and microprobe investigations; remote sensing of planetary surfaces; Project Scientist for Mars Global Surveyor Mission.

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Edward M. Stolper

William E. Leonhard Professor of Geology; Ph.D., Harvard, 1979. Petrology of meteoritic, lunar, and terrestrial igneous rocks; physical and chemical properties

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Michael C. Gurnis

Professor of Geophysics; Ph.D., Australian National University, 1987. Dynamics of the Earth's interior using computational methods. Relation between mantle dynamics and the geological evolution of the continents.

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Robert W. Clayton

Professor of Geophysics; Ph.D., Stanford, 1981. Reflection seismology, numerical wave simulation, tomographic reconstructions, inverse methods, tectonics.

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Joann M. Stock

Associate Professor of Geology and Geophysics; Ph.D., MIT, 1988. Plate tectonics; marine geophysical studies of plate boundary evolution; stress and deformation in the lithosphere; structural geology and tectonics; remote sensing and volcanic hazards.

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Peter J. Wyllie

Professor of Geology; Ph.D., St. Andrews, 1958. Experimental petrology of magmas and volatiles; origin of granites, andesites, kimberlites, carbonatites, and associated ore deposits.

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Joseph L. Kirschvink

Professor of Geobiology; Ph.D., Princeton, 1979; Geobiology, paleomagnetism, magnetobiology.

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Kerry E. Sieh

Professor of Geology; Ph.D., Stanford, 1977. Neotectonics of North America and Asia; paleoseismology of the San Andreas and other faults and subduction zones, seismic hazard assessment for engineering applications, post-earthquake field investigations, active silicic volcanism.

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Barclay Kamb

Barbara and Stanley R. Rawn, Jr., Professor of Geology and Geophysics; Ph.D., Caltech, 1956. Mechanics of glacier flow, with emphasis on basal sliding, surging and streaming flow in the Antarctic ice sheet; structures produced by rock flow and fracture in the earth.

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Thomas H. Heaton

Professor of Engineering Seismology; Ph.D., Caltech, 1979. Seismology emphasis on wave-form modeling, strong motions, and earthquake-source physics.

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Donald V. Helmberger

Professor of Geophysics and Director of the Seismological Laboratory; Ph.D., University of California, San Diego, 1967. Seismic wave propagation and fine structures of the upper earth, as determined by P and S wave inversion; particularly interested in mapping ultra-low-velocity zones of the core-mantle boundary.

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George R. Rossman

Professor of Mineralogy; Ph. D., Caltech, 1971. Spectroscopic, chemical, and structural properties of minerals, which involve metal ion site occupancy, trace water, radiation effects, and X-ray amorphous materials.

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Brian P. Wernicke

Professor of Geology; Ph.D., MIT, 1982. Structural geology and tectonics, with emphasis on field observation.

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Don L. Anderson

Eleanor and John R. McMillan Professor of Geophysics; Ph.D., Caltech, 1962. Interpretation of deep Earth seismic data, including tomography, to derive models for the composition, physical state and evolution of the Earth's interior; derivation of global geodynamic models. Synthesis of geochemical, geophysical and geodynamic data; interactions of lithosphere and

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Hermann Engelhardt

Senior Research Associate in Geophysics; Ph.D., Technical University of Munich, 1964. Experimental physics; physics of ice; glaciology; structure and physical properties of ice; dynamics of glaciers and large ice streams; climatic change affecting the West Antarctic ice stream; mechanisms of fast ice streaming flow; ice in the planetary systems; hot-water borehole drilling and ice coring; borehole geophysics.

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Geoffrey A. Blake

Professor of Cosmochemistry and Planetary Science; Ph.D., Caltech, 1986. Observational analyses of stellar and planetary genesis, in situ characterization of the Earth's atmosphere and biogeochemical cycles; laser spectroscopic and ab initio characterization of weakly bonded clusters and reactive intermediates.

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Bruce C. Murray

Professor of Planetary Science and Geology; Ph.D., MIT, 1955. Surfaces of Earth, Moon, Mars, Mercury, and Venus; techniques and technology of deep space exploration.

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D.A. Papanastassiou

Senior Research Associate in Geochemistry; Ph.D., Caltech, 1970. Mass spectrometry of positive and negative ions, the study of preserved nucleosynthetic components in the early solar system and of the evolution of primitive meteorites and protoplanets.

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Shrinivas R. Kulkarni

Professor of Astronomy and Planetary Science; Ph.D., University of California, Berkeley, 1983. Extra-solar planetary systems; detection and formation; pulsars and neutron stars; search and evolution; instrumentation; digital signal processing; optical interferometry; data analysis on supercomputers.

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Gerald J. Wasserburg

Crafoord Laureate and John D. MacArthur Professor of Geology and Geophysics; Ph.D., Chicago, 1954. Application of chemical physics to problems in the origin and evolution of the earth and the solar system and the study of radioactive dating and time scales for the transport of isotopes in natural waters

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Andrew P. Ingersoll

Professor of Planetary Science; Ph.D., Harvard, 1966. Dynamic meteorology and climatology, spacecraft studies of the earth and other planets.

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David J. Stevenson

Professor of Planetary Science; Ph.D., Cornell, 1976. Origin, evolution, and structure of planets.

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Donald S. Burnett

Professor of Geochemistry, Ph.D., University of California, Berkeley, 1963. Problems of nucleosynthesis, elemental abundances and chemical evolution of solar system, meteorite and lunar sample analyses and laboratory synthesis experiments.

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Michael E. Brown

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Peter Goldreich

Lee A. DuBridge Professor of Astrophysics and Planetary Physics; Ph.D., Cornell, 1963. Astrophysics and planetary physics; principal interest in theoretical astrophysics and planetary physics.

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Yuk L. Yung

Professor of Planetary Science; Ph.D., Harvard, 1974. Atmospheric chemistry and radiation, planetary atmospheres, evolution of atmospheres, global change.

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Paul O. Wennberg

Associate Professor of Atmospheric Chemistry and Environmental Engineering Science; Ph.D., Harvard, 1994. Laboratory and field studies probing the processes controlling photochemistry, dynamics, and radiation in the Earth's atmosphere; spectroscopy and kinetics; aircraft-borne and ground-based instrument development.

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