

2008-09

Caltech Catalog



California Institute of Technology
Pasadena, California 91125
626/395-6811

September 2008

The mission of the California Institute of Technology is to expand human knowledge and benefit society through research integrated with education. We investigate the most challenging, fundamental problems in science and technology in a singularly collegial, interdisciplinary atmosphere, while educating outstanding students to become creative members of society.

While every effort has been made to ensure that this catalog is accurate and up to date, it may include typographical or other errors. The Institute reserves the right to change its policies, rules, regulations, requirements for graduation, course offerings, and any other contents of this catalog at any time.

You can view the *Caltech Catalog* on line at <http://pr.caltech.edu/catalog>. Please note that the contents of websites that link to online course entries are not part of the official catalog.

CONTENTS

2

General Information

9	Introduction	111	Geological and Planetary Sciences
11	Historical Sketch		
18	Buildings and Facilities	114	History and Philosophy of Science
27	Undergraduate Research	114	Humanities
28	Student Life	115	Independent Studies Program
34	Student Health	115	Information Science and Technology
36	Career Development	116	Materials Science
38	Caltech Alumni Association	117	Mathematics
39	International Student Programs	118	Mechanical Engineering
39	Auditing Courses	119	Physics
40	Grades and Grading	123	Social Science
44	Notices and Agreements		
52	Institute Policies		

Areas of Study and Research

79	Aeronautics
83	Applied and Computational Mathematics
85	Applied Mechanics
85	Applied Physics
87	Astrophysics
89	Biochemistry and Molecular Biophysics
90	Bioengineering
91	Biology
93	Biotechnology
93	Chemical Engineering
95	Chemistry
97	Civil Engineering
98	Computation and Neural Systems
99	Computer Science
102	Control and Dynamical Systems
103	Electrical Engineering
108	Energy Science and Technology
109	Environmental Science and Engineering

Information for Undergraduate Students

127	Admission to the Freshman Class
131	Admission to Upper Classes by Transfer
134	Study Abroad
138	ROTC
139	Registration Regulations
141	Scholastic Requirements
146	Undergraduate Expenses
151	Financial Aid
166	Prizes
175	Graduation Requirements, All Options

Information for Graduate Students

233	Graduate Program
234	Graduate Policies and Procedures
242	Degree Requirements
249	Graduate Expenses
252	Financial Assistance

255	Prizes
260	Special Regulations of Graduate Options

Courses

335	General Information
336	Aeronautics
344	Anthropology
345	Applied and Computational Mathematics
350	Applied Mechanics
351	Applied Physics
356	Art History
359	Astrophysics
364	Biochemistry and Molecular Biophysics
365	Bioengineering
368	Biology
378	Business Economics and Management
380	Chemical Engineering
385	Chemistry
394	Civil Engineering
396	Computation and Neural Systems
400	Computer Science
409	Control and Dynamical Systems
412	Economics
415	Electrical Engineering
424	Energy Science and Technology
424	Engineering (General)
425	English
434	English As a Second Language
435	Environmental Science and Engineering
439	Film
440	Geological and Planetary Sciences
455	History

461	History and Philosophy of Science
467	Humanities
470	Independent Studies Program
471	Information Science and Technology
471	Languages
475	Law
476	Materials Science
479	Mathematics
489	Mechanical Engineering
495	Music
497	Performance and Activities
499	Philosophy
502	Physical Education
507	Physics
516	Political Science
518	Psychology
520	Social Science

Trustees, Administration, Faculty

527	Officers
527	Board of Trustees
531	Administrative Officers
533	Faculty Officers and Committees
536	Staff of Instruction and Research
571	Officers and Faculty

625 Index

3

ACADEMIC CALENDAR 2008-09

FIRST TERM 2008

September 15-19
Pre-orientation for international students

September 21
New-student check-in, location and time TBA

September 22-26
New-student orientation

September 29
Beginning of instruction—8 a.m.

September 30
Undergraduate Academic Standards and Honors Committee—9 a.m.

October 17
Last day for adding courses and removing conditions and incompletes

October 29–November 4
Midterm examination period

November 10
Midterm deficiency notices due—9 a.m.

November 19
Last day for dropping courses, exercising pass/fail option, and changing sections

November 20–December 5
Registration for second term, 2008-09

November 21
Last day for admission to candidacy for the degrees of Master of Science and Engineer

November 27-28
Thanksgiving (Institute holiday)

December 5
Last day of classes
Last day to register for second term, 2008-09, without a \$50 late fee

December 6-9
Study period

December 10*-12
Final examinations, first term, 2008-09

December 12
End of first term, 2008-09

*First due date for final examinations

December 13–January 4
Winter recess

December 17
Instructors' final grade reports due—9 a.m.

December 25-26
Christmas (Institute holiday)

December 29-31
Special release days

January 1-2
New Year holidays (Institute holiday)

SECOND TERM 2009

January 5
Beginning of instruction—8 a.m.

January 6
Undergraduate Academic Standards and Honors Committee—9 a.m.

January 19
Martin Luther King Day (Institute holiday)

January 23
Last day for adding courses and removing conditions and incompletes

February 4-10
Midterm examination period

February 16
Presidents' Day (Institute holiday)

February 17
Midterm deficiency notices due—9 a.m.

February 25
Last day for dropping courses, exercising pass/fail option, and changing sections

February 26–March 11
Registration for third term, 2008-09

March 11
Last day of classes
Last day to register for third term, 2008-09, without a \$50 late fee

March 12-15
Study period

March 16*-18
Final examinations, second term, 2008-09

March 18
End of second term, 2008-09

March 19-29
Spring recess

March 25
Instructors' final grade reports due—9 a.m.

THIRD TERM 2009

March 30
Beginning of instruction—8 a.m.

March 31
Undergraduate Academic Standards and Honors Committee—9 a.m.

April 6
Student/faculty conference, location and time TBA

April 17
Last day for adding courses and removing conditions and incompletes

April 29–May 5
Midterm examination period

May 11
Midterm deficiency notices due—9 a.m.
Last day for seniors to remove conditions and incompletes

May 15
Last day for scheduling examinations for the degrees of Doctor of Philosophy and Engineer

May 20
Last day for dropping courses, exercising pass/fail option, and changing sections

May 21–June 5
Registration for first term, 2009-10, and for summer research

May 25
Memorial Day (Institute holiday)

May 29
Last day of classes—seniors and graduate students
Last day for presenting theses for the degrees of Doctor of Philosophy and Engineer

May 30–June 2
Study period for seniors and graduate students

*First due date for final examinations

June 3*-5
Final examinations for seniors and graduate students, third term, 2008-09

June 5
Last day of classes—undergraduates
Last day to register for first term, 2009-10, without a \$50 late fee

June 6-9
Study period for undergraduates

June 8
Instructors' final grade reports due for seniors and graduate students—9 a.m.

June 10
Undergraduate Academic Standards and Honors Committee—9 a.m.
Curriculum Committee—10 a.m.
Faculty meeting—2 p.m.

June 10*-12
Final examinations for undergraduates, third term, 2008-09

June 12
Commencement—10 a.m.
End of third term, 2008-09

June 17
Instructors' final grade reports due for undergraduates—9 a.m.

June 24
Undergraduate Academic Standards and Honors Committee—9 a.m.

July 3
Independence Day (Institute holiday)

September 7
Labor Day (Institute holiday)

FIRST TERM 2009-10

September 14-18
Pre-orientation for international students

September 20
New-student check-in, location and time TBA

September 21-25
New-student orientation

September 29
Beginning of instruction—8 a.m.

September 30
Undergraduate Academic Standards and Honors Committee—9 a.m.



insert campus directory

General Information



INTRODUCTION

The California Institute of Technology is an independent, privately supported university, whose educational mission has not changed since it was stated by the original trustees on November 29, 1921: “To train the creative type of scientist or engineer urgently needed in our educational, governmental, and industrial development.”

Its mission in research was expressed by President Emeritus Thomas E. Everhart in his 1988 inaugural address: “There need to be a few places that look ahead and still dare to do the most ambitious things that human beings can accomplish. Caltech still has that ambition and that daring.”

Caltech conducts instruction at both the undergraduate and graduate levels and, including its off-campus facilities, is one of the world’s major research institutions. Its mission to train creative scientists and engineers is achieved by conducting instruction in an atmosphere of research, accomplished by the close contacts between a relatively small group of students (approximately 900 undergraduate and 1,200 graduate students) and the members of a relatively large faculty (296 professorial faculty, 60 research faculty, and 600 postdoctoral scholars). “Caltech has achieved international influence far disproportionate to its size,” according to *Time* magazine.

Caltech’s educational objective is to provide an outstanding education that prepares students to become world leaders in science, engineering, academia, business, and public service.

The Institute’s educational outcomes are as follows.

- Caltech graduates can analyze, synthesize, and communicate ideas.
- Caltech graduates demonstrate integrity, personal and professional responsibility, and respect for others.
- Bachelor of Science graduates can identify, analyze, and solve challenging problems within and across science and engineering disciplines.
- Bachelor of Science graduates can apply their analytic skills to other areas of knowledge and understand issues important in our society.
- Master of Science graduates can apply advanced knowledge in a specialized area in preparation for professional careers.
- Doctor of Philosophy graduates can independently identify, analyze, and solve fundamental research problems with breadth and depth.

The Institute is organized into six divisions: Biology; Chemistry and Chemical Engineering; Engineering and Applied Science; Geological and Planetary Sciences; the Humanities and Social Sciences; and Physics, Mathematics and Astronomy. It is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges.

Undergraduate Program

Caltech offers a four-year undergraduate course with options available in applied and computational mathematics; applied physics; astrophysics; biology; business economics and management; chemical engineering; chemistry; computer science; economics; electrical engineering; engineering and applied science; English; geobiology; geochemistry; geology; geophysics; history; history and philosophy of science; independent studies; mathematics; mechanical engineering; philosophy; physics; planetary science; and political science. Each leads to the degree of Bachelor of Science.

All options require students to take courses in biology, chemistry, humanities, mathematics, physics, and the social sciences. Course work is rigorous and students are encouraged to participate in research. The undergraduate program is thus designed to provide an intensive exposure to a wide spectrum of intellectual pursuits.

Near the end of the first year, students select an option, and during the second year they begin to specialize. However, the major concentration in chosen fields and professional subjects occurs during the third and fourth years.

Caltech also encourages a reasonable participation in extracurricular activities, which are largely managed by the students themselves. Three terms of physical education are required, and intercollegiate and intramural sports are encouraged.

In short, every effort is made to provide undergraduate students with well-rounded, integrated programs that will not only give them sound training in their professional fields, but that will also develop character, intellectual breadth, and physical well-being.

Graduate Program

Graduate students constitute approximately 57 percent of the total student body at Caltech. Jointly engaged in research problems with faculty members, they contribute materially to the general atmosphere of intellectual curiosity and creative activity generated on the Institute campus.

Caltech offers courses leading to the degree of Master of Science, which normally involves one year of graduate work; the degree of Engineer in certain branches of engineering, with a minimum of two years; and the degree of Doctor of Philosophy. In all the graduate work, research is strongly emphasized, not only because of its importance in contributing to the advancement of science and thus to the intellectual and material welfare of humankind, but also because research activities add vitality to the educational work of Caltech.

The graduate options are aeronautics and aerospace engineering, applied and computational mathematics, applied mechanics, applied physics, astrophysics, biochemistry and molecular biophysics, bioengineering, biology, chemical engineering, chemistry,

civil engineering, computation and neural systems, computer science, control and dynamical systems, electrical engineering, environmental science and engineering, geological and planetary sciences, materials science, mathematics, mechanical engineering, physics, and social science.

Postdoctoral and Senior Postdoctoral Scholars

Postdoctoral scholars form a vital part of the research community at Caltech and JPL. They advance knowledge through research and scholarship in science and technology; add to their own experience and education; and contribute to the education of Caltech undergraduates and graduate students. Postdoctoral scholars on campus always work under the close supervision of one or more Caltech professorial faculty members. In virtually all circumstances they must have an earned doctorate from a duly accredited institution. Upon arrival at the Institute, postdoctoral scholars should call the Postdoctoral Scholar Services office in Human Resources, (626) 395-3300, to make an appointment to activate their positions according to the terms and conditions of their letter.

Betty and Gordon Moore Distinguished Visitors

The Moore Distinguished Visitors program brings to the Caltech campus scientists, scholars, technologists, and artists of great distinction or of great promise. Through this program, Caltech faculty and students and the Moore Distinguished Visitors will have the opportunity to inform, inspire, and invigorate one another through discussions, seminars, lectures, and research. Appointments will be made in all academic divisions, and will normally last from two to nine months.

HISTORICAL SKETCH

.....

The California Institute of Technology developed from a local school of arts and crafts founded in Pasadena in 1891 by the Honorable Amos G. Throop. Initially named Throop University, it was later renamed Throop Polytechnic Institute. Known as the California Institute of Technology since 1920, it has enjoyed the support of the citizens of Pasadena, and as early as 1908 the Board of Trustees had as members Dr. Norman Bridge, Arthur H. Fleming, Henry M. Robinson, J. A. Culbertson, C. W. Gates, and Dr. George Ellery Hale. The dedication by these men, of their time, their minds, and their fortunes, transformed a modest vocational school into a university capable of attracting to its faculty some of the most eminent of the world's scholars and scientists.

George Ellery Hale, astronomer and first director of the Mount Wilson Observatory, foresaw the development in Pasadena of a

distinguished institution of engineering and scientific research. Hale well knew that a prime necessity was modern well-equipped laboratories, but he stressed to his fellow trustees that the aim was not machines, but men. “We must not forget,” he wrote in 1907, “that the greatest engineer is not the man who is trained merely to understand machines and apply formulas, but is the man who, while knowing these things, has not failed to develop his breadth of view and the highest qualities of his imagination. No creative work, whether in engineering or in art, in literature or in science, has been the work of a man devoid of the imaginative faculty.”

The realization of these aims meant specializing, so the trustees decided in 1907 to discontinue the elementary school, the business school, the teacher-training program, and the high school, leaving only a college of science and technology that conferred Bachelor of Science degrees in electrical, mechanical, and civil engineering.

In 1910 Throop Polytechnic Institute moved from its crowded quarters in the center of Pasadena to a new campus of 22 acres on the southeastern edge of town, the gift of Arthur H. Fleming and his daughter Marjorie. The president, Dr. James A. B. Scherer, and his faculty of 16 members, opened the doors to 31 students that September. When, on March 21, 1911, Theodore Roosevelt delivered an address at Throop Institute, he declared, “I want to see institutions like Throop turn out perhaps ninety-nine of every hundred students as men who are to do given pieces of industrial work better than any one else can do them; I want to see those men do the kind of work that is now being done on the Panama Canal and on the great irrigation projects in the interior of this country—and the one-hundredth man I want to see with the kind of cultural scientific training that will make him and his fellows the matrix out of which you can occasionally develop a man like your great astronomer, George Ellery Hale.”

It would have surprised Roosevelt to know that within a decade the little Institute, known from 1913 as Throop College of Technology, would have again raised its sights, leaving to others the training of more efficient technicians and concentrating its own efforts on Roosevelt’s “hundredth man.” On November 29, 1921, the trustees declared it to be the express policy of the Institute to pursue scientific researches of the greatest importance and at the same time “to continue to conduct thorough courses in engineering and pure science, basing the work of these courses on exceptionally strong instruction in the fundamental sciences of mathematics, physics, and chemistry; broadening and enriching the curriculum by a liberal amount of instruction in such subjects as English, history, and economics; and vitalizing all the work of the Institute by the infusion in generous measure of the spirit of research.”

Three men were responsible for the change in the Institute. George Ellery Hale still held to his dream. Arthur Amos Noyes,

professor of physical chemistry and former acting president of the Massachusetts Institute of Technology, served part of each year from 1913 to 1919 as professor of general chemistry and as research associate; then, in 1919, he resigned from MIT to devote full time to Throop as director of chemical research. In a similar way Robert Andrews Millikan began, in 1916–17, to spend a few months a year at Throop as director of physical research. Shortly after the school was renamed in 1920, Scherer resigned as president. In 1921, when Dr. Norman Bridge agreed to provide a research laboratory in physics, Millikan resigned from the University of Chicago and became administrative head of the Institute as well as director of the Norman Bridge Laboratory.

The great period of the Institute’s life began, then, under the guidance of three men of vision—Hale, Noyes, and Millikan. They were distinguished research scientists who soon attracted graduate students. In 1920 the enrollment was nine graduate students and 359 undergraduates with a faculty of 60; a decade later there were 138 graduate students, 510 undergraduates, and a faculty of 180. At the present time there are about 900 undergraduates, 1,100 graduate students, and 900 faculty (including postdoctoral fellows).

The Institute also attracted financial support from individuals, corporations, and foundations. In January 1920 the endowment had reached half a million dollars. In February of that year it was announced that \$200,000 had been secured for research in chemistry and a like amount for research in physics. Other gifts followed from trustees and friends who could now feel pride in the Institute as well as hope for its future. The Southern California Edison Company provided a high-voltage laboratory, with the million-volt Sorensen transformer. Philanthropic foundations bearing the names of Carnegie, Rockefeller, and Guggenheim came forth with needed help when new departments or projects were organized.

In 1923 Millikan received the Nobel Prize in physics. He had attracted to the Institute such men as Charles Galton Darwin, Paul Epstein, and Richard C. Tolman. In 1924 the Ph.D. degree was awarded to nine candidates.

It was inevitable that the Institute would enlarge its fields; it could not continue to be merely a research and instructional center in physics, chemistry, and engineering. But the trustees pursued a cautious and conservative policy, not undertaking to add new departments except when the work done in them would be at the same high level as that in physics and chemistry. In 1925 a gift of \$25,000 from the Carnegie Corporation of New York made possible the opening of a department of instruction and research in geology. A seismological laboratory was constructed, and Professors John P. Buwalda and Chester Stock came from the University of California to lead the work in the new division.

That same year William Bennett Munro, chairman of the Division of History, Government, and Economics at Harvard, joined the Institute faculty. Offerings in economics, history, and literature were added to the core of undergraduate instruction.

In 1928 Caltech began its program of research and instruction in biology. Thomas Hunt Morgan became the first chairman of the new Division of Biology and a member of Caltech's Executive Council. Under Morgan's direction the work in biology developed rapidly, especially in genetics and biochemistry. Morgan received the Nobel Prize in 1933.

The Guggenheim Graduate School of Aeronautics was founded at Caltech in the summer of 1926 and a laboratory was built in 1929, but courses in theoretical aerodynamics had been given at the Institute for many years by Professors Harry Bateman and P. S. Epstein. As early as 1917 the Throop Institute had constructed a wind tunnel in which, the catalog proudly boasted, constant velocities of 4 to 40 miles an hour could be maintained, "the controls being very sensitive." The new program, under the leadership of Theodore von Kármán, included graduate study and research at the level of the other scientific work at the Institute, and what is now known as GALCIT (Graduate Aeronautical Laboratories at the California Institute of Technology) was soon a world-famous research center in aeronautics.

In 1928 George Ellery Hale and his associates at the Mount Wilson Observatory developed a proposal for a 200-inch telescope and attracted the interest of the General Education Board in providing \$6,000,000 for its construction. The Board proposed that the gift be made, and Caltech agreed to be responsible for the construction and operation. The huge instrument was erected on Palomar Mountain. Teaching and research in astronomy and astrophysics thus became a part of the Caltech program.

From the summer of 1940 until 1945, Caltech devoted an increasingly large part of its personnel and facilities to the furthering of the national defense and war effort. Caltech's work during this period fell mainly into two categories: special instructional programs and weapons research. The research and development work was carried on, for the most part, under nonprofit contracts with the Office of Scientific Research and Development. Rockets, jet propulsion, and antisubmarine warfare were the chief fields of endeavor. The Jet Propulsion Laboratory in the upper Arroyo Seco continues under Institute management to carry on a large-scale program of research for the National Aeronautics and Space Administration and other agencies in the science and technology of robotic space exploration.

In the 1950s, in response to the growing technological component of societal problems, the Institute began to expand the fields in which it had substantial expertise. In the late 1960s and early 1970s the Institute added to its faculty several economists and political scientists who initiated theoretical and applied studies of interdisciplinary issues. A graduate program in social sciences was added in 1972. Caltech students could now engage their talents in the development of the basic scientific aspects of economics and political science, and begin to use the principles from these sci-

ences together with those from the physical sciences to formulate and address public policies.

In 1945 Robert A. Millikan retired as chairman of the Executive Council but served as vice chairman of the Board of Trustees until his death in 1953. Dr. Lee A. DuBridge became president of Caltech on September 1, 1946. Formerly chairman of the physics department and dean of the faculty at the University of Rochester, he came to the Institute after working five years as wartime director of the MIT Radiation Laboratory—and remained for 22 years.

DuBridge was also committed to the concept of a small, select institution offering excellence in education. Facts and figures are only part of the story, but the statistical record of change during the DuBridge administration indicates how he held to that concept. The 30-acre campus of 1946 grew to 80 acres; the \$17 million endowment grew to more than \$100 million; the faculty of 260 became 550; the number of campus buildings increased from 20 to 64; and the budget went from something less than \$8 million to \$30 million. But enrollment remained relatively constant. In 1946 the total number of students, graduate and undergraduate, was 1,391. In 1968, the year DuBridge left, it was 1,492.

Dr. Harold Brown came to Caltech as president in 1969. A physicist who had received his Ph.D. from Columbia in 1949, he had succeeded Dr. Edward Teller as director of the University of California's Lawrence Radiation Laboratory in Livermore in 1960. President Lyndon Johnson named Brown Secretary of the Air Force in 1965, and he came to the Institute from that office. Six new campus buildings were dedicated under Brown's administration, and a major development campaign for \$130 million was under way when he resigned in 1977 to become Secretary of Defense under President Carter.

Dr. Marvin L. Goldberger was appointed president in 1978. He had received his B.S. at the Carnegie Institute of Technology (now Carnegie Mellon University) and his Ph.D. at the University of Chicago. He came to Caltech from Princeton University, where he was the Joseph Henry Professor of Physics. Among the major accomplishments of the Goldberger administration were the addition of three new laboratories; the acquisition of a \$70 million grant for construction of the W. M. Keck Observatory to house the world's most powerful optical telescope; and a \$50 million pledge for the establishment of the Beckman Institute. Goldberger resigned in 1987 to become director of the Institute for Advanced Study, in Princeton, New Jersey.

In fall 1987 Dr. Thomas E. Everhart became president, coming to Caltech from his position as chancellor at the University of Illinois at Urbana-Champaign. Everhart graduated magna cum laude with an A.B. in physics from Harvard, received his M.Sc. in applied physics from UCLA, and earned a Ph.D. in engineering from Cambridge University. He had gained international recognition for his work in the development of electron microscopy, and he had also done research on electron beams as applied to the

analysis and fabrication of semiconductors. Everhart retired as president in October 1997, but he retains his position as professor of electrical engineering and applied physics. During his tenure in office, he oversaw construction of the Keck Observatory in Hawaii, the Moore Laboratory of Engineering, Avery House, the Braun Athletic Center, the Sherman Fairchild Library, and the Beckman Institute, and he directed the successful completion of a \$350 million campaign for Caltech.

In October 1997, Dr. David Baltimore assumed the presidency of the Institute. One of the world's leading biologists, he received the 1975 Nobel Prize for his work in virology. Previously the Ivan R. Cottrell Professor of Molecular Biology and Immunology at MIT and founding director of its Whitehead Institute for Biomedical Research, Baltimore had also served as president of Rockefeller University, where he earned his doctorate in 1964. He played a pivotal role in creating a consensus on national science policy regarding recombinant DNA research, served as chairman of the National Institute of Health AIDS Vaccine Research Committee, and in 1999 was awarded the National Medal of Science by President Clinton.

In late 2006, Baltimore stepped down from the Caltech presidency, returning to his research as the Institute's Millikan Professor of Biology. During his administration he had successfully completed a \$100 million campaign to support biological research, resulting in the construction of the Broad Center for the Biological Sciences. He had also launched a \$1.4 billion comprehensive campaign. By the time he returned to his lab, the campaign was near completion: three new laboratories had been funded and the Thirty-Meter Telescope had passed its conceptual design review phase.

Dr. Jean-Lou Chameau became Caltech's eighth president on September 1, 2006. The former provost and vice president for academic affairs at the Georgia Institute of Technology, he was also a Georgia Research Alliance Eminent Scholar and the Hightower Professor, and he earlier served as dean of the Georgia Tech College of Engineering, the largest in the country. Chameau had focused on making Georgia Tech a worldwide model for interdisciplinary education and research, innovation, and entrepreneurship, and for the promotion of these activities as a catalyst for economic development. He received his undergraduate education in France and his Ph.D. in civil engineering from Stanford University, and is particularly interested in sustainable technology, environmental geotechnology, soil dynamics, earthquake engineering, and liquefaction of soils.

Since coming to the Institute, Chameau has overseen the conclusion of the largest fund-raising campaign in Caltech's history and the construction of the Cahill Center for Astronomy and Astrophysics, the Annenberg Center for Information Science and

Technology, and the Schlinger Laboratory for Chemistry and Chemical Engineering. Known for his commitment to developing multidisciplinary talent in faculty and students, Chameau has placed strong emphasis on improving the educational experience of students, on increasing diversity, and on fostering research, entrepreneurial, and international opportunities for faculty and students.

As Caltech has developed in effectiveness and prestige, it has attracted a steady flow of gifts for buildings, endowment, and current operations, in particular during the last campaign. In addition, substantial grants and contracts from the federal government and private sources support many research activities.

Caltech has more than 22,000 living alumni all over the world, many of them eminent in their fields of engineering, science, law, medicine, academe, and entrepreneurship.

Caltech Nobel Laureates

Robert A. Millikan	physics	1923
Thomas Hunt Morgan	physiology or medicine	1933
Carl D. Anderson, B.S. '27, Ph.D. '30	physics	1936
Edwin M. McMillan, B.S. '28, M.S. '29	chemistry	1951
Linus Pauling, Ph.D. '25	chemistry Peace Prize	1954 1962
William Shockley, B.S. '32	physics	1956
George W. Beadle	physiology or medicine	1958
Donald A. Glaser, Ph.D. '50	physics	1960
Rudolf Mössbauer	physics	1961
Charles H. Townes, Ph.D. '39	physics	1964
Richard Feynman	physics	1965
Murray Gell-Mann	physics	1969
Max Delbrück	physiology or medicine	1969
* David Baltimore	physiology or medicine	1975
Renato Dulbecco	physiology or medicine	1975
Leo James Rainwater, B.S. '39	physics	1975
Howard M. Temin, Ph.D. '60	physiology or medicine	1975
William N. Lipscomb, Ph.D. '46	chemistry	1976
Robert W. Wilson, Ph.D. '62	physics	1978
Roger W. Sperry	physiology or medicine	1981
Kenneth G. Wilson, Ph.D. '61	physics	1982
William A. Fowler, Ph.D. '36	physics	1983
* Rudolph A. Marcus	chemistry	1992
Edward B. Lewis, Ph.D. '42	physiology or medicine	1995

Douglas D. Osheroff, B.S. '67	physics	1996
Robert C. Merton, M.S. '67	economics	1997
* Ahmed H. Zewail	chemistry	1999
Leland H. Hartwell, B.S. '61	physiology or medicine	2001
Vernon L. Smith, B.S. '49	economics	2002
* Hugh David Politzer	physics	2004
* Robert H. Grubbs	chemistry	2005

* *In residence*

Caltech Crafoord Laureates

* Gerald J. Wasserburg	geochemistry	1986
Allan R. Sandage, Ph.D. '53	astronomy	1991
Seymour Benzer	biosciences	1993
* Don L. Anderson, M.S. '58, Ph.D. '62	geosciences	1998
James E. Gunn, Ph.D. '66	astronomy	2005

* *In residence*

BUILDINGS AND FACILITIES

On-Campus Buildings

Gates and Crellin Laboratories of Chemistry: first unit, 1917; second unit, 1927; third unit, 1937. The first two units were the gifts of Messrs. C. W. Gates and P. G. Gates of Pasadena; the third unit was the gift of Mr. and Mrs. E. W. Crellin of Pasadena. Gates (first unit), which was retired after suffering extensive damage in the 1971 earthquake, was rebuilt in 1983 as the Parsons-Gates Hall of Administration. **The Arnold and Mabel Beckman Laboratory of Chemical Synthesis,** 1986, occupying portions of Crellin Laboratory (as well as portions of Church Laboratory for Chemical Biology), was built with funds provided by the Arnold and Mabel Beckman Foundation.

Norman Bridge Laboratory of Physics: first unit, 1922; second unit, 1924; third unit, 1925. The gift of Dr. Norman Bridge of Los Angeles, president of the Board of Trustees, 1896–1917.

High Voltage Research Laboratory, 1923. Built with funds provided by the Southern California Edison Company. Retired in 1959 with basic research completed and rebuilt in 1960 as the Alfred P. Sloan Laboratory of Mathematics and Physics.

Dabney Hall, 1928. The gift of Mr. and Mrs. Joseph B. Dabney of Los Angeles.

William G. Kerckhoff Laboratories of the Biological Sciences: first unit, 1928; second unit, 1939; annex, 1948. The gift of Mr. and Mrs. William G. Kerckhoff of Los Angeles. He was a trustee during 1928.

Guggenheim Aeronautical Laboratory, 1929. Built with funds provided by the Daniel Guggenheim Fund for the Promotion of Aeronautics. A substantial addition was built in 1947.

Athenaeum, 1930. A clubhouse for the teaching, research, and administrative staffs of the Institute and the Huntington Library, Art Collections, and Botanical Gardens, for the Associates of the California Institute of Technology, and for others who have demonstrated their interest in advancing the objectives of the Institute. The gift of Mr. and Mrs. Allan C. Balch of Los Angeles. He was president of the Board of Trustees, 1933–43.

Undergraduate Houses, 1931:

Blacker House. The gift of Mr. and Mrs. R. R. Blacker of Pasadena.

Dabney House. The gift of Mr. and Mrs. Joseph B. Dabney of Los Angeles.

Fleming House. Built with funds provided by some 20 donors and named in honor of Mr. Arthur H. Fleming of Pasadena, president of the Board of Trustees, 1917–33.

Ricketts House. The gift of Dr. and Mrs. Louis D. Ricketts of Pasadena.

W. K. Kellogg Radiation Laboratory, 1932. The gift of Mr. W. K. Kellogg of Battle Creek, Michigan.

Henry M. Robinson Laboratory of Astrophysics, 1932. Built with funds provided by the International Education Board and the General Education Board, and named in honor of Mr. Henry M. Robinson of Pasadena, member of the Board of Trustees, 1907–37, and of the Executive Council of the Institute.

Charles Arms Laboratory of the Geological Sciences, 1938. The gift of Mr. and Mrs. Henry M. Robinson of Pasadena, in memory of Mrs. Robinson's father, Mr. Charles Arms.

Seeley W. Mudd Laboratory of the Geological Sciences, 1938. The gift of Mrs. Seeley W. Mudd of Los Angeles, in memory of her husband.

Franklin Thomas Laboratory of Engineering, first unit, 1945; second unit, 1950. Funds for the first unit were allocated from the Eudora Hull Spalding Trust with the approval of Mr. Keith Spalding, trustee. Named in honor of Dean Franklin Thomas, professor of civil engineering and first chair of the Division of Engineering, 1924–45.

Alumni Swimming Pool, 1954. Provided by the Alumni Fund through contributions from the alumni of the Institute.

Scott Brown Gymnasium, 1954. Built with funds provided by the trust established by Mr. Scott Brown of Pasadena and Chicago, who was a member and director of the Caltech Associates.

Norman W. Church Laboratory for Chemical Biology, 1955. Built with funds provided through a gift and bequest by Mr. Norman W. Church of Los Angeles, who was a member of the Caltech Associates.

Eudora Hull Spalding Laboratory of Engineering, 1957. Built with funds allocated from the Eudora Hull Spalding Trust.

Archibald Young Health Center, 1957. The gift of Mrs. Archibald Young of Pasadena, in memory of her husband, who was a life member and officer of the Caltech Associates, 1926–56.

Physical Plant Building and Shops, 1959. Built with funds provided by many donors.

Gordon A. Alles Laboratory for Molecular Biology, 1960. Built with the gift of Dr. Gordon A. Alles of Pasadena, an Institute research associate in biology, an alumnus, and a member of the Caltech Associates, 1947–63; and with funds provided by the National Institutes of Health, Health Research Facilities Branch.

Undergraduate Houses, 1960. Built with funds provided by the Lloyd Foundation and other donors.

Lloyd House. Named in memory of Mr. Ralph B. Lloyd and his wife, Mrs. Lulu Hull Lloyd, of Beverly Hills. He was a member of the Board of Trustees, 1939–52.

Page House. Named in honor of Mr. James R. Page of Los Angeles, a member of the Board of Trustees, 1931–62, and chairman, 1943–54.

Ruddock House. Named in honor of Mr. Albert B. Ruddock of Santa Barbara, a member of the Board of Trustees, 1938–71, and chairman, 1954–61.

Harry Chandler Dining Hall, 1960. The gift of the Chandler family, the Pfaffinger Foundation, and the Times Mirror Company of Los Angeles.

W. M. Keck Engineering Laboratories, 1960. The gift of the W. M. Keck Foundation and the Superior Oil Company of Los Angeles.

Alfred P. Sloan Laboratory of Mathematics and Physics, 1960. Formerly the High Voltage Research Laboratory, 1923. Rebuilt in 1960 with funds provided by the Alfred P. Sloan Foundation.

Graduate Houses, 1961:

Braun House. Built with funds provided by the trustees of the Carl F Braun Trust Estate, in his memory.

Marks House. The gift of Dr. David X. Marks of Los Angeles.

Karman Laboratory of Fluid Mechanics and Jet Propulsion, 1961. The gift of the Aerojet-General Corporation, named in honor of Dr. Theodore von Kármán, professor of aeronautics at the Institute, 1929–49.

Firestone Flight Sciences Laboratory, 1962. The gift of the Firestone Tire and Rubber Company.

Winnett Student Center, 1962. The gift of Mr. P. G. Winnett of Los Angeles, a member of the Board of Trustees, 1939–68. Winnett houses the bookstore, the Red Door Café, and Caltech Wired.

Beckman Auditorium, 1964. The gift of Dr. Arnold O. and Mabel Beckman of Corona del Mar. The late Dr. Beckman, an alumnus, was an Institute faculty member from 1928 to 1939. He joined the Board of Trustees in 1953, was chairman, 1964–74, and was chairman emeritus until his death in 2004.

Harry G. Steele Laboratory of Electrical Sciences, 1965. Built with funds provided by the Harry G. Steele Foundation and the National Science Foundation.

Central Engineering Services Building, 1966.

Robert A. Millikan Memorial Library, 1967. Built with a gift from Dr. Seeley G. Mudd and named in honor of Dr. Robert Andrews Millikan, director of the Bridge Laboratory of Physics and chair of the Executive Council of the Institute, 1921–45.

Arthur Amos Noyes Laboratory of Chemical Physics, 1967. Built with funds provided by the National Science Foundation and Mr. Chester F. Carlson, an alumnus, and named in honor of Dr. Arthur Amos Noyes, director of the Gates and Crellin Laboratories of Chemistry and chair of the Division of Chemistry and Chemical Engineering, 1919–36.

Central Plant, 1967.

George W. Downs Laboratory of Physics and Charles C. Lauritsen Laboratory of High Energy Physics, 1969. The Downs wing was built with funds provided by Mr. George W. Downs and the National Science Foundation. The Lauritsen wing was built with Atomic Energy Commission funds and named in honor of Dr. Charles C. Lauritsen, a member of the Institute faculty, 1930–68.

Keith Spalding Building of Business Services, 1969. Named in honor of Mr. Keith Spalding, Caltech trustee, 1942–61.

Donald E. Baxter, M.D., Hall of the Humanities and Social Sciences, 1971. Built with funds provided by Mrs. Delia B. Baxter of Atherton and named in honor of her late husband, Donald E. Baxter, M.D. Additional funds were given by the U.S. Department of Health, Education and Welfare. Dr. and Mrs. Simon Ramo provided funds for the completion of **Ramo Auditorium** within the hall. Dr. Ramo is a life member of the Board of Trustees.

The Earle M. Jorgensen Laboratory of Information Science, 1971. Built with the gift of Mr. and Mrs. Earle M. Jorgensen, with additional funds provided by the Booth-Ferris Foundation and other private donors. Mr. Jorgensen was a member of the Board of Trustees, 1957–99.

The Mabel and Arnold Beckman Laboratories of Behavioral Biology, 1974. The gift of Dr. Arnold O. and Mabel Beckman of Corona del Mar. The late Dr. Beckman was chairman emeritus of the Board of Trustees.

Seeley G. Mudd Building of Geophysics and Planetary Science, 1974. Built with funds provided by Dr. Seeley G. Mudd, Mrs. Roland Lindhurst, Mr. and Mrs. Ross McCollum, Mr. and Mrs. Henry Salvatori, and the U.S. Department of Health, Education and Welfare.

Clifford S. and Ruth A. Mead Memorial Undergraduate Chemistry Laboratory, 1981. Built with funds allocated from the Clifford S. and Ruth A. Mead Memorial Building Fund.

Thomas J. Watson, Sr., Laboratories of Applied Physics, 1982. Built with funds provided by the Watson family and other private donors. Thomas J. Watson, Jr., was a member of the Board of Trustees, 1961–92.

Braun Laboratories in Memory of Carl F and Winifred H Braun, 1982. Built with funds provided by the Braun family, other

private donors, and the National Cancer Institute. Various members of the Braun family have served on Caltech's Board of Trustees.

Parsons-Gates Hall of Administration, 1983. Formerly Gates Laboratory of Chemistry, 1917. Rebuilt in 1983 with funds provided by the Ralph M. Parsons Foundation and the James Irvine Foundation.

Athletic Facility, 1984. Built with funds provided by the Carl F Braun Trust and the Braun Foundation.

Catalina Graduate Apartment Complex, 1984, 1986, 1988. Four of the buildings have been named for Max and Ruth Alcorn, Frank and Elizabeth Gilloon, Fred and Marvis Maloney, and William C. and Verna Rockefeller, honoring their generosity to Caltech.

Infrared Processing and Analysis Center, 1986. Renamed the **David W. Morrisroe Astroscience Laboratory, 1995.** Second-floor addition built with funds provided by the late Dr. Arnold O. Beckman, chairman emeritus of the Board of Trustees.

Wilson Avenue North Parking Structure, 1987.

Beckman Institute, 1989. Built with funds provided by the Arnold and Mabel Beckman Foundation and other private donors. The late Dr. Arnold O. Beckman was chairman emeritus of the Board of Trustees.

Braun Athletic Center, 1992. Built with funds provided by the Braun family.

Holliston Avenue Parking Structure/Satellite Utility Plant, 1993.

The Gordon and Betty Moore Laboratory of Engineering, 1996. Built with funds provided by Dr. and Mrs. Gordon Moore. Dr. Moore is an alumnus and chairman emeritus of the Board of Trustees.

Avery House, 1996. Built with funds provided by Mr. R. Stanton Avery, who was a member of the Board of Trustees from 1971 until his death in 1997. He had been chairman, 1974–85, and chairman emeritus since 1986.

Sherman Fairchild Library of Engineering and Applied Science, 1997. Built with funds provided by the Sherman Fairchild Foundation.

Space Infrared Telescope Facility Science Center, 1998. Renamed the **Spitzer Space Telescope Science Center**, 2003. Located within the **Keith Spalding Building of Business Services**.

Powell-Booth Laboratory for Computational Science, 1999. Formerly the Willis H. Booth Computing Center, 1963, constructed with support from the Booth-Ferris Foundation and the National Science Foundation. Renovated in 1999 with grants from the Charles Lee Powell Foundation, the National Science Foundation, and the Booth-Ferris Foundation.

Wilson Avenue South Parking Structure, 1999.

Center for Student Services, the Keck Wing, 2000. Originally the Keck Graduate House, built with funds provided by the William M. Keck, Jr., Foundation, 1961. **Center for Student Services, the Mosher-Jorgensen Wing**, 2002. Originally the Mosher-Jorgensen Graduate House, built with funds provided by Mr. Samuel B. Mosher and Mr. Earle M. Jorgensen, both of Los Angeles. Mr. Jorgensen was a member of the Board of Trustees, 1957–99.

Financial Services Building, 2000.

Broad Center for the Biological Sciences, 2002. Made possible by a lead gift from Eli and Edythe Broad. Eli Broad is a member of the Board of Trustees.

California Parking Structure, 2005.

Cahill Center for Astronomy and Astrophysics, construction to be completed in 2008. Built with funds provided by Charles and Aniko Dír Cahill, and other private donors.

Walter and Leonore Annenberg Center for Information Science and Technology, construction to be completed in 2009. Built with a lead gift from the Annenberg Foundation and with funds provided by Life Trustee Stephen Bechtel, Jr., and other private donors.

Warren and Katharine Schlinger Laboratory for Chemistry and Chemical Engineering, construction to be completed in 2009. Built with funds provided by alumnus Warren Schlinger and his wife, Katharine, a former Caltech employee and other private donors.

Off-Campus Facilities

William G. Kerckhoff Marine Biological Laboratory, 1930, Corona del Mar. Rehabilitated with funds provided by the National Science Foundation in 1966.

Jet Propulsion Laboratory, 1944, 4800 Oak Grove Drive, Pasadena. Administered by the Institute; owned and supported by the National Aeronautics and Space Administration.

Palomar Observatory, 1948, San Diego County. Site of the 200-inch Hale Telescope (1948) and the 48-inch Schmidt telescope (1949), built by the Institute with funds from the Rockefeller Foundation. The Schmidt was named the Samuel Oschin Telescope in 1987 in honor of benefactor Samuel Oschin of Los Angeles.

Owens Valley Radio Observatory, 1958, Big Pine. Built with funds provided by the Winnett Foundation, the Office of Naval Research, the National Science Foundation, and the Oscar G. and Elsa S. Mayer Charitable Trust.

Big Bear Solar Observatory, 1969, Big Bear Lake. Built with funds provided by the National Science Foundation and the Max C. Fleischmann Foundation of Nevada. (Operated by the New Jersey Institute of Technology.)

Submillimeter Observatory, 1986, Mauna Kea, Hawaii. Built with funds provided by the National Science Foundation and the Kresge Foundation.

W. M. Keck Observatory, Keck I (1991), Keck II (1996); Mauna Kea, Hawaii. Built with funds provided by the W. M. Keck Foundation. Site of the two 10-meter Keck Telescopes.

Georgina and William Gimbel Building, Caltech Submillimeter Observatory, 1996, Hilo, Hawaii. Built with funds provided by Mr. and Mrs. William Gimbel, members of the Caltech Associates.

Laser Interferometer Gravitational-Wave Observatory, 1999, Hanford, Washington, and Livingston, Louisiana. Built with funds provided by the National Science Foundation.

Beckman Institute

Opening its doors in 1990, the Beckman Institute has been a major addition to Caltech. The mission of the scientists working there is to invent new methods, materials, and instrumentation for fundamental research in biology and chemistry that will open the way for novel applications of scientific discoveries to human needs.

Center for Advanced Computing Research

The Center for Advanced Computing Research (CACR) exists to ensure that Caltech is at the forefront of computational science and engineering (CSE). CSE is the practice of computer-based modeling, simulation, and data analysis for the study of scientific phenomena and engineering designs. Computer modeling and simulation make it possible to investigate regimes that are beyond current experimental capabilities and to study phenomena that cannot be replicated in laboratories, such as the evolution of the universe. The results often suggest new experiments and theories. Computation is also essential for processing the flood of high-dimensional data generated by modern instruments.

CACR provides an environment that cultivates multidisciplinary collaborations. CACR researchers take an applications-driven approach and currently work with Caltech research groups in aeronautics, applied mathematics, astronomy, biology, engineering, geophysics, materials science, and physics. Center staff have expertise in data-intensive scientific discovery, physics-based simulation, scientific software engineering, visualization techniques, novel computer architectures, and the design and operation of large-scale computing facilities.

Industrial Relations Center

The Industrial Relations Center develops and offers programs on managing technology and innovation, improving the effectiveness of business operations, developing the leadership skills of technical professionals, and encouraging new business ventures. Courses and forums are presented on campus and are open to executives and managers in technology-based organizations, and Caltech students, faculty, and staff. Fees are waived for Caltech students who participate in the center's programs.

The center is located on campus at 383 South Hill Avenue. The latest calendar of programs or more information may be obtained by calling (626) 395-4041.

Libraries

The Caltech Library System (CLS) consists of a number of distributed library locations from which staff provide a high level of information service to support and facilitate the research and educational programs of the Institute. The Library's policies and many electronic resources, including the online catalog, are accessible from the CLS website at <http://library.caltech.edu>.

The CLS includes the astrophysics library; Dabney library for the Division of the Humanities and Social Sciences, which contains literature, art, philosophy, European, Asian, and ancient history monographs, and music CD collections; the geology library, with an extensive map collection; Millikan Memorial Library, which contains collections for biology, chemistry, mathematics, and

physics, government documents, microforms, the humanities and social sciences journals, American history and social sciences monographs, along with library administration and the inter-library-loan/document delivery services; the Sherman Fairchild Library of Engineering and Applied Science, which supports the environmental, aeronautics, chemical and mechanical engineering, and applied physics and mathematics programs.

Collectively, the libraries subscribe to over 2,228 print journals and 2,959 electronic journals. They hold over 705,950 volumes, and have extensive collections of technical reports, government documents, and maps. The library electronic catalog includes records of print and nonprint materials held throughout the libraries, and active links to electronic resources, especially full-text online journals. Also available online are citations to articles from over 10,000 journals in science and technology, the social sciences, and art history, as well as a variety of additional electronic reference sources. Special services available through the libraries include computerized literature searches, document delivery, interlibrary loans, digitizing and archiving technical report collections, and the creation and archiving of electronic theses, dissertations, and other research papers.

UNDERGRADUATE RESEARCH

The Institute provides three principal avenues for undergraduate research: the Summer Undergraduate Research Fellowships (SURF) program, research courses for academic credit and senior theses, and research for pay under a faculty member's grant or contract. Students may combine these options, but they may not receive both pay and credit (at the same time) for the same piece of work. Students registering for a research course during the summer do not have to pay tuition.

Each division offers the opportunity for qualified students early in their careers to engage in research under the supervision of a faculty member. Most options offer undergraduate research courses in order to encourage participation, and students should consult listings and descriptions of opportunities. Students are encouraged to undertake research of such scope and caliber as to merit the preparation of a senior thesis. The requirements for such thesis research vary from option to option; individual option representatives should be consulted.

The Summer Undergraduate Research Fellowships (SURF) program provides continuing undergraduate students the opportunity to work on an individual research project in a tutorial relationship with a mentor, usually a member of the Caltech/JPL research community, but occasionally a faculty member at another college or university. Students write research proposals in collaboration

with their mentors. Proposals and recommendations are reviewed by the SURF administrative committee, and awards are made on the basis of reviewer recommendation and available funding. The work is carried out during a 10-week period in the summer. Students may attend weekly seminars presented by members of the Caltech faculty and JPL technical staff and may participate in professional development workshops. At the conclusion of the summer, SURFers submit a written report describing the project, methods, and results of their work. On the third Saturday of October, students make oral presentations of their projects at SURF Seminar Day. About 20 percent of the students publish their work in the open scientific literature. In 2007, SURF students received awards of \$6,000. Applications are available online at <http://www.surf.caltech.edu> and are due in mid-February. Awards are announced in early April. To be eligible, students must be continuing undergraduates and have a cumulative GPA of at least 2.0. Students must complete the third quarter at Caltech (or at another school under a program approved by a dean). Students must be eligible for fall term registration as of the end of the June Undergraduate Academic Standards and Honors (UASH) Committee reinstatement meeting and must not be on medical leave or under disciplinary sanction.

For further information regarding this program, contact the Student-Faculty Programs Office, 08 Parsons-Gates, (626) 395-2885, sfp@caltech.edu. Visit the Student-Faculty Programs website at <http://www.sfp.caltech.edu> for more information on SURF and other programs.

STUDENT LIFE

.....

Undergraduate Student Houses

Seven of the eight undergraduate student houses are situated on both sides of the Olive Walk near the southeastern end of the campus. The original four—Blacker, Dabney, Fleming, and Ricketts—were built in 1931 from the plans of Mr. Gordon B. Kaufmann, in the Mediterranean style to harmonize with the adjacent Athenaeum. The other three, designed by Smith, Powell and Morgridge, were completed in 1960, and are named Lloyd, Page, and Ruddock.

Each of the houses is a separate unit with its own dining room and lounge, providing accommodations for between 65 and 100 students, depending on the house. Each has its own elected officers; a long history of self-governance gives students a great deal of influence over their living environments. Each house has a resident associate, typically a graduate student.

In addition to the student houses, the Institute maintains three apartment buildings, Marks/Braun House, and a number of off-

campus houses. Typically two or three students share an apartment. Depending upon size, the off-campus houses have a capacity of four to ten students. These residences are all within a short walk of the campus and offer students greater privacy, a different lifestyle, and the opportunity to prepare their own meals.

Application for rooms in student housing may be made through Institute Housing, Mail Code 160-86, California Institute of Technology, Pasadena, CA 91125, or at <http://www.housing.caltech.edu>.

Mail is delivered daily to the student mailboxes. Students should use their mailbox number, California Institute of Technology, Pasadena, CA 91126, to facilitate handling of mail at the campus post office.

Avery House

Made possible by a gift from trustee R. Stanton Avery, this innovative residential complex was designed by Moore, Ruble, Yudell and completed in September 1996. Located at the north end of the campus, Avery House has a resident associate and rooms for about 100 undergraduates and 25 graduate students, in addition to three faculty apartments. Its dining facilities, meeting rooms, lounges, and library are designed to encourage informal faculty-student interaction and to attract all members of the campus community to join in this interaction. Avery House hosts programs and social events that facilitate involvement between residents, faculty in residence, Avery associate, and visitors to the campus.

Avery House began accepting freshmen in 2005, after which it became fully integrated into the undergraduate house system as the eighth house.

The Student Activities Center

The SAC is located in the basement of the south undergraduate housing complex and is open for student use 24 hours a day.

The SAC provides office space for the officers of the undergraduate student government, working space for student publications, rehearsal space for musical activities, and space for many more student-oriented functions.

Whether students are interested in music, publications, student government, gaming, photography, or simply finding a room for their group to meet in, the SAC will probably have what is needed. The center also houses the South House laundry room and has several club rooms, a small library, a shop, and a movie screening room—most are open 24 hours.

Interhouse Activities

The president of each undergraduate house represents that house on the Interhouse Committee (IHC). While the eight houses are generally autonomous, the IHC exists to ensure that conflicts

between houses do not develop and to deal with matters that affect the houses in general. In particular, the IHC is responsible for the selection process by which the houses choose their new members.

In conjunction with the athletic department, the IHC conducts two intramural sports programs: the Interhouse and Discobolus trophy competitions. (These are described below under *Athletics*.) Other interhouse activities include an annual eight-house party called Interhouse.

Faculty-Student Relations

Faculty-student coordination and cooperation with regard to campus affairs are secured through the presence of students on faculty committees, by faculty-student conferences, and by other mechanisms, such as course ombudsmen.

Freshman Advisers

Each member of the freshman class is assigned a faculty adviser. The adviser follows the freshman's progress and provides advice on any questions or problems that the freshman may have.

Option Advisers

Each member of the three undergraduate upper classes is assigned an option adviser, a faculty member in the option in which the student is enrolled. The adviser takes an interest in the student's selection of courses and progress toward a degree, and, eventually, in assisting the student toward satisfactory placement in industry or in graduate school. Normally, the association between student and adviser is established before the beginning of the sophomore year and continues through graduation.

Athletics

Caltech supports a well-rounded program of competitive athletics. As a member of the NCAA Division III and the Southern California Intercollegiate Athletic Conference, Caltech carries out intercollegiate competition in nine men's sports and eight women's sports, with teams such as Claremont-Mudd-Scripps, LaVerne, Occidental, Pomona-Pitzer, Cal Lutheran, Redlands, and Whittier. Individual athletes and teams who distinguish themselves in conference competition earn the privilege of participating in NCAA regional and national championships.

Caltech also sponsors vigorous programs of club sports and intramural competition. Club sports include rugby, ultimate Frisbee, ice hockey, and men's volleyball and soccer. Intramural competition consists of residence house teams battling for championships (and bragging rights) in flag football, soccer, swimming, ultimate Frisbee, basketball, volleyball, tennis, track and field, and softball. Thirty percent of Caltech undergraduates participate in

intercollegiate athletics, and over 80 percent participate in some form of organized athletic competition each year.

Outdoor athletic facilities include an all-weather running track, a soccer field, a baseball diamond, six tennis courts, and two 25-yard swimming pools. Indoor facilities include two full-size gymnasiums for basketball, volleyball, and badminton; four racquetball courts; two squash courts; a 4,000-square-foot weight room; and a large multipurpose room for dance/aerobics, fencing, and martial arts.

ASCIT

The undergraduate student body forms the membership of a corporation known as the Associated Students of the California Institute of Technology, Inc., or ASCIT. Governed by a board of directors consisting of nine elected officers, it is involved in many aspects of student life, overseeing publication of the student newspaper, a directory, the yearbook, a research opportunities handbook, a course review, and a literary magazine.

Besides overseeing many student publications and coordinating activities and policies, the ASCIT Board of Directors administers the corporation's finances. ASCIT sponsors a wide variety of special-interest clubs and programs, such as the student shop and the Students for the Exploration and Development of Space (SEDS).

The student government is active in campus affairs. The student members of each standing faculty committee ensure that undergraduate opinion is considered seriously. Excellent informal relations between students and faculty and between students and administration promote mutual concern and goodwill. Student-faculty conferences are held every other year, and serve a very useful purpose in promoting cooperation and communication.

Graduate Student Council

The graduate student body forms the membership of a corporation known as the Graduate Student Council, or GSC. Governed by a board of directors, consisting of graduate student representatives from different graduate options, the GSC provides funding for student clubs, publishes a monthly newsletter, and organizes or subsidizes various campus events. Annual events include New Student Orientation activities, and Gradiators, a fun-filled summer day of unusual games. *The Technique*, an information guide for graduate-student life off and on campus, is published by the GSC. The GSC also organizes monthly social hours, the GSC Teaching and Mentoring Awards, and the Everhart Lecture Series, which honors outstanding graduate student speakers, and is active in campus affairs, with graduate student representatives on many faculty standing committees.

Honor System

The Honor System, embodied in the phrase “No member shall take unfair advantage of any member of the Caltech community,” is the fundamental principle of conduct for all students. More than merely a code applying to conduct in examinations, it extends to all phases of campus life. It is the code of behavior governing scholastic and extracurricular activities, relations among students, and relations between students and faculty. The Honor System is the outstanding tradition of the student body, which accepts full responsibility for its operation. The Board of Control, which is composed of elected student representatives, is charged with monitoring the Honor System for undergraduates, while the Graduate Review Board performs the same function for graduate students. The Conduct Review Committee, composed of students, faculty, and staff, also considers cases involving the Honor System and Institute policies. Suspected violations are reported to the appropriate board, which conducts investigations and hearings with strict confidentiality. If necessary, recommendations for actions are made to the deans.

Student Body Publications

The publications of the student body include a weekly paper, *The California Tech*; an undergraduate research journal, *CURJ*; a literary magazine, *The Totem*; a student handbook, *the little t*, which gives a survey of student activities and organizations and serves as a campus directory; a yearbook, *The Big T*; an annual review of the quality of teaching in the various courses, *The Clue*; and an undergraduate research opportunities handbook, *UROH*. These publications, staffed entirely by students, provide an opportunity for interested students to obtain valuable experience in creative writing, photography, artwork, reporting and editing, advertising, and business management.

Performing and Visual Arts Activities

The Institute provides qualified directors and facilities for various choral music groups, a concert band, a jazz band, a symphony orchestra (jointly with Occidental College), numerous chamber music ensembles, guitar classes, a theater program, and a variety of art classes. These activities are centered in the Music and Theater Arts Houses on Hill Avenue along the eastern edge of campus. Performances are held mainly in Dabney Lounge and Ramo Auditorium.

Student Societies and Clubs

The Institute has more than 70 societies and clubs covering a wide range of interests. The American Chemical Society, the American Institute of Chemical Engineers, the American Society of Mechanical Engineers, and the Society of Women Engineers all

maintain active student branches. There is a chapter of the National Society of Black Engineers, and the Caltech Latino Association of Students in Engineering and Science is a chapter of the Society of Hispanic Engineers.

The Institute has a chapter (California Beta) of Tau Beta Pi, the national scholarship honor society of engineering colleges. Each year the Tau Beta Pi chapter elects to membership students from the highest-ranking eighth of the junior class and the highest fifth of the senior class.

Special interests and hobbies are provided for by a broad and constantly changing spectrum of clubs, some informal but most formally recognized by either ASCIT or the Graduate Student Council.

Student Shop

The student shop is housed in the Physical Plant complex. It is equipped by the Institute, largely through donations, and is operated by the students. Here qualified students may work on private projects that require tools and equipment not otherwise available. All students are eligible to apply for membership in the student shop; applications are acted on by a governing committee of students. Members not proficient in power tools are limited to hand tools and bench work; however, instruction in power tools is given as needed. Yearly dues are collected to provide for maintenance and replacement.

The Caltech Y

The Caltech Y is a unique nonprofit organization on campus. Founded by students for students, the Y challenges the Caltech community to see the world with a broader perspective and a deeper understanding of social issues. Through community service projects, outdoor adventures, social activities, and cultural events, the Y encourages students to become active participants during their years here. The Caltech Y helps students plan events, meetings, and initiatives on campus and provides the resources and equipment needed for successful programs. Some of the many Y-sponsored activities include the Y hike in the California Sierras, Alternative Spring Break, Make-A-Difference-Day, International Week, the Social Activism Speaker Series, and an International Service Learning Program. The Y also provides services to the Caltech community, such as low-cost rentals on camping equipment, discounted tickets, and much more.

Ombuds Office

The Ombuds Office provides the Caltech community with confidential, informal assistance in resolving campus conflicts, disputes, and grievances. It helps to promote fair and equitable treatment within the Institute and to foster general well-being of the Caltech

community. The office is available to all members of the Caltech community (students, faculty, and staff). Appointments are available upon request before and after normal business hours.

Religious Life

In addition to several groups active on campus such as the Caltech Christian Fellowship and Hillel, houses of worship of many different denominations are within walking distance or are only a short drive from campus.

Public Events

Beckman and Ramo Auditoriums serve as the home of the professional performing arts program on the Caltech campus. Each year, more than 150 public events, ranging from the traditional Earnest C. Watson Lecture Series to dramatic, film, and concert attractions (featuring world-renowned artists), are presented at Caltech. Tickets, often with discounts available, are offered to Caltech students for all events in Beckman and Ramo Auditoriums.

Bookstore

The Caltech Bookstore is located on the ground floor of the Winnett Student Center. Owned and operated by the Institute, the store serves the students, faculty, and staff, carrying a complete stock of general interest and reference books, insignia merchandise, greeting cards, and gift items. These are in addition to textbooks, and school and office supplies. The store offers an ordering service for books and items that are not a part of its regular stock. Located within the store are the Red Door Café and Caltech Wired Computer Store. The Red Door Café provides various types of coffee drinks and juices, along with other food items. Caltech Wired provides computers (including hardware and supporting software and instructional materials) that support Caltech's educational and research functions.

STUDENT HEALTH

.....

Medical Examination

Before initial registration, each applicant is required to submit a Report of Medical History and Physical Examination on a form that is sent at the time of notification of admission. Students who have been absent from the Institute for one term or more may also be required to submit this report.

Student Health Services

The Archibald Young Health Center provides the following services for undergraduate and graduate students and their spouses

enrolled in the Spouse Program: (1) office consultation and treatment of most medical problems by physicians and nurse practitioners (physician visits by appointment only and at prescribed hours); (2) referral to specialists; (3) laboratory tests and some radiology tests as ordered by the medical staff; (4) women's health services, including annual Pap and contraceptive needs; (5) sexual health concerns, including HIV and STD screening; (6) routine medications, common vaccinations, prescription drugs, and other supplies at cost; (7) allergy clinic, travel medicine, dermatology and orthopedic clinic visits. A variety of health education handouts are also available. Visits to the health center are provided at no cost. For more information, visit the health center webpage at <http://www.healthcenter.caltech.edu>.

Student Counseling Service

A staff of mental health professionals provides individual, group, and crisis counseling to undergraduates and graduates at no cost. Students are seen at the center with various concerns, such as depression, stress, grief, relationship difficulties, and self-esteem issues, among others. The center also offers workshops and training on psychologically related topics, a health-education program, psychiatric consultation, and referrals to other professionals in the community. Counseling sessions are confidential.

Health Education

As a joint service of the counseling and health centers, the health educator offers health education programs designed to enhance students' personal development and academic achievement. Program topics include stress management, general health and wellness, nutrition, alcohol and other drug use, and sexual health. Confidential, drop-in counseling hours are available. For additional information, visit <http://www.healtheducation.caltech.edu>.

Student Health Insurance

In addition to services provided by the Health and Counseling Centers, all currently enrolled degree-seeking Caltech students are enrolled in a comprehensive medical insurance plan. This plan covers (with a small deductible) hospital and surgical costs, as well as costs of outpatient treatment for injury, illness, and psychotherapy, when students use providers covered by the plan. Benefits continue during the entire time a student is in residence at Caltech.

Medical Coverage of Dependents

A student's spouse and all unmarried dependent children under 19 years of age are eligible to purchase coverage under the medical insurance plan. In addition, student spouses may enroll for a modest fee in a plan that makes them eligible for all services offered at the Health Center. Children are not eligible for these services.

Application for dependents' insurance should be made at the time of registration for any one school term. Rates for dependents' coverage are available at the Benefits Office in Human Resources.

Medical Responsibility of the Student

The responsibility for securing adequate medical attention in any contingency, whether emergency or not, is solely that of the student, whether the student is residing on or off campus. Apart from providing the opportunity for consultation and treatment at the Health Center as already described, the Institute bears no responsibility for providing medical attention.

Any expenses incurred in securing advice and attention in any case are entirely the responsibility of the student, except as already specified. To secure payment from the insurance plan and substantiate a claim for services rendered away from the Institute, the student is required to retain bills for such services and present them with appropriate documentation when medical claims are made. The Health Center office staff may be called upon for advice on the preparation of claim forms.

CAREER DEVELOPMENT

Career Services

The Career Development Center (CDC) provides assistance to students, postdoctoral scholars, and alumni in the areas of career and life planning and employment. Personal assistance is available in career choice, résumé preparation, interviewing, graduate school application, and job search strategies. Career and vocational interest tests can also be taken.

All students are encouraged to visit and make use of the Career Development Center early in their student careers.

CDC Online

The CDC's home page contains information about the center's programs and activities, as well as links to career, educational, and employment resources nationwide. The URL is <http://www.career.caltech.edu>.

Premedical and Graduate School Advising

Students planning to apply to medical school can make use of many resources and individual counseling in the CDC. Medical school catalogs and statistical information on successful Caltech medical school matriculants are among the materials available. Students can obtain relevant medical research experience, and there is a comprehensive list of available health-related volunteer opportunities. Counselors can help students throughout the process from freshman year to graduation, and will work closely with students to help ensure their success.

We encourage students planning to apply to graduate school and other professional programs to plan ahead. The CDC provides many resources for these programs. (See also pages 187 and 284–285.)

On-Campus Recruiting Program

Through the on-campus recruiting program, employment interviews are arranged with companies that seek full-time employees pursuing B.S., M.S., Eng., or Ph.D. degrees. All graduating students, Caltech postdoctoral scholars, and recent alumni are eligible to participate.

Career Days

Each year in October and February, companies send representatives to campus for a day of informal discussion with students on internship and employment opportunities. Most bring informative displays and literature, and many of the representatives are themselves Caltech alumni. Ph.D.'s and postdoctoral scholars also find organizations that address special considerations of researchers with doctoral degrees.

Career Library

The library contains information on college, graduate, and professional schools, scholarship information, company literature, employer directories, career literature, audio-visual resources, and access to Web-based data.

Work-Study and Employment Listings

Job listings are maintained in the Career Library and through MonsterTRAK.com for students seeking full-time, part-time (including tutoring positions), or work-study employment. Part-time employment provides students with the opportunity to help finance their education and to gain relevant work experience. (See also Student Employment, pages 161–162.)

Internships

The CDC office provides opportunities for students at all levels to work in private industry, government laboratories, educational institutions, and other nonprofit agencies. Many of the advertised positions are with Caltech alumni.

Students are encouraged to see a career counselor to develop summer work interests that will support or complement their long-term career objectives. The CDC provides job search assistance including résumé preparation, mock interview training, and evaluation of offers consistent with goals. Application times for specific positions may be as early as October or as late as May. Many employers, eager to hire Caltech students, provide or supplement transportation and housing as part of their employment package.

Students are encouraged to establish a relationship with the CDC staff during the fall term to start the summer job process.

Annual Report

The center surveys all graduating students and compiles a detailed annual report that provides information on the plans of graduating students. Included are lists of graduate and medical schools chosen, companies that recruited on campus, and industry and academic salaries offered and accepted. (The report is available online at <http://www.career.caltech.edu>.)

Employment Experience of Recent Graduates

Each year the CDC surveys graduating students' future plans. Over several years approximately 50 percent of undergraduates are accepted to graduate school programs, 30 percent accept employment, 10 percent have not accepted offers yet, and 10 percent pursue unconventional options, such as part-time work, part-time school, travel, a year off, etc. At the M.S. level, about 85 percent continue in graduate school, and the remainder accept employment. Of those receiving the Ph.D. degree, about 50 percent accept faculty positions, about 40 percent accept employment, and 10 percent pursue other options.

Caltech graduates who accept industry positions consistently receive salaries in the top quartile nationally.

CALTECH ALUMNI ASSOCIATION

The mission of the Association is to promote the interests of Caltech in setting a world standard of academic excellence by strengthening the ties of goodwill and communication between the Institute, its alumni, and current students, and by maintaining programs to serve alumni needs. These programs include

- Alumni College, a two-day lecture series focused on one theme, with Caltech faculty as featured speakers;
- Seminar Day, a day of lectures, exhibits, and social events held on campus;
- reunions by class year and student house;
- travel/study programs worldwide;
- regional events around the world, many of which feature Caltech faculty.

The Association also supports student activities and organizations, and provides contact between alumni and students. Alumni volunteers play an important role for the Association by maintaining contact with prospective students and their families and by serving as networking resources to other alumni and to current students. Benefits of membership in the Alumni Association include a subscription to *Engineering & Science* magazine, an alumni e-mail account, discounts at the bookstore, and more. For more information, please see <http://alumni.caltech.edu>.

General Information

INTERNATIONAL STUDENT PROGRAMS

The Office of International Student Programs (ISP) is responsible for all immigration-related matters pertaining to students. In addition, ISP provides support services and programs that assist international students and their dependents in adjusting to life in the United States and in addressing any personal, academic, or other important issues that they may face during their stay at Caltech.

As the definitive immigration resource for international students, ISP disseminates information on the rules and regulations pertaining to all student visas. The office assists students with visa acquisition, employment authorization, extensions of stay, and any other immigration-related matters.

Both independently and in cooperation with various student organizations and Institute departments, ISP plans and promotes events that celebrate cultures and peoples of the world, address cross-cultural adjustment, and provide opportunities for international students to establish a sense of community at Caltech.

Each September, ISP hosts a weeklong orientation program that provides a comprehensive introduction to academic and social life at Caltech and in the United States. All incoming international students are required to participate in this program.

Further information about services, current programs, and U.S. immigration regulations pertaining to nonimmigrant students can be obtained by contacting the ISP staff at isp@caltech.edu.

For information on English-as-a-second-language courses for graduate students, please refer to the course listings of this catalog.

AUDITING COURSES

Persons not regularly enrolled in the Institute may audit courses if they obtain the consent of the instructor in charge of the course, and the dean of undergraduate students or dean of graduate studies, as appropriate, and pay the required fee (contact Bursar's Office for audit fee). The fees are nonrefundable.

Auditing fees for nonacademic staff members may be covered by the Institute Tuition Support Plan. Auditing cards may be obtained in the Registrar's Office.

Regularly enrolled students and members of the faculty are not charged for auditing. Auditing cards are not required, but the instructor's consent is necessary in all cases. No grades for auditors are reported to the Registrar's Office, and no official record is kept of the work done.

Auditing Courses

All permanent grades recorded for freshmen during the first and second terms they are enrolled will be either P, indicating passed, or F, indicating failed. The temporary grade of I (Incomplete) may be used as it is for other students. The temporary grade of E may be given to freshmen as described below for other students. It may also be used in a continuing course if the performance of the freshman concerned is not significantly below the current passing level, and if the student is maintaining a steady and substantial improvement; an E given for this reason will be automatically changed to a P if the freshman earns a P for the following term, and will change to an F if the student receives an F for the following term. The grade may not be used in this way for two successive terms nor for the last term of the course.

If a first-quarter or second-quarter freshman is enrolled in a course in which the instructor gives letter grades, the registrar will record P for all passing grades. No grades given to a freshman during the first and second quarter in which they are enrolled will be used in computing the cumulative grade-point average.

For all students beyond the first and second quarters of their freshman year, graduate and undergraduate, letter grades will ordinarily be used to indicate the character of the student's work: A, excellent; B, good; C, satisfactory; D, poor; E, conditional; F, failed; I, incomplete. P may also be used as described below under *Pass/Fail Grading*. In addition, grades of A+ and A-, B+ and B-, C+ and C-, and D+ may be used. In any situation in which no grade is reported, the grade shall be assumed to be F.

At their discretion, instructors may give students who have not completed their work for a course by the end of the term a grade of E. The grade E indicates deficiencies that may be made up without repeating the course. If the instructor does not specify a date on the grade report sheet for completion of the work, students receiving an E will have until Add Day of the following term to complete their work for that course. Instructors may, however, require the work for the course to be completed by an earlier date. If a student receives an E and does not complete the work by the date specified by the instructor or by Add Day, the grade will be changed to an F. Adequate time must be afforded to instructors to grade the work and to submit the final grade to the registrar. It is the responsibility of a student receiving an E to confirm that the registrar has recorded the terms for satisfying the completion of the work in the course.

With the written permission of the instructor a student may extend the E grade past Add Day of the following term, but doing so will cause an additional E grade to be registered. Each additional extension of the E will be until the date specified by the instruc-

tor or until Add Day of the following term, but in each case will require the written permission of the instructor and the registering of an additional E grade.

After an undergraduate student has been awarded the grade of E six times, he or she is not eligible to receive E grades in any subsequent term. A petition for an E in a subsequent term may be approved by the Undergraduate Academic Standards and Honors Committee (UASH) in an exceptional case. Such a petition requires the support of the instructor and the dean or associate dean of students.

The grade I is given only in case of sickness or other emergency that justifies noncompletion of the work at the usual time. It is given at the discretion of the instructor, after approval by the dean or associate dean of students or the dean of graduate studies. The time period within which the grade of I is to be made up should be indicated on the grade sheet, or students receiving an I will have until Add Day of the following term to complete their work for the course. As in the case of the E grade, the grade of I shall not be considered in calculating a student's grade-point average.

Students receiving grades of E or I should consult with their instructors not later than the beginning of the next term in residence as to the work required and the time allowed. This time should, in most cases, coincide with the date fixed in the calendar for removal of conditions and incompletes (Add Day), and in fact if no other time is specified, this date will be assumed. Further, under no circumstances may the time for the completion of the work be extended for more than three terms in residence after the end of the term in which the grade of E or I was given. At the end of the specified time, unless there is a written request from the instructor to the contrary, or in any event at the time of graduation or at the end of three terms in residence, whichever occurs first, all E's and I's not otherwise reported will be changed to F. Grades of E and I shall not be considered in calculating a student's grade-point average.

Failed means that no credit will be recorded for the course. The units, however, count in computing the student's grade-point average, unless the course was taken on a pass/fail basis. He or she may register to repeat the subject in a subsequent term and receive credit without regard to the previous grade, the new grade and units being counted as for any other course, but the original F and units for the course remain on the record. An F, once recorded, will be changed to a passing grade only on the basis of error. Such a change may be made only with the approval of the Undergraduate Academic Standards and Honors Committee or of the Graduate Studies Committee, whichever has jurisdiction.

Petitions by undergraduate students for late drops (i.e., requests to drop a course after Drop Day) will be considered by the UASH Committee. If approved, a W (standing for "withdrawn") will be

recorded on the student's transcript in place of a grade for that course. W's will not be included in the computation of the student's grade-point average. Courses will be expunged from the student's record only in exceptional circumstances, at the discretion of the UASH Committee.

Each course at the Institute is assigned a number of *units* corresponding to the total number of hours per week devoted to that subject, including classwork, laboratory, and the normal outside preparation. Credits are awarded as shown in the table below.

Grade-Point Average is computed by dividing the total number of credits earned in a term or an academic year by the total number of units taken in the corresponding period. Units for which a grade of F has been received are counted, even though the course may have subsequently been repeated. Grades of P or F obtained in courses graded on a pass/fail basis are not included in computing grade-point average.

No. of Units	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	F
1	4	4	4	3	3	3	2	2	2	1	1	0
2	9	8	7	7	6	5	5	4	3	3	2	0
3	13	12	11	10	9	8	7	6	5	4	3	0
4	17	16	15	13	12	11	9	8	7	5	4	0
5	22	20	18	17	15	13	12	10	8	7	5	0
6	26	24	22	20	18	16	14	12	10	8	6	0
7	30	28	26	23	21	19	16	14	12	9	7	0
8	35	32	29	27	24	21	19	16	13	11	8	0
9	39	36	33	30	27	24	21	18	15	12	9	0
10	43	40	37	33	30	27	23	20	17	13	10	0
11	48	44	40	37	33	29	26	22	18	15	11	0
12	52	48	44	40	36	32	28	24	20	16	12	0
13	56	52	48	43	39	35	30	26	22	17	13	0
14	61	56	51	47	42	37	33	28	23	19	14	0
15	65	60	55	50	45	40	35	30	25	20	15	0

Pass/Fail Grading: The following regulations apply:

- First-quarter and second-quarter freshmen receive pass/fail grades in all courses by virtue of their classification as freshmen by an admissions committee or, for students whose status after the first year is uncertain, by the Undergraduate Academic Standards and Honors Committee.
- Required laboratory courses will be graded P or F regardless of when they are taken, but these courses must be taken during the freshman or sophomore years.
- All other students, undergraduate and graduate, in courses with numbers under 200 will receive letter grades unless the course is designated "graded pass/fail" or unless, when it is allowed, the student files with the office of the registrar

a completed Pass/Fail Course Selection Card not later than the last day for dropping courses.

- In courses with numbers 200 or greater that are not designated either "graded pass/fail" or "letter grades only," the instructor may decide separately for each student what class of grades to use.
- All research courses shall be designated "graded pass/fail." All reading courses, seminar courses, or other courses that do not have a formal class structure shall be designated "graded pass/fail" unless the option secures an exemption from the Curriculum Committee or the Graduate Studies Committee and from the Faculty Board.
- A grade on the pass/fail system should be P if it would have been a D or better on the letter grade system. (Note that there is no D- grade.) The standards of failure in courses in which only pass/fail grades are used should be the same as they would be if the course were letter graded.
- Any instructor may, at his or her discretion, specify prior to registration that his or her course, if not classified by the above regulations, is to be graded on a "letter grades only" basis or is to be graded pass/fail only, subject to possible review by the responsible option. The registrar must be notified of such specification two weeks before the beginning of registration. (Note: If the grading scheme is changed during the term, it is changed for everyone.)
- Each term any student may select, subject to such requirements as may be imposed by the option, two elective courses in which he or she is to be graded on a pass/fail basis if it is not designated as "letter grades only" and is not specifically required for the degree in his or her option. To make this election, a completed Pass/Fail Course Selection Card must be submitted to the Office of the Registrar on or before the last day for dropping courses that term. This election may be reversed or reinstated at any time before the deadline. The election must be approved and the card signed by the student's adviser. The instructor must be notified and should sign the card to indicate that this has been done; the instructor must allow any eligible student to make this election.
- Of the units offered to satisfy the requirements for the Bachelor of Science degree, no more than 90 may be in courses graded pass/fail because of the student's election.

Procedures for Resolving Disputes over Grading

At Caltech, the instructor has full responsibility for assigning grades to students enrolled in a course. On occasion, a student may not understand how a grade was determined and may seek further information. The student should first meet with the instructor or teaching assistant to discuss the grade. If after doing so the student believes the grade is unjustified or capricious, the following procedures are available.

Before the end of the term following the term when the grade was issued, the student should contact the academic mediator, appointed by the provost, who will work with the student and instructor to resolve the problem. If the mediation effort is unsatisfactory to the student, he or she may request a formal review by an appropriate executive officer or academic officer. The executive officer will review the case and report the decision in writing to the student. If the executive officer decides that a change of grade is warranted, or if the student requests a further appeal, these shall be requested of the division chair. At the discretion of the division chair, a committee may be appointed to review the case. The committee members should interview everyone involved in the case (the student, the course instructor, the teaching assistant, and anyone else with relevant information), and make a written recommendation to the division chair. Only the division chair can authorize the registrar to enter a new grade in the student's transcript.

NOTICES AND AGREEMENTS

Academic Records of Veterans

The Institute maintains a written record of a student's previous education. This is part of the student's official transcript, and included on this is a summary of any prior college-level education. A true copy of a transcript of college-level work at other institutions is maintained as part of the student's record. The amount of credit granted for prior training is indicated on the student's official transcript and, where this results in the shortening of a required training period in the case of a veteran, the Veterans Administration is notified.

The Institute's official transcript for each student shows the progress that student is making at the Institute. There is a record of each course enrolled in each term with a grade recorded for the course. The total number of units earned is kept so that the record will show continued progress toward the degree sought. The final grades are recorded at the end of each term of the school year, and the accumulative permanent record has on it grades for all subjects taken at the Institute. No student is allowed to enroll repeatedly in a course and withdraw without penalty. If a student enrolls in a course, he or she is expected to complete the course or receive a failing grade unless he or she withdraws from the course prior to the deadline for dropping courses. All students must maintain a minimum load equivalent to 12 quarter hours each term; no student may drop courses that would bring him or her below this level of effort. At any time when the student falls below the required number of units, fails to receive satisfactory grades, or engages in unsatisfactory conduct, the record is marked to indicate this, and the student is forbidden to continue at the Institute.

The grading system of the Institute is A (excellent) to F (failed). An A is equivalent to 4.0 and an F to 0.0. A student must maintain a grade-point average of 1.4 in any term and at least 1.9 in each full year in order to be able to enroll in a successive term at the Institute. A minimum 1.9 overall grade-point average is required for graduation. A student who drops below the required averages (1.4 for a given term or 1.9 for the year) is dismissed and must petition for reinstatement. A student may be reinstated by the Undergraduate Academic Standards and Honors Committee and, if so, is required to earn a 1.9 GPA during the immediately following term. The Veterans Administration is notified when a veteran is academically dismissed or is making unsatisfactory progress toward a degree. Since the Institute requires all students to carry a minimum full load that corresponds to 12 quarter hours each term, any student who finishes a term in good standing is considered to have made satisfactory progress. If a student withdraws from a course before the final date for withdrawal, no grade is given in that course. The time spent in school counts, however, and the student may be considered to have not made satisfactory progress in the event of such withdrawal.

In order to withdraw from any course a student must submit a withdrawal card. This shows the date on which the student was last in official attendance in that course. If a student reenrolls in that course and successfully completes it, that fact will be noted on his or her official transcript.

Access to Student Records

The Institute maintains educational records for each student that include name, address, student identification number (including Social Security number), information on parents, guardian, and spouse, general information on academic status at the Institute, previous school data, results of standardized admissions examinations, courses previously taken or being taken, credits, and grades. Applicants for financial aid have an additional file holding those records. The Family Education Rights and Privacy Act (FERPA) and Caltech policy afford students certain rights as well as establish limitations with respect to student education records. These rights and limitations are as follows:

1. The registrar of the Institute is responsible for maintaining all educational records, except for those involving Financial Aid. Caltech permits disclosure of educational records, without consent of the student, to Institute officials with legitimate educational interests in them. An Institute official is a person employed by the Institute in an administrative, supervisory, academic or research, or support-staff position (including security personnel and health and women's center staff), a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent), a person serving on the Board of Trustees, or a

student serving on an official committee, such as a disciplinary or grievance committee, or assisting another Institute official in performing his or her tasks. An Institute official has a legitimate educational interest if he or she needs to review an education record in order to fulfill his or her professional responsibility. They are available to the registrar, provost, president, general counsel, vice president for student affairs, dean of graduate studies, dean of students, director of financial aid, and faculty of the Institute and to their respective staffs for the normal academic and business purposes of the Institute. Records involving financial aid are maintained by the director of financial aid, and are available to the director and staff, to the dean of graduate studies and staff, to the Faculty Committee on Scholarships and Financial Aid, and to the Faculty Committee on Graduate Study, for the purpose of granting and administering the Institute's Financial Aid program. Except as authorized by federal or state law or regulation, none of these educational records nor any personally identifiable information contained therein, other than directory information (see below), will be made available to anyone else, other than the student, without the written consent of that student. Where consent is required and given, the student, upon request, will receive a copy of the records to be released. The Institute will keep a record, available to the student and kept with his or her file, of all persons and organizations, other than those authorized within the Institute, requesting or obtaining access to the files, except when records have been produced in response to a grand-jury subpoena or other subpoena issued for a law-enforcement purpose and the court or issuing agency has ordered that the existence or the contents of the subpoena or the information furnished in response to the subpoena not be disclosed.

2. Students are allowed access to their educational records as follows: A student may inspect his or her academic transcript during normal working hours. To see other records, the student must provide a written request to the registrar or to the director of financial aid or to the dean of graduate studies or to the dean of students, or their deputies, as appropriate. A mutually convenient time will be arranged within 10 working days after receipt of the request for the student to examine the records in his or her file. At that time the student may examine all educational records in the file with the exception of those specifically exempted by Part 99 of Title 34 of the Code of Federal Regulations. The student may obtain copies of any of the records available to him or her; the cost will be 44 cents for the first page copied and 12 cents for each additional page. All reasonable requests for

- explanations or interpretations of the educational records will be honored, and if inaccurate, misleading, or otherwise inappropriate data are found in these records, they will be promptly corrected or deleted. The student also has the right to insert into the records a written explanation respecting the contents of such records. If the student and the registrar, or the director of financial aid, or the dean of graduate studies, or the dean of students, or their deputies, do not agree on any item contained in the educational records, the student may submit a written request to the provost for a hearing to challenge the content of the records. The provost will schedule such a hearing within 30 days after receipt of the request and will notify the student at a time reasonably in advance of the hearing of its date, time, and place. The hearing will be before a board composed of the provost, the vice president for student affairs, or their designated alternates, and at least one disinterested member of the faculty, who shall be appointed by the chair of the Faculty Board. None of those hearing the challenge may have a direct interest in the outcome. The student will be afforded a full and fair opportunity to present evidence relevant to the issues raised and may be assisted or represented by individuals of his or her choice at his or her own expense, including an attorney. The decision of the board on the correctness of the educational record, as determined by majority vote, will be in writing, will be rendered within 10 days after the conclusion of the hearing, and will be final. This decision will be based solely upon the evidence presented at the hearing and will include a summary of the evidence and of the reasons for the decision. If, as a result of the hearing, the Institute decides that the information in the files is inaccurate, misleading, or otherwise in violation of the privacy or other rights of the student, the Institute shall amend the records accordingly and so inform the student in writing. However, if, as a result of the hearing, the Institute decides that the information is not inaccurate, misleading, or otherwise in violation of the privacy or other rights of a student, it shall inform the student of the right to place in the educational records a statement commenting on the information in the records and/or setting forth any reasons for disagreeing with the decision of the Institute.
3. The Institute considers the following to be directory information: a student's name, UID, address, e-mail address, telephone listing, ID photograph, date and place of birth, major field of study, year in school, current enrollment status, expected date of graduation, participation in officially recognized activities and sports, weight and height if a member of an athletic team, dates of attendance, degrees and awards received, thesis title, home town, and most recently attended educational agency or institution. Directory information may

be made available to requestors at the Institute's discretion. Any student may, however, have part or all of this information withheld by notifying the registrar in writing no later than 30 days after the commencement of classes in the academic year. That information will then be withheld for the balance of that academic year. If the information is to be withheld in subsequent years, new requests must be filed.

4. A student will not be required to waive any rights regarding access to educational records. However, a student may voluntarily waive right of access to confidential statements made by third parties respecting admission to educational agencies or institutions, applications for employment, or the receipt of an honor or honorary recognition. In case of waiver, the confidential statements will be used solely for the purposes for which they were specifically intended, and the student will, upon request, be notified of the names of all persons making such confidential statements. If a student should desire to so waive right of access, so as to facilitate the obtaining of a confidential statement of this nature, he or she should contact the registrar for the necessary form.
5. The Institute reserves the right to destroy from time to time any and all educational records that it maintains on a student, except to the extent that the law requires their maintenance for a longer period of time. However, where access to records has been requested, no destruction of those records will be allowed to take place until such access has been granted or denied.
6. Students who believe their rights under FERPA may have been violated may file a complaint with the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue SW, Washington D.C. 20202-4605.

Transcripts of Records

A student, or former student, may request that official transcripts of his or her records be forwarded to designated institutions or individuals. Requests should be filed at the Registrar's Office at least five days before the date on which the transcripts are to be mailed. (See "Unpaid Bills," page 150, for complete details.)

Accreditations and Authorizations

The California Institute of Technology is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges, 985 Atlantic Ave., Ste. 100, Alameda, CA 94501; (510) 748-9001. In addition, the Institute is authorized by the California State Department of Education, Office of Private Postsecondary Education, to operate as a private postsecondary educational institution and, by the same agency, to train veterans in the programs of the Veterans Administration.

The Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700) has accredited our B.S. programs in chemical engineering, in electrical engineering, in engineering and applied science, and in mechanical engineering. Further, the Committee on Professional Training of the American Chemical Society has approved our B.S. program in chemistry.

The documents describing these accreditations and authorizations are on file and may be inspected in the Office of the Registrar, the Undergraduate Admissions Office, or the Office of the Dean of Graduate Studies.

Student Grievance Procedure

Caltech provides a variety of routes, most of them informal, by which students may bring complaints to consideration and resolution. In academic matters, for example, they may begin with faculty-student conversations and may extend to the deans, the division chairs, the registrar, or to various committees having faculty and student members. Undergraduate housing matters are dealt with by house officers, the resident associates, the IHC, and the assistant vice president for campus life. The dean of graduate studies is often of assistance in resolving graduate student matters. As the Institute officers responsible for the supervision of many Student Affairs offices, the assistant vice presidents for student affairs may be the appropriate persons to appeal to in case of unresolved complaints involving those offices. The ombudsperson, who acts on behalf of the entire Caltech community, may be consulted confidentially about any problem. The Graduate Student Council and ASCIT may become involved in important complaints, and sometimes ad hoc groups are formed to make recommendations.

The grievance procedure is intended to deal with complaints by currently enrolled students for which reasonable efforts by the available informal routes have not led to an acceptable resolution, and which do not fall within the jurisdiction of the Honor System.

The first step in this procedure is to consult with the person appointed by the president of the Institute as mediator for student grievances. The mediator will assist the student in trying to work out the problem in an informal way. If the student is not satisfied with the results, he or she may appeal the case to the Student Grievance Committee. The members of the committee are undergraduates appointed by the ASCIT Board of Directors, graduate students appointed by the Graduate Student Council, faculty appointed by the faculty chair, and administrative staff appointed by the vice president for student affairs. Two members and two alternates are appointed from each of the four categories. The chair of the committee is appointed by the president and does not vote except in case of a tie. The grievant may present the case to the committee, present documents in support of the case, request that witnesses be called, and be assisted by another member of the

Caltech community who is not an attorney. The committee will present its conclusions and recommendations to the president of the Institute, and the president's decision will be final. A complete statement of the student grievance procedure is available from the following offices: Student Affairs, Dean of Students, Dean of Graduate Studies, Women's Center, and the Ombuds Office.

Student Patent and Computer Software Agreement

The California Institute of Technology has the responsibility to see that inventions made and computer software developed at the Institute be used for the public benefit, be administered in such a way as to avoid cause for criticism of the Institute, and meet the Institute's contractual obligations to others.

Students at Caltech have many opportunities to work in laboratories, in shops, or with computers, sometimes on individual projects and sometimes as part of a group activity. It is not unusual under these circumstances for inventions to be made, or computer software to be written, and it is important that the student's rights in patents on such inventions and computer software be protected. The Institute's policy is to reserve to itself rights in inventions and computer software generated by faculty and staff members with the use of Institute facilities or in the normal course of their Institute duties. The student's position is different, however, and students retain all rights except in inventions or computer software generated under circumstances such that rights clearly belong to the Institute or to the sponsor of the research. In order to clarify this situation and to protect the rights of both the student and the Institute, each student at Caltech is asked to sign the following agreement.

In view of the patent and copyright policies of the Institute in force at this date and as may from time to time be amended, and as consideration for my use of Institute facilities and equipment, I hereby agree as follows.

1. The Institute agrees that I shall retain all rights in inventions and computer software generated by me at the Institute except when such inventions are first conceived or actually reduced to practice, or such computer software is written: A) in the course of the performance of work as a paid employee of the Institute; B) in the course of independent student research financed by or otherwise obligated to an outside grant to or contract with the Institute, or financed by a grant from the Institute; or C) during work in the research program of an academic staff member.
2. When I generate inventions or computer software at the Institute in connection with in the educational program of the Institute (e.g., course work, homework, theses), the Institute agrees that I shall retain rights but the Institute shall obtain an irrevocable royalty-free nonexclusive license,

with the right to grant sublicenses, for any purpose whatsoever.

3. I agree to notify the Institute promptly of any discovery, innovation, or invention that is first conceived or first actually reduced to practice, or computer software written, under the conditions of paragraphs 1A through 1C above.
4. I agree to assign, and hereby do assign, to the Institute all such inventions and computer software made or written under the conditions of paragraphs 1A through 1C above, and all inventions, copyrights, patent applications, and patents relating thereto; and to execute all papers required to apply for, obtain, maintain, issue, and enforce such copy right registrations, patents, and applications; and to provide reasonable assistance regarding such copyrights, patents and patent applications, including testifying in any interference proceeding or litigation relating thereto. Expenses for the copyrights and patent applications, and for the assistance set forth in the preceding sentence, shall be borne entirely by the Institute.
5. I understand that if the Institute receives funds from the licensing of computer software or patents assigned to it by me pursuant to this agreement, in excess of unreimbursed expenses associated with obtaining, maintaining, and enforcing such copyrights and patents, I shall share in these funds according to the established Institute policy, procedures, and practice in effect on the date that the patent application is filed or the computer software is completed, in the same manner as a member of the academic staff.
6. I understand that the Institute relies on the foregoing agreement when it enters into contracts with others and obligates itself with respect to inventions or computer software made or written in the course of research conducted at the Institute.
7. I also understand that this agreement does not apply to any invention that qualifies fully under the provisions of Section 2870, Chapter 2 of Division 3 of the Labor Code of the State of California, which states as follows.

(a) Any provision in an employment agreement which provides that an employee shall assign, or offer to assign, any of his or her rights in an invention to his or her employer shall not apply to an invention that the employee developed entirely on his or her own time without using the employer's equipment, supplies, facilities, or trade secret information except for those inventions that either: (1) Related at the time of conception or reduction to practice of the invention to the employer's business, or actual or demonstrably anticipated research or development of the employer; or (2) Result from work performed by the employee for the employer. (b) To the

extent a provision in an employment agreement purports to require an employee to assign an invention otherwise excluded from being required to be assigned under subdivision (a), the provision is against the public policy of this state and is unenforceable.

Student Retention and Persistence Rates

Most undergraduates enter Caltech at the freshman level. Of the 214 freshmen enrolled during the 2006–07 academic year, 210 reenrolled in the first term of the 2007–08 academic year and are progressing, yielding a persistence rate of 98 percent. Of the 214 freshmen enrolled during the 2001–02 academic year, 191 graduated by June 2007, yielding a graduation rate for this group of 89 percent.

At the graduate level, most students enter Caltech to pursue either the degree of Master of Science or Doctor of Philosophy or, occasionally, both. Of the 206 entering graduate students enrolled in a Ph.D. program during the 2006–07 academic year, 200 reenrolled in the first term of the 2007–08 academic year and are making satisfactory academic progress, resulting in a persistence rate of 97 percent. Of the 51 entering graduate students enrolled in M.S. programs during the 2006–07 academic year, 10 completed requirements within one year; an additional 40 reenrolled in the first term of the 2007–08 academic year and are making satisfactory progress toward a higher degree.

INSTITUTE POLICIES

Acceptable Use of Electronic Information Resources

Caltech provides electronic information resources (including, but not limited to, computers, computer accounts and services, networks, software, electronic mail services, electronic information sources, video and voice services, servers, web pages, and related services) to assist members of the Institute community in the pursuit of education and research. This policy, in conjunction with other applicable Caltech policies, sets forth the acceptable use of all Caltech electronic information resources owned or managed by Caltech, and describes the rights and responsibilities of the Institute and of faculty, staff, students, and other members of the Institute community with respect to use of these resources.

Electronic information resources are intended to be used to carry out the legitimate business of the Institute, although some incidental personal use is permitted. Faculty, staff, students, and other members of the Institute community (“users”) who use campus electronic information resources should be guided by the Institute’s Honor System, which prohibits any member of the Institute community from taking unfair advantage of any other.

In addition, users who use the Institute’s electronic information resources assume responsibility for their appropriate use and agree to comply with all relevant Institute policies and all applicable local, state, and federal laws.

Users of Institute electronic information resources may not use these resources for inappropriate or unauthorized purposes. Some examples of inappropriate use are sending a communication or using electronic information resources, including web pages, that discriminate against or illegally harass, defame, offend, or threaten individuals or organizations, or to engage in other illegal conduct or conduct that violates Institute policy; destruction of or damage to equipment, software, or data belonging to others; disruption or unauthorized monitoring of electronic communications; interference with use of Institute systems; violations of computer security systems; unauthorized use of accounts, access codes, or identification numbers; use of facilities in ways that intentionally impede the legitimate computing activities of others; use of facilities for commercial purposes; use for political or lobbying activities that jeopardize the Institute’s tax exempt status and, therefore, violate Institute policy; violation of copyrights, software license agreements, patent protections and authorizations, or protections on proprietary or confidential information; unauthorized use of Caltech’s trademarks; violating copyright laws by downloading and sharing files; violations of privacy; academic dishonesty; sending chain mail; spamming; intrusion into computer systems to alter or destroy data or computer programs (e.g., hacking or cracking); or sending communications that attempt to hide the identity of the sender or represent the sender as someone else.

Password capabilities and other safeguards are provided to members of the Caltech community in order to safeguard electronic messages, data, files, and other records (including computer files and records, electronic mail, and voice mail) from unauthorized use. In addition, the Institute will routinely follow up on systems and/or accounts that appear to be compromised or are in the process of being compromised. However, these safeguards are not intended to provide confidentiality from the Institute with respect to personal messages or files stored on Institute systems. Electronic information resources are Institute property. Users should not have an expectation of privacy with respect to their use of Institute electronic information resources or data, files, or other records generated, stored, or maintained on Institute resources.

The Institute may routinely examine network transmission patterns such as source/destination, address/port, flags, packet size, packet rate, and other indicia of traffic on the servers. While the Institute will not, as a routine matter, review the content of electronic messages or other data, files, or records generated, stored, or maintained on Institute electronic information systems, the Institute retains the right, within its discretion, to inspect, review,

or retain the content of electronic messages and other data, files, or records generated, stored, or maintained by users at any time without prior notification, for legitimate Institute reasons. These legitimate reasons include, but are not limited to, responding to lawful subpoenas or court orders, investigating misconduct and determining compliance with Institute policies, and locating electronic messages, data, files, or other records. Users should also understand that electronic messages, data, files, and other records generated, stored, or maintained on Institute electronic information systems may be electronically accessed, reconstructed, or retrieved even after they have been deleted. Institute access to the content of electronic mail, data, files, or other records generated, stored, or maintained by any member of the Caltech community may only be requested 1) by the provost for faculty; 2) by the associate vice president for human resources for employees; and 3) by the vice president for student affairs for students. In all cases, Institute access requires prior consultation with the Office of the General Counsel.

The use of Institute electronic information resources is a privilege, not a right, and the Institute may revoke this privilege, or decline to extend this privilege, at any time. Inappropriate use of Institute resources may result in administrative discipline up to and including separation from the Institute. Suspected illegal acts involving Institute electronic information services may be reported to state and federal authorities, and may result in prosecution by those authorities. Any questions concerning the appropriate use of any of the Institute's electronic information resources or relevant Institute policies should be directed to the provost, the chief information officer, the associate vice president for human resources, the dean of students, or the dean of graduate studies.

Accommodations for Disabilities

It is the policy and practice of Caltech to comply fully with the Americans with Disabilities Act (ADA), the Rehabilitation Act (Section 504), and other applicable federal, state, and local laws to ensure equal opportunity for qualified persons with disabilities. Caltech is committed to ensuring that there is no unlawful discrimination in any of its programs, services, activities, and terms and conditions of employment. As required by law, Caltech will provide reasonable accommodations to qualified individuals with disabilities including students, employees, and job applicants.

It is the responsibility of the Caltech administration and faculty to ensure the Institute's compliance with this policy.

The following individuals have been designated as contacts regarding disability issues. For students, Barbara Green, associate dean of students, (626) 395-6351. For staff, April White Castañeda, senior director of employee relations, (626) 395-8167. For faculty, Sharon Borbon, assistant to the provost for faculty administration, (626) 395-6261.

Alcohol Use at Student Events

I. Basic Principles

Caltech is committed to providing its students, faculty, and staff with an environment that promotes safe and responsible social interaction.

The Institute's concern over the illicit use and the abuse of alcohol and drugs results from the serious health hazards caused by substance abuse and from the potential legal penalties for those convicted of unlawful use, possession, or distribution of these substances, and by the ways in which alcohol and drugs adversely affect the campus environment. All members of the Caltech community should be familiar with and adhere to the Institute's policy on substance abuse. Please refer to <http://cit.hr.caltech.edu/policies/policies-main.html> for the complete text of the policy.

Caltech's primary approach to preventing substance abuse is to educate its students regarding the medical and psychological hazards of abuse and to increase student sensitivity to the ways in which substance abuse interferes with the rights and privileges of others. The Institute encourages the future growth of a community where substance abuse is not condoned and where those with related abuse problems are provided with assistance.

The Caltech community, guided by the Honor Code, is founded on trust, respect, and responsibility. These principles apply to all aspects of Caltech life, including alcohol and substance use and abuse. Caltech has a long-standing tradition of students acting responsibly and refraining from actions that are damaging to others or to the Institute. Individuals are expected to take responsibility for their own conduct and to comply with state and federal laws as well as with Institute policy and the Honor Code.

II. Caltech Policy on Controlled Substances and Alcohol

The Institute maintains a drug-free workplace and campus. The use, possession, cultivation, manufacture, sale, or transfer of illegal drugs is prohibited. The illegal use of other drugs or prescriptions is also prohibited. Members of the Caltech community are expected to act lawfully with respect to the possession and consumption of alcoholic beverages. Possession and consumption of alcohol by individuals under 21 is prohibited. It is a violation of Caltech's policy to serve, share, or pass alcohol to anyone under 21. Anyone who is intoxicated, regardless of age, may not be served. All members of the Caltech community, including students, are prohibited from returning to work in an experimental lab after having consumed alcohol. Consumption of alcoholic beverages in public areas outside residences, such as walkways, building steps and porches, and green spaces (e.g., the Olive Walk, the Millikan Pond area, the Court of Man), is not permitted regardless of the drinker's age unless the event is registered.

Planning Student Events at Caltech

Caltech recognizes that student parties and activities are an important part of campus life. The information provided here is intended to help minimize the risks associated with sponsoring a party, and to help individuals and organizations plan and execute a safe, healthy, fun, and problem-free event.

Event planners are encouraged to consult with the assistant vice president for campus life, the dean or associate dean of students, or the dean of graduate studies prior to the party so that the respective office can work with planners in arranging their event.

Planning Requirements

These requirements apply to events taking place in an Institute common area (any area outside of an individual's apartment or private room). Examples of common areas include house lounges, dining rooms, and courtyards, the Catalina recreation room, Dabney Lounge, etc. These planning requirements do not apply to activities that take place in private rooms within student residences or student apartments. Such locales are governed by applicable laws and conditions of the housing contract.

All student events at which alcohol will be served (including official campus functions, registered events, and private parties) must adhere to the following guidelines:

- In order to use Institute funds (including house dues, club funding, and student government funding) for an event where alcohol is served, prior authorization must be received from the assistant vice president for campus life, the dean or associate dean of students, or the dean of graduate studies.
- Events where alcohol is served may be open only to members of the Caltech community and their invited personal guests.
- Events should not promote the inappropriate or excessive use of alcohol.
- One student must fill out the event registration form as the event host on behalf of the sponsoring organization, signifying that the organization agrees to abide by Caltech procedures and applicable law.
- Professional bartenders are required at any event where alcohol is served and participants under the legal drinking age are present. Professional bartenders may also be required at the discretion of the Institute if circumstances so require. A current driver's license with a picture, a state-issued identification card, or a passport is the acceptable means of age verification.
- A bartender may not serve alcohol to any individual who is under 21 years of age or to anyone who is intoxicated. A bartender may not serve more than one drink to one person at any one time.

- Alcoholic and nonalcoholic beverages must be free and provided in quantities determined by the proportion of guests above and below the legal drinking age. An adequate supply of quality nonalcoholic beverages must be provided throughout the duration of the party. Alcohol may not be served if nonalcoholic beverages run out. Food must also be available throughout the duration of the event.
- Campus security must be present at any registered event where alcohol is served unless the assistant vice president for campus life, the dean or associate dean of students, or the dean of graduate studies grants an exception.
- All events must conclude by the time governed by Institute policy, which is 2:00 a.m. The bar must be closed at 2:00 a.m., and security will be present to assist in the process. This may include removing remaining alcohol to a designated secure location.
- An accessible shared supply of alcohol may not be held by houses, individuals, or clubs. This includes, but is not limited to, unregistered kegs, trash-can punches, and beer fridges.
- Any drinking game or any other activity that promotes the rapid and/or excessive consumption of alcoholic beverages is not permitted.

To determine whether your event must be registered, access the undergraduate event registration form or the graduate registration form on the Student Affairs website.

Federal and State Law

Caltech abides by federal and state laws in regard to the use of illegal drugs and alcohol. It is a criminal offense

- To use, possess, cultivate, manufacture, sell, or transfer illegal drugs, or to illegally use other drugs or prescriptions
- For any person under the age of 21 to consume, purchase, or possess alcohol
- To provide any alcoholic beverage to a person under the age of 21
- To provide any alcoholic beverage to an obviously intoxicated person
- To be under the influence of alcohol in a public place and unable to exercise care for one's own safety or that of others
- To operate equipment or vehicles after consuming alcohol or drugs
- To have in one's possession or to use false evidence of age and identity to purchase alcohol

A student's eligibility for federal financial aid may be suspended if the student is convicted, under federal or state law, of an offense involving the possession or sale of illegal drugs.

Liability

While the law regarding civil liability is complex, it is important to know that under some circumstances student houses, event sponsors, bartenders, or others might be held legally liable for the consequences of serving alcohol to underage drinkers or to obviously intoxicated persons. Persons could be sued and potentially found personally liable for damages to any injured party or parties.

Institute-Imposed Consequences for Policy Violation

Caltech will impose sanctions on individuals and organizations that violate this policy. These sanctions and penalties will depend on the severity of the offense. The penalties can be imposed by the dean or associate dean of students, dean of graduate studies, assistant vice president for campus life, the Conduct Review Committee, the Board of Control, the Graduate Review Board, and the vice president for student affairs. For undergraduate violations, the Routing Committee (made up of the chair of the Board of Control, the student cochair of the Conduct Review Committee, assistant vice president for campus life, and the dean of students) determines who will hear the case. For graduate students, the dean of graduate studies and the chair of the Graduate Review Board will meet to determine who has jurisdiction over the case. Penalties can include expulsion from the Institute and referral to civil authorities for prosecution for violations of the law. A student who is found to be selling or providing illegal drugs can be suspended or expelled from the Institute, even for a first offense.

In addition to suspension or expulsion, other sanctions may include the following:

- Verbal and written warnings
- Organizing an educational program for peers
- Community service
- The completion of an appropriate rehabilitation program
- Social probation for an individual or a group
- Persona non grata status
- Suspension from housing
- Attending a substance-abuse awareness program

Houses and student organizations that flagrantly or frequently violate the policy will have restrictions placed on parties, events, and/or other social activities. An event may be closed immediately, or other interventions may be taken to correct the violation. Disciplinary action may be invoked entirely apart from any civil or criminal penalties that the student might incur.

Students should understand that inebriation is never an excuse for misconduct—that a student's careless or willful reduction, through the use of alcohol or other intoxicants, of his or her own ability to think clearly, exercise good judgment, and respond to rational intervention may invoke more stringent penalties than otherwise might be levied.

Recent legislation allows institutions of higher education to contact parents when their adult children violate a school's alcohol or drug policy. If it is a possibility that students' behavior with respect to alcohol and drugs presents a danger to themselves and/or others, Caltech may inform parents. Such a determination will be made by the deans or the assistant vice president for campus life, in consultation with other offices as necessary.

III. Alcohol Safety

When planning an event where alcohol will be served, it is important to be aware of the need to implement a plan to promote the health and safety of your guests. Caltech's alcohol policy and programs are intended to encourage its community members to make responsible decisions about the use of alcoholic beverages, and to promote safe, legal, and healthy patterns of social interaction.

As an event host or as a participant, it is important to be educated regarding signs of intoxication, signs and symptoms of alcohol poisoning, and managing high-risk guests.

In order to manage high-risk guests, the following is a list of suggested Dos and Don'ts:

Do

- Be friendly but firm
- Be assertive and nonjudgmental
- Make sure you have others close by for support
- Use the guest's friends as your allies
- Offer guests an alternative to drinking; this will allow the guest to "save face" and feel in control
- Be aware of possible aggression; try to get the person away from the crowd and distracted from possible sources of anger

Don't

- Be angry or obnoxious
- Back down or change your mind
- Hesitate to call your RA or Security
- Take statements personally or get into a shouting match
- Touch anyone without good reason; if someone attacks you, only use enough force to restrain them
- Embarrass the guest; others observing the situation may feel a need to intervene or retaliate

In addition, the ability to differentiate between the symptoms of alcohol intoxication and an alcohol emergency is critical. Signs of intoxication include

- Talking loudly, then very softly
- Rambling or irrational speech
- Acting aggressively or belligerently
- Spilling drinks
- A decrease in coordination, e.g., missing the mouth while attempting to drink

In contrast, the signs and symptoms of alcohol poisoning are more severe and dangerous. There is no way to sober someone up quickly. It takes about as many hours to sober up as the number of drinks consumed. If an individual exhibits

- Unconsciousness or semiconsciousness
- Slow breathing—eight breaths or less a minute
- Cold, clammy, pale, or bluish skin
- No response to sounds, pinching, prodding, or poking

it is highly possible that he or she has alcohol poisoning.

What to Do:

- Telephone ext. 5000 or 395-5000 immediately
- Stay with the person until help arrives
- Observe the person’s vital signs (level of consciousness, breathing rate, color of skin)
- Prevent choking by rolling the person onto his or her side

In cases of intoxication and/or alcohol poisoning, the primary concern is for the health and safety of the persons involved. Individuals are strongly encouraged to call for medical assistance for themselves or for a friend/acquaintance who is dangerously intoxicated. **No student seeking medical treatment for an alcohol or drug-related overdose will be subject to discipline for the sole violation of using or possessing alcohol or drugs.** A staff member may follow up with the student after the incident to determine his or her health and welfare.

Counseling and Treatment

Students who believe they may have an alcohol or drug problem are strongly encouraged to seek assistance through resources available at the Institute. Students should seek aid through the Health and Counseling Center, the deans, or the assistant vice president for campus life. Such contacts will be kept confidential, except as required by law or the immediate health, safety, or security of the individual or others.

Resources

You can always contact your RA and health advocate. Additional resources include

Security	ext. 5000
Health Center	395-6393
Counseling Center	395-8331
Health Educator	395-2961
Huntington Hospital Emergency Room	397-5111

Fire Safety

It is the policy of the California Institute of Technology to comply with all applicable laws, regulations, codes, and standards in regard to fires, fire safety, and fire protection. The Institute recognizes that campus fire safety is vitally important to the Institute community, and thus is committed to maintaining a safe environment for faculty, staff, students, and other members of the Institute community.

The purpose of the Institute Policy on Fire Safety is to provide guidelines for establishing and maintaining fire safety procedures with respect to the undergraduate and graduate student houses and dormitories (student living areas or student housing) at the Institute.

Please refer to <http://www.studaff.caltech.edu/policies.htm> for the complete text of the policy.

Firearms and Other Dangerous Materials

No one is allowed to maintain, possess, transport, or use any firearms, including BB, pellet or paintball guns, or replicas that could be mistaken for real guns, or other weapons, including martial arts weapons, hunting knives, fireworks, ammunition, explosives, dangerous chemicals, or highly flammable materials (e.g., gasoline) on Institute property, including off-campus facilities. The use or threatened use of any knife as a weapon is also prohibited.

Nondiscrimination and Equal Employment Opportunity

Caltech is committed to equal opportunity for all persons without regard to sex, race, creed, color, religion, national origin, ancestry, age, marital status, pregnancy, gender identity, sexual orientation, status as disabled veteran, a veteran of the Vietnam era or other eligible veteran, and for otherwise qualified individuals with a disability. It is the policy of Caltech to provide a work and academic environment free of discrimination. Consistent with this policy, illegal harassment will not be tolerated at Caltech. Caltech will take all reasonable steps to eliminate it in its work and academic environment.

Caltech is an equal employment and affirmative action employer and will, whenever possible, actively recruit and include for employment members of minority groups, females, disabled veterans, veterans of the Vietnam era, other eligible veterans, and otherwise qualified persons with disabilities. Caltech will hire, transfer, and promote based on the qualifications of the individual to ensure equal consideration and fair treatment of all. All other employment actions, such as work assignments, appointments, compensation, evaluations, training, benefits, layoffs, and terminations are governed by this policy. Personnel actions will be reviewed to ensure adherence to this policy.

The provost has been designated as the Equal Employment Coordinator for faculty, the director of employee relations for staff, the dean of students for undergraduate students, and the dean of graduate studies for graduate students. The director of the Women's Center has been designated as Caltech's Title IX coordinator. Inquiries concerning the interpretation and application of this policy should be referred to the appropriate designated individual. These coordinators are responsible for program administration, monitoring progress, and implementing goals and action-oriented programs relating to affirmative action. Likewise, management is responsible for monitoring decisions regarding personnel actions to ensure that these decisions are based solely on the individual's merit, and on legitimate, nondiscriminatory job requirements for the position in question and the reasonableness of any necessary accommodations for persons with a disability. Managers' performance in regards to Caltech's affirmative action goals and objectives will be evaluated, as will be their performance on other Institute goals.

Anyone who witnesses or experiences conduct he/she believes to be in violation of this policy is urged to contact any of the above mentioned coordinators, the individuals identified in related harassment policies, or the Employee Relations office immediately. Complaints will be investigated promptly and individuals who violate this policy will be subject to disciplinary action up to and including termination or expulsion.

To achieve the goals of our affirmative action program and to ensure equal employment opportunity and nondiscrimination, each member of the Caltech community must understand the importance of this policy and his/her responsibilities to contribute to its success.

Sexual Assault

The California Institute of Technology will not tolerate sexual assault, whether directed at males or females. It is the policy of the Institute to provide a work and academic environment free of physical assault, including sexual assault. Rape and other types of sexual assault, whether by a stranger or by an acquaintance, are violations of the law and Caltech policy. Sexual assault includes, but is not limited to, rape, forced sodomy, forced oral copulation, rape by a foreign object, sexual battery, or threat of sexual assault. Caltech views sexual assault, in any of its forms, as a very serious matter and is committed to responding promptly to, and thoroughly investigating, sexual assault charges leveled at a member of the Caltech community. To reduce the risk of sexual assault, Caltech provides education for the campus community to increase awareness of this important issue.

I. Basic Principles

A crucial part of Caltech culture is respect for one another; no member of the Caltech community should take unfair personal advantage of another member of the community. Students, faculty, and staff who wish to file a complaint against another member of the Caltech community will have their complaints treated seriously and will be treated with dignity. The Institute recognizes that a sexual assault is more than an assault on an individual's body; it is also an attack on the individual's dignity and sense of self. Therefore, the Institute is committed to seeking input from the complainant and the respondent before making any decision to take action. There may be circumstances, depending on the seriousness of the offense, in which the Institute must take action to protect the complainant or other members of the Caltech community. The Institute will provide assistance and support for survivors of sexual assault.

II. What to Do if a Sexual Assault Has Occurred

If you have been sexually assaulted, you are encouraged to seek medical, psychological, and support services provided by campus and/or community services. If emergency response is required, please call Campus Security (x5000) or local law enforcement (744-4241).

Psychological treatment is available from the Student Counseling Center or the Staff and Faculty Consultation Center. Medical treatment is available at the Caltech Health Center, Huntington Memorial Hospital Emergency Room, a private physician, or through other community resources. You will benefit from being examined for physical injury, disease, and/or the possibility of pregnancy.

Because sexual assault may involve physical trauma and is a crime, the person assaulted is urged to seek medical treatment as soon as possible so that physical evidence can be obtained. To preserve evidence, do not bathe, douche, smoke, brush your teeth, or change your clothes. If clothes have been changed, the original clothes should be put in a paper bag (paper is best for preserving evidence) and brought to the hospital. If possible, you should bring a fresh change of clothes. In most cases, evidence can be collected only within 72 hours of the assault.

Please note that the hospital and certain health-care providers have an obligation to inform the police, and the police may conduct an interview at the hospital regarding the assault. Your consent will be requested to allow collection of evidence. You can choose whether or not to disclose information to the police or to file a civil or criminal complaint. If you desire further information concerning this procedure, please contact the Women's Center, Staff and Faculty Consultation Center, or the Rape Hotline.

Individuals who do not wish to be interviewed by the police should seek medical assistance from a private physician or other community resources. These health-care professionals may need to fulfill legally mandated reporting requirements.

III. Community Resources

If you or someone you know has been sexually assaulted within or outside of the Caltech community, there are support and resources available.

Confidential Campus Resources

Members of the Caltech community may contact any of the offices below confidentially. Personnel in these offices will listen and offer options. Talking to any of these individuals does not constitute reporting an incident involving a member of the Caltech community to Caltech. However, these offices can provide you with support and can guide you through Institute procedures. Although they will not participate in formal Institute processes or legal action, the staff in each office is available to help the complainant and/or the respondent look at all available options; decide what plan of action feels most comfortable; craft a statement that contains all of the relevant information regarding the complaint; and make decisions about how to proceed.

Sources of support and information on campus and in the community include

- Student Counseling Center (626) 395-8331
- Staff and Faculty Consultation Center (626) 395-8360
- Ombuds Office (626) 395-6990
- Caltech Women’s Center (626) 395-3221

Other campus resources:

- Student Health Center (626) 395-6393
- Dean of Students (626) 395-6351
- Dean of Graduate Studies (626) 395-5802
- Campus Life (626) 395-6174
- Associate Vice President for Human Resources (626) 395-3230
- Director of Employee Relations (626) 395-8167
- Provost (626) 395-6336
- Campus Security (626) 395-5000
- Vice President for Student Affairs (626) 395-6100

Other community resources:

- Planned Parenthood (626) 798-0706
- Victim–Witness Assistance Program (800) 773-7574
- Rape Hotline (626) 793-3385
- Pasadena Police Department (626) 744-4241
- Domestic Violence Hotline (800) 978-3600
- Huntington Memorial Hospital
 - Emergency Department (626) 397-5111
 - Information Hotline for Support Servs. (626) 350-6833

IV. Procedures for Filing Complaints

A student, faculty, or staff member who has been sexually assaulted by a member of the Caltech community is strongly encouraged to file a complaint with the Caltech administration as well as local law enforcement. If you would like support and guidance in filing a complaint, please contact the Caltech Women’s Center, the Staff and Faculty Consultation Center, Employee Relations, and/or the Security Office.

A. Filing a Complaint with Civil Authorities

Members of the Caltech community wishing to report a sexual assault to the police are encouraged to seek support and guidance from the Caltech Women’s Center, (626) 395-3221. The telephone number of the Pasadena Police is (626) 744-4241.

B. Filing a Complaint on Campus—Overview

A student, faculty, or staff member who wishes to file a campus complaint against a member of the Caltech community should do so as soon as possible after the assault, although complaints may be filed at any time. Complaints should be brought to the attention of one of the following individuals: provost, deans, director of employee relations, employee relations specialists, student affairs directors, division chairs, and division administrators, who will ensure that the complaint reaches the appropriate investigating office. If the respondent is a student, the complaint will be forwarded to the dean of students or dean of graduate studies; if staff, to the director of employee relations; and if faculty, to the provost. Within a reasonable length of time the person accused, the respondent, will be notified of the nature of the complaint and an investigation will begin. If administrative changes are needed to protect the rights of either party during the investigation, the appropriate administrators shall see that they are made.

The complainant should immediately notify any of the above individuals if anyone associated with the matter is under continuing threat or is being subjected to retaliation. Immediate action will be taken, and in such cases the complainant has the right to file another complaint.

C. Campus Complaint Procedure

Initial Meeting

The administrator receiving the complaint will

- Ask the complainant questions to assess whether there is a continuing threat to the complainant and/or other members of the community.
- Ensure that the complainant is given appropriate protection, including protection from retaliation for the complaint. Such protection may include restrictions on the accused.
- Provide a copy of this policy to the complainant.

- Review available resources, including medical and psychological counseling.
- Request a written statement from the complainant. Review confidential campus resources that could assist the complainant in the process.

As soon as practicable after a complaint is received, the Dean of Students office or the Dean of Graduate Studies office, the Provost's office, or Employee Relations will form a team to investigate the complaint. The lead investigator will be from the same area as the respondent. For example, if a staff member makes a complaint against a faculty member, a representative of the provost will lead the investigation, and if a faculty member files a complaint against a staff member, a representative of the director of employee relations will lead the investigation. The individuals involved in the investigation will respect the privacy of the complainant and that of all parties involved while they complete a thorough review of the situation. All participants will be required to keep the contents of the investigation confidential. The investigation should be completed as soon as practicable, usually within 30 days after the formation of the team. The Caltech investigation will occur independently from any legal proceedings that may take place.

The investigative process will be the following:

- The respondent should be notified as soon as possible after a complaint is filed. The respondent will receive a verbal summary of the complaint and a copy of this policy.
- The investigators will review the written statement from the complainant if one has been prepared, and interview the complainant and the respondent. Each will be allowed to have a friend who is a member of the Caltech community present during his or her interview. The friend will serve as an observer and will not participate in the proceedings.
- The complainant and the respondent will be asked to suggest available witnesses. Others may be interviewed to obtain relevant information.

Both parties will be kept informed of the status of the investigation.

Determination

The investigators will consult with Institute counsel and make a recommendation to the relevant dean, the provost, or Employee Relations, as appropriate, regarding the charges and the appropriate consequences, including disciplining of the respondent.

In addition, the investigators will prepare a summary record of the case for the president of Caltech. This record will be considered a confidential Institute document and will be provided only to the vice president for business and finance (for staff), the provost (for faculty), the vice president for student affairs (for students), and the president in the case of an appeal.

Resolution

The Dean of Students office, the Dean of Graduate Studies office, the Provost's office, or Employee Relations, as appropriate, will inform both parties of the outcome of the investigation in writing within seven days after receiving the recommendation and completing consultation with counsel. The provost, the vice president for student affairs, or the vice president for business and finance will carry out any disciplinary consequences and should consult with Institute counsel for aid in determining the Institute's legal duties and obligations before taking appropriate disciplinary action based on the team's findings. Discipline can include, but is not limited to, the following: counseling, probation, involuntary leave of absence, expulsion and/or termination. If the complainant is found to have acted in bad faith in bringing the charges, disciplinary action may also be taken.

Appeal

Any party involved in the investigation may appeal the decision to the president of Caltech. The appeal must be on the grounds of improper procedure or an arbitrary decision based on evidence in the record. The president will appoint an investigator to interview both parties and confer with the original investigators before deciding whether to accept the original judgment or authorize further investigation or deliberations.

Confidentiality

On a need-to-know basis, the following individuals at the Institute may also be informed of the fact that a sexual assault complaint has been made and that both parties are members of the Caltech community:

- President
- Ombudsperson
- Vice President/Assistant Vice President for Student Affairs
- Campus security
- Dean of Students
- Dean of Graduate Studies
- Assistant Vice President for Student Affairs, Campus Life
- Resident Associate
- Provost
- Associate Vice President for Human Resources
- Director of Employee Relations
- Director of the Women's Center
- Director of the Student Counseling Center
- Director of the Health Services
- Staff and Faculty Consultation Center
- Office of Public Relations

The names of the individuals involved will not be released unless the release is essential to the health and safety of the complainant or is otherwise required in order to fulfill the legal obliga-

tions of the Institute. In such rare circumstances, the vice president for student affairs (for students), the provost (for faculty), and the associate vice president for human resources (for staff) are the only persons authorized to make an exception to the rule of complete confidentiality regarding the names of those involved. If an exception is made to this rule, the parties involved in the incident will be notified as soon as possible.

Title IX

Title IX of the Education Amendments of 1972 is a comprehensive federal law that prohibits discrimination on the basis of sex in any federally funded education program or activity. Inquiries concerning the Institute's policies, compliance with applicable laws, statutes, and regulations (such as Title IX and section 504), and complaints may be directed to Title IX coordinator, Felicia Hunt, (626) 395-3221. Inquiries about the laws and compliance may also be directed to the assistant secretary for civil rights, U.S. Department of Education.

Unlawful Harassment

It is the policy of the Institute to provide a work and academic environment free of unlawful harassment and retaliation. Harassment is the creation of a hostile or intimidating environment in which verbal or physical conduct, because of its severity and/or persistence, is likely to interfere significantly with an individual's work or education, or affect adversely an individual's living conditions. Harassment in any form, based on sex, race, color, age, national origin, disability, religion, gender identity, sexual orientation, or any other characteristic protected by state or federal laws, is prohibited, as are all forms of sexual intimidation and exploitation. All faculty, students, and staff should be aware that the Institute will not tolerate any conduct that constitutes illegal harassment. The Institute also takes prompt action when notified about harassment by third parties such as nonemployees, vendors, or contractors. Complaints of harassment will be promptly and thoroughly investigated and appropriate action, including disciplinary measures, will be taken when warranted.

Faculty, students, and staff, at all levels, are responsible for maintaining an appropriate environment for study and work. This includes conducting themselves in a professional manner, actively discouraging harassment, and taking appropriate corrective action to prevent and eliminate harassment. Caltech requires that any employee who is responsible for directing other Caltech employees participate in training regarding illegal harassment, including sexual harassment, at least every two years.

Faculty, students, and staff have the right at any time to raise the issue of harassment without fear of retaliation. Caltech policy prohibits retaliation against an individual for making a good-faith

report of alleged harassment. Any faculty, student, or staff who feels that he or she has been harassed should review the Procedures for Investigating and Resolving Unlawful Harassment Complaints at Caltech and immediately bring the matter to the attention of his or her supervisor or any of the individuals listed below. They will handle matters brought to their attention with sensitivity and discretion.

- Deans
- Director of employee relations
- Division administrators
- Division chairs
- Employee Relations consultants
- Provost
- Student Affairs directors (including the master of student houses)
- Director of the Women's Center

The Institute also offers members of the Caltech community the choice of seeking confidential counseling outside the Institute's formal mechanisms for resolving harassment complaints. These confidential counseling services are intended for the personal benefit of the individual and offer a setting where various courses of action can be explored. Those seeking this type of assistance should check with the offices listed below, each of which has its own mandate and guidelines for providing services:

- Ombuds Office
- Staff and Faculty Consultation Center
- Student Counseling Center
- Women's Center

Information for faculty, students, and staff is also available from the Women's Center, Ombuds Office, Staff and Faculty Consultation Center, any Student Affairs office, resident associates, or Employee Relations.

Any member of the Caltech community who believes he or she has been a witness to or a target of harassment is urged to report promptly the facts of the incident(s) to any of the above offices. Delay in reporting may impede the Institute's ability to take appropriate action. In addition, an employee who believes he or she has been harassed has the right to file a complaint with the federal Equal Employment Opportunity Commission or the California Department of Fair Employment and Housing, which have the authority to remedy violations; students may file complaints with the federal Office for Civil Rights. No member of the Caltech community will be retaliated against for making a good-faith report of alleged harassment or for participating in an investigation, proceeding, or hearing conducted by the Institute, or by a state or federal agency.

I. Guidelines Regarding Harassment

Harassment

Harassment is the creation of a hostile or intimidating environment in which verbal or physical conduct, because of its severity and/or persistence, is likely to interfere significantly with an individual's work or education, or affect adversely an individual's living conditions. Abusive or harassing behavior, verbal or physical, which demeans, intimidates, threatens, or injures another because of his or her personal characteristics or beliefs, is subject to the Institute's disciplinary process. Examples of personal characteristics or beliefs include race, ethnicity, national origin, religion, disability, age, gender identity, and sexual orientation. Some kinds of behavior that are clearly intended to harass, while inappropriate and not tolerated at Caltech, may not be illegal because the behaviors are not clearly linked to these personal characteristics or beliefs. These types of behavior may be dealt with through the student disciplinary process or through supervisory intervention, including the Caltech progressive disciplinary process.

Harassment must be distinguished from behavior which, even though unpleasant or disconcerting, is appropriate to the carrying out of certain instructional, advisory, or supervisory responsibilities or is objectively reasonable under the circumstances. Similarly, instructional responsibilities require appropriate latitude for pedagogical decisions concerning the topics discussed and the methods used to draw students into discussion and full participation. There are, however, obligations of civility and respect for others that underlie rational discourse. Behavior evidently intended to dishonor or such characteristics as race, gender identity, national origin or ethnic group, religious belief, sexual orientation, age, or disability is contrary to the pursuit of inquiry and education and may be discriminatory harassment violative of law and Institute policy. Some examples of incidents that may constitute illegal harassment follow.

- An adviser tells a minority student not to take a certain course because the adviser says that other minority students have had difficulty in the course.
- A disabled individual is not included in an off-site outing because of lack of mobility.
- A supervisor assigns only menial tasks to a minority staff member. A supervisor gives menial tasks only to a minority staff member and not to other employees.
- An older employee is disciplined for insubordination when the same conduct is tolerated from younger employees.
- Swastikas have been painted on the door of a room often used to prepare for the observance of the Jewish Sabbath.
- A student tells a racially offensive joke within a study group session with other students.
- Downloading or viewing pornography that is seen by others.

Of course, in order to make an accurate judgment as to whether these incidents are illegal or violate policy, the full context in which these actions were taken or statements made must be considered. Conduct of this type, therefore, will initiate an investigation, since making tolerance of illegal harassment or submission to it a condition of employment, evaluation, compensation, or advancement is a serious offense.

Sexual Harassment

Sexual harassment is unlawful, violating Title VII of the Civil Rights Act of 1964, as amended, Title IX of the Education Code, and California state law. Sexual harassment is defined as follows: Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when

- (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or education,
- (2) submission to or rejection of such conduct by an individual is used as the basis for decisions affecting that individual, or
- (3) such conduct has the purpose or effect of unreasonably interfering with an individual's performance or creating an intimidating, hostile, or offensive environment.

The test is not whether the person participated voluntarily; the test is whether the conduct was unwelcome.

Sexual harassment by peers, coworkers, or third parties such as nonemployees, vendors, or contractors is a form of prohibited sex discrimination where the objectionable conduct creates a hostile educational or work environment. Both males and females are protected from peer sexual harassment. Moreover, sexual harassment is prohibited regardless of the sex of the harasser, e.g., even where the harasser and the person being harassed are members of the same sex.

Some examples of conduct that may constitute harassment are

- Unwanted sexual advances.
- Offering employment benefits in exchange for sexual favors.
- Making or threatening reprisals after a negative response to sexual advances.
- Making sexual gestures or displaying sexually suggestive objects, pictures, cartoons, posters, calendars, or computer screens.
- Downloading, viewing, and/or sharing of pornography.
- Making or using derogatory comments, epithets, slurs, or jokes of a sexual nature.
- Verbal sexual advances or propositions.
- Using Institute resources or time to create or obtain sexually explicit materials that are not directly related to legitimate business of the Institute.

- Verbal abuse of a sexual nature, graphic commentaries about an individual's body, sexually degrading words used to describe an individual, suggestive or obscene letters, notes, electronic mail messages, or invitations.
- Unwelcome, intentional and/or repeated touching of a sexual nature.
- Stalking.
- Ostracizing individuals from group activities because of their sex or because they objected to harassing behavior.

Even when relationships are consensual, care must be taken to eliminate the potential for harassment or other conflicts. It is not acceptable to treat other employees, who are not in the consensual relationship, less favorably. Institute practice, as well as more general ethical principles, precludes individuals from evaluating the work or academic performance of those with whom they have amorous and/or sexual relationships, or from making hiring, salary, or similar decisions.

Upon learning about such a relationship, the supervisor, the dean(s), or the division chair has the authority and responsibility to review and remedy, if inappropriate, any direct administrative or academic relationship between the involved individuals.

When a consensual personal relationship arises and a power differential exists, consent will not be considered a defense in a claim that the Institute's unlawful harassment policy has been violated. The individual in the relationship with greater power will bear the burden of accountability.

Investigations

The Institute is firmly committed to resolving allegations of harassment fairly and quickly. To ensure that open and forthright dialog occurs, attorneys are not permitted to accompany individuals during interviews, nor are interview sessions recorded in any manner. Those interviewed are always entitled to submit a written statement if they so choose or to consult with others regarding the interview, keeping in mind that these proceedings must be kept as confidential as possible.

II. Procedures for Investigating and Resolving Unlawful Harassment Complaints at Caltech

Basic Principles

The Institute is committed to maintaining a work and academic environment for all members of the Caltech community that is free of unlawful harassment, including sexual harassment. A crucial part of Caltech culture is respect for one another; no member of the Caltech community should take unfair personal advantage of another member of the community.

Caltech also is dedicated to the free exchange of ideas and to intellectual development as part of the campus milieu. Harassment,

as defined by the Institute's policy on unlawful harassment, is neither legal nor a proper exercise of academic freedom. This policy is not intended to stifle vigorous discussion, debate, or freedom of expression generally, or to limit teaching methods. Harassment compromises the tradition of intellectual freedom and the trust placed in the members of the Caltech community.

Caltech provides resources that address unlawful harassment and sexual harassment. Law and Caltech policy also prohibit retaliation against an individual for reporting any type of harassment.

Copies of the Institute's nondiscrimination, unlawful harassment, and other policies are available from Human Resources, any Student Affairs office, Dean's offices, the Women's Center, the Ombuds Office, the Staff and Faculty Consultation Center, and the Provost's Office. Policies are also published in the *Caltech Catalog* and the *Employee Handbook*, and are on the Caltech website. The policies and these procedures identify appropriate people on campus to contact with complaints.

Procedures

A member of the Caltech community who believes he or she has been subjected to harassment, including sexual harassment, should review the Institute's policy. There are several courses of action available to address the problem, each with different consequences and implications with respect to confidentiality and resultant action. These options are not mutually exclusive. The complainant may choose which course to follow and may submit a formal complaint at any time.

A. Informal Options

An individual who believes that he or she has been harassed may choose to resolve his or her concerns informally. In general, the goal of the informal options is to quickly end offending behavior without utilizing disciplinary action. Third parties with an official status at Caltech, such as faculty, managers, or supervisors, are expected to follow up with the complainant to make sure that the issue has indeed been resolved. Mutually agreeable administrative changes are sometimes possible to ease an uncomfortable situation. Complainants should consider at the outset whether such changes might be desirable. Informal options include

1. Talking personally with the offending individual, or writing a letter asking him or her to stop. This is a personal step taken solely among the relevant parties.
2. Speaking to members of the Student Counseling Center, the Ombuds Office, the Staff and Faculty Consultation Center, or the Women's Center. Such conversations are confidential and are not communicated to individuals within or outside the Institute.
3. Resolving the complaint informally with the help of a third party who does not have a faculty, supervisory, or managerial

position at Caltech. This could be a peer for staff; or, for students, a peer, a resident associate, or a member of the Board of Control or the Graduate Review Board. The goal here is to allow the parties to resolve complaints without an investigation and without elevating the complaint within the Institute. The person here is not obligated to share this information with other persons holding positions of responsibility at Caltech.

4. Resolving the complaint informally with the help of a third party who has a faculty, supervisory, or managerial position at Caltech. The goal here is also to allow the parties to resolve complaints without an investigation and without elevating the complaint within the Institute. However, a person in these official positions is obligated to follow up to be sure the situation has been resolved. This action might include referring to an appropriate individual within the Institute or sharing some of this information with other persons holding positions of responsibility at Caltech.

B. Formal Complaints

A formal complaint is a request that the Institute take action. The complainant may file a formal complaint by reporting the offending conduct to individuals holding any of the following positions: provost, dean, director of employee relations, employee relations consultant, student affairs director (including master of student houses), division chair, or division administrator. The complaint is then taken to the provost, director of employee relations, or dean(s) as appropriate (for faculty or postdoctoral scholars, staff, and students, respectively). This individual initiates an investigation described more fully below.

Protection of complainant. Because the Institute encourages staff, faculty, and students to report and address incidents of harassment, complainants will be protected: retaliation against any member of the Caltech community is strictly prohibited. Overt or covert acts of reprisal, interference, discrimination, intimidation, or harassment against an individual or group for exercising his or her rights under this policy will be subject to appropriate and prompt disciplinary or remedial action.

Administrative and/or academic changes may be needed in order to protect the rights of the complainant. These changes should be discussed with the appropriate parties: provost, director of employee relations, or dean(s). Changes might include transfer of supervisory or evaluative responsibility regarding grading, supervision, tenure review, letters of recommendation, etc. Care will be taken to protect both the complainant and the respondent with the greatest degree of confidentiality. A complainant may have an adviser or support person present when reporting harassment. However, the proceeding is an internal Caltech function and,

therefore, the presence of legal counsel is not permitted by anyone during the conduct of these procedures.

C. Details of Formal Complaints

- Formal complaints of harassment can be made orally or in writing, but if made orally, should, in the end, be put in writing.
- Complaints should be brought to the attention of one of the following individuals: provost, dean, director of employee relations, employee relations consultant, student affairs director, division chair, or division administrator. They will ensure that complaints reach the provost, director of employee relations, or the dean(s), as appropriate.
- Within a reasonable length of time the accused party (“the respondent”) will be notified of the nature of the complaint, and an investigation will begin. If administrative changes are needed to protect the rights of the complainant during the investigation, the appropriate administrators shall see that they are made.
- All formal complaints will be investigated within a reasonable length of time after the complaint has been made, normally within 120 days. An individual, a committee, or an outside consultant may conduct the investigation. The purpose of the investigation is to determine the facts relating to the complaint.
- Each individual or team member who conducts an investigation will be trained in various aspects of harassment. Because of the sensitive nature of these investigations, he or she will consult with the general counsel for legal assistance in investigative techniques, in applying legal standards regarding harassment, and in determining the Institute’s legal duties and obligations.
- The complainant and respondent will be informed of the relevant procedures and will have an opportunity to comment on the suitability of the investigator(s).
- The Institute’s nondiscrimination and equal employment opportunity (EEO) and harassment policies, and the Institute’s policy against retaliation will be reviewed with both parties. The complainant and respondent shall be given the opportunity to present their cases separately to the investigator(s) and to suggest others who might be interviewed. Subsequently the investigator(s) can, if appropriate, interview other parties to reach findings and conclusions.
- All parties who participate in investigative interviews may submit written statements. Investigatory meetings will not be recorded.
- The investigator(s) will summarize for the respondent the evidence in support of the complaint to allow the respondent

- the opportunity to reply. The investigation will remain confidential to the extent possible.
- Findings and conclusions in the case will be reported to the respondent's manager, dean, or the provost, as appropriate, within 30 days of the investigation being concluded. Additionally, the report will include recommendations regarding resolution and sanctions, as well as measures to prevent the occurrence of similar instances.
 - Exceptions to or modification of these procedures can be made by the provost, the dean(s), or the director of employee relations if required for fairness or practical necessity. Exceptions must be made in writing and notice provided to both the complainant and respondent. Other administrative issues regarding the conduct of the investigation will be decided by the provost, dean(s), and director of employee relations, as needed.
 - Investigative files are confidential and will be maintained in the appropriate administrator's office.

The conclusions that the investigation might reach include, but are not limited to, the following possibilities. In each case the investigator(s) should summarize the evidence that supports the conclusion.

1. A violation of the Institute's EEO and/or harassment policies occurred.
2. Inappropriate behavior occurred, but did not constitute a violation of the Institute's policies on discrimination and/or harassment. For example, the respondent improperly used the power of his or her position, used poor judgement, or violated applicable standards of ethical behavior.
3. The charges were not supported by the evidence.
4. The charges were brought without any basis or without a reasonable, good-faith belief that a basis existed.

D. Resolution

As soon as practicable after receiving the findings of the investigator(s), management or administration shall review the findings with the dean(s), managers, division chairs, and others as necessary. Both the complainant and respondent shall be informed of the results.

If a violation of the Institute EEO and/or harassment policies occurred, sanctions shall be imposed. Depending on the severity of the case and role at Caltech, possible sanctions include, but are not limited to

- Verbal counseling/training
- A formal written warning placed in the respondent's file
- Suspension of the right to accept new graduate students or postdoctoral scholars

- Transfer of advisees and/or removal from positions of administrative responsibility
- Removal from student housing
- Removal from a supervisory position
- Enforced leave of absence/suspension
- Termination of employment or permanent dismissal

If the respondent was not found to have violated Institute policy on harassment, but the investigation concludes that he or she violated another Institute policy, or committed some other wrongful or improper act, appropriate sanctions will be imposed. Likewise, if the complainant is found to have brought charges without any basis or without a reasonable, good-faith belief that a basis existed, appropriate sanctions will be imposed on the complainant.

E. Appeals

Appeals must be submitted in writing within 30 days of notification of the decision.

Appeals by a faculty member of decisions or actions by the provost that affect academic freedom and tenure can be made to the Faculty Committee on Academic Freedom and Tenure as indicated in Chapter 4 of the *Faculty Handbook*. Other appeals for faculty and appeals by postdoctoral scholars can be made to the president.

Student appeals can be made to the vice president for student affairs or his or her designee. Staff appeals can be made to the associate vice president for human resources or his or her designee.

F. Further Complaints

The complainant should notify the provost or division chair, the dean(s), or director of employee relations immediately if the corrective action does not end the harassment, or if any retaliatory action occurs. In such cases, the complainant has the right to file another complaint.