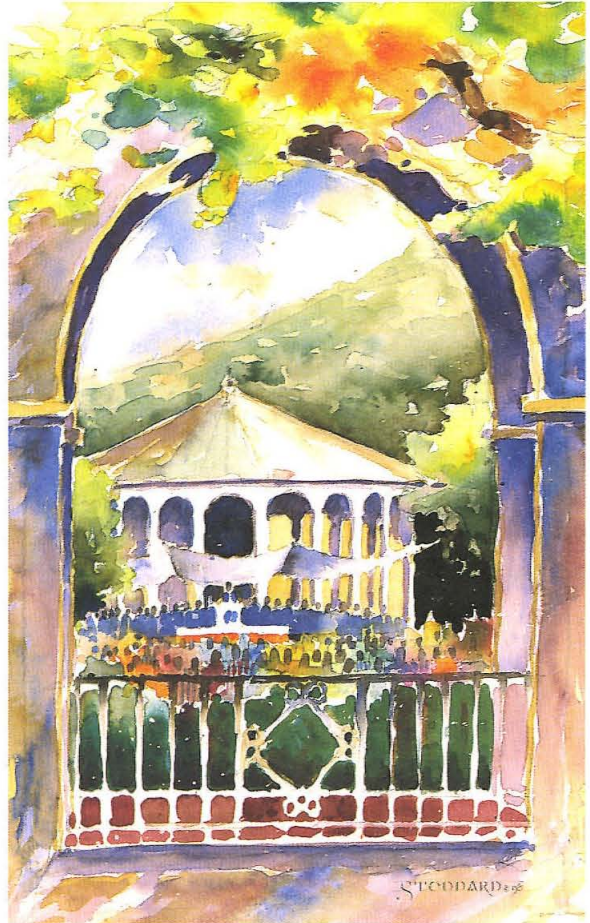




CALIFORNIA INSTITUTE *of* TECHNOLOGY

*One Hundred and Fifth Annual Commencement
June 11, 1999*



Cover: Caltech's commencement ceremony,
by Joseph Stoddard.

This program is produced by the Public Relations Office.

CALIFORNIA INSTITUTE
of TECHNOLOGY

*One Hundred and Fifth
Annual Commencement*

Friday Morning at Ten O'Clock
June Eleventh, Nineteen Ninety-Nine

IN HIS DIARY ENTRY of September 1, 1891, Pasadena philanthropist Amos Throop wrote, “Planted potatoes, cleaned a water pipe, husked the corn . . . In afternoon, saw Mr. Wooster and rented his block for five years . . . and hope I have made no mistake.” Were he here today, Throop could rest assured in his decision. For the building of which he wrote, the Wooster Block, was rented for the purpose of establishing Throop University—the forerunner of Caltech.

In November of that year, Throop opened its doors to 31 students and a six-member faculty. Could anyone have imagined then that the school would become a world center for science and engineering research and education? Perhaps . . . for in the first year, the board of trustees began to reconsider the mission of the school. In 1892, they decided to emphasize industrial training, and in 1893, reflecting this new focus, renamed the school Throop Polytechnic Institute.

Throop might have remained just a good local school had it not been for the arrival in Pasadena of George Ellery Hale. A faculty member at the University of Chicago and a noted astronomer, Hale settled here in 1903. From that time until his death in 1938, he made significant contributions to Pasadena and Southern California: he established the Mount Wilson Observatory, raised funds for Palomar Observatory and its 200-inch telescope, participated in the creation of the Huntington Library and Art Gallery, helped design the Civic

Center in downtown Pasadena, and—perhaps his single greatest achievement—set the course for the development of Throop into the California Institute of Technology, a school he envisioned as a scientific institution of the highest rank.

In 1913, Hale convinced Arthur Amos Noyes, professor of chemistry and former president of the Massachusetts Institute of Technology, to join him in Pasadena. With the arrival in 1917 of Robert Andrews Millikan, professor of physics at the University of Chicago, Hale had assembled the founders of the new institution. The world center of scientific and engineering research and education he had imagined soon took shape under a new name, the California Institute of Technology, administered by Millikan and enriched with the scientific talents of Noyes and his faculty colleagues.

Caltech today has a 124-acre campus and operates seven off-campus astronomical, seismological, and marine biological facilities, and administers NASA's Jet Propulsion Laboratory as well. At present, the Institute has an enrollment of some 2,000 students, more than half of whom are in graduate studies; about 280 professorial faculty members, including three Nobel laureates and four Crafoord laureates; and more than 200 research faculty members. Today, Caltech will award 197 students the B.S. degree; 113 students the M.S. degree; 2 scholars the Engineer's degree; and 156 doctoral candidates the Ph.D. degree, for a total of 468 graduates—quite a leap from the one man and one woman who constituted the first collegiate graduating class of Throop Polytechnic Institute.

Please note:

Video footage of Commencement may be viewed on the Caltech Web site at <http://www.caltech.edu/commencement/>. Broadcast will begin at 11 a.m. today and will be available throughout the year.

YOU MAY KNOW HIM AS THE ANCHOR and managing editor of NBC's *Nightly News* program, but Tom Brokaw is also no stranger to technology.

Named one of *Vanity Fair's* Top 50 Leaders of the Information Age, Brokaw was an early proponent of the Internet, and was instrumental in helping NBC realize the power and potential of this new medium. As a keynote speaker for various technology conferences, Brokaw has discussed this new medium and its effect on the global distribution of information.

"The future of our society depends on our ability to create a synergy between what we do as individuals, how we tap the potential of new interactive technologies, and how we translate those skills into the new millennium," says Brokaw.

Brokaw's journey to becoming one of the techno-savvy members of the world media included, as it happens, a stop in Los Angeles. After graduating from the University of South Dakota in 1962, Brokaw worked at television stations in Omaha and Atlanta before heading west in 1966 to anchor for KNBC, NBC's Los Angeles television affiliate.

Since that time, Brokaw has reported on world and local issues and events, racking up an impressive series of firsts in the process. The only anchor to report from the scene the night the Berlin Wall fell, Brokaw also conducted the first exclusive United States one-on-one interview with Mikhail Gorbachev, for which he earned an Alfred I. DuPont–Columbia University Award for excellence in broadcast journalism.

Brokaw's other awards include another Dupont-Columbia Award for "Tom Brokaw Reports: Why Can't We Live Together," a special report on the hidden realities of racial separation in America's suburbs; a Peabody for his report "To Be an American;" an Emmy for his "China in Crisis" special report and for his reporting on the 1992 floods in the Midwest; and the American Legion's top award for distinguished public service in the field of communications. In 1997, Brokaw was inducted into *Broadcasting and Cable's* prestigious TV Hall of Fame.

Brokaw has received honorary degrees from Notre Dame, Duke University, Washington University in St. Louis, Boston College, the University of Pennsylvania, and Fairfield University. NBC recognized Brokaw's commitment to education and commemorated his 30 years of service to NBC News by establishing the Tom Brokaw Scholarship Program. The program benefits the children of full-time NBC News employees who plan to pursue higher education.

Brokaw has also been active in writing articles, essays, and commentary for several publications, including the *New York Times*, the *Washington Post*, the *Los Angeles Times*, *Newsweek*, *Sports Illustrated*, *Life*, *Outside*, and *Interview*. In December 1998, Brokaw wrote his first book, *The Greatest Generation*, a bestselling account of the generation of Americans born in the 1920s, who came of age during the Great Depression, fought in the Second World War, and went on to build modern America.

THESE TRIBAL RITES have a very long history. They go back to the ceremony of initiation for new university teachers in mediaeval Europe. It was then customary for students, after an appropriate apprenticeship to learning and the presentation of a thesis as their masterpiece, to be admitted to the Guild of Masters of Arts and granted the license to teach. In the ancient University of Bologna this right was granted by authority of the Pope and in the name of the Holy Trinity. We do not this day claim such high authority.

As in any other guild, whether craft or merchant, the master's status was crucial. In theory at least, it separated the men from the boys, the competent from the incompetent. On the way to his master's degree, a student might collect a bachelor's degree in recognition of the fact that he was half-trained, or partially equipped. The doctor's degree was somewhat different. Originally indistinguishable from the master's, the doctor's gradually emerged by a process of escalation into a super magisterial role—first of all in the higher faculties of theology, law, and medicine. It will come as no surprise that the lawyers had a particular and early yen for this special distinction.

These graduations and distinctions are reflected in the quaint and colorful niceties of academic dress.

Of particular interest is the cap or mortarboard. In the form of the biretta it was the peculiar sign of the master. Its use has now spread far beyond

that highly select group to school girls and choir boys and even to the nursery school. *Sic transit* . . .

The gown, of course, is the basic livery of the scholar, with its clear marks of rank and status—the pointed sleeves of the bachelor, the oblong sleeves of the master, the full sleeves and velvet trimmings of the doctor. The doctors, too, may depart from basic black and break out into many colors—Harvard crimson or Yale blue or the scarlet splash of Oxford.

Color is the very essence of the hood: color in the main body to identify the university; color perhaps in the binding to proclaim the subject of the degree—orange for engineering, gold for science, the baser copper for economics, white for arts and letters, green for medicine, purple for law, scarlet for theology, and so on. Size is a further variable, as the hoods tend to lengthen from the three feet of the bachelor to the four of the doctor. So the birds are known by their plumage.

With this color and symbolism, which is mediaeval though mutated, we stage our brief moment of pageantry, paying homage to that ancient community of scholars in whose shadow we stand, and acknowledging our debt to the university as one of the great institutional constructs of the Middle Ages. While looking back, however, we also celebrate the achievements of this present generation of students and look forward to the future of these our younger colleagues, whom we now welcome to our midst.

David C. Elliot

Professor of History, Emeritus

ACADEMIC PROCESSION

Chief Marshal

J. Morgan Kousser, Ph.D.

Marshals

Arden L. Albee, Ph.D.

Frances H. Arnold, Ph.D.

Jean-Paul Revel, Ph.D.

Ellen Rothenberg, Ph.D.

Alison Winter, Ph.D.

Nai-Chang Yeh, Ph.D.

Faculty Officers

David J. Stevenson, Ph.D.

John E. Bercaw, Ph.D.

Ward Whaling, Ph.D.

MARCHING ORDER

Candidates for the Degree of Bachelor of Science

Candidates for the Degree of Master of Science

Candidates for the Degree of Engineer

Candidates for the Degree of Doctor of Philosophy

Faculty Officers

The Faculty

The Chairs of the Divisions

The Deans

The Provost

The Trustees

The Commencement Speaker

The President

The Chair of the Board of Trustees

PROGRAM

<i>Organ Prelude</i>	Leslie J. Deutsch, Ph.D.
PROCESSIONAL	The Caltech Convocations Brass and Percussion Ensemble <i>William Bing, M.M., Conductor</i>
PRESIDING	Gordon E. Moore, Ph.D. <i>Chair of the Board of Trustees</i> <i>California Institute of Technology</i>
COMMENCEMENT SPEAKER <i>"An Anchorman Looks at the World"</i>	Mr. Tom Brokaw Anchor and Managing Editor <i>NBC Nightly News</i>
SPECIAL MUSICAL SELECTION "Praise the Lord with Drums and Cymbals" <i>by Sigfried Kark-Elert</i> <i>Arranged by Leslie J. Deutsch</i>	Dr. Deutsch and the Caltech Convocations Brass and Percussion Ensemble
CHORAL SELECTION "Hallelujah," from <i>Messiah</i> George Frideric Handel	The Caltech Glee Clubs <i>Donald G. Caldwell, D.M.A.</i> <i>Conductor</i>
CONFERRING OF DEGREES	David Baltimore, Ph.D. <i>President</i> <i>California Institute of Technology</i>
PRESENTATION OF CANDIDATES FOR DEGREES	
For the Degree of Bachelor of Science	Jean-Paul Revel, Ph.D. <i>Dean of Students</i>
For the Degree of Master of Science	Christopher E. Brennen, Ph.D. <i>Vice President for Student Affairs</i>
For the Degree of Engineer	Arden L. Albee, Ph.D. <i>Dean of Graduate Studies</i>

For the Degree of Doctor of Philosophy	Dr. Albee
Biology	Melvin I. Simon, Ph.D. <i>Division Chair</i>
Chemistry and Chemical Engineering	Peter B. Dervan, Ph.D. <i>Division Chair</i>
Engineering and Applied Science	John H. Seinfeld, Ph.D. <i>Division Chair</i>
Geological and Planetary Sciences	David J. Stevenson, Ph.D. <i>George Van Osdel Professor of Planetary Science</i>
The Humanities and Social Sciences	John O. Ledyard, Ph.D. <i>Division Chair</i>
Physics, Mathematics and Astronomy	Thomas A. Tombrello, Ph.D. <i>Division Chair</i>

ANNOUNCEMENT OF AWARDS AND CONCLUDING REMARKS

President Baltimore

ALMA MATER

The Caltech Glee Clubs,
The Caltech Convocations Brass and
Percussion Ensemble, and Organ

“Caltech Alma Mater”
By Manton Barnes, BS '21 EE
(*The audience may join in;
lyrics are found on page 45.*)

RECESSIONAL

The Caltech Convocations Brass
and Percussion Ensemble

Organ Postlude

Dr. Deutsch

You are invited to attend a reception on the
Athenaeum West Lawn following the program.

CANDIDATES FOR DEGREES

Bachelor Of Science

Nasim Afsarmanesh* *Claremont, California* Biology and Independent Studies Program
Kyle James Alvine* *Hughson, California* Physics
Valerie Louise Anderson* *Bloomington, Minnesota* Physics
Carl Thomas Anhalt *Bakersfield, California* Engineering and Applied Science
Noah Arribas-Layton* *Guadalajara, Guadalajara, Spain* Chemistry
Michael David Astle *Charleston, South Carolina* Engineering and Applied Science
C. Michael Atkin* *Georgetown, Canada* Physics
Michael James Baier *Warner, New Hampshire* Applied Physics
Matthew Edward Barnet *Boise, Idaho* Chemical Engineering
Amritaksha Basu *Calcutta, India* Electrical Engineering
Samuel Hemingway Bauknight *Olympia, Washington* Engineering and Applied Science
Klejda Adnan Bega* *Tirana, Albania* Physics
Sibani Lisa Biswal* *San Ramon, California* Chemical Engineering
Joseph Kalmon Blitzstein* *Los Angeles, California* Mathematics
Eric Kenneth Bogs *Hammond, Indiana* Engineering and Applied Science
Tudor Andrei Bosman* *Bucharest, Romania* Engineering and Applied Science
Adrienne Michelle Bourque *Tucson, Arizona* Engineering and Applied Science
(Mechanical Engineering)
Jason Luis Briceño *McLean, Virginia* Physics
Christopher Alva Brichford *Salt Lake City, Utah* Engineering and Applied Science
James Franklin Buckwalter* *Yardley, Pennsylvania* Electrical Engineering
Jonathan Otto Burrows* *St. Augustine, Florida* Applied Physics
Hui Cai *Cupertino, California* Electrical Engineering
Carolyn Sze-Yun Chan* *Houston, Texas* Biology
Samuel Yeong-Shi Chang* *Huntington Beach, California* Engineering and Applied Science
(Mechanical Engineering)
Amy Chia-Nai Chang-Chien* *Temple City, California* Engineering and Applied Science
Petru-Nicolae Chebeleu* *Bucharest, Romania* Engineering and Applied Science
Phyllis Hwe-Teh Chen *King of Prussia, Pennsylvania* Chemical Engineering
Yebo Chen *San Mateo, California* Economics
Jim M. Cheng* *Los Angeles, California* Chemistry
Alwin Yuk-Lun Chi* *Hong Kong, China* Engineering and Applied Science
Adriane Chiu* *Walnut, California* Engineering and Applied Science
John Damon Chodera *Westminster, California* Biology
Ryan Thomas Chornock *Sterling, Virginia* Physics

Students whose names are followed by an asterisk are being graduated with honor in accordance with a vote of the faculty.

Bachelor Of Science continued

Thomas Ray Collier *Santa Clara, California* Engineering and Applied Science
Karl Jason D'Adamo *Baltimore, Maryland* Chemical Engineering
Yevgeniy Dashevsky *Kiev, Ukraine* Engineering and Applied Science
Matthew Walter Dawson *Downingtown, Pennsylvania* Geology
Micah Travis Dedmon *Whittier, California* Applied Physics
Teo Der-Stepanians *Glendale, California* Electrical Engineering
Oliver Eugene Dial III* *Thornton, Colorado* Physics
Francisco Javier Dias Lourenco *Paso Robles, California* Engineering and Applied Science
(Mechanical Engineering)
Ryan Robert Dieckmann *St. Louis, Missouri* Chemistry
Sheng Ding* *Beijing, P.R. China* Chemistry
David Stefanov Djambazov* *Sofia, Bulgaria* Physics
Joanna Lynn Dodd *Riverside, California* Chemical Engineering
Patrick James Drew *Dinuba, California* Biology
Amy Langdon Dullard *Glen Ellyn, Illinois* Biology
Uri Tzvi Eden* *Ann Arbor, Michigan* Mathematics and Engineering and Applied Science
Marrq Anthony Ellenbecker *Germantown, Wisconsin* Engineering and Applied Science
Clifford Bridgman Ellgen* *Oklahoma City, Oklahoma* Mathematics and Economics
Douglas Wayne Elliott *San Antonio, Texas* Chemistry
Leigh Elizabeth Engen *New Canaan, Connecticut* Geochemistry
Xavier Chi-Yau Fan* *Ottawa, Ontario, Canada* Engineering and Applied Science
Mike Fisher* *Toledo, Ohio* Applied Mathematics
Joseph Scott Fouché* *Kingsport, Tennessee* Applied Mathematics
Brian Edward Frazier* *Orange, California* Engineering and Applied Science
Jacques Christopher Frechet *Oakland, California* Engineering and Applied Science
Benjamin Nikolas Herschel Freeman *Colorado Springs, Colorado* Applied Mathematics
Margaret Anne Gabriel *Spring, Texas* Chemistry
Minxi Gao* *Yongjia, Zhejiang Province, P.R. China* Electrical Engineering
Corinne Elizabeth Gilliam *Dallas, Texas* Physics
Richard Arthur Gilmore *Reno, Nevada* Engineering and Applied Science (Aeronautics)
Samantha Sharon Gizerian *Fresno, California* Biology
Emma Elizabeth Goldberg* *Los Angeles, California* Physics
Cynthia-May Shiu Gong *Bakersfield, California* Chemistry
Robert Daniel Gorsche *San Antonio, Texas* Mathematics
Laura Elizabeth Gossett *Santa Ana, California* Biology
David Michael Goulet* *South Portland, Maine* Applied Mathematics
Sander Harold Granat* *Tarzana, California* Chemistry and Economics
Michael Jan Grebeck* *Aurora, Ohio* Engineering and Applied Science
Anthony David Greenman *Arlington, Texas* Engineering and Applied Science

Bachelor Of Science continued

Matthew Michael Gregori *Richmond, Virginia* Chemistry
Garun Kumar Gupta *Torrance, California* Engineering and Applied Science
David Edward Hackenson *Houston, Texas* Engineering and Applied Science
Matthew William Hage* *El Cajon, California* Engineering and Applied Science
(Mechanical Engineering) and Economics
David Kenric Hammond* *Tacoma, Washington* Chemistry and Mathematics
Andrea Rayne Hasenstaub* *Anchorage, Alaska* Mathematics and Engineering and Applied
Science
Aaron Keith Higgins *Tulsa, Oklahoma* Engineering and Applied Science
Samantha Lea Howarth *Long Beach, California* Chemical Engineering
Alex C. Huang *Fountain Valley, California* Engineering and Applied Science and Economics
Mingjing Huang *Tempe, Arizona* Engineering and Applied Science
Victor Kuan Kai Huang* *Singapore, Singapore* Chemistry and Engineering and Applied
Science
Sung Ha Huh* *Rancho Palos Verdes, California* Engineering and Applied Science
Hiroyuki Iwanami* *Tokyo, Japan* Engineering and Applied Science (Mechanical Engineering)
Neema Jalali* *Bellevue, Washington* Engineering and Applied Science
Marjorie Lucy James *Kensington, California* Biology
Joanne Wei-Un Jang* *Sacramento, California* Biology and Chemistry
Kay Young Jhun *Burlingame, California* Chemical Engineering
Lei Jin* *Baldwin Park, California* Engineering and Applied Science
Matthew Brandon Johnson* *Connell, Washington* Engineering and Applied Science
(Mechanical Engineering)
Rebecca Mae Jones *San Diego, California* Engineering and Applied Science (Mechanical
Engineering)
Dae Woong Kang* *Atlanta, Georgia* Engineering and Applied Science
Krishna Mattegunta Kant *Eden Prairie, Minnesota* Engineering and Applied Science
Daniel Dmitry Kaplan* *West Hills, California* Economics
Tatsuki Kashitani* *Hyogo, Japan* Engineering and Applied Science
Charles John Kim* *Las Flores, California* Engineering and Applied Science (Mechanical
Engineering)
Paul Yong Jin Kim* *Norwalk, California* Biology
Minoree Kohwi* *Berkeley, California* Biology
Matthew Allen Komsthoef* *Clayton, California* Engineering and Applied Science
Rajat Kongovi* *Houston, Texas* Engineering and Applied Science and Economics
William Yu-Man Kung *Alhambra, California* Physics
Andrew Samuel Laucius *Wyncote, Pennsylvania* Engineering and Applied Science
Diana A. Lavelly *Midlothian, Virginia* Literature

Bachelor Of Science continued

Caleb Joseph Lavergne *Seattle, Washington* Engineering and Applied Science
Samuel Sang Jung Lee *Houston, Texas* Electrical Engineering
Alan David Lewis* *Portland, Oregon* Electrical Engineering
Benjamin David Liao *Cerritos, California* Engineering and Applied Science
Angela (Yu-Chen) Lin* *Alhambra, California* Engineering and Applied Science
John Chung-Han Lin *Cudahy, California* Economics
Vincent Lin* *Bethany, Oklahoma* Engineering and Applied Science
Andrew Shin-Chiun Ling *Portland, Oregon* Electrical Engineering
Christianto Liu* *Victoria, British Columbia, Canada* Electrical Engineering
Autumn Hope Looijen *Kirkland, Washington* Engineering and Applied Science
Milena Marinova* *Sofia, Bulgaria* Engineering and Applied Science and Economics
Ellen Leigh Martin* *Ocala, Florida* Biology
Ryan Lee McCorvie *Orlando, Florida* Mathematics
Steven Randall McCoy *Lewistown, Montana* Engineering and Applied Science
Rory Vivek McKenna *Hinsdale, Illinois* Engineering and Applied Science
Vivian Faye McNeill *Danville, California* Chemical Engineering
Jeffrey Michael Mendez* *Huntington Beach, California* Chemistry
Jose Francisco Mendez *Los Angeles, California* Engineering and Applied Science
Ryan Bruce Merle* *Kent, Washington* Engineering and Applied Science
Gabriel Alan Miller* *Bonsall, California* Biology and Chemistry
Liviu Mihail Mirica* *Buzau, Romania* Chemistry
Vladimir Mitsner *Houston, Texas* Biology
Shayan Mookherjea* *Calcutta, India* Electrical Engineering
Dan Alin Muresan* *Bucharest, Romania* Engineering and Applied Science
Steve Na* *Los Angeles, California* Applied Physics
John Philip Niccolai* *Fullerton, California* Mathematics
Ivana Danilo Nikolić* *Niš, Yugoslavia* Chemical Engineering
Juan Carlos Nuño *Los Angeles, California* Engineering and Applied Science (Mechanical Engineering)
Aaron KiatSiang Oei *Cypress, California* Engineering and Applied Science
Reuben Walter Ogburn IV* *Jacksonville, Florida* Physics
Juan José Oleaga *Vizcaya, Spain* Mathematics
Lisa Maria O'Rourke *Bardonia, New York* Mathematics
Robert Radoslaw Zygmunt Osada* *Shoreview, Minnesota* Engineering and Applied Science and Mathematics
Stavroula Anastasia Otis *Santa Ana, California* Biology
Yongkai Ow* *Singapore, Singapore* Chemical Engineering and Biology
Jorge Luis Palamara *Santiago, Chile* Engineering and Applied Science
Khristie Victoria Phillips *Nashville, Tennessee* Biology

Bachelor Of Science continued

Aimee Lucinda Pierce* *Eugene, Oregon* Biology
Angela Carolyn Poole *Baton Rouge, Louisiana* Engineering and Applied Science
David Gabe Powers* *Newfield, New York* Applied Mathematics
Vincent Paul Revil Quitoriano *Los Angeles, California* Planetary Science
Joseph Merrill Renes* *Port Angeles, Washington* Physics
Allison Denise Roberts *Memphis, Tennessee* Engineering and Applied Science and Literature
Brigitte Roth* *Los Angeles, California* Economics
Jason Alexander Roth *Woodinville, Washington* Engineering and Applied Science
Luis Saenz *Manhattan Beach, California* Engineering and Applied Science
Erich Rudolf Schmidt* *Sighetu Marmatiei, Romania* Engineering and Applied Science
Miles Morgan Shuman *Philadelphia, Pennsylvania* Physics
Gabor Siklos *Budapest, Hungary* Engineering and Applied Science
Claudiu Simion* *Galati, Romania* Biology
Anna Smirnova *Kaliningrad, Russia* Economics
Charles Pascal Smith* *Morgan Hill, California* Engineering and Applied Science and Literature
Ethan Gregory Snyder-Frey* *Oakland, California* Engineering and Applied Science and Biology
Joseph Binamira Soriaga *College Station, Texas* Electrical Engineering
Rachel Elizabeth Steinberger *Woodinville, Washington* Biology
Ann Marie Stimmler *Annandale, Minnesota* Electrical Engineering
Peter Gerd Stobbe* *Westlake Village, California* Applied Mathematics
Michael Brier Stone* *Silver Spring, Maryland* Physics
Valentin Gabriel Stredie* *Reghin, Romania* Applied Mathematics
Erik William Streed *Minneapolis, Minnesota* Physics
Julius Tsu-Li Su* *Boca Raton, Florida* Physics
Kara Michelle Swedlow *Cleveland, Ohio* Engineering and Applied Science
Brian Seisho Taba* *Cupertino, California* Electrical Engineering
Gregory TK Tan* *Glendale, California* Engineering and Applied Science
Wesley Neal Tanaka *Aiea, Hawaii* Engineering and Applied Science
Xiaoyi Tang* *Shanghai, China* Electrical Engineering
Cristian Tapus* *Bucharest, Romania* Engineering and Applied Science
Tanya Serena Tickel *Los Altos, California* Engineering and Applied Science (Mechanical Engineering)
Hai-Xin Tie* *Beijing, China* Engineering and Applied Science
Brian Christopher Tiemann *Redwood Valley, California* Engineering and Applied Science
Andre Tkacenko* *Sunnyvale, California* Electrical Engineering

Bachelor Of Science continued

Hung Viet Dai Tran *Oakland, California* Electrical Engineering
Evan Chi Shing Tsang *Vancouver, British Columbia, Canada* Engineering and Applied Science
David Edward Tytell *Newbury Park, California* Planetary Science
Matthew Adam Vanderzee* *Danville, California* Engineering and Applied Science
Koen Chris Jan Verbrughe *Collegeville, Pennsylvania* Biology
Bret Michael Victor* *Castro Valley, California* Electrical Engineering
Alfred Wang *Cerritos, California* Biology
Louis Meng-Hui Wang, Jr. *San Jose, California* Engineering and Applied Science
Paul Brent Welander *Monmouth, Oregon* Engineering and Applied Science
Michael Thomas Westcoat *Long Branch, Pennsylvania* Engineering and Applied Science
and Economics
Michael James Westover* *Woodbridge, Virginia* Astronomy
Derick John Wiant *Eugene, Oregon* Engineering and Applied Science
David Andrew Williams *Katy, Texas* Engineering and Applied Science and Literature
Grant Stedman Williams *Bonanza, Oregon* Engineering and Applied Science
Travis Jesse Williams* *Houston, Texas* Chemistry
Jeremy Aaron Wong *Mesa, Arizona* Mathematics and minor in Science, Ethics, and Society
Ben Yan Kan Wu *Tappan, New York* Electrical Engineering
Jian Ye *Naperville, Illinois* Electrical Engineering
Helen Shin-IYeh *Thousand Oaks, California* Electrical Engineering
Janice Josephine Yeung *Pasadena, California* Biology
Amalia (Molly) Marie Zacher *Los Gatos, California* Chemistry
Naishen Zhou *San Jose, California* Electrical Engineering
Conrad Havluj Ziesler* *Ladysmith, Wisconsin* Electrical Engineering

Master of Science

- Girish Nanda Aakalu (*Biology*) B.A., The Johns Hopkins University 1996.
- Gabriel Alejandro Acevedo-Bolton (*Aeronautics*) B.S., University of California, Berkeley 1998.
- William B. G. Agassounon (*Electrical Engineering*) Diplôme d'Ingénieur, École Supérieure d'Ingénieurs en Électrotechnique et Électronique 1999.
- Joseph A. Akins (*Geology*) B.S., University of Connecticut 1997.
- Ichiro Aoki (*Electrical Engineering*) B.S., Universidad Estadual de Campinas 1987.
- Cahit Can Aydiner (*Applied Mechanics*) B.Sc., Middle East Technical University 1998.
- Raymond Stephen Baker (*Mechanical Engineering*) B.S., The Pennsylvania State University 1998.
- Lorena Andrea Barba (*Aeronautics*) B.Sc., Universidad Tecnica Federico Santa Maria 1989.
- Peter Reinhard Becker (*Biology*) S.B., Massachusetts Institute of Technology 1992.
- Nitin Bhandari (*Electrical Engineering*) B.E., Bharati Vidyapeeth's College of Engineering 1998.
- Prakash Viththal Bhawe (*Environmental Engineering Science*) B.S., University of California, Berkeley 1998.
- Kumar Manoj Bobba (*Aeronautics*) B.Tech., Indian Institute of Technology, Madras 1998.
- Daniel N. Bolon (*Biochemistry*) B.S., Duke University 1997.
- Maret Jesse Bower (*Computer Science*) B.S., University of California, Santa Barbara 1996.
- Keith B. Brown (*Biology*) B.S., Grambling State University 1992.
- Yên Kim Bui (*Biology*) B.A., Pomona College 1996.
- Adam Jonathan Burgasser (*Physics*) B.S., University of California, San Diego 1996.
- Steven Joseph Callander (*Social Science*) B.Com., The University of New South Wales 1996.
- Vanessa Sabrina Camelo (*Civil Engineering*) B.S., California Polytechnic State University, San Luis Obispo 1996.
- Shiyan Cao (*Mechanical Engineering*) B.S., University of California, Berkeley 1998.
- Kenneth R. Carlgren (*Chemical Engineering*) B.S., Georgia Institute of Technology 1997.
- Xavier Cartoixa (*Applied Physics*) Licenciat en Física, Universitat Autònoma de Barcelona 1996.
- Tong Wa Chao (*Aeronautics*) B.A., B.Sc., The University of Texas at Austin 1998.
- Min Chen (*Computer Science*) B.S., Peking University 1994; M.S., 1997.
- Tianxin Chen (*Biochemistry*) B.S., Tsinghua University 1996.
- Isaac Vikram Chenchiah (*Applied Mechanics*) B.Tech., Indian Institute of Technology, Madras 1998.
- Alwin Yuk-Lun Chi (*Electrical Engineering*) B.S., California Institute of Technology 1999.
- Swee Hong Choo (*Chemical Engineering*) B.A., Cambridge University 1997.
- Zohir Chowdhury (*Environmental Engineering Science*) B.S., The University of Montana 1997.

Master of Science continued

- Johan Chu (*Physics*) B.S., Korea Advanced Institute of Science and Technology 1992.
- Michèle Elise Cucullu (*Chemistry*) B.Sc., University of New Orleans 1996.
- Jeremy Alan Dillon (*Aeronautics*) B.Eng., Carleton University 1996.
- Matthew Justin Fago (*Aeronautics*) B.S.E. (*Aerospace Engineering*), B.S.E. (*Mechanical Engineering*), The University of Michigan 1995.
- Cedric Jean Paul Florens (*Electrical Engineering*) Diplôme d'Ingénieur, École Supérieure d'Ingénieurs en Électronique et Électrotechnique 1999.
- Chung Wah Fon (*Applied Physics*) B.Sc., Hong Kong University of Science and Technology 1997.
- Massimo Franceschetti (*Electrical Engineering*) Laurea, Università di Napoli Federico II 1997.
- Jimmy Fung (*Aeronautics*) B.S., Virginia Polytechnic Institute and State University 1997; M.S., 1998.
- Sean Patrick Gilmard (*Social Science*) B.S., Indiana University, Bloomington 1996; M.S., 1997.
- Gregory Peter Gerbi (*Geology*) B.A., Amherst College 1997.
- Roman Ginis (*Computer Science*) B.S., University of Rhode Island 1996.
- Robert Lloyd Goettler (*Electrical Engineering*) B.S., Pennsylvania State University 1997.
- Serena Silvia Guarnaschelli (*Social Science*) Laurea, Bocconi University 1996.
- Donhee Ham (*Physics*) B.S., Seoul National University 1996.
- Jay Clarke Hanan (*Materials Science*) B.S. (*Chemistry*), B.S. (*Engineering Physics*), Oklahoma Christian University 1997.
- Michael David Hartl (*Physics*) A.B., Harvard College 1996.
- María Eugenia Hernández (*Environmental Engineering Science*) Licenciatura en Química, Universidad Nacional de Tucumán 1997.
- Carlos José Herrera (*Computation and Neural Systems*) B.S., University of California, San Diego 1996.
- Ari Isaac Hershowitz (*Computation and Neural Systems*) B.S., Yale College 1993.
- Kathleen Pui-Shan Ho (*Electrical Engineering*) B.E., King's College London 1998.
- Jason Knowles Holt (*Chemical Engineering*) B.S. University of California, Irvine 1997.
- James Sean Humbert (*Mechanical Engineering*) B.S. University of California, Davis 1997.
- Syed Ali Jafar (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Delhi 1997.
- Chen Ji (*Geophysics*) B.S., Peking University 1991; M.S., Institute of Geophysics, Chinese Academy of Science 1994.
- Ming Jian (*Electrical Engineering*) B.S., Tsinghua University 1991; M.S., China Academy of Space Technology 1994.
- Hui Jin (*Electrical Engineering*) B.S., California Institute of Technology 1998.
- Elizabeth Ann Johnson (*Geochemistry*) B.A., Rice University 1997.
- James Philip Johnson (*Chemistry*) B.A., Nebraska Wesleyan University 1997.

Master of Science continued

- Takashi Kanamori (*Electrical Engineering*) B.E., The University of Tokyo 1998.
- Scott David Kee (*Electrical Engineering*) B.S., University of Delaware 1998.
- Melinda Jane Kellogg (*Astronomy*) B.S., University of California, Santa Barbara 1993.
- Jason Andrew Kenney (*Chemical Engineering*) B.S. (*Chemical Engineering*), B.S. (*Mathematics*), University of Kentucky 1996.
- Abdur Reza Khan (*Electrical Engineering*) B.S.E.E., Cornell University 1994.
- Aamod Dinkar Khandekar (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Bombay 1998.
- Andrei Mikhailovich Khodakovsky (*Computer Science*) Diploma, St. Petersburg State University 1993.
- Brian Randall King (*Environmental Engineering Science*) B.S., University of Florida 1996.
- Benjamin Kyle Kitzke (*Applied Physics*) B.S., University of Rochester 1997.
- David John Kopecky (*Chemistry*) Sc.B., Brown University 1994.
- Marisol Koslowski (*Aeronautics*) Licenciada en Ciencias Fisicas, Universidad de Buenos Aires 1997.
- Joseph J. Kubicky (*Electrical Engineering*) B.S., California Institute of Technology 1992.
- Carolyn Elizabeth Lawrence (*Biology*) B.S.E.E., University of Florida 1992.
- Jean-Baptiste Lazerges (*Aeronautics*) Engineer, École Centrale Paris 1996.
- Cin-Young Lee (*Mechanical Engineering*) B.S. (*Materials Science*), B.S. (*Mechanical Engineering*), University of California, Berkeley 1997.
- Adrian Jose Lew (*Aeronautics*) Nuclear Engineer, Instituto Balseiro 1998.
- Jing Liu (*Geophysics*) B.S., Nanjing University 1991; M.S., Institute of Geology 1994.
- Yi Luo (*Electrical Engineering*) B.E., Xidian University 1994; M.S., University of Hong Kong 1998.
- Theresa Wan-Zhen Lynn (*Physics*) B.A., Harvard College 1995.
- Andrei Mihai Marinescu (*Biology*) B.S., Purdue University 1995.
- Ryan Jeffrey Martin (*Materials Science*) B.S. (*Chemistry*), B.S. (*Physics*), University of Nevada, Las Vegas 1997.
- Daniel Keith Meulemans (*Biology*) B.S., University of Hawaii at Manoa 1996.
- Masashi Nakatsugawa (*Electrical Engineering*) B.E., Waseda University 1987; M.E., 1989.
- Rajiv Rajagopalan Nambiar (*Electrical Engineering*) B.E., Gujarat University 1997.
- John Wiggs Patty (*Social Science*) A.B. (*Economics*), A.B. (*Mathematics*), The University of North Carolina at Chapel Hill 1996.
- Paul Juan Penzes (*Computer Science*) B.S., California Institute of Technology 1996.
- Tracy Glen Phelps (*Aeronautics*) B.S., University of Tennessee 1987.
- Tait Sherman Pottebaum (*Aeronautics*) B.S., University of Southern California 1998.
- Carlo Joseph Quiñónez (*Biology*) B.S., San Diego State University 1997.
- Frank Randolph Rice III (*Physics*) B.A., Northwestern University 1977; M.S., Naval Postgraduate School 1986.

Master of Science continued

- Ulf Richter (*Environmental Engineering Science*) Dipl. Ing., Humboldt-Universität Zu Berlin 1994.
- Michelle Rojas-Soto (*Biology*) B.S., University of Puerto Rico 1997.
- Michael Thomas Rubel (*Aeronautics*) B.S., Rutgers, The State University of New Jersey 1998.
- Dimitrios Dionysios A. Sakellariou (*Electrical Engineering*) Diplom, Swiss Federal Institute of Technology 1996.
- Steven Schkolne (*Computer Science*) B.S., Carnegie Mellon University 1997.
- Rustem Vil Shaikhutdinov (*Applied Mechanics*) B.A., Moscow State University of Technology 1998.
- Adam Peter Showman (*Planetary Science*) B.S., Stanford University 1991.
- Luke Shipman Sollitt (*Physics*) B.A., University of Maryland, College Park 1990; B.S., 1997.
- Wei-Jen Su (*Aeronautics*) B.S., Polytechnic University 1998.
- Lu Sun (*Materials Science*) B.S., Peking University 1995; M.S., Southern Illinois University 1997.
- Maribeth Swiatek (*Applied Physics*) B.S., University of Illinois at Urbana-Champaign 1997.
- David Isaac Tazartes (*Electrical Engineering*) B.S., University of California, Los Angeles 1995.
- Erik Martin Terreri (*Social Science*) B.S., University of California, Berkeley 1993.
- John Henry Thompson (*Biology*) B.S., Fairleigh Dickinson University 1984.
- Craig Shigeru Tomooka (*Chemistry*) B.S., University of California, Irvine 1996.
- Sriram Vishwanath (*Electrical Engineering*) B.Tech., Indian Institute of Technology, Madras 1998.
- Bojan Vrcelj (*Electrical Engineering*) B.Sc., University of Belgrade 1998.
- Guofeng Wang (*Materials Science*) B.S., Tsinghua University 1995; M.S., 1997.
- Catherine Heden Wilson (*Social Science*) B.A., University of Pennsylvania 1993.
- Peter Scott Yakowec (*Biology*) B.A., Ithaca College 1996.
- Bo Yang (*Electrical Engineering*) B.S., Peking University 1995; M.S., 1998.
- Tehshik Peter Yoon (*Chemistry*) A.B., Harvard College 1996.
- Jie Yu (*Control and Dynamical Systems*) B.S., Zhejiang University 1996.
- Chiming Zhang (*Applied Mechanics*) B.S., Beijing University of Aeronautics and Astronautics 1994; M.S., 1997.
- Qian Zhao (*Electrical Engineering*) B.S., Tsinghua University 1998.
- Ute Zimmerman (*Electrical Engineering*) Vordiplom, Universität Bremen 1995.

Engineer

Nitin Ashok Deshpande (*Aeronautics*) B.Tech., Indian Institute of Technology, Bombay 1996; M.S. California Institute of Technology 1997.

Randall Lee Owen (*Mechanical Engineering*) B.A., The University of Texas at Dallas 1985; M.S., Yale College 1987; M.Phil., 1988; M.S., California Institute of Technology 1994.

Doctor of Philosophy

DIVISION OF BIOLOGY

Arash R. Bashirullah (*Biology*) B.Sc., The University of Winnipeg 1989; M.S., California Institute of Technology 1992.

Thesis: Temporal and Spatial Control of RNA Stability in the Early Embryo of *Drosophila melanogaster*.

Aaron Paul Batista (*Computation and Neural Systems*) B.A., B.S.E., University of Pennsylvania 1994; M.S.E., 1994.

Thesis: Contributions of Parietal Cortex to Reach Planning.

Hannah Dvorak-Carbone (*Biology*) B.Sc., Queen's University 1992.

Thesis: Contribution of the Temporoammonic Pathway to Hippocampal Processing.

Suzanne Elsasser (*Molecular Biology and Biochemistry*) B.S., The Catholic University of America 1987.

Thesis: Regulation of the *Saccharomyces cerevisiae* DNA Replication Protein Cdc6p by the Cyclin Dependent Kinases.

Joanna L. Jankowsky (*Cellular and Molecular Neurobiology*) B.A., Amherst College 1991.

Thesis: The Regulation and Role of Cytokines in Models of Synaptic Activity and Plasticity.

Li (Lily) Jiang (*Biology*) B.S., Tsinghua University 1993.

Thesis: Interactions of Multiple Signaling Pathways Generate Tail Patterning during the Development of *Caenorhabditis elegans*.

José Angel Lebrón (*Molecular Biology and Biochemistry*) B.S., University of Puerto Rico 1993.

Thesis: Biochemical and Biophysical Characterization of the Hemochromatosis Protein HFE and Its Interaction with the Transferrin Receptor.

Jennifer Fran Linden (*Computation and Neural Systems*) S.B., Harvard College 1991.

Thesis: Responses to Auditory Stimuli in Macaque Lateral Intraparietal Area.

Katrina Marie MacLeod (*Biology*) B.A., The Johns Hopkins University 1992.

Thesis: Mechanisms and Function of Neural Synchronization in an Insect Olfactory System.

Sandra Marie Malakauskas (*Biology*) B.S., University of California, Davis 1994.

Thesis: A Study of Boundary Residues in Protein Design.

Maneesh Sahani (*Computation and Neural Systems*) B.S., California Institute of Technology 1993.

Thesis: Latent Variable Models for Neural Data Analysis.

When more than one field of study is listed, in the Division of Biology it indicates a dual major; in other divisions the first is the major, and the second and others are minors.

Doctor of Philosophy continued

- Lixin Tang (*Biology [major] and Computer Science [minor]*) B.S., University of Science and Technology of China 1989; M.S., 1992; M.S., California Institute of Technology 1996.
Thesis: Role for the Cadherin Family of Cell Adhesion Molecules in Synaptic Function in the Adult Hippocampus.
- Christopher Robert Trotta (*Molecular Biology and Biochemistry*) B.S., Worcester Polytechnic Institute 1992.
Thesis: The Composition, Function, and Evolution of the tRNA Splicing Endonuclease.
- Roger Alan Wagner (*Biology*) B.S., Michigan State University 1984.
Thesis: Muscle Differentiation Pathways and Withdrawal from the Cell Cycle: The Role of Cyclin Dependent Kinase Inhibitors in Muscle Differentiation.
- Hai Wang (*Biology*) B.S., University of Washington 1992.
Thesis: Transmembrane Ephrin Ligands in Neural and Vascular Development.
- Michael Stephen Wehr (*Computation and Neural Systems*) Sc.B., Brown University 1991.
Thesis: Oscillatory Sequences of Firing in the Locust Olfactory System: Mechanisms and Functional Significance.

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

- Cheryl Marie Anderson (*Chemical Engineering and Applied Physics*) B.Sc., The University of Calgary 1992; M.S., California Institute of Technology 1995.
Thesis: Two-Dimensional Photonic Band Gap Crystals.
- Eldon Eugene Baird (*Chemistry*) B.A. (*Biology*), B.A. (*Chemistry*), University of California, Santa Cruz 1993.
Thesis: Solid Phase Synthesis of DNA-Binding Small Molecules.
- Helen Elizabeth Blackwell (*Chemistry*) B.A., Oberlin College 1994.
Thesis: New Synthetic Applications for Ring-Closing Metathesis and Cross-Metathesis Employing Well-Defined Ruthenium Alkylidenes.
- Kenneth A. Brameld (*Chemistry*) B.S., University of Washington 1993.
Thesis: Molecular Modeling of Biological Systems: From Chitinase A to Z-DNA.
- Scott Reynolds Carter (*Chemistry*) B.A., Amherst College 1992.
Thesis: Sequence-Specific Minor Groove Binding Polyamides: DNA Recognition and Applications.
- Pin Chen (*Chemistry*) B.S., University of California, Berkeley 1991.
Thesis: Terahertz Generation via Optical-Heterodyne Conversion: Development of a New Far-Infrared Spectrometer and Its Applications toward a Better Understanding of Nonrigid, Astronomically Important Molecules.
- Christopher L. Claypool (*Chemistry*) B.S., Southern Methodist University 1993.
Thesis: Why Molecules Look the Way They Do in STM: A Systematic Functional Group Approach.

Doctor of Philosophy continued

- Brett James Doleman (*Chemistry*) B.Sc., University of New Brunswick 1994.
Thesis: Study and Development of an "Electronic Nose" and Comparison with Mammalian Olfaction.
- Arnel Manasan Fajardo (*Chemistry*) B.S., Florida State University 1993.
Thesis: Rate Constants for Charge Transfer Across the Semiconductor/Liquid Interface.
- Neil Anthony Farrow (*Chemistry*) B.Sc., Portsmouth Polytechnic 1988.
Thesis: Investigation of Electron Transfer in an Alpha Helical Protein.
- David Roger Foss (*Chemical Engineering*) B.S., Rensselaer Polytechnic Institute 1994; M.S., California Institute of Technology 1997.
Thesis: Rheological Behavior of Colloidal Suspensions: the Effects of Hydrodynamic Interactions.
- Amy Pangborn Giardello (*Chemistry*) B.A., Cornell University 1992.
Thesis: Ruthenium Mediated Olefin Metathesis: Materials with Controlled Microstructure and Functionalization.
- Bryan Christopher Hathorn (*Chemistry*) B.A. (*Chemistry*), B.A. (*Mathematics*), Haverford College 1991.
Thesis: Statistical Calculations of Ozone Isotopomeric Rate Constants.
- Yonglin Hu (*Chemistry*) B.S., Peking University 1986; M.S., 1989.
Thesis: Crystal Structures of ModA from *Escherichia coli* and Formaldehyde Ferredoxin Oxidoreductase from *Pyrococcus furiosus*.
- Gyeong Soon Hwang (*Chemical Engineering*) B.S., Seoul National University 1991; M.S., 1993; M.S., California Institute of Technology 1998.
Thesis: Plasma-Surface Interactions and the Physics of Charging Damage during Plasma Processing of Semiconductors.
- Brian Anthony Jackson (*Chemistry and Science, Ethics, and Society*) B.S., Haverford College 1994.
Thesis: Recognition of Base Mismatches in DNA by Chrysenequinone Diimine Intercalators of Rhodium (III).
- Christopher W. Jones (*Chemical Engineering and Chemistry*) B.S., The University of Michigan 1995; M.S., California Institute of Technology 1997.
Thesis: Organic-Functionalized Molecular Sieves (OFMS'S): A New Class of Materials.
- Alexander Katz (*Chemical Engineering*) B.Ch.E., University of Minnesota 1992; M.S., 1994.
Thesis: The Synthesis and Characterization of Molecularly Imprinted Materials.
- Shana O. Kelley (*Chemistry*) B.S., Seton Hall University 1994.
Thesis: Electron Transfer through the DNA Double Helix: Spectroscopic and Electrochemical Studies.
- Chang Hee Kim (*Chemistry*) B.A., Harvey Mudd College 1991.
Thesis: Site-Specific Chemical Modification and Crosslinking Studies of U6 snRNA in the Yeast *spliceosome*.

Doctor of Philosophy continued

Chuo-Han Lee (*Chemistry*) B.S., University of California, Los Angeles 1992.

Thesis: Electron-Molecule Collisions in Semiconductor-Processing Plasmas.

Hak-No Lee (*Chemistry*) B.S., University of California, Davis 1993.

Thesis: I. Gas Phase Proton Affinity of Zwitterionic Betaine. II. High Resolution Spectroscopy of Trapped Ions: Concept and Design.

Chih-hsiu Lin (*Chemistry*) B.S., National Taiwan University 1990.

Thesis: Synthesis and Characterization of Hyperbranched Polyradicals.

David Michael Lynn (*Chemistry*) B.S., University of South Carolina 1994.

Thesis: Water-Soluble Ruthenium Alkylidene Complexes: Synthesis and Application to Olefin Metathesis in Protic Solvents.

Seth Adrian Miller (*Chemistry*) B.A., Carleton College 1992.

Thesis: Magnetic Interactions in Molecular Materials.

Cynthia Ann Parrish (*Chemistry*) S.B., Massachusetts Institute of Technology 1992.

Thesis: Synthesis of an α ,3-Dehydrotoluene Biradical Precursor with DNA Cleaving Activity and Studies Directed toward the Total Synthesis of Tetracycline.

Ronald S. Rock, Jr. (*Chemistry*) S.B., The University of Chicago 1992.

Thesis: Caged Polypeptides for the Rapid Triggering of Protein Conformational Change.

Geneviève Sauvé (*Chemistry*) B.Sc., Concordia University 1994.

Thesis: Dye Sensitization of Nanocrystalline Titanium Dioxide with Osmium and Ruthenium Polypyridine Complexes.

Jason Charles Schense (*Chemical Engineering and Biology*) S.B., Massachusetts Institute of Technology 1994; M.S., California Institute of Technology 1996.

Thesis: Enzymatic Incorporation of Bidomain Peptides into Fibrin Matrices for Directed Enhancement of Three-Dimensional *in vitro* Neurite Outgrowth and *in vivo* Nerve Regeneration.

Erik Jon Severin (*Chemistry*) B.A., Macalester College 1990.

Thesis: Array-Based Vapor Sensing Using Conductive Carbon Black-Polymer Composite Thin Film Detectors.

Jason W. Szewczyk (*Chemistry*) B.A., Northwestern University 1993; M.S., 1993.

Thesis: Design of Ligands for Sequence-Specific Recognition of the Minor-Major Grooves of DNA.

John Wesley Trauger (*Chemistry*) B.S., Stanford University 1993.

Thesis: Design of DNA-Binding Polyamides for Regulation of Gene Expression.

Marc Alexander Unger (*Chemistry*) B.S., Union College 1993.

Thesis: Advances in High-Resolution Probes for Scanning Probe Microscopy.

Michael Allen Vicic (*Chemical Engineering*) B.S., The University of Akron 1992.

Thesis: Rheology and Microstructure of Complex Fluids: Dispersions, Emulsions, and Polymer Solutions.

Paul A. Wagner (*Chemistry*) B.S., University of Wisconsin-Madison 1993.

Thesis: Structural Investigations of Zeolites.

Doctor of Philosophy continued

- Guangyang Wang (*Chemistry*) B.S., University of Science and Technology of China 1992.
Thesis: Design and Synthesis of Photoreleasable Ubiquinol and Its Biologically Active Analogues.
- Marcus Weck (*Chemistry*) Diplom Chemiker, Universität Mainz 1994.
Thesis: Olefin Metathesis for the Synthesis of Supramolecular Structures.
- Sarah White (*Chemistry*) B.S., The University of Texas at Austin 1993.
Thesis: Recognition of All Four Watson-Crick Base Pairs in the Minor Groove of DNA by Synthetic Ligands.
- Thomas Edward Wilhelm (*Chemistry*) S.B., Massachusetts Institute of Technology 1994.
Thesis: Easier and More Efficient Methods for the Generation of Metathesis Catalysts: Investigations into Group VI and VIII.
- Sheng Wu (*Chemistry*) B.Sc. (*Chemistry*), B.Sc. (*Physics*), Beijing University 1992; M.S., California Institute of Technology 1995.
Thesis: Development of Broadly Tunable Light Sources and Their Application to Alkali Metal-Small Molecule Cluster Spectroscopy.
- Chung-hei Yeung (*Chemical Engineering and Control and Dynamical Systems*) B.S., Case Western Reserve University 1993; M.S., California Institute of Technology 1996.
Thesis: Nonlinear Control of Rotating Stall and Surge with Axisymmetric Bleed and Air Injection on Axial Flow Compressors.
- Bo Yu (*Chemistry*) B.Sc., Tsinghua University 1990; M.S., University of Utah 1992.
Thesis: An Engineered Mutant of G Protein α Subunit that Binds Xanthine Nucleotide but Not Guanine Nucleotide.
- Dongping Zhong (*Chemistry*) B.S., Huazhong University of Science and Technology 1985; M.S. (*Laser Physics*), 1988; M.S. (*Physical Chemistry*), Kansas State University 1993.
Thesis: Femtosecond Molecular Dynamics of Complex Reactions.

DIVISION OF ENGINEERING AND APPLIED SCIENCE

- Keri Ann Aivazis (*Applied Mathematics*) B.S., Southern Methodist University 1994; M.S., California Institute of Technology 1996.
Thesis: A Spherical Vortex Model for Homogeneous Turbulence.
- Alicia Cristina Alonzo (*Applied Physics*) B.S., Cornell University 1993; M.S., California Institute of Technology 1995.
Thesis: Effects of Geometry on the Wet Thermal Oxidation of Aluminum Arsenide.
- Noel Lakshman Benedict (*Mechanical Engineering*) B.S., Lafayette College 1993; M.S., California Institute of Technology 1994.
Thesis: Buoyant Flows in Vertical Channels Relating to Smoke Movement in High-Rise Building Fires.

Doctor of Philosophy continued

Christopher Llewellyn Bond (*Aeronautics*) B.S., California Institute of Technology 1989; M.S., 1990.

Thesis: Reynolds Number Effects on Mixing in the Turbulent Shear Layer.

Jean-Yves Bouguet (*Electrical Engineering*) Diplôme d'Ingénieur, École Supérieure d'Ingénieurs en Électrotechnique et Électronique 1994; M.S., California Institute of Technology 1994.

Thesis: Visual Methods for Three-Dimensional Modeling.

Paul Martin Bridger (*Applied Physics*) B.Sc., University of Waterloo 1994; M.S., California Institute of Technology 1996.

Thesis: Development of Apertureless Microscopy and Force Microscopy of GaN and CeO₂.

Francesco Bullo (*Control and Dynamical Systems*) Laurea, Università degli Studi di Padova 1994.

Thesis: Nonlinear Control of Mechanical Systems: A Riemannian Geometry Approach.

Anders Elof Carlson (*Civil Engineering*) B.S., Cornell University 1988; M.Eng., 1989.

Thesis: Three-Dimensional Nonlinear Inelastic Analysis of Steel Moment-Frame Buildings Damaged by Earthquake Excitations.

Xiao-chang Cheng (*Applied Physics*) B.Sc. (*Engineering Physics*), University of Alberta 1992; B.Sc. (*Honors Physics*), 1993; M.S., California Institute of Technology 1997.

Thesis: Investigation of New Devices and Characterization Techniques in the III-V Semiconductor System.

Haein Choi-Yim (*Materials Science*) B.S., Sookmyung University 1989; M.S., 1991; M.S., California Institute of Technology 1995.

Thesis: Synthesis and Characterization of Bulk Metallic Glass Matrix Composites.

Patrick Yung-Shie Chuang (*Environmental Engineering Science*) B.Sc., University of Alberta 1992; M.S., California Institute of Technology 1994.

Thesis: Experimental and Theoretical Studies of Cloud Condensation Nuclei.

Andria Michelle Costello (*Environmental Engineering Science*) B.S., Georgia Institute of Technology 1992; M.S., California Institute of Technology 1995.

Thesis: Molecular Ecology Studies of Methanotrophs in a Freshwater Lake Sediment.

Jean-Paul Davis (*Aeronautics*) B.S., Cornell University 1992; M.S., California Institute of Technology 1993.

Thesis: High-Enthalpy Shock/Boundary-Layer Interaction on a Double Wedge.

Jeffrey Allen Dickson (*Electrical Engineering*) B.Sc., The University of Manitoba 1990; M.Sc., 1992.

Thesis: Integration of Analog VLSI and Thin Films: Towards an Electronic Nose.

Yalchin R. Efendiev (*Applied Mathematics*) Diploma, Moscow State University 1993.

Thesis: The Multiscale Finite Element Method (MsFEM) and Its Applications.

Doctor of Philosophy continued

Donal A. Gallagher (*Applied Mathematics*) B.Sc., University College Dublin 1992; M.Sc., 1993.

Thesis: Saffman-Taylor Fingers in Deformed Hele-Shaw Cells.

Mohammad Reza Gharib (*Aeronautics and Applied Mechanics*) B.S., California Institute of Technology 1992; M.S., 1993.

Thesis: Vortex-Induced Vibration, Absence of Lock-In, and Fluid Force Deduction.

James Gleeson (*Applied Mathematics*) B.Sc., University College Dublin 1994; M.Sc., 1995.

Thesis: Random Advection of a Passive Scalar.

Gavin B. Horn (*Electrical Engineering*) B.A.Sc., University of Toronto 1995; M.S., California Institute of Technology 1996.

Thesis: Iterative Decoding and Pseudo-Codewords.

Yun Huang (*Electrical Engineering*) B.E., Tsinghua University 1992; M.S., California Institute of Technology 1993.

Thesis: Nonlinear Optimal Control: An Enhanced Quasi-LPV Approach.

Anne Marie Jorunn Johansen (*Environmental Engineering Science and Geology*) B.S.,

University of Oslo 1989; M.S., 1991; M.S., California Institute of Technology 1995.

Thesis: Aerosol Chemistry Over Remote Oceanic Regions.

Michael Jiro Kaneshige (*Mechanical Engineering*) B.S., University of Illinois at Urbana-Champaign 1993; M.S., California Institute of Technology 1994.

Thesis: Gaseous Detonation Initiation and Stabilization by Hypervelocity Projectiles.

Sung Phill Kang (*Applied Mathematics*) B.A., University of California, Berkeley 1991.

Thesis: A Study of Viscous Flow Past Axisymmetric and Two-Dimensional Bodies.

Sven Hiralal Khatrī (*Electrical Engineering*) B.S., University of Maryland, College Park 1992; M.S., California Institute of Technology 1994.

Thesis: Extensions to the Structured Singular Value.

Ahmet Kiraç (*Electrical Engineering*) B.S., Bilkent University 1993; M.S., California Institute of Technology 1994.

Thesis: Optimal Orthonormal Subband Coding and Lattice Quantization with Vector Dithering.

Michael John Kleeman (*Environmental Engineering Science*) B.A.Sc., University of Waterloo 1993; M.S., California Institute of Technology 1994.

Thesis: Source Contributions to the Size and Composition Distribution of Urban Particulate Air Pollution.

Patrick M. Lahey (*Applied Mathematics*) B.S., Rensselaer Polytechnic Institute 1990; M.S., 1991.

Thesis: A Fixed-Grid Numerical Method for Dendritic Solidification with Natural Convection.

Sharon Lynn Laubach (*Electrical Engineering*) B.A., M.A., The University of Virginia 1990; M.S., California Institute of Technology 1992.

Thesis: Theory and Experiments in Autonomous Sensor-Based Motion Planning with Applications for Flight Planetary Microrovers.

Doctor of Philosophy continued

Patrick Lemieux (*Mechanical Engineering*) B.Sc., University of New Brunswick 1991;
M.Sc., Cranfield Institute of Technology 1992.

Thesis: The Instability of Shear Layers Produced by Curved Shocks.

Ivett Alejandra Leyva (*Aeronautics and French*) B.A., Whitman College 1994; B.S.,
California Institute of Technology 1994; M.S., California Institute of Technology
1995.

Thesis: Shock Detachment Process on Cones in Hypervelocity Flows.

Hui Li (*Mechanical Engineering*) B.S., University of Rochester 1994.

Thesis: Evolutionary Techniques Applied to Mask-Layout Synthesis in Micro-
Mechanical-Electronic Systems (MEMS).

Shijie Li (*Electrical Engineering*) B.S., Tsinghua University 1988; M.S., 1991; M.S.,
California Institute of Technology 1993.

Thesis: UHF and X-Band Class-E Amplifiers.

Thomas Lloyd (*Environmental Engineering Science and Chemistry*) B.S., University of
California, Berkeley 1993; M.S., California Institute of Technology 1995.

Thesis: Dissolution of Fe(III) and Mn(III,IV)- (hydr)oxides by Deferrioxamine B.

Mark K. Long (*Mechanical Engineering*) B.S., Lehigh University 1987; M.S., Stanford
University 1988.

Thesis: Computer Aided Mask Layout for Anisotropic Etch Photolithography.

Philip Christopher Love (*Applied Mathematics*) B.Sc., University of Warwick 1994.

Thesis: Bifurcations in Kolmogorov and Taylor-Vortex Flows.

Patrice Michel Maheo (*Aeronautics*) Diplôme d'Ingénieur, École Centrale de Lille 1992;
M.S., California Institute of Technology 1993.

Thesis: Free-Surface Turbulent Shear Flows.

Rajit Manohar (*Computer Science*) B.S., California Institute of Technology 1994; M.S., 1995.

Thesis: The Impact of Asynchrony on Computer Architecture.

Dragan S. Marić (*Electrical Engineering*) B.S.E.E., The University of Belgrade 1994;
M.S., California Institute of Technology 1996.

Thesis: Advanced Flux Weakening Techniques for Surface-Mounted Permanent-
Magnet Machine Drives.

Andreas Masuhr (*Materials Science*) Diplom Physiker, Westfälische Wilhelms-Universität
1994.

Thesis: Viscous Flow and Crystallization of Bulk Metallic Glass Forming Liquids.

Franklin Gregory Monzon (*Applied Physics*) B.S.E., Princeton University 1993; M.S.,
California Institute of Technology 1995.

Thesis: Semiconductor Magnetoelectronics and Prospects for a Spin Transistor.

Charles Art Ofria (*Computation and Neural Systems*) B.S., State University of New York at
Stony Brook 1994.

Thesis: Evolution of Genetic Codes.

Doctor of Philosophy continued

- Roberto Paiella (*Applied Physics*) B.S., Columbia University 1993; M.S., 1994.
Thesis: Physics and Applications of Four-Wave Mixing in Semiconductor Optical Amplifiers.
- Denis Joseph Phares (*Environmental Engineering Science*) B.S., Villanova University 1992; M.S., California Institute of Technology 1994.
Thesis: Particle Resuspension from Surfaces.
- Eric C. Piquette (*Applied Physics*) B.S., Colorado School of Mines 1993; M.S., California Institute of Technology 1996.
Thesis: Molecular Beam Heteroepitaxial Growth and Characterization of Wide Band Gap Semiconductor Films and Devices.
- Spyridoula Polly Preventza (*Electrical Engineering*) Diploma, National Technical University of Athens 1993; M.S., California Institute of Technology 1994.
Thesis: Analysis and Design for Quasi-Optical Structures.
- James Alan Primbs (*Control and Dynamical Systems*) B.S.E.E., B.S., University of California, Davis 1994; M.S.E.E., Stanford University 1995.
Thesis: Nonlinear Optimal Control: A Receding Horizon Approach.
- Sam Tawfik Roweis (*Computation and Neural Systems*) B.A.Sc., University of Toronto 1994.
Thesis: Data Driven Production Models for Speech Processing.
- Kurt Schenk (*Electrical Engineering*) Diplom, Die Ingenieurschule Burgdorf 1989.
Thesis: Power Factor Correction Topologies and Small-Signal Modeling. I: Single-Phase and Three-Phase Power Factor Correction. II. Small-Signal Analysis of Converters in Discontinuous Conduction Mode.
- Michael Joseph Scott (*Mechanical Engineering*) A.B., Harvard College 1986; M.S., California Institute of Technology 1994.
Thesis: Formalizing Negotiation in Engineering Design.
- Benjamin Shapiro (*Control and Dynamical Systems*) B.S., Georgia Institute of Technology 1995.
Thesis: Passive Control of Flutter and Forced Response in Bladed Disks via Mistuning.
- Shaun S. Shariff (*Aeronautics and German*) B.S. (*Aerospace Engineering*), B.S. (*Ocean Engineering*), Virginia Polytechnic Institute and State University 1992; M.S., California Institute of Technology 1993.
Thesis: Numerical Simulation of Viscous Reacting Hypersonic Flow Past Cones.
- Yi-Chung Shu (*Applied Mechanics and Materials Science*) B.S., National Taiwan University 1990; M.S., 1992.
Thesis: Shape-Memory Effect in Bulk and Thin-Film Polycrystals.
- Andrew Brett Slatkin (*Mechanical Engineering*) B.S., University of California, Los Angeles 1990; M.S., 1990.
Thesis: Modeling and Experiments for a Class of Robotic Endoscopes.

Doctor of Philosophy continued

Xubo Song (*Electrical Engineering*) B.E., Tsinghua University 1992.

Thesis: Contextual Pattern Recognition with Applications to Biomedical Image Identification.

Randall Richard Spangler (*Computation and Neural Systems*) B.S., Harvey Mudd College 1992.

Thesis: Rule-Based Analysis and Generation of Music.

Tricia Ann Waniewski (*Mechanical Engineering*) B.S., Pennsylvania State University 1993; M.S., California Institute of Technology 1994.

Thesis: Air Entrainment by Bow Waves.

Nancy A. Winfree (*Applied Mechanics*) B.S., The University of Michigan 1984; M.S., 1986.

Thesis: Impact-Induced Phase Transformations in Elastic Solids: A Continuum Study Including Numerical Simulations for GeO₂.

John A. Wright (*Electrical Engineering*) B.A., Dartmouth College 1991; B.E., Thayer School of Engineering 1992.

Thesis: Through-Wafer 3-D Micromachining and Its Applications for Neural Interfaces and Microrelays.

Lihao Xu (*Electrical Engineering*) B.S., Shanghai Jiao Tong University 1988; M.S., 1991; M.S., California Institute of Technology 1996.

Thesis: Highly Available Distributed Storage Systems.

Meina Xu (*Electrical Engineering*) B.S., University of Hawaii at Manoa 1995; M.S., California Institute of Technology 1997.

Thesis: Iterative Decoding and Graphical Code Representations.

Xing Yang (*Electrical Engineering*) B.Sc., Beijing University of Posts and Telecommunications 1991; M.Sc., 1994.

Thesis: Micromachined Silicone Rubber Membrane Valves for Fluidic Applications.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

Mark Joseph Abolins (*Geology*) B.A., University of California, Berkeley 1992; M.S., California Institute of Technology 1996.

Thesis: I. Stratigraphic Constraints on the Number of Discrete Neoproterozoic Glaciations and the Relationship between Glaciation and Ediacaran Evolution.

II. The Kwichup Spring Thrust in the Northwestern Spring Mountains, Nevada: Implications for Large-Magnitude Extension and the Structure of the Cordilleran Thrust Belt.

Kathleen Gabrielle Holland (*Geophysics*) B.A., Pomona College 1990; M.S., California Institute of Technology 1995.

Thesis: Phase Changes and Transport Properties of Geophysical Materials under Shock Loading.

Doctor of Philosophy continued

- Miriam Jackson (*Geophysics*) B.Sc., University College London 1985; M.S., The Ohio State University 1990.
Thesis: Dynamics of the Shear Margin of Ice Stream B, West Antarctica.
- David M. Kass (*Planetary Science and Applied Computation*) B.S., University of Dayton 1992.
Thesis: Change in the Martian Atmosphere.
- Cangli Liu (*Geophysics and Aeronautics*) B.S., Changsha Institute of Technology 1982; M.S., University of Science and Technology of China 1993.
Thesis: 1. Rigid Body Penetration into Brittle Material. 2. Phase Change Effect on Shock Wave Propagation.
- Timothy Ian Melbourne (*Geophysics*) B.A., Reed College 1991; B.S., California Institute of Technology 1991.
Thesis: I. Rupture Properties of Large Subduction Earthquakes. II. Broadband Upper Mantle Structure of Western North America.
- Jascha Polet (*Geophysics*) Drs., Rijksuniversiteit Utrecht 1992; M.S., California Institute of Technology 1994.
Thesis: 1. Seismological Observations of Upper Mantle Anisotropy. 2. Source Spectra of Shallow Subduction Zone Earthquakes and Their Tsunamigenic Potential.
- Adam Peter Showman (*Planetary Science and Geology*) B.S., Stanford University 1991.
Thesis: I. Dynamics at the Galileo Probe Site on Jupiter and II. Orbital and Thermal Evolution of Ganymede.
- Igor A. Sidorin (*Geophysics and Computer Science*) B.S., Moscow State University 1993.
Thesis: Dynamically Consistent Interpretation of the Seismic Structure at the Base of the Mantle.
- James Anthony Spotila (*Geology*) B.S., Boston College 1992; M.S., California Institute of Technology 1995.
Thesis: The Neotectonics of the San Bernardino Mountains and Adjacent San Andreas Fault: A Case Study of Uplift Associated with Strike-Slip Fault Systems.
- Slawek M. Tulaczyk (*Geology*) Magister, University of Wroclaw 1990; M.S., Northern Illinois University 1993; M.S., California Institute of Technology 1995.
Thesis: Basal Mechanics and Geologic Record of Ice Streaming, West Antarctica.
- Laura Eileen Wasylenki (*Geology*) B.S., Stanford University 1992; M.S., California Institute of Technology 1995.
Thesis: Partial Melting of Depleted Peridotite in the Earth's Upper Mantle and Implications for Generation of Mid-Ocean Ridge Basalts.

Doctor of Philosophy continued

DIVISION OF HUMANITIES AND SOCIAL SCIENCE

Peter Judd Coughlan (*Social Science*) B.A., The University of Virginia 1992; M.S., California Institute of Technology 1995.

Thesis: Public Institutions and Private Incentives: Three Essays.

Garrett Edwin Glasgow (*Social Science*) B.A., University of California, Los Angeles 1995; M.S., California Institute of Technology 1998.

Thesis: Issue Publics in American Politics.

Christina Michelle Ramirez (*Social Science*) B.A., The University of Texas at Austin 1994; M.S., California Institute of Technology 1996.

Thesis: Statistical and Econometric Analysis of the Treatment of HIV/AIDS.

Dean Victor Williamson (*Social Science*) B.A., Yale College 1989; M.S., London School of Economics 1994.

Thesis: The Design of Agency Relations: Three Essays on Contract Theory, Applications, and Experimentation.

Jin Yu (*Social Science*) B.A., Institute of International Relations 1991; M.A., University of Arkansas 1994; M.S., California Institute of Technology 1996.

Thesis: Discrete Approximations of Continuous Allocation Mechanisms.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Mina Aganagic (*Physics*) B.S., California Institute of Technology 1995.

Thesis: String Theory on Calabi-Yau Manifolds: Topics in Geometry and Physics.

Dominic James Benford (*Physics*) B.A. (*Applied Mathematics*), B.A. (*Physics*), University of California, Berkeley 1992; M.S., California Institute of Technology 1994.

Thesis: Broadband Submillimeter Instrumentation for the Detection of Distant Galaxies.

Joshua Lovis Bliss (*Physics*) A.B., The University of Chicago 1992.

Thesis: Collisional Studies of Ultracold Cesium.

Paul Whitton Carter (*Physics*) B.A. (*Mathematics*), B.A. (*Physics*), Rice University 1993; M.S., California Institute of Technology 1996.

Thesis: The HERMES Experiment: I. Analyzing Powers in Pion Electroproduction.
II. The Aerogel Radiator of the HERMES RICH.

Johan Chu (*Physics*) B.S., Korea Advanced Institute of Science and Technology 1992.

Thesis: Computational Explorations of Life.

Christopher D. Fassnacht (*Astronomy*) A.B., Harvard College 1989.

Thesis: Determining the Distance Scale with CLASS: Studies of Two New Gravitational Lenses and a Measurement of the Hubble Constant.

Doctor of Philosophy continued

- Siddhartha Gadgil (*Mathematics*) B.S., Indian Statistical Institute 1995; M.S., California Institute of Technology 1998.
Thesis: On the Geometric Simple-Connectivity of 4-Manifolds.
- Laura Elizabeth Grego (*Physics*) B.S., The University of Michigan 1992; M.S., California Institute of Technology 1996.
Thesis: Galaxy Cluster Gas Fractions Interferometric Observations of the Sunyaev-Zel'dovich Effect.
- Roman O. Grigoriev (*Physics*) Physicist, Moscow State University 1992.
Thesis: Symmetry and Localized Control of Extended Chaotic Systems.
- Andrei M. Khodakovsky (*Mathematics*) Diploma, St. Petersburg State University 1993.
Thesis: Inverse Spectral Problem with Partial Information on the Potential.
- Chao Ku (*Mathematics*) B.S., Peking University 1994; M.S., California Institute of Technology 1998.
Thesis: Dade's Ordinary Conjecture for the Finite Unitary Groups in the Defining Characteristic.
- Yury Levin (*Physics*) B.Sc., University of Melbourne 1993.
Thesis: Topics in Physics and Astrophysics of LIGO.
- Hans-Michael Müller (*Physics*) Diplom, Westfälische Wilhelms-Universität 1992.
Thesis: Fermionic Quantum Systems. Part I: Phase Transitions in Quantum Dots. Part II: Nuclear Matter on a Lattice.
- Ben R. Oppenheimer (*Astronomy*) B.A., Columbia University 1994.
Thesis: Direct Detection of Brown Dwarf Companions of Nearby Stars.
- James Harvey Panetta (*Physics*) B.S., Drexel University 1991; M.S., California Institute of Technology 1993.
Thesis: Decays of the $\psi(2S)$ Meson to Baryonic Final States.
- Nikolaos Efstathiou Sofronidis (*Mathematics*) B.S., Aristotle University of Thessaloniki 1995.
Thesis: Topics in Descriptive Set Theory Related to Equivalence Relations, Complex Borel and Analytic Sets.
- Iain W. Stewart (*Physics*) B.Sc., The University of Manitoba 1994; M.Sc., 1995.
Thesis: Applications of Chiral Perturbation Theory in Reactions with Heavy Particles.
- Qing Yang (*Mathematics*) B.S., University of Science and Technology of China 1992; M.S., California Institute of Technology 1997.
Thesis: The Seiberg-Witten Equations on 3-Manifolds with Boundary.
- Douglas J. Zare (*Mathematics*) B.A., New College of the University of South Florida 1994.
Thesis: Geometric Invariants in Contact Structures on 3-Manifolds.

PRIZES AND AWARDS

Prizes and awards are listed only for those students receiving degrees in 1999, and include prizes and awards received by them in previous years.

MILTON AND FRANCIS CLAUSER DOCTORAL PRIZE

Awarded to the Ph.D. candidate whose research is judged to exhibit the greatest degree of originality as evidenced by its potential for opening up new avenues of human thought and endeavor as well as by the ingenuity with which it has been carried out.

Recipient to be announced at Commencement.

FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

Awarded to the seniors who, in the opinion of the undergraduate Deans, have made the greatest undergraduate contribution to the welfare of the student body and whose qualities of leadership, character, and responsibility have been outstanding.

1999 *Michael David Astle, Brigitte Roth*

MABEL BECKMAN PRIZE

Awarded to an undergraduate woman upon completion of her junior or senior year in recognition of demonstrated academic and personal excellence, contributions to the Institute community, and outstanding qualities of character and leadership.

1999 *Nasim Afsarmanesh*

CHARLES D. BABCOCK AWARD

Awarded, by vote of the aeronautics faculty, to a student whose achievements in teaching or other assistance to students have made a significant contribution to the aeronautics department.

1997 *Ivett Alejandra Leyva*

WILLIAM F. BALLHAUS PRIZE

Awarded to aeronautics students for outstanding doctoral dissertations.

1999 *Michael Jiro Kaneshige*

ROLF D. BUHLER MEMORIAL AWARD IN AERONAUTICS

Awarded to an aeronautics student for outstanding academic achievement in the Master's program.

1993 *Patrice Michel Maheo*

1997 *Nitin Ashok Deshpande*

1999 *Adrian Jose Lew*

ROSALIND W. ALCOTT MERIT SCHOLARSHIP, CALTECH PRIZE
SCHOLARSHIP, CARNATION SCHOLARSHIP, AND JOHN STAUFFER
MERIT SCHOLARSHIP

Each year Caltech awards these prizes for academic excellence to undergraduates. They are based solely on merit (selection is made on the basis of grades, faculty recommendations, and demonstrated research productivity) with no consideration given to need or any other nonacademic criteria.

1994 *Rajit Manohar*

1998 *C. Michael Atkin*
Matthew Edward Barnett
James Franklin Buckwalter
Carolyn Sze-Yun Chan
Oliver Eugene Dial III
Sheng Ding
Angela (Yu-Chen) Lin
Milena Marinova

Liviu Mihail Mirica
Shayan Mookherjea
Dan Alin Muresan
Reuben Walter Ogburn IV
Robert Radoslaw Zygmunt Osada
Yongkai Ow
Claudiu Simion
Michael James Westover

1999 *C. Michael Atkin*
Mathew Edward Barnett
Klejda Adnan Bega
Sibani Lisa Biswal
James Franklin Buckwalter
Carolyn Sze-Yun Chan
Oliver Eugene Dial III
Sheng Ding
Uri Tzvi Eden
Mike Fisher
Joseph Scott Fouché
Emma Elizabeth Goldberg
David Michael Goulet
Michael Jan Grebeck
Andrea Rayne Hasenstaub

Victor Kuan Kai Huang
Neema Jalali
Joanne Wei-Un Jang
Angela (Yu-Chen) Lin
Shayan Mookherjea
Dan Alin Muresan
John Philip Niccolai
Reuben Walter Ogburn IV
Robert Radoslaw Zygmunt Osada
Yongkai Ow
Claudiu Simion
Xiaoyi Tang
Michael James Westover

RICHARD BRUCE CHAPMAN MEMORIAL AWARD

Awarded to a graduate student in hydrodynamics who has distinguished himself or herself in research in the Division of Engineering and Applied Science.

1999 *Patrice Michel Maheo, Tricia Ann Waniewski*

DONALD S. CLARK MEMORIAL AWARD

May be awarded to two juniors in recognition of service to the campus community and academic excellence. Preference is given to students in the Division of Engineering and Applied Science and to those in Chemical Engineering.

1998 *Sibani Lisa Biswal*

DEANS' CUP AWARD

Presented to undergraduates whose concern for their fellow students has been demonstrated by persistent efforts to improve the quality of undergraduate life and by effective communication with members of the faculty and administration. The recipients are selected by the Deans.

1999 *Khristie Victoria Phillips, David Edward Tytell*

CONSTANTIN G. ECONOMOU MEMORIAL PRIZE

Awarded to a chemical engineering graduate student distinguished by outstanding research accomplishments and exemplary attitude while fulfilling candidacy requirements for the Ph.D. degree.

1997 *Gyeong Soon Hwang*

EVERHART DISTINGUISHED GRADUATE STUDENT LECTURER AWARD

Awarded to a graduate student who has demonstrated exemplary presentation ability and graduate research.

1998 *Sam Tawfik Roweis*

1999 *Christina Michelle Ramirez*

LAWRENCE L. AND AUDREY W. FERGUSON PRIZE

Awarded to the graduating Ph.D. candidate in biology who has produced the outstanding Ph.D. thesis for the past year.

1999 *Hai Wang*

RICHARD P. FEYNMAN PRIZE IN THEORETICAL PHYSICS

Awarded to a senior on the basis of excellence in theoretical physics.

1999 *Reuben Walter Ogburn IV*

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS

Awarded to a junior physics major who demonstrates the greatest promise of future contributions in physics.

1998 *Oliver Eugene Dial III, Joseph Merrill Renes*

HENRY FORD II SCHOLAR AWARD

Awarded either to the engineering student with the best academic record at the end of the third year of undergraduate study, or to the engineering student with the best first-year record in the graduate program.

1998 *Robert Radoslaw Zygmunt Osada*

JACK E. FROEHLICH MEMORIAL AWARD

Awarded to a junior in the upper five percent of his or her class who shows outstanding promise for a creative professional career.

1998 *Robert Radoslaw Zygmunt Osada*

GRADUATE DEAN'S AWARD FOR OUTSTANDING
COMMUNITY SERVICE

Awarded to a Ph.D. candidate who, throughout his or her graduate years at the Institute, has made great contributions to graduate life and whose qualities of leadership and responsibility have been outstanding.

1999 *José Angel Lebrón*

ARIE J. HAAGEN-SMIT MEMORIAL AWARD

Awarded to a sophomore or junior in biology or chemistry who has shown academic promise and who has made recognized contributions to Caltech.

1998 *Claudiu Simion*

BIBI JENTOFT-NILSEN MEMORIAL AWARD

Awarded to an upperclass student who exhibits outstanding qualities of leadership and who actively contributes to the quality of student life at Caltech.

1999 *Joanne Wei-Un Jang*

D.S. KOTHARI PRIZE IN PHYSICS

Awarded to a graduating senior in physics who has produced an outstanding research project during the year.

1999 *Emma Elizabeth Goldberg*

DOROTHY B. AND HARRISON C. LINGLE SCHOLARSHIP

Awarded to an incoming freshman in recognition of interest in a career in science or engineering, outstanding academic record, demonstrated fair-mindedness, and unquestioned integrity.

1995 *Rachel Elizabeth Steinberger*

ARTUR MAGER PRIZE IN ENGINEERING

Awarded to a senior in engineering who has shown excellence in scholarship and the promise of an outstanding professional career.

1999 *Samuel Yeong-Shi Chang*

THE HERBERT NEWBY McCOY AWARD

Awarded to chemistry doctoral students for outstanding contributions to the science of chemistry.

1998 *Christopher L. Claypool*

1999 *Shana O. Kelley, David Michael Lynn, Dongping Zhong*

ROBERT L. NOLAND LEADERSHIP SCHOLARSHIP

Awarded to undergraduate students who exhibit qualities of outstanding leadership, which are most often expressed as personal actions that have helped other people and that have inspired others to fulfill their capabilities.

1998 *Nasim Afsarmanesh*

1999 *Sibani Lisa Biswal, David Stefanov Djambazov*

HOWARD REYNOLDS MEMORIAL PRIZE IN GEOLOGY

Awarded to a sophomore or junior who demonstrates the potential to excel in the field of geology and who actively contributes to the quality of student life at Caltech.

1998 *Matthew Walter Dawson*

HERBERT J. RYSER MEMORIAL SCHOLARSHIPS

Awarded to undergraduate students for academic excellence, preferably in mathematics.

1998 *Joseph Kalmon Blitzstein*

RICHARD P. SCHUSTER MEMORIAL PRIZE

Awarded to one or more juniors or seniors in chemistry or chemical engineering on the basis of financial need and academic promise.

1998 *Sheng Ding*

ERNEST E. SECHLER MEMORIAL AWARD IN AERONAUTICS

Awarded to an aeronautics student who has made the most significant contribution to the teaching and research efforts of GALCIT (Graduate Aeronautical Laboratories of the California Institute of Technology). Preference is given to students working in structural mechanics.

1998 *Michael Jiro Kaneshige*

DON SHEPARD AWARD

Awarded to students who would find it difficult, without additional financial help, to engage in extracurricular and cultural activities. The recipients are selected on the basis of their capacity to take advantage of and to profit from these activities rather than on the basis of their scholastic standing.

- 1996 *Kay Young Jhun*
 Khristie Victoria Phillips
- 1997 *C. Michael Atkin*
 James Franklin Buckwalter
 Matthew Michael Gregori
- 1998 *C. Michael Atkin*
 Adriane Chiu
 Minxi Gao
 Brian Seisho Taba
 Janice Josephine Yeung

SIGMA XI AWARD

Awarded to a senior selected for an outstanding piece of original scientific research.

- 1999 *Andrea Rayne Hasenstaub*

JOHN STAGER STEMPLE MEMORIAL PRIZE IN PHYSICS

Awarded to a graduate student in physics for outstanding progress in research as demonstrated by an excellent performance on the oral Ph.D. candidacy examination.

- 1997 *Yury Levin*

ALAN R. SWEEZY PRIZE IN ECONOMICS

Awarded to a graduating senior who has shown unusual interest in and talent for economics.

- 1999 *Brigitte Roth*

FREDRICK J. ZEIGLER MEMORIAL AWARD

Awarded to an outstanding sophomore or junior in pure or applied mathematics, for excellence in scholarship as demonstrated in class activities or in the preparation of an original paper or essay in any subject area.

1997 *Peter Gerd Stobbe*

1998 *David Gabe Powers*

Caltech Alma Mater

by Manton Barnes, BS '21 EE

In Southern California with grace and splendor bound,
Where the lofty mountain peaks look out to lands beyond,
Proudly stands our Alma Mater, glorious to see;
We raise our voices proudly, hailing, hailing Thee!
Echoes ringing while we're singing over land and sea;
The halls of fame resound thy name, noble CIT!