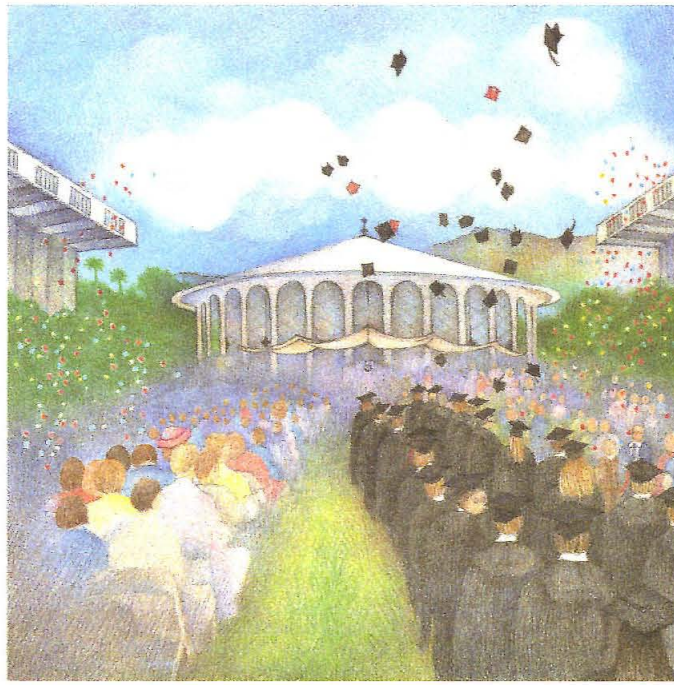
One Hundred and First Annual Commencement

June 16, 1995



CALIFORNIA INSTITUTE
of TECHNOLOGY

Cover illustration by Margery Mintz

CALIFORNIA INSTITUTE OF TECHNOLOGY

One Hundred and First Annual Commencement

FRIDAY MORNING AT TEN O'CLOCK
JUNE SIXTEENTH, NINETEEN NINETY-FIVE

About Caltech

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, and a faculty of about 275 professorial members and more than 370 research members, including a Nobel laureate and two Crafoord laureates. Today, Caltech will award 204 students the B.S. degree; 117 students the M.S. degree; 4 scholars the Engineer's degree; and 166 doctoral candidates the Ph.D. degree, for a total of 491 graduates—quite a leap from the one man and one woman who constituted the first collegiate graduating class of Throop University.

About the Speaker

Twenty-three years after receiving his own Caltech diploma, alumnus Mark Wrighton returns to the site of our commencement exercises, this time to deliver the commencement address. Wrighton, who received Caltech's Distinguished Alumni Award in 1992, is currently the provost of the Massachussetts Institute of Technology and the Ciba-Geigy Professor of Chemistry. He will be leaving MIT in July for Washington University in Saint Louis, where he has accepted the position of chancellor.

After receiving his Ph.D. in chemistry at Caltech in 1972, Wrighton joined the faculty at MIT as an assistant professor of chemistry, becoming a full professor in 1977. Four years later, he was named the Frederick G. Keyes Professor, and, at the age of 32, became one of the youngest persons ever at MIT to be appointed to a named chair. Wrighton served as head of the chemistry department from 1987 until 1990, when he was named provost.

During his tenure as provost at MIT, Wrighton emphasized the value of teaching in a research university, and initiated the establishment of the Margaret MacVicar Faculty Fellows Program to recognize the importance of undergraduate education. He worked on enhancing and reshaping science and engineering education by coupling these disciplines to a concept of serving the larger needs of society; examining the role of environmental studies; reevaluating the academic computing environment; and assessing the impact of international educational institutions on science education and research as a whole. Wrighton also inaugurated programs to build diversity within the MIT faculty and developed funding programs to seed new research and to endow faculty salaries.

The author of more than 400 articles and the holder of 14 patents, Wrighton conducts research that uses chemical processes to mimic photosynthesis and to tailor the properties of surfaces with respect to optical, wetting, or catalytic properties. Recently, he has been investigating molecular electronics and its use in sensor devices.

Active in public and professional affairs, Wrighton has been elected a fellow in both the American Academy of Arts and Sciences and the American Association for the Advancement of Science. He has received a Sloan Fellowship, a Dreyfus Teacher-Scholar Award, and a MacArthur Fellowship. Wrighton has also received two awards for excellence in teaching from MIT.

The Commencement Ceremony

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 supermagisterial 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.
Noel Robert Corngold, Ph.D.
Joel N. Franklin, Ph.D.
D. Roderick Kiewiet, Ph.D.
Ward Whaling, Ph.D.

Faculty Officers

John J. Hopfield, Ph.D.
Mary E. Lidstrom, 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 CHAPLAIN

THE COMMENCEMENT SPEAKER

THE PRESIDENT

THE CHAIR OF THE BOARD OF TRUSTEES

Program

ORGAN PRELUDE . . . . . *Leslie J. Deutsch, Ph.D.*

PROCESSIONAL . . . . . The Caltech Convocations Brass and Percussion Ensemble
William Bing, M.M., Conductor

PRESIDING . . . . . Gordon E. Moore, Ph.D.
Chair of the Board of Trustees
California Institute of Technology

INVOCATION . . . . . The Reverend Thomas J. Edwards
Pastor, Knox Presbyterian Church

"20TH-CENTURY EDUCATION,
21ST-CENTURY ACHIEVEMENT" . . . . . Mark S. Wrighton, Ph.D.
Chancellor-elect
Washington University in Saint Louis

CHORAL SELECTION . . . . . The Caltech Glee Clubs
Donald G. Caldwell, D.M.A., Conductor

"Hallelujah" from *Messiah*
George Frederick Handel
(The audience will please rise during the singing of the "Hallelujah" chorus.)

CONFERRING OF DEGREES . . . . . Thomas E. Everhart, Ph.D.
President
California Institute of Technology

PRESENTATION OF CANDIDATES FOR DEGREES

For the Degree of Bachelor of Science . . . . D. Roderick Kiewiet, Ph.D.
Dean of Students

For the Degree of Master of Science . . . . . Gary A. Lorden, Ph.D.
Vice President for Student Affairs

For the Degree of Engineer . . . . . Arden L. Albee, Ph.D.
Dean of Graduate Studies

For the Degree of Doctor of Philosophy . . . . . Dr. Albee

Biology . . . . . John Abelson, Ph.D.
Division Chair

Chemistry and Chemical Engineering . . . . . Peter B. Dervan, Ph.D.
Division Chair

Engineering and Applied Science . . . . . John H. Seinfeld, Ph.D.
Division Chair

Geological and Planetary Sciences . . . . . Edward M. Stolper, Ph.D.
Division Chair

Humanities and Social Sciences . . . . . John O. Ledyard, Ph.D.
Division Chair

Physics, Mathematics and Astronomy . . . . . Charles Peck, Ph.D.
Division Chair

ANNOUNCEMENT OF AWARDS AND
CONCLUDING REMARKS . . . . . President Everhart

ALMA MATER . . . . . The Caltech Glee Clubs,
The Caltech Convocations Brass and
Percussion Ensemble, and Organ
(The audience may join in; lyrics are found on page 40.)

BENEDICTION . . . . . Reverend Edwards

RECESSIONAL . . . . . The Caltech Convocations Brass
and Percussion Ensemble

ORGAN POSTLUDE . . . . . *Dr. Deutsch*

Candidates for Degrees

BACHELOR OF SCIENCE

Leif Eric Aamot *Falls Church, Virginia* Engineering and Applied Science
Gypsy Rebekah Achong* *Port of Spain, Trinidad* Engineering and Applied Science
Brian A. Adair* *Tucson, Arizona* Chemical Engineering
Mina Aganagic* *Minneapolis, Minnesota* Physics
Erica Lynn Alliston* *Murrysville, Pennsylvania* Biology
Jasmine Rae Anderson *North Hollywood, California* Chemistry
Jesus Arcilla *San Diego, California* Economics
John Miguel Baker *Denair, California* Engineering and Applied Science
Alexei Yakov Barski *Saint Petersburg, Russia* Physics
Carlan Joseph Beheler* *Richardson, Texas* Engineering and Applied Science
Serge Justin Belongie* *Sacramento, California* Electrical Engineering
Bevan Christopher Bennett *Philadelphia, Pennsylvania* Electrical Engineering
Zackary Dov Berger* *Louisville, Kentucky* Biology
Vance Carl Bjorn* *Brooklyn Park, Minnesota* Engineering and Applied Science
Cesar Bocanegra *Pacoima, California* Engineering and Applied Science
Charles Kevin Boyce* *La Cañada Flintridge, California* Biology and Literature
Brian Edmond Brewington *Colorado Springs, Colorado* Engineering and Applied Science
Christopher Warren Bryant *Hutchinson, Kansas* Engineering and Applied Science
Christopher Michael Buchner *Foster City, California* Engineering and Applied Science
Karen Lynn Casciotti *East Aurora, New York* Engineering and Applied Science
William Andrew Cesarotti *San Jose, California* Engineering and Applied Science
Frances Suyin Chance *Newtown, Connecticut* Biology
Celene Chang* *Hong Kong, Hong Kong* Engineering and Applied Science
Clark C. Chang *La Cañada Flintridge, California* Engineering and Applied Science and Chemistry
Daniel Hen-An Chang* *Knoxville, Tennessee* Chemistry
Finney George Chavanikamannil* *La Verne, California* Chemistry
Alix J. Chen* *Yorba Linda, California* Physics
Lucy Chen *Seattle, Washington* Biology
Joseph I-Jen Chiu *Cerritos, California* Engineering and Applied Science
Hsun-Hua Chou *Okinawa, Japan* Biology

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*

Ajay Chugh* *Lakewood, Colorado* Electrical Engineering
William C. Chuong *Pecos, Texas* Biology
Erick Wang Co *Brunswick, Ohio* Chemistry
Brian Michael Cooper *Duncan Falls, Ohio* Chemical Engineering
Tobé Noel Corazzini* *Bethesda, Maryland* Engineering and Applied Science
Jennifer Leigh Cormack* *Waunakee, Wisconsin* Chemistry
Michael Hamilton Coward *Edmonton, Canada* Electrical Engineering
Brian Andrew Craft *Emporia, Kansas* Engineering and Applied Science
Thomas J. Creath *Tucson, Arizona* Physics and Engineering and Applied Science
Schuyler A. Cullen* *Chico, California* Physics and Mathematics
Chandra Prakash Das* *Hermitage, Pennsylvania* Engineering and Applied Science and Economics
Chitralekha Dasgupta *Calcutta, India* Mathematics and Literature
Gregory Evan Davis* *San Ramon, California* Electrical Engineering
Michael James Debar* *Reisterstown, Maryland* Engineering and Applied Science
Sayuri Desai *Pasadena, California* Engineering and Applied Science
Frederick William Duewer* *Livermore, California* Physics
Vikas Duvvuri* *Bombay, India* Biology and Chemistry
Adalberto Jorge Erives *Pacoima, California* Biology
Edward Van Etzkorn *Fountain Valley, California* Applied Physics
Brent Robert Eubanks *Phoenix, Arizona* Engineering and Applied Science
Javier Favela *Bell, California* Engineering and Applied Science
Stacy Joane Fox *Kansas City, Kansas* Engineering and Applied Science
June Hiromi Fujimoto *Burbank, California* Chemistry
Virginia Celestine Garcia* *Omaha, Nebraska* Engineering and Applied Science
Heather Joy Gibble* *Overland Park, Kansas* Chemical Engineering
Anthony Hernan Gonzalez* *Key Largo, Florida* Physics
Ramesh K. Gopi* *Rancho Santa Margarita, California* Engineering and Applied Science
Todd Jason Gottula *Klamath Falls, Oregon* Chemical Engineering
Stanley Grant III *Dallas, Texas* Physics
Steven Joseph Greenberg *River Edge, New Jersey* Engineering and Applied Science
Sharon Lynne Grelecki *Tulsa, Oklahoma* Engineering and Applied Science
John George Haba, Jr. *Oakwood Village, Ohio* Social Science
Jiho Hahm* *Portland, Oregon* Engineering and Applied Science
Ryan Hamilton *San Pedro, California* Electrical Engineering
Robert Andrew Hanna *Saint Louis, Missouri* Applied Physics
Christopher Alan Hare *Las Cruces, New Mexico* Engineering and Applied Science
Konstantinos George Haritos* *Beavercreek, Ohio* Electrical Engineering
Ricardo Justo Hassan II *Oceanside, New York* Engineering and Applied Science

BACHELOR OF SCIENCE — *Continued*

Syed Asif Hassan *Houston, Texas* Physics

Remy Adam Hathaway *Portland, Oregon* Engineering and Applied Science and Economics

Magnus Hedlund* *Brooklyn, New York* Engineering and Applied Science

DeAnn Christine Henny *Brooks, Oregon* Engineering and Applied Science

Hootan Hidaji *Memphis, Tennessee* Chemical Engineering

Adrian Hightower *Los Angeles, California* Engineering and Applied Science

Courtney Irene Hilliard* *Reston, Virginia* Electrical Engineering

Flora Kou Ho* *Arcadia, California* Biology

Tuan Quoc Hoang* *Modesto, California* Biology

Cedric Michael Hobbs *Lawton, Oklahoma* Engineering and Applied Science

Jacob Edward Holland *Poulsbo, Washington* Engineering and Applied Science

Jason Pippert Hollinger* *Owings, Maryland* Physics and Mathematics

James Michael Holton* *Stockton, California* Biology

Lanny Lai Hsieh* *Beverly Hills, California* Biology

Daniel Way Huang *Sacramento, California* Biology

Ewald William Hueffmeier, Jr.* *Boulder City, Nevada* Physics and Mathematics

Michael Edwin Ichiriu *Honolulu, Hawaii* Electrical Engineering

Nicky Pierre Impert *Seattle, Washington* Engineering and Applied Science and Applied Mathematics

R. Michael Jarvis* *Katonah, New York* Astronomy

Monwhea Jeng* *Saint Louis, Missouri* Mathematics and Astronomy

Steven Wayne Jilcott, Jr. *Pensacola, Florida* Mathematics

Mbuyi N. Kazadi *Naperville, Illinois* Mathematics and Physics

Sanza Nkashama Tshilobo Kazadi *Naperville, Illinois* Physics

Farid Ahmed Khan* *Lahore, Pakistan* Electrical Engineering

Imran Haroon Khan* *Sheikhupura, Pakistan* Electrical Engineering

Rohit Khare* *Ellicott City, Maryland* Engineering and Applied Science and Economics

Michael Taehoon Kim *Germantown, Tennessee* Biology

Yun H. Kim *Bloomington, Minnesota* Electrical Engineering

Jeffrey Alan Kirshberg* *Santa Monica, California* Engineering and Applied Science

Susy Carolina Kohout *Bethesda, Maryland* Chemistry

David Allan Kornreich* *Houston, Texas* Astronomy

Svetlana A. Kryukova* *Moscow, Russia* Engineering and Applied Science

Lucia D. Kuhns *The Plains, Virginia* Engineering and Applied Science

Jason Prince Kumar* *Cleveland, Tennessee* Physics and Mathematics

Thomas C. Kwan* *Leonia, New Jersey* Chemical Engineering

BACHELOR OF SCIENCE — *Continued*

Kade Bryce Larsen *Grand Junction, Colorado* Applied Mathematics
Janice Lau* *Alhambra, California* Chemical Engineering
Elizabeth Myung Jin Lee *Roslyn, New York* Engineering and Applied Science
Joseph Paul Lee* *Everett, Washington* Biology and Chemistry
Leslie Lee *Signal Mountain, Tennessee* Physics
Ann-Virginie Laetitia Leenknecht *Bordeaux, France* Chemical Engineering
Debbie Wunchi Leung* *Hong Kong, Hong Kong* Physics and Mathematics
Richard Yungning Liu* *Sandy, Utah* Electrical Engineering
Eric Brent Loftsgaarden *Missoula, Montana* Mathematics
Joseph Louis Long *Venice, Florida* Engineering and Applied Science
Brenda Marina Mar *Seattle, Washington* Chemistry
John Edward Marquis *New Braunfels, Texas* Geology
Sarah Deborah Martin *Milwaukee, Wisconsin* Electrical Engineering
Betsy M. Marvit *Pasadena, California* Engineering and Applied Science
Andrew Richard Maskiell* *Madison, New Jersey* Engineering and Applied Science
Don Hideyasu Matsubayashi *Monterey, California* Engineering and Applied Science
Bridget Lauren Mattingly *Kennesaw, Georgia* Engineering and Applied Science
Leslie Marie Maxfield* *Houston, Texas* Astronomy
Benjamin John McCall* *Kalamazoo, Michigan* Chemistry
Amitav Mehra* *New Delhi, India* Engineering and Applied Science
Matthew Alexander Metz *Coos Bay, Oregon* Biology
Marko Milek *Zagreb, Croatia* Physics
Brian P. Moerdyk *Lansing, Michigan* Electrical Engineering
Ravi Rico Montenegro* *Placentia, California* Mathematics
Rhonda M. Morgan *Albuquerque, New Mexico* Electrical Engineering
Vikas Nanda *Annapolis, Maryland* Biology
Mark Andrew Nelson *Keedysville, Maryland* Chemical Engineering
Timothy David Nelson* *Seattle, Washington* Chemistry
Francis Man Lung Ng* *Hong Kong, Hong Kong* Electrical Engineering
Michael Masao Ng *Kaneohe, Hawaii* Engineering and Applied Science
A. Jennifer Niessink* *Portage, Michigan* Chemistry
Brien M. Oberstein* *Flushing, New York* Electrical Engineering
Jane Virginia Oglesby *Garden Grove, California* Chemistry
Amy Lynn Oldenburg* *Darien, Illinois* Applied Physics
David Michael Ozenne* *Torrance, California* Physics
Clinton Sangkyu Park* *Rowland Heights, California* Applied Physics
David Sangchoon Park *Walnut, California* Chemical Engineering
Michael David Pawson *Loudonville, New York* Chemical Engineering and Economics

BACHELOR OF SCIENCE — *Continued*

Amy Lynn Pemberton *Louisville, Kentucky* Planetary Science
Baoquoc Ngoc Pham *Austin, Texas* Economics
Kristin Ann Polito *Tijeras, New Mexico* Physics
Lesley Kay Preister *Highland, Michigan* Engineering and Applied Science
Antonio Francisco Ramirez *El Paso, Texas* Physics
Rajan Ranga *Palo Alto, California* Electrical Engineering
Albert Ratner *Minneapolis, Minnesota* Engineering and Applied Science
Kurt Allen Revis *Manhattan, Illinois* Engineering and Applied Science
Robert Kim Rickenbrode II *Kaneohe, Hawaii* Economics
Gisela Maria Rodriguez Sandoval* *Astorga, Spain* Biology
Todd Loren Rope *Farmington Hills, Michigan* Physics
Heather J. Russell* *Rochester, New York* Mathematics
Chutima Saipetch* *Bangkok, Thailand* Applied Physics
Steven William Sandberg *Riverside, California* Engineering and Applied Science
Eric Brian Schell *West Orange, New Jersey* Planetary Science
Theobald Alexander Seales III *Saint Croix, United States Virgin Islands* Engineering and Applied Science
Keith Ronald Seitz *Arlington Heights, Illinois* Chemical Engineering
Jerry Wei-Jen Shan* *Riverside, California* Engineering and Applied Science
Attma Sharma *Chaguanas, Trinidad* Electrical Engineering
Charles Scott Sharman* *Montrose, Colorado* Electrical Engineering
Monica C. Sharman *Carson, California* Engineering and Applied Science
Shiyin Siou *Honolulu, Hawaii* Engineering and Applied Science
Katharine J. Sippel* *Woodbury, Minnesota* Chemistry
Michelin Aldridge Sloneker *Escondido, California* Biology
Geoffrey Douglas Smith* *Atlanta, Georgia* Chemistry
Thomas Sullivan Smith II *Marksville, Louisiana* Chemistry
Albert Joseph Sommar *Malvern, Pennsylvania* Mathematics and Economics
Joseph Nicholas Spitale *Diamond Bar, California* Physics
Anatoly Spitkovsky* *Sunnyvale, California* Physics
Linda Heather Springer *Laton, California* Biology
Laurent Fabris Stadler *New Canaan, Connecticut* Engineering and Applied Science
Ronald David Stieger* *Beaverton, Oregon* Electrical Engineering
Khurram Mehmud Sunasara *Karachi, Pakistan* Chemical Engineering
Stephen Hsien Shun Tang* *Phoenix, Arizona* Electrical Engineering
Grant Travis Templin *Telluride, Colorado* Chemical Engineering
Craig Eugene Tibbetts* *Riverside, California* Engineering and Applied Science
Scott Douglas Townsend *Laguna Niguel, California* Engineering and Applied Science

BACHELOR OF SCIENCE — *Continued*

Kathleen Rene Tozer* *Pendelton, Indiana* Biology
Brian C. Trotter* *Gaithersburg, Maryland* Applied Physics
Thanh Nguyet Truong *Houston, Texas* Biology
Dennis Wayne Ugolini* *Phoenix, Arizona* Physics
Scott Jeffrey Van Essen *Saint Louis, Missouri* Applied Physics
Eddy Samuel Vataru *Los Angeles, California* Chemistry and Economics
Charles D. Waite* *Pago Pago, American Samoa* Engineering and Applied Science
Christian J. Waite* *Pago Pago, American Samoa* Engineering and Applied Science
John Weijune Wang* *Fountain Valley, California* Biology
Justin Brian Warner *Sonoma, California* Engineering and Applied Science and Economics
Erik Christopher Wasinger *Chico, California* Chemistry
Jonathan David Weinstein* *Las Vegas, Nevada* Physics
Michelle Marie Wilber* *Hilo, Hawaii* Astronomy
Joyce Yuenwah Wong* *Arcadia, California* Electrical Engineering
Li Ann Wong *El Monte, California* Electrical Engineering
Jun Yang* *McLean, Virginia* Chemical Engineering
Sarah Elizabeth Yoder *North Hills, California* Biology and Geology
Steven Young *Great Neck, New York* Biology
Mengchen Yu* *Shanghai, China* Electrical Engineering
Patrick Yue* *Deerfield, Illinois* Biology and Chemistry
Rebecca Lynn Zaske *Oshkosh, Wisconsin* Geology
Tom R. Zavisca* *Lubbock, Texas* Engineering and Applied Science and Mathematics
Michael Maroun Zeineh* *Fullerton, California* Biology
Alexander Zeyliger *Milpitas, California* Physics
Xiaoting Zhu* *Charlotte, North Carolina* Applied Mathematics
Richard Riños Zitola *South Yarmouth, Massachusetts* Engineering and Applied Science

MASTER OF SCIENCE

Brad Thomas Aagaard *(Civil Engineering)* B.S., Harvey Mudd College 1994.

Alicia Cristina Alonzo *(Applied Physics)* B.S., Cornell University 1993.

Cheryl Marie Anderson *(Chemical Engineering)* B.Sc., The University of Calgary 1992.

Zvonimir Bandić *(Applied Physics)* B.S., University of Belgrade 1994.

Sarah Elizabeth Bates *(Electrical Engineering)* B.S.E., Princeton University 1991.

Eric Theodore Bax *(Computer Science)* B.S., Furman University 1990.

Joseph Gregory Billock *(Electrical Engineering)* B.S., Walla Walla College 1994.

Vance Carl Bjorn *(Computation and Neural Systems)* B.S., California Institute of Technology 1995.

Vardkes Boyadzhyan *(Electrical Engineering)* B.S., California State Polytechnic University, Pomona 1991.

Robert John Brady *(Geology)* B.S., University of Calgary 1993.

Renato Penha Camata *(Applied Physics)* B.S., University of São Paulo 1990; M.S., 1992.

Peter Alan Carlin *(Computer Science)* B.S., California Institute of Technology 1994.

Limdara Ong Chea *(Aeronautics)* B.S., École Centrale Paris 1994.

Zhongren Chen *(Chemical Engineering)* B.S., Zhejiang University 1984; M.S., 1987.

Haein Choi-Yim *(Materials Science)* B.S., Sookmyung University 1989; M.S., 1991.

Joseph Carl Christopherson *(Electrical Engineering)* B.S., Iowa State University 1994.

Dawn Denise Waterman Cornelison *(Biology)* B.A., University of Colorado at Boulder 1990.

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

Peter Judd Coughlan *(Social Science)* B.A., University of Virginia 1992.

Heather Elizabeth Crawford *(Social Science)* B.A., University of Arizona 1993.

David Wallace Croft *(Electrical Engineering)* B.S., United States Air Force Academy 1990.

Uri Vaughan Cummings *(Electrical Engineering)* B.A., Wesleyan University 1994; B.S., California Institute of Technology 1994.

John Frank Davis *(Electrical Engineering)* B.S., Arizona State University 1993.

Hooman Davoudiasl *(Physics)* S.B., Massachusetts Institute of Technology 1993.

Dina Michelle DelConte *(Environmental Engineering Science)* B.S., University of California, Davis 1993.

Xiaoming Ding *(Geophysics)* B.S., University of Science and Technology of China 1989.

Ognjen Djekić *(Electrical Engineering)* B.S.E.E., University of Maryland at College Park 1994.

Mihai N. Ducea *(Geology)* Diploma, Bucharest University 1991.

Olivier B. Duchemin *(Aeronautics)* Diplôme d'Ingénieur, École Nationale Supérieure des Ingénieurs des Études et Techniques d'Armement 1993.

Maciej Konrad Dudek *(Applied Mathematics)* B.S., California Institute of Technology 1994.

Francois Jean Joseph Durnez *(Electrical Engineering)* Maîtrise, École Centrale Paris 1994.

Christopher Adam Eckett *(Aeronautics)* B.E., The University of Queensland 1993.

Brenton Todd Flatt *(Chemistry)* B.S., Texas A&M University 1990.

Heather Nicol Frase *(Materials Science)* B.S., Miami University 1992.

Laurence Jon Fumagalli *(Social Science)* B.A., University College, Oxford 1993.

Kon-Chung Stanley Fung *(Aeronautics)* B.E., McGill University 1994.

Kathleen Gabrielle Gallagher *(Geophysics)* B.A., Pomona College 1990.

Jeffrey M. Goldsmith *(Computer Science)* B.S., Rensselaer Polytechnic Institute 1981; M.S., 1983.

Javier González González *(Aeronautics)* B.A., B.S., Boston University 1994.

Charles Inmyong Grosjean *(Electrical Engineering)* B.S., California Institute of Technology 1994.

Jerod Lée Gross *(Planetary Science)* B.S., University of Illinois at Urbana-Champaign 1993.

Qun Gu *(Civil Engineering)* B.S., Tongji University 1991.

Jeffrey Scott Hammond *(Physics)* B.S., University of California, Riverside 1987; M.S., 1989.

Robert Joseph Harley *(Computer Science)* B.Sc., University of Edinburgh 1992.

Darrell Anthony Harrington *(Physics)* B.Sc. *(Physics)*, University of Saskatchewan 1992; B.Sc. *(Mathematics)*, 1993.

Michael Lee Harville, Jr. *(Computation and Neural Systems)* B.S., Stanford University 1992.

Jeffrey Masayuki Hashimoto *(Geochemistry)* B.A., Dartmouth College 1993.

Makoto Hatanaka *(Physics)* B.E., University of Tsukuba 1988; M.E., 1990.

Matthew Mark Helmkamp *(Chemical Engineering)* B.S., Purdue University 1993.

Ralf H. Hoechemer *(Chemical Engineering)* Diplom, Technische Hochschule Darmstadt 1991.

Wen Hsuan Hsieh *(Electrical Engineering)* B.S., California Institute of Technology 1994.

Scott Alexander Hughes *(Physics)* B.A., Cornell University 1993.

Alexandr Nickolaevich Ikriannikov *(Electrical Engineering)* Engineer-Physicist, Moscow Engineering Physics Institute 1992.

Anne Marie J. Johansen *(Environmental Engineering Science)* B.S., University of Oslo 1989; M.S. *(Chemistry)*, University of Oslo 1991; M.S. *(Materials Science and Engineering)*, Oregon Graduate Institute 1993.

Mark Daniel Johnson *(Applied Mechanics)* B.S., University of Virginia 1985; M.S., Stanford University 1986.

Anna Karion *(Mechanical Engineering)* B.S., Yale University 1994.

Christoph David Karp *(Chemistry)* B.S., Florida State University 1991.

Atsumichi Kawashima *(Geochemistry)* B.S., University of Tokyo 1990; M.S., 1992.

Susan Elizabeth Kephart *(Chemistry)* B.A., Rice University 1994.

Shervin Khodabandeh *(Chemical Engineering)* B.S., University of California, Los Angeles 1993.

Kevin James Konty *(Mathematics)* B.S., Tulane University 1993.

Mayuresh Vithal Kothare *(Chemical Engineering)* B.Tech., Indian Institute of Technology, Bombay 1991.

Svetlana A. Kryukova *(Computer Science)* B.S., California Institute of Technology 1995.

Martha Gail Kuykendall *(Geophysics)* B.S., Eckerd College 1993.

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

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

Yushan Li *(Electrical Engineering)* B.S., Beijing University 1990; M.S., Institute of High Energy Physics 1993.

David Alan Liberles *(Biology)* B.A., Oberlin College 1991.

John Lindal *(Electrical Engineering)* B.S., California Institute of Technology 1994.

Andrew Matthew Lines *(Computer Science)* B.S., California Institute of Technology 1994.

Thomas Lloyd *(Environmental Engineering Science)* B.S., University of California, Berkeley 1993.

Andrew Hamilton Lundsten *(Electrical Engineering)* B.S., California Institute of Technology 1994.

Malik Magdon-Ismail *(Physics)* B.S., Yale University 1993.

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

Marsha A. Maxwell *(Biology)* B.S. *(Chemistry)*, B.S. *(Physics)*, Spelman College 1993.

Melissa Masae Midzor *(Physics)* B.A., University of Colorado at Boulder 1992.

Franklin Gregory Monzon *(Applied Physics)* B.S.E., Princeton University 1993.

Ingrid Danielle-Jeanine Mounier *(Applied Mathematics)* B.S., Rensselaer Polytechnic Institute 1993.

Jane Virginia Oglesby *(Geochemistry)* B.S., California Institute of Technology 1995.

Stephen Michael Ouellette *(Physics)* B.S., University of Maine 1992.

Oskar Jon Painter *(Electrical Engineering)* B.A.Sc., University of British Columbia 1994.

Bibhuti Bhusan Patel *(Aeronautics)* B.Tech., Indian Institute of Technology, Madras 1994.

Scott Douglas Poll *(Aeronautics)* B.S., The University of Michigan 1994.

Alexei Gennadierich Poltoratski *(Mathematics)* B.Sc., Saint Petersburg State University 1988.

Winston Pun *(Mechanical Engineering)* B.A.Sc., University of Toronto 1994.

Jeffrey Lincoln Rawlings *(Biology)* B.A., University of California, Berkeley 1991.

Carl Rhodes, Jr. *(Chemical Engineering)* B.S., Stanford University 1992.

Gregory Charles Roberts *(Environmental Engineering Science)* B.A., B.S., Kansas State University 1994.

Emily Celeste Sleeper *(Astronomy)* B.A., B.S., Boston University 1992.

Stanislav Konstantin Smirnov *(Mathematics)* B.Sc., Saint Petersburg State University 1992.

Xi Song *(Geophysics)* B.S., University of Science and Technology of China 1992.

Paul Harrison Speaker *(Astronomy)* B.S., University of Dallas 1993.

James Anthony Spotila *(Geology)* B.S., Boston College 1992.

Ronald David Stieger *(Electrical Engineering)* B.S., California Institute of Technology 1995.

Vijaya Subramanian *(Chemistry)* B.Sc., University of Delhi 1987; M.Sc., Indian Institute of Technology 1988.

Maggie Elizabeth Taylor *(Materials Science)* B.S., California Institute of Technology 1993.

Konstantin Titov *(Environmental Engineering Science)* Engineer, Odessa Institute of Low Temperature Engineering and Energetics 1993.

Patty Bihguang Tsai *(Biology)* B.S. *(Biology)*, B.S. *(Chemistry)*, California Institute of Technology 1993.

Slawomir Mariusz Tulaczyk *(Civil Engineering)* Magister, University of Wrocław 1990; M.S., Northern Illinois University 1993.

Anastasios Vayonakis *(Physics)* B.S., University of Ioannina 1993.

Chun-Ming Wang *(Applied Physics)* B.S., Chiao-Tung University 1990.

Neng E. Wang *(Chemistry)* B.S., Nanjing University 1992.

Laura Eileen Wasylenki *(Geology)* B.S., Stanford University 1992.

Mark Charles Westfall *(Electrical Engineering)* B.S., University of Virginia 1987.

Robert L. Wilson *(Aeronautics)* B.S., Rice University 1994.

Charles Kincaid Witham *(Materials Science)* B.S., Yale University 1991.

Ah San Wong *(Physics)* B.S., California State University, Fresno 1992.

Sheng Wu *(Environmental Engineering Science)* B.Sc. *(Chemistry)*, B.Sc. *(Physics)*, Beijing University 1992.

Shuyun Wu *(Electrical Engineering)* B.S., Shanghai Jiao-Tong University 1987.

Jiazhao Jessie Xu *(Computer Science)* B.A., Shanghai Jiao-Tong University 1990; M.A., Fordham University 1992.

Weihua Xu *(Applied Physics)* B.S., Beijing University 1992.

Yushan Yan *(Chemical Engineering)* B.S., University of Science and Technology of China 1988.

Masaru Yarime *(Chemical Engineering)* B.E., University of Tokyo 1993.

Albert Shih-Yueh Yen *(Planetary Science)* S.B., Massachusetts Institute of Technology 1986; M.S., Stanford University 1987.

Yi Zhang *(Electrical Engineering)* B.S., Xi'an Jiaotong University 1989.

Xiaoyun Zhu *(Electrical Engineering)* B.S., Tsinghua University 1994.

Kurt P. Zobenica *(Social Science)* B.A., University of Arizona 1993.

ENGINEER

Fabienne Anne Breton *(Mechanical Engineering)* Licence, Université Pierre et Marie Curie 1991; M.S., 1992.

Xiaodong Chen *(Civil Engineering)* B.S., Tongji University 1983; M.S., 1986; M.S., California Institute of Technology 1991.

Bernard Rousset *(Aeronautics)* Diplôme d'Ingénieur, École Centrale Paris 1991; M.S., California Institute of Technology 1992.

Charles Michael Tierney *(Aeronautics)* B.S., University of Colorado at Boulder 1989; M.S., California Institute of Technology 1993.

DOCTOR OF PHILOSOPHY

DIVISION OF BIOLOGY

Joseph Gerard Hacia *(Biology)* B.S., Rutgers University 1989.
Thesis: The Use of Modified Oligonucleotides to Investigate Biological Applications for Triple Helix Formation.

Susan Richardson Halsell *(Molecular Biology and Biochemistry)* B.A., The University of Texas at Austin 1982; M.A., 1984.
Thesis: Expression and Localization of *Hsp83* RNA in the Early *Drosophila* Embryo.

Linda Shuchao Huang *(Biology)* B.S., University of California, Los Angeles 1988.
Thesis: The *Caenorhabditis elegans lin-15* Locus.

Katharine Liu *(Biology)* B.A., University of California, Berkeley 1988.
Thesis: Male Mating Behavior in *Caenorhabditis elegans*.

James A. Mazer *(Biology)* B.A., Yale University 1987.
Thesis: Integration of Parallel Processing Streams in the Inferior Colliculus of the Barn Owl.

Larry P. Proctor *(Neurobiology)* B.A., University of California, Berkeley 1986.
Thesis: Characterization of the Auditory Thalamic Nucleus of the Barn Owl.

Jeffrey Herman Stack *(Molecular Biology and Biochemistry)* B.S., California State University, Long Beach 1980; M.S., 1985.
Thesis: Protein and Phosphatidylinositol Kinases in Yeast Protein Sorting.

Humbert Hans Helmuth Suarez *(Computation and Neural Systems)* M.D., University of Geneva 1987; M.S., 1987.
Thesis: Modeling Motion Detection in Striate Visual Cortex Using Massive Excitatory Feedback.

David Guo-Wei Wang *(Developmental Biology)* B.S., Beijing Medical University 1986; M.S., 1988.
Thesis: Identification and Characterization of a Negative Regulator Required for Spatial Control of the Territory-Specific *CyIIIa* Gene in the Sea Urchin Embryo.

Man Lun Richard Yip *(Developmental Biology)* B.S., Pacific Lutheran University 1988.
Thesis: Molecular Genetic Analysis of Morphogenesis in *Drosophila*: Functions of the *hindsight* Locus.

Robert Werner Zeller, Jr. *(Developmental Biology and Molecular Biology and Biochemistry)* B.A., Boston University 1988.
Thesis: Transcriptional Control of Spatially Regulated Genes in the Early Sea Urchin Embryo.

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.

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

John Charles Bart *(Chemistry)* B.S., Indiana University 1989.
Thesis: Electrochemical Investigations of Ruthenium-Substituted Heteropolytungstate Anions: Catalytic Studies of an Inorganic Oxometalloporphyrin Analog.

Nikolaos Bekiaris *(Chemical Engineering)* Diploma, National Technical University of Athens 1989; M.S., California Institute of Technology 1992.
Thesis: Multiple Steady States in Distillation.

Alto D. Benedicto *(Chemistry)* B.S. *(Chemistry)*, University of the Philippines 1985; B.S. *(Mathematics)*, 1986.
Thesis: Rational Approaches to Regulating Polymer Properties in Ring-Opening Metathesis Polymerization.

George Colin Best *(Chemistry)* B.S., The University of Chicago 1989.
Thesis: Sequence Composition and Mismatch Effects on Triple Helix Formation.

Erik Paul Bierwagen *(Chemistry)* B.A., Dartmouth College 1989.
Thesis: Computational Studies of Ziegler-Natta Catalysis and Concurrent Resonance Computations.

Eva Rachel Birnbaum *(Chemistry)* B.A., Carleton College 1991.
Thesis: The Mechanism of Catalytic Hydrocarbon Oxidation by Molecular Oxygen and Halogenated Ruthenium and Iron Porphyrins.

Sandra Louise Burkett *(Chemistry)* B.A., Princeton University 1990.
Thesis: Mechanisms of Structure Direction in Zeolite Synthesis.

Sherrie A. Campbell *(Chemistry)* B.S. *(Biological Sciences)*, B.S. *(Chemistry)*, University of California, Irvine 1988.
Thesis: FT-ICR Studies of the Structures, Energetics and Reaction Dynamics of Biological Molecules in the Gas Phase.

Jong-Ho Choi *(Chemistry)* B.Sc., Korea University 1985; M.Sc., 1987.
Thesis: Infrared Spectroscopy of Molecular Ions and Ion-Solvent Clusters.

Geun-Chang Chung *(Chemical Engineering)* B.S., Korea Institute of Technology 1989.
Thesis: Segmental Dynamics of Individual Species in a Miscible Polymer Blend.

Scott B. Cohen *(Chemistry)* B.S., San Diego State University 1990.
Thesis: Mechanistic Studies of the Natural DNA-Cleaving Agents Neocarzinostatin Chromophore, Calicheamicin γ1, and Dynemicin A.

Neilay N. Dedhia *(Chemical Engineering and Biology)* B.Tech., Indian Institute of Technology, Kanpur 1989; M.S., California Institute of Technology 1991.
Thesis: Metabolic Engineering of Central Carbon Metabolism in *Escherichia coli:* Improving the Production of Biomass and Metabolites.

Mark Edward Fraley *(Chemistry)* B.S., University of Wisconsin-Madison 1989.
Thesis: Synthesis of (+)-Dynemicin A and Analogs of Wide Structural Variability. Establishment of the Absolute Configuration of Natural Dynemicin A.

Marcia Beth France *(Chemistry)* S.B., Massachusetts Institute of Technology 1988; M.S., Yale University 1989.
Thesis: Olefin Metathesis with Group VIII Transition Metal Complexes: Mechanism, Reactivity, and Catalyst Development.

Sharad Hajela *(Chemistry)* B.S., California State University, Northridge 1989.
Thesis: Synthetic, Structural, and Mechanistic Studies of Homogeneous Ziegler-Natta Catalysis.

Hogyu Han *(Chemistry)* B.S., Seoul National University 1985; M.S., 1987.
Thesis: Study of RNA Structure by Affinity Cleaving.

Qizhi He *(Chemistry)* B.S., Beijing University 1986; M.S., 1989.
Thesis: Cytochrome *c* Oxidase: Studies of Electron Input and Intramolecular Electron Transfer.

Marc Andrew Hillmyer *(Chemistry)* B.S., University of Florida 1989.
Thesis: The Preparation of Functionalized Polymers by Ring-Opening Metathesis Polymerization.

Julia A. Hodge *(Chemistry)* B.A., The Johns Hopkins University 1988.
Thesis: Properties of Distorted Tetraphenylporphyrins.

Robert David Johnson *(Chemical Engineering and Chemistry)* B.S., Cornell University 1988; M.S., California Institute of Technology 1991.
Thesis: Multivalent Protein Binding to Metal-Complexing Materials: Applications to Synthetic Receptors and Affinity Chromatography.

Rangaramanujam Mudumbai Kannan *(Chemical Engineering)* B.E., Birla Institute of Technology and Science 1987; M.S., Pennsylvania State University 1989; M.S., California Institute of Technology 1991.
Thesis: Flow-induced Alignment in Intrinsically Anisotropic Polymeric Materials.

Charles B. Khouw *(Chemical Engineering and Chemistry)* B.S., University of Wisconsin, Madison 1990; M.S., California Institute of Technology 1993.
Thesis: Partial Oxidation of Hydrocarbons Using Titanium Containing Molecular Sieves.

Ching-Hwa Kiang *(Chemistry)* B.S., National Taiwan University 1987.
Thesis: Physics and Chemistry of Advanced Nanoscale Materials: Experiment, Simulation, and Theory.

Kyoung-Hee Kim *(Chemistry)* B.S., Korea Institute of Technology 1990.
Thesis: Crystallographic Structure Determination of Neocarzinostatin, an Antitumor Protein-Chromophore Complex.

Ralf Langen *(Chemistry)* Diploma, Universität Hannover 1988.
Thesis: Electron Transfer in Proteins: Theory and Experiment.

Kelvin H. Lee *(Chemical Engineering and Biology)* B.S.E., Princeton University 1991; M.S., California Institute of Technology 1993.
Thesis: The Effects of the Deregulated Expression of the Cloned Transcription Factor E2F-1 on Chinese Hamster Ovary Cells.

Kian-Tat Lim *(Chemistry)* B.S., Haverford College 1987.
Thesis: Mega-Molecular Dynamics on Highly Parallel Computers: Methods and Applications.

Jian Lin *(Chemistry)* B.S., Xiamen University 1988.
Thesis: ATP Modulation of the Electron Transfer between Cytochrome *c* and Cytochrome *c* Oxidase.

Raul Francisco Lobo *(Chemical Engineering and Chemistry)* Licenciatura en Ingeniería, Universidad de Costa Rica 1989; M.S., California Institute of Technology 1993.
Thesis: The Synthesis and Characterization of Novel High-Silica Zeolites.

Teresa Lynn Longin *(Chemistry)* B.S., Ithaca College 1988.
Thesis: Measurements of Solvent Effects on Local Barrier Heights in Scanning Tunneling Microscopy.

Elaine M. Marzluff *(Chemistry)* A.B., Harvard College 1989.
Thesis: Fundamental Studies of the Structures, Energetics and Collision Dynamics of Large Molecules in the Gas Phase.

Barry James Maurer *(Chemistry)* B.S., The University of Michigan 1980.
Thesis: Dihydrofolate Recutase Gene Amplification in Human Cell Lines VA_2-B and Hela BU25.

Alison McCurdy *(Chemistry)* B.S., The University of Chicago 1988.
Thesis: Cation-π and Polarizability Effects in Biomimetic Catalysis and the Design of a Photoactive Donor-Cyclophane-Acceptor Triad.

Laura Sera Mizoue *(Chemistry)* B.A., Oberlin College 1987.
Thesis: Investigations of Cation-π Binding by Cyclophane Receptors in Aqueous Media.

Sonbinh Thebao Nguyen *(Chemistry)* B.S. *(Chemistry)*, B.S. *(Physics)*, Pennsylvania State University 1990.
Thesis: The Design, Syntheses, and Applications of Well-Defined Group VIII Olefin Metathesis Catalysts.

Stephen D. O'Connor *(Chemistry)* B.S., University of Houston 1991.
Thesis: Studying Material Properties on the Nanometer Scale: Instrumental Development and Applications.

Simo Olavi Pehkonen *(Chemistry)* B.S., Oregon State University 1990.
Thesis: Redox Chemistry of Iron in Multiphase Atmosphere.

Sean Drummond Plunkett *(Chemical Engineering and Chemistry)* B.S., University of Maryland 1988; M.S., California Institute of Technology 1993.
Thesis: Substrate-Selective Metal-Affinity Composite Adsorbents.Prepared by Template Polymerization: Synthesis, Characterization and Application to Chromatography.

Michael Morris Pustilnik *(Chemistry)* B.S., State University of New York at Stony Brook 1987; M.A., Columbia University 1988.
Thesis: The Construction and Application of Metal Complexes for DNA Strand Scission.

Niranjan Y. Sardesai *(Chemistry)* M.Sc., Indian Institute of Technology, Bombay 1989.
Thesis: Rhodium Intercalators as Novel Peptide Delivery Systems to the Major Groove of DNA: Towards the Design of Artificial Repressors.

Thomas P. Shields *(Chemistry)* B.S., University of Notre Dame 1989.
Thesis: DNA Recognition by the Enantiomers of $Rh(en)_2phi^{3+}$: Recognition through Hydrogen Bonding and van der Waals Contacts.

Gary A. Shreve *(Chemistry)* B.A., Oberlin College 1984.
Thesis: Electron Transfer at n-Silicon-Methanol Junctions.

DOCTOR OF PHILOSOPHY — *Continued*

Scott Fain Singleton *(Chemistry)* B.A., Trinity University 1988.
Thesis: The Thermodynamics of Oligonucleotide-Directed Triple Helix Formation at Single DNA Sites.

Ming X. Tan *(Chemistry)* B.S., University of California, Irvine 1990.
Thesis: Photoelectrochemistry of GaAs and Si Liquid Junctions.

Philip S. Tsai *(Chemical Engineering and Biology)* B.S., University of Illinois at Urbana-Champaign 1990; M.S., California Institute of Technology 1992.
Thesis: Understanding the Physiological Consequences of *Vitreoscilla* Hemoglobin (VHb) Expression in *Escherichia coli.*

Youqi Wang *(Chemistry)* B.S., Fudan University 1982; M.S., 1985.
Thesis: Electron Energy Loss Spectroscopic Study of Small Molecules on Transition Metal Surfaces.

Zhi Qiang (Alex) Zheng *(Chemical Engineering and Control and Dynamical Systems)* B.S., Clemson University 1990.
Thesis: Robust Control of Systems Subject to Constraints.

DIVISION OF ENGINEERING AND APPLIED SCIENCES

Gilad Almogy *(Applied Physics)* B.Sc., Hebrew University of Jerusalem 1986; M.S., California Institute of Technology 1993.
Thesis: Quantum Well Intersubband Transitions: Nonlinear Optics, Refractive Index and Infrared Modulation.

Robert E. Bodenheimer, Jr. *(Electrical Engineering)* B.A., B.S., University of Tennessee 1986; M.S., 1987.
Thesis: The Whirling Blade and the Steaming Cauldron.

Hugh Alan Bruck *(Materials Science and Applied Mechanics)* B.S., University of South Carolina 1988; M.S., 1989.
Thesis: Quasi-static and Dynamic Constitutive Characterization of Beryllium Bearing Bulk Metallic Glasses.

Jen-Sue Chen *(Materials Science)* B.S., National Tsing Hua University 1988; M.S., California Institute of Technology 1990.
Thesis: Ohmic Contacts to Beta Silicon Carbide: Electrical and Metallurgical Characterizations.

Weinong Chen *(Aeronautics and Materials Science)* B.E., Beijing University of Aeronautics and Astronautics 1982; M.E., 1985.
Thesis: Dynamic Failure Behavior of Ceramics Under Multiaxial Compression.

Christos S. Christoforou *(Mechanical Engineering)* B.S., Rice University 1988; M.S., California Institute of Technology 1989.
Thesis: Control of Air Exchange and Particle Deposition within the Buddhist Cave Temples at Yungang, China.

John A. Cortese *(Electrical Engineering)* B.S., Worcester Polytechnic Institute 1982; M.S., *(Electrical Engineering)* 1985; M.S. *(Applied Mathematics)*, California Institute of Technology 1990.
Thesis: Stochastic Computation.

Eric Bryant Cummings *(Aeronautics and Chemistry)* B.S., Pennsylvania State University 1989; M.S., California Institute of Technology 1990.
Thesis: Laser-Induced Thermal Acoustics.

Sanjeev Kumar Deora *(Electrical Engineering)* B.Tech., Indian Institute of Technology, Madras 1992; M.S., California Institute of Technology 1993.
Thesis: Channel Assignment Algorithms in Cellular Radio Networks.

Igor Djokovic *(Electrical Engineering)* B.S., University of Belgrade 1990; M.S., California Institute of Technology 1992.
Thesis: Optimization Issues in Wavelets and Filter Banks.

Michael Joseph Flanagan *(Electrical Engineering)* B.E., Stevens Institute of Technology 1990; M.S., California Institute of Technology 1991.
Thesis: Reduced-Complexity Digital Sinusoid Generators and Oversampled Data Converters.

Kurt Fleischer *(Computation and Neural Systems)* Sc.B., Brown University 1982; M.S., Stanford University 1987.
Thesis: A Multiple-Mechanism Developmental Model for Defining Self-Organizing Geometric Structures.

Marvin Wilford Halling *(Applied Mechanics and Geophysics)* B.S., Utah State University 1985; M.S., Stanford University 1986.
Thesis: Investigation of Base-Isolated Structures During Recent Earthquakes and Computer Simulations Utilizing Near-Source Long-Period Ground Motions.

Masayuki Hattori *(Electrical Engineering)* B.S., Tokyo Institute of Technology 1983; M.S., 1985.
Thesis: Subspace Subcodes of Reed-Solomon Codes.

Harm Peter Hofstee *(Computer Science)* B.Sc., Groningen University 1983; M.Sc., 1988; M.S., California Institute of Technology 1991.
Thesis: Synchronizing Processes.

Liping Huang *(Applied Mechanics)* B.S., Beijing Polytechnic University 1982; M.S., Tsinghua University 1984.
Thesis: Mode-Like Properties and Identification of Nonlinear Vibrating Systems.

John Michael Iannelli *(Applied Physics)* B.S., Rensselaer Polytechnic Institute 1987; M.S., California Institute of Technology 1991.
Thesis: Coherence and Spectral Properties of Composite-Cavity Semiconductor Lasers.

Mohit Kumar Jain *(Materials Science and Applied Mechanics)* B.Tech., Indian Institute of Technology, Kanpur 1989; M.S., California Institute of Technology 1991.
Thesis: Processing and Mechanical Behavior of Ultrafine Grain Materials.

David Andrew Kaufman *(Mechanical Engineering)* B.S., Stanford University 1989; B.A., Willamette University 1989; M.S., California Institute of Technology 1990.
Thesis: Investigation of an ECR Plasma Thruster and Plasma Beam Interactions with a Magnetic Nozzle.

Donald William Kendrick *(Mechanical Engineering)* B.A.Sc., The University of British Columbia 1989; M.S., California Institute of Technology 1990.
Thesis: An Experimental and Numerical Investigation into Reacting Vortex Structures Associated with Unstable Combustion.

Anthony S. Kewitsch *(Applied Physics)* B.S., Stanford University 1991; M.S., California Institute of Technology 1993.
Thesis: Part I: Optically Induced, Ferroelectric Domain Gratings in Photorefractive Crystals and Applications to Nonlinear Optics. Part II: Self-Focusing and Self-Trapping of Optical Beams Upon Photopolymerization and Applications to Microfabrication.

John Edward Kitching *(Applied Physics)* B.Sc., McGill University 1990; M.S., California Institute of Technology 1992.
Thesis: Quantum Noise Reduction in Semiconductor Lasers Using Dispersive Optical Feedback.

David Hales Laidlaw *(Computer Science)* Sc.B., Brown University 1984; Sc.M., 1986; M.S., California Institute of Technology 1992.
Thesis: Geometric Model Extraction from Magnetic Resonance Volume Data.

Tak Kwan Lee *(Computer Science)* B.A., B.S., University of California, San Diego 1986; M.S., California Institute of Technology 1988.
Thesis: A General Approach to Performance Analysis and Optimization of Asynchronous Circuits.

Stephanie Diane Leifer *(Applied Physics)* B.A. *(Mathematics)*, B.A. *(Physics)*, University of Pennsylvania 1989; M.S., California Institute of Technology 1993.
Thesis: Characterization of Fullerenes for Electrostatic Propulsion Applications.

K. Rustan M. Leino *(Computer Science)* B.A., The University of Texas at Austin 1989; M.S., California Institute of Technology 1993.
Thesis: Toward Reliable Modular Programs.

Harold Joseph Levy *(Applied Physics)* B.S., University of California, Irvine 1987; M.S., California Institute of Technology 1990.
Thesis: Application and Integration of Quantum-Effect Devices for Cellular VLSI.

Andrew D. Lewis *(Applied Mechanics)* B.Sc.E., University of New Brunswick 1987; M.S., California Institute of Technology 1988.
Thesis: Aspects of Geometric Mechanics and Control of Mechanical Systems.

Jianqiang Liu *(Electrical Engineering)* B.S., Nanjing University 1983; M.S., 1986; M.S., California Institute of Technology 1991.
Thesis: Integrated Micro Devices for Small Scale Gaseous Flow Study.

Yixin Liu *(Applied Physics)* B.S., Nankai University 1984.
Thesis: Quantum Tunneling, Field Induced Injecting Contact, and Excitons.

Zhenhuan Liu *(Mechanical Engineering)* B.S., University of Science and Technology of China 1988; M.S., California Institute of Technology 1991.
Thesis: Nuclei Population Dynamics and Cavitation.

Michael Francis Lough *(Applied Mathematics)* B.Sc., University College Dublin 1987; M.Sc., Trinity College Dublin 1989.
Thesis: The Motion of Thin-Cored Vortex Filaments: The Equations of Motion and their Solution for Some Special Cases.

Wei-Min Lu *(Electrical Engineering and Mathematics)* B.Sc., Tsinghua University 1986; M.Sc., 1989; M.S., California Institute of Technology 1990.
Thesis: Control of Uncertain Systems: State-Space Characterizations.

DOCTOR OF PHILOSOPHY — *Continued*

Melissa Mae Lunden *(Mechanical Engineering and Materials Science)* B.S., Texas Tech University 1987; M.S., California Institute of Technology 1989.
Thesis: Sintering of Aerosol Agglomerates.

Ronald Richard Marquardt *(Applied Physics)* S.B., Massachusetts Institute of Technology 1989; M.S., California Institute of Technology 1991.
Thesis: Quantum Magnetotransport Studies of Semiconductor Heterostructure Devices.

Elizabeth Anne McKenney *(Mechanical Engineering)* B.S.E., Princeton University 1984; M.S.E., 1989.
Thesis: A Study of Tip Vortices and Cavitation on a Propeller in a Non-uniform Flow Field.

Robert Thomas M'Closkey III *(Mechanical Engineering)* B.A.Sc., University of Windsor 1987; M.S., California Institute of Technology 1988.
Thesis: Exponential Stabilization of Driftless Nonlinear Control Systems.

Robert Joseph Miles *(Applied Physics)* B.S., United States Naval Academy 1982; M.S., Rensselaer Polytechnic Institute 1989; M.S., California Institute of Technology 1991.
Thesis: Microprobe Investigations of Semiconductor Structures.

Inki A. Min *(Aeronautics)* B.S., University of California, Los Angeles 1984; M.S., Stanford University 1985.
Thesis: Transport, Stirring and Mixing in Two-Dimensional Vortex Flows.

M. V. Ramana Murty *(Applied Physics)* B.Tech., Indian Institute of Technology, Bombay 1988; M.S., University of Southern California 1989.
Thesis: Ion-Surface Interactions and Limits to Silicon Epitaxy at Low Temperatures.

Charles B. Musgrave *(Materials Science)* B.S., University of California, Berkeley 1988; M.S., California Institute of Technology 1990.
Thesis: Molecular Mechanics and Ab Initio Simulations of Silicon (III) Surface Reconstructions, Semiconductors and Semiconductor Superlattices, H Abstraction for Nanotechnology, Polysilane, and Growth of CVD Diamond.

Volnei Antonio Pedroni *(Electrical Engineering)* Electronic Engineer, Universidade do Rio Grande do Sul 1975; M.S., California Institute of Technology 1990.
Thesis: VLSI Systems for Analog and Hamming Parallel Computation.

Frank Allen Perez *(Mechanical Engineering and Computer Science)* B.S., Colombia University 1979; M.S., California Institute of Technology 1980.
Thesis: Hue Segmentation, Color Circuitry, and the Mantis Shrimp.

Petr Pich *(Applied Mechanics)* Ing., České Vysoké Ucení Technické 1988; M.S., California Institute of Technology 1991.
Thesis: Nonlinear Rigid Block Dynamics.

N. Sateesh Pillai *(Electrical Engineering)* B.Tech., University of Kerala 1987; M.S., California Institute of Technology 1990.
Thesis: Non-Dissipative Decay of Linear Quasimodes in a Pure Electron Plasma.

Martin Wolfgang Regehr *(Electrical Engineering)* B.Sc., University of Toronto 1988; M.S., California Institute of Technology 1990.
Thesis: Signal Extraction and Control for an Interferometric Gravitational Wave Detector.

Jason S. Reid *(Applied Physics)* B.S., University of California, Davis 1989.
Thesis: Amorphous Ternary Diffusion Barriers for Silicon Metallizations.

Simon Ralph Sanderson *(Aeronautics)* B.E., University of Queensland 1987; M.Eng., 1989.
Thesis: Shock Wave Interaction in Hypervelocity Flow.

Jeremy David Semrau *(Environmental Engineering Science)* B.S., The University of Texas at Austin 1988; M.S., California Institute of Technology 1989.
Thesis: Kinetic, Biochemical, and Genetic Analyses of the Particulate Methane Monooxygenase.

Ljubiša D. Stevanović *(Electrical Engineering)* B.S., University of Belgrade 1988; M.S., California Institute of Technology 1989.
Thesis: Switching Converters for Input Current Shaping and Regulation of Multiple Outputs.

Johanes F. N. Swenberg *(Applied Physics)* B.A., University of California, Berkeley 1988.
Thesis: Development of Wide-Bandgap II-VI Semiconductor Light-Emitting Device Technology Based on the Graded Injector Design.

Svetlana Tatić-Lučić *(Electrical Engineering)* B.S.E.E., University of Belgrade 1986; M.S., California Institute of Technology 1990.
Thesis: Silicon Micromachined Devices for *In Vitro* and *In Vivo* Studies of Neural Networks.

José Andrés Tierno *(Computer Science)* Ingeniero Industrial, Universidad de la República 1987; M.S., California Institute of Technology 1989.
Thesis: An Energy-Complexity Model for VLSI Computations.

Marcel René van der Goot *(Computer Science)* Doctorandus, Rÿksuniversiteit Groningen 1987; M.S., California Institute of Technology 1990.
Thesis: Semantics of VLSI Synthesis.

Michael Wei-Ching Wang *(Applied Physics)* B.E., University of Saskatchewan 1989; M.S., California Institute of Technology 1991.
Thesis: Graded Injector, Wide Bandgap Light Emitters and XPS Studies of the InAs/GaSb Heterointerface.

Thomas Peter Witelski *(Applied Mathematics)* B.S., The Cooper Union 1991.
Thesis: Problems in Nonlinear Diffusion.

Xiaoguang Zhong *(Applied Mechanics)* B.S., Zhejiang University 1986; M.E., Tsinghua University 1988.
Thesis: Continuum Dynamics of Solid-Solid Phase Transitions.

Jianhui Zhou *(Applied Physics)* B.S., Beijing University of Posts and Telecommunications 1984; M.S., 1987; M.S., California Institute of Technology 1992.
Thesis: Four-Wave Mixing in Semiconductor Optical Amplifiers for Terahertz Spectroscopy and Wavelength Conversion.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

Richard William Dissly *(Planetary Science and Geochemistry)* B.A., Rice University 1988; M.S., California Institute of Technology 1990.
Thesis: Laboratory Studies of Astrophysical Ices.

Carey Alice Gazis *(Geology)* B.S., Stanford University 1984.
Thesis: An Isotopic Study of the Fluid Flow and Thermal History of the 2.8 Ma Chegem Ash-flow Caldera and Related Intrusive Rocks (Caucasus Mountains, Russia).

Marguerite F. Gerstell *(Planetary Science)* A.B., Harvard College 1970; M.S., Florida Institute of Technology 1987.
Thesis: I. Two Radiative Transfer Models With Terrestrial Applications; II. Testing the Porcupine Plate Hypothesis.

Weishi Huang *(Geology and Geophysics)* B.S., Nanjing University 1984; M.S., Chinese Academy of Sciences 1987.
Thesis: Seismic Strain Rates and the State of Tectonic Stress in the Southern California Region.

Laura Ellen Jones *(Geophysics)* B.S., University of California, Riverside 1988; M.S., California Institute of Technology 1990.
Thesis: Part I: Broadband Modeling of Aftershocks from the Joshua Tree, Landers, and Big Bear Sequences, Southern California. Part II: Characteristics of the June 28, 1992, Big Bear Mainshock from TERRAscope Data: Evidence for a Multiple-Event Source.

David W. Koerner *(Planetary Science and Astronomy)* B.S., California State University, Long Beach 1989; M.S., California Institute of Technology 1991.
Thesis: The Kinematics of Circumstellar Disks around T Tauri Stars.

Monica Diane Kohler *(Geophysics)* A.B., Harvard College 1988.
Thesis: Three-dimensional Seismic Velocity Structure of the Earth's Outermost Core and Mantle.

Laurie Ann Leshin *(Geochemistry)* B.S., Arizona State University 1987; M.S., California Institute of Technology 1989.
Thesis: The Abundance and Hydrogen Isotopic Composition of Water in SNC Meteorites: Implications for Water on Mars.

Stuart McMuldroch *(Planetary Science)* B.Sc., University College London 1988; M.S., California Institute of Technology 1992.
Thesis: The Circumstellar Environments of FU Orionis Stars.

Terrill Wylie Ray *(Planetary Science and Geophysics)* B.S., Colorado School of Mines 1990; M.S., California Institute of Technology 1993.
Thesis: Remote Monitoring of Land Degradation in Arid/Semiarid Regions.

Stuart Keller Stephens *(Planetary Science and Geophysics)* B.S., California Institute of Technology 1981; M.S., 1981.
Thesis: Carbonate Formation on Mars: Experiments and Models.

DOCTOR OF PHILOSOPHY — *Continued*

Toshiko Takata *(Planetary Science and Geophysics)* B.S., Nagoya University 1985; M.S., California Institute of Technology 1991.
Thesis: Three-Dimensional Analysis of Impact Processes on Planets.

Kimberly A. Tryka *(Planetary Science and Astronomy)* A.B., Cornell University 1989; M.S., California Institute of Technology 1992.
Thesis: Nitrogen on Triton and Pluto.

Shingo Watada *(Geophysics)* B.S., The University of Tokyo 1987; M.S., 1989.
Thesis: Part I: Near-source Acoustic Coupling Between the Atmosphere and the Solid Earth During Volcanic Eruptions. Part II: Nearfield Normal Mode Amplitude Anomolies of the Landers Earthquake.

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

Paul J. Brewer *(Social Science)* B.S., California Institute of Technology 1989; M.S., 1992.
Thesis: Allocation and Computation in Rail Networks: A Binary Conflicts Ascending Price Mechanism (BICAP) for the Decentralized Allocation of the Right to Use Railroad Tracks.

Yan Chen *(Social Science)* B.A., Tsinghua University 1988.
Thesis: A Theoretical Study of Political Institutions and Economic Policies.

John Duggan *(Social Science)* B.A., Whitman College 1987; M.A., Claremont Graduate School 1990; M.S., California Institute of Technology 1993.
Thesis: Bayesian Implementation.

Mark Philip Fey *(Social Science)* B.S., California Institute of Technology 1990.
Thesis: Three Aspects of Multicandidate Competition in Plurality Rule Elections.

Katerina Vladislavna Sherstyuk *(Social Science)* B.S., Novosibirsk State University 1989; M.S., California Institute of Technology 1993.
Thesis: The Formation of Teams Under Incomplete Information.

Olga V. Shvetsova *(Social Science)* Diploma, Moscow State Lomonosov University 1989; M.S., California Institute of Technology 1993.
Thesis: Electoral Institutional Design.

Michael Alan Udell *(Social Science)* B.A., University of Pennsylvania 1980; M.A., 1980; M.S., California Institute of Technology 1989.
Thesis: Essays In Applied Economics with Applications to Tax Evasion and the Political Business Cycle.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Theocharis A. Apostolatos *(Physics)* B.S., University of Athens 1988; M.S., California Institute of Technology 1990.
Thesis: Topics in General Relativity: Naked Singularities, and Theoretical Aspects of Gravitational Waves from Merging Compact Binaries.

DOCTOR OF PHILOSOPHY — *Continued*

Andrey Yurevich Biyanov *(Mathematics and Computer Science)* B.Sc., Moscow State Lomonosov University 1991; M.Sc., 1991; M.S., California Institute of Technology 1994.
Thesis: Evolution Equations and Semigroups of Operators with the Disjoint Support Property.

Wayne Jeremy Broughton *(Mathematics)* B.Sc., University of British Columbia 1990.
Thesis: Symmetric Designs, Difference Sets, and Autocorrelations of Finite Binary Sequences.

Chi-Keung Chow *(Physics)* B.Sc., The Chinese University of Hong Kong 1991; M.S., California Institute of Technology 1993.
Thesis: Heavy Hadrons in the Large N_c Limit.

Aaron David Gillespie *(Physics)* B.A., The University of Virginia 1990; M.S., California Institute of Technology 1992.
Thesis: Thermal Noise in the Initial LIGO Interferometers.

Todd Dickson Groesbeck *(Physics)* B.S., Brigham Young University 1985.
Thesis: The Contribution of Molecular Line Emission to Broadband Flux Measurements at Millimeter and Submillimeter Wavelengths.

Zhen Hu *(Physics)* B.S., Fudan University 1989; M.S., California Institute of Technology 1991.
Thesis: Quantum Optics with Cold Atoms—Nonlinear Spectroscopy and Road toward Single-Atom Trap.

Shujuan Ji *(Mathematics)* B.S., Nanjing University 1988.
Thesis: Arithmetic and Geometry on Triangular Shimura Curves.

Wen Jiang *(Physics)* B.S., Beijing University 1988; M.S., California Institute of Technology 1991.
Thesis: Effects of Controlled Disorder on the Vortex Phases of High-Temperature Superconductors.

Yonggang Jin *(Mathematics and Electrical Engineering)* B.S., Zhejiang University 1987; M.S., University of Science and Technology of China 1990; M.S., California Institute of Technology 1993.
Thesis: Box Codes and Convolutional Coding of Block Codes.

Lawrence Aston Jones *(Physics)* B.A., Oxford University 1989; M.S., California Institute of Technology 1991.
Thesis: A Measurement of the Mass of the Tau Lepton.

Chandrashekhar Khare *(Mathematics)* B.A., Cambridge University 1989; M.Sc., Oxford University 1990.
Thesis: Congruences between Cusp Forms.

Haseo Ki *(Mathematics)* B.A., Yonsei University 1989.
Thesis: Topics In Descriptive Set Theory Related to Number Theory and Analysis.

Hee-Won Lee *(Physics)* B.S., Seoul National University 1989.
Thesis: Polarization of Resonantly Scattered Lines in Active Galactic Nuclei.

Rongzhi Liu *(Physics and Electrical Engineering)* B.S., University of Science and Technology of China 1986; M.S., California Institute of Technology 1991.
Thesis: A Search for Fast Moving Magnetic Monopoles with the MACRO Detector.

DOCTOR OF PHILOSOPHY — *Continued*

Ming Lu *(Physics)* B.S., University of Science and Technology of China 1988; M.S., Boston University 1990.
Thesis: Applications of Heavy Quark Symmetry and Long Distance Contributions to Weak Decays.

Gary M. McGuire *(Mathematics)* B.Sc., University College Dublin 1989; M.Sc., 1990; M.S., California Institute of Technology 1992.
Thesis: Absolutely Irreducible Curves with Applications to Combinatorics and Coding Theory.

Michal Leah Peri *(Astronomy)* B.A., University of California, San Diego 1986; M.S., California Institute of Technology 1991.
Thesis: Asteroseismological Observations of η *Cassiopeiae A* with the Palomar East Arm Echelle Spectrograph.

Alexei G. Poltoratski *(Mathematics)* M.S., Leningrad State University 1988.
Thesis: Boundary Behavior of Cauchy Integrals and Rank One Perturbations of Operators.

Ernest Navaroop Prabhakar *(Physics)* S.B., Massachusetts Institute of Technology 1988.
Thesis: Doubly Tagged D_s Decays at 4.03 GeV.

Kevin Patrick Rauch *(Astronomy)* A.B., Princeton University 1990.
Thesis: Black Holes and Accretion Disks in Active Galactic Nuclei: Microlensing, Caustics, and Collisional Stellar Dynamics.

Paul Shelton Ray *(Physics)* B.A., University of California, Berkeley 1989; M.S., California Institute of Technology 1991.
Thesis: High-Sensitivity Searches for Radio Pulsars.

Daniel Seymour Reed *(Physics)* B.S., University of Missouri-Columbia 1989; M.S., California Institute of Technology 1991.
Thesis: Frequency Dependent Investigation of the Vortex Dynamics in High Temperature Superconductors.

Robert John Schoelkopf III *(Physics)* A.B., Princeton University 1986.
Thesis: Studies of Noise in Josephson-Effect Mixers and their Potential for Submillimeter Heterodyne Detection.

Slawomir J. Solecki *(Mathematics)* M.S., University of Wrocław 1989.
Thesis: Applications of Descriptive Set Theory to Topology and Analysis.

Zheng-Yao Su *(Physical Computation and Complex Systems)* B.S., National Taiwan University 1983.
Thesis: The Hierarchical Algorithms - Theory and Applications.

David John Thompson *(Astronomy and Physics)* B.S., California State Polytechnic University, Pomona 1986.
Thesis: Surveys for Primeval Galaxies.

William Nicholas Weir *(Astronomy and Physics)* A.B., Harvard College 1987; M.S., California Institute of Technology 1992.
Thesis: Automated Analysis of the Digitized Second Palomar Sky Survey: System Design, Implementation, and Initial Results.

Wenge Xu *(Astronomy)* B.S., Beijing University 1985; M.S., 1987.
Thesis: The First Caltech-Jodrell Bank VLBI Survey.

Prizes and Awards

FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

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

Stanley Grant III
Flora Kou Ho

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.

Gisela Maria Rodriguez Sandoval

THE 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.

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.

Fabienne Anne Breton

THE WILLIAM F. BALLHAUS PRIZE

Awarded to aeronautics students for outstanding doctoral dissertations.

Weinong Chen
Eric Bryant Cummings
Simon Ralph Sanderson

Prizes and awards are listed only for those students awarded degrees in 1995, and include prizes and awards received by them in previous years.

ROLF BUHLER AWARD

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

Christopher Adam Eckett

FRITZ B. BURNS PRIZE IN GEOLOGY

Awarded to a junior or senior who has demonstrated both academic excellence and great promise of future contributions in the fields represented by the Division of Geological and Planetary Sciences.

1991 Richard Riños Zitola

1994 Jane Virginia Oglesby
Rebecca Lynn Zaske

CALTECH PRIZE SCHOLARSHIPS AND CARNATION SCHOLARSHIPS

Each year Caltech awards these prizes for academic excellence. 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.

1993
Maggie Elizabeth Taylor

1994
Peter Alan Carlin
Wen Hsuan Hsieh
John Lindal
Andrew Matthew Lines
Rajit Manohar

1995
Erica Lynn Alliston
John Miguel Baker
Serge Justin Belongie
Vance Carl Bjorn
Charles Kevin Boyce
Celene Chang
Finney George Chavanikamannil
Tobé Noel Corazzini
Schuyler A. Cullen
Jiho Hahm
Monwhea Jeng
Svetlana A. Kryukova
Jason Prince Kumar
Thomas C. Kwan
Janice Lau
Joseph Paul Lee
Debbie Wunchi Leung
Leslie Marie Maxfield
Amitav Mehra
Francis Man Lung Ng
Clinton Sangkyu Park
Gisela Maria Rodriguez Sandoval
Anatoly Spitkovsky
Stephen Hsien Shun Tang
Dennis Wayne Ugolini
Christian J. Waite
Jonathan David Weinstein
Mengchen Yu
Michael Maroun Zeineh
Xiaoting Zhu

THE W. P. CAREY & CO., INC., PRIZE IN MATHEMATICS

Awarded to a student receiving a Doctor of Philosophy degree for an outstanding doctoral dissertation in applied mathematics or pure math.

Slawomir J. Solecki

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.

Zhenhuan Liu

DONALD S. CLARK MEMORIAL AWARDS

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.

1994 Tom R. Zavisca

1995 Gypsy Rebekah Achong

DEANS' CUP AND DIRECTOR OF RESIDENCE LIFE AND MASTER'S AWARD

Two awards, selected by the Deans, the Director of Residence Life, and the Master of Student Houses, 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.

1994 Gisela Maria Rodriguez Sandoval, Deans' Cup

Cesar Bocanegra, Deans' Cup

1995 Kathleen Rene Tozer, Deans' Cup

William Andrew Cesarotti, Director of Residence Life and Master's Award

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.

1992 Charles B. Khouw

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.

Katharine Liu

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS

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

1994 Jonathan David Weinstein

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.

1994 Francis Man Lung Ng

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.

1994 Jonathan David Weinstein

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.

Michal Leah Peri

GEORGE W. GREEN MEMORIAL PRIZE

Awarded to the undergraduate student who, in the opinion of the division chairs, has shown outstanding ability and achievement in creative scholarship.

Jerry Wei-Jen Shan

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.

1994 Zackary Dov Berger

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, good work ethic, demonstrated fair-mindedness, and unquestioned integrity.

1991 Geoffrey Douglas Smith

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.

Ronald David Stieger

THE HERBERT NEWBY McCOY AWARD

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

1994 Ming X. Tan

1995 Mark Edward Fraley
Sonbinh Thebao Nguyen

MARY A. EARL McKINNEY PRIZE IN LITERATURE

The purpose of this prize is to cultivate proficiency in writing. It may be awarded for essays submitted in connection with regular literature classes or awarded on the basis of a special essay contest.

1993 Zackary Dov Berger
Linda Heather Springer

1994 Linda Heather Springer

1995 Lucia D. Kuhns

MILLIKAN SCHOLARSHIP

Awarded to selected freshmen whose record of personal and academic accomplishment is judged outstanding among the remarkable group of incoming freshmen.

1990
Hootan Hidaji
Mbuyi N. Kazadi
Sanza Nkashama Tshilobo Kazadi
Linda Heather Springer
Sarah Elizabeth Yoder

1991
Jennifer Leigh Cormack
Steven Joseph Greenberg
Courtney Irene Hilliard
Michael Edwin Ichiriu
Steven Wayne Jilcott, Jr.
John Edward Marquis
Vikas Nanda
Katharine J. Sippel

1992
Ravi Rico Montenegro

ROBERT L. NOLAND LEADERSHIP SCHOLARSHIP

Awarded to 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.

1993 Robert Kim Rickenbrode II

1994 Benjamin John McCall

HOWARD REYNOLDS MEMORIAL PRIZE IN GEOLOGY

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

1994 Rebecca Lynn Zaske

HERBERT J. RYSER MEMORIAL SCHOLARSHIPS

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

1993 Monwhea Jeng

1994 Debbie Wunchi Leung

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.

1994 Janice Lau

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.

1994 Weinong Chen

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.

1992 Betsy M. Marvit
Rhonda M. Morgan

1993 Leslie Marie Maxfield
Rhonda M. Morgan
Jane Virginia Oglesby
Kristin Ann Polito
Rebecca Lynn Zaske

1994 Brian Edmond Brewington
Syed Asif Hassan
Tuan Quoc Hoang
Jerry Wei-Jen Shan

PRIZES AND AWARDS — *Continued*

SIGMA XI AWARD

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

Monwhea Jeng

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.

1992 Daniel Seymour Reed

1994 Aaron David Gillespie

ALAN R. SWEEZY PRIZE IN ECONOMICS

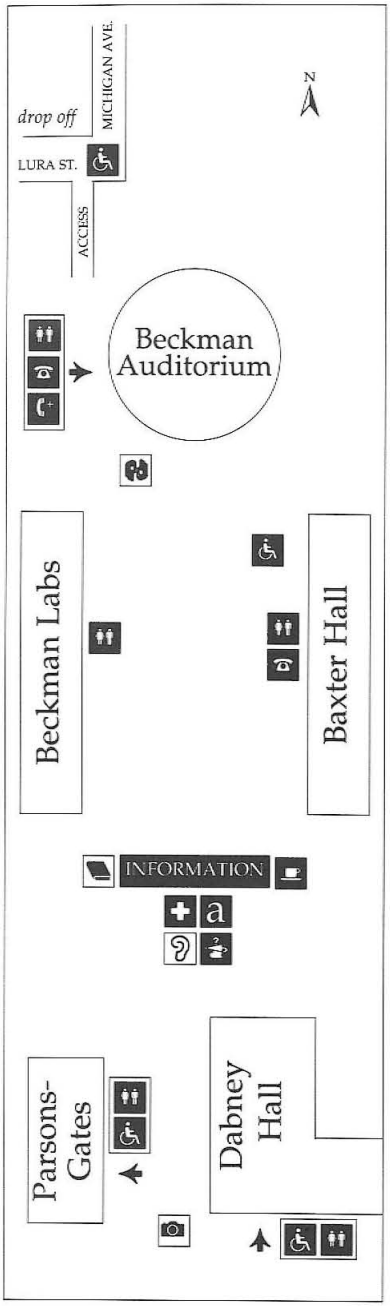
Awarded to a graduating senior who has shown unusual interest in and talent for economics.

1995 Robert Kim Rickenbrode II

CIT 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.



SERVICES FOR COMMENCEMENT GUESTS

- PUBLIC TELEPHONES are available in Baxter Hall and Beckman Auditorium.
- RESTROOMS are available in Baxter Hall, Beckman Labs, Dabney Hall, Parsons-Gates Hall of Administration, and Beckman Auditorium.
- FIRST AID SERVICES are available at the Information Center.
- LOST AND FOUND items may be reported and/or claimed at the Information Center.
- Complimentary COFFEE and PUNCH (beginning at 8:30 a.m.)
- Informal cap and gown photographs 8:30 a.m.–9:30 a.m.
- CALTECH BOOKSTORE sells souvenirs, film, and other items. ATHENAEUM luncheon tickets on sale 8 a.m.–10 a.m.

SPECIAL SERVICES FOR PERSONS WITH DISABILITIES

- ASSISTIVE LISTENING DEVICES are available at the Information Center. A driver's license or state-issued ID card is required.
- LARGE-TYPE PROGRAMS (abridged) are available at the Information Center.
- AMERICAN SIGN LANGUAGE (ASL) interpreters are stationed at the west front of the Ceremony seating area.
- PEOPLE WHO USE WHEELCHAIRS, and their guests, will find a special section near the east front of the Ceremony seating area.
- RESTROOMS ACCESSIBLE TO PEOPLE WHO USE WHEELCHAIRS are located on the first floor of Dabney Hall and in the Parsons-Gates Hall of Administration.
- AMPLIFIED TELEPHONE is available in Beckman Auditorium.