Ninety-Ninth
Annual Commencement

June 11, 1993

CALIFORNIA INSTITUTE
of TECHNOLOGY
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FRIDAY MORNING AT TEN O’CLOCK
JUNE ELEVENTH, NINETEEN NINETY-THREE
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 1901. 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, including four Nobel laureates, and more than 370 research members. Today, Caltech will award degrees to 542 graduates—quite a leap from the one man and one woman who constituted the first collegiate graduating class of Throop University.
About the Speaker

The Institute is honored to have Jewel Plummer Cobb as the speaker at its 99th annual commencement. Dr. Cobb is president emerita of California State University at Fullerton, and Trustee Professor at California State University at Los Angeles. She earned her bachelor’s degree in biology from Talladega College, in Alabama, in 1944 and her Ph.D. in cell physiology from New York University in 1950. After two years of post-doctoral research and two as an instructor at the University of Illinois, she became a faculty member in the Department of Surgery in the NYU Postgraduate Medical School. In 1960, she joined Sarah Lawrence College as professor of biology. Her research has focused on how normal and cancer pigment cells grow, and their morphology and genetic expression. She is the author of 36 papers.

Dr. Cobb joined the ranks of university administrators in 1969 when she became dean of Connecticut College. In 1971, she went to Rutgers University’s Douglass College as dean and professor of biology, a position she left in 1981 to assume the presidency of Cal State Fullerton.

Since she retired from that post in 1990, Dr. Cobb has been active in promoting the advancement of women and minorities in scientific fields and has authored a number of publications on issues relating to women in science. A fellow of the American Association for the Advancement of Science, she holds 18 honorary doctorates and serves on the boards of many companies, universities, and public-service groups.
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, Judith R. Goodstein, Ph.D.

Marshals
Arden L. Albee, Ph.D. Christopher E. Brennen, D.Phil.
D. Roderick Kiewiet, Ph.D. Ward Whaling, Ph.D.
David S. Wood, Ph.D.

Faculty Officers
John H. Richards, Ph.D. Mary E. Lidstrom, 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 CHAIRMEN OF THE DIVISIONS
THE DEANS
THE PROVOST
THE TRUSTEES
THE COMMENCEMENT CHAPLAIN
THE COMMENCEMENT SPEAKER
THE PRESIDENT
THE CHAIRMAN 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 ................................. Ruben F. Mettler, Ph.D.
                             Chairman of the Board of Trustees
                             California Institute of Technology

INVOCATION ......................... Reverend Brandoch Lovely
                             Neighborhood Church

COMMENCEMENT ADDRESS ...... Jewel Plummer Cobb, Ph.D.
                             President Emerita
                             California State University at Fullerton

“Choices and Chances in the 21st Century”

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 Chairman

Chemistry and Chemical Engineering ...... Fred C. Anson, Ph.D.
    Division Chairman

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

Geological and Planetary Sciences ....... David J. Stevenson, Ph.D.
    Division Chairman

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

Physics, Mathematics and Astronomy .. Gerry Neugebauer, Ph.D.
    Division Chairman

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 Lovely

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

    ORGAN POSTLUDE ....................... Dr. Deutsch
Candidates for Degrees

BACHELOR OF SCIENCE

B. Thomas Adler  New York, New York  Engineering and Applied Science
Snehal Surendra Adodra*  La Habra, California  Biology
Christopher Nicholas Alexander*  Woodland Hills, California  Biology
Shantanu Prasad Ambastha*  New Delhi, India  Engineering and Applied Science
Glenn S. Ammons  Annapolis, Maryland  Mathematics
Steven Charles Anderson*  St. Louis Park, Minnesota  Mathematics
Matthew Howard Ashton  Orange, California  Electrical Engineering
Melinda Jennifer Au  Fremont, California  Biology
Walker Garret Aumann  Palmdale, California  Engineering and Applied Science
Richard Allen Baltzersen  Farmingdale, New York  Chemistry
David Alexander Banks  Winchester, Massachusetts  Engineering and Applied Science
George Richard Benzinger III*  Swissvale, Pennsylvania  Biology
Michelle Ann Berteig  Monrovia, California  Chemistry
Rajesh Billimoria  Lubbock, Texas  Engineering and Applied Science
Brooks Bishopberger  Fair Oaks, California  Engineering and Applied Science
Kristen Jeanne Blouke  Beaverton, Oregon  Geology
Ina Elizabeth Brenneise  Phoenix, Arizona  Biology
Jonathan Peter Briggs*  Brunswick, Maine  Engineering and Applied Science
John Joseph Brodoff  New York, New York  Engineering and Applied Science
Selaka Bandara Bulumulla*  Kandy, Sri Lanka  Electrical Engineering
Claudine Butcher  Boulder, Colorado  Geophysics
Lawrence Stephen Canino, Jr.*  Torrance, California  Physics
Thomas Matthew Capellari  Allen Park, Michigan  Engineering and Applied Science
Peter Jon Gerhardt Caylor  Fairfax Station, Virginia  Electrical Engineering
Winston Douglas Chamberlain*  La Cañada Flintridge, California  Biology
Alice Liu Chan  El Monie, California  Electrical Engineering
Antony Ming-Kyong Chan  Carrollton, Texas  Engineering and Applied Science
Stephen Szu-chien Chang  Racine, Wisconsin  Engineering and Applied Science
Jing-Tying Chao  La Crescenta, California  Engineering and Applied Science
Julian C. Chen  Aloha, Oregon  Chemistry
Richard Chiu*  Los Altos, California  Electrical Engineering
Francis Fu Shin Chong*  Serangoon Gardens, Republic of Singapore  Chemistry

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

Ingrid Chiaing Choong  Los Altos Hills, California Chemistry
Danny Chu*  Alhambra, California  Engineering and Applied Science
Samuel Joseph Clark  Pendleton, Oregon  Biology and Engineering and Applied Science
Aaron Ray Clements  Lubbock, Texas  Chemistry
Douglas Ian Clowe  Colleyville, Texas  Physics
Philip David Cofield  New Monmouth, New Jersey  Mathematics and Economics
Timothy Russell Crowder  Klamath Falls, Oregon  Engineering and Applied Science
Khurram Dastgir-Khan  Gujranwala, Pakistan  Engineering and Applied Science
Tasahi Dennis  Port Townsend, Washington  Electrical Engineering
Taletha Mae Derrington  Aspen, Colorado  Biology
Brian Michael Donning  Portland, Oregon  Engineering and Applied Science
Jennifer Ann Dooley  Escondido, California  Applied Physics
Roanna Noriko Doty*  Mililani, Hawaii  Engineering and Applied Science
Brian I. Duchovnay  Jacksonville, Florida  Engineering and Applied Science
Gregory Lee Dudey*  Gainesville, Florida  Engineering and Applied Science
Christopher Robert Dunn*  Pasadena, California  Physics
Oscar Alfredo Duran  Guatemala City, Guatemala  Biology
Matthew David Durasoff  Edmonds, Washington  Engineering and Applied Science
Fatima Husein Jaffer Ebrahim*  Dubai, United Arab Emirates  Physics
Erik Andrew Edelberg*  Jacksonville, Florida  Chemical Engineering
Ernesto José Escorcia-Aparicio  Cali, Colombia  Engineering and Applied Science
Vicken Rostom Etyemezian*  Boston, Massachusetts  Engineering and Applied Science
Scot Steven Fagerland*  Rapid City, South Dakota  Applied Mathematics
Carl Thomas Feierabend  Houston, Texas  Engineering and Applied Science
Yanga Rolando Fernández*  Cape Coral, Florida  Astronomy
Timothy Kemp Firman  Yakima, Washington  Chemistry
Jeffrey Alan Foust*  Council Bluffs, Iowa  Geophysics
George Louis Fox*  Sterling Heights, Michigan  Biology
Nathan Albert Frei*  Pocatello, Idaho  Chemistry
Dan Yoel Frumin  Salisbury, Maryland  Engineering and Applied Science
Truxton King Fulton II  Fort Wayne, Indiana  Engineering and Applied Science
Swathi Ganaraj  Tyler Town, Mississippi  Biology
Anna Melissa George*  Federal Way, Washington  Geochemistry
Timothy J. Gerk*  Osage, Iowa  Engineering and Applied Science
Kimberly Gin  Millbrae, California  Engineering and Applied Science
Balasubramanian Girish*  Madras, India  Physics
Keow Lin (Lindee) Goh*  Penang, Malaysia  Biology
BACHELOR OF SCIENCE — Continued

Francisco Gustavo Gomez  Willows, California  Geology
John Daniel Grade*  Waunakee, Wisconsin  Engineering and Applied Science
Michael David Guadarrama  San Antonio, Texas  Physics
Korhan Gürkan*  Istanbul, Turkey  Electrical Engineering
Todd Lyndell Gustavson  Los Altos, California  Physics
Catherine Irene Hafer  Whitewater, Wisconsin  Economics
Atiya Yasmeen Hakeem*  Marine, Illinois  Biology
Jessie Gwendolynn Haldeman*  Zanesville, Ohio  Chemistry
Amy Therese Hansen  Minnetonka, Minnesota  Engineering and Applied Science
Stephen Charles Heise  St. Louis Park, Minnesota  Engineering and Applied Science
Francisco Herrero Jimenez  Madrid, Spain  Electrical Engineering
Karen Tristam Hong  Walnut, California  Engineering and Applied Science
Mark Shiu Sheng Horng*  Pasadena, California  Biology
Hoyt Emmet Hudson  Winnetka, Illinois  Applied Physics
Mark Rough Humphreys  Irvine, Scotland  Engineering and Applied Science
Neena Imam  Dhaka, Bangladesh  Electrical Engineering
Valerie Michele Jacox  Sandy, Utah  Chemical Engineering
Mansoor Akhtar Jafari*  Karachi, Pakistan  Electrical Engineering
Anup Jatia  Kobe, Japan  Engineering and Applied Science and Economics
David Michael Jeitner  Philadelphia, Pennsylvania  Engineering and Applied Science
Jennifer Lee Johnson  Bellevue, Nebraska  Biology
Jennifer Lynn Jungkuntz  Colgate, Wisconsin  Engineering and Applied Science
Kevin Shiu Hao Kan  Glendale, Arizona  Engineering and Applied Science
Tarun Mohan Kapoor*  Calcutta, India  Chemistry and Biology
Osman Kibar*  Izmir, Turkey  Electrical Engineering
Tristania Kibbey  Lake Oswego, Oregon  Geology
Daniel Lee Kim*  Deerfield, Illinois  Engineering and Applied Science
Nitya Ranjan Kitchloo*  Bombay, India  Mathematics
Michael Edward Klitzke  Oshkosh, Wisconsin  Engineering and Applied Science
Jeffrey Mitsuru Koshi*  St. Louis, Missouri  Physics
Jean-Paul Kovalik*  Montreal, Canada  Biology
David Wayne Krider*  Danville, California  Engineering and Applied Science and Economics
John Carson Krowas  Sturgeon Bay, Wisconsin  Engineering and Applied Science
Alan Eugene Kulawik*  Anchorage, Alaska  Electrical Engineering
Yu-Chien Kuo*  San Dimas, California  Biology
Brian Michael Kurkoski  Portland, Oregon  Engineering and Applied Science
Choong Oh Kwon  Houston, Texas  Physics

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Jae H. Kyung  Castle Rock, Colorado  Physics
David Lande*  Paris, France  Physics
Walter Joseph Landry, Jr.  Lafayette, Louisiana  Astronomy
Jonathan E. Lange  St. Paul, Minnesota  Engineering and Applied Science
Wa-To Lau*  Hong Kong, Hong Kong  Chemistry
Joseph Paul Lauer  Pittsburgh, Pennsylvania  Electrical Engineering
Andrew John Lavin  Millmont Park, Pennsylvania  Mathematics and Engineering and Applied Science
Albert Niels Lee  Atherton, California  Engineering and Applied Science
Jong Won Lee*  Seoul, Republic of Korea  Applied Physics
Owen Webster Lee*  Honolulu, Hawaii  Electrical Engineering
Roy Kang Lee  Los Angeles, California  Mathematics and Physics
Victor Soo Lee*  Mountain View, California  Electrical Engineering
Marcia Joyce Li*  Hillsborough, California  Biology
Melissa Yan-Yee Li*  San Jose, California  Electrical Engineering
Martin Wei-Min Lin*  Sugar Land, Texas  Electrical Engineering
Hsiu-Hsien Ling*  Hacienda Heights, California  Biology
Nye Tse-Yao Liu  Los Angeles, California  Engineering and Applied Science
Yvonne Yue Liu*  Hong Kong, Hong Kong  Chemical Engineering
James Alan Low  Upland, California  Engineering and Applied Science
Whye-Kei Lye*  Singapore, Republic of Singapore  Physics
Jason Dorian Macleod  Baltimore, Maryland  Chemical Engineering
Rohan Mahadevan*  Bangalore, India  Physics
Gabriela Mallén-Ornelas  Mexico City, Mexico  Astronomy
Beth Michelle Mammini  Novato, California  Applied Physics
Jesús Mancilla Cisneros  Tonaya, Mexico  Chemical Engineering
Steve Aaron Marschke*  Bismarck, North Dakota  Engineering and Applied Science
Mark Eugene Mazurek  Littleton, Colorado  Biology
Peter James McCann  Memphis, Tennessee  Engineering and Applied Science
Todd Robert McLaughlin  Rosemount, Minnesota  Biology
Diana Therese McMahon  Scranton, Pennsylvania  Chemistry
Amitabh Mehr*  Green Bay, Wisconsin  Electrical Engineering
Audra Hsien-I Meng*  Sterling Heights, Michigan  Electrical Engineering
Adrienne Pauline Miller*  Bremerton, Washington  Engineering and Applied Science
Theresa Kathleen Miller  Bremerton, Washington  Engineering and Applied Science
Areez Minoo Mody*  Bombay, India  Mathematics
Erika Elizabeth Moilanen  Chula Vista, California  Biology
Mark David Montague  Menlo Park, California  Engineering and Applied Science
BACHELOR OF SCIENCE — Continued

Allen Brady Montz Urbana, Illinois Engineering and Applied Science
Thayer Miller Morris III Salem, Virginia Applied Mathematics
Ali Mortazavi Pasadena, California Engineering and Applied Science
Jennifer Ann Mullin* Coronado, California Applied Physics
Michael Andrew Nassir La Jolla, California Physics
Joyce Chin Chin Ng* Singapore, Republic of Singapore Chemistry
Jessica Anne Philomena Nichols National City, California Engineering and Applied Science
Monica Oei* Nanuet, New York Biology
Christopher Michael Orth Levittown, Pennsylvania Physics
Keith Edward Oslakovic Oak Lawn, Illinois Engineering and Applied Science
Ritankar Pal* Calcutta, India Engineering and Applied Science
Theodore Harry Palmatier, Jr.* Yakima, Washington Electrical Engineering
Kevin N. Park* Montebello, California Engineering and Applied Science
Michael Pejic* Redwood City, California Physics
José Pérez González de Apodaca* Madrid, Spain Biology
Preston Manly Pfanner Hudson, New Hampshire Engineering and Applied Science
Tzanetos Philippakos New York, New York Engineering and Applied Science
Teerachai Nicholas Pornsinsirirak* Bangkok, Thailand Physics and Electrical Engineering
Katherine Jane Quinn* Adelaide, Australia Geophysics
James Edward Radford* Fountain Valley, California Engineering and Applied Science
Antonio Rangel* Madrid, Spain Economics
Jennifer Sarah Remine* South Dennis, Massachusetts Engineering and Applied Science
Miran So Young Rhee Palos Park, Illinois Chemistry
Karen Eileen Ross* Upper Nyack, New York Biology and History
Jennifer Messenger Rosser Granger, Indiana Biology and Chemistry
Dirk P. Runge Fair Haven, New Jersey Electrical Engineering
Behnam Sadeghi Tehran, Iran Electrical Engineering
Maneesh Sahani High Wycombe, United Kingdom Physics
Daniel Anthony Sandoval* Santa Paula, California Engineering and Applied Science
Shane H. Sauby La Crescenta, California Biology
Mark David Savellano* Scottsdale, Arizona Applied Physics
Rachel Mara Schwartz St. Louis Park, Minnesota Engineering and Applied Science and Literature
Mimi Sengupta* Duarte, California Biology
Ahmed A. Serag* West Chester, Pennsylvania Chemistry
Susan Shuyan Sheu* San Marino, California Biology
BACHELOR OF SCIENCE — Continued

Douglas G. Shiels* Madison, Connecticut  Engineering and Applied Science
Aimée Louise Smith* Catonsville, Maryland  Engineering and Applied Science
Jared L. Smith* Boulder, Colorado  Engineering and Applied Science
Michael John Smith South Pasadena, California  Engineering and Applied Science
Steven Milner Sobelman Culver City, California  Engineering and Applied Science
Jill Amy Soha* Pasadena, California  Biology
Mark Myong Je Son Flushing, New York  Physics and Mathematics
John David Stamm Lindstrom, Minnesota  Physics
Peter Sturdza Bethesda, Maryland  Engineering and Applied Science
Ting Kin Tam* Hong Kong, Hong Kong  Electrical Engineering
Erik Dannel Taylor* Riverton, Utah  Applied Physics
Maggie Elizabeth Taylor* Peoria, Illinois  Physics
Paul Piya Thienprasit Minneapolis, Minnesota  Engineering and Applied Science and Economics
Stephen Craig Thompson Omaha, Nebraska  Geology
Maria Diana Toronto Stony Brook, New York  Applied Physics
Chon David Torres Pasadena, California  Physics
Patty Bihuang Tsai* Arcadia, California  Biology and Chemistry
Matthew Keoni Tucker* Kailua-Kona, Hawaii  Electrical Engineering
Yuan Tsung Tung* Taipei, Taiwan  Electrical Engineering
Debra Louise Tuttle* Brick, New Jersey  Literature
Chris Thad Ulmer Weiser, Idaho  Electrical Engineering
Robert Douglas Underwood Moreno Valley, California  Electrical Engineering
Frederick Scott Upton Los Angeles, California  Mathematics
Andreja Volene* Zagreb, Croatia  Biology and Independent Studies Program
Nathan Simon Wallach* Flushing, New York  Mathematics
Xiaohui Kevin Wang* Gainesville, Florida  Electrical Engineering
Gregory William Wardle* Galveston, Texas  Electrical Engineering
Atsuhiko Watanabe* Pasadena, California  Engineering and Applied Science
Sean Michael Wetterer Livingston, New Jersey  Chemistry and Engineering and Applied Science
Robert Jennings Whiteley, Jr. Lakenheath, England  Physics
Kenneth Copeland Wiberg Sepulveda, California  Engineering and Applied Science
Geoffrey Sean Wiersema Houston, Texas  Chemical Engineering
Joanna Marie Wills Denville, New Jersey  Geochemistry
Diane Kristin Wong* Seal Beach, California  Chemistry
Jennifer Ann Wright* Sacramento, California  Literature
Ren Wu* Shanghai, China  Electrical Engineering
BACHELOR OF SCIENCE — Continued

Julius Chen-Huan Yang  St. Louis, Missouri  Applied Physics
Andre Teikboon Yew  Honolulu, Hawaii  Engineering and Applied Science
Yuka Yonebayashi*  Fullerton, California  Biology
Jennifer S. Yu  Williamsburg, Virginia  Engineering and Applied Science
Feng Yuan*  Beijing, China  Physics
Yair Zadik  Huntington Beach, California  Engineering and Applied Science
MASTER OF SCIENCE

Lawrence Anthony (Materials Science) California Institute of Technology.
Valerie Felice Arst (Applied Mathematics) B.S., University of California, Santa Barbara 1991.
Paul David Asimow (Geology) A.B., Harvard College 1991.
Helen Banava (Chemistry) S.B., Massachusetts Institute of Technology 1991.
Fabienne Anne Breton (Mechanical Engineering) Licence de Mécanique, Université Pierre et Marie Curie 1991; Maîtrise de Mécanique, 1992.
Martin Walter John Burmeister (Chemical Engineering) B.S., University of California, Davis 1991.
Shun Chan (Physics) B.Sc., University of Hong Kong 1991.
Jai Sig Choi (Engineering Science) B.S., Seoul National University 1987; M.S., 1989.
Chi-Keung Chow (Physics) B.Sc., The Chinese University of Hong Kong 1991.
Ernest Yee-Wei Chuang (Electrical Engineering) B.S., University of California, Berkeley 1992.
Brian Cook (Physics) B.S., Yale University 1991.
Christopher Bruce Dartt (Chemical Engineering) B.S.E., Princeton University 1991.
Jean-Paul Davis (Aeronautics) B.S., Cornell University 1992.
Douglas David Dawn (Chemistry) B.S., University of Miami 1984.
MASTER OF SCIENCE — Continued

Bahadir Erimli (Electrical Engineering) B.S., Middle East Technical University 1992.
Hali Janine Lana Forstner (Chemical Engineering) B.Sc., University of Calgary 1991.
Mark S. Graf (Social Science) B.A. (Economics), B.A. (Political Science), University of Kansas 1987.
Vinay Kumar Gupta (Chemical Engineering) B.Tech., Indian Institute of Technology, Bombay 1990.
Gang He (Physics) B.S., Peking University 1991.
Monica Jocelyn Holboke (Civil Engineering) A.B., Occidental College 1992; B.S., California Institute of Technology 1992.
John William Holt (Geology) B.S., Rice University 1988.
Liubo Hong (Materials Science) B.S., Peking University 1990.
Jean Chia-Chin Hsieh (Geology) B.Sc., Carleton University 1991.
Yun Huang (Electrical Engineering) B.E., Tsinghua University 1992.
Gregory Huyer (Biology) B.Sc., University of Alberta 1990.
Adrian Cezar Ionescu (Electrical Engineering) B.S., Columbia University 1981.
Michihiro Izumi (Electrical Engineering) B.S., The University of Tokyo 1987.
MASTER OF SCIENCE — Continued

Yonggang Jin (Mathematics) B.S., Zhejiang University 1987; M.S., University of Science and Technology of China 1990.
Milan M. Jovovic (Computation and Neural Systems) B.S., University of Belgrade 1987; M.S. (Electrical Engineering), California Institute of Technology 1990.
Paul Brendan Kavanagh (Electrical Engineering) S.B., Massachusetts Institute of Technology 1990.
Vittu Khanna (Physics) B.Sc., Panjab University 1991.
Charles Budiana Khouw (Chemical Engineering) B.S., University of Wisconsin-Madison 1990.
David Lande (Physics) B.S., California Institute of Technology 1993.
Michelle Lazovich (Social Science) B.S., Arizona State University 1988.
Kelvin Hao-Hua Lee (Chemical Engineering) B.S.E., Princeton University 1991.
Thomas Sooyoung Lee (Mechanical Engineering) A.B., Occidental College 1984; M.S., University of California, Santa Barbara 1986.
Hoi Ming Leung (Mathematics) B.Sc., The Chinese University of Hong Kong 1990.
John Edwin Lewis, Jr. (Chemical Engineering) B.S., Texas A&M University 1991.
Shijie Li (Electrical Engineering) B.S., Tsinghua University 1988; M.S., 1991.
Bih-Jwo Lin (Biology) B.S., National Taiwan University 1986; M.S., 1991.
Yuan-Pei Lin (Electrical Engineering) B.S., National Chiao Tung University 1992.
MASTER OF SCIENCE — Continued

Rolf Mauermann (Civil Engineering) B.S., University of Illinois at Urbana-Champaign 1992.
Todd Alan McAdams (Chemical Engineering) B.S., University of Colorado at Boulder 1991.
Ruthann Kimberly Melbourne (Electrical Engineering) B.A., University of California, Santa Cruz 1989.

Sherrill Lynn Minch (Chemical Engineering) S.B. (Chemical Engineering), S.B. (Life Sciences), Massachusetts Institute of Technology 1990.
Kimberly Ann Mislick (Chemical Engineering) S.B., Massachusetts Institute of Technology 1991.

Karina Luciel Montilla (Aeronautics) B.S., University of Rhode Island 1992.
John Frederick Nagel (Chemical Engineering) B.S., Stanford University 1991.


Sergei Stanislavovich Orlov (Electrical Engineering) Diploma, Moscow Institute of Physics and Technology 1991.
Steven Leslie Palm (Aeronautics) B.S., California Institute of Technology 1991.
James Harvey Panetta (Physics) B.S., Drexel University 1991.

Szilvia Papai (Social Science) Diploma, University of Economics, Budapest 1989.

Susan Catherine Paulsen (Civil Engineering) B.S., Stanford University 1991.


Tracy Lynn Peters (Aeronautics) B.S.E., The University of Michigan 1990.

Tzanetos Philippakos (Aeronautics) B.S., California Institute of Technology 1993.
Hongyu Piao (Electrical Engineering) B.S., University of Science and Technology of China 1989.

Sean Drummond Plunkett (Chemical Engineering) B.S., University of Maryland at College Park 1988.


Kent Allen Potter (Electrical Engineering) A.A., Pasadena City College 1974; B.S., California State University, Long Beach 1976.

Anoop Prasad (Physics) B.Sc., St. Xavier's College 1991.

Thomas Jay Prins (Chemistry) B.S., Hope College 1990.


James Edward Radford (Mechanical Engineering) B.S., California Institute of Technology 1993.


Lucy Regan (Chemical Engineering) B.E., University College Dublin 1988.


Adam Roff (Applied Mechanics) B.Sc., University of Cape Town 1990.

Susan Felicia Rubin (Chemical Engineering) S.B., Massachusetts Institute of Technology 1991.

Lynn Monica Russell (Chemical Engineering) A.B., B.S., Stanford University 1991.

Steven Jay Sanders (Applied Physics) B.S., University of California, Berkeley 1991.

Jason Lee Saving (Social Science) B.A., Rice University 1991.

Craig William Scrivner (Geophysics) B.S., University of California, San Diego 1989.

Fernando Javier Selman (Astronomy) Bachillerato, Universidad de Chile 1981; Magister, 1982.


Katerina Vladislavna Sherstyuk (Social Science) B.S., Novosibirsk State University 1989.

Olga Vitalievna Shvetsova (Social Science) Diploma, Moscow State Lomonosov’s University 1989.

Paolo Alberto Gregorio Sivilotti (Computer Science) B.Sc., Queen’s University 1991.


Stefano Soatto (Electrical Engineering) Laurea in Ingegneria Elettronica, Università degli Studi di Padova 1992.


MASTER OF SCIENCE — Continued

Adam Franklin Strassberg (Computation and Neural Systems) A.B., Harvard College 1990.
Xin Sun (Physics) Peking University.
Tao Tan (Electrical Engineering) B.S., University of Science and Technology Beijing 1991.
Charles Michael Tierney (Aeronautics) B.S., University of Colorado at Boulder 1989.
Quentin A. Turchette (Physics) S.B., Massachusetts Institute of Technology 1991.
Dimitrios Vlassopoulos (Geochemistry) B.Sc., Concordia University 1986; M.Sc., McGill University 1988.
Serge Volkoff (Electrical Engineering) Diploma, Moscow Institute of Physics and Technology 1986.
Daniel LeRoy Williams (Physics) B.S., Louisiana State University 1991.
Blair Zajac, Jr. (Geophysics) B.S., University of Washington 1990.
José Roberto Zenit-Camacho (Mechanical Engineering) Ingeniero, Universidad Nacional Autónoma de México 1992.

ENGINEER

Susan Marie Beatty (Mechanical Engineering) B.S. California State University, Northridge 1978; M.S., 1983.
DOCTOR OF PHILOSOPHY

DIVISION OF BIOLOGY

Ralph Adolphs (Neurobiology) B.S., M.S., Stanford University 1986.
Thesis: Processing of Interaural Level Differences in the Auditory Brainstem of the Barn Owl.


Thesis: Synaptic Integration and its Control in Neocortical Pyramidal Cells.

Upinder Singh Bhalla (Biology) B.A., Cambridge University 1986.

Alan-Philippe Blanchard (Computation and Neural Systems) B.S., California Institute of Technology 1980.

Steven Manning Clark (Biotechnology/Molecular Biology and Biochemistry) B.S., California State University, Northridge 1985.

Tobias Delbrück (Computation and Neural Systems) B.S., University of California, San Diego 1983.

Dali Ding (Biology) B.S., Fudan University 1986.

Thesis: The In Vivo Examination of Transcriptional Control Mechanisms in Mammalian Cells.

Bruce Alan Hamilton (Biology) B.A., University of California, San Diego 1986.


Tim Hunkapiller (Biology) B.S., Oklahoma Baptist University 1976.

Gregg Duane Jongeward (Developmental Biology and Genetics) B.S., University of Minnesota 1986.

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

George Anthony Komatsoulis (Molecular Biology and Biochemistry) B.S., Cornell University 1986.
  Thesis: Recognition of tRNA<sub>Cys</sub> by the <i>E. coli</i> Cysteinyll-tRNA Synthetase: <i>in vivo</i> and <i>in vitro</i> Studies.

Joseph Thomas Meier (Biology) B.A., Kalamazoo College 1978.
  Thesis: A Biological Arms Race: Site Specific DNA Recombination in Competing Immunofunctional Proteins.

Edith Karina Schimmerling Cramer (Biology) B.A., University of California, Berkeley 1986.
  Thesis: Motor Neuron Projection Patterns and Maturation of Motor Unit Types in the Rabbit Soleus Muscle.

Derek Lyle Stemple (Biology) B.A., B.S., University of Colorado 1983.
  Thesis: Isolation of a Mammalian Neural Crest Stem Cell and Environmental Control of Cell Fate Choices.

Yukang Wang (Immunology) B.S., Shanghai Medical University 1984; M.S., Shanghai Second Medical University 1987.
  Thesis: Transcriptional Regulation of T Cell Receptor Genes by a Novel CACCC Box Binding Protein.

Shawn Kathleen Westaway (Molecular Biology and Biochemistry) B.A., California State University, Northridge 1984.

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

  Thesis: Mechanistic and Electrochemical Studies of the Reduction of Carbon Dioxide as Catalyzed by Ni(I)cyclam*.


David Randall Baselt (Chemistry) B.S., University of California, Berkeley 1988.

Richard Dean Braatz (Chemical Engineering) B.S., Oregon State University 1988; M.S., California Institute of Technology 1991.
  Thesis: Robust Loopshaping for Process Control.

Steven Keith Buratto (Chemistry) B.S., University of Puget Sound 1987.

Elizabeth G. Burns (Chemistry) B.S., Southern Methodist University 1987.
  Thesis: Functionalized Polymers via Ring-Opening Metathesis Polymerization.

Wilfred Chen (Chemical Engineering) B.S., University of California, Los Angeles 1988.
  Thesis: Molecular Expression System Design: Theoretical and Experimental Characterization of a Novel Cross-Regulation System and its Application as a Metabolic Switch.
Terry Ronald Coley (Chemistry) B.S. (Chemistry), B.S. (Computer Science), University of Illinois at Urbana-Champaign 1985. 

Thesis: Organoscadium Complexes as Mechanistic Probes in the Ziegler-Natta Polymerization of α-Olefins and Dienes.

Peter Scott Dragovich (Chemistry and Biology) B.S., University of California, Berkeley 1988. 

Thesis: Scanning Tunneling Microscopy and Spectroscopy: I. Semimetals and Semiconductors II. Atom-Resolved Imaging of DNA.


Douglas Lee Gin (Chemistry) B.Sc., The University of British Columbia 1988. 

Thesis: Design and Chemical Synthesis of Sequence-Specific DNA-Cleaving Metalloprotein Ni (II) GGH-γ8 (141-183).

Amy Jo Hoffman (Chemistry) B.S., Purdue University 1986. 

Tyler Reed Holcomb (Chemical Engineering) B.S., The University of Texas at Austin 1987; M.S., California Institute of Technology 1992. 

Daniel Hall Jones (Chemistry) B.S., University of California, Berkeley 1987. 


Thesis: I. Thermal Cyclization of (Z)-1,2,4-Heptatrien-6-ynyl II. Studies Directed Toward the Synthesis of Neocarzinostatin Chromophore.
DOCTOR OF PHILOSOPHY — Continued

Thesis: Intertial Effects on Particle Dynamics.


Alan Martin Mathiowetz (Chemistry) B.A., Rice University 1985.

Thesis: ab initio Calculations in Heterogeneous and Homogeneous Catalysis
I. Methanol to Gasoline with ZSM-5 II. Carbonyl Ligand Effects on Metal-Metal Bonds.


Changmoon Park (Chemistry) B.S., Seoul National University 1987.
Thesis: Protein Design and Simulation.

Thanh Ngoc Phung (Chemical Engineering) B.S., University of Pittsburgh 1985; M.S., 1987.

Thesis: The Design and Synthesis of Electroactive and Magnetic Polymers.

Gail Naomi Ryba (Chemistry) B.A., Reed College 1984.
Thesis: Time-Resolved Photoluminescence Studies of Metal Ion Treated n-GaAs in Electrolytes.

Thesis: Sequence Specific Recognition and Photocleavage of DNA by Phenanthrenequinone Diimine Complexes of Rhodium (III).

Thesis: Designing Protein Separations Based on Metal-Affinity Interactions.

Thesis: NMR Imaging of Solids with Multiple-Pulse Line Narrowing and Radiofrequency Gradients.

Xiaotian Zhu (Chemistry) B.S., Peking University 1988.

DIVISION OF ENGINEERING AND APPLIED SCIENCES

Yoshio Abe (Materials Science) B.E., The University of Tokyo 1981; M.S., California Institute of Technology 1990.

Lawrence Anthony (Materials Science) M.S., California Institute of Technology 1993.

Thesis: Drift Wave Ion Fluid Velocity Field Measured by Planar Laser Induced Fluorescence.


David Henry Bridges (Aeronautics) B.S., Mississippi State University 1986; M.S., 1987.

Gregory Scott Cardell (Aeronautics) B.A., Reed College 1981; M.S., California Institute of Technology 1986.

Wingsiu Richard Chan (Mechanical Engineering) S.B., Massachusetts Institute of Technology 1985; M.S., California Institute of Technology 1986.
Thesis: Experimental and Numerical Studies on Two-Dimensional Gravity Currents in a Horizontal Channel.

Tsuhan Chen (Electrical Engineering) B.S., National Taiwan University 1987; M.S., California Institute of Technology 1990.

Dar-Yun Chiang (Applied Mechanics) B.S., National Taiwan University 1982; M.S., 1986.


Luca Cortelezzi (Engineering Science) B.S., Milano State University 1978; M.S., California Institute of Technology 1988.
Thesis: A Theoretical and Computational Study on Active Wake Control.
DOCTOR OF PHILOSOPHY — Continued

Thesis: Single and Multiple Frequency Fiber Lasers.

Regina E. Dugan (Mechanical Engineering) B.S., Virginia Polytechnic Institute and State University 1984; M.S., 1985.

Thesis: Low Threshold Current Strained InGaAs/AlGaAs Quantum Well Lasers.

Zezhong Fu (Materials Science) B.S., Jilin University 1982; M.S., 1985; M.S., California Institute of Technology 1989.


Thesis: GaAs Quantum Well Devices for Detection and Nonlinear Optics in the Mid-Infrared.


Douglas Payton Hart (Mechanical Engineering) B.S., University of Illinois at Urbana-Champaign 1983; S.M., Massachusetts Institute of Technology 1985.

Charles Marion Higgins, Jr. (Electrical Engineering) B.S., Louisiana State University 1987; M.S., Georgia Institute of Technology 1989.
Thesis: Classification and Approximation with Rule-Based Networks.


Shu-San Hsiau (Mechanical Engineering) B.S., National Taiwan University 1985; M.S., California Institute of Technology 1989.

Wen-Jean Hsueh (Mechanical Engineering) B.S., National Taiwan University 1987; M.S., California Institute of Technology 1989.

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DOCTOR OF PHILOSOPHY — Continued

Thesis: Pulsed Expansion of Plasma in a Magnetic Thruster.


Thesis: Experiments in Very Large-Scale Analog Computation.

Thesis: Grid Amplifiers.

David B. Kirk (Computer Science) S.B., Massachusetts Institute of Technology 1982; S.M., 1984; M.S., California Institute of Technology 1990.


Thesis: Nominally 2-Dimensional Flow About a Normal Flat Plate.


DOCTOR OF PHILOSOPHY — Continued


Petros N. Mouchtaris (Electrical Engineering) Diploma, National Technical University of Athens 1989; M.S., California Institute of Technology 1990.
Thesis: Analysis of an Interactive Video Architecture.

Thesis: Parallel Analog Computation with Charge Coupled Devices.


Hao Ouyang (Materials Science) B.S., National Tsing Hua University 1985; M.S., California Institute of Technology 1989.

Catherine Mary Petroff (Civil Engineering) B.A., Pomona College 1982; B.S., California Institute of Technology 1982; M.S., Stanford University 1983.

Thesis: Nonsteady Crack Propagation and Craze Behavior in PMMA.

Jerald Day Ramsden (Civil Engineering) B.S., Oregon State University 1985; M.S., 1986.

Jim M. Restuccio (Applied Mechanics) B.S., The University of Tennessee 1986; M.S., Purdue University 1988.

Thesis: Molecular Tracers for Sources of Atmospheric Carbon Particles: Measurements and Model Predictions.


Carl Frederick Ruoff, Jr. (Mechanical Engineering and Computer Science) B.S., California State University, Long Beach 1967; M.S., University of California, Los Angeles 1971.
DOCTOR OF PHILOSOPHY — Continued


Joel Christopher Sercel (Mechanical Engineering) B.S., University of Arizona 1984; M.S., California Institute of Technology 1987.

Finbar Thomas Sheehy (Electrical Engineering) B.E., University College Dublin 1986; M.S., California Institute of Technology 1990.


Donald Lloyd Watts (Electrical Engineering) B.Sc., Queen’s University 1984; M.A.Sc., Simon Fraser University 1989.
Thesis: Cochlear Mechanics: Analysis and Analog VLSI.

Peter Michael Young (Electrical Engineering) B.A., Oxford University 1985; M.S., University of Florida 1988.
Thesis: Robustness with Parametric and Dynamic Uncertainty.

Yong Fang Zhang (Electrical Engineering) B.S., Northwest University 1982; M.S., Huazhong University of Science and Technology 1984; M.S., California Institute of Technology 1991.
Thesis: Coupled Array of CO\textsubscript{2} Waveguide Lasers.


DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

David Ronald Bell (Geochemistry) B.Sc., University of Cape Town 1980; B.Sc., 1981.

Thesis: An Experimental Investigation of the Behavior of Carbon Dioxide in Rhyolitic Melt.
IXCTOR OF PHILOSOPHY - Continued

Emelia Anna Burt (Geochemistry) B.S., University of Maryland 1979; M.S., 1983; M.S., California Institute of Technology 1990.

Douglas Scott Dreger (Geophysics) B.S., University of California, Riverside 1987; M.S., California Institute of Technology 1989.
Thesis: Modeling Earthquakes with Local and Regional Broadband Data.


Lisa Baugh Grant (Geology and Geophysics) B.S., Stanford University 1985; M.S. (Environmental Engineering Science), California Institute of Technology 1989; M.S. (Geology), 1990.

Thomas LaTourrette (Geology) B.A., University of California, Berkeley 1985; M.S., California Institute of Technology 1988.
Thesis: Experimental Determination of U and Th Partitioning Between Clinopyroxene, Garnet, Olivine, and Natural and Synthetic Silicate Melt.

Kuo-Fong Ma (Geophysics) B.S., National Central University 1985; M.S., National Taiwan University 1987.
Thesis: Part I: The Origin of Tsunamis Excited by Local Earthquakes Part II: Broadband Waveform Observation of Local Earthquakes.

Linda Rose Rowan (Geology) B.S. (Computer Science), B.S. (Geology), B.S. (Mathematics), University of Illinois at Urbana-Champaign 1986; M.S., California Institute of Technology 1989.

Thesis: The Thermal Structure, Dust Loading, and Meridional Transport in the Martian Atmosphere During Late Southern Summer.

David Jay Wald (Geophysics) B.S., St. Lawrence University 1984; M.S., University of Arizona 1986.
DOCTOR OF PHILOSOPHY — Continued

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

Peng Lian (Social Science) B.S., Xiamen University 1984; M.A., 1987; M.S., California Institute of Technology 1991.
Charles Nabih Noussair (Social Science) B.A., University of Pennsylvania 1987; M.S., California Institute of Technology 1990.
  Thesis: A Theoretical and Experimental Investigation of Auctions in Multi-Unit Demand Environments.
Charles William Polk (Social Science) B.S., Harvey Mudd College 1983; M.A., University of California, Los Angeles 1989.
  Thesis: The Organization of Production: Moral Hazard and R&D.
Jeffrey Emig Prisbrey (Social Science) B.A., University of Massachusetts 1988.
  Thesis: Cooperation in Reciprocity Games and in the Voluntary Contributions Mechanism.
Langche Zeng (Social Science) B.S., Chengdu University of Science and Technology 1982; M.A., Sichuan Institute of Finance and Economics 1985; M.S., California Institute of Technology 1990.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Stuart Bruce Anderson (Physics) B.A., Bethel College 1986.
  Thesis: A Study of Recycled Pulsars in Globular Clusters.
Darin Emerson Beigie (Physics) B.Sc., University of Toronto 1986; M.S., California Institute of Technology 1988.
Wei-Feng Chen (Mathematics) B.S., Zhejiang University 1982; M.S., 1985.
  Thesis: Birkhoff Periodic Orbits, Aubry-Mather Sets, Minimal Geodesics and Lyapunov Exponents.
DOCTOR OF PHILOSOPHY — Continued


Stéphane Coutu (Physics) B.Sc., McGill University 1987; M.S., California Institute of Technology 1989.

Thesis: On the Transition from Two- to Three-Dimensional Behavior in Adsorbed Films.

Fernando P. Echeverria (Physics) B.S. (Electrical Engineering), Universidad de Chile 1982; B.S. (Physics), 1985; B.S. (Computer Science), 1986; M.S., 1986.

Andrea Mia Ghez (Physics) S.B., Massachusetts Institute of Technology 1987; M.S., California Institute of Technology 1989.

Thesis: Measurement of the Tau-Pair Cross Section and Charge Asymmetry at the Z° Resonance.

Thesis: Perturbative Corrections to the Ratio \( \frac{\Gamma(B \rightarrow D \pi^+)\Gamma(B \rightarrow D \pi^-)}{\Gamma(B \rightarrow D \pi^-)} \).

Jiangtao Hong (Physics) B.S., University of Science and Technology of China 1987; M.S., California Institute of Technology 1989.
Thesis: Search for GUT Magnetic Monopoles and Other Supermassive Particles with the MACRO Detector.


Mark Dixon Looper (Physics) A.B., Princeton University 1985; M.S., California Institute of Technology 1989.

Christopher Gerald Matthews (Physics) B.Sc., University of Waterloo 1983; M.S., California Institute of Technology 1985.

Chung-Yu Mou (Physics) B.S., National Taiwan University 1986.
Thesis: Spherical Model for Turbulence.

Thesis: Global analogue of the Aharonov-Bohm Effect.
DOCTOR OF PHILOSOPHY — Continued


Thesis: The Kinematics of Molecular Gas and Dust in the Nearby Galaxies Centaurus A and M82.

Thesis: Hydrodynamics of Neutron Star Interiors and Laboratory Superfluids.

Thesis: The Dimension of Spacetime.


Thesis: Renormalization Corrections in Heavy Colored Scalar Effective Field Theory.

Jude Thaddeus U. Socrates (Mathematics) B.S., University of the Philippines 1986; M.S., 1988; M.S., California Institute of Technology 1990.
Thesis: The Quaternionic Bridge Between Elliptic Curves and Hilbert Modular Forms.

William Russell Softky (Physics) B.Sc., Haverford College 1984; M.S., California Institute of Technology 1990.
Thesis: Irregularity in the Cortical Spike Code: Noise or Information?

Christopher G. Tinney (Astronomy) B.Sc., University of Sydney 1987.

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.
1992 Maneesh Sahani
1993 Michael Andrew Nassir

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.

THE WILLIAM F. BALLHAUS PRIZE
Awarded to aeronautics students for outstanding doctoral dissertations.
Philippe H. Geubelle; Anastasios Michail Lappas

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.
1992 Aimée Louise Smith
1993 Catherine Irene Hafer

ROLF BUHLER AWARD
Awarded to an aeronautics student for outstanding academic achievement in the Master's program.
Patrice Michel Maheo

Prizes and awards are listed only for those students awarded degrees in 1993, and include prizes and awards received by them in previous years.
FRITZ B. BURNS PRIZE IN GEOLOGY
Awarded to a junior or senior who has demonstrated academic excellence and the greatest promise of future contributions in the fields represented by the Division of Geological and Planetary Sciences.
Francisco Gustavo Gomez; Tristani Kibbey

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. Listed below are graduating seniors who have been recipients of these prizes.

George Richard Benzinger III  
Francis Fu Shin Chong  
Danny Chu  
Balasubramanian Girish  
Keow Lin (Lindee) Goh  
John Daniel Grade  
Tarun Mohan Kapoor  
Nitya Ranjan Kitchloo  
Alan Eugene Kulawik  
David Lande  
Wa-To Lau

Victor Soo Lee  
Melissa Yan-Yee Li  
Areez Minoo Mody  
Antonio Rangel  
Karen Eileen Ross  
Mimi Sengupta  
Douglas G. Shiels  
Maggie Elizabeth Taylor  
Chris Thad Ulmer  
Andreja Volenee  
Feng Yuan

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.
Jude Thaddeus U. Socrates

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.
Wooyong Choi; Douglas Payton Hart

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.
1992 Amitabh Mehra
PRIZES AND AWARDS — Continued

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

Two awards, given 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.

1991 Catherine Irene Hafer, Deans’ Cup; Maneesh Sahani, Deans’ Cup
1993 Nathan Albert Frei, Deans’ Cup; Joanna Marie Wills, 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 Budiana Khouto

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.

Dali Ding

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.

1992 Melissa Yan-Yee Li

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.

1992 Tarun Mohan Kapoor

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.

Tyler Reed Holcomb
PRIZES AND AWARDS — Continued

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.
1991 Karen Eileen Ross
1992 Francis Fu Shin Chong

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.
Melissa Yan-Yee Li

MARY A. EARL McGINNEY 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.
1990 George Richard Benzinger III
1991 Hoyt Emmet Hudson; Jennifer Ann Wright
1993 George Richard Benzinger III; Truxton King Fulton II

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.
1991 Michael Andrew Nassir
1992 Catherine Irene Hafer
1993 Claudine Butcher

THE RODMAN W. PAUL HISTORY PRIZE
Awarded to a graduating senior who has displayed unusual interest in and talent for history.
1992 Karen Eileen Ross
1993 Karen Eileen Ross

HERBERT J. RYSER MEMORIAL SCHOLARSHIPS
Awarded to undergraduate students for academic excellence, preferably in mathematics.
1991 Nitya Ranjan Kitchloo
PRIZES AND AWARDS — Continued

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.

1992 Tarun Mohan Kapoor; Wa-To 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.

1992 Philippe H. Geubelle

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.

1991 Samuel Joseph Clark; Amy Therese Hansen
1992 Matthew David Durasoff; Balasubramanian Girish; Keow Lin (Lindee) Goh; Nitya Ranjan Kitchloo; Rohan Mahadevan; Debra Louise Tuttle

SIGMA XI AWARD

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

Antonio Rangel

JOHN STAGER STEMPEL 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.

1991 Thomas Büttigenbach
1992 Peter Kenneth Day

THE MORGAN WARD PRIZE

Awarded for the best problems and solutions in mathematics submitted by a freshman or sophomore.

1991 Nitya Ranjan Kitchloo

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PRIZES AND AWARDS — Continued

CHARLES WILTS PRIZE
Awarded to a graduate student for outstanding independent research in electrical engineering leading to a Ph.D.
Tsuhan Chen

FREDERICK 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.
1992 Nitya Ranjan Kitchloo
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 adjacent to the Special Services Center.

LOST AND FOUND items may be reported and/or claimed at the Special Services Center.

SPECIAL SERVICES FOR PERSONS WITH DISABILITIES

SPECIAL SERVICES CENTER is located on the east side of the Ceremony seating area.

ASSISTIVE LISTENING DEVICES are available at the Special Services Center. A driver's license or state-issued ID card is required.

LARGE-TYPE PROGRAMS (abridged) are available at the Special Services Center.

AMERICAN SIGN LANGUAGE (ASL) interpreters will be stationed at the west front of the Ceremony seating area.

PERSONS WHO USE WHEELCHAIRS, and their guests, will find a special section near the east front of the Ceremony seating area.

RESTROOMS ACCESSIBLE TO PERSONS 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.