Eighty-Ninth
Annual Commencement
June 10, 1983
CALIFORNIA INSTITUTE OF TECHNOLOGY

Eighty-Ninth Annual Commencement

FRIDAY MORNING AT TEN O'CLOCK
JUNE TENTH, NINETEEN EIGHTY-THREE
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 masters, the doctors 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 gradations 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 boys and choir girls 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
Secretary of the Faculty
Academic Procession

Chief Marshal, Christopher E. Brennen, Ph.D.

Assistant Marshals
Arden L. Albee, Ph.D.       Jenijoy La Belle, Ph.D.
J. Kent Clark, Ph.D.        Robert W. Oliver, Ph.D.
Ray D. Owen, Ph.D., Sc.D.

Faculty Officers
Fred C. Anson, Ph.D.       Donald S. Cohen, Ph.D.
                          David C. Elliot, Ph.D.

MARCHING ORDER
CANDIDATES FOR THE DEGREE OF BACHELOR OF SCIENCE
CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE
CANDIDATE FOR THE DEGREE OF ENGINEER
CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
FACULTY OFFICERS
THE FACULTY
THE CHAIRMEN OF DIVISIONS
THE DEANS
THE PROVOST
THE TRUSTEES
THE COMMENCEMENT CHAPLAIN
THE COMMENCEMENT SPEAKER
THE PRESIDENT
THE CHAIRMAN OF THE BOARD OF TRUSTEES
Program

PRESIDING . . . . . . . . . . . R. Stanton Avery, LL.D.
Chairman of the Board of Trustees

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

PROCESSIONAL . . . The Caltech Wind Ensemble Brass and Organ
William Bing, M.M., Conductor

INVOCATION . . . . . . . The Reverend Dr. George F. Regas
Rector
All Saints Church, Pasadena

COMMENCEMENT ADDRESS . . . . . . . "Your Revolution"
James A. Michener
Writer

MUSICAL SELECTION . . . . . . . The Caltech Glee Clubs
Morning Trumpet
Donald G. Caldwell, D.M.A., Conductor
Early American Folk Hymn

CONFERRING OF DEGREES . . Marvin L. Goldberger, Ph.D., D.H.L.
President
California Institute of Technology
PRESENTATION OF CANDIDATES FOR DEGREES

For the Degree of Bachelor of Science . . . David B. Wales, Ph.D.
Dean of Students

For the Degree of Master of Science . . . Stirling L. Huntley, Ph.D.
Associate Dean of Graduate Studies

For the Degree of Engineer . . . . Francis S. Buffington, Sc.D.
Associate Dean of Graduate Studies

For the Degree of Doctor of Philosophy . . . Dean Buffington

Biology . . . . . . . . . . Leroy E. Hood, M.D., Ph.D.
Division Chairman

Chemistry and Chemical Engineering . . John H. Seinfeld, Ph.D.
Executive Officer for Chemical Engineering

Engineering and Applied Science . . . Roy W. Gould, Ph.D.
Division Chairman

Geological and Planetary Sciences . . . Arden L. Albee, Ph.D.
Professor of Geology and
Chief Scientist, Jet Propulsion Laboratory

Humanities and Social Sciences . . . David M. Grether, Ph.D.
Division Chairman

Physics, Mathematics and Astronomy . Edward C. Stone, Jr., Ph.D.
Division Chairman

CONCLUDING REMARKS . . . . . . President Goldberger

BENEDICTION . . . . . . . . . . . . . Dr. Regas

RECESSIONAL . . . The Caltech Wind Ensemble Brass and Organ

ORGAN POSTLUDE . . . . . . . . . . . Leslie Deutsch
Candidates for Degrees

BACHELOR OF SCIENCE

David L. Adler  Pasadena, California  Applied Physics
Lynne Kay Adler  Irvine, California  Applied Physics
Jeffrey Alan Aguilera  Santa Rosa, California  Applied Mathematics
Carla Ahlstrom  Salem, Oregon  Chemical Engineering
Philip Harold Albert  Electrical Engineering
Russell George Almond  Maple Glen, Pennsylvania  Mathematics
Loren Ingrid Alving  Chevy Chase, Maryland  Biology
James Allen Anderson  Los Angeles, California  Electrical Engineering
Julie Ann Anderson  Pasadena, California  Chemistry
Lorna Lee Anderson  Sacramento, California  Chemical Engineering
Nazeeh Issa Aranki  Jerusalem, Palestine  Electrical Engineering
Justine Leslie Armantrout  Bakersfield, California  Chemistry
Gloria Ann Badilla  Pleasanton, California  Engineering and Applied Science
Michael Edward Becker  Los Angeles, California  Engineering and Applied Science
John Albert Behr  Woodlake, California  Physics
Bruce Edward Behymer  Hanover Park, Illinois  Engineering and Applied Science
Leif Bennett  Playa del Rey, California  Applied Physics and Engineering and Applied Science
Allan Ira Berger  Castro Valley, California  Electrical Engineering
Andrew Laurence Berkin  Encino, California  Physics
Jeffrey Brian Berner  Glendale, California  Electrical Engineering
Thomas Edward Berto  San Anselmo, California  Engineering and Applied Science
Robert Eric Betzig  Ann Arbor, Michigan  Physics
Robert Edward Bible, Jr.  Rancho Santa Fe, California  Engineering and Applied Science
Scott Harris Bloom  Oyster Bay Cove, New York  Physics
Arthur Paul Brazy  Milwaukee, Wisconsin  Economics
Clark Donald Brooks  Norton, Ohio  Mathematics
Ellen Susanna Bus  Mountain View, California  Geophysics
Vincenzo Cammarata  Beachwood, New Jersey  Chemistry
Bao Quoc Cao  San Diego, California  Engineering and Applied Science
Armand J. Capote  Brooklyn, New York  Chemical Engineering
Anthony Julian Capowski  Manchester, New Hampshire  Electrical Engineering

Students whose names appear in bold face type are being graduated with honor in accordance with a vote of the faculty.
BACHELOR OF SCIENCE—Continued

Mark Bernard Caruso  La Cañada, California  Electrical Engineering
Virginia M. Chan  Southington, Connecticut  Engineering and Applied Science
William Albert Chapman  Melbourne, Victoria, Australia  Engineering and Applied Science
Steven Chin  Wantagh, New York  Biology
R. Sekhar Chivukula  Lincoln, Nebraska  Physics and Applied Mathematics
Ri-Chee Chou  Sunnyvale, California  Electrical Engineering
Kenneth Shun-kei Chow  Hong Kong  Physics
Thomas Phillip Christian  Roanoke, Virginia  Engineering and Applied Science
Dale Cheng-Hsin Chu  Carson, California  Electrical Engineering
Ming-Chung Chu  Hong Kong  Physics
Karl Robert Clausing  Camarillo, California  Electrical Engineering
Jean-Pierre Deodat Clejan  New York, New York  Engineering and Applied Science
Karen Marie Close  Norwich, Connecticut  Engineering and Applied Science
Steven Lee Colwell  San Diego, California  Engineering and Applied Science
Tony M. Conneally  Lombard, Illinois  Chemical Engineering
Walter A. Coole  Bayview, Washington  Applied Physics
Mark Edward Cornell  Godfrey, Illinois  Astronomy
John Timothy Cramer  Seattle, Washington  Engineering and Applied Science
Jim Cummings  Placentia, California  Physics
Noemi Guadalupe de la Puente del Campillo  Monterey Park, California  Engineering and Applied Science
Alan Joseph Dellamore  Ogden, Utah  Engineering and Applied Science
Daniel Scott Dickerson  Pasadena, California  Engineering and Applied Science
Kaitlin Drisko  Solana Beach, California  Engineering and Applied Science
Andrew Malcolm Duncan  Napa, California  Engineering and Applied Science
Jahn-Anders Dørsdal Dyvik  New City, New York  Engineering and Applied Science
Kent Franklin Evans  Los Alamos, New Mexico  Physics
Mario Ernesto Fajardo  Miami, Florida  Chemistry
John Gregory Favor  Houston, Texas  Engineering and Applied Science
Jacqueline Fernández  Santurce, Puerto Rico  Mathematics
Lisa Lynn Flitz  Mequon, Wisconsin  Biology
Chi Hang Fong  Los Angeles, California  Chemical Engineering
Arthur J. Fortini  Bronx, New York  Chemical Engineering and Chemistry
Ronald William Francis  Bronx, New York  Applied Physics
Lloyd Paul Franklin  East Brunswick, New Jersey  Engineering and Applied Science
Joseph Franklin Garvey  Bonita, California  Electrical Engineering
Lisa C. Grenier  Brea, California  Engineering and Applied Science
John Nicholas Gross  Westbrook, Maine  Electrical Engineering
BACHELOR OF SCIENCE—Continued

Lawrence Stuart Gross  Sherman Oaks, California  Engineering and Applied Science
Wahid Suleiman Hamid  Karachi, Pakistan  Electrical Engineering
Lee Zachary Hasuk  Philadelphia, Pennsylvania  Engineering and Applied Science
Gregory Johannes Haussmann  Torrance, California  Engineering and Applied Science
Christopher J. Hawley  Pasadena, California  Engineering and Applied Science
Mary Ellen Heinrich  Conifer, Colorado  Engineering and Applied Science
Douglas Heirich  Ann Arbor, Michigan  Engineering and Applied Science
Robert Gordon Helbing  Pasadena, California  Engineering and Applied Science
Michael Scott Hisey  Cupertino, California  Engineering and Applied Science
Pui Tong Ho  Harrisburg, Pennsylvania  Chemistry
Brian Douglas Horn  Los Angeles, California  Engineering and Applied Science
David Bland Huff  Sylacauga, Alabama  Electrical Engineering
Kevin Allen Hughes  Fair Oaks, California  Engineering and Applied Science
Johnny Nicholas Humphrey III  Savannah, Georgia  Physics
Elton Mori Inada  Honolulu, Hawaii  Engineering and Applied Science and Social Science
Tze Kin Ip  Houston, Texas  Engineering and Applied Science
Christopher Scott Jacobs  Cincinnati, Ohio  Applied Physics
Daniel K. Jew  Bell Gardens, California  Engineering and Applied Science
Hamid Johari  Tehran, Iran  Engineering and Applied Science
Howell Kenneth Johnson  Seattle, Washington  Engineering and Applied Science
Paul A. Johnson  Rock Springs, Wyoming  Electrical Engineering
Scott Russell Johnson  Lakewood, California  Mathematics
Vivek Madhusudan Joshi  Grand Forks, North Dakota  Mathematics
Arlene Patricia Keller  Arcadia, California  Chemistry
Muhammad Farrukh Khan  Lahore, Pakistan  Social Science
Paul Kevin Kienker  Palatine, Illinois  Biology
Michael Andrew Kilby  Bethesda, Maryland  Engineering and Applied Science
Sung Joon Kim  Glendale, California  Electrical Engineering
Young Shil Kim  Taegu, Korea  Physics
Steven C. Knowles  Gig Harbor, Washington  Engineering and Applied Science
Julia Ann Kornfield  Los Altos, California  Chemistry
Daniel Benjamin Kostka  Minnetonka, Minnesota  Engineering and Applied Science
Nancy Lee Krebbiel  El Cajon, California  Biology
Kenneth Ting-Yuan Kung  San Francisco, California  Electrical Engineering
Huy Minh Le  Pasadena, California  Electrical Engineering
Jeremy Leader  Princeton, New Jersey  Engineering and Applied Science
Brian Robert Leahy  El Cajon, California  Engineering and Applied Science
Young Soo Lee  Rancho Palos Verdes, California  Engineering and Applied Science
BACHELOR OF SCIENCE—Continued

Alexander V. Leibovich San Jose, California Engineering and Applied Science
Daniel Edward Lenoski North Hollywood, California Electrical Engineering
David John LePoiré Holland, Michigan Physics
Lyle E. Levine St. Louis, Missouri Physics
Barret Lippey San Jose, California Applied Physics
Andrew H. Liu Los Angeles, California Chemistry
Donald Ching-tze Lo West Covina, California Biology
Sandra Tsing Loh Malibu, California Physics and Literature
John Charles Loveall Covina, California Applied Physics
Mark Warner Maier Los Angeles, California Engineering and Applied Science
Donald Edward Major Seattle, Washington Electrical Engineering
Maclen Buckminster Marvit Swampscott, Massachusetts Physics
Vladimir Matijasevic Beograd, Yugoslavia Applied Physics
Bjorn Eckart Matthias Berlin (west), Germany Physics
James Gerald McCuskey Duluth, Minnesota Engineering and Applied Science
Joseph McIntyre Bellingham, Washington Biology
Christopher Kevin McKinnon Great Falls, Montana Chemical Engineering
John Arthur Meiling San Pedro, California Engineering and Applied Science
Michael James Mettille Newark, Ohio Chemical Engineering
Frank Albert Meyer Brentwood, New York Electrical Engineering
Scott Michael Novato, California Mathematics
Richard Henry Miles Bethesda, Maryland Physics
Gary Craig Mockli Lakewood, California Biology and Chemistry
Luis A. Monsalve, Jr. Los Angeles, California Engineering and Applied Science
Rodney Morison, Jr. Huntington Beach, California Applied Mathematics
Harry George Mousmoules Westminster, California Engineering and Applied Science
Roman Movshovich Los Angeles, California Applied Physics
David James Muraki Scarborough, Ontario, Canada Mathematics
Lawrence Peter Muray Los Altos, California Applied Physics
Thomas Joseph Murphy Dallas, Texas Physics
Glenn Ernest Nakamura Los Angeles, California Biology and Chemistry
Thelma Yolanda Nunez Tucson, Arizona Chemical Engineering
David Arthur Oare Wellsville, New York Chemistry
Peter Orr Arvada, Colorado Engineering and Applied Science
Richard Leon Paquette Chicopee, Massachusetts Geophysics
Jonathan Parker Hermosa Beach, California Chemistry
Vipul Periwal New Delhi, India Physics and Mathematics
Richard William Pogge Ridgecrest, California Physics
William Alvo Polson Saginaw, Michigan Applied Physics
BACHELOR OF SCIENCE—Continued

Leslie Anthony Poltrack  Stamford, Connecticut  Engineering and Applied Science
Vincent Martin Powers  Newport Beach, California  Chemistry
John Quackenbush  MountainTop, Pennsylvania  Physics
Jon Tabor Quilliam  Everett, Washington  Engineering and Applied Science
Russell Warren Quong  Palos Verdes, California  Electrical Engineering
Wendy G. Rasmussen  Edina, Minnesota  Engineering and Applied Science
Zinovy Boris Reichstein  Selinsgrove, Pennsylvania  Mathematics
Ilene Miller Reinitz  Miami, Florida  Geochemistry
Brian Clark Richards  Issaquah, Washington  Electrical Engineering
Jay Bennett Rickard  Arlington, Texas  Electrical Engineering
Beverley Ann Robertson  Whitehorse, Yukon, Canada  Engineering and Applied Science
Cheryl Jean Robertson  Littleton, Colorado  Chemical Engineering
Gary Thomas Rodriguez  Kansas City, Missouri  Physics
Bruce Jones Sams III  Belvedere, California  Astronomy
Gregory Damian Sayles  El Sobrante, California  Chemical Engineering
Gregory Keith Schenter  Richland, Washington  Physics
Russell Brown Schweickart  Sacramento, California  Engineering and Applied Science
James G. Scoby  Park Ridge, Illinois  Engineering and Applied Science
Kenneth Donald Seibert  LimaVille, Ohio  Electrical Engineering
Glenn Robert Seidman  Palos Verdes Estates, California  Engineering and Applied Science
Cynthia Louise Shaver  Sierra Vista, Arizona  Engineering and Applied Science
Rebecca Lynn Sheets  Wentzville, Missouri  Biology
Dean Kazuo Shibata  Westminster, California  Biology
Kenneth William Shrum  Los Angeles, California  Engineering and Applied Science
Thomas Russell Sim  Eugene, Oregon  Chemical Engineering
Evangelos Simoudis  Thessaloniki, Greece  Electrical Engineering
Eric Sinn  Pasadena, California  Biology
Risto Leo Sjogren  Los Angeles, California  Engineering and Applied Science
Don Allan Smith  Del Mar, California  Chemical Engineering
Robert James Snook  Stockton, California  Engineering and Applied Science
Christopher Martin Snyder  Evergreen, Colorado  Mathematics
Jonathan David Souder  San Diego, California  Engineering and Applied Science
Scott Edward Sperling  Tustin, California  Applied Physics
Aditya Srinivasan  Sharjah, United Arab Emirates  Electrical Engineering
Mark Joseph Stefanich  Anchorage, Alaska  Engineering and Applied Science
Michael Alan Strauser  Walla Walla, Washington  Electrical Engineering
Charlie Elliott Murton Strauss  Seattle, Washington  Electrical Engineering
BACHELOR OF SCIENCE—Continued

Brent Connon Stuart  Walnut Creek, California  Physics
Ichiro Sugioka  Kyoto, Japan  Engineering and Applied Science
Gary Rikio Tanigawa  Aiea, Hawaii  Biology
Arthur Christopher Thompson  Winnipeg, Manitoba, Canada  Physics
Lynnmarie Kim Thompson  Manhattan Beach, California  Chemistry
Mark M. Todorovich  New York, New York  Engineering and Applied Science
Curtis Alan Trimble  Las Vegas, Nevada  Physics
Thomas Richard Tyler, Jr.  Mystic, Connecticut  Engineering and Applied Science
Carlos Valencia III  Porterville, California  Electrical Engineering
Camilla Adele Van Voorhees  Larkspur, California  Literature
Thiti Vejpas  Bangkok, Thailand  Electrical Engineering
John Szeming Wang  San Francisco, California  Electrical Engineering
John Y. Wang  Morton Grove, Illinois  Electrical Engineering
Keith Richard Warfield  Williamsport, Pennsylvania  Engineering and Applied Science
Michael Scott Weston  Los Altos, California  Engineering and Applied Science
Frederick Paul Wieland  Garden City, New York  Astronomy
Timothy Lowell Williams  Palos Verdes, California  Electrical Engineering
William Harrison Wright III  Amenia, New York  Applied Physics
Walter Ulrich Wuensch  Clinton, New York  Physics
Sung Jun Yoo  Closter, New Jersey  Biology
Jeffrey Winston Yu  Dallas, Texas  Electrical Engineering
Avideh Zakhor  Tehran, Iran  Electrical Engineering
Graham Stuart Zaretsky  Spring Valley, New York  Engineering and Applied Science
MASTERS OF SCIENCE

Khaled Ahmed Sabry Abdel-Ghaffar (Electrical Engineering) B.Sc., Alexandria University 1980.


Julie Ann Anderson (Chemistry) B.S., California Institute of Technology 1974.

Mark William Anderson (Aeronautics) B.S., Purdue University 1974.


William C. Athas, Jr. (Computer Science) B.S., University of Utah 1981.

Diane Elizabeth Austin (Environmental Engineering Science) B.S., Texas Christian University 1981.

Haruo Awano (Electrical Engineering) B.S., University of Tokyo 1979.


Christopher Louis Barrett (Engineering Science and Bioinformation Systems) B.S., University of New Mexico 1976.

William I. Behen (Electrical Engineering) B.S., California Institute of Technology 1978.

Philip Stewart Beran (Aeronautics) B.S., Cornell University 1982.

Janet A. Blume (Civil Engineering) B.S., Princeton University 1982.


William Michael Bruno (Electrical Engineering) B.S., University of California, San Diego 1981.

George Mario Buriticá (Electrical Engineering) B.E., Youngstown State University 1981.

Walter Yichen Chen (Electrical Engineering) B.S., Polytechnic Institute of New York 1982.


Jonathan Edward Child (Chemical Engineering) B.Ch.E., University of Delaware 1981.

Michael V. Chobotov (Mechanical Engineering) B.S., California Institute of Technology 1982.

Young-il Choo (Computer Science) B.S., California Institute of Technology 1978.

Christopher Vincent Chow (Chemical Engineering) B.S., University of Illinois at Urbana-Champaign 1980.
MASTER OF SCIENCE—Continued

Eugene Yun-Ching Chu (Electrical Engineering) B.S., University of Detroit 1982.
Johnson Nain-Lun Chu (Electrical Engineering) B.S., University of California, Los Angeles 1982.
Daniel Mark Coffman (Physics) B.S., Yale University 1979.
Stefano Enrico Concina (Electrical Engineering) Diplôme d'Ingénieur, Ecole Supérieure d'Ingénieurs en Electrotechnique et Electronique 1983.
YongBum Park Cuevas (Electrical Engineering) B.S., University of Hawaii at Manoa 1982.
David Stewart Dandy (Chemical Engineering) B.S., University of California, Davis 1981.
Barry Daniel Davidson (Aeronautics) B.S., State University of New York at Buffalo 1981.
Teresa Melissa Davis (Electrical Engineering) B.S., University of Texas at Austin 1981.
Pablo de Urquijo Niembro (Electrical Engineering) B.S., Universidad Iberoamericana 1980.
Thomas Joseph DiChristina (Environmental Engineering Science) B.S., University of Rochester 1982.
William Patrick Donlon Jr. (Civil Engineering) B.S., University of Notre Dame 1982.
David Russel Dowling (Aeronautics) B.S., California Institute of Technology 1982.
Gregory Peter Dubois (Physics) B.A., University of South Florida 1981.
Bahaa Mohamed El-Aidi (Civil Engineering) B.Sc., Cairo University 1978.
Daniel Weiler Eustace (Electrical Engineering) B.S., Case Western Reserve University 1982.
Lee Samuel Finn (Physics) B.S., University of California, Los Angeles 1982.
Lloyd Paul Franklin (Electrical Engineering) B.S., California Institute of Technology 1983.
Ronald John Franz (Mechanical Engineering) B.S., California Institute of Technology 1982.
Stephen D. Freeland (Electrical Engineering) B.S., Harvey Mudd College 1982.
Clifford Eugene Frieler (Aeronautics) B.S., California Institute of Technology 1982.
MASTER OF SCIENCE—Continued

Ghavam Ghavamishahidi (Electrical Engineering) S.B., Massachusetts Institute of Technology 1981.
Rita Gitik (Mathematics) B.A., Hebrew University of Jerusalem 1981.
Aaron Henry Goldberg (Chemistry) B.S., Yale University 1979.
Carl Scott Guernsey (Aeronautics) B.S., Purdue University 1976.
Armineh Hakob Nalbandian (Civil Engineering) B.S., California State University, Northridge 1982.
Imad Awni Hannoun (Civil Engineering) B.E., American University of Beirut 1982.
Debra Kay Heckendorn (Chemistry) B.S., University of Idaho 1980.
Joseph E. Heideman (Electrical Engineering) B.S., Oregon State University 1982.
Gavin Julian Hendricks (Mechanical Engineering) B.Sc., University of Cape Town 1981.
Maurice Alfred Hernandez (Electrical Engineering) B.S., University of the Pacific 1981.
Lynn Mary Hildemann (Environmental Engineering Science) B.S., California Institute of Technology 1980.
Eric John Holstege (Computer Science) B.S., California Institute of Technology 1981.
John Hyunchul Hong (Electrical Engineering) S.B., Massachusetts Institute of Technology 1982.
Scott Curtis Honkonen (Mechanical Engineering) B.S., University of Vermont 1982.
Astrid H. Howard (Geology) S.B., Massachusetts Institute of Technology 1979.
Joseph William Humphrey III (Mechanical Engineering) B.M.E., Georgia Institute of Technology 1982.
Susan Elizabeth Hunts (Environmental Engineering Science) B.S., California Institute of Technology 1981.
David Earl James (Environmental Engineering Science) A.B., University of California, Davis 1975.
Robert McNamara Kanne (Chemistry) B.S., Stanford University 1977.
Gary Michael Kolbasuk (Geology) B.S., Northern Illinois University 1977.
Jeffrey Yau-Pak Kong (Electrical Engineering) B.S., University of Santa Clara 1982.
Albert Ernst Koszarek (Mechanical Engineering) B.S., Washington State University 1982.
Brian Charles Kravitz (Mechanical Engineering) B.S., Rutgers, The State University 1982.
Nehemias Lima Lacerda (Aeronautics) Aeronautical Engineer, Instituto Tecnológico de Aeronáutica 1978.
Jimmy Kwok-Ching Lam (Computer Science) B.S., California Institute of Technology 1982.
Wayne Wing Lam (Electrical Engineering) B.S., University of Hawaii at Manoa 1981.


Norman Tai Ming Lee  *(Electrical Engineering)*  B.S., California Institute of Technology 1980.


Mary Kathleen McCann  *(Aeronautics)*  B.S., University of Notre Dame 1981.


David James Muraki  *(Mechanical Engineering)*  B.S., California Institute of Technology 1983.


Sotirios Natsiavas  *(Mechanical Engineering)*  Ptychion, Aristotelion University of Thessaloniki 1982.


Charles Hok-Bun Ng  *(Computer Science)*  B.S., California Institute of Technology 1982.

Edward Thien-Duy Nguyen  *(Electrical Engineering)*  B.S., California State University, Los Angeles 1982.
MASTER OF SCIENCE—Continued

Wendy Ann Olson  (Chemistry)  B.S., University of Illinois at Urbana-Champaign 1980.
Leonidas George Paparizos  (Civil Engineering)  Diploma, National Technical University of Athens 1982.
Hisup Park  (Mechanical Engineering)  B.S., California Institute of Technology 1982.
Peter Mirrill Partch  (Engineering Science)  B.S., University of California, San Diego 1981.
Joel Stephen Paslaski  (Electrical Engineering)  B.S., California Institute of Technology 1982.
Chia-Yen Peng  (Civil Engineering)  B.S., National Taiwan University 1980.
Alexios Pantelis Polychronakos  (Physics)  Diploma, National Technical University of Athens 1982.
George Anthony Rakuljic  (Electrical Engineering)  B.S., University of California, Los Angeles 1982.
Raymond Luther Rau  (Physics)  B.S., Lehigh University 1981.
Kenneth Frederick Reardon  (Chemical Engineering)  B.S., University of Pennsylvania 1981.
Gabriel Michel Rebeiz  (Electrical Engineering)  B.E., American University of Beirut 1982.
John Hulett Runnels  (Chemistry)  B.S., Louisiana State University 1980.
David Christopher Sams  (Aeronautics)  B.S., University of Washington 1982.
Christopher O’Neill Sanders  (Geophysics)  B.S., University of Nevada, Reno 1979.
Vera Olivia Shen  (Electrical Engineering)  B.S., Oregon State University 1982.
George Siopsis  (Physics)  B.Sc., The University of Sussex 1982.
Frank Cheung Tao So  (Electrical Engineering)  B.Sc., The University of Manchester 1982.
Master of Science—Continued

Richard Jerome Stead (Geophysics) B.S., Lehigh University 1982.
Karl E. Steinhoff (Applied Mathematics) B.S., Harvey Mudd College 1981.
Kenneth Jeffrey Stern (Electrical Engineering) B.S., University of Pennsylvania 1979.
Stephen Yiu Ken Tam (Electrical Engineering) B.Sc., The University of Alberta 1982.
Chin An Tan (Aeronautics) B.S., University of California, Berkeley 1982.
Francis Chi Kin Ting (Civil Engineering) B.Sc., The University of Manchester Institute of Science and Technology 1982.
Gregory Paul Tollisen (Mathematics) B.S., University of Portland 1978.
David Alan Treiber (Aeronautics) B.S., University of Washington 1982.
Walter Shigeharu Tsuha (Aeronautics) B.S., University of Hawaii at Manoa 1981.
Moderagé Anthony Marius Waas (Aeronautics) B.Sc., The Imperial College of Science and Technology 1982.
Stefan Wabnitz (Electrical Engineering) Laurea, Università di Roma 1982.
Korawit Wacharasindhu (Electrical Engineering) B.Sc., The University of Sussex 1982.
Carlos René Weissenberg Jr. (Electrical Engineering) B.S., University of California, Davis 1981.
Lance Nevin West (Electrical Engineering) B.S., Tufts University 1982.
Theresa Ann Weston (Chemical Engineering) S.B., Massachusetts Institute of Technology 1980.
Jin-Jwarg Alice Wu (Environmental Engineering Science) B.S., National Taiwan University 1981.
Joanne Mulligan Yeakley (Biology) B.S., Purdue University 1976.
Alan Taylor Zehnder (Mechanical Engineering) B.S., University of California, Berkeley 1982.

Engineer

DOCTOR OF PHILOSOPHY

DIVISION OF BIOLOGY

Steven Michael Block  (Biology)  B.A., Oxford University 1974; M.A., 1978; M.A., University of Colorado 1982.
Thesis: Chemotactic Responses of Tethered Bacteria.

Stephen Thomas Crews  (Biology)  B.A., The University of Texas at Austin 1975.
Thesis: The Structure of Mammalian Genes: I. Antibody Heavy Chain Variable Region Genes: Organization, Diversity, and Somatic Mutation. II. Structure and Transcription of the DNA Encompassing the Origin of Replication of Human Mitochondrial DNA.

Jay William Ellison  (Biology)  B.S., University of Illinois at Urbana-Champaign 1977; M.S., California Institute of Technology 1980.

Karl Joseph Fryxell  (Biology)  B.A., B.S., The University of Texas at Austin 1975.
Thesis: Biochemical and Genetic Studies on Peripheral Myelination in Normal Development and in the Mouse Mutant Trembler.

Richard Hans Gomer  (Biology)  B.A., Pomona College 1977.

Thesis: Gene Expression in B and T Lymphocytes: I. Evolution of Rat Cκ Alleles. II. The T-cell Receptor Problem.

Baruch Davidson Kuppermann  (Biology)  A.B., University of California, Berkeley 1977.

Greg Erwin Lemke  (Biology)  S.B., Massachusetts Institute of Technology 1978.

Thesis: Neuronal Control of Bird Song Production.


Michael P. Snyder  (Biology)  B.A., University of Rochester 1977.

Chung Wang  (Biology)  B.S., National Tsing Hua University 1973; M.S., 1975.

When more than one field of study is indicated, the first is the major and the second and others are minors.
DOCTOR OF PHILOSOPHY—Continued

DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING

David Thomas Allen (Chemical Engineering) B.S., Cornell University 1979; M.S., California Institute of Technology 1981.

Paul Theron Barger (Chemistry) B.S., University of Minnesota 1978.
Thesis: The Reactivity of Zirconium Hydrides with Transition Metal Carbonyls.


Robert Clark Bowman, Jr. (Chemistry) B.S., Miami University 1967; S.M., Massachusetts Institute of Technology 1969.

James Gleason Crump III (Chemical Engineering and Mathematics) S.B., Massachusetts Institute of Technology 1978.
Thesis: Aerosol Deposition, Growth, and Dynamics in the Continuous Stirred Tank Reactor.

John Powell Daub (Chemistry) B.A., Pomona College 1977.

John Austin Dodge (Chemistry) B.S., University of New Orleans 1977.
Thesis: The Synthesis and Characterization of Binuclear Copper(I) Complexes as Models for Protein Active Sites.


Daniel C. Duan (Chemistry) B.S., University of Illinois at Urbana-Champaign 1976.

Michael Dalton Ennis (Chemistry) B.S., University of Missouri-St. Louis 1978.
Thesis: I. Asymmetric Alkylation Reactions of Chiral Imide Enolates. II. Efforts Directed Toward the Total Synthesis of (+)-Macbecin I.


William Roger Lambert (Chemistry) A.B., University of California, Berkeley 1973; M.S., San Francisco State University 1977.
Thesis: Picosecond Excitation and Quantum Beats of Molecules in Supersonic Molecular Beams.

William Alan Marritt (Chemistry) B.A., Ohio Wesleyan University 1978.


Dennis E. McGee (Chemistry) B.A., University of Oregon 1978.

Daniel Keith McIntyre (Chemistry) B.A., Saint Olaf College 1976.

Mark Allen Mitchell (Chemistry) B.S., University of Iowa 1975.
Thesis: Interhelical DNA-DNA Crosslinking of Bacteriophage Lambda: Bis(monoaizidomethidium)octaaxahexacoosanediamine and Bis(psoralen)nonaethyleneoxy ether, Probes of Packaged Nucleic Acid.


Kevin Curtis Ott (Chemistry) B.S., Arizona State University 1976.
Thesis: Some Mechanistic and Synthetic Aspects of the Interaction of Lewis Acids with Bis-CyclopentadienylTitanium(IV) Alkyls and Bis-CyclopentadienylTita-
cyclobutanes.

Mark Thomas Paffett (Chemistry) B.S., The University of New Mexico 1978.
Thesis: Electrochemistry of Molybdenum Aquo Ions.

Andrew John Pesthy (Chemical Engineering) B.Ch.E., University of Delaware 1976; M.Ch.E., 1977.

Gregory Ryskin (Chemical Engineering) Engineer-Physicist in Fluid Mechanics, Polytechnical Institute, Leningrad, U.S.S.R. 1970; Candidate of Physical-

Paul David Siders (Chemistry) B.S., University of Wisconsin-Whitewater 1978.

Thesis: Studies on the Mechanism of Complement Activation by Murine Immunoglobulin G.

Daniel Albert Straus (Chemistry) B.S., University of California, Santa Barbara 1977.
Thesis: Synthesis and Reactivity of Bis(cyclopentadienyl)titanacyclobutanes and Ketene Complexes of Bis(cyclopentadienyl)titanium and Bis(cyclopentadienyl)-zirconium.
DOCTOR OF PHILOSOPHY—Continued

David Walter Suobank  (Chemical Engineering)  B.S., University of Arkansas 1976.
Thesis: A Quantitative, Comparative Study of Sound Produced In Vitro by Pulsatile
Flow in and Around Prosthetic, Aortic Heart-Valves.


Brian Christopher Willett  (Chemistry)  B.S., Indiana University 1978.
Thesis: Electron Transfer Rates and Adsorption in the Electrochemistry of
Cobalt-2,2'-Bipyridine, Ruthenium Ammine Thiocyanate Complexes and
cis-[(C₅H₅)Fe(CO)P(C₅H₅)₂]₂.

DIVISION OF ENGINEERING AND APPLIED SCIENCE

Yaser Said Abu-Mostafa  (Electrical Engineering and Computer Science)  B.Sc., Cairo
University 1979; M.S.E.E., Georgia Institute of Technology 1981.
Thesis: Complexity of Information Extraction.

Elias A. Awad  (Mechanical Engineering)  Diplôme d'Ingénieur, Ecole Centrale des
Arts et Manufactures 1979; M.S., California Institute of Technology 1980.

Farhad Barzegar  (Electrical Engineering)  B.S., Arya-Mehr University of Technology
1977; M.S., California Institute of Technology 1978.


Dircceu Luiz Rodrigues Botelho  (Civil Engineering)  Engenheiro, Escola Politécnica da
Universidade de Sao Paulo 1975; Mestre em Engenharia, 1978; M.S., California
Institute of Technology 1979.

Marina Chien-mei Chen  (Computer Science)  B.S., National Taiwan University 1978;
M.S., California Institute of Technology 1980.

Arthur Er-Terg Chiou  (Applied Physics)  B.S., Rangoon Arts and Science University
1969; M.S., National Taiwan University 1972.
II. Theory and Experiment of Folded Fabry-Perot Quasi-Optical Ring Resonator
Diplexer.

Liew-Chuang Chiu  (Applied Physics)  B.S., California Institute of Technology 1979;
M.S., 1980.
DOCTOR OF PHILOSOPHY — Continued

Thesis: Superconductivity as a Structural Characterization Tool in Amorphous Materials.


Thesis: A Tracking Phase Vocoder and Its Use in the Analysis of Ensemble Sounds.

Thesis: Large Signals in Switching Converters.

Thesis: The Effect of Flow Oscillations on Cavity Drag and a Technique for Their Control.

Thesis: Analysis and Control of Quasi Distributed Parameter Systems.


Thesis: An Engineering Analysis of Polymer Film Adhesion to Rigid Substrates.

Stuart Thomas Hopkins (Applied Physics) B.Sc., Queen’s University at Kingston 1977; M.S., California Institute of Technology 1978.

Sudhir Kumar Jain (Civil Engineering) B.E., University of Roorkee 1979; M.S., California Institute of Technology 1980.

Itzhak Levit (Mechanical Engineering) B.Sc., Tel-Aviv University 1977; M.Sc., 1979.

Barry Bruce Megdal (Computer Science) B.S., California Institute of Technology 1977; M.S., 1978.
Thesis: VLSI Computational Structures Applied to Fingerprint Image Analysis.
DOCTOR OF PHILOSOPHY—Continued

II. Experimental Investigation of the Liquid Helium II — Vapor Interface.


Thesis: The Effects of a Vortex Field on Flames with Finite Reaction Rates.


Ahmed Atef Rashed  (Civil Engineering)  B.Sc., Cairo University 1975; M.S., California Institute of Technology 1979.

William Stapf Sargent  (Aeronautics)  A.B., Princeton University 1974; M.S., California Institute of Technology 1975.


Alan Thomas Stone  (Environmental Engineering Science and Chemistry)  B.S., University of Maryland 1978; M.S., California Institute of Technology 1981.
Thesis: The Reduction and Dissolution of Manganese(III) and (IV) Oxides by Organics.


DOCTOR OF PHILOSOPHY—Continued

David James Trawick (Computer Science) B.S., M.S., California Institute of Technology 1979.
Thesis: Robust Sentence Analysis and Habitability.

Stephen Mathias Trimberger (Computer Science) B.S., California Institute of Technology 1977; M.S., University of California, Irvine 1978.

Michael K. Ullner (Computer Science) B.S., California Institute of Technology 1977.

Iraklis Anestis Valioulis (Environmental Engineering Science) B.S., Aristotle University of Thessaloniki 1978; M.S., Cornell University 1980.
Thesis: Particle Collisions and Coalescence in Fluids.


Keith P. Zondervan (Applied Mechanics) B.S., Calvin College 1975; B.S.E., University of Michigan, Ann Arbor 1975; M.S.E., 1977.
Thesis: Optimal Low Thrust, Three Burn Orbit Transfers with Large Plane Changes.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

Eric Paul Chael (Geophysics) B.S., Purdue University 1977; M.S., California Institute of Technology 1979.


Stephen Norfleet Cohn (Geophysics) A.B., Harvard College 1975; M.S., California Institute of Technology 1978.
Thesis: Holographic In-Situ Stress Measurement in Geophysics.

Keith Alan Echelmeier (Geophysics) B.A., University of Colorado 1976.
Thesis: Response of Blue Glacier to a Perturbation in Ice Thickness: Theory and Observation.


DOCTOR OF PHILOSOPHY—Continued

Thorne Lay (Geophysics) B.S., University of Rochester 1978; M.S., California Institute of Technology 1980.

Richard Edwin Lewis (Geology) B.S., University of California, Los Angeles 1976; M.S., California Institute of Technology 1977.
Thesis: Geology of the Hackberry Mountain Volcanic Center, Yavapai County, Arizona.

Thesis: Interpretation of Near-Source Ground Motion and Implications.

James Christopher Pechmann (Geophysics) A.B., Hamilton College 1976; M.S., California Institute of Technology 1979.


Thesis: Voyager Observations of Saturn’s Rings: I. The Eccentric Rings at 1.29, 1.45, 1.95, and 2.27 Rs. II. The Periodic Variation of Spokes.


Terry Charles Wallace, Jr. (Geophysics) B.S., New Mexico Institute of Mining and Technology 1978; M.S., California Institute of Technology 1980.

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

Gary Walter Cox (Social Science) B.S., California Institute of Technology 1978.

Matthew Daniel McCubbins (Social Science) B.A., University of California, Irvine 1978; M.S., California Institute of Technology 1980.

Venkatraman Sadanand (Social Science) B.Tech., Indian Institute of Technology, Madras 1978; M.S., California Institute of Technology 1980.
DOCTOR OF PHILOSOPHY—Continued

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY


Norman Bobroff (Physics) B.S., University of Chicago 1977; M.S., California
Institute of Technology 1980.

Kirk Daniel Borne (Astronomy) B.S., Louisiana State University 1975; M.S.,
California Institute of Technology 1980.

Mark John Bowick (Physics) B.Sc., University of Canterbury 1976; M.S., California
Institute of Technology 1979.

Mark Cronin-Golomb (Physics) B.Sc., University of Sydney 1979.
Thesis: Large Nonlinearities in Four-Wave Mixing in Photorefractive Crystals and
Applications in Passive Optical Phase Conjugation.

John Alan Fawcett (Applied Mathematics) B.Sc., University of Victoria 1979.
Thesis: I. Three Dimensional Ray-Tracing and Ray-Inversion in Layered Media. II.
Inverse Scattering and Curved Ray Tomography with Applications to Seismology.

Halil Yekta Gürsel (Physics) B.S., Middle East Technical University 1975.
Thesis: Stability of Spherically Symmetric, Charged Black Holes and Multipole
Moments for Stationary Systems.

Thesis: Reduction of Unbounded Domains to Bounded Domains for Partial
Differential Equation Problems.

Jeffrey John Hamilton (Physics) B.S., Cornell University 1973; M.S., (Applied
Thesis: A Thermodynamic Study of Methane Multilayers Adsorbed on Graphite.

Dean Robert Hart (Mathematics) B.S., University of Chicago 1978.
Thesis: Disjointness Preserving Operators.


Kenneth A. Jensen (Physics) B.S., State University of New York at Stony Brook 1976.

Sarbmeeet Singh Kanwal (Physics) M.Sc., Indian Institute of Technology, Kanpur
1976.
Thesis: A Leading Order QCD Computation of $\pi\pi$ Elastic Scattering.

Keith E. Krombel (Physics) B.S., Wilkes College 1976; M.S., California Institute of
Technology 1979.
Thesis: The Relative Abundances of Sn, Te, Xe, Ba, and Ce in the Cosmic Radiation.


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DOCTOR OF PHILOSOPHY — Continued


Olivier Martin  (Physics)  DEUG, Lycée Janson de Sailly 1978; M.S., California Institute of Technology 1982.
Thesis: Large N Gauge Theory at Strong Coupling with Chiral Fermions.


John Lawrence Osborne  (Physics)  B.S., University of Washington 1977.
Thesis: The 8He(a,γ)7Be Reaction at Low Energies.


Thesis: Topics in Grand Unified Theories: I. The Naturalness Problem. II. Monopoles and Fermion Number Violation.

Kristen Sellgren  (Physics)  B.A., University of California, San Diego 1976.

Thesis: Nuclear Structure of Quasars at 329 Megahertz.

Thesis: The Isotopic Composition of Energetic Particles Emitted from a Large Solar Flare.
Srinivas Sridhar  (Physics)  B.Sc., University of Calcutta 1972; M.Sc., Madurai University 1974; M.S., The Ohio State University 1976.  
Thesis: Microwave Dynamics of Quasiparticles and Critical Fields in Superconducting Films.

Thesis: Carbon Isotope Fusion.


John Reinhold Valainis  (Physics)  B.S., Butler University 1973; M.S., California Institute of Technology 1975.  
Thesis: Second Order Corrections to the Variational Approximation to Frolich’s Polaron Model.

Thesis: Semiclassical Quantization in Many Dimensions.

Barton Zwiebach  (Physics)  Ingeniero, Universidad Nacional de Ingeniería 1977; M.S., California Institute of Technology 1978.  
Thesis: Use of Superspace Geometry to Find All Supergravity Theories: Case of N = 4 and SO(4) Symmetry.

Thesis: Long Distance Energy Correlations in Random Media.
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.

Recipient to be announced at Commencement.

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.

ERIC TEMPLE BELL UNDERGRADUATE MATHEMATICS RESEARCH PRIZE
Awarded to one or more juniors or seniors for outstanding original research in mathematics.
Vipul Periwal, senior; Mark R. Purtill, junior

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.

David L. Adler       Lisa L. Flitz          Roman Movshovich
Jeffrey A. Aguilera  Scott R. Johnson   Glenn E. Nakamura
Loren I. Aloing      Steven C. Knowles   Richard W. Pogge
Julie A. Anderson    Young S. Lee        Zinovy B. Reichstein
Robert E. Betzig     David J. LePoire    Beverley A. Robertson
Arthur P. Brazy      Andrew H. Liu       Gregory K. Schenter
Armand J. Capote     Donald C. Lo        Russell B. Schweickart
William A. Chapman   Maclen B. Marvit    Aditya Srinivasan
R. Sekhar Chivukula  Vladimir Matijasevic Arthur C. Thompson
Kenneth S. Chow      Richard H. Miles    John S. Wang
John G. Favor

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PRIZES AND AWARDS—Continued

THE W. P. CAREY & CO., INC. PRIZE IN APPLIED MATHEMATICS
Awarded to the student receiving a Doctor of Philosophy degree for an outstanding doctoral dissertation in applied mathematics.

Luis Guillermo M. Reyna

DONALD S. CLARK MEMORIAL AWARDS
May be awarded to a sophomore and a junior in recognition of service to the campus community and good academic performance. Preference is given to students in the Division of Engineering and Applied Science and to those in Chemical Engineering.

1983 Richard E. Honrath, Jr., junior; Donald Laurence Meixner, junior
1982 Russell B. Schweickart*

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS
Awarded to a junior physics major who demonstrates the greatest promise of future contributions in physics.

1983 Kenneth Hui
1982 Arthur C. Thompson*

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.

1983 Avidah Zakhor, senior
1982 Kenneth Ting-Yuan Kung*

JACK E. FROELICH 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.

1983 Ned S. Wingreen
1982 Kenneth Shun-Kei Chow,* Roman Movshovich*

*The names of students who have received prizes or awards in previous years, but who are graduating in 1983, are also listed.
PRIZES AND AWARDS—Continued

GEORGE W. GREEN MEMORIAL PRIZE
Awarded to the undergraduate student who, in the opinion of the division chairmen, has shown outstanding ability and achievement in creative scholarship.

1983 Ming-Chung Chu, senior; Arthur C. Thompson, senior
1982 David J. LePoire*

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.

1983 Candice McCoy, junior; Eliza L. Sutton, junior
1982 Julia A. Kornfield*

INSTITUTE FOR THE ADVANCEMENT OF ENGINEERING AWARD
Awarded to a student who exhibits a professional attitude toward engineering by a leadership role in the student chapter of a professional organization, such as the IEEE, ASCE, ASME.

Beverley A. Robertson, senior

DAVID JOSEPH MACPHERSON PRIZE IN ENGINEERING
Awarded to the graduating senior in engineering who best exemplifies excellence in scholarship.

John G. Favor

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.

Glen D. Crawford, sophomore; Dean K. Shibata, senior

ROBERT L. NOLAND LEADERSHIP SCHOLARSHIP
Awarded to students who exhibit qualities of outstanding leadership, which is most often expressed as personal actions that have helped other people and that have inspired others to fulfill their capabilities.

1983 Arthur P. Brazy, senior; Richard H. Miles, senior
1982 R. Sekhar Chivukula*
PRIZES AND AWARDS—Continued

THE ROYAL SOCIETY FOR THE ENCOURAGEMENT OF ARTS MANUFACTURES AND COMMERCe SILVER MEDAL

Awarded to students who are receiving their first degrees from the most important institutions of learning in the United States. Winners are selected on the basis of outstanding academic records and significant participation in student activities.

Kenneth S. Chow

THE 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.

Thomas Roesgen

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.

1983 Barbara J. Turpin, junior; Sven Andreas Wolf, sophomore; Frederic Y. Wong, sophomore
1982 Paul K. Kienker,* Sandra T. Loh*
1981 Avideh Zakhor*

SIGMA XI AWARD

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

Kent Franklin Evans, Donald C. Lo

THE MORGAN WARD PRIZE

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

1983 Tad P. White, sophomore
1980 Scott Michael*