Eighty-Sixth Annual Commencement
June 13, 1980
CALIFORNIA INSTITUTE OF TECHNOLOGY

Eighty-Sixth
Annual
Commencement

FRIDAY MORNING AT TEN-THIRTY O’CLOCK
JUNE THIRTEENTH, NINETEEN EIGHTY
The Commencement Ceremony

These tribal rites have a very long history. They go back to the ceremony of initiation for new university teachers in medieaval 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 medieaval 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, Robert W. Oliver, Ph.D.

Assistant Marshals
Arden L. Albee, Ph.D. J. Kent Clark, Ph.D.
Christopher Brennen, Ph.D. Robert V. Langmuir, Ph.D.

Faculty Officers
David L. Goodstein, Ph.D. E. John List, 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
CANDIDATES FOR THE DEGREE OF ENGINEER
CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
FACULTY OFFICERS
THE FACULTY
THE CHAIRMEN OF DIVISIONS
THE DEANS
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, M.S.

PROCессIONAL . . . The Convocation Brass Ensemble and Organ
James Rötter, M.M., Conductor

INVOCATION . . . . . . . . . Rabbi Leonard I. Beerman
Leo Baeck Temple

COMMENCEMENT ADDRESS . The Honorable Dixy Lee Ray, Ph.D.
Governor of the
State of Washington

MUSICAL SELECTION . . . . The Caltech Combined Glee Clubs
Olaf M. Frodsham, A.M., Director

Dance, Dance, My Heart, by Emma Lou Diemer

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

For the Degree of Bachelor of Science . . Ray D. Owen, Ph.D., Sc.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 . . . . . . Cornelius J. Pings, Ph.D.
Dean of Graduate Studies

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

Biology . . . . . . . . . . . . Norman H. Horowitz, Ph.D.
Division Chairman

Chemistry and Chemical Engineering . . Harry B. Gray, Ph.D.
Division Chairman

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 . . . . Roger G. Noll, Ph.D.
Division Chairman

Physics, Mathematics and Astronomy . . Rochus E. Vogt, Ph.D.
Division Chairman

CONCLUDING REMARKS . . . . . . President Goldberger

BENEDICTION . . . . . . . . . . . . Rabbi Beerman

RECESSIONAL . . . The Convocation Brass Ensemble and Organ

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

BACHELOR OF SCIENCE

David Laurence Adams  Granada Hills, California  Physics
Rayhaneh Akhavan-Alizadeh  Tehran, Iran  Engineering and Applied Science
Robert Dennis Arendt  San Diego, California  Applied Physics
Timothy N. Ayres  Los Altos Hills, California  Engineering and Applied Science
Ralph Gallegos Baca  Phoenix, Arizona  Engineering and Applied Science
Donald George Bacon  Fridley, Minnesota  Engineering and Applied Science
Bruce Matathias Baskir  Houston, Texas  Biology and Chemistry
James Hugh Bayless  Santa Maria, California  Physics
Raymond G. Beausoleil, Jr.  Phoenix, Arizona  Physics
Paul D. Belmont  Minneapolis, Minnesota  Engineering and Applied Science
Kevin Andrew Berasley  Reseda, California  Engineering and Applied Science
Allan Ira Berger  Castro Valley, California  Mathematics
Frank Lovett Bernstein  Washington, District of Columbia  Applied Mathematics
Gregory Allan Blaisdell  Camarillo, California  Applied Mathematics
Alan-Philippe Blanchard  East Hampton, New York  Mathematics
David Joseph Atwood Bliss  Danville, Kentucky  Engineering and Applied Science
Cristine Rae Bockenstette  Cincinnati, Ohio  Chemical Engineering
Thomas Alan Boldt  Menasha, Wisconsin  Engineering and Applied Science
Alan Howard Boyar  Whittier, California  Biology
Dean Carter Brackett  Cumberland, Rhode Island  Engineering and Applied Science
Christopher Stephen Bretherton  Boulder, Colorado  Applied Mathematics
Forrest Duane Brewer  Arvada, Colorado  Physics
Kenneth Hale Britten  Newport Beach, California  Biology
Donald Jeffery Brotemarkle  Valley Center, California  Applied Physics
Nicholas Gregg Brown  Chesham, Buckinghamshire, United Kingdom  Engineering and Applied Science
Richard O'Reilly Brown  Vienna, Virginia  Biology
Robert Lester Butler  Harbor City, California  Engineering and Applied Science
John Nathaniel Campbell  Los Angeles, California  Engineering and Applied Science
Jeffrey D. Carpenter  Yakima, Washington  Engineering and Applied Science
Edward Ming Chan  Wauwatosa, Wisconsin  Chemical Engineering
Robert Timothy Chang  New York, New York  Engineering and Applied Science and Economics

Students whose names appear in bold face type are being graduated with honor in accordance with a vote of the faculty.
Shepperd Chao  Tainan, Taiwan  Engineering and Applied Science  
Alan G. Cocconi  Geneva, Switzerland  Engineering and Applied Science  
Johanan Leal Codona  Crestline, California  Applied Physics  
Sean William John Colgan  Carmelian Bay, California  Astronomy  
Margaret Elizabeth Cox  Ridgecrest, California  Mathematics  
Carrie Anne Cummings  Sunnyvale, California  Engineering and Applied Science  
Russell Lane Dailey  Minden, Louisiana  Engineering and Applied Science  
John Ricardo DeAguiar  Chino, California  Chemical Engineering  
Paul Raymond de la Houssaye  San Diego, California  Applied Physics  
Stefan Gabriel Demetrescu  Irvine, California  Applied Physics  
Scott Lawrence DeVore  Applied Physics  
Joseph Brun DiGiorgio  Sacramento, California  Engineering and Applied Science  
Brian Patrick Doyle  Pasadena, California  Geophysics  
Peter Ward Drapes  Great Falls, Montana  Electrical Engineering  
Steven Glen Eaton  Salina, Kansas  Engineering and Applied Science  
Peter Albert Edwards  Compton, California  Chemical Engineering  
Victoria A. Edwards  Los Angeles, California  Chemical Engineering  
Michael Dean Ellis  Petaluma, California  Engineering and Applied Science  
Erik Eriksen  Montague, California  Biology  
Henri Hayim Farhi  Richmond, Virginia  Biology  
Shal Wayne Farley  Kailua, Hawaii  Engineering and Applied Science  
M.G. Finn  Mahwah, New Jersey  Chemistry  
Mark Steven Fischer  Northridge, California  Engineering and Applied Science  
Cynthia Ann Flanagan  Miami, Florida  Chemistry  
Thomas Havird Fly  Spartanburg, South Carolina  Engineering and Applied Science  
Jon Fong  Los Angeles, California  Chemistry  
Courtenay Peter Footman  San Francisco, California  Physics  
Mark Patrick Fortunato  Williamsville, New York  Electrical Engineering  
Ali Fotowat-Ahmady  Tehran, Iran  Engineering and Applied Science  
Susan Elizabeth Fuhs  Carmel, California  Chemical Engineering  
Susan Akiko Fujimoto  Honolulu, Hawaii  Engineering and Applied Science  
Deane A. Gardner  Granada Hills, California  Engineering and Applied Science  
Susan Shevaun Gilley  Denver, Colorado  Biology and Literature  
Charles Edward Goodhart, Jr.  Leonardo, New Jersey  Applied Mathematics  
Peter Marvin Goodwin  Bangkok, Thailand  Physics  
John Arlin Goree  Odessa, Texas  Applied Physics  
William Wallace Gould  Las Vegas, Nevada  Geology
BACHELOR OF SCIENCE—Continued

Kenneth Gray  
*Dallas, Texas*  Biology

Jay Aaron Hellinger  
*Van Nuys, California*  Chemical Engineering

Laurel Jean Henderson  
*Littleton, Colorado*  Geochemistry

William Edwin Henslin, Jr.  
*San Marino, California*  Engineering and Applied Science

Glen Alan Herrmannsfeldt  
*Los Altos, California*  Applied Physics

Lynn Mary Hildemann  
*Los Angeles, California*  Biology and Engineering and Applied Science

Thomas Adam Howell  
*St. Paul, Minnesota*  Engineering and Applied Science

Gregory Jude Hungerford  
*Santee, California*  Mathematics

James Neal Jensen II  
*Bellevue, Washington*  Engineering and Applied Science

David Mark Joseph  
*Los Angeles, California*  Chemical Engineering

Dennis Koichi Kato  
*Huntington Beach, California*  Chemical Engineering

John William Killea  
*San Diego, California*  Applied Physics

Eric William Klumpe  
*La Cañada, California*  Engineering and Applied Science

Chung-Tung Augustine Kong  
*Hong Kong*  Mathematics

Scott Michael Konishi  
*Gardena, California*  Physics

William Stuart Lawson  
*Pleasant Hill, California*  Physics

Norman Tai Ming Lee  
*Pasadena, California*  Electrical Engineering

Pik-Chun Beatrice Lee  
*Hong Kong*  Engineering and Applied Science

Gabriel Anthony Lengua  
*Miramar, Florida*  Physics

Isabella Talley Lewis  
*Redding, California*  Chemical Engineering

Kenneth George Libbrecht  
*Fargo, North Dakota*  Physics

Wen Liu  
*Singapore*  Engineering and Applied Science

Edmond Yatman Lo  
*Singapore*  Engineering and Applied Science

Eugene Ying Loh  
*Malibu, California*  Physics

Robert J Luoma  
*New York, New York*  Astronomy

Steven John Margaretic  
*Merced, California*  Engineering and Applied Science

Rono James Mathieson  
*Denver, Colorado*  Applied Physics

David Ross Mathog  
*San Jose, California*  Applied Physics

Robert Dennis McAnelly  
*Austin, Texas*  Applied Physics

Robert Edwin McCarthy III  
*Bakersfield, California*  Engineering and Applied Science

Mark Allen McHenry  
*Orange, California*  Engineering and Applied Science

Kevin Shane McLoughlin  
*Santa Barbara, California*  Physics

James Chester Meador  
*Oklahoma City, Oklahoma*  Engineering and Applied Science

Gary Harris Memovich  
*Tigard, Oregon*  Mathematics

Bruce Allen Miller  
*Manhattan Beach, California*  Applied Physics

David James Morris  
*Olympia, Washington*  Applied Physics

Edward Ernest Musgrave  
*Berkeley, California*  Physics
Charles Kwame Nartey  Big Ada, Ghana  Engineering and Applied Science
Bill A. Newman  Thousand Oaks, California  Engineering and Applied Science
Kim Man Ng  Seattle, Washington  Engineering and Applied Science
Albert Loyd Nichols III  Westwood, California  Chemistry and Applied Mathematics
Eric Stephen Nickell  Bainbridge Island, Washington  Engineering and Applied Science
Eric Nygren  Zumbrota, Minnesota  Applied Physics
Randall Edward Okubo  White Bear Lake, Minnesota  Engineering and Applied Science
Barry Anthony O'Mahony  Union City, New Jersey  Physics
Dale Koji Ota  Los Altos Hills, California  Engineering and Applied Science
Charles Changsik Park  Seoul, Korea  Engineering and Applied Science
Bruce Bennett Pedersen  El Cajon, California  Applied Physics
Chris Lee Peterson  Belmont, California  Applied Physics
Eric Thomas Peterson  Manhattan Beach, California  Geophysics
E. Sterl Phinney III  Leverett, Massachusetts  Astronomy
Alexis Porras  San José, Costa Rica  Engineering and Applied Science
William Laurence Power  San Rafael, California  Geology
Brian Mathew Punsly  Palos Verdes Estates, California  Physics
Ralph Edward Pursifull, Jr.  Midwest City, Oklahoma  Engineering and Applied Science
James Frederick Quilliam  McMinnville, Oregon  Engineering and Applied Science
Bill Hamilton Ray  Fort Collins, Colorado  Engineering and Applied Science
Michael Keith Reach  Oxnard, California  Physics and Mathematics
John Bertram Reinitz  Colorado Springs, Colorado  Biology
Charles Scott Reynolds  Little Rock, Arkansas  Engineering and Applied Science
Janet Ann Rice  Chicago, Illinois  Chemistry
David Brian Ritchie  Los Angeles, California  Economics
Alexander Francisco Rivera  Bremerton, Washington  Engineering and Applied Science
Kelly Roach  Spokane, Washington  Mathematics and Engineering and Applied Science
Jeffrey Arthur Ronne  Portland, Oregon  Chemistry
Mitchell Benedict Rotter  Alamo, California  Chemical Engineering
Constance Slavens Royden  Los Altos Hills, California  Engineering and Applied Science and Biology
Colleen Roseanna Ruby  Roseville, Michigan  Engineering and Applied Science
David E. Rumph  Orinda, California  Engineering and Applied Science
Kurt William Runge  San Diego, California  Biology and Chemistry
Leslie Ann Rusch  Schaumburg, Illinois  Electrical Engineering
Eric Saund  Los Angeles, California  Engineering and Applied Science
William B. Schmidke, Jr.  Lombard, Illinois  Physics
Mark Diedrich Seidler  El Cajon, California  Chemistry
Paul Fredrich Seidler  El Cajon, California  Chemistry
David Christopher Shafer  Oak Park, Illinois  Physics
K T Shum  Hong Kong  Engineering and Applied Science
Paul Alan Shupak  Dresher, Pennsylvania  Biology
Sandra Kay Sigmund  Wadsworth, Ohio  Chemistry
Conrad Lorenzo Silvestre  Seattle, Washington  Applied Physics
Michael Perry Simon  Pasadena, California  Applied Mathematics
Dave William Sivertsen  Des Moines, Iowa  Engineering and Applied Science
John Stephen Smith  Phoenix, Arizona  Applied Physics
Kenneth Scott Smith  Pasadena, California  Applied Mathematics
Michael Joseph Spreitzer  Westminster, California  Engineering and Applied Science
John Richard Stabler  Jacksonville, Florida  Engineering and Applied Science
David Zhao-Yo Ting  Taipei, Taiwan  Physics
Kerry John Vahala  Flint, Michigan  Applied Physics
Timothy Edwin Van Eck  Waldwick, New Jersey  Applied Physics
Jimmy Kwok-Yu Wang  Hong Kong  Chemical Engineering
David John Warling  Northridge, California  Engineering and Applied Science
Robert Wooddell Weaver  San Diego, California  Mathematics
Matthew Jonah Weinstein  Palm Beach, Florida  Engineering and Applied Science
Douglas Lee Whiting  Richmond, Virginia  Applied Physics
Mladen Victor Wickerhauser  Bethesda, Maryland  Mathematics
Michael Richard Woolley  Salt Lake City, Utah  Engineering and Applied Science
Mary Alice Wuerz  Belleville, Illinois  Chemistry
Robert R. Yamashita  Pearl City, Hawaii  Engineering and Applied Science
Joseph Anthony Zasadzinski  Riverside, California  Chemical Engineering
Jonathan Alan Zingman  Louisville, Kentucky  Physics
Lawrence M. Zwick  Livermore, California  Engineering and Applied Science
MASTER OF SCIENCE

Paul Mihran Agbabian  (Mechanical Engineering)  B.S., University of California, Los Angeles 1979.
Richard Bartlett Ashman  (Mechanical Engineering)  B.S., University of Miami 1979.
Pamela Rae Auburn  (Chemistry)  B.A., Goucher College 1975.
Thomas Clyde Banwell  (Electrical Engineering)  B.S., Harvey Mudd College 1978.
Katherine Hamilton Barhydt  (Mechanical Engineering)  B.S., University of California, Los Angeles 1979.
Meir Bartur  (Electrical Engineering)  B.Sc., Technion, Israel Institute of Technology 1975.
Samir Elias Barudi  (Social Science)  B.E., American University of Beirut 1975; M.S., California Institute of Technology 1976.
Michael Stanley Becker  (Social Science)  B.A., University of California, San Diego 1978.
Robert Jacques Bensoussan  (Electrical Engineering)  
Barry Jerome Bentley  (Chemical Engineering)  B.Ch.E., University of Delaware 1978.
Beckie E. Berg  (Chemistry)  B.S., California Institute of Technology 1976.
Donna Hope Berry  (Social Science)  B.A., Pomona College 1978.
Stuart Lynch Blackburn  (Mathematics)  B.S., University of the Pacific 1976.
Michael Anthony Blessinger  (Applied Physics)  B.S., Purdue University 1978.
Norman Bobroff  (Physics)  B.S., University of Chicago 1977.
Kirk Daniel Borne  (Astronomy)  B.S., Louisiana State University 1975.
Eugene David Brooks III  (Physics)  B.S., University of Maryland 1977.
Cynthia Rae Carlson  (Social Science)  B.A., St. Lawrence University 1977.
Samuel Kwang Yeh Chang  (Aeronautics)  B.Sc., National Taiwan Normal University 1976.
Marina Chien-Mei Chen  (Computer Science)  B.S., National Taiwan University 1978.
Michael Jiu-Wei Chen  (Electrical Engineering)  B.S., National Taiwan University 1975.
Wen-Wei Chiang  (Mechanical Engineering)  B.S., National Taiwan University 1977.
Bo Hyung Cho  (Electrical Engineering)  B.S., California Institute of Technology 1979.
Christopher William Coyle  (Electrical Engineering)  S.B., Massachusetts Institute of Technology 1978.
Henry Marie Defalque  (Electrical Engineering)  Ingénieur Civil Electricien, Université Catholique de Louvain 1979.
Alain Delsupeche  (Electrical Engineering)
Stefan Gabriel Demetrescu  (Computer Science)  B.S., California Institute of Technology 1980.
Steven Duran  (Electrical Engineering)  B.S., University of New Mexico 1979.
Kenneth Eagle  (Chemical Engineering)  B.S., State University of New York at Buffalo 1979.
Steven Glen Eaton  (Electrical Engineering)  B.S., California Institute of Technology 1980.
Peter Kent Edberg  (Engineering Science)  B.S., California Institute of Technology 1977.
Gregory Humphreys Efland  (Computer Science)  B.S., Rensselaer Polytechnic Institute 1978.
Reda Abdu el-hay Mohamed Ali El-Damak  (Civil Engineering)  B.Sc., Cairo University 1975; M.Sc., 1978.
James Richard Ellison  (Electrical Engineering)  B.S., University of Texas at Austin 1978.
MASTER OF SCIENCE—Continued

Jay William Ellison (Biology) B.S., University of Illinois at Urbana-Champaign 1977.


Jeffrey Lee Fordon (Mathematics) B.S., Clarkson College of Technology 1977.

Lynn Forester (Chemical Engineering) B.A., University of California, Santa Cruz 1978.

Patrick Michael Frantz (Physics) B.S., Rochester Institute of Technology 1978.


Sai-Wai Fu (Electrical Engineering) B.S., California Institute of Technology 1979.

Celestino John Gaeta (Electrical Engineering) B.S., California State University, Fresno 1979.


Marius Gerber (Civil Engineering) B.Sc., University of Stellenbosch 1974; M.Sc., University of Cape Town 1978.

Alexander Sherwin Gerwer (Chemistry) B.S., University of Michigan 1976.


Paula Jean Grunthaner (Chemistry) B.S., California Institute of Technology 1975.

Mark E. Gurney (Biology) B.A., University of California, San Diego 1975.


Christoph Stephan Harder (Electrical Engineering) Diploma, Swiss Federal Institute of Technology Zurich 1978.

Paul Baxter Harwood (Materials Science) B.Sc., Clarkson College of Technology 1978.

Steven Wayne Hashimoto (Social Science) A.B., University of California, Berkeley 1976.

Mohammed Fawzy Farrage Helwa (Civil Engineering) B.Sc., Cairo University 1975; M.Sc., 1979.
MASTER OF SCIENCE—Continued


Mark Hereld (Physics) B.S., University of California, Berkeley 1978.

James Carl Hermanson (Aeronautics) B.S., University of Washington 1977.

Bruce Kuo Ting Ho (Electrical Engineering) S.B., Massachusetts Institute of Technology 1978.

Kwok Kee Ho (Electrical Engineering) B.S., University of Texas at Austin 1979.

Tai-Ping Ho (Computer Science) B.S., National Chung-Hsing University 1971; M.S., The University of Tennessee, Knoxville 1978.


Dominic Izzo (Civil Engineering) B.S., United States Military Academy 1974.

Sudhir Kumar Jain (Civil Engineering) B.E., University of Roorkee 1979.


Jeffrey Bowman Johnson (Social Science) B.A., University of Kansas 1978.


William Gerard Kerschen (Mechanical Engineering) B.S., New Mexico State University 1979.


Douglas Harold Klein (Mechanical Engineering) B.S.M.E., University of Cincinnati 1978.

Tony Siu Pong Kong (Environmental Engineering Science) B.S., University of Wisconsin, Madison 1979.


Charles Richard Lang, Jr. (Computer Science) B.S., University of Texas at Austin 1974; M.S., 1975.
MASTER OF SCIENCE—Continued

Billy Ying Bui Lau  (Electrical Engineering)  B.E., State University of New York at Stony Brook 1979.
Thorne Lay  (Geophysics)  B.S., University of Rochester 1978.
Katherine Dai-Li Lee  (Biology)  B.S., Fu Jen Catholic University 1977.
Herman Sui Ning Li  (Computer Science)  B.A., St. John’s University 1978.
Wen Liu  (Aeronautics)  B.S., California Institute of Technology 1980.
Edmond Yatman Lo  (Mechanical Engineering)  B.S., California Institute of Technology 1980.
Mark Allen Ludwig  (Physics)
Hiroshi Maekawa  (Aeronautics)  B.E., University of Tokyo 1972.
Robert Sullivan Maier  (Physics)
Eric Francois Matthys  (Mechanical Engineering)  Mechanical & Electrical Engineer, Brussels University 1978.
Mathew McCubbins  (Social Science)  B.A., University of California, Irvine 1978.
Paul Vincent Neilson  (Chemistry)  B.S., California Polytechnic State University, San Luis Obispo 1977.
Phyllis Roberta Nelson  (Electrical Engineering)  B.S., California State Polytechnic University, Pomona 1977.
Khai Doan The Ngo  (Electrical Engineering)  B.S., California State Polytechnic University, Pomona 1979.
Donald Wallace Northfelt  (Geochemistry)  B.S., University of Minnesota 1978.
Jaime Jose Olacchea  (Civil Engineering)  B.S., Texas A&M University 1978.
Ronald Yu Sang Pak  (Civil Engineering)  B.Eng., McMaster University 1979.
Alexandros Christos Papachristidis  (Computer Science)  Diploma of Mechanical and Electrical Engineering, National Technical University of Athens 1979.
<table>
<thead>
<tr>
<th>Name</th>
<th>Program</th>
<th>Degree</th>
<th>Institution</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Scott Patton</td>
<td>(Mechanical Engineering)</td>
<td>B.M.E.</td>
<td>Georgia Institute of Technology</td>
<td>1979</td>
</tr>
<tr>
<td>Thomas James Pence</td>
<td>(Applied Mechanics)</td>
<td>B.S.</td>
<td>Michigan State University</td>
<td>1979</td>
</tr>
<tr>
<td>Marc Jean-François Peran</td>
<td>(Mechanical Engineering)</td>
<td>Diplôme d'Ingénieur, L'Ecole Polytechnique</td>
<td>1979</td>
<td></td>
</tr>
<tr>
<td>Frank Allen Perez</td>
<td>(Mechanical Engineering)</td>
<td>B.S.</td>
<td>Columbia University</td>
<td>1979</td>
</tr>
<tr>
<td>Robert Charles Pike</td>
<td>(Physics)</td>
<td>B.Sc.</td>
<td>University of Toronto</td>
<td>1978</td>
</tr>
<tr>
<td>Elliot Martin Pines</td>
<td>(Electrical Engineering)</td>
<td>B.A.</td>
<td>Brandeis University</td>
<td>1978</td>
</tr>
<tr>
<td>Alexis Porras</td>
<td>(Mechanical Engineering)</td>
<td>B.S.</td>
<td>California Institute of Technology</td>
<td>1980</td>
</tr>
<tr>
<td>James Neal Potechin</td>
<td>(Mechanical Engineering)</td>
<td>B.S.</td>
<td>Rensselaer Polytechnic Institute</td>
<td>1979</td>
</tr>
<tr>
<td>Arati Prabhakar</td>
<td>(Electrical Engineering)</td>
<td>B.S.</td>
<td>Texas Tech University</td>
<td>1979</td>
</tr>
<tr>
<td>Paul Michael Rapacz</td>
<td>(Aeronautics)</td>
<td>B.S.</td>
<td>Illinois Institute of Technology</td>
<td>1979</td>
</tr>
<tr>
<td>Wayne Harvey Richardson</td>
<td>(Electrical Engineering)</td>
<td>B.S.</td>
<td>University of Southern California</td>
<td></td>
</tr>
<tr>
<td>Rory Alberto Rivera</td>
<td>(Electrical Engineering)</td>
<td>B.S.</td>
<td>University of Puerto Rico</td>
<td>1979</td>
</tr>
<tr>
<td>Kelly Roach</td>
<td>(Computer Science)</td>
<td>B.S.</td>
<td>California Institute of Technology</td>
<td>1980</td>
</tr>
<tr>
<td>Karen Irene Robinson</td>
<td>(Geology)</td>
<td>B.S.</td>
<td>University of California, Los Angeles</td>
<td>1978</td>
</tr>
<tr>
<td>Kenneth Vincent Rousseau</td>
<td>(Applied Physics)</td>
<td>B.S.</td>
<td>California Institute of Technology</td>
<td>1979</td>
</tr>
<tr>
<td>Nicolas Alexis Roy</td>
<td>(Applied Mechanics)</td>
<td>B.S.</td>
<td>The Pennsylvania State University</td>
<td>1979</td>
</tr>
<tr>
<td>Olivier Roy</td>
<td>(Aeronautics)</td>
<td>Diplôme d'Ingénieur, Ecole Centrale des Arts &amp; Manufactures</td>
<td>1979; Licence es Sciences Economiques, Université Paris I</td>
<td>1979</td>
</tr>
<tr>
<td>Armistead Goode Russell</td>
<td>(Mechanical Engineering)</td>
<td>B.S.</td>
<td>Washington State University</td>
<td>1979</td>
</tr>
<tr>
<td>Todd Spencer Rust</td>
<td>(Aeronautics)</td>
<td>A.B.</td>
<td>Occidental College</td>
<td>1979; B.S., California Institute of Technology</td>
</tr>
<tr>
<td>Venkatraman Sadanand</td>
<td>(Social Science)</td>
<td>B.Tech.</td>
<td>Indian Institute of Technology, Madras</td>
<td>1978</td>
</tr>
<tr>
<td>David Bruce Sams</td>
<td>(Geochemistry)</td>
<td>B.S.</td>
<td>University of California, Irvine</td>
<td>1977</td>
</tr>
<tr>
<td>Martine Marie-Françoise Savalle</td>
<td>(Electrical Engineering)</td>
<td>Diplôme d'Ingénieur, Ecole Supérieure d'Ingénieurs en Electrotechnique et Electronique</td>
<td>1979</td>
<td></td>
</tr>
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</table>


Patricia Frances Scott  (Geophysics) B.A., Princeton University 1976.

Karl A. Seibert  (Chemical Engineering) B.S., University of Illinois at Urbana-Champaign 1978.

Larry Dean Seiler  (Computer Science) B.S., California Institute of Technology 1978.

Linda A. Seltzer  (Electrical Engineering) A.B., University of Pennsylvania 1971; B.S., University of Colorado 1978.


John George Sherstobitoff  (Civil Engineering) B.A.Sc., University of British Columbia 1978.

Lorenz Willard Sigurdson  (Aeronautics) B.A.Sc., University of Toronto 1978.


James Eric Skjelbreia  (Civil Engineering) B.S., University of Washington 1979.

Charles Seymour Slater  (Social Science) A.B., Duke University 1978.

Duane Andre Smith  (Mechanical Engineering) B.S., Purdue University 1978.

Tracy Marie Stigers  (Environmental Engineering Science) B.S., Clarkson College of Technology 1979.

Mark Edward Stover  (Social Science) B.A., University of Kentucky 1977.

Ralph Eric Strong  (Electrical Engineering) B.S., United States Air Force Academy 1977.


Eric John Swanson  (Electrical Engineering) B.S., Michigan State University 1977.


Elizabeth Anne Horton Thomas  (Geology) B.S., University of California, Los Angeles 1978.

Allen Eric Tracht  (Electrical Engineering) S.B., Massachusetts Institute of Technology 1979.


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

Jimmy Kwok Yu Wang  (Chemical Engineering) B.S., California Institute of Technology 1980.
MASTER OF SCIENCE—Continued

Thierry Lucien Watteyne  (Electrical Engineering)  Ingénieur Civil Electricien, Université Catholique de Louvain 1979.


Howard Kwong Chew Yee  (Astronomy)  B.A., University of Toronto 1975.

ENGINEER

Douglas Kerry Ikemi  (Mechanical Engineer)  B.S., Harvey Mudd College 1976; M.S., California Institute of Technology 1978.


Hideki Nomoto  (Aeronautical Engineer)  B.E., University of Tokyo 1972; M.E., 1974.
DOCTOR OF PHILOSOPHY

DIVISION OF BIOLOGY

David John Asai  (Biology)  B.S., M.S., Stanford University 1975.
Thesis: Immunological Approaches to Flagellar Movement.


Andrew Duncan Byers  (Biology)  B.A., Carleton College 1970.

Edwin Paul Ching  (Biochemistry and Neurobiology)  A.B., University of California, Berkeley 1974.
Thesis: Biochemical and Functional Characterization of the Products of Mitochondrial Protein Synthesis in HeLa Cells.

David Paul Corey  (Neurobiology)  B.A., Amherst College 1974.

Franklin David Costantini  (Developmental Biology)  B.S., Yale College 1974.
Thesis: Studies of Repetitive Sequence Transcripts in the Sea Urchin.

Philip Warren Early  (Biochemistry)  B.S., Yale University 1974.

John Gregory Frelinger  (Biochemistry)  B.S., Stanford University 1975.
Thesis: Studies on the Major Histocompatibility Complex of the Mouse and Rat.

Thesis: Behavioral Studies on Learning and Interocular Transfer in the Domestic Chick.

Thesis: Studies on RNA Metabolism in HeLa Mitochondria.

Mark E. Gurney  (Biology)  B.A., University of California, San Diego 1975; M.S., California Institute of Technology 1980.

Larry E. Johnson  (Psychobiology)  B.S., University of Washington 1971; M.D., University of Chicago 1975.

When more than one field of study is indicated, the first is the major and the second and others are minors.


Thesis: Binocular Facilitation and Inhibition in the Lateral Geniculate Nucleus of the Cat.

Galina Dmitrievna Moller  *(Biochemistry)*  M.S., University of Moscow 1961;  
M.S., California Institute of Technology 1974.

Thesis: Chromosomal Protein-DNA Interactions.


**DIVISION OF CHEMISTRY AND CHEMICAL ENGINEERING**

George Adler  *(Chemistry)*  B.A., Hunter College (City University of New York) 1974.
Thesis: NMR Studies of Cooperativity in Hemoglobin.

Peter Bruce Armentrout  *(Chemistry)*  B.S., Case Western Reserve University 1975.
Thesis: Mechanistic and Thermochemical Studies of the Reactions of Transition Metal Ions and Uranium Ions with Small Molecules in the Gas Phase.

Steven Gerard Blanchard  *(Chemistry)*  B.S., Loyola University, New Orleans 1975.
Thesis: Interactions of Local Anesthetics and Cholinergic Ligands with Membrane-Bound Acetylcholine Receptor from *Torpedo californica*.

William Matthew Bowser  *(Applied Physics)*  B.S., Case Western Reserve University 1973;  
M.S., California Institute of Technology 1975.

Thesis: Macrocyclic Lactone Formation Through Sulfide Contraction: Synthesis of (+)-Diplodialide A.
DOCTOR OF PHILOSOPHY—Continued

Paul Chun-Ho Chan (Chemical Engineering) B.Ch.E., University of Minnesota 1973.

Richard Eugene Cherpeck (Chemistry) B.A., Rice University 1975.

Ernest Ying-Chee Chung (Chemical Engineering) B.S., California Institute of Technology 1974; M.S., 1976.
I. Measurement of Velocity Distributions of Suspension Flows in a Rectangular Channel. II. Experimental Study of the Effective Thermal Conductivity in Shear Flow of a Suspension. III. The Use of Fluorescence Correlation Spectroscopy to Measure Molecular Diffusion and Velocity Distributions.

William Robert Croasmun (Chemistry) B.A., Case Western Reserve University 1975.

Thomas Michael Duncan (Chemical Engineering and Chemistry) B.S.E., University of Michigan 1975; M.S., California Institute of Technology 1977.

Thesis: Interactions of Perhydrohistrionicotin with Acetylcholine Receptors from Torpedo californica Electroplax.

Howard Edwin Evans (Chemical Engineering) B.S., Brigham Young University 1974.

Eric Robert Evitt (Chemistry) B.S., University of Rochester 1975.

Gerald Gendall Fuller (Chemical Engineering) B.Sc., University of Calgary 1975; M.S., California Institute of Technology 1977.

Paula Jean Grunthaner (Chemistry) B.S., California Institute of Technology 1975; M.S., 1980.
Thesis: The Chemical Structure of Metal/Semiconductor Interfaces as Determined by X-Ray Photoelectron Spectroscopy.

William Dinan Hinsberg III (Chemistry) B.S., University of Michigan 1975.

David Michael Ingle (Chemistry) A.B., Pasadena College 1973.
DOCTOR OF PHILOSOPHY—Continued


Hsiao-ping Hsu Moore (Chemistry) B.S., National Taiwan University 1975. Thesis: Correlation of Structure and Function of the Acetylcholine Receptor from Torpedo californica.


22
Albert Theodore Watson, Jr.  (Chemical Engineering)  B.S., University of Texas at Austin 1975.  

Mary Ann White  (Chemistry)  B.S., Miami University 1975.  

DIVISION OF ENGINEERING AND APPLIED SCIENCE

Pinchas Agmon  (Applied Physics)  B.Sc., The Hebrew University of Jerusalem 1972;  
M.S., California Institute of Technology 1974.  

Anthony Francis Barton  (Computer Science)  B.Sc., St. Andrews University 1976;  
M.S., California Institute of Technology 1977.  

David Miner Braisted  (Mechanical Engineering)  B.S., Michigan State University 1974;  
M.S., California Institute of Technology 1975.  
Thesis: Cavitation Induced Instabilities Associated with Turbomachines.

Sally Anne Browning  (Computer Science)  B.S., University of Oregon 1974;  
M.S., California Institute of Technology 1977.  

Jing-Chang Chen  (Civil Engineering)  B.S., National Taiwan University 1972;  
M.S., California Institute of Technology 1975.  
Thesis: Studies on Gravitational Spreading Currents.


Evangelos Athanassios Coutsias  (Applied Mathematics)  B.S., California Institute of Technology 1975.  

Thesis: Optical Determination of the Properties of Excitons Bound to Impurities in Semiconductors.

Timothy Joseph Gallagher  (Applied Physics)  B.S., Rose-Hulman Institute of Technology 1975;  
M.S., California Institute of Technology 1977.  
DOCTOR OF PHILOSOPHY—Continued

Medhat Ahmed Haroun (Civil Engineering) B.S., Cairo University 1973; M.S., California Institute of Technology 1976.
Thesis: Dynamic Analyses of Liquid Storage Tanks.

Jerry Michael Harris (Electrical Engineering) B.S.E.E., University of Mississippi 1973; M.S., California Institute of Technology 1974.

Gideon David Hess (Computer Science) B.Sc., Technion, Israel Institute of Technology 1968; M.Sc., 1975; M.S., California Institute of Technology 1977.

Shi-Ping Hsu (Electrical Engineering) B.S., National Taiwan University 1973; M.S., California Institute of Technology 1977.

Thesis: Coagulation in Continuous Particle Size Distributions; Theory and Experimental Verification.

Larry Douglas Koffman (Engineering Science) B.S., University of Tennessee 1972; M.S., 1975.


James Shigeru Kuwabara (Environmental Engineering Science and Social Science) B.S., University of Hawaii 1975; M.S., California Institute of Technology 1976.
Thesis: Micronutrient Requirements for Macrocystis pyrifera (L.) C. A. Agardh (Giant Kelp) Gametophytes Determined by Means of a Chemically Defined Medium, Aquil.

Stelios Kyriakides (Aeronautics) B.Sc., University of Bristol 1975; M.S., California Institute of Technology 1976.


DOCTOR OF PHILOSOPHY—Continued

Howard Michael Liljestrand  *(Environmental Engineering Science and Chemistry)*

Bartholomew Nicholas Locanthi III  *(Computer Science)*
B.S., California Institute of Technology 1975; M.S., 1977.

Graeme Haynes McVerry  *(Applied Mechanics)*

Richard Harrison Moyer  *(Applied Physics)*
B.S., Purdue University 1974; M.S., California Institute of Technology 1976.

Tanh Van Nguyen  *(Mechanical Engineering)*
B.S., Iowa State University 1975; M.S., California Institute of Technology 1976.

David M. Pepper  *(Applied Physics)*
B.S., University of California, Los Angeles 1971; M.S., California Institute of Technology 1974.

Loman Rensink  *(Electrical Engineering)*
B.S., California State University, Northridge 1974; M.S., California Institute of Technology 1976.
Thesis: Switching Regulator Configurations and Circuit Realizations.

James A. Rowson  *(Computer Science)*

Stanley Paul Sander  *(Environmental Engineering Science and Chemistry)*
B.A., Pomona College 1974; M.S., California Institute of Technology 1975.
Thesis: Kinetics Studies of Bromine Monoxide and Methylperoxy Free Radicals by Flash Photolysis.

David Carl Sherman  *(Mechanical Engineering)*
B.S., University of California, Santa Barbara 1974; M.S., California Institute of Technology 1975.
Thesis: Natural Convection Film Boiling on a Vertical Surface.

Malladi Venkata Subbaiah  *(Mechanical Engineering)*
Thesis: Non-Steady Behavior of a Flame Spreading from a Point in a Two-Dimensional Duct.
DOCTOR OF PHILOSOPHY—Continued

Bor-Yeu Tsaur (Electrical Engineering) B.S., National Taiwan University 1977; M.S., California Institute of Technology 1978.
Thesis: Ion-Beam-Induced Modifications of Thin Film Structures and Formation of Metastable Phases.

Timothy Neal Turner (Aeronautics) A.B., Occidental College 1974; M.S., California Institute of Technology 1975.
Thesis: Second Sound Shock Waves and Critical Velocities in Liquid Helium II.


Kadri Lütfi Vural (Electrical Engineering) B.S., Middle East Technical University 1973; M.S., California Institute of Technology 1975.
Thesis: Magnetic Domain Wall Dynamics in the Presence of an In-Plane Field.

DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES

David Wayne Beaty (Geology) A.B., Dartmouth College 1975; M.S., California Institute of Technology 1978.
Thesis: I. Comparative Petrology of the Apollo 11 Mare Basalts. II. The Oxygen Isotope Geochemistry of the Abitibi Greenstone Belt.

Timothy Miller Benjamin (Geochmstry) B.S., University of California, Davis 1973; M.S., California Institute of Technology 1974.
Thesis: Experimental Actinide Element Partitioning Between Whitlockite, Apatite, Diopsidic Clinopyroxene, and Anhydrous Melt at One Bar and 20 Kilobars Pressure.

Michael Welch Burnett (Geochemistry) B.S., Boston College 1968; M.S., 1970; M.S., California Institute of Technology 1972.
Thesis: The Occurrence and Distribution of Lead and Related Alkaline Earth Metals in Marine Ecosystems.

Bruce Alan Carter (Geology) B.S., California Institute of Technology 1968; M.S., 1965.
Thesis: Structure and Petrology of the San Gabriel Anorthosite-Syenite Body, Los Angeles County, California.


David Martin Cole (Geophysics) B.S., Indiana University 1972.


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DOCTOR OF PHILOSOPHY—Continued

Raymond Jeanloz  (Geology and Geophysics)  B.A., Amherst College 1974.


Malcolm Thomas McCulloch  (Geology)  B.Sc., Western Australian Institute of Technology 1973; M.Sc., 1975.
Thesis: I. Sm-Nd and Rb-Sr Chronology of Crustal Formation. II. Ba, Nd and Sm Isotopic Anomalies in the Allende Meteorite.

Crayton Jeffery Yapp  (Geochemistry)  B.S., University of Wisconsin, Madison 1971; M.S., California Institute of Technology 1973.

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

Randall Lee Calvert  (Social Science)  B.S., University of Kentucky 1975.

Lee Ira Sparling  (Social Science)  B.S., California Institute of Technology 1971; M.A., Stanford University 1972.
Thesis: Regulatory Distortions in Transportation and Telecommunications.

DIVISION OF PHYSICS, MATHEMATICS AND ASTRONOMY

Thesis: I. Moore Type Graphs. II. Properties of ($\phi,1$)-Matrices with Forbidden Configurations. III. Properties of ($\phi,1$)-Matrices with Prescribed Row and Column Sums.

Alan Voltz Barnes  (Physics)  B.S., Indiana University 1971.
Thesis: Measurements of Pion Charge Exchange and Other Things at Fermilab Energies.

Thesis: Algebraic Coding Theory.

Menachem Cimerman  (Astronomy)  B.Sc., Tel-Aviv University 1971.

DOCTOR OF PHILOSOPHY—Continued


Michael David Huffman (Mathematics) B.S., University of New Mexico 1975; M.S., California Institute of Technology 1977. Thesis: Efficient Approximate Solutions to the Kiefer-Weiss Problem.


Frank Joseph Nagy (Physics) B.S., Carnegie-Mellon University 1971; M.S., California Institute of Technology 1978. Thesis: A Study of the Reactions $\pi^\pm p \rightarrow \pi^\pm \pi^\mp \pi^0 p$ and $\pi^\pm p \rightarrow \pi^\pm \pi^\mp \pi^\mp n$ at $P_{\text{lab}} = 14$ GeV/c Using a Triggered Hybrid Bubble Chamber.


DOCTOR OF PHILOSOPHY—Continued

Lucy Elizabeth Seiberling  (Physics)  B.S., California State University, Los Angeles 1975.

Chun-Ching Shih  (Physics)  B.S., National Taiwan University 1972.

Peter Taborek  (Physics)  B.S., Harvey Mudd College 1974.
Thesis: Phonon Reflection from Crystal Interfaces and the Kapitza Problem.

Harold Stevenson Wilson  (Physics)  B.Sc., Queen’s University 1974.
Thesis: Gamow-Teller Beta Decays in 1s-\(\phi d\) Shell Nuclei.

Stephen Wolfram  (Physics)


Mark Edward Zimmermann  (Physics)  B.A., Rice University 1974; M.S., California Institute of Technology 1976.
Thesis: Studies on Gravitational Waves and Stars with Neutron Cores.
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.

ERIC TEMPLE BELL UNDERGRADUATE MATHEMATICS RESEARCH PRIZE
Awarded to one or more juniors or seniors for outstanding original research in mathematics.
Eugene Y. Loh, senior; John R. Stembridge, junior;
Robert W. Weaver, senior

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.
1980 Grace H.-J. Mah, junior; Michael P. Thien, sophomore
1979 Joseph A. Zasadzinski*
1978 Isabella T. Lewis*

HAREN LEE FISHER MEMORIAL AWARD IN JUNIOR PHYSICS
Awarded to a junior physics major who demonstrates the greatest promise of future contributions in physics.
1980 Terry T. Chiang
1979 Kenneth G. Libbrecht*

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.
1980 Erdal Arikan, junior
1979 Pik-Chun Beatrice Lee*

*The names of students who have received prizes or awards in previous years, but who are graduating in 1980, are also listed.
PRIZES AND AWARDS—Continued

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.

1980 Terry T. Chiang
1979 E. Sterl Phinney III*

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.

1980 Douglas L. Whiting, senior
1979 Kenneth G. Libbrecht*

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.

1980 Andrew J. Gellman, junior
1979 Lynn M. Hildemann*

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, etc.

William C. Ledeboer, junior

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

Steven Glen Eaton

MARY A. EARL MCKINNEY PRIZE IN ENGLISH
The purpose of this prize is to cultivate proficiency in writing. It may be awarded for essays submitted in connection with regular English classes or awarded on the basis of a special essay contest.

Luke J. Will, sophomore; John E. Hershberger, junior

ROBERT L. NOLAND LEADERSHIP SCHOLARSHIP
Awarded to a junior or sophomore who exhibits 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.

Larry B. Friedrich, junior; Charles R. O'Neil, junior
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.

Designee: Isabella T. Lewis

SCHUSTER-MARLAR MEMORIAL AWARD

A memorial award in honor of Richard P. Schuster, presented to a deserving aeronautics student completing the Doctor of Philosophy degree in June 1980.

Kenneth M. Liechti

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.

1980 David C. Johnson, John V. C. Nye, Todd C. Olson
1979 Kenneth M. Gray*
1978 Janet A. Rice,* Colleen R. Ruby*
1977 John B. Reinitz*

SIGMA XI AWARD

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

Mark D. Seidler, Paul F. Seidler

THE MORGAN WARD PRIZE

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

Forrest C. Quinn, sophomore; Scott Michael, sophomore