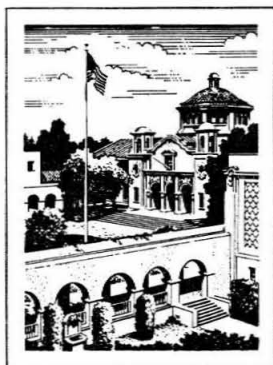


California Institute of Technology



SIXTY-FIFTH ANNUAL  
COMMENCEMENT  
EXERCISES

FRIDAY AFTERNOON AT FOUR-THIRTY O'CLOCK  
JUNE TWELFTH, NINETEEN FIFTY-NINE

# ACADEMIC PROCESSION

*Chief Marshal:* HARVEY EAGLESON, Ph.D.

*Assistant Marshals:* DONALD S. CLARK, Ph.D.

JAMES C. DAVIES, Ph.D.

RODMAN W. PAUL, Ph.D.

## *Division I*

CANDIDATES FOR THE DEGREE OF BACHELOR OF SCIENCE

CANDIDATES FOR THE DEGREE OF  
MASTER OF SCIENCE IN SCIENCE

CANDIDATES FOR THE DEGREE OF  
MASTER OF SCIENCE IN ENGINEERING

CANDIDATES FOR THE ENGINEER'S DEGREE

CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

## *Division II*

THE FACULTY OF THE CALIFORNIA INSTITUTE

THE CHAIRMEN OF DIVISIONS  
AND DIRECTORS OF LABORATORIES

THE TRUSTEES OF THE CALIFORNIA INSTITUTE

THE REPRESENTATIVE OF THE UNITED STATES AIR FORCE

THE COMMENCEMENT CHAPLAIN

THE PRESIDENT OF THE CALIFORNIA INSTITUTE

THE COMMENCEMENT SPEAKER

THE CHAIRMAN OF THE BOARD OF TRUSTEES

# PROGRAM

---

*Presiding:* ALBERT B. RUDDOCK, B. A., M. A.  
*Chairman of the Board of Trustees*

---

## PRELUDE AND PROCESSIONAL MARCH

*Organist:* JAMES H. SHEARER, A.R.C.M., A.R.C.O.

## INVOCATION

THE REVEREND WILLIAM E. McCORMACK, D.D.  
*First Congregational Church of Pasadena*

## COMMENCEMENT ADDRESS

“Democracy in an Age of Science”

SIR SOLLY ZUCKERMAN, M.D., D.Sc., F.R.S.  
*Professor of Anatomy, University of Birmingham*  
*Deputy Chairman, Advisory Council on Scientific Policy*  
*(Great Britain)*

# PROGRAM—*continued*

---

CONFERRING OF DEGREES

BY

PRESIDENT DUBRIDGE

PRESENTATION OF CANDIDATES FOR DEGREES

*For the degree of Bachelor of Science, by*

PAUL CONANT EATON, A.M.

*Dean of Students*

*For the degree of Master of Science in Science, by*

WILLIAM R. SMYTHE, Ph.D.

*Chairman of the Committee on the Course in Science*

*For the degree of Master of Science in Engineering, by*

DAVID S. WOOD, Ph.D.

*Chairman of the Committee on the Course in Engineering*

*For the Engineer's degree, by*

FREDERIC BOHNENBLUST, Ph.D.

*Dean of Graduate Studies*

*For the degree of Doctor of Philosophy, by*

DEAN BOHNENBLUST

# PROGRAM—*continued*

---

## COMMISSIONING OF AIR FORCE RESERVE OFFICERS

*Presentation of Cadets, by*

MAJOR FRANCIS R. MACKENZIE, B.S.

*Professor of Air Science*

*Oath of Office and award of Certificate of Commission as*

*Second Lieutenant in the Air Force Reserve, by*

BRIGADIER GENERAL WILLIAM G. HIPPS

*United States Air Force*

## CONCLUDING REMARKS

PRESIDENT DUBRIDGE

## BENEDICTION

THE REVEREND DR. MCCORMACK

*The audience is requested to remain standing until*

*the end of the Recessional March*

## RECESSIONAL MARCH

# Candidates for Degrees

## BACHELOR OF SCIENCE IN SCIENCE

Gerald Jack Arenson, Los Angeles, California. *Applied Chemistry; Academic Honor, Honor Key.*

Allen Miller Ashley, North Hollywood, California. *Physics.*

Walter S. Baer, Glencoe, Illinois. *Physics; Academic Honor, Honor Key.*

Luis Báez-Duarte, Caracas, Venezuela. *Mathematics; Academic Honor.*

John Stanton Bailey, Memphis, Tennessee. *Mathematics.*

Gordon E. Baird, Dallas, Texas. *Physics.*

Jack Bass, Los Angeles, California. *Physics; Academic Honor.*

Robert Roy Blandford, Ghost Hollow, Pennsylvania. *Physics.*

Michael Barry Bogost, Honolulu, Hawaii. *Chemistry.*

Keith Spalding Brown, Jr., Amado, Arizona. *Chemistry; Academic Honor, Honor Key.*

Richard Nelson Byrne, Columbus, Ohio. *Physics; Academic Honor.*

Alan Philip Carlin, Birmingham, Michigan. *Physics; Academic Honor.*

Clark Edward Carroll, Pittsburgh, Pennsylvania. *Physics; Academic Honor.*

Hung Cheng, Canton, China. *Physics; Academic Honor.*

Melvyn David Cheslow, Pasadena, California. *Physics.*

Barry Gillespie Clark, Canyon, Texas. *Astronomy; Academic Honor.*

Alexis Neal de Gaston, Los Angeles, California. *Physics.*

Solomon DePicciotto, Los Angeles, California. *Physics.*

Richard Darby Dietz, Mountainside, New Jersey. *Astronomy.*

Robert John Doyle, New Albany, Indiana. *Physics; Academic Honor.*

Lawrence W. Elmore, Sebastopol, California. *Physics.*

John C. Everitt, Hallowell, Kansas. *Physics; Honor Key.*

Clinton Frasier, Greenlawn, New York. *Geophysics.*

Arnold Irl Goldford, University City, Missouri. *Applied Chemistry.*

William Robert Graham, Jr., Fairborne, Ohio. *Physics; Academic Honor.*

Michael Thomas Gray, Marysville, California. *Physics.*

Herold Richard Gustafson, Portland, Oregon. *Physics.*

David Handel, Brooklyn, New York. *Mathematics; Academic Honor.*

Robert Philip Hangebrauck, Waukegan, Illinois. *Applied Chemistry.*

Michael David Hanley, Greenlawn, New York. *Physics.*

Robert Earl Harmon, Pasadena, California. *Applied Chemistry; Academic Honor.*

Philip Darling Harriman, Larkspur, California. *Physics.*

Timothy Merrill Harrington, Carmel, California. *Physics.*

James Halbert Havey, Jr., Montgomery, Alabama. *Physics.*

David Kirk Himrod, Pasadena, California. *Physics.*

Roger Louis Hoelter, Menlo Park, California. *Physics.*

Gordon Frierson Hughes, Cheviot Hills, California. *Physics; Academic Honor.*

Robert Isreal Jewett, Providence, Rhode Island. *Mathematics.*

ACADEMIC HONOR: *Graduated with scholastic honor in accordance with a vote of the Faculty.*

HONOR KEY: *Awarded by the Associated Students, CIT, for participation in student activities.*

## BACHELOR OF SCIENCE IN SCIENCE

- Charles Richard Johnson, Lewiston, Idaho. *Applied Chemistry; Academic Honor, Honor Key.*
- Richard Michael Jones, South Gate, California. *Physics.*
- Robert Douglas Junge, Jr., Tracy, California. *Physics.*
- Lloyd Philip Kamins, Milwaukee, Wisconsin. *Biology; Academic Honor.*
- H. Jerome Keisler, Seattle, Washington. *Mathematics; Academic Honor.*
- Mike Edward Kiefer, Van Nuys, California. *Chemistry.*
- E. David Kipping, Whittier, California. *Physics.*
- Karl Kent Knapp, La Mesa, California. *Physics.*
- Murray Arnold Koerner, Santa Barbara, California. *Physics.*
- DeWitt Landis, Jr., Dallas, Texas. *Physics.*
- Robert Victor Lange, Phoenix, Arizona. *Physics; Academic Honor, Honor Key.*
- Ronald Baldwin Leonard, North Hollywood, California. *Applied Chemistry.*
- Lewis Martell Linson, Berkeley, California. *Physics; Academic Honor.*
- George Wahl Logemann, Milwaukee, Wisconsin. *Mathematics; Academic Honor.*
- Bernard Miles Malofsky, Valley Stream, New York. *Chemistry.*
- Carl Maltz, Pasadena, California. *Physics.*
- Robert Maltz, Pasadena, California. *Physics.*
- William Owen McClure, Yakima, Washington. *Biology.*
- John D. Mihalov, Pasadena, California. *Physics.*
- David Michael Milder, North Hollywood, California. *Physics; Academic Honor, Honor Key.*
- Richard C. Montgomery, Frankfort, Kentucky. *Physics.*
- Eldridge Morton Moores, III, Globe, Arizona. *Geology; Academic Honor.*
- Thomas Ernest Morton, Great Falls, Montana. *Mathematics; Academic Honor.*
- Martin G. Olsson, Pasadena, California. *Physics.*
- David Vincent Owens, San Fernando, California. *Chemistry.*
- Donald Boyd Owings, Rolling Hills, California. *Applied Chemistry.*
- Michael Wood Peters, Santa Barbara, California. *Physics.*
- Russell Mosher Pitzer, Berkeley, California. *Chemistry; Academic Honor.*
- James Emerson Potter, Rockford, Illinois. *Mathematics; Academic Honor.*
- John Charles Price, Deerfield, Illinois. *Physics; Academic Honor.*
- Eugene Elliot Robkin, Los Angeles, California. *Mathematics.*
- Arthur Rosenthal, Pasadena, California. *Chemistry.*
- Stanley Roth, Los Angeles, California. *Mathematics; Academic Honor.*
- Michael Henry Rusin, Chicago, Illinois. *Physics.*
- Steven Emanuel Schwarz, Oxnard, California. *Physics; Academic Honor.*
- Edwin Charles Seltzer, Encino, California. *Applied Chemistry; Academic Honor.*
- James Seymour Somberg, Berkeley, California. *Physics.*
- John D. Stack, Van Nuys, California. *Physics; Academic Honor.*
- Byron Edwin Swartz, Kansas City, Missouri. *Physics.*
- Ivo Tammaru, Los Angeles, California. *Physics; Academic Honor.*
- John David Teal, Seattle, Washington. *Physics; Academic Honor.*
- Robert Melvin Thornton, Auburn, California. *Biology; Academic Honor.*
- Jon Alan Wright, Tacoma, Washington. *Physics; Academic Honor.*
- Harold Thomas Yura, Los Angeles, California. *Physics.*

## BACHELOR OF SCIENCE IN ENGINEERING

- Kenneth Hoyt Adams, San Francisco, California. *Mechanical Engineering.*
- Steven Martin Ahrens, Los Angeles, California. *Mechanical Engineering.*
- Gustave Akselrod, New York, New York. *Mechanical Engineering; Honor Key.*
- DeLoyce Alcorn, Jr., Pasadena, California. *Electrical Engineering.*
- Bruce Allesina, Oswego, Oregon. *Mechanical Engineering.*
- Vladimir Vadim Baicher, Altadena, California. *Mechanical Engineering; Academic Honor.*
- Edward Raymond Bate, Jr., San Francisco, California. *Mechanical Engineering.*
- Richard Alan Baugh, Port Townsend, Washington. *Electrical Engineering.*
- Chai Bong Byun, Seoul, Korea. *Electrical Engineering.*
- Robert Eugene Chandos, Garden Grove, California. *Electrical Engineering; Academic Honor.*
- Frank Wesley Childs, III, Omaha, Nebraska. *Mechanical Engineering.*
- Douglas Ronald Christman, San Francisco, California. *Mechanical Engineering.*
- Philip Luis Clar, Los Angeles, California. *Electrical Engineering.*
- John Allan Conover, Laguna Beach, California. *Mechanical Engineering.*
- Mert Cramer, Los Angeles, California. *Electrical Engineering.*
- Walter James Cribbs, Torrance, California. *Electrical Engineering.*
- Charles Kenneth Daniels, Santa Ana, California. *Mechanical Engineering.*
- Ronald Alvin Forbess, Nyssa, Oregon. *Electrical Engineering; Academic Honor.*
- Michael DeWitt Godfrey, Eugene, Oregon. *Electrical Engineering; Honor Key.*
- L. Dale Green, Pasadena, California. *Electrical Engineering; Academic Honor.*
- Joel David Greenberg, Los Angeles, California. *Electrical Engineering.*
- Francis Wayne Groesbeck, Altadena, California. *Electrical Engineering; Academic Honor.*
- Gary Deane Hachtel, North Hollywood, California. *Electrical Engineering.*
- Harvey Jerome Hansen, Carlsbad, New Mexico. *Civil Engineering; Honor Key.*
- Hubert Kenneth Hopkins, Los Angeles, California. *Electrical Engineering.*
- William Norris Huse, Cos Cob, Connecticut. *Electrical Engineering.*
- Anthony Joseph Iorillo, Southington, Connecticut. *Mechanical Engineering.*
- Joseph Michael Jenkins, Abilene, Texas. *Electrical Engineering.*
- Walter Adrian Johnson, Jr., Covina, California. *Mechanical Engineering; Academic Honor.*
- Joseph Adamec Jurca, Phoenix, Arizona. *Electrical Engineering.*
- Carl C. Kesler, Jr., Cedar Rapids, Iowa. *Electrical Engineering.*
- Gerhard Joachim Klose, Hagerstown, Maryland. *Mechanical Engineering; Academic Honor.*
- Wayne Charles Kreger, Toledo, Ohio. *Mechanical Engineering.*
- Dennis Wayne Kuli, Lancaster, California. *Electrical Engineering; Honor Key.*
- Robert Mark Lebovitz, Scranton, Pennsylvania. *Electrical Engineering.*
- Anthony Leonard, Ventura, California. *Mechanical Engineering; Academic Honor, Honor Key.*
- Lanny Louis Lewyn, Los Angeles, California. *Electrical Engineering; Academic Honor.*
- Richard Frederick Long, Hanford, California. *Mechanical Engineering.*
- James Nelson Lovelady, Colorado Springs, Colorado. *Electrical Engineering.*
- David Gilbert Luenberger, Los Angeles, California. *Electrical Engineering; Academic Honor.*



## BACHELOR OF SCIENCE IN ENGINEERING

- Richard Bruce MacAnally, Omaha, Nebraska. *Electrical Engineering.*
- Raymond Edward Magdaleno, Los Angeles, California. *Electrical Engineering.*
- Gail Austin Massey, Glendale, California. *Electrical Engineering; Academic Honor.*
- James Michael Moore, Hollydale, California. *Electrical Engineering.*
- Kenneth Akira Muraoka, Honolulu, Hawaii. *Mechanical Engineering.*
- Frank A. Nowak, Santa Paula, California. *Mechanical Engineering.*
- Ralph Bailey Owen, White Swan, Washington. *Mechanical Engineering.*
- Robert Marshall Pailthorp, Portland, Oregon. *Electrical Engineering.*
- Dennis Lorin Paull, Los Angeles, California. *Electrical Engineering.*
- John Charles Petersen, Los Angeles, California. *Electrical Engineering; Academic Honor.*
- James Sibley Petty, Guthrie, Oklahoma. *Mechanical Engineering.*
- Kirk Alexander Polson, Kansas City, Missouri. *Mechanical Engineering; Honor Key.*
- Allan Ray Porush, Pasadena, California. *Civil Engineering.*
- Donald Orville Rasmussen, Pasadena, California. *Mechanical Engineering.*
- John Joseph Schuster, Peoria, Illinois. *Electrical Engineering; Academic Honor.*
- David Crosthwaite Spencer, Los Angeles, California. *Mechanical Engineering; Honor Key.*
- John Iver Stene, Los Angeles, California. *Electrical Engineering; Academic Honor.*
- John Michael Stevens, San Diego, California. *Electrical Engineering.*
- Terry Olin Teigen, Orange, California. *Electrical Engineering; Academic Honor.*
- Lawrence Finlayter Tenn, Bog Walk, Jamaica, B. W. I. *Mechanical Engineering.*
- William Louis Waggoner, South Gate, California. *Electrical Engineering.*
- Evan Otto Weiner, Eagle Rock, California. *Mechanical Engineering.*
- Donald Martin Wiberg, Highland Park, Illinois. *Mechanical Engineering.*
- William Y. Wong, Shanghai, China. *Electrical Engineering.*
- Pai Cheng Young, Weng Tung, China. *Electrical Engineering.*

65

## MASTER OF SCIENCE IN SCIENCE

### *Astronomy*

Harvey Harold Bird. *A.B., The Johns Hopkins University, 1956.*

### *Chemistry*

J. Philip Bromberg. *S.B., Massachusetts Institute of Technology, 1956.*

Richard Bernard McGriff. *B.S., Florida A. & M. University, 1955.*

### *Chemical Engineering*

Louis Najib Bathish. *B.A., Pomona College, 1957.*

Ernest Russell Boller. *B.S., Purdue University, 1958.*

Alan S. Emanuel. *B.S., California Institute of Technology, 1958.*

Charles Ronald Penquite. *B.S., California Institute of Technology, 1958.*

Philip Lee Reynolds. *B.S., California Institute of Technology, 1958.*

James Steven Rode. *B.S., California Institute of Technology, 1958.*

Clayton Sutherland Smith. *B.S., Purdue University, 1958.*

Jon René Valbert. *B.S., California Institute of Technology, 1958.*

Emilio Cesare Venezian. *B.E., McGill University, 1958.*

John Walden. *B.Ch.E., Polytechnic Institute of Brooklyn, 1955.*

### *Geology*

Meredith Grant Gross, Jr. *A.B., Princeton University, 1954.*

Lewis Brigham Gustafson. *B.S.E., Princeton University, 1955.*

Harvey John Meyer. *B.A., University of Minnesota, 1957.*

Dean Carl Presnall. *B.S., The Pennsylvania State University, 1957.*

Robert Victor Shull. *B.S., New Mexico Institute of Mining and Technology, 1957.*

John C. Vinje. *B.A., University of Minnesota, 1957.*

Robert Eugene Zartman. *B.S., The Pennsylvania State University, 1957.*

### *Geochemistry*

Robert Lawrence Wershaw. *B.S., Texas Western College, 1956.*

### *Geophysics*

Shelton Setzer Alexander. *B.S., The University of North Carolina, 1956.*

Don Lynn Anderson. *B.S., Rensselaer Polytechnic Institute, 1955.*

Ritchie Brooke Coryell. *S.B., Massachusetts Institute of Technology, 1958.*

Francis Clay McMichael. *B.S., Lehigh University, 1958.*

Kenneth Watson. *B.A., University of Toronto, 1957.*

## MASTER OF SCIENCE IN SCIENCE

### *Physics*

- Raymond Wallace Allard, Jr. *B.A.*, *University of Minnesota*, 1958.  
Alan George Bodine. *B.S.*, *University of Illinois*, 1957.  
William Davis Burnett. *B.S.*, *Texas Western College*, 1955.  
Donald Delbert Clayton. *B.S.*, *Southern Methodist University*, 1956.  
Richard Lewis Cohen. *B.A.*, *Haverford College*, 1957.  
James L. C. Ford. *B.A.*, *Montana State University*, 1955.  
Murlin Fern Gillis. *B.S.*, *University of Washington*, 1956.  
Richard O'Neil Hundley. *B.S.*, *California Institute of Technology*, 1957.  
James Daniel Larson. *S.B.*, *Massachusetts Institute of Technology*, 1957.  
Norton Leonard Moise. *B.S.*, *University of Illinois*, 1948; *M.A.*, *University of California*, 1954.  
Martin Emery Nordberg, Jr. *B.S.*, *The University of Rochester*, 1957.  
Theodore Wesley Speiser. *B.S.*, *Colorado Agricultural and Mechanical College*, 1956.  
John Richard Stevens. *B.A.*, *Pomona College*, 1956.  
Joseph Louis Vogl. *A.B.*, *Columbia University*, 1957.

## MASTER OF SCIENCE IN ENGINEERING

### *Aeronautics* 2<sup>1</sup>

- Stanley Walter Augustyniewicz, Jr. *B.S.*, *Parks College of Aeronautical Technology*, 1956.  
Michael Eugene Fourney. *B.S.A.E.*, *West Virginia University*, 1958.  
Donald James Ketter. *B.S.*, *Parks College of Aeronautical Technology*, 1958.  
Wolfgang Gustav Knauss. *B.S.*, *California Institute of Technology*, 1958.  
William Ko. *B.S.*, *National Taiwan University*, 1950.  
Akira Kobayashi. *B.E.*, *University of Tokyo*, 1954.  
Gary Lynn Marlotte. *B.S.*, *Purdue University*, 1958.  
Roy Donald Maxwell. *B.S.*, *Louisiana State University*, 1958.  
Robert James McElvain, IV. *B.S.*, *Purdue University*, 1958.  
Burton Walters Melcher, II. *B.C.E.*, *Cornell University*, 1957.  
Harry Moerjono. *B.S.*, *Feati Institute of Technology*, 1956.  
Robert Reid Parmerter. *B.S.*, *California Institute of Technology*, 1958.  
Françoise Renée Pioline. *Dipl.d'Ing.*, *École Nationale Supérieure de L'Aéronautique*, 1958.  
Charles P. Ranunkel. *Dipl.d'Ing.*, *École Centrale des Arts et Manufactures*, 1958.  
Xavier Marc Rouvillois. *Dipl.d'Ing.*, *École Nationale Supérieure de L'Aéronautique*, 1958.  
Patrick J. Rygh. *B.Aero.E.*, *University of Minnesota*, 1955.  
Mitchell Harvey Seidman. *B.S.*, *California Institute of Technology*, 1958.  
Frank Clark Thomas. *B.S.*, *University of California*, 1957.  
George Charpentier Vlases. *B.E.S.*, *The Johns Hopkins University*, 1958.  
Walter Victor Weber, Jr. *B.S.*, *University of Kansas*, 1955.  
Jain-Ming Wu. *B.S.*, *National Taiwan University*, 1955.

## MASTER OF SCIENCE IN ENGINEERING

### *Civil Engineering*

- William Thomas Alt. *B.C.E., Rensselaer Polytechnic Institute, 1958.*  
Victor Baekelandt. *C.E., University of Ghent, 1958.*  
Armando Hamel. *C.E., Escuela de Ingenieria de la Universidad de Chile, 1954.*  
Izzat Muhammad Idriss. *B.C.E., Rensselaer Polytechnic Institute, 1958.*  
Young Chun Kim. *B.E., University of Southern California, 1958.*  
Andrew Richard Nasser. *B.Ar.E., University of Detroit, 1958.*

### *Electrical Engineering*

- David Anthony Ackley. *B.S., California Institute of Technology, 1958.*  
John Fredrich Asmus. *B.S., California Institute of Technology, 1958.*  
Richard Lee Baron. *B.S., California Institute of Technology, 1958.*  
Robert Harold Bond. *B.S., Colorado State University, 1958.*  
Carl James Buczek. *B.E.E., Rensselaer Polytechnic Institute, 1956.*  
George M. Canova. *B.S., California Institute of Technology, 1958.*  
William Kent Clarkson. *B.S.E., Princeton University, 1958.*  
Richard Kent Cooper. *B.S., California Institute of Technology, 1958.*  
Harvey Emanuel Fiala. *B.S., The North Dakota Agricultural College, 1958.*  
David Edward Fisher. *B.A.Sc., University of Toronto, 1957.*  
Harold Kay Forsen. *B.S., California Institute of Technology, 1958.*  
André Jean Pierre Fossard. *Dipl.d'Ing., École Supérieure de L'Aéronautique, 1958.*  
Stuart Goff. *B.S., California Institute of Technology, 1958.*  
Richard M. Goldstein. *B.S., Purdue University, 1947.*  
Michel Pierre Guillemet. *Dipl.d'Ing., École Nationale d'Ingénieurs Arts et Métiers, 1958.*  
Jay Howard Harris. *B.E.E., Brooklyn Polytechnic Institute, 1958.*  
Richard F. Herlein. *B.S., California Institute of Technology, 1958.*  
Robert Henry Hertel. *S.B., Massachusetts Institute of Technology, 1958.*  
Donivan Richard Howard. *B.S., Purdue University, 1958.*  
Edgar Towar Irons. *B.S.E., Princeton University, 1958.*  
Donald Melvin Kisner. *B.E.E., The Cooper Union, 1958.*  
Norman Bruce Kramer. *B.S., Oklahoma State University of Agriculture and Applied Science, 1958.*  
Raymond Walter Latham. *B.E., McGill University, 1958.*  
Joseph Louis LeMay. *B.E.E., University of Detroit, 1957.*  
Alfred George Lieberman. *B.E.E., Polytechnic Institute of Brooklyn, 1958.*  
Bruce Timoney McKeever. *B.S., California Institute of Technology, 1958.*  
Rémi-Noël Menegaux. *Dipl.d'Ing., École Centrale des Arts et Manufactures, 1958.*  
Kenneth Martin Mitzner. *S.B., Massachusetts Institute of Technology, 1958.*  
Warren Darold Moon. *S.B., Massachusetts Institute of Technology, 1958.*  
Xavier F. Namy. *Dipl.d'Ing., École Supérieure D'Électricité, 1958.*  
Henri Lucien Neuville. *Dipl.d'Ing., École Supérieure D'Électricité, 1958.*  
Richard Coulston Neville. *B.S., California Institute of Technology, 1958.*  
Patrick Gerard O'Regan. *B.E., University College, Cork, Ireland, 1957.*  
Max Bruno Peltier. *Dipl.d'Ing., École Supérieure D'Électricité, 1958.*

## MASTER OF SCIENCE IN ENGINEERING

### *Electrical Engineering—continued*

- Andrew Louis Perga. *B.S., California Institute of Technology, 1958.*  
Bernard Charles Reardon. *B.E., University College, Cork, Ireland, 1957.*  
Donald Wesley Rice. *B.S., University of Pennsylvania, 1958.*  
Robert Finley Ringland, II. *B.S.E., Princeton University, 1958.*  
Lee Rosenthal. *B.E.E., Polytechnic Institute of Brooklyn, 1958.*  
Lee Otis Schmidt. *B.S., California Institute of Technology, 1958.*  
Danver Schuster. *B.S., California Institute of Technology, 1957.*  
Donald R. Sessler. *B.S., California Institute of Technology, 1958.*  
Joe Nelson Smith, Jr. *B.S., California Institute of Technology, 1958.*  
Lawrence Shepard Smith. *B.S., California Institute of Technology, 1958.*  
Peter Raymond Smith. *B.S., California Institute of Technology, 1958.*  
Robert Edward Tokheim. *B.S., California Institute of Technology, 1958.*  
James Norman Weaver. *B.S., California Institute of Technology, 1958.*  
John S. Winslow. *B.S., California Institute of Technology, 1953.*  
Jonas Stasys Zmuidzinias. *B.S., Indiana Technical College, 1958.*

49

### *Mechanical Engineering*

27

- Frank A. Albini. *B.S., California Institute of Technology, 1958.*  
Charles Albert Bodeen. *B.S., California Institute of Technology, 1956.*  
Ray Morris Bowen. *B.S., Agricultural and Mechanical College of Texas, 1958.*  
Ronald Arlie Christensen. *B.S., Iowa State College, 1958.*  
Thomas Francis Clancy. *B.S., University of Pennsylvania, 1958.*  
Joseph Michael Colucci. *B.S., Michigan State College, 1958.*  
Martin Leo Conneally. *B.S., California Institute of Technology, 1958.*  
Glenn Leland Converse. *B.S., California Institute of Technology, 1958.*  
Richard Truman Cowley. *B.S., California Institute of Technology, 1958.*  
Brinton Stanley Deighton, Jr. *B.Ch.E., Cornell University, 1958.*  
John Irvine Dick-Peddie. *B.S., Iowa State College, 1953.*  
George Frederick Engelke. *B.S., California Institute of Technology, 1958.*  
Roger Keith Farrar. *B.S., Stanford University, 1958.*  
Alan K. Forsythe. *B.S., California Institute of Technology, 1958.*  
Walter Robert Haddad. *B.S.M.E., West Virginia University, 1958.*  
Lance Gregory Hays. *B.S., California Institute of Technology, 1958.*  
Kalman I. Krakow. *B.E., McGill University, 1958.*  
Daniel Julius Krause. *B.Met.E., The Ohio State University, 1958.*  
Robert Julius Kwik. *M.E., Stevens Institute of Technology, 1958.*  
Robert Georges Lallement. *Dipl.d'Ing., École Nationale Supérieure des Mines de Paris, 1958.*  
Kaye Don Lathrop. *B.S., United States Military Academy, 1955.*  
Didier Vincent Morane. *Dipl.d'Ing., École Nationale Supérieure du Génie Maritime, 1958.*  
Robert Max Schmidt. *S.B., Massachusetts Institute of Technology, 1958.*  
Andrew Charles Sergi. *B.Ch.E., Pratt Institute, 1958.*  
Alan Soler. *B.S., University of Pennsylvania, 1958.*  
John William Wesner, Jr. *B.S., Carnegie Institute of Technology, 1958.*  
Charlie Lee Yates. *B.S., Virginia Polytechnic Institute, 1958.*

## ENGINEER'S DEGREE

### *Aeronautical Engineer*

- Andrew Burkhard Bauer. *B.Aero.E., Ohio State University, 1951; M.Sc., 1951.*
- Robert Lynn Chapkis. *B.S., California Institute of Technology, 1956; M.S., 1957.*
- Thomas Emmett Dawson, Major, U.S.M.C. *B.S., United States Naval Academy, 1947; B.S., United States Naval Postgraduate School, 1958.*
- Eugene Richard Doering, Lt., U.S.N. *B.S., United States Naval Academy, 1951; B.S., United States Naval Postgraduate School, 1958.*
- Richard Earl Hemmingway, Capt., U.S.M.C. *B.S.I.E., Georgia Institute of Technology, 1948; B.S., United States Naval Postgraduate School, 1958.*
- Louis L. Monroe. *B.S., Newark College of Engineering, 1936; M.S., Case Institute of Technology, 1953.*
- Jerry Clifford Peck. *B.S., California Institute of Technology, 1957; M.S., 1958.*
- Robert Scott Satre, Lt., U.S.N. *B.S., United States Naval Academy, 1950; B.S., United States Naval Postgraduate School, 1958.*
- Homer Leroy Smith, Lt., U.S.N. *B.S., United States Naval Academy, 1949; B.S., United States Naval Postgraduate School, 1958.*
- Wilfried Erhard Stockmair. *Cand.Ing., Technische Hochschule (München), 1958.*
- Richard Donald Wood. *B.M.E., University of Minnesota, 1950; M.S., 1954.*

### *Mechanical Engineer*

- Boris Aucksmann. *B.A.Sc., University of British Columbia, 1955; M.S., California Institute of Technology, 1958.*
- Victor Charles Douglas Dawson. *S.B., Massachusetts Institute of Technology, 1948; M.S., Harvard University, 1950.*

## DOCTOR OF PHILOSOPHY

- Peter Albersheim (Biochemistry and Chemistry). *B.S., Cornell University, 1956.*  
Thesis: Metabolism of the Pectic Substances.
- Samuel Morris Berman (Physics). *B.S., University of Miami, 1954; M.S., 1955.*  
Thesis: Radiative Corrections to Muon and Neutron Decay.
- Walter Karl Bonsack (Astronomy and Physics). *B.S., Case Institute of Technology, 1954.*  
Thesis: The Abundance of Lithium in the Atmospheres of Cool Stars.
- Gary Delane Boyd (Electrical Engineering and Physics).  
*B.S., California Institute of Technology, 1954; M.S., 1955.*  
Thesis: Experiments on the Interaction of a Modulated Electron Beam with a Plasma.
- Richard Harald Briceland (Mechanical Engineering).  
*B.S., State University of Iowa, 1954; M.S., 1955.*  
Thesis: Secondary Flow in a Cascade of Airfoils.
- Howard M. Brody (Physics). *S.B., Massachusetts Institute of Technology, 1954;*  
*M.S., California Institute of Technology, 1956.*  
Thesis: Photoproduction of Positive K Mesons in Hydrogen.
- Gunnar Erik Broman (Mechanical Engineering and Physics). *C.E.(Ae.), Royal Institute of  
Technology (Stockholm), 1947; M.S., California Institute of Technology, 1955.*  
Thesis: Experimental Investigation of Flame Stabilization in a Deflected Jet.
- Wilmot Grant Brownlee, Capt., Royal Canadian Artillery, (Mechanical Engineering and  
Physics). *B.Sc., Carleton College (Ontario, Canada), 1951; M.S., California Institute  
of Technology, 1956.*  
Thesis: An Experimental Investigation of Unstable Combustion in Solid Propellant  
Rocket Motors.
- Richard Bradford Campbell (Petrology and Stratigraphy). *B.A.Sc., University of British  
Columbia, 1948; M.S., California Institute of Technology, 1951.*  
Thesis: The Texture, Origin, and Emplacement of the Granitic Rocks of Glenlyon  
Range, Yukon Territory, Canada.
- I-dee Chang (Aeronautics and Mathematics). *B.S., National Central University (Nanking),  
1944; M.S., Kansas State College, 1954.*  
Thesis: Navier-Stokes Solutions at Large Distances from a Finite Object.
- Paul Palmer Craig (Physics and Mathematics). *B.S., Haverford College, 1954.*  
Thesis: Observations of Perfect Potential Flow and Critical Velocities in Superfluid  
Helium II.
- Cedric Inglis Davern (Plant Physiology and Genetics). *B.S.Agr., University of Sydney, 1953;*  
*M.S.Agr., 1956.*  
Thesis: I. Chemotherapy of High Temperature Inhibition of Plant Growth.  
II. Studies of the Relationship between Tobacco Mosaic Virus Infection and the DNA  
Metabolism of Tobacco Leaves.  
III. The Conservation of Microsomal RNA in *Escherichia coli*.

## DOCTOR OF PHILOSOPHY

- Donald F. DuBois (Physics and Mathematics). *B.A., Cornell University, 1954.*  
Thesis: Electron Interactions: A Field Theoretic Generalization of the Gell-Mann-Brueckner Method and a Calculation of Exchange Effects.
- David Duncan Elliott (Physics and Mathematics). *B.S., Stanford University, 1951;*  
*M.S., California Institute of Technology, 1953.*  
Thesis: Angular Correlation of Photoproduced Pion Pairs.
- Rolf Engleman, Jr. (Chemistry and Physics). *B.S., University of Oklahoma, 1955.*  
Thesis: On the Recombination Rate of Iodine Atoms in the Presence of Various Gases.
- Marshall Paul Ernstene (Physics and Electrical Engineering). *A.B., Harvard College, 1952.*  
Thesis: Counter Telescope Investigations of K Meson Photoproduction and Production of Pion Pairs by 1 Bev Photons.
- Nick George (Electrical Engineering and Physics). *B.S., University of California, 1949;*  
*M.S., University of Maryland, 1956.*  
Thesis: Spatial Distribution of Thermal Radiation at Microwave Frequencies.
- Roger Morse Golden (Electrical Engineering and Physics).  
*B.S., California Institute of Technology, 1954; M.S., 1955.*  
Thesis: Experiments in Very Low-Frequency Radio Propagation.
- Thomas Pascoe Gordon (Chemistry). *A.B., Princeton University, 1954;*  
*M.S., California Institute of Technology, 1956.*  
Thesis: I. Studies in the Chemistry of Sodium Dithionite.  
II. A pH Study of the  $\alpha$ -Chymotrypsin Catalysed Hydrolysis of Methyl Hippurate.
- Thomas Neil Irvine (Geology and Geochemistry).  
*B.Sc., University of Manitoba, 1953; M.Sc., 1954.*  
Thesis: The Ultramafic Complex and Related Rocks of Duke Island, Southeastern Alaska.
- John Joseph Kalvinskas (Chemical Engineering).  
*S.B., Massachusetts Institute of Technology, 1951; S.M., 1952.*  
Thesis: Partial Oxidation of n-Butane.
- Donald Alvin Kohler (Physics and Mathematics). *B.S., University of Oregon, 1951; M.S., 1952.*  
Thesis: Observations on the Lifetimes of the 3.37-MEV  $2+$  State of  $\text{Be}^{10}$  and of the 6.14-MEV  $3-$  State of  $\text{O}^{16}$ .
- Hans Henry Kuehl (Electrical Engineering and Physics). *B.S.E., Princeton University, 1955;*  
*M.S., California Institute of Technology, 1956.*  
Thesis: Asymmetrically Excited Electromagnetic Radiation from Circular Cylinders of Finite Length and Prolate Spheroids.
- Stanley Lawrence Manatt (Chemistry and Physics).  
*B.S., California Institute of Technology, 1955.*  
Thesis: I. 3-Phenylcyclobut-2-enone and 3-Phenylcyclobutanone Derivatives.  
II. Calculation of the Delocalization Energies of Some Small-ring Systems Employing the Simple Molecular Orbital Treatment.



## DOCTOR OF PHILOSOPHY

- Richard Alan McKay (Chemical Engineering and Electrical Engineering).  
*B.S., California Institute of Technology, 1949; M.S., 1950.*  
Thesis: I. Measurement of the Latent Heat of Vaporization of Lighter Hydrocarbons—Values for Normal Octane. II. Volumetric and Phase Behavior in the Ethane-Propene System.
- William Geary Melbourne (Astronomy and Physics). *A.B., University of California at Los Angeles, 1954; M.S., California Institute of Technology, 1955.*  
Thesis: Line Blanketing Effects on Middle-type Main-sequence and Sub-dwarf Stars.
- James Edgar Mercereau (Physics and Engineering Science).  
*B.A., Pomona College, 1953; M.S., University of Illinois, 1954.*  
Thesis: Diffraction of Thermal Waves in Liquid Helium II.
- Joe Hill Mullins (Physics and Mathematics). *B.S., Agricultural and Mechanical College of Texas, 1950; M.S., California Institute of Technology, 1954.*  
Thesis: I. A  $WF_6$  Bubble Chamber. II. Physics of Bubble Chambers and Applications to Advanced Designs.
- Gordon Cedric Oates (Mechanical Engineering and Physics). *B.A.Sc., University of British Columbia, 1954; M.Sc., University of Birmingham, 1956.*  
Thesis: Throughflow in Axial Turbomachines with Variable Wall Geometry.
- Paul Pietrokowsky (Engineering Science and Physics).  
*B.A.S., University of California, 1944; M.S., 1948.*  
Thesis: A Study of Conformal Phases in Metal Alloy Systems.
- John Rischard Rice (Mathematics).  
*B.S., Oklahoma Agricultural and Mechanical College, 1954; M.S., 1956.*  
Thesis: The Characterization of Best Nonlinear Tchebycheff Approximations.
- Robert Gene Rinker (Chemical Engineering and Chemistry).  
*B.S., Rose Polytechnic Institute, 1951; M.S., California Institute of Technology, 1955.*  
Thesis: I. Studies in the Chemistry of Sodium Dithionite. II. A Preliminary Study of the Catalyzed Addition of Hydrogen Chloride to Vinyl Chloride in a Stirred Reactor.
- Winston Walker Royce (Aeronautics and Mathematics).  
*B.S., California Institute of Technology, 1951; M.S., 1952.*  
Thesis: Transonic Flow about a Non-lifting Slender Body of Revolution.
- Willard Van Tuyl Rusch (Electrical Engineering and Physics).  
*B.S.E., Princeton University, 1954; M.S., California Institute of Technology, 1955.*  
Thesis: A New Transmitting Antenna System for Very Low Radio Frequencies.
- Clay Marcus Sharts (Chemistry and Physics). *B.S., University of California, 1952.*  
Thesis: Some Fluorinated Cyclobutenes and their Derivatives.
- Ronald Lee Shreve (Geology and Physics). *B.S., California Institute of Technology, 1952.*  
Thesis: Geology and Mechanics of the Blackhawk Rockslide, Lucerne Valley, California.

## DOCTOR OF PHILOSOPHY

- Marc Stamm Silver (Chemistry and Physics). *A.B., Harvard College, 1955.*  
Thesis: Intermediates in Carbonium Ion Reactions of Methyl-substituted Cyclopropyl-carbinyl Cyclobutyl and Allylcarbinyl Derivatives.
- Darwin Waldron Smith (Chemistry and Physics).  
*B.S., University of California at Los Angeles, 1953.*  
Thesis: Some Electron Diffraction Studies: I. Electron Diffraction Studies of Some Heavy Metal Hexafluorides. II. The Molecular Structure of Gaseous  $N_2O_4$ . III. Applications of the Method of Least Squares in Electron Diffraction Investigations.
- Noboru Sueoka (Genetics and Immunology). *B.Agr., Kyoto University, 1953; M.Agr., 1955.*  
Thesis: Genetic and Biochemical Studies of Tyrosinase in *Neurospora*.
- Hugh Pettingill Taylor, Jr. (Geochemistry and Geology).  
*B.S., California Institute of Technology, 1954; A.M., Harvard University, 1955.*  
Thesis:  $O^{18}/O^{16}$  Ratios in Coexisting Minerals of Igneous and Metamorphic Rocks.
- Guy Allen Thompson, Jr. (Biochemistry and Chemistry). *B.S., Mississippi State College, 1953.*  
Thesis: The Biosynthesis of Carotenes in the Tomato.
- Frank Lee Vernon, Jr. (Electrical Engineering and Physics).  
*B.S., Southern Methodist University, 1949; M.S., University of California, 1952.*  
Thesis: The Theory of a General Quantum System Interacting with a Linear Dissipative System.
- Willard Henry Wells (Physics and Mathematics). *B.S., University of Texas, 1952.*  
Thesis: Quantum Theory of Coupled Systems Having Application to Masers.
- Paul Frederick Roberts Weyers (Aeronautics and Physics). *B.Sc., University of Sydney, 1950; B.E.(Ae.), 1952; M.S., California Institute of Technology, 1954.*  
Thesis: The Vibration and Acoustic Radiation of Thin-Walled Cylinders Caused by Internal Turbulent Flow.
- John Peter Wolf, III (Chemistry and Animal Physiology).  
*B.A., University of California at Riverside, 1956.*  
Thesis: I. The  $\alpha$ -Chymotrypsin-Catalyzed and Base-Catalyzed Hydrolysis of Some Substituted Glycine Esters and Related Compounds. II. The Nature and Properties of the Enzyme-Substrate Complex Produced under Conditions of Very High Substrate Concentrations. III. A Hypothesis Concerning  $\alpha$ -Chymotrypsin-Substrate Complexes.
- Norman Julius Zabusky (Physics). *B.E.E., The City College of New York, 1951; S.M., Massachusetts Institute of Technology, 1953.*  
Thesis: Hydromagnetic Stability of a Streaming Cylindrical Plasma.

CANDIDATES FOR COMMISSIONS  
UNITED STATES AIR FORCE  
RESERVE OFFICERS' TRAINING CORPS

Steven Martin Ahrens\*  
John Allan Conover\*  
Philip Darling Harriman  
David Vincent Owens  
James Sibley Petty  
Arthur Rosenthal

*\*Distinguished Air Force Reserve Officers' Training Corps Graduates*

## *Prizes and Awards*

### FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

*Awarded annually to "the senior who, in the opinion of the undergraduate Deans, has throughout his years at the Institute made the greatest contribution to the welfare of the student body and whose qualities of leadership, character and responsibility have been outstanding."*

*(Recipient to be announced)*

---

### DON BAXTER, INC. PRIZES IN CHEMISTRY

*Awarded to the two undergraduate students who during the year have carried out the best original researches in chemistry.*

*First Prize: DONALD H. VOET*

*Second Prize: DAVID V. OWENS*

### CONGER PEACE PRIZE ORATION

*Established in 1912 by the late Everett D. Conger, D.D.*

*First Prize: THOMAS M. JOVIN*

*Second Prize: KEITH BROWN, JR.*

### INSTITUTE OF THE AERONAUTICAL SCIENCES SCHOLASTIC AWARD

*Awarded to the student member of the I.A.S. attaining the best scholastic record in engineering or the physical sciences.*

**GEORGE C. VLASES**

## *Prizes and Awards—continued*

### DAVID JOSEPH MACPHERSON PRIZE

*Awarded annually for the winning essay in a contest open to Seniors in the Division of Engineering. The award is made in order to stimulate interest and excellence in written communication.*

BRENT BANTA

### MARY A. EARLE MCKINNEY PRIZE IN ENGLISH

*Established in 1946 by the late Samuel P. McKinney, M.D.,  
as a memorial to his mother.*

*First Prize:* ROBERT LEROY WAX

*Second Prize:* DAVID BERNARD BENSON

### DON SHEPARD AWARD

*Awarded annually to one or more outstanding residents of the Student Houses in order to pursue cultural opportunities which they might otherwise not be able to enjoy.*

BRADLEY EFRON

THOMAS M. JOVIN

