



THE UNIVERSITY OF ALABAMA

GRADUATE PROGRAMS FOR M.S. AND PH.D. DEGREES IN CHEMICAL ENGINEERING

The University of Alabama, enrolling approximately 14,000 undergraduate and 2,500 graduate students per year, is located in Tuscaloosa, a town of some 70,000 population in West Central Alabama. Since the climate is warm, outdoor activities are possible most of the year.

The Department of Chemical Engineering has an annual enrollment of approximately 200 undergraduate and 25 graduate students. For information concerning available graduate fellowships and assistantships, contact: Director of Graduate Studies, Department of Chemical Engineering, P.O. Box G, University, AL 35486.

FACULTY AND RESEARCH INTEREST

G.C. April, Ph.D. (Louisiana State): Biomass Conversion, Modeling, Transport Processes

D.W. Arnold, Ph.D. (Purdue): Thermodynamics, Physical Properties, Phase Equilibrium

J.H. Black, Ph.D. (Pittsburgh): Process Design, Cost Engineering, Economics

W.C. Clements, Jr., Ph.D. (Vanderbilt): Process Dynamics and Control, Micro-computer Hardware

W.J. Hatcher, Jr., Ph.D. (Louisiana State): Catalysis, Chemical Reactor Design, Reaction Kinetics

I.A. Jefcoat, Ph.D. (Clemson University): Syn-fuels, Environmental, Alternate Chemical Feedstocks

E.K. Landis, Ph.D. (Carnegie Institute of Technology): Metallurgical Processes, Solid-liquid Separations, Thermodynamics

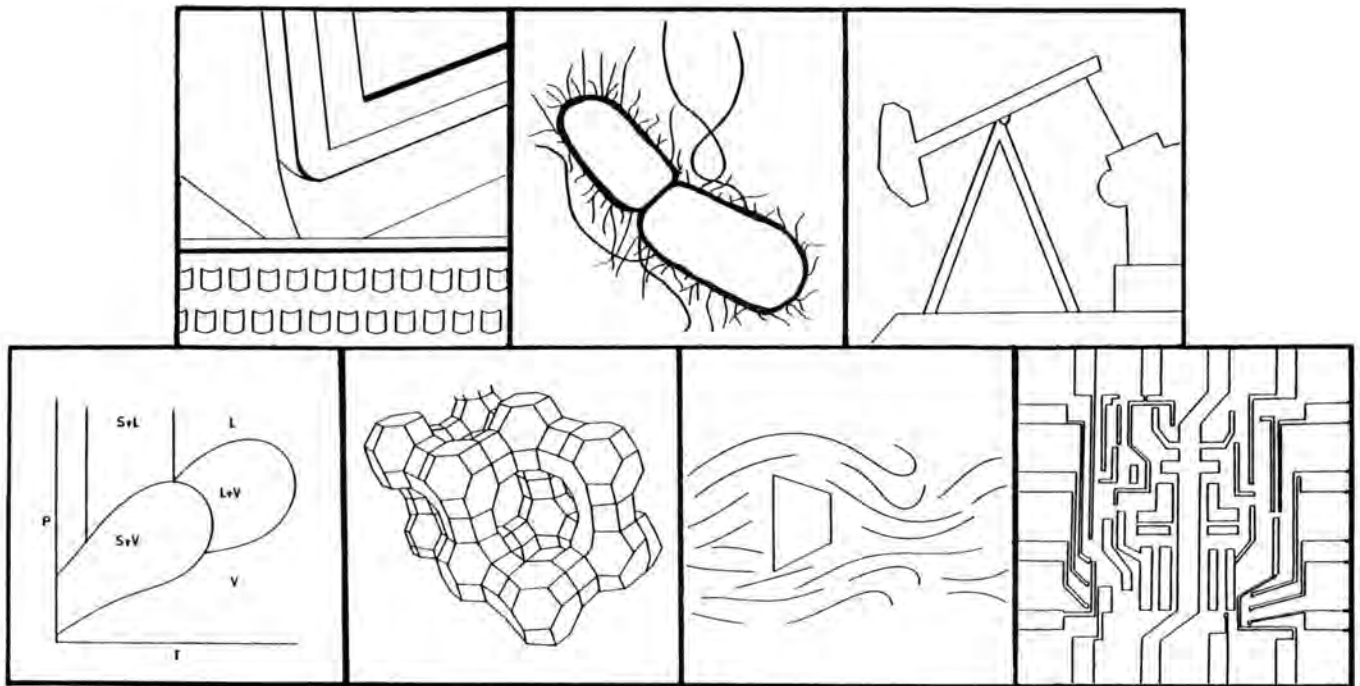
M.D. McKinley, Ph.D. (Florida): Coal and Oil Shale, Mass Transfer, Separation Processes

L.Y. Sadler, III, Ph.D. (Alabama): Energy Conversion Processes, Rheology, Lignite Technology

Chemical Engineering at

UNIVERSITY OF ALBERTA

EDMONTON, CANADA



FACULTY AND RESEARCH INTERESTS

I.G. DALLA LANA, Ph.D. (Minnesota): Kinetics, Heterogeneous Catalysis.

D.G. FISHER, Ph.D. (Michigan): Process Dynamics and Control, Real-Time Computer Applications.

M.R. GRAY, Ph.D. (Caltech): Chemical Kinetics, Characterization of Complex Organic Mixtures, Bioreactors.

R.E. HAYES, Ph.D. (Bath): Catalysis, Kinetic Modelling.

D.T. LYNCH, Ph.D. (Alberta): Catalysis, Kinetic Modelling, Numerical Methods, Computer-Aided Design.

J. MARTIN-SANCHEZ, Ph.D. (Barcelona): Process Control, Adaptive-Predictive Control, Systems Theory.

J.H. MASLIYAH, Ph.D. (British Columbia): Transport Phenomena, Numerical Analysis, Particle-Fluid Dynamics.

A.E. MATHER, Ph.D. (Michigan): Phase Equilibria, Fluid Properties at High Pressures, Thermodynamics.

A.J. MORRIS, Ph.D. (Newcastle-Upon-Tyne): Process Control, Real Time Use of Microcomputers, Process Simulation.

K. NANDAKUMAR, Ph.D. (Princeton): Transport Phenomena, Process Simulation, Computational Fluid Dynamics.

W.K. NADER, Dr. Phil. (Vienna) Heat Transfer, Transport Phenomena in Porous Media, Applied Mathematics.

F.D. OTTO, Ph.D. (Michigan), DEAN OF ENGINEERING: Mass Transfer, Gas-Liquid Reactions, Separation Processes, Heavy Oil Upgrading.

D. QUON, Sc.D. (M.I.T.), PROFESSOR EMERITUS: Energy Modelling and Economics.

D.B. ROBINSON, Ph.D. (Michigan), PROFESSOR EMERITUS: Thermal and Volumetric Properties of Fluids, Phase Equilibria, Thermodynamics.

J.T. RYAN, Ph.D. (Missouri): Energy Economics and Supply, Porous Media.

S.L. SHAH, Ph.D. (Alberta): Linear Systems Theory, Adaptive Control, Stability Theory, Stochastic Control.

S.E. WANKE, Ph.D. (California-Davis), CHAIRMAN: Catalysis, Kinetics.

R.K. WOOD, Ph.D. (Northwestern): Process Dynamics and Identification, Control of Distillation Columns, Computer-Aided Design.

CHAIRMAN,
Department of Chemical Engineering,
University of Alberta,
Edmonton, Canada T6G 2G6



THE UNIVERSITY OF ARIZONA

TUCSON, AZ

The Chemical Engineering Department at the University of Arizona is young and dynamic with a fully accredited undergraduate degree program and M.S. and Ph.D. graduate programs. Financial support is available through government grants and contracts, teaching, and research assistantships, traineeships and industrial grants. The faculty assures full opportunity to study in all major areas of chemical engineering. Graduate courses are offered in most of the research areas listed below.

THE FACULTY AND THEIR RESEARCH INTERESTS ARE:

MILAN BIER, Professor

Ph.D., Fordham University, 1950
Protein Separation, Electrophoresis, Membrane Transport

HERIBERTO CABEZAS, Asst. Professor

University of Florida, 1984
Liquid Solution Theory, Solution Thermodynamics
Polyelectrolyte Solutions

WILLIAM P. COSART, Assoc. Professor

Ph.D., Oregon State University, 1973
Heat Transfer in Biological Systems, Blood Processing

EDWARD J. FREEH, Adjunct Professor

Ph.D., Ohio State University, 1958
Process Control, Computer Applications

JOSEPH F. GROSS, Professor

Ph.D., Purdue University, 1956
Boundary Layer Theory, Pharmacokinetics, Fluid Mechanics and
Mass Transfer in The Microcirculation, Biorheology

SIMON P. HANSON, Asst. Professor

Sc.D., Massachusetts Inst. Technology, 1982
Coupled Transport Phenomena in Heterogeneous Systems, Com-
bustion and Fuel Technology, Pollutant Emissions, Separation
Processes, Applied Mathematics

GARY K. PATTERSON, Professor and Head

Ph.D., University of Missouri-Rolla, 1966
Rheology, Turbulent Mixing, Turbulent Transport, Numerical
Modelling of Transport

THOMAS W. PETERSON, Assoc. Professor

Ph.D., California Institute of Technology, 1977
Atmospheric Modeling of Aerosol Pollutants, Long-Range Pollutant
Transport, Particulate Growth Kinetics, Combustion Aerosols

ALAN D. RANDOLPH, Professor

Ph.D., Iowa State University, 1962
Simulation and Design of Crystallization Processes, Nucleation
Phenomena, Particulate Processes, Explosives Initiation Mechanisms

THOMAS R. REHM, Professor

Ph.D., University of Washington, 1960
Mass Transfer, Process Instrumentation, Packed Column Distillation,
Computer Aided Design

FARHANG SHADMAN, Assoc. Professor

Ph.D., University of California-Berkeley, 1972
Reaction Engineering, Kinetics, Catalysis, Coal Conversion

JOST O. L. WENDT, Professor

Ph.D., Johns Hopkins University, 1968
Combustion Generated Air Pollution, Nitrogen and Sulfur Oxide
Abatement, Chemical Kinetics, Thermodynamics, Interfacial Phen-
omena

DON H. WHITE, Professor

Ph.D., Iowa State University, 1949
Polymers Fundamentals and Processes, Solar Energy, Microbial
and Enzymatic Processes

DAVID WOLF, Visiting Professor

D.Sc., Technion, 1962.
Energy, Fermentation, Mixing

Tucson has an excellent climate and many recreational opportunities. It is a growing, modern city of 450,000 that retains much of the old Southwestern atmosphere.

For further information,
write to:

Dr. Farhang Shadman
Graduate Study Committee
Department of
Chemical Engineering
University of Arizona
Tucson, Arizona 85721

The University of Arizona is an
equal opportunity educational
institution/equal opportunity employer





ARIZONA STATE UNIVERSITY

Graduate Programs for M.S. and Ph.D. Degrees in Chemical and Bio Engineering

Research Specializations Include:

ENERGY CONSERVATION • ADSORPTION/SEPARATION •
BIOMEDICAL ENGINEERING • TRANSPORT PHENOMENA •
SURFACE PHENOMENA • REACTION ENGINEERING •
CATALYSIS • ENVIRONMENTAL CONTROL • MATERIALS •
ENGINEERING DESIGN • PROCESS CONTROL •

Our excellent facilities for research and teaching are complemented by a highly-respected faculty:

James R. Beckman, University of Arizona, 1976
Lynn Bellamy, Tulane University, 1966
Neil S. Berman, University of Texas, 1962
Llewellyn W. Bezanson, Clarkson College, 1983
Veronica A. Burrows, Princeton University, 1985
Timothy S. Cale, University of Houston, 1980
William J. Crowe, University of Florida, 1969 (Adjunct)
William J. Dorson, Jr., University of Cincinnati, 1967
R. Leighton Fisk, MD, University of Alberta, Canada, 1972 (Adjunct)
David E. Haskins, University of Oklahoma, 1964 (Adjunct)
James B. Koeneman, University of Western Australia, 1981 (Adjunct)
James T. Kuester, Texas A&M University, 1970
Gregory Raupp, University of Wisconsin, 1984
Castle O. Reiser, University of Wisconsin, 1945 (Emeritus)
Vernon E. Sater, Illinois Institute of Technology, 1963
Robert S. Torrest, University of Minnesota, 1967
Bruce C. Towe, Pennsylvania State University, 1978
Allan M. Weinstein, Polytechnic Institute of Brooklyn, 1972 (Adjunct)
Jack M. Winters, University of California, Berkeley, 1985
Imre Zwiebel, Yale University, 1961

Fellowships and teaching and research assistantships are available to qualified applicants.

ASU in Tempe, a city of 120,000, part of the greater Phoenix metropolitan area. More than 38,000 students are enrolled in ASU's ten colleges; 10,000 of whom are in graduate study. Arizona's year-round climate and scenic attractions add to ASU's own cultural and recreational facilities.

FOR INFORMATION, CONTACT:

Imre Zwiebel, Chairman,
Department of Chemical and Bio Engineering
Arizona State University, Tempe, AZ 85287

Arizona State University vigorously pursues affirmative action and equal opportunity in its employment, activities and programs.



GRADUATE STUDIES

CHEMICAL ENGINEERING



Auburn University

Auburn **ae**
Engineering



THE FACULTY

R. P. CHAMBERS (University of California, 1965)
C. W. CURTIS (Florida State University, 1976)
J. A. GUIN (University of Texas, 1970)
L. J. HIRTH (University of Texas, 1958)
A. C. T. HSU (University of Pennsylvania, 1953)
Y. Y. LEE (Iowa State University, 1972)
R. D. NEUMAN (Inst. Paper Chemistry, 1973)
T. D. PLACEK (University of Kentucky, 1978)
C. W. ROOS (Washington University, 1951)
A. R. TARRER (Purdue University, 1973)
B. J. TATARCHUK (University of Wisconsin, 1981)
D. L. VIVES (Columbia University, 1949)
D. C. WILLIAMS (Princeton University, 1980)

FOR INFORMATION AND APPLICATION, WRITE

Dr. R. P. Chambers, Head
Chemical Engineering
Auburn University, AL 36849

RESEARCH AREAS

Biomedical/Biochemical Engineering	Process Simulation
Biomass Conversion	Reaction Engineering
Coal Conversion	Reaction Kinetics
Environmental Pollution	Separations
Heterogeneous Catalysis	Surface Science
Oil Processing	Transport Phenomena
Process Design and Control	Thermodynamics
Interfacial Phenomena	Pulp and Paper Engineering

THE PROGRAM

The Department is one of the fastest growing in the Southeast and offers degrees at the M.S. and Ph.D. levels. Research emphasizes both experimental and theoretical work in areas of national interest, with modern research equipment available for most all types of studies. Generous financial assistance is available to qualified students.

Auburn University is an Equal Opportunity Educational Institution



Graduate Studies in Chemical Engineering at Brigham Young University, Provo, Utah

*Programs of study leading to the M.E., M.S. and Ph.D. degrees on a
beautiful campus located at the base of the Rocky Mountains.*

Faculty

Dee Barker, *U. of Utah, 1951*
Calvin H. Bartholomew, *Stanford, 1972*
Merrill W. Beckstead, *U. of Utah, 1965*
Douglas N. Bennion, *Berkeley, 1964*
B. Scott Brewster, *U. of Utah, 1979*
James J. Christensen, *Carnegie Mellon, 1957*
Richard W. Hanks, *U. of Utah, 1960*
William C. Hecker, *Berkeley, 1982*
Paul O. Hedman, *BYU, 1973*
John L. Oscarson, *U. of Michigan, 1982*
Richard L. Rowley, *Michigan State, 1978*
Philip J. Smith, *BYU, 1979*
L. Douglas Smoot, *U. of Washington, 1960*
Kenneth A. Solen, *U. of Wisconsin, 1974*

For additional information and application, write:

Graduate Coordinator
Department of Chemical Engineering
350 CB
Brigham Young University
Provo, Utah 84602

Research Areas

Thermodynamics
Transport Phenomena
Calorimetry
Computer Simulation
Coal Combustion and Gasification
Kinetics and Catalysis
Biomedical Engineering
Fluid Mechanics
Chemical Propulsion
Mathematical Modeling
Electrochemistry
Membrane Transport
Nonequilibrium Thermodynamics
Process Design and Control



**THE
UNIVERSITY
OF CALGARY**



The University is located in the City of Calgary, the oil capital of Canada, the home of the world famous Calgary Stampede and the 1988 Winter Olympics. The city combines the traditions of the Old West with the sophistication of a modern urban centre. Beautiful Banff National Park is 110 km west of the City and the ski resorts of the Banff, Lake Louise and Kananaskis areas are readily accessible.

FOR ADDITIONAL INFORMATION WRITE

**Dr. R. G. Moore, Chairman
Graduate Studies Committee
Dept. of Chemical & Petroleum Eng.
The University of Calgary
Calgary, Alberta T2N 1N4 Canada**

GRADUATE STUDIES IN CHEMICAL AND PETROLEUM ENGINEERING

The Department offers programs leading to the M.Sc. and Ph.D. degrees (full-time) and the M. Eng. degree (part-time) in the following areas:

- Thermodynamics—Phase Equilibria
- Heat Transfer and Cryogenics
- Catalysis, Reaction Kinetics and Combustion
- Multiphase Flow in Pipelines
- Fluid Bed Reaction Systems
- Environmental Engineering
- Petroleum Engineering and Reservoir Simulation
- Enhanced Oil Recovery
- In-Situ Recovery of Bitumen and Heavy Oils
- Natural Gas Processing and Gas Hydrates
- Computer Simulation of Separation Processes
- Computer Control and Optimization of Engineering and Bio Processes
- Biotechnology and Biorheology

Fellowships and Research Assistantships are available to qualified applicants.

FACULTY

R. A. HEIDEMANN , Head	(Wash. U.)
A. BADA KHSHAN	(Birm. U.K.)
L. A. BEHIE	(W. Ont.)
D. W. B. BENNION	(Penn. State)
P. R. BISHNOI	(Alberta)
R. M. BUTLER	(Imp. Coll. U.K.)
M. FOGARASI	(Alberta)
M. A. HASTAOGLU	(SUNY)
J. HAVLENA	(Czech.)
A. A. JEJE	(MIT)
N. E. KALOGERAKIS	(Toronto)
A. K. MEHROTRA	(Calgary)
M. F. MOHTADI	(Birm. U.K.)
R. G. MOORE	(Alberta)
P. M. SIGMUND	(Texas)
J. STANISLAV	(Prague)
W. Y. SVRCEK	(Alberta)
E. L. TOLLEFSON	(Toronto)

THE UNIVERSITY OF CALIFORNIA,

BERKELEY...



... offers graduate programs leading to the Master of Science and Doctor of Philosophy. Both programs involve joint faculty-student research as well as courses and seminars within and outside the department. Students have the opportunity to take part in the many cultural offerings of the San Francisco Bay Area, and the recreational activities of California's northern coast and mountains.

RESEARCH INTERESTS

ENERGY UTILIZATION
ENVIRONMENTAL PROTECTION
KINETICS AND CATALYSIS
THERMODYNAMICS
POLYMER TECHNOLOGY
ELECTROCHEMICAL ENGINEERING
PROCESS DESIGN AND DEVELOPMENT
SURFACE AND COLLOID SCIENCE
BIOCHEMICAL ENGINEERING
SEPARATION PROCESSES
FLUID MECHANICS AND RHEOLOGY
ELECTRONIC MATERIALS PROCESSING

FACULTY

Alexis T. Bell (Chairman)
Harvey W. Blanch
Elton J. Cairns
Morton M. Denn
Alan S. Foss
Simon L. Goren
David B. Graves
Edward A. Grens
Donald N. Hanson
Dennis W. Hess
C. Judson King
Scott Lynn
James N. Michaels
John S. Newman
Eugene E. Petersen
John M. Prausnitz
Clayton J. Radke
Jeffrey A. Reimer
David S. Soong
Doros N. Theodorou
Charles W. Tobias
Charles R. Wilke
Michael C. Williams

PLEASE WRITE:

Department of Chemical Engineering
UNIVERSITY OF CALIFORNIA
Berkeley, California 94720

UNIVERSITY OF CALIFORNIA DAVIS



Course Areas

Applied Kinetics and Reactor Design
Applied Mathematics
Biotechnology
Colloid and Interface Processes
Fluid Mechanics
Heat Transfer
Mass Transfer
Process Control
Process Design
Rheology
Semiconductor Device Fabrication
Separation Processes
Thermodynamics
Transport Processes in Porous Media

Program

UC Davis, with 19,000 students, is one of the major campuses of the University of California system and has developed great strength in many areas of the biological and physical sciences. The Department of Chemical Engineering emphasizes research and a program of fundamental graduate courses in a wide variety of fields of interest to chemical engineers. In addition, the department can draw upon the expertise of faculty in other areas in order to design individual programs to meet the specific interests and needs of a student, even at the M.S. level. This is done routinely in the areas of environmental engineering, food engineering, biochemical engineering and biomedical engineering.

Excellent laboratories, computation center and electronic and mechanical shop facilities are available. Fellowships, Teaching Assistantships and Research Assistantships (all providing additional summer support if desired) are available to qualified applicants.

Degrees Offered

Master of Science
Doctor of Philosophy

Faculty

RICHARD L. BELL, University of Washington
Mass Transfer, Biomedical Applications
ROGER B. BOULTON, University of Melbourne
Enology, Fermentation, Filtration, Process Control
BRIAN G. HIGGINS, University of Minnesota
Fluid Mechanics of Thin Film Coating, Interfacial Phenomena
ALAN P. JACKMAN, University of Minnesota
Environmental Engineering, Transport Phenomena
BEN J. McCOY, University of Minnesota
Separation and Transport Process, Kinetics
KAREN A. McDONALD, University of Maryland
Process Control, Biochemical Engineering
AHMET N. PALAZOGLU, Rennselaer Polytechnic Institute
Process Design and Process Control
ROBERT L. POWELL, The Johns Hopkins University
Rheology, Fluid Mechanics, Acoustics, Hazardous Waste
DEWEY D. Y. RYU, Massachusetts Inst. of Technology
Biochemical Engineering, Fermentation
JOE M. SMITH, Massachusetts Institute of Technology
Applied Kinetics and Reactor Design
PIETER STROEVE, Massachusetts Institute of Technology
Mass Transfer, Colloids, Biotechnology, Thin Film Technology
STEPHEN WHITAKER, University of Delaware
Fluid Mechanics, Interfacial Phenomena, Transport Processes in Porous Media

Davis and Vicinity

The campus is a 20-minute drive from Sacramento and just over an hour away from the San Francisco Bay area. Outdoor sports enthusiasts can enjoy water sports at nearby Lake Berryessa, skiing and other alpine activities in the Sierra (2 hours from Davis). These recreational opportunities combine with the friendly informal spirit of the Davis campus to make it a pleasant place in which to live and study.

Married student housing, at reasonable cost, is located on campus. Both furnished and unfurnished one- and two-bedroom apartments are available. The town of Davis (population 36,000) is adjacent to the campus, and within easy walking or cycling distance.

For further details on graduate study at Davis, please write to:

**Graduate Advisor
Chemical Engineering Department
University of California
Davis, California 95616
or call (916) 752-0400**

CHEMICAL ENGINEERING

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PROGRAMS

UCLA's Chemical Engineering Department maintains academic excellence in its graduate programs by offering diversity in both curriculum and research opportunities. The department's continual growth is demonstrated by the newly established Institute for Medical Engineering and the National Center for Intermedia Transport Research, adding to the already wide spectrum of research activities.

Fellowships are available for outstanding applicants. A fellowship includes a waiver of tuition and fees plus a stipend.

Located five miles from the Pacific Coast, UCLA's expansive 417 acre campus extends from Bel Air to Westwood Village. Students have access to the highly regarded sciences programs and to a variety of experiences in theatre, music, art and sports on campus.

CONTACT

Admissions Officer
Chemical Engineering Department
5531 Boelter Hall
UCLA
Los Angeles, Ca 90024

FACULTY

D.T. Allen	Ken Nobe
Yoram Cohen	L.B. Robinson
T.H.K. Frederking	O.I. Smith
S.K. Friedlander	W.D. Van Vorst
Robert F. Hicks	V.L. Vilker
E.L. Knuth	A.R. Wazzan
V. Manousiouthakis	F.E. Yates

RESEARCH AREAS

Thermodynamics and Cryogenics
Reverse Osmosis and Membrane Transport
Process Design and Systems Analysis
Polymer Processing and Rheology
Mass Transfer and Fluid Mechanics
Kinetics, Combustion and Catalysis
Electrochemistry and Corrosion
Biochemical and Biomedical Engineering
Aerosol and Environmental Engineering

UNIVERSITY OF CALIFORNIA

SANTA BARBARA



FACULTY AND RESEARCH INTERESTS

SANJOY BANERJEE

Ph.D. (Waterloo)
(Chairman)
Two Phase Flow, Reactor Safety,
Nuclear Fuel Cycle Analysis
and Wastes

PRAMOD AGRAWAL

Ph.D. (Purdue)
Biochemical Engineering, Fermentation
Science

HENRI FENECH Ph.D. (M.I.T.)

Nuclear Systems Design and Safety,
Nuclear Fuel Cycles, Two-Phase Flow,
Heat Transfer.

OWEN T. HANNA Ph.D. (Purdue)

Theoretical Methods, Chemical
Reactor Analysis, Transport
Phenomena.

SHINICHI ICHIKAWA

Ph.D. (Stanford)
Adsorption and Heterogeneous
Catalysis

GLENN E. LUCAS Ph.D. (M.I.T.)

Radiation Damage, Mechanics of
Materials.

DUNCAN A. MELLICHAMP

Ph.D. (Purdue)
Computer Control, Process
Dynamics, Real-Time Computing.

JOHN E. MYERS Ph.D. (Michigan)

(Dean of Engineering)
Boiling Heat Transfer.

G. ROBERT ODETTE Ph.D. (M.I.T.)

Radiation Effects in Solids, Energy
Related Materials Development.

A. EDWARD PROFIO

Ph.D. (M.I.T.)
Bionuclear Engineering, Fusion
Reactors, Radiation Transport
Analyses.

ROBERT G. RINKER Ph.D. (Caltech)

Chemical Reactor Design, Catalysis,
Energy Conversion, Air Pollution.

ORVILLE C. SANDALL

Ph.D. (U.C. Berkeley)
Transport Phenomena, Separation
Processes.

DALE E. SEBORG Ph.D. (Princeton)

Process Control, Computer Control,
Process Identification.

THEOFANIS G. THEOFANOUS

Ph.D. (Minnesota)
Nuclear and Chemical Plant Safety,
Multiphase Flow, Thermalhydraulics

PROGRAMS AND FINANCIAL SUPPORT

The Department offers M.S. and Ph.D. degree programs. Financial aid, including fellowships, teaching assistantships, and research assistantships, is available. Some awards provide limited moving expenses.

THE UNIVERSITY

One of the world's few seashore campuses, UCSB is located on the Pacific Coast 100 miles northwest of Los Angeles and 330 miles south of San Francisco. The student enrollment is over 14,000. The metropolitan Santa Barbara area has over 150,000 residents and is famous for its mild, even climate.

For additional information and applications, write to:

**Professor Sanjoy Banerjee, Chairman
Department of Chemical & Nuclear
Engineering
University of California,
Santa Barbara, CA 93106**

Caltech



PROGRAM OF STUDY Distinctive features of study in chemical engineering at the California Institute of Technology are the creative research atmosphere and the strong emphasis on basic chemical, physical, and mathematical disciplines in the program of study. In this way a student can properly prepare for a productive career of research, development, or teaching in a rapidly changing and expanding technological society.

A course of study is selected in consultation with one or more of the faculty listed below. Required courses are minimal. The Master of Science degree is normally completed in one calendar year and a thesis is not required. A special M.S. option, involving either research or an integrated design project, is a feature of the overall program of graduate study. The Ph.D. degree requires a minimum of three years subsequent to the B.S. degree, consisting of thesis research and further advanced study.

FINANCIAL ASSISTANCE Graduate students are supported by fellowship, research assistantship, or teaching assistantship appointments during both the academic year and the summer months. A student may carry a full load of graduate study and research in addition to any assigned assistantship duties. The Institute gives consideration for admission and financial assistance to all qualified applicants regardless of race, religion, or sex.

APPLICATIONS Further information and an application form may be obtained by writing

Professor L. Gary Leal
Chemical Engineering
California Institute of Technology
Pasadena, California 91125

It is advisable to submit applications before February 15, 1986.

JAMES E. BAILEY, Professor
Ph.D. (1969), Rice University
Biochemical engineering; chemical reaction engineering.

JOHN F. BRADY, Associate Professor
Ph.D. (1981), Stanford University
Fluid mechanics; transport properties of heterogeneous systems

GEORGE R. GAVALAS, Professor
Ph.D. (1964), University of Minnesota
Applied kinetics and catalysis; process control and optimization; coal gasification.

L. GARY LEAL, Professor
Ph.D. (1969), Stanford University
Theoretical and experimental fluid mechanics; heat and mass transfer; suspension rheology; mechanics of non-Newtonian fluids.

MANFRED MORARI, Professor
Ph.D. (1977), University of Minnesota
Process control; process design

C. DWIGHT PRATER, Visiting Associate
Ph.D. (1951), University of Pennsylvania
Catalysis; chemical reaction engineering; process design and development.

JOHN H. SEINFELD, Louis E. Nohl Professor,
Executive Officer
Ph.D. (1967), Princeton University
Air pollution; control and estimation theory.

FRED H. SHAIR, Professor
Ph.D. (1963), University of California, Berkeley
Plasma chemistry and physics; tracer studies of various environmental and safety related problems.

NICHOLAS W. TSCHOEGL, Professor
Ph.D. (1958), University of New South Wales
Mechanical properties of polymeric materials; theory of viscoelastic behavior; structure-property relations in polymers.

W. HENRY WEINBERG, Chevron Professor
Ph.D. (1970), University of California, Berkeley
Surface chemistry and catalysis.

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- Ethel Casassa* *Colloids and Polymers*
- Michael Domach* *Biochemical Engineering*
- Ignacio Grossmann* *Process Synthesis and Design*
- Rakesh Jain* *Biomedical Engineering*
- Myung Jhon* *Polymer Science*
- Edmond Ko* *Heterogeneous Catalysis*

— side two —

- Kun Li* *Gas-Solid Reaction Kinetics*
- Gregory McRae* *Mathematical Modeling and Environmental Engineering*
- Geoffrey Parfitt* *Colloidal Phenomena*
- Gary Powers* *Process Synthesis and Design*
- Dennis Prieve* *Colloid and Surface Science*
- Paul Sides* *Electrochemical Engineering*
- Herbert Toor* *Heat and Mass Transfer*
- Arthur Westerberg* *Design Research*



Carnegie-Mellon University

Write:

Director of Graduate Admissions
Department of Chemical Engineering
Carnegie-Mellon University
Pittsburgh, PA 15213

Study Chemical Engineering

At one of the nation's top chemical engineering research facilities

Case Western Reserve University

Case Tech

Specializations in:

- Electrochemical engineering
- Surfaces and colloids
- Laser applications
- Mixing and separations
- Process control

Faculty and specializations:

The Second Century

Robert J. Adler, Ph.D. 1959, Lehigh University
Particle separations, mixing, acid gas recovery

John C. Angus, Ph.D. 1960, University of Michigan
Redox equilibria, thin carbon films, modulated electroplating

Coleman B. Brosilow, Ph.D. 1962, Polytechnic Institute of Brooklyn
Adaptive inferential control, multivariable control, coordination algorithms

Robert V. Edwards, Ph.D. 1968, Johns Hopkins University
Laser anemometry, mathematical modelling, data acquisition

Donald L. Feke, Ph.D. 1981, Princeton University
Colloidal phenomena, ceramic dispersions, fine-particle processing

Nelson C. Gardner, Ph.D. 1966, Iowa State University
High-gravity separations, sulfur removal processes

Uziel Landau, Ph.D. 1975, University of California (Berkeley)
Electrochemical engineering, current distributions, electrodeposition

Chung-Chiun Liu, Ph.D. 1968, Case Western Reserve University
Electrochemical sensors, electrochemical synthesis, electrochemistry related to electronic materials

J. Adin Mann, Jr., Ph.D. 1968, Iowa State University
Surface phenomena, interfacial dynamics, light scattering

Syed Qutubuddin, Ph.D. 1983, Carnegie-Mellon University
Surfactant systems, metal extraction, enhanced oil recovery

For more information contact:

Graduate Coordinator, Department of Chemical Engineering
Case Western Reserve University
Cleveland, Ohio 44106

The
**UNIVERSITY
OF
CINCINNATI**



**GRADUATE STUDY in
Chemical Engineering
M.S. and Ph.D. Degrees**



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Joel Fried
Rakesh Govind
David Greenberg
Daniel Hershey
Sun-Tak Hwang
Yuen-Koh Kao
Soon-Jai Khang
Sotiris Pratsinis
Neville Pinto
Stephen Thiel
Joel Weisman

CHEMICAL REACTION ENGINEERING AND HETEROGENEOUS CATALYSIS

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PROCESS SYNTHESIS

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POLYMERS

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Thermodynamics, thermal analysis
and morphology of polymer blends.*

AIR POLLUTION

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TWO-PHASE FLOW

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MEMBRANE SEPARATIONS

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William Beckwith

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James M. Haile
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Earle Hall
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Clemson, South Carolina 29631



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GRADUATE STUDY
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M.S. and Ph.D. Programs



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DAVID E. CLOUGH, Associate Professor
Ph.D. (1975), University of Colorado
Fluidization, Process Control

ROBERT H. DAVIS, Assistant Professor
Ph.D. (1983), Stanford University
Fluid Dynamics of Suspensions, Biotechnology

JOHN L. FALCONER, Professor
Ph.D. (1974), Stanford University
Heterogeneous Catalysis, Surface Science

R. IGOR GAMOW, Associate Professor
Ph.D. (1967), University of Colorado
Biophysics, Bioengineering

PAUL G. GLUGLA, Assistant Professor
Ph.D. (1977), University of Illinois
Ionic Solutions, Thermodynamics, Membrane Separations

R. CURTIS JOHNSON, Professor
Ph.D. (1951), Pennsylvania State University
Global Modeling

DHINAKAR S. KOMPALA, Assistant Professor
Ph.D. (1984), Purdue University
Biochemical Engineering, Biotechnology, Mathematical Modeling

WILLIAM B. KRANTZ, Professor
Ph.D. (1968), University of California, Berkeley
Membranes, Geophysical Fluid Mechanics, Coal Gasification, Transport Processes in Permafrost

LEE L. LAUDERBACK, Assistant Professor
Ph.D. (1982), Purdue University
Surface Science, Heterogeneous Catalysis, Molecular Dynamics

MAX S. PETERS, Professor
Ph.D. (1951), Pennsylvania State University
Biomass Conversion, Economics

W. FRED RAMIREZ, Professor
Ph.D. (1965), Tulane University
Optimal Control and Identification, Transport in Porous Media

ROBERT L. SANI, Professor
Ph.D. (1963), University of Minnesota
Numerical Techniques in Fluid Dynamics, Membranes

KLAUS D. TIMMERHAUS, Chairman and
James M. and Catherine T. Patten Professor
Ph.D. (1951), University of Illinois
Economics, Thermodynamics, Heat Transfer

RONALD E. WEST, Professor
Ph.D. (1958), University of Michigan
Water Pollution Control, Solar Energy Utilization

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University of Colorado
Boulder, Colorado 80309-0424

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- A. J. Kidnay**, Professor and Head; D.Sc., Colorado School of Mines. Thermodynamic properties of coal-derived liquids, vapor-liquid equilibria in natural gas systems, cryogenic engineering.
- J. H. Gary**, Professor; Ph.D., University of Florida. Upgrading of shale oil and coal liquids, petroleum refinery processing operations, heavy oil processing.
- E. D. Sloan, Jr.**, Professor; Ph.D., Clemson University. Phase equilibrium thermodynamics measurements of natural gas fluids and natural gas hydrates, thermal conductivity measurements for coal derived fluids, adsorption equilibria measurements, stagewise processes, education methods research.
- V. F. Yesavage**, Professor; Ph.D., University of Michigan. Thermodynamic properties of fluids, especially relating to synthetic fuels. Oil shale and shale oil processing; numerical methods.
- R. M. Baldwin**, Professor, Ph.D., Colorado School of Mines. Mechanisms of coal liquefaction, kinetics of coal hydrogenation, relation of coal geochemistry to liquefaction kinetics, upgrading of coal-derived asphaltenes, supercritical gas extraction of oil shale and heavy oil.
- M. S. Graboski**, Associate Professor; Ph.D., Pennsylvania State University. Coal and biomass gasification processes, gasification kinetics, thermal conductivity of coal liquids, kinetics of SNG upgrading.
- M. C. Jones**, Associate Professor; Ph.D., University of California at Berkeley. Heat transfer and fluid mechanics in oil shale retorting, radiative heat transfer in porous media, free convection in porous media.
- M. S. Selim**, Associate Professor; Ph.D., Iowa State University. Flow of concentrated fine particulate suspensions in complex geometries; Sedimentation of multisized, mixed density particle suspensions.
- A. L. Bunge**, Associate Professor; Ph.D., University of California at Berkeley. Chromatographic processes, enhanced oil recovery, minerals leaching, liquid membrane separations, ion exchange equilibria.

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University of Wisconsin

Bruce Dale, Ph.D.
Purdue University

Jud Harper, Ph.D.,
Iowa State University

Naz Karim, Ph.D.,
University of Manchester

Terry Lenz, Ph.D.,
Iowa State University

Jim Linden, Ph.D.,
Iowa State University

Carol McConica, Ph.D.
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Vince Murphy, Ph.D.,
University of
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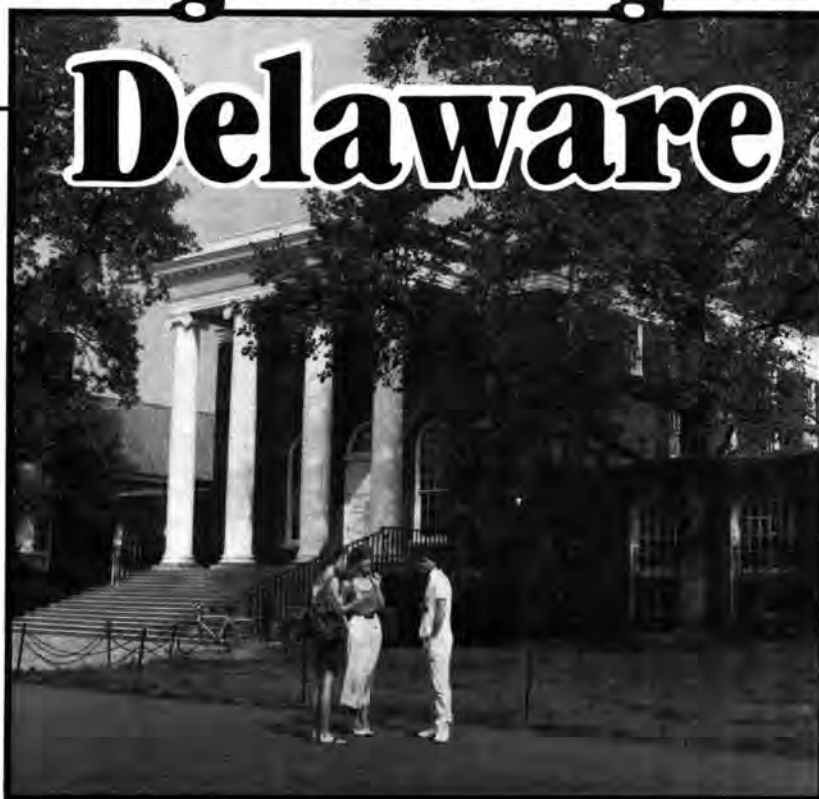
Professor Claude Cohen
Cornell University
Olin Hall of Chemical Engineering
Ithaca, New York 14853



Chemical Engineering at

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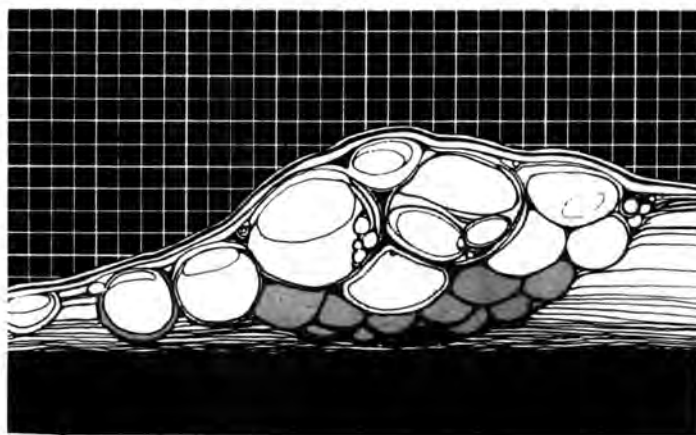
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Dale Kirmse Process Control, Computer Aided Design, Biotechnology/ Hong H. Lee Reactor Design, Catalysis/ Gerasimos K. Lyberatos Optimization, Biochemical Processes/ Frank May Separations/ Ranga Narayanan Transport Phenomena/ John O'Connell Statistical Mechanics, Thermodynamics/ Dinesh O. Shah Enhanced Oil Recovery, Biomedical Engineering/ Spyros Svoronos Process Control/ Robert D. Walker Surface Chemistry, Enhanced Oil Recovery/
Gerald Westermann-Clark Electrochemistry, Transport Phenomena



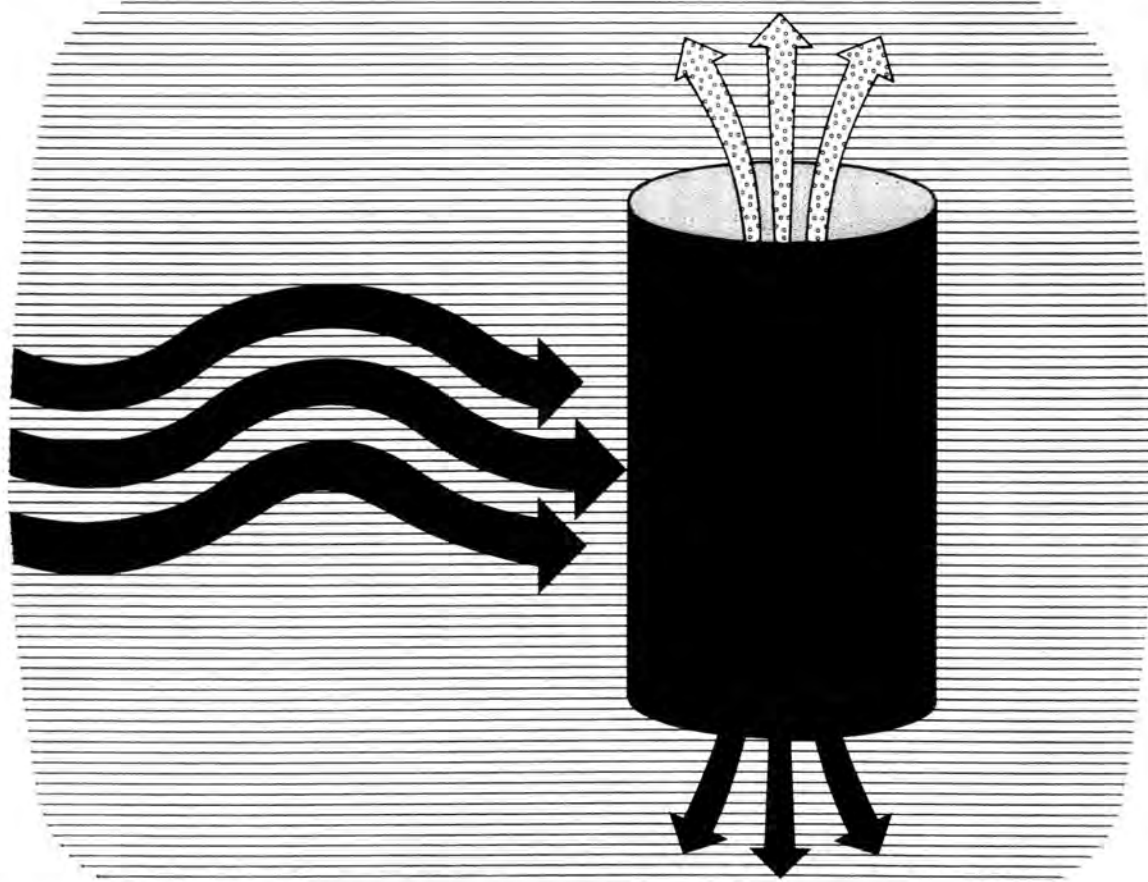
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properties
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Y. Arkun	F.J. Schork
E.J. Clayfield	A.H.P. Skelland
W.R. Ernst	J.T. Sommerfeld
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J.S. Hsieh	H.C. Ward
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J.D. Muzzy	J. Winnick
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Atlanta, Georgia 30332-0100

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O. A. Asbjornsen
V. Balakotaiah
H.-C. Chang
E. L. Claridge
J. R. Crump
H. A. Deans
A. E. Dukler
D. J. Economou
C. F. Goochee
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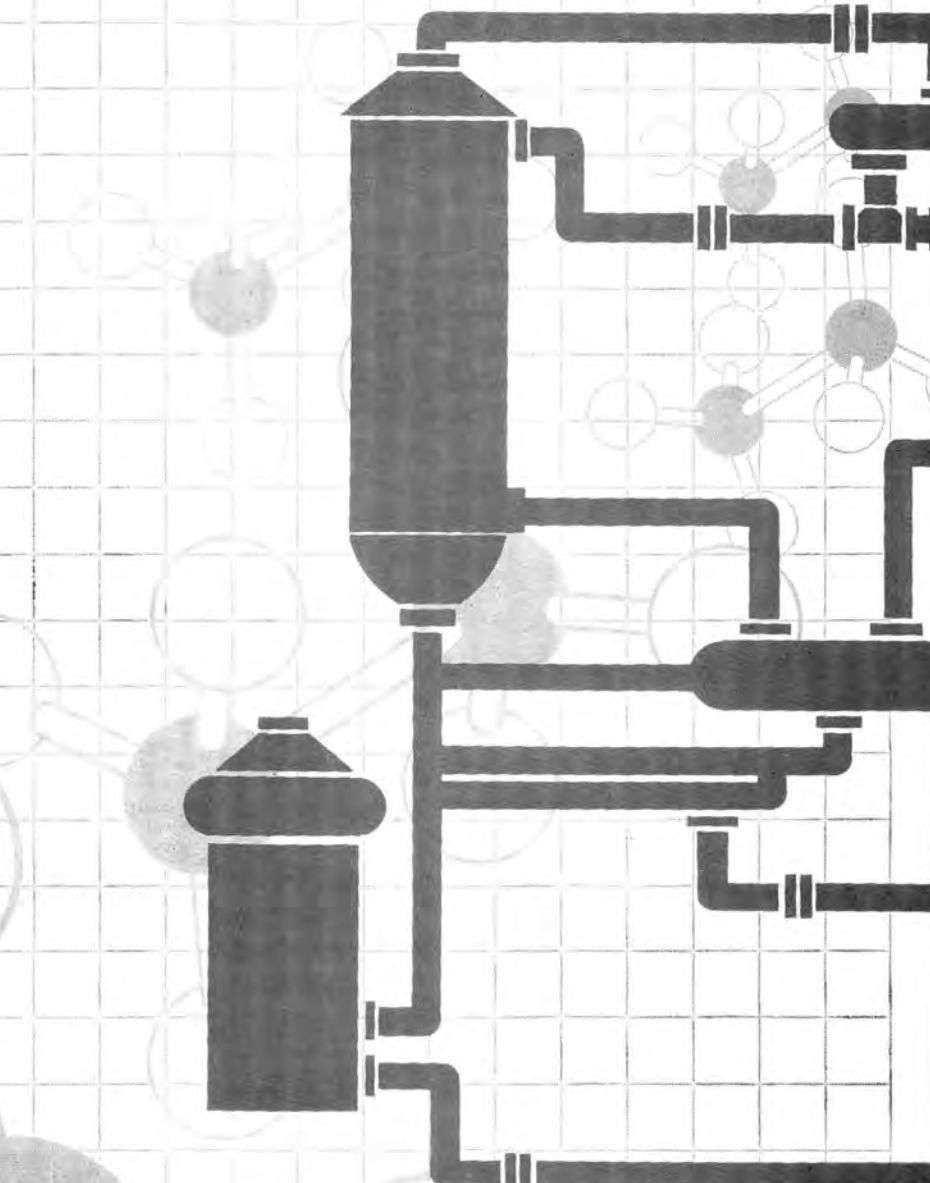
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Chicago, Illinois

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W.A. Weigand

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Computer-Aided Design
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Environmental Engineering
Fluidization
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Multi-Phase Flow
Process Dynamics and Control
Transport Phenomena



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FACULTY AND RESEARCH ACTIVITIES

Richard D. Gonzalez
Ph.D., The Johns Hopkins University, 1965
Professor and Head

Heterogeneous catalysis and surface chemistry,
catalysis by supported metals, subseabed radioactive
waste disposal studies, clay chemistry

T. S. Jiang
Ph.D., Northwestern University, 1981
Assistant Professor

Interfacial Phenomena, multiphase flows, flow through
porous media, suspension rheology

John H. Kiefer
Ph.D., Cornell University, 1961
Professor

Kinetics of gas reactions, energy transfer processes,
laser diagnostics

G. Ali Mansoori
Ph.D., University of Oklahoma, 1969
Professor

Thermodynamics and statistical mechanics of fluids
solids, and solutions, kinetics of liquid reactions,
solar energy.

Sohail Murad
Ph.D., Cornell University, 1979
Assistant Professor

Thermodynamics and transport properties of
fluids, computer simulation and statistical mechanics
of liquids and liquid mixtures

Satish C. Saxena
Ph.D., Calcutta University, 1956
Professor

Transport properties of fluids and solids, heat and
mass transfer, isotope separation, fixed and fluidized
bed combustion, and indirect coal liquefaction

Stephen Szepe
Ph.D., Illinois Institute of Technology, 1966
Associate Professor

Catalysis, chemical reaction engineering, energy
transmission, modeling and optimization

Rafi M. Turian
Ph.D., University of Wisconsin, 1964
Professor

Slurry transport, suspension and complex fluid flow
and heat transfer, porous media processes,
mathematical analysis and approximation.

Irving F. Miller
Ph.D., University of Michigan
Professor

Lipid microencapsulation; Adsorption and
surface reactions; Membrane transport.
Synthesis of blood.

Joachim Floess
Ph.D., Massachusetts Inst. of Tech., 1985
Assistant Professor

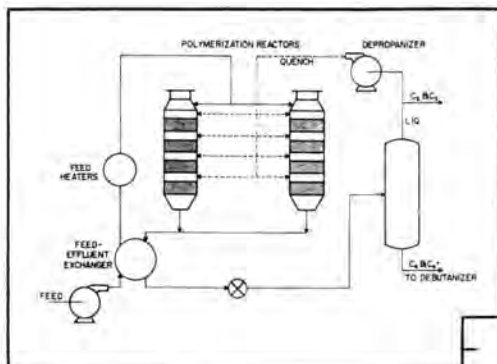
Reaction engineering with primary focus
on the pyrolysis of oil shale and coal.
Energy technology, environmental controls.

David Wilcox
Ph.D., Northwestern University, 1985
Assistant Professor

Mechanistic aspects of the carbon monoxide-
hydrogen reaction with emphasis on the
synthesis of methanol over oxide catalysts.

For more information, write: Director of Graduate Studies, Dept. of Chemical
Engineering, University of Illinois at Chicago, Box 4348, Chicago, IL, 60680, (312)996-3424

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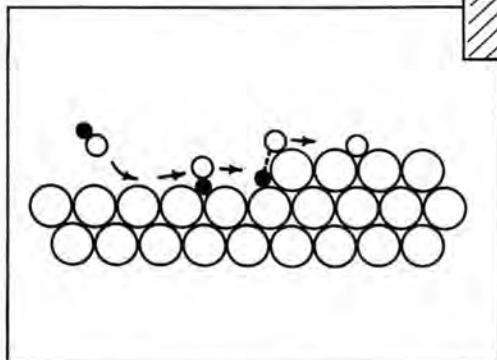
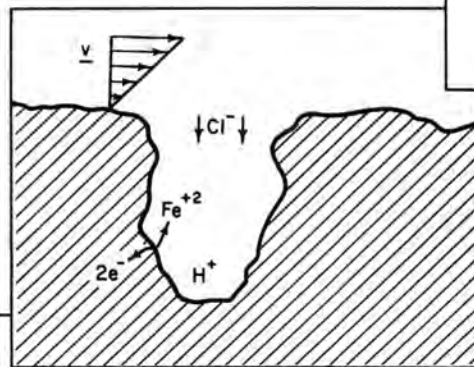
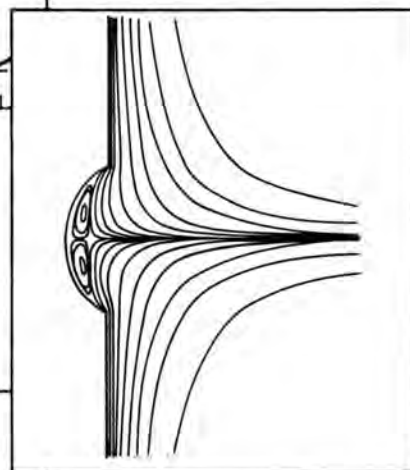
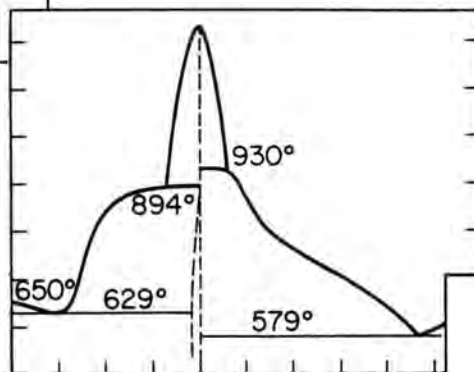


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 Richard I. Masel
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 Mark A. Stadtherr
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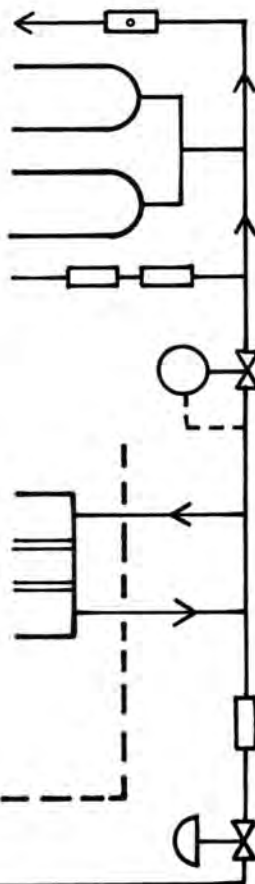
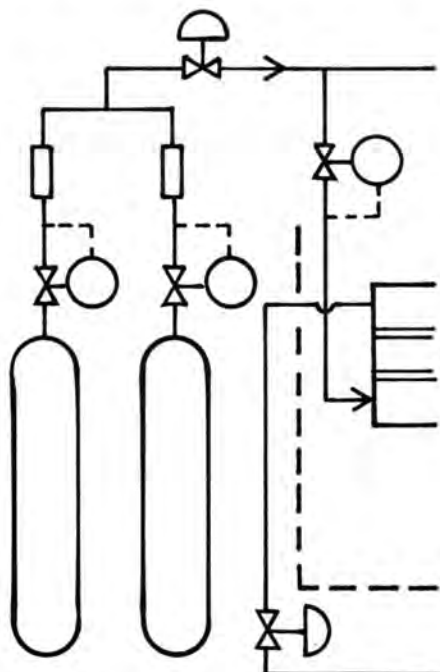
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- Surface Science
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Chemical and Materials Engineering
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Iowa City, Iowa 52242
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control

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Coal technology, separation processes, high
temperature ceramics

John M. Eggbrecht

Thermodynamics and structure of liquids and
liquid mixtures

Charles E. Glatz

Biochemical engineering, processing of
biological materials

Kurt R. Hebert

Applied electrochemistry, corrosion

James C. Hill

Fluid mechanics, turbulence, convective transport
phenomena, aerosols

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Thermodynamics, simulation, computer graphics

Terry S. King

Catalysis, surface science, catalyst applications

Maurice A. Larson

Crystallization, process dynamics

Peter J. Reilly

Biochemical engineering, enzyme
technology, carbohydrate chromatography

Glenn L. Schrader

Catalysis, kinetics, solid state electronics
processing

Richard C. Seagrave

Biological transport phenomena, biothermo-
dynamics, reactor analysis

Dean L. Ulrichson

Solid-gas reactions, process modeling

Thomas D. Wheelock

Chemical reactor design, coal technology,
fluidization

Gordon R. Younquist

Crystallization, chemical reactor design,
polymerization

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Graduate Officer

Department of Chemical Engineering

Iowa State University

Ames, Iowa 50011



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Professor George W. Swift
Chairman and Graduate Advisor
Department of Chemical and Petroleum Engineering
4006 Learned Hall
The University of Kansas
Lawrence, Kansas 66045

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Kenneth A. Bishop, Professor (Ph.D., Oklahoma); reservoir simulation, interactive computer graphics, optimization

John C. Davis, Professor and chief of geology research section, Kansas Geological Survey (Ph.D., Wyoming); probabilistic techniques for oil exploration, geologic computer mapping

Kenneth J. Himmelstein, Adjunct Associate Professor (Ph.D., Maryland); pharmacokinetics, mathematical modeling of biological processes, cell kinetics, diffusion and mass transfer

Colin S. Howat, III, Assistant Professor (Ph.D., Kansas); applied equilibrium thermodynamics, process design

Don W. Green, Professor and Co-director Tertiary Oil Recovery Project (Ph.D., Oklahoma); enhanced oil recovery, hydrological modeling

James O. Maloney, Professor Emeritus (Ph.D., Penn State); technology and society

Russell B. Mesler, Professor (Ph.D., Michigan); nucleate and film boiling, bubble and drop phenomena

Floyd W. Preston, Professor (Ph.D., Penn State); geologic pore structure

Harold F. Rosson, Professor (Ph.D., Rice); production of alternate fuels from agricultural materials

Bala Subramaniam, Assistant Professor (Ph.D., Notre Dame); kinetics and catalysis, insitu characterization of catalyst systems

George W. Swift, Professor and Chairman (Ph.D., Kansas); thermodynamics of petroleum and petrochemical systems, natural gas reservoirs analysis, fractured well analysis, petrochemical plant design

John E. Thiele, Assistant Professor (Sc.D., MIT); structure/property relationships of polymers, polymer chemistry and physics, polymer viscoelasticity

Shapour Vossoughi, Associate Professor (Ph.D., U. of Alberta); enhanced oil recovery, thermal analysis, applied rheology and computer modeling

Stanley M. Walas, Professor Emeritus (Ph.D., Michigan); combined chemical and phase equilibrium

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ENVIRONMENTAL POLLUTION CONTROL

UNIVERSITY OF KENTUCKY



DEPARTMENT OF CHEMICAL ENGINEERING M.S. and Ph.D. Programs

THE FACULTY AND THEIR RESEARCH INTERESTS

J. Berman, Ph.D., Northwestern
Biomedical Engineering; Cardiovascular
Transport Phenomena; Blood Oxygenation

D. Bhattacharyya, Ph.D.
Illinois Institute of Technology
Novel Separation Processes; Membranes;
Water Pollution Control

G. F. Crewe, Ph.D., West Virginia
Computer-aided process design; Coal Liquefaction

C. E. Hamrin, Jr., Ph.D., Northwestern
Coal Liquefaction; Catalysis; Three-phase Reactors

R. I. Kermode, Ph.D., Northwestern
Process Control and Economics

E. D. Moorhead, Ph.D., Ohio State
Dynamics of Electrochemical Processes; Computer
Measurement Techniques and Modeling

L. K. Peters, Ph.D., Pittsburgh
Atmospheric Transport; Aerosol Phenomena

A. K. Ray, Ph.D., Clarkson
Heat and Mass Transfer in Knudsen
Regime; Transport Phenomena

J. T. Schrodtt, Ph.D., Louisville
Simultaneous Heat and Mass Transfer;
Fuel Gas Desulfurization

T. T. Tsang, Ph.D., Texas-Austin
Aerosol Dynamics in Uniform and Non-Uniform Systems

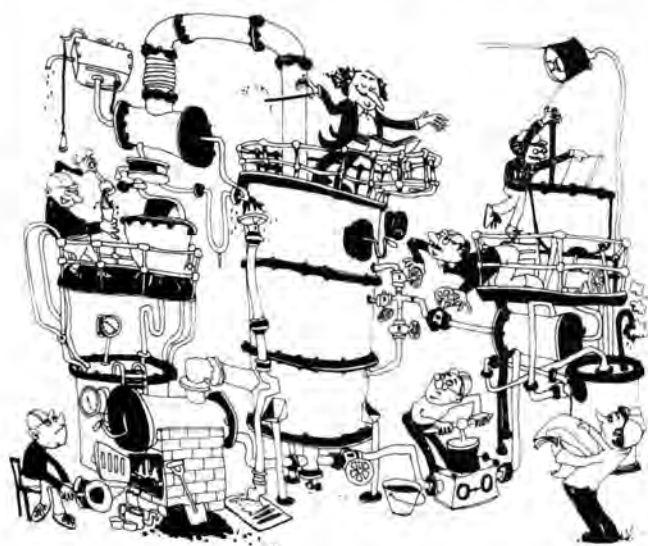
Fellowships and Research Assistantships are Available to Qualified Applicants

For details write to:

R. I. Kermode
Director for Graduate Studies
Chemical Engineering Department
University of Kentucky
Lexington, Kentucky 40506-0046

Louisiana State University

CHEMICAL ENGINEERING GRADUATE SCHOOL



THE CITY

Baton Rouge is the state capitol and home of the major state institution for higher education—LSU. Situated in the Acadian region, Baton Rouge blends the Old South and Cajun Cultures. The Port of Baton Rouge is a main chemical shipping point, and the city's economy rests heavily on the chemical and agricultural industries. The great outdoors provide excellent recreational activities year round, additionally the proximity of New Orleans provides for superb nightlife, especially during Mardi Gras.

THE DEPARTMENT

M.S. and Ph.D. Programs

Approximately 70 Graduate Students

DEPARTMENTAL FACILITIES

IBM 4341 with more than 50 color graphics terminals

Analytical Facilities including GC/MS, FTIR, FT-NMR, LC's, GC's...

Vacuum to High Pressure Facilities for kinetics, catalysis, thermodynamics, supercritical processing

Shock Tube and Combustion Laboratories

Laser Doppler Velocimeter Facility

Bench Scale Fermentation Facilities

TO APPLY, CONTACT:

EDWARD McLAUGHLIN, CHAIRMAN
Department of Chemical Engineering
Louisiana State University
Baton Rouge, LA 70803

FACULTY

A. B. CORRIPIO (Ph.D., LSU)

Control, Simulation, Computer Aided Design

K. M. DOOLEY (Ph.D., Delaware)

Heterogeneous Catalysis, Reaction Engineering

F. R. GROVES (Ph.D., Wisconsin)

Control, Modeling, Separation Processes

D. P. HARRISON (Ph.D., Texas)

Fluid-Solid Reactions, Hazardous Wastes

A. E. JOHNSON (Ph.D., Florida)

Distillation, Control, Modeling

M. HJORTSØ (Ph.D., Univ. of Houston)

Biotechnology, Applied Mathematics

F. C. KNOPF (Ph.D., Univ. of Purdue)

Computer Aided Design, Supercritical Processing

E. McLAUGHLIN (D.Sc., Univ. of London)

Thermodynamics, High Pressures, Physical Properties

R. W. PIKE (Ph.D., Georgia Tech)

Fluid Dynamics, Reaction Engineering, Optimization

J. A. POLACK (Sc.D., MIT)

Sugar Technology, Separation Processes

G. L. PRICE (Ph.D., Rice Univ.)

Heterogeneous Catalysis, Surfaces

D. D. REIBLE (Ph.D., Caltech)

Transport Phenomena, Environmental Engineering

R. G. RICE (Ph.D., Pennsylvania)

Mass Transfer, Separation Processes

D. L. RISTROPH (Ph.D., Pennsylvania)

Biochemical Engineering

C. B. SMITH (Ph. D., Univ. of Houston)

Non-linear Dynamics, Control

A. M. STERLING (Ph.D., Univ. of Washington)

Biomedical Engineering, Transport Properties, Combustion

L. J. THIBODEAUX (Ph.D., LSU)

Chemodynamics, Hazardous Waste

D. M. WETZEL (Ph.D., Delaware)

Physical Properties, Hazardous Wastes

FINANCIAL AID

Tax-free fellowships and assistantships with tuition waivers available

Special industrial and alumni fellowships with higher stipends for outstanding students

Some part-time teaching positions for graduate students in high standing

University of Maine at Orono

M.S. AND PH.D. PROGRAMS IN CHEMICAL ENGINEERING

- Sponsored projects valued at \$1 million per year are in progress.
- Faculty is supported by extensive state-of-the-art facilities.
- Relevancy of the Department's research is insured by continuous liaison with engineers and scientists from industry who help guide the faculty concerning emerging needs and activities of other laboratories.
- Research and teaching assistantships are available.
- Outstanding candidates (GPA between 3.75 and 4.00) wishing to pursue the Ph.D. are invited to apply for President's Fellowships which provide \$4000 per year in addition to regular stipend and free tuition.

THE GRADUATE FACULTY AND THEIR RESEARCH

William H. Ceckler

Sc.D., MIT, 1960

- Heat Transfer
- Pressing & Drying Operations
- Energy from Low Btu Fuels
- Process Simulation

Albert Co

Ph.D., Wisconsin, 1979

- Transport phenomena
- Polymeric Fluid Dynamics
- Rheology

Joseph M. Genco

Ph.D., Ohio State, 1965

- Process Engineering
- Pulp & Paper Technology
- Wood Delignification

Marqueta K. Hill

Ph.D., University of California, 1966

- Black Liquor Chemistry
- Pulping Chemistry
- Ultrafiltration

John C. Hassler

Ph.D., Kansas State, 1966

- Process Analysis and Numerical Methods
- Instrumentation and Real-Time Computer Applications

John J. Hwalek

Ph.D., University of Illinois, 1982

- Heat Transfer
- Process Control Systems

Erdogan Kiran

Ph.D., Princeton, 1974

- Polymer Physics and Chemistry
- Thermal Analysis and Pyrolysis
- Supercritical Fluids

James D. Lisius

Ph.D., University of Illinois, 1985

- Transport Phenomena
- Electrochemical Engineering
- Mass Transfer

Kenneth I. Mummé

Ph.D., Maine, 1970

- Process Modeling and Control
- System Identification & Optimization

Hemant Pendse

Ph.D., Syracuse, 1980

- Colloidal Phenomena
- Particulate Systems
- Porous Media Modeling

Ivar H. Stockel

Sc.D., MIT, 1959

- Pulp & Paper Technology
- Droplet Formation
- Fluidization

Edward V. Thompson

Ph.D., Polytechnic Institute of Brooklyn, 1962

- Polymer Material Properties
- Membrane Separation Processes
- Pressing & Drying Operations

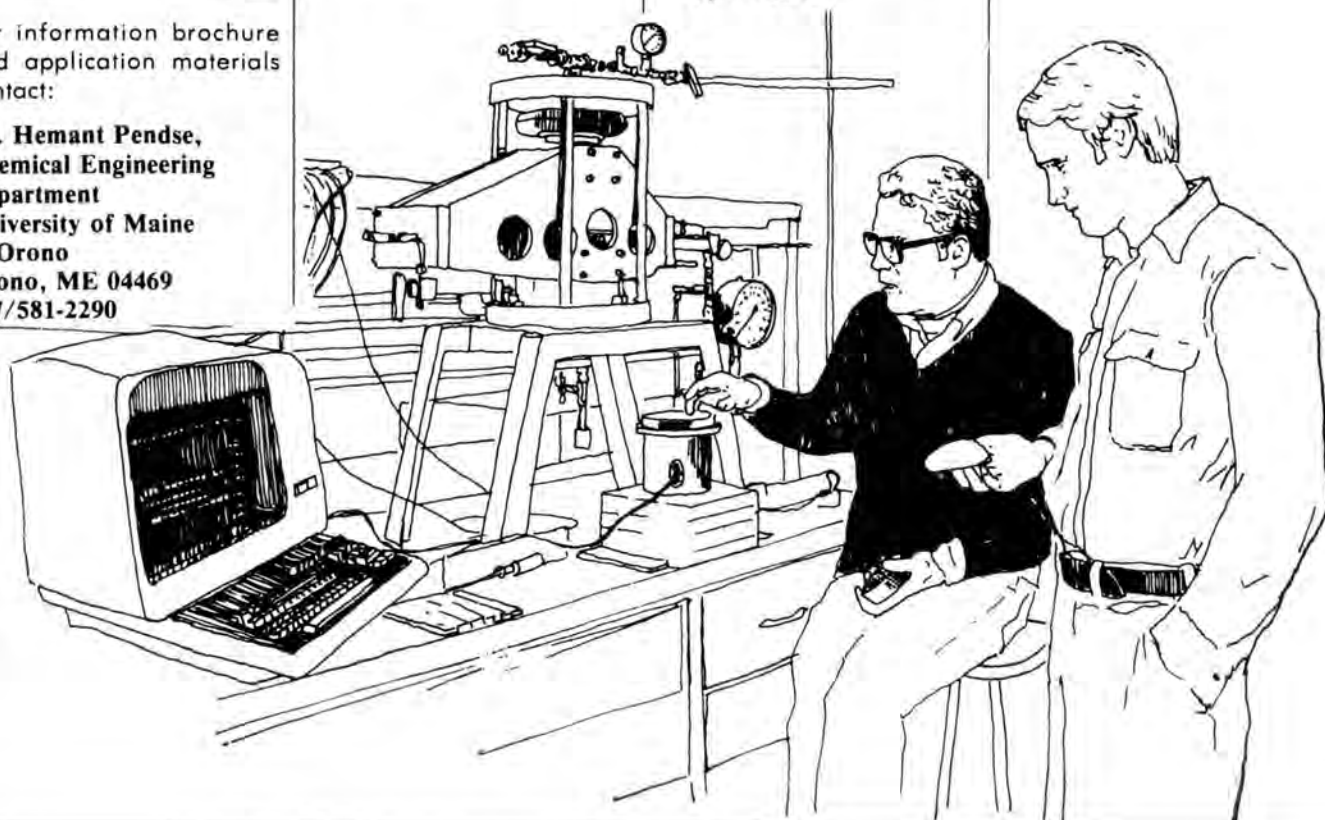
Douglas L. Woerner

Ph.D., University of Washington, 1983

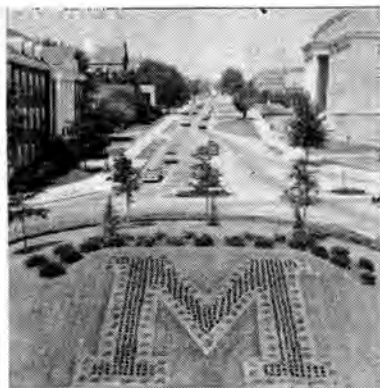
- Concentration Polarization
- Ultrafilter Operation
- Light Scattering

For information brochure and application materials contact:

Dr. Hemant Pendse,
Chemical Engineering
Department
University of Maine
at Orono
Orono, ME 04469
207/581-2290



University of Maryland



Location:

The University of Maryland is located approximately 10 miles from the heart of the nation, Washington, D.C. Excellent public transportation permits easy access to points of interest such as the Smithsonian, National Gallery, Congress, White House, Arlington Cemetery, and the Kennedy Center. A short drive west produces some of the finest mountain scenery and recreational opportunities on the east coast. An even shorter drive east brings one to the historic Chesapeake Bay.



Faculty:

Robert B. Beckmann
Theodore W. Cadman
Richard V. Calabrese
Kyu Y. Choi
Stowell Davison
Larry L. Gasner
James W. Gentry
Albert Gomezplata
Yih-Yun Hsu
Thomas J. McAvoy
Thomas M. Regan
Wilburn C. Schroeder
Theodore G. Smith

Degrees Offered.

M.S. and Ph.D. programs in
Chemical Engineering.

Financial Aid Available:

Teaching and Research
Assistantships at \$10,400/yr.



Research Areas:

Aerosol Mechanics
Air Pollution Control
Biochemical Engineering
Fermentation
Laser Anemometry
Mass Transfer
Polymer Processing
Process Control
Risk Assessment
Separation Processes
Simulation



For Applications and Further Information, Write:

Chemical Engineering Graduate Studies
Department of Chemical and Nuclear Engineering
University of Maryland
College Park, Md. 20742

UNIVERSITY of MASSACHUSETTS

Amherst

The Chemical Engineering Department at the University of Massachusetts offers graduate programs leading to M.S. and Ph.D. degrees in Chemical Engineering. Active research areas include polymer engineering, catalysis, design, and basic engineering sciences. Close coordination characterizes research in polymers which can be conducted in either the Chemical Engineering Department or the Polymer Science and Engineering Department. Financial aid, in the form of research assistantships and teaching assistantships, is available. Course of study and area of research are selected in consultation with one or more of the faculty listed below.



For further details, please write to

Prof. M. F. Doherty
Graduate Program Director
Dept. of Chemical Engineering
University of Massachusetts
Amherst, Mass. 01003
413-545-0593

or

Prof. S. L. Hsu
Graduate Program Director
Dept. of Polymer Science and Engineering
University of Massachusetts
Amherst, Mass. 01003
413-545-0433

**Joint appointments in Chemical Engineering and Polymer Science and Engineering*

• CHEMICAL ENGINEERING •

- M. A. BURNS Biochemical engineering, Chromatographic separations
- W. C. CONNER Catalysis, Kinetics, Surface diffusion
- M. F. DOHERTY Distillation, Thermodynamics, Design
- J. M. DOUGLAS Process design and control, Reactor engineering
- J. W. ELDRIDGE Kinetics, Catalysis, Phase equilibria
- V. HAENSEL Catalysis, Kinetics
- M. P. HAROLD Kinetics and Reactor Engineering
- R. S. KIRK Kinetics, Ebullient bed reactors
- R. L. LAURENCE* Polymerization reactors, Fluid mechanics
- R. W. LENZ* Polymer synthesis, Kinetics of polymerization
- M. F. MALONE Rheology, Polymer processing, Design
- P. A. MONSON Statistical mechanics of gases
- K. M. NG Enhanced oil recovery, Two-phase flows
- J. M. OTTINO* Mixing, Fluid mechanics, Polymer engineering
- M. VANPEE Combustion, Spectroscopy
- H. H. WINTER* Polymer rheology and processing, Heat transfer
- B. E. YDSTIE Process control

• POLYMER SCIENCE AND ENGINEERING •

- J. C. W. CHIEN Polymerization catalysts, Biopolymers, Polymer degradation
- R. J. FARRIS Polymer composites, Mechanical properties, Elastomers
- D. A. HOAGLAND* Hydrodynamic chromatography separations
- S. L. HSU Polymer spectroscopy, Polymer structure analysis
- F. E. KARASZ Polymer transitions, Polymer blends, Conducting polymers
- W. J. MacKNIGHT Viscoelastic and mechanical properties of polymers
- T. J. McCARTHY Polymer synthesis, Polymer surfaces
- M. MUTHUKUMAR Statistical mechanics of polymer solutions, gels, and melts
- R. S. PORTER Polymer rheology, Polymer processing
- R. S. STEIN Polymer crystallinity and morphology, Characterization
- D. A. TIRRELL Polymer synthesis and membranes
- E. L. THOMAS* Electron microscopy, Polymer morphology, x-Ray scattering

CHEMICAL ENGINEERING AT MIT

FACULTY

J. Wei, Department Head	J. P. Longwell
R. C. Armstrong	E. W. Merrill
R. F. Baddour	C. M. Mohr
J. M. Beér	R. C. Reid
H. Brenner	A. F. Sarofim
R. A. Brown	C. N. Satterfield
R. E. Cohen	H. H. Sawin
C. K. Colton	K. A. Smith
C. Cooney	Robert D. Sproull
W. M. Deen	G. Stephanopoulos
L. B. Evans	G. N. Stephanopoulos
C. Guzy	U. W. Suter
T. A. Hatton	J. W. Tester
J. B. Howard	P. S. Virk
M. Kramer	D. I. C. Wang

RESEARCH AREAS

Biomedical Engineering
Biotechnology
Catalysis and Reaction Engineering
Combustion
Computer-Aided Design
Electrochemistry
Energy Conversion
Environmental
Fluid Mechanics
Electronic Materials Processing
Kinetics and Reaction Engineering
Polymers
Process Dynamics and Control
Surfaces and Colloids
Transport Phenomena



Photo by James Wei

MIT also operates the School of Chemical Engineering Practice, with field stations at the General Electric Company in Albany, New York, the Bethlehem Steel Company at Bethlehem, Pennsylvania, and Brookhaven National Lab at Long Island, New York.

For Information

Chemical Engineering Headquarters
Room 66-350
MIT
Cambridge, MA 02139

Chemical Engineering at The University of Michigan

Research Areas

Biotechnology. Control of fermentation processes, in-situ separation techniques, biosensors, synthetic membranes, self-assembly of proteins, models of cell metabolism.

Catalysis. Atomic metallic clusters, catalyst support interactions, kinetic mechanisms of hydrocarbon synthesis, preparation of catalytic metal colloids, electroless plating, periodic operation of catalytic reactors.

Colloidal Science. Structure of microemulsions and micelles, colloidal interactions in liquefied coal, stability and hydrodynamic theory for emulsions, coagulation kinetics.

Environmental Control. Waste treatment in natural waters, hazardous waste recovery methods, adsorption processes in pollutant removal.

Petroleum Engineering. Enhanced production of oil and gas, catalytic stimulation of formation porosity, colloidal properties of minerals, interfacial adsorption of surfactants, two-phase flow through porous media.

Polymers. Polymer processing, structural properties relations, rheology of polymers, kinetics of polymerization and gelation.

Real-time Computation and Process Simulation. Dynamic simulation of processes, computer modeling of transport phenomena, parameter identification, computer-aided design with personal workstations.



Faculty

Dale E. Briggs
Brice Carnahan
Rane L. Curl
Francis M. Donahue
H. Scott Fogler
Erdogan Gulari
Robert H. Kadlec
Donald L. Katz
Lloyd L. Kempe
Costas Kravaris
Bernhard Palsson
Anastasios C. Papanastasiou
John E. Powers
Jerome S. Schultz
Johannes Schwank
Maurice J. Sinnott
M. Rasin Tek
Henry Y. Wang
James O. Wilkes
Brymer Williams
Gregory S.Y. Yeh
Edwin H. Young
Robert M. Ziff



College of Engineering

For information, write:
Dept. of Chemical Engineering
The University of Michigan
Dow Building
Ann Arbor, Michigan 48109
or call collect: (313) 763-1148.

MICHIGAN STATE UNIVERSITY



The Department of Chemical Engineering of Michigan State University has assistantships and fellowships available for students wishing to pursue advanced study. With one of these appointments it is possible for a graduate student to obtain the M.S. degree in one year and the Ph.D. in two to three additional years.

ASSISTANTSHIPS: Teaching and research assistantships pay \$880.00 per month to a student studying for the M.S. degree and approximately \$950.00 per month for a Ph.D. candidate. A thesis may be written on the subject covered by the research assistantship. Non-resident tuition is waived.

FELLOWSHIPS: Available appointments pay up to \$16,000 plus out-of-state tuition for calendar year.

● CURRENT FACULTY AND RESEARCH INTERESTS ●

D. K. ANDERSON, Chairman
Ph.D., University of Washington
Transport Phenomena, Cardiovascular Physiology,
Diffusion in Polymer Solutions

K. A. BERGLUND
Ph.D., Iowa State University
Crystallization and Precipitation from Solution, Food
Engineering, Applications of Raman Spectroscopy

D. BRIEDIS
Ph.D., Iowa State University
Biomedical Engineering, Thermodynamics of Living
Systems, Biological Mineralization, Immobilized En-
zyme Technology

R. E. BUXBAUM
Ph.D., Princeton University
Chemical Engineering Aspects of Nuclear Fusion,
Diffusivities and Separation Rates from Theory and
Experiment, Nerve Growth

C. M. COOPER, Professor Emeritus
Sc.D., Massachusetts Institute of Technology
Thermodynamics and Phase Equilibria, Modeling of
Transport Processes

L. T. DRZAL
Ph.D., Case Western Reserve University
Surface and Interfacial Phenomena, Adhesion, Com-
posite Materials, Surface Characterization, Gas-Solid
and Liquid-Solid Adsorption

E. A. GRULKE
Ph.D., Ohio State University
Mass Transport Phenomena, Polymer Devolatilization,
Biochemical Engineering, Food Engineering

M. C. HAWLEY
Ph.D., Michigan State University
Kinetics, Catalysis, Reactions in Plasmas, and Reaction
Engineering

K. JAYARAMAN
Ph.D., Princeton University
Rheology of Suspensions and Polymers, Permeation
through Packaging Plastics

D. J. MILLER
Ph.D., University of Florida
Fundamentals of Catalyzed Carbon Gasification,
Thermal Conversion of Cellulose and Biomass

C. A. PETTY
Ph.D., University of Florida
Fluid Mechanics, Turbulent Transport Phenomena,
Solid-Fluid Separations

B. W. WILKINSON
Ph.D., Ohio State University
Energy Systems and Environmental Control, Nuclear
Reactor, and Radioisotope Applications

FOR ADDITIONAL INFORMATION WRITE

Dr. Donald K. Anderson, Chairman, Department of Chemical Engineering
173 Engineering Building, Michigan State University
East Lansing, Michigan 48824-1226

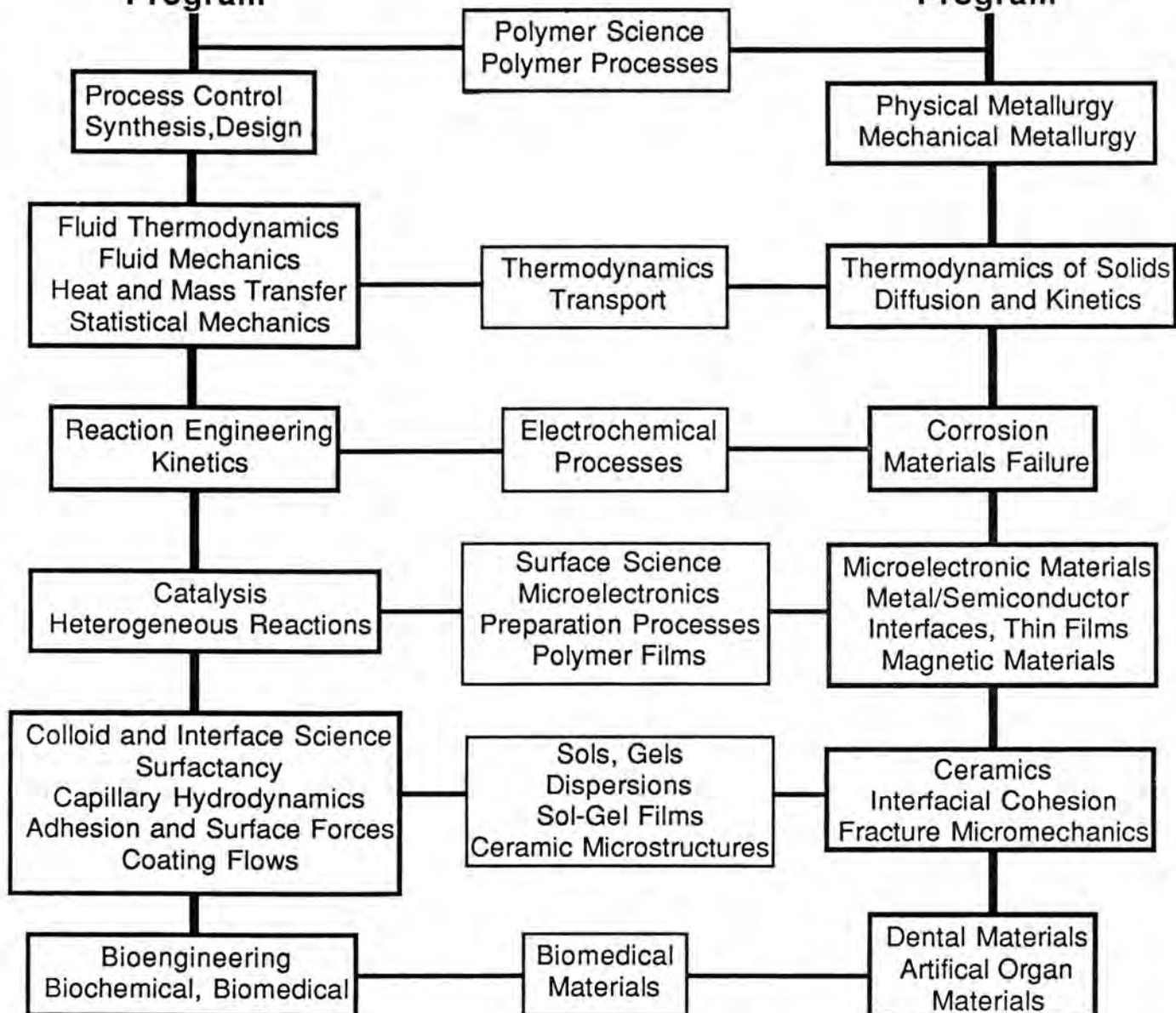
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University of Minnesota

Chemical Engineering and Materials Science

Chemical Engineering Program

Materials Science Program



The Faculty

R. Aris
F.H. Arnold
R.W. Carr, Jr
E.L. Cussler
J.S. Dahler
H.T. Davis
C.G. Economou
D.F. Evans
A. Franciosi
A.G. Fredrickson

C.J. Geankoplis
W.W. Gerberich
G.L. Griffin
W-S. Hu
K.F. Jensen
K.H. Keller
C.W. Macosko
M.L. Mecartney
R.A. Oriani

W.E. Ranz
L.D. Schmidt
L.E. Scriven
D.A. Shores
J.M. Sivertsen
W.H. Smyrl
R.W. Staehle
M.V. Tirrell
J.H. Weaver
H.S. White

*For information and application forms,
write:*

Graduate Admissions
Chemical Engineering and
Materials Science
University of Minnesota
421 Washington Ave. S.E.
Minneapolis, MN 55455

Department of Chemical Engineering

UNIVERSITY OF MISSOURI — ROLLA

ROLLA, MISSOURI 65401

Contact Dr. J. W. Johnson, Chairman
Day Programs M.S. and Ph.D. Degrees

FACULTY AND RESEARCH INTERESTS

N. L. BOOK (Ph.D., Colorado)—Computer Aided Process Design, Bioconversion.

O. K. CROSSER (Ph.D., Rice)—Transport Properties, Kinetics, Catalysis.

M. E. FINDLEY (Ph.D., Florida)—Biochemical Studies, Biomass Utilization

J.-C. HAJDUK (Ph.D. Illinois-Chicago)—Chemical kinetics, Statistical and Non-equilibrium Thermodynamics.

J. W. JOHNSON (Ph.D., Missouri)—Electrode Reactions, Corrosion.

A. I. LIAPIS (Ph.D., ETH-Zurich)—Adsorption, Freeze Drying, Modeling, Optimization, Reactor Design.

J. M. D. MAC ELROY (Ph.D., University College Dublin)—Transport Phenomena, Heterogeneous Catalysis, Drying, Statistical Mechanics.

D. B. MANLEY (Ph.D., Kansas)—Thermodynamics, Vapor-Liquid Equilibrium.

P. NEOGI (Ph.D., Carnegie-Mellon)—Interfacial Phenomena

B. E. POLING (Ph.D., Illinois)—Kinetics, Energy Storage, Catalysis.

X. B. REED, JR. (Ph.D., Minnesota)—Fluid Mechanics, Drop Mechanics, Coalescence Phenomena, Liquid-Liquid Extraction, Turbulence Structure.

O. C. SITTON (Ph.D., Missouri-Rolla)—Bioengineering

R. C. WAGGONER (Ph.D., Texas A&M)—Multi-stage Mass Transfer Operations, Distillation, Extraction, Process Control.

H. K. YASUDA (Ph.D., New York-Syracuse)—Polymer Membrane Technology, Thin-Film Technology, Plasma Polymerization, Biomedical Materials.

R. M. YBARRA (Ph.D., Purdue)—Rheology of Polymer Solutions, Chemical Reaction Kinetics.



Financial aid is obtainable in the form of Graduate and Research Assistantships, and Industrial Fellowships. Aid is also obtainable through the Materials Research Center.

Advanced Studies in Chemical Engineering at NJIT

NJIT, the public technological university of New Jersey, offering the Master of Science in Chemical Engineering, Master of Science, Degree of Engineer, and Doctor of Engineering Science.

AT NJIT YOU'LL FIND:

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Graduate and undergraduate enrollment in chemical engineering among the largest in the country

Financial support available to qualified, full-time graduate students

Faculty: Chemical Engineering Division

M. F. Abd-El-Bary (Lehigh) P. Armenante (Virginia)
 B. Baltzis (Minnesota) E. Bart (NYU) T. Greenstein (NYU) D. Hanesian (Cornell) C. R. Huang (Michigan)
 D. Knox (RPI) G. Lewandowski (Columbia) C. C. Lin (Technische Universitat Munchen) J. E. McCormick (Cincinnati) T. Petroulas (Minnesota) A. J. Perna (Connecticut)
 E. C. Roche, Jr. (Stevens) D. Tassios (Texas)
 W. T. Wong (Princeton)

Faculty: Chemistry Division

J. Bozzelli (Princeton) V. Cagnati (Stevens) L. Dauerman (Rutgers) D. Getzin (Columbia) A. Greenberg (Princeton)
 J. Grow (Oregon State) T. Gund (Princeton) B. Kebbekus (Penn State) H. Kimmel (CUNY) D. S. Kristol (NYU)
 D. Lambert (Oklahoma State) G. Lei (PINY) R. Parker (Washington) H. Perlmutter (NYU) A. Shilman (PINY)
 L. Suchow (PINY) R. Tomkins (London) R. Trattner (CUNY) C. Venanzi (UC at Santa Barbara)

CURRENT RESEARCH AREAS

ENVIRONMENTAL ENGINEERING

Air pollutant analysis and transport of organic compounds
 Biological and chemical detoxification Design of air pollution control equipment Toxicology

REACTION KINETICS AND REACTOR DESIGN

Fixed and fluidized bed reactors Free radical and global reaction kinetics Biochemical reactors Reactor modeling and transport mechanisms

THERMODYNAMICS

Vapor-liquid equilibria Calorimetry Equations of state
 Solute/solvent systems

APPLIED CHEMISTRY

Electrochemistry Trace analysis and instrument development
 Strained molecules Inorganic solid state and material



science Heterocyclic and synthetic organic compounds Drug receptor interaction modeling Enzyme/substrate geometrics

POLYMER SCIENCE AND ENGINEERING

Rheology of polymer melts Synthesis of dental adhesive Photo initiated polymerization Size distribution of emulsion polymerization Fire resistance fibers

BIOMEDICAL ENGINEERING

Thixotropic property of human blood
 Modified glucose tolerance test

Mathematical modeling of metabolic processes

PROCESS SIMULATION AND SEPARATION PROCESSES

Distillation Parametric pumping Protein separation
 Liquid membranes

New Jersey Institute of Technology is a publicly supported university with 7,000 students enrolled in baccalaureate through doctoral programs, within three colleges: Newark College of Engineering, the School of Architecture, and Third College, the school of sciences, humanities, and management.

We invite you to explore academic opportunities at NJIT

For further information call (201) 596-3460 or write:

Director of Graduate Studies
NEW JERSEY INSTITUTE OF TECHNOLOGY
Newark, New Jersey 07102

AA/EO Institution



UNFORTUNATELY, CHOOSING A GRADUATE SCHOOL IS NOT AN EXACT SCIENCE.

There's no formula for it. It's a decision that depends, in the end, on your own instincts and judgment.

It's also a decision you shouldn't make until you look at North Carolina State.

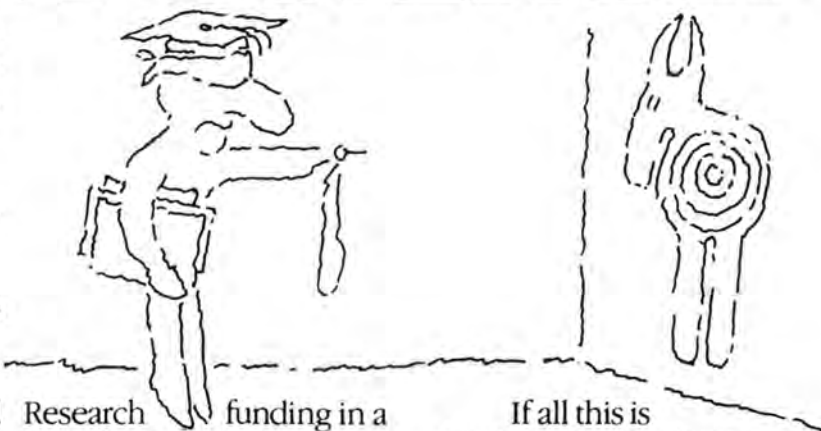
Because something is happening here that's begun to surprise a lot of people.

We've established the highest matriculation standard in a university system already known for excellence.

And that means brighter, more talented undergraduates.

The faculty, as a result, are constantly challenged. A very healthy state of affairs that reflects, in turn, on the quality of the graduate program.

And "quality" is the word.



Research funding in a typical year comes to over \$1,250,000. And it comes from the most competitive sources for research support.

Currently active research projects run the gamut of classical areas, including multi-faculty collaboration in coal gasification, polymer science and biotechnology.

If all this is beginning to intrigue you, try a simple experiment:

Write to our department head, Harold B. Hopfenberg, for more information. Or call him at (919) 737-2318.

After all, when you're trying to make a decision on a graduate school, it always pays to do your homework.

CHEMICAL ENGINEERING NORTH CAROLINA STATE UNIVERSITY

Department of Chemical Engineering Bx: 7905, North Carolina State University, Raleigh, North Carolina 27695-7905.

Chemical Engineering at

Northwestern University

S. George Bankoff

Two-phase heat transfer, fluid mechanics

John B. Butt

Chemical reaction engineering

Stephen H. Carr

Solid state properties of polymers

William C. Cohen

Control and measurement of distributed parameter systems

Buckley Crist Jr.

Polymer science

Joshua S. Dranoff

Chemical reaction engineering, chromatographic separations

Thomas K. Goldstick

Biomedical engineering, oxygen transport in the human body

Hugh M. Hulburt

Chemical and physical process fundamentals

Iftekhar Karimi

Computer-aided design, scheduling of noncontinuous processes

Harold H. Kung

Kinetics, heterogeneous catalysis

Richard S.H. Mah

Computer-aided process planning, design and analysis, distillation systems

Gregory Ryskin

Fluid mechanics, computational methods, polymeric liquids

Wolfgang M.H. Sachtler

Heterogeneous catalysis

John C. Slattery

Interfacial transport phenomena, multiphase flows

William F. Stevens

Process control and optimization, computer applications

George Thodos

Physical properties of gases and liquids

John M. Torkelson

Polymer science



**For information and application to the
graduate program, write**

Harold H. Kung
Chairperson of Graduate Program
Department of Chemical Engineering
Northwestern University
Evanston, Illinois 60201

GRADUATE STUDY IN

CHEMICAL ENGINEERING

WE HAVE state-of-the-art research facilities for all of the areas mentioned below. In addition, the Department has a DEC VAX 11/780 computer with auxiliary equipment for monochromatic and color graphics, real-time data acquisition, and control.

The University and surrounding community provide a stimulating setting for our Department. There are several major chemical companies and a variety of high-technology firms in the vicinity. For example, Battelle Memorial Institute is adjacent to our campus, and we have enjoyed technical interaction on many levels. Columbus is a cultural center with many varied musical, artistic, and dramatic offerings. There are also a wide variety of recreational opportunities – nearly every sport from archery to water skiing is available.

Financial support is available ranging from \$8,500 to \$15,000 annually.



THE OHIO STATE UNIVERSITY

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Between Graduate
Students and Their
Faculty Advisors

WRITE OR CALL COLLECT

Professor Jacques L. Zakin, Chairman
Department of Chemical Engineering
The Ohio State University
140 West 19th Avenue
Columbus, Ohio 43210
(614) 422-6986

Robert S. Erodkey Wisconsin 1952

Turbulence, Mixing, Reactor Design,
Rheology, and Fluid Mechanics

James F. Davis Northwestern 1982

Computer-Aided Design, Artificial
Intelligence, Heat Transfer, and
Mass Transfer

L. S. Fan West Virginia 1975

Fluidization, Chemical & Biochemical
Reaction Engineering, and
Mathematical Modeling

Edwin R. Haering Ohio State 1966

Reaction Engineering, Catalysis,
and Adsorption

Harry C. Hershey Missouri-Rolla 1965

Thermodynamics, and Drag
Reduction

Kent S. Knaebel Delaware 1980

Mass Transfer, Separations,
Computer-Aided Design, and
Power Conversion Cycles

L. James Lee Minnesota 1979

Polymer Processing, Heat Transfer,
and Rheology

Won-Kyoo Lee Missouri-Columbia 1972

Process Control, Computer Control,
and Computer-Aided Design

Umit Ozkan Iowa State 1984

Heterogeneous Catalysis, and
Reaction Kinetics

Duane R. Skidmore Fordham 1960

Coal Processing, and
Biochemical Engineering

Edwin E. Smith Ohio State 1949

Combustion, and Environmental
Engineering

Thomas L. Sweeney Case 1962

Air Pollution Control, Heat Transfer,
and Legal Aspects of Engineering

Shang-Tian Yang Purdue 1984

Biomedical Engineering, Anaerobic
Fermentation, and Fermentation
Kinetics

Jacques L. Zakin New York 1959

Drag Reduction, Rheology, and
Fluid Mechanics

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William C. Forsman, PhD, Pennsylvania (1961)
Eduardo D. Glandt, PhD, Pennsylvania (1977)
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Alan L. Myers, PhD, California (1964)
Daniel D. Perlmutter, PhD, Yale (1956)
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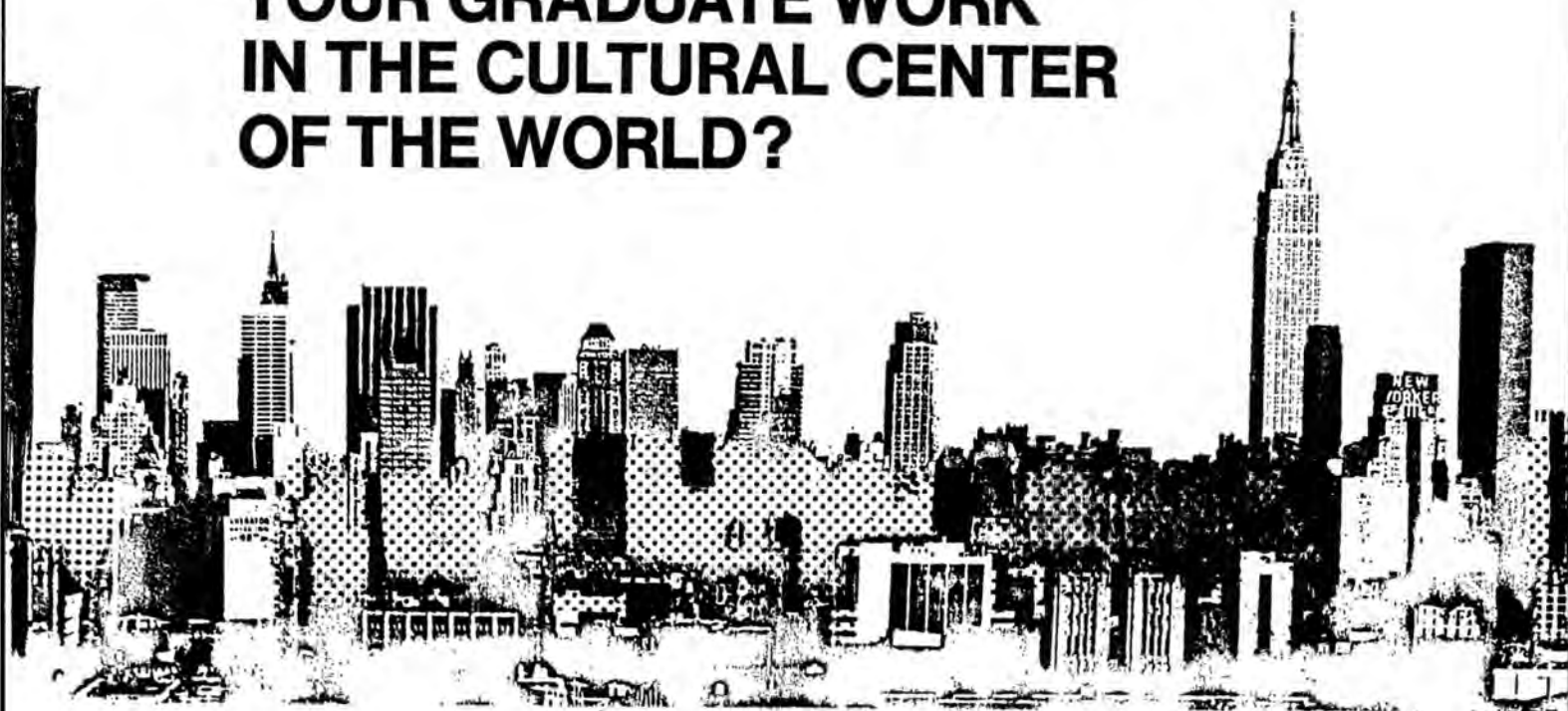
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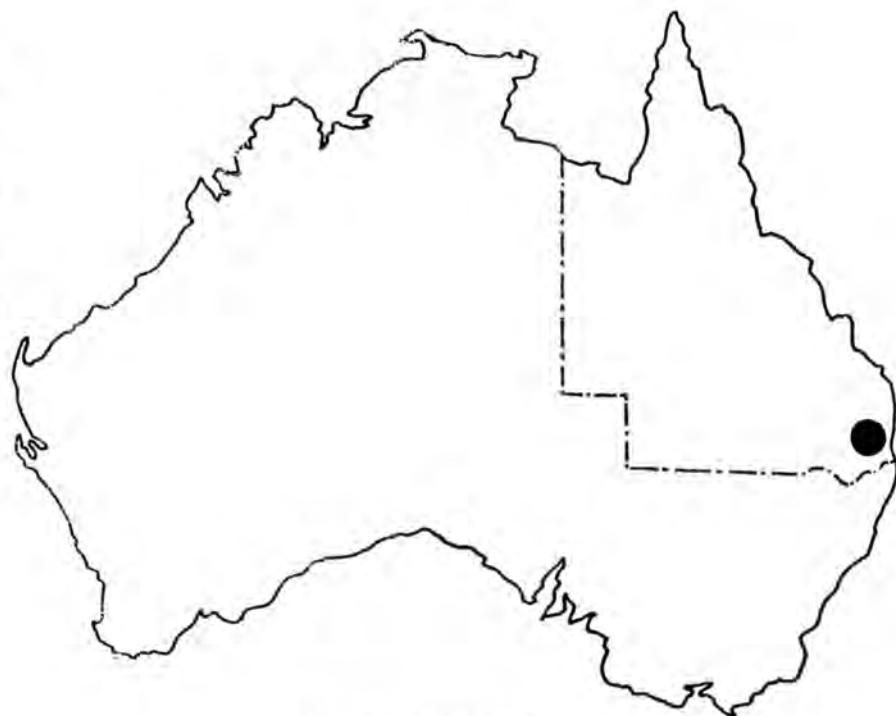
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- CONSTANTINE D. ARMENIADES (Case Western Reserve, 1969) Polymers and composites, biomaterials.
- SAM H. DAVIS, JR. (MIT, 1957) Dynamics of chemical systems, optimization, and process control.
- DEREK C. DYSON (London, 1966) Interfacial phenomena, hydrodynamic stability, and enhanced oil recovery.
- J. DAVID HELLUMS (Michigan, 1961) Fluid mechanics and biomedical engineering
- JOE W. HIGHTOWER (Johns Hopkins, 1963) Kinetics and heterogeneous catalysis.
- RIKI KOBAYASHI (Michigan, 1951)
Thermodynamics and transport properties, chromatography, coal liquefaction, and high-pressure properties.
- THOMAS W. LELAND, JR. (Texas, 1954)
Thermodynamic properties.
- LARRY V. McINTIRE (Princeton, 1970) Rheology, fluid mechanics, and biomedical engineering.
- CLARENCE A. MILLER (Minnesota, 1969)
Interfacial phenomena, enhanced oil recovery, detergency
- E. TERRY PAPOUTSAKIS (Purdue, 1979)
Biochemical engineering and applied mathematics.
- MARK A. ROBERT (Swiss Fed. Institute of Technology, 1980) Thermodynamics, statistical mechanics.
- KA-YIU SAN (CalTech, 1983) Biochemical engineering, and process control
- KYRIACOS ZYGOURAKIS (Minnesota, 1981)
Chemical reaction engineering, computer applications for control and data acquisition.

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Faculty and Research Areas

S. H. CHEN, Ph.D. 1981, Minnesota
Diffusion in Dense Gases and Polymer Solutions, Mixing and Chemical Reactions, Solution Thermodynamics

E. H. CHIMOWITZ, Ph.D. 1982, Connecticut
Computer-Aided Design, Super-Critical Extraction, Control

G. R. COKELET, Sc.D. 1963, M.I.T.
Blood and Suspension Rheology, Biomedical Engineering

M. R. FEINBERG, Ph.D. 1968, Princeton
Complex Reaction Systems, Applied Mathematics

J. R. FERRON, Ph.D. 1958, Wisconsin
Molecular Transport Processes, Applied Mathematics

J. C. FRIEDLY, Ph.D. 1965, California (Berkeley)
Process Dynamics, Control, Heat Transfer

R. H. HEIST, Ph.D. 1972, Purdue
Nucleation, Solid State, Atmospheric Chemistry

J. JORNE, Ph.D. 1972, California (Berkeley)
Electrochemical Engineering, Theoretical Biology

R. H. NOTTER, M.D., Ph.D. 1969, Washington (Seattle)
Lung Surfactants, Aerosols, Bioengineering

H. J. PALMER, Ph.D. 1971, Washington (Seattle)
Interfacial Phenomena, Mass Transfer

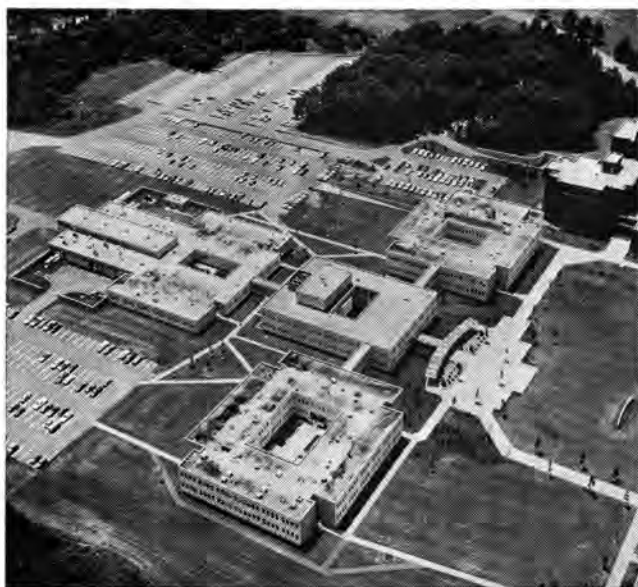
H. SALTSBURG, Ph.D. 1955, Boston
Surface Phenomena, Catalysis, Molecular Scattering

S. V. SOTIRCHOS, Ph.D. 1982, Houston
Reaction Engineering, Combustion and Gasification of Coal, Gas-Solid Reactions



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- B. L. Baker, Distinguished Professor Emeritus, Ph.D., North Carolina State University, 1955 (Process design, environment problems, ion transport).
- M. W. Davis, Jr., Weisiger Chair Professor, Ph.D., University of California (Berkeley), 1951 (Kinetics and catalysis, chemical process analysis, solvent extraction, waste treatment).
- F. A. Gadala-Maria, Assistant Professor, Ph.D., Stanford University, 1979 (Fluid mechanics, rheology).
- J. H. Gibbons, Professor, Ph.D., University of Pittsburgh, 1961 (Heat transfer, fluid mechanics).
- E. L. Hanzevack, Jr., Associate Professor, Ph.D., Northwestern University, 1974 (Two-phase flow, turbulence).
- F. P. Pike, Professor Emeritus, Ph.D., University of Minnesota, 1949 (Mass transfer in liquid-liquid systems, vapor-liquid equilibria).
- T. G. Stanford, Assistant Professor, Ph.D., The University of Michigan, 1977 (Chemical reactor engineering, mathematical modeling of chemical systems, process design, thermodynamics).
- V. Van Brunt, Associate Professor, Ph.D., University of Tennessee, 1974 (Mass transfer, computer modeling, fluidization).
- J. W. Van Zee, Assistant Professor, Ph.D., Texas A & M University, 1984 (Electrochemical systems, mathematical modeling, statistical applications).

FOR FURTHER INFORMATION CONTACT:
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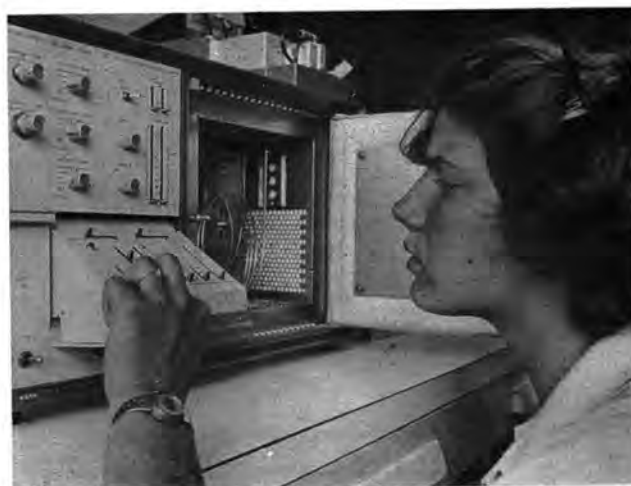
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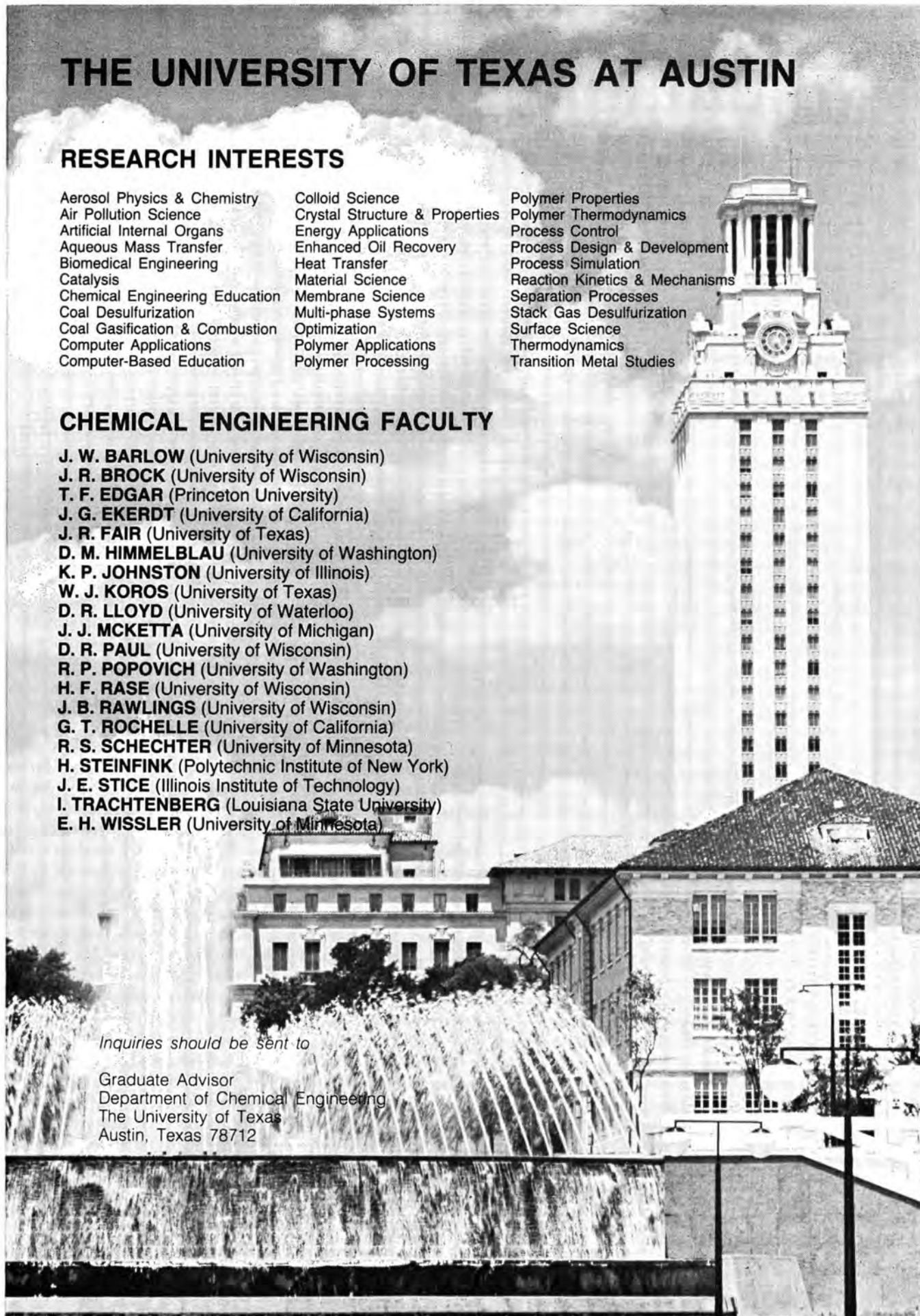
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G. T. ROCHELLE (University of California)
R. S. SCHECHTER (University of Minnesota)
H. STEINFINK (Polytechnic Institute of New York)
J. E. STICE (Illinois Institute of Technology)
I. TRACHTENBERG (Louisiana State University)
E. H. WISSLER (University of Minnesota)

Inquiries should be sent to

Graduate Advisor
Department of Chemical Engineering
The University of Texas
Austin, Texas 78712



Texas A&M University



● THE UNIVERSITY ●

Texas A&M is a land-grant and sea-grant university, and the oldest public institution of higher learning in Texas. The current enrollment is about 36,000. The university location is Bryan/College Station, Texas—twin cities with a combined population of 122,000 (including students). The surrounding country is deciduous forest—Houston is 95 miles Southeast and Dallas is 180 miles North.

● THE DEPARTMENT ●

The ChE department has an enrollment of about 700 undergraduates and 100 graduates. ChE has excellent facilities in the Zachry Engineering Center. All graduate students have desk space. Graduate stipends are currently up to \$1050/month for teaching assistantships and fellowships. Research assistantships are \$800/month for M.Sc. students and \$960/month for Ph.D. students.

FACULTY AND RESEARCH INTERESTS

C. D. Holland (department head)—distillation
A. Akgerman—kinetics
R. G. Anthony—catalysis
D. B. Bukur—reaction engineering
J. A. Bullin—gas sweetening, air pollution
R. Darby—rheology, polymers
R. R. Davison—solar energy
L. D. Durbin—process control
P. T. Eubank—thermodynamics

A. M. Gadalla—materials, industrial wastes
C. J. Glover—polymer solutions
K. R. Hall—thermodynamics
D. T. S. Hanson—biochemical
W. B. Harris—methanol fuel
J. C. Holste—thermodynamics
G. B. Tatterson—turbulence and mixing
A. T. Watson—porous media
R. E. White—electrochemical applications

FOR INFORMATION CONTACT:

Graduate Advisor
Chemical Engineering Dept.
Texas A&M University
College Station, TX 77843
409/845-3361

Admission to The Texas A&M University System and any of its sponsored programs is open to qualified individuals regardless of race, color, age, religion, sex, national origin or educationally unrelated handicaps.



An aerial view of the campus located on a plateau between the Allegheny and Blue Ridge Mountains.

Chemical Engineering

at

Virginia Polytechnic Institute and State University

At Virginia Tech, we apply chemistry to the needs of man! Study with outstanding professors in the land of Washington, Jefferson, Henry and Lee...where Chemical Engineering is an exciting art. Some current areas of major and well-funded activity are:

Renewable Resources

chemical and microbiological processing, chemicals from renewable resources

Catalysis

homogeneous, heterogeneous, spectroscopy, novel immobilizations of homogeneous systems, zeolite synthesis

Coal Science and Process Chemistry

chemistry of prompt intermediates, reaction paths in coal liquefaction, fate of trace elements

Coal Combustion Workshop

small-scale systems, fate of trace elements, environmental controls, fluidized beds

Microcomputers, Digital Electronics, and Control

digital process measurements, microcomputer interfacing, remote data acquisition, digital controls

Polymer Science and Engineering

processing, morphology, synthesis, surface science, biopolymers

Biochemical Engineering

synthetic foods, antibiotics, fermentation process design and instrumentation, environmental engineering

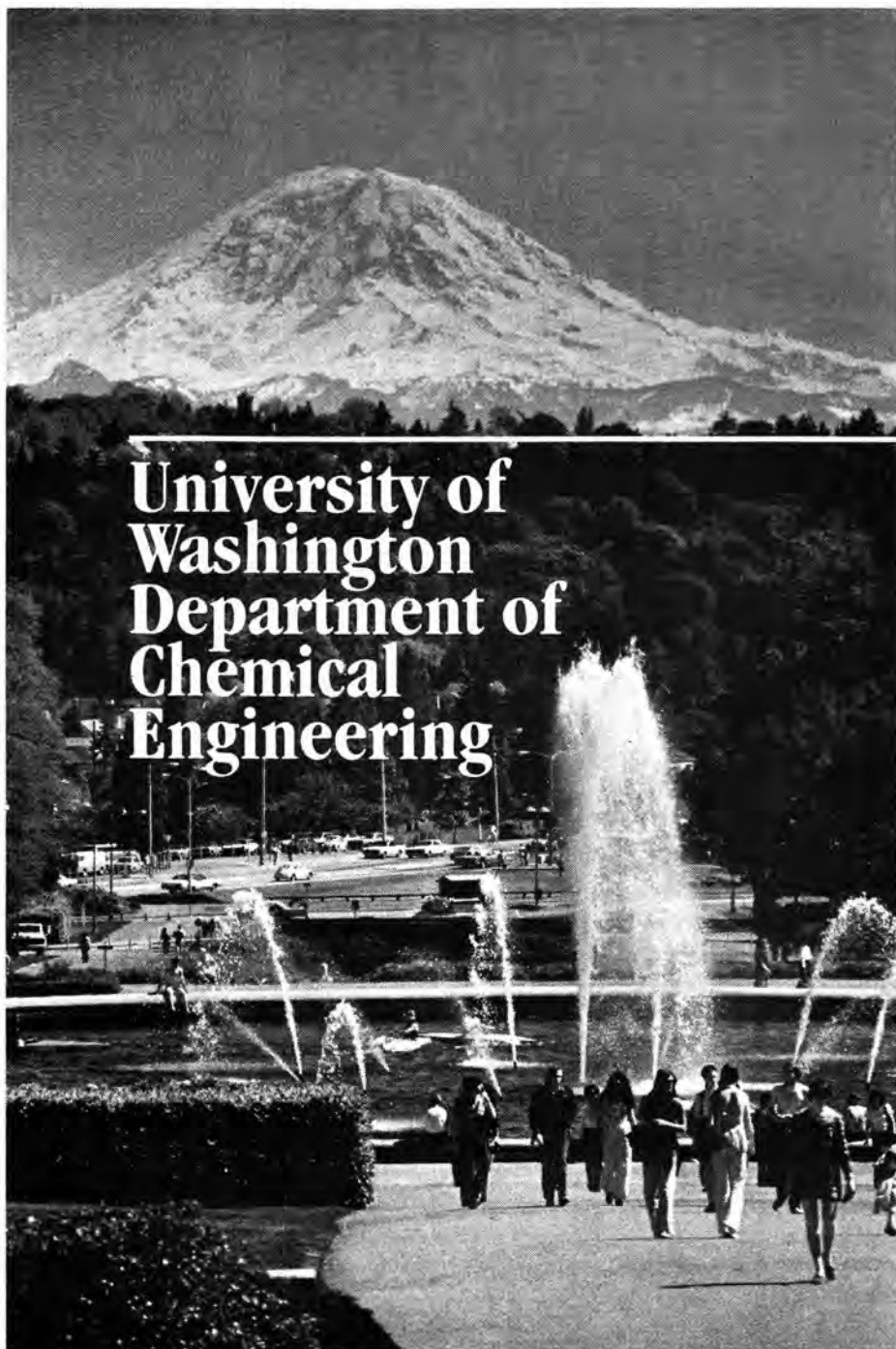
Surface Activity

use of bubbles and other interfaces for separations, water purification, trace elements, concentration, understanding living systems

VPI&SU is the state university of Virginia with 20,000 students and over 5,000 engineering students ... located in the beautiful mountains of southwestern Virginia. White-water canoeing, skiing, backpacking, and the like are all nearby, as are Washington, D.C. and historic Williamsburg.

Initial Stipends to \$10,000 per year.

Write to: Graduate Committee, Chemical Engineering Department, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061



University of Washington Department of Chemical Engineering

The Department has a vigorous research program and excellent physical facilities. There are about 55 graduate students, of whom typically 6-8 are foreign students and the remainder are from about 30 universities in over 20 states. All full-time graduate students are supported.

The research environment is stimulating and supportive, and there is a fine esprit de corps among the graduate students and faculty. Seattle is a beautiful city with outstanding cultural activities and unparalleled outdoor activities throughout the year.

We welcome your inquiry. For further information please write:

Chairman
Department of Chemical Engineering, BF-10
University of Washington
Seattle, WA 98195

 University of Washington

Regular Faculty

J. Ray Bowen, Ph.D., Stanford
(Dean, College of Engineering)
John C. Berg, Ph.D., California (Berkeley)
E. James Davis, Ph.D., Washington
Bruce A. Finlayson, Ph.D., Minnesota
Harold E. Hager, Ph.D., Princeton
William J. Heideger, Ph.D., Princeton
Bradley R. Holt, Ph.D., Wisconsin
Eric W. Kaler, Ph.D., Minnesota
Barbara B. Krieger, Ph.D., Wayne State
N. Lawrence Ricker, Ph.D., California
(Berkeley)
James C. Seferis, Ph.D., Delaware
Charles A. Sleicher, Ph.D., Michigan
Eric M. Stuve, Ph.D., Stanford

Research Faculty

Thomas A. Horbett, Ph.D., Washington

Adjunct and Joint Faculty Active in Department Research

G. Graham Allan, Ph.D., Glasgow
Allan S. Hoffman, Sc.D., M.I.T.
William T. McKean, Ph.D., Washington
Michael J. Pilat, Ph.D., Washington
Buddy D. Ratner, Ph.D., Brooklyn Polytechnic
Kyosti V. Sarkanen, Ph.D., State Univ. of N.Y.

Research Areas

Aerosols
Applied Kinetics
Biochemical and Biomedical Engineering
Colloids and Microemulsions
Electrochemical Engineering
Fluid Mechanics and Rheology
Heat Transfer
Mathematical Modeling
Polymer Science and Engineering
Process Control and Optimization
Pulp and Paper Chemistry and Processes
Semiconductor Processing and Technology
Surface Science and Interfacial Phenomena

WASHINGTON STATE UNIVERSITY

Chemical Engineering Department

Here at Washington State University, we are proud of our graduate program, and of our students. The program has been growing quickly in size and quality, but is still small and informal.

For a department of this size, the range of faculty research interests is very broad. Students choose research projects of in-

terest to them, then have the opportunity—and the responsibility—to make an individual contribution.

Through a combination of core courses and many electives, students can gain a thorough understanding of the basics of chemical engineering.

FACULTY AND RESEARCH INTERESTS

J.M. Lee (Ph.D., University of Kentucky): biochemical engineering, mass transfer, mixing.

K.C. Liddell (Ph.D., Iowa State University): semiconductor electrochemistry, extractive metallurgy, dynamic X-ray diffraction, radioactive waste management.

R. Mahalingam (Ph.D., University of Newcastle-upon-Tyne): electronic materials and polymers, particulate phoretic phenomena, air pollution, toxic wastes, non-Newtonian fluids, synfuels.

J.N. Petersen (Ph.D., Iowa State University): process dynamics and control, digital computer control, real time computing, on-line optimization.

J.C. Sheppard (Ph.D., Washington University): radioactive wastes, actinide element chemistry, atmospheric chemistry, radiocarbon dating.

W.J. Thomson (Ph.D., University of Idaho): kinetics and catalysis, mathematical modeling, solid state reactions.

B.J. Van Wie (Ph.D., University of Oklahoma): kinetics of mammalian tissue culture cultivation, bio-reactor design, centrifugal blood cellular separations.

R.L. Zollars (Ph.D., University of Colorado): multiphase reactor design, polymer reactor design, colloidal phenomena, in-situ fossil fuel recovery, chemical vapor deposition reactor design.

GRADUATE DEGREE PROGRAMS AT WSU

M.S. in Chemical Engineering

Twelve credits in graduate chemical engineering courses, nine credits in supporting courses, and a thesis are required.

Ph.D. in Chemical Engineering

Eighteen credits in graduate chemical engineering courses, sixteen credits in supporting courses, and a dissertation are required. Upon successful completion of the coursework and the Ph.D. preliminary examination, a student is admitted to candidacy for the degree. The dissertation must represent a significant original contribution to the research literature.

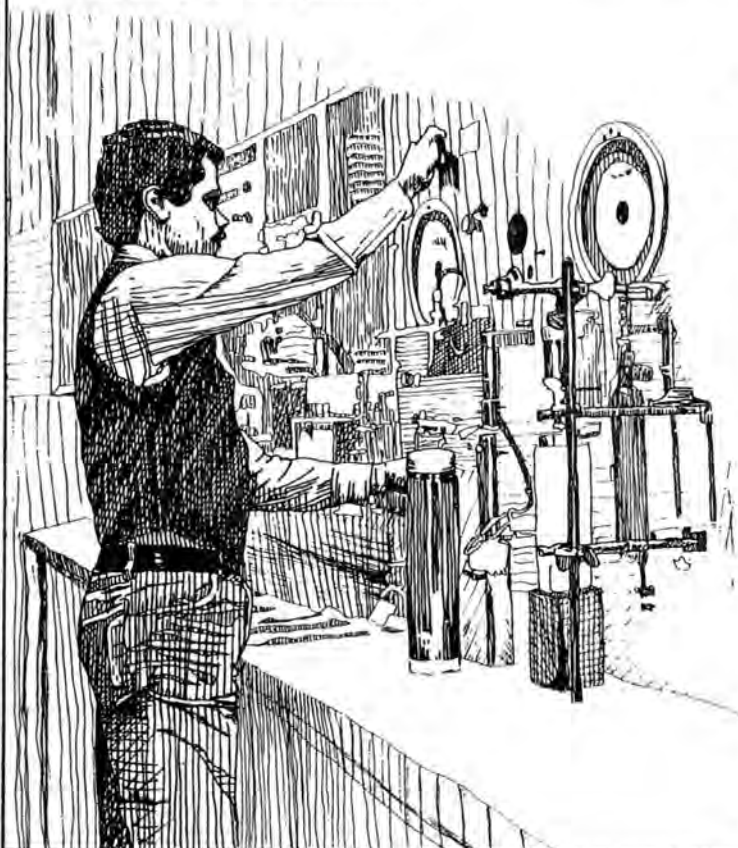
Conversion Program

Students with B.S. degrees in the physical or life sciences may apply for admission to the conversion program. Normally a small number of undergraduate courses must be taken in addition to the regular requirements for the M.S. or Ph.D.

FINANCIAL ASSISTANCE

Research or teaching assistantships, partial tuition waivers, and fellowships are available, and nearly all of our students receive financial assistance. Living costs are quite low.

WANT TO APPLY? Contact: Dr. K.C. Liddell, Graduate Coordinator, Department of Chemical Engineering, Washington State University, Pullman, WA 99164-2710, 509/335-4332 or 509/335-3710.





Washington University

ST. LOUIS, MISSOURI

Washington University encourages and gives full consideration to application for admission and financial aid without respect to sex, race, handicap, color, creed or national origin.



GRADUATE STUDY IN

CHEMICAL ENGINEERING

MASTER'S AND
DOCTORAL PROGRAMS

RESEARCH AREAS

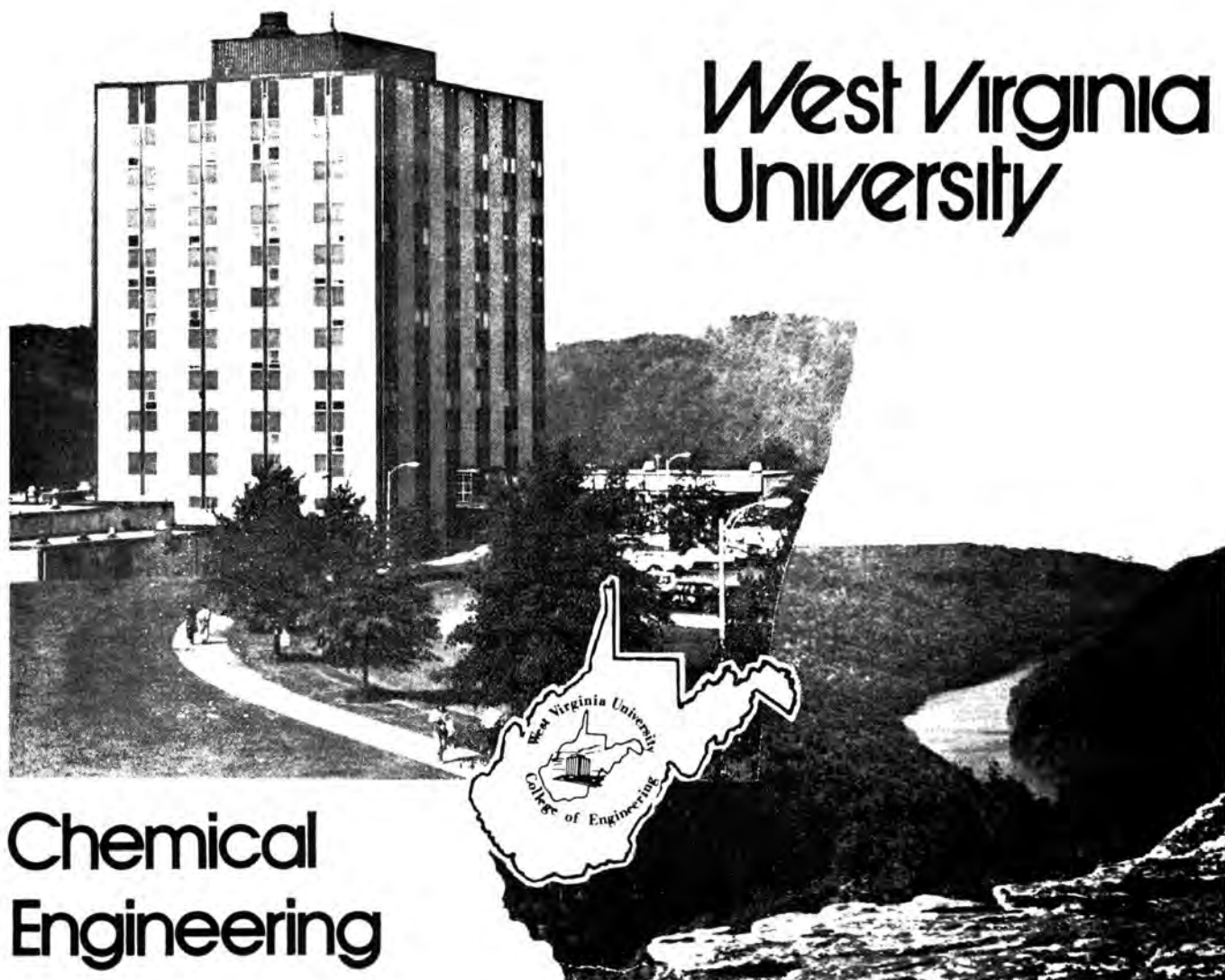
Reaction Engineering
Transport Phenomena
Thermodynamics
Process Design
And Control
Polymer And
Materials Engineering
Biomedical Engineering
Biochemical Engineering

FOR INFORMATION CONTACT

Graduate Admissions Committee
Department of
Chemical Engineering
Washington University
St. Louis, Missouri 63130



West Virginia University



Chemical Engineering

Faculty

Richard C. Bailie (Iowa State Univ.)
Eugene V. Cilento (Univ. of Cincinnati)
Dady B. Dadyburjor (Univ. of Delaware)
Alfred F. Galli (West Virginia Univ.)
Joseph D. Henry, Jr., Chair. (Univ. of Michigan)
Hisashi O. Kono (Kyushu Univ.)
Joseph A. Shaeiwitz (Carnegie-Mellon Univ.)
Alfred H. Stiller (Univ. of Cincinnati)
Charles W. White (Univ. of Pennsylvania)
Wallace B. Whiting (Univ. California, Berkeley)
Ray Y. K. Yang (Princeton Univ.)
John W. Zondlo (Carnegie-Mellon Univ.)

Topics

Catalysis and Reaction Engineering
Separation Processes
Surface and Colloid Phenomena
Phase Equilibria
Fluidization
Biomedical Engineering
Solution Chemistry
Transport Phenomena
Biochemical Engineering
Biological Separations
Computer-aided Design

M.S. and Ph.D. Programs

For further information on financial aid write:

Graduate Admission Committee
Department of Chemical Engineering
P.O. Box 6101
West Virginia University
Morgantown, West Virginia 26506-6101

Wisconsin

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in Chemical Engineering



Faculty Research Interests

R. Byron Bird

Transport phenomena, polymer fluid dynamics, polymer kinetic theory

Thomas W. Chapman

Electrochemistry, mass transfer

Camden A. Coberly

Director, Engineering Experiment Station

Stuart L. Cooper (Chmn.)

Polymer science, biomaterials

E. Johansen Crosby

Spray and suspended particle processing

John A. Duffie

Solar energy

James A. Dumesic

Kinetics and catalysis, surface chemistry

Charles G. Hill, Jr.

Kinetics and catalysis, membrane processes

Richard R. Hughes

Process synthesis, simulation and optimization

Sangtae Kim

Fluid mechanics, applied mathematics

James A. Koutsky

Polymer science, adhesives, composites

Stanley H. Langer

Kinetics, catalysis, electrochemistry, chromatography, hydrometallurgy

E. N. Lightfoot, Jr.

Mass transport and separations processes, biochemical engineering

W. Robert Marshall

Director, University-Industry Research Program

Patrick D. McMahon

Statistical thermodynamics, renormalization group theory

W. Harmon Ray

Process dynamics and control, reactor engineering

Dale F. Rudd

Process design and industrial development

Glenn A. Sather

Development of instructional program mathematics

Warren E. Stewart

Reactor modeling, transport phenomena, applied

Ross E. Swaney

Design research, computer-aided design

For further information about graduate study in chemical engineering, write:

THE GRADUATE COMMITTEE
Department of Chemical Engineering
University of Wisconsin-Madison
1415 Johnson Drive
Madison, Wisconsin 53706

Chemical Engineering At **YALE**



The Department of Chemical Engineering at Yale offers graduate study in a variety of traditional, nontraditional and interdisciplinary areas. Research laboratories are well equipped with modern instruments and computers. Students also benefit from outstanding educational and research programs in the social sciences, humanities, and the arts as well as other branches of engineering and applied/pure science.

FACULTY

J. B. Fenn, D. D. Frey, G. L. Haller, B. L. Halpern, C.s. Horvath, J. Levitzky (Adj.), W. R. Melander, J. O'Brien, L. D. Pfefferle, D. E. Rosner

RESEARCH AREAS

Heterogeneous Catalysis, Combustion, Separation Processes, Transport Phenomena, Biochemical Engineering, Chemical Reaction Engineering, Chemical Kinetics, Molecular Beam Chemical Engineering

Within a short drive of Long Island Sound beaches, Yale is located in New Haven, Connecticut, on Long Island Sound about 80 miles northeast of New York and 130 miles southwest of Boston. Yale and New Haven have two theatre companies of national repute, a symphony orchestra, and several chamber music groups.

**For more information write: Chairman, Dept. of Chemical Engineering
P.O. Box 2159 Yale Station
New Haven, CT 06520**





UNIVERSITY OF ARKANSAS



DEPARTMENT OF CHEMICAL ENGINEERING

Graduate Study and Research Leading to M.S. and Ph.D. Degrees

FACULTY AND AREAS OF SPECIALIZATION

ROBERT E. BABCOCK ● Water Resources, Fluid Mechanics, Thermodynamic Properties, Enhanced Oil Recovery

EDGAR C. CLAUSEN ● Conversion of Biomass into Chemicals and Energy, Biochemical Engineering

JAMES R. COUPER ● Process Design and Economics, Polymers

JAMES L. GADDY ● Biochemical Engineering, Process Optimization

JERRY A. HAVENS ● Irreversible Thermodynamics, Fire and Explosion Hazard Assessment

WILLIAM A. MYERS ● Natural and Artificial Radioactivity, Nuclear Engineering,

CHARLES SPRINGER ● Mass Transfer, Diffusional Processes

THOMAS O. SPICER ● Computer Simulation, Dense Gas Dispersion

CHARLES M. THATCHER ● Mathematical Modeling, Computer Simulation

JIM L. TURPIN ● Fluid Mechanics, Biomass Conversion, Process Design

J. REED WELKER ● Risk Analysis, Fire and Explosion Behavior and Control

FINANCIAL AID

Graduate Research and Teaching Assistantships, Fellowships.

LOCATION

The U of A campus is located in beautiful Northwest Arkansas in the heart of the Ozark mountains. This tranquil setting provides an invigorating climate with excellent outdoor recreation including hunting, fishing, camping, hiking, skiing, sailing, and canoeing. Technical and cultural opportunities are available within the eight-college consortium for higher education.

For Further Details Contact:

Dr. James L. Gaddy, Professor and Head
Department of Chemical Engineering
227 Engineering Building, University of Arkansas
Fayetteville, AR 72701

Brown University



Graduate Study in Chemical Engineering

Faculty

- Joseph M. Calo, Ph.D. (Princeton)
- Bruce Caswell, Ph.D. (Stanford)
- Joseph H. Clarke, Ph.D. (Polytechnic Institute of New York)
- Richard A. Dobbins, Ph.D. (Princeton)
- Sture K.F. Karlsson, Ph.D. (Johns Hopkins)
- Joseph D. Kestin, D.Sc. (University of London)
- Joseph T.C. Liu, Ph.D. (California Institute of Technology)
- Paul F. Maeder, Ph.D. (Brown)
- Edward A. Mason, Ph.D. (Massachusetts Institute of Technology)
- T.F. Morse, Ph.D. (Northwestern)
- Peter D. Richardson, Ph.D., D.Sc. Eng. (University of London)
- Merwin Sibulkin, A.E. (California Institute of Technology)
- Eric M. Suuberg, Sc.D. (Massachusetts Institute of Technology)

Research Topics in Chemical Engineering

Chemical kinetics, combustion, two phase flows, fluidized beds, separation processes, numerical simulation, vortex methods, turbulence, hydrodynamic stability, coal chemistry, coal gasification, heat and mass transfer, aerosol condensation, transport processes, irreversible thermodynamics, membranes, particulate deposition, physiological fluid mechanics, rheology.

A program of graduate study in Chemical Engineering leads toward the M.Sc. or Ph.D. Degree. Teaching and Research Assistantships as well as Industrial and University Fellowships are available.

For further information write:

Professor J. Calo, *Coordinator*
Chemical Engineering Program
Division of Engineering
Brown University
Providence, Rhode Island 02912



CLEVELAND STATE UNIVERSITY

Graduate Studies in Chemical Engineering

M.Sc. and D.Eng. Programs

RESEARCH AREAS:

- Adsorption and Diffusion in Zeolites
- Catalysis, Kinetics and Reactor Design
- Materials Science
- Mathematical Modelling, Simulation and Control
- Separation Processes
- Surface Phenomena and Mass Transfer
- Thermodynamics and Fluid Phase Equilibria
- Transport Phenomena
- Zeolite Synthesis

FACULTY:

R. Elliott (Illinois)
G.A. Coulman (Case Western)
B. Ghorashi (Ohio State)
D.T. Hayhurst (WPI)
A.B. Ponter (Manchester)
D.B. Shah (Michigan State)
T. Walsh (Case Western)
G. Wotzak (Princeton)

Cleveland State University has 18,000 students enrolled in its academic programs. It is located in the center of the city of Cleveland with many outstanding cultural and recreational opportunities nearby.

FOR FURTHER INFORMATION WRITE TO:

Chairman,
Department of Chemical Engineering
Cleveland State University
Cleveland, Ohio 44115

CSU Cleveland State
University

COLUMBIA UNIVERSITY

NEW YORK, NEW YORK 10027

Graduate Programs in Chemical Engineering,
Applied Chemistry and Bioengineering

FACULTY AND RESEARCH AREAS:

J. A. ASENJO

H. Y. CHEH

C. J. DURNING

H. P. GREGOR

C. C. GRYTE

E. F. LEONARD

G. J. PROKOPAKIS

J. L. SPENCER

U. STIMMING

V. VENKATASUBRAMANIAN

Biochemical Engineering

Chemical Thermodynamics and Kinetics,
Electrochemical Engineering

Polymer Physical Chemistry

Polymer Science, Membrane Processes,
Environmental Engineering

Polymer Science, Separation Processes

Biomedical Engineering, Transport Phenomena

Process Analysis, Simulation and Design

Applied Mathematics, Chemical Reactor Engineering

Electrochemistry

Artificial Intelligence, Statistical Mechanics

For Further Information, Write:

Chairman, Graduate Committee
Department of Chemical Engineering and Applied Chemistry
Columbia University
New York, New York 10027

Financial assistance is available.

(212) 280-4453

the university of connecticut

faculty

T. F. ANDERSON
J. P. BELL
C. O. BENNETT
D. J. COOPER
R. W. COUGHLIN
M. B. CUTLIP
A. T. DiBENEDETTO
J. M. FENTON
G. M. HOWARD
H. E. KLEI
M. T. SHAW
R. M. STEPHENSON
D. W. SUNDSTROM
R. A. WEISS

financial aid — Research and Teaching Assistantships, Fellowships

location — Beautiful setting in rural Northeast Connecticut,
convenient to Boston, New York, and Northern New England

We would like to tell you much more about the opportunities
for an education at UCONN, please write to:

Graduate Admissions Committee
Department of Chemical Engineering
The University of Connecticut
Storrs, Connecticut 06268

programs

M.S. and Ph.D. programs covering
most aspects of Chemical Engineering.

Research projects in the following areas:

KINETICS AND CATALYSIS
POLYMERS AND COMPOSITE MATERIALS
PROCESS DYNAMICS AND CONTROL
WATER AND AIR POLLUTION CONTROL
BIOCHEMICAL ENGINEERING
FUEL PROCESSING
ELECTROCHEMICAL ENGINEERING

THAYER SCHOOL OF ENGINEERING AT DARTMOUTH COLLEGE

Masters and Doctoral Programs in Engineering
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Courses available from

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RESEARCH OPPORTUNITIES IN THE FOLLOWING AREAS:

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- BIOMASS CONVERSION • HIP AND KNEE PROTHESES • PHYSIOLOGY •
- SEPARATION OPERATIONS • BIOSENSORS • WASTE-WATER TREATMENT •
- IMMOBILIZED HYBRIDOMA CELL REACTOR DEVELOPMENT •

For further information and application forms, write:

Director of Admissions, Bio/Chemical Engineering Program
Thayer School of Engineering, Dartmouth College, Hanover, NH 03755

DREXEL UNIVERSITY

M.S. and Ph.D. Programs in Chemical Engineering and Biochemical Engineering

Faculty

D. R. Coughanowr
S. M. Benner
E. D. Grossmann
Y. H. Lee
S. P. Meyer
R. Mutharasan
J. A. Tallmadge
J. R. Thygeson
X. E. Verykios
C. B. Weinberger

Research Areas

- Biochemical Engineering
- Catalysis and Reactor Engineering
- Mass and Heat Transport
- Microcomputer Applications
- Polymer Processing
- Process Control and Dynamics
- Rheology and Fluid Mechanics
- Systems Analysis and Optimization
- Thermodynamics and Process Energy Analysis
- Drying Processes

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Write to:

Dr. X. E. Verykios
Department of Chemical Engineering
Drexel University
Philadelphia, PA 19104

HOWARD UNIVERSITY

Chemical Engineering MS Degree

Faculty/Research Areas

M. E. ALUKO, Ph.D., UC (Santa Barbara)

J. N. CANNON, Ph.D., Colorado

R. C. CHAWLA, Ph.D., Wayne State

H. M. KATZ, Ph.D., Cincinnati

F. G. KING, D.Sc., Stevens Institute

M. G. RAO, Ph.D., Washington (Seattle)

Dynamics of Reacting Systems, Applied Mathematics

Fluid and Thermal Sciences (Experimental,
Computational)

Air and Water Pollution Control, Reaction Kinetics

Environmental Engineering

Biochemical Engineering, Process Control,
Pharmacokinetics

Process Synthesis and Design, Ion Exchange
Separations

For Information Write

Director of Graduate Studies
Department of Chemical Engineering
Howard University
Washington, DC 20059

**CHEMICAL ENGINEERING
M.S. and Ph.D. PROGRAMS**

FACULTY

- T. E. CARLESON** —Mass Transfer Enhancement, Chemical Reprocessing of Nuclear Wastes, Bioseparation
- D. C. DROWN** —Process Design, Computer Applications Modeling, Process Economics and Optimization with Emphasis on Food Processing
- L. L. EDWARDS** —Computer Aided Process Design, Systems Analysis, Pulp/Paper Engineering, Numerical Methods and Optimization
- M. L. JACKSON** —Mass Transfer in Biological Systems, Particulate Control Technology
- R. A. KORUS** —Polymers, Biochemical Engineering
- J. Y. PARK** —Chemical Reaction Analysis and Catalysis, Laboratory Reactor Development, Thermal Plasma Systems
- J. J. SCHELDORF** —Heat Transfer, Thermodynamics
- G. M. SIMMONS** —Geothermal Energy Engineering, Pyrolysis Kinetics, Process Control, Supercritical Fluid Extraction



The department has a highly active research program covering a wide range of interests. With Washington State University just 8 miles away, the two departments jointly schedule an expanded list of graduate courses for both MS and PhD candidates, giving the graduate student direct access to a combined graduate faculty of fifteen. The northern Idaho region offers a year-round complement of outdoor activities including hiking, white water rafting, skiing, and camping.

FOR FURTHER INFORMATION & APPLICATION WRITE:

Graduate Advisor
Chemical Engineering Department
University of Idaho
Moscow, Idaho 83843



**THE JOHNS HOPKINS
UNIVERSITY**

Please contact:
Professor Geoffrey Prentice
Department of Chemical Engineering
The Johns Hopkins University
Baltimore, Maryland 21218
301-338-7006

RESEARCH AREAS

Fluid Mechanics
Phase Equilibria
Biotechnology
Nucleation and Crystallization
Electrochemical Engineering
Rheology
Coal Conversion
Turbulence and Mixing
Supercritical Solvent Extraction
Polymer Solution Thermodynamics
Mass and Heat Transfer
Process Modeling and Control
Reaction Engineering
Catalysis

FACULTY

- Stanley Corrsin, Ph.D.
Caltech
- Marc Donohue, Ph.D.
Berkeley
- Ini Ekpenyong, Sc.D.
M.I.T.
- Joseph Katz, Ph.D.
Chicago
- Robert Kelly, Ph.D.
North Carolina State
- Mark McHugh, Ph.D.
Delaware
- Louis Monchick, Ph.D.
Boston
- Geoffrey Prentice, Ph.D.
Berkeley
- William Schwarz, Dr.Eng.
Johns Hopkins

M.S. AND Ph.D. PROGRAMS



CHEMICAL ENGINEERING

LAMAR UNIVERSITY

Graduate Study in Chemical Engineering

- Master of Engineering
- Master of Engineering Science
- Doctor of Engineering

FACULTY:

- **D. H. CHEN** (*Ph.D., Oklahoma State Univ.*)
- **J. R. HOPPER** (*Ph.D., Louisiana State Univ.*)
- **T. C. HO** (*Ph.D., Kansas State Univ.*)
- **K. Y. LI** (*Ph.D., Mississippi State Univ.*)
- **R. E. WALKER** (*Ph.D., Iowa State Univ.*)
- **C. L. YAWS** (*Ph.D., Univ. of Houston*)
- **O. R. SHAVER** (*Ph.D., Univ. of Houston*)



RESEARCH AREAS:

- Computer Simulation, Process Dynamics and Control
- Heterogeneous Catalysis, Reaction Engineering
- Fluidization and Mass Transfer
- Transport Properties, Mass Transfer, Gas-Liquid Reactions
- Rheology of Drilling Fluids, Computer-Aided Design
- Thermodynamic Properties, Cost Engineering, Photovoltaics

FOR FURTHER INFORMATION PLEASE WRITE:

Graduate Admissions Chairman
Department of Chemical Engineering
Lamar University
P. O. Box 10053
Beaumont, TX 77710

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LEHIGH UNIVERSITY

Department of Chemical Engineering
Whitaker Laboratory, Bldg. 5
Bethlehem, Pa. 18015

FACULTY

Philip A. Blythe
Hugo S. Caram
Marvin Charles
John C. Chen
Curtis W. Clump
Mohamed El-Aasser
Christos Georgakis
James T. Hsu
Arthur E. Humphrey
Andrew Klein
William L. Luyben
Janice Phillips
Matthew J. Reilly
Eric P. Salathe
William E. Schiesser
Cesar Silebi
Leslie H. Sperling
Fred P. Stein
Harvey Stenger
Leonard A. Wenzel

RESEARCH CONCENTRATIONS

Polymer Science & Engineering
Fermentation, Enzyme Engineering,
Biochemical Engineering
Process Simulation & Control
Catalysis & Reaction Engineering
Thermodynamic Property Research
Energy Conversion Technology
Applied Heat & Mass Transfer
Multiphase Processing

DEGREE PROGRAMS

M.S. and Ph.D. in Ch.E.
M.Eng. Program in Design
M.S. and Ph.D. in
Polymer Science & Engineering

FINANCIAL AID

Of course.

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LOUISIANA TECH UNIVERSITY

Master of Science and Doctor of Engineering Programs



For information, write
Dr. David H. Knoebel,
Interim Head
Department of Chemical
Engineering
Louisiana Tech University
Ruston, Louisiana 71272
(318) 257-2483

The Department of Chemical Engineering at Louisiana Tech University offers a well-balanced graduate program for either the Master's or Doctor's degree. Twenty-five full-time students (ten doctoral candidates) and fifteen part-time students are pursuing research in Membrane Transport, Adaptive Control, Process Simulation, Two-Phase Heat Transfer, Lignite Utilization, Nuclear Energy, and Ozonation, with concentration in Energy, Environment, and Control Studies.

FACULTY

Joseph B. Fernandes, IIT, Bombay
Houston K. Huckabay, LSU
David H. Knoebel, Oklahoma State
Norman F. Marsolan, LSU
Ronald H. Thompson, Arkansas



Manhattan College

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- Con Edison
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- Pfizer Inc.
- Stauffer Chemical Co., Inc.
- Air Products and Chemicals, Inc.

*Manhattan College is located in Riverdale,
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MANHATTAN COLLEGE
RIVERDALE, NY 10471



McMASTER UNIVERSITY

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