INDEX

Graduate School Adversisements

The University of Akron SM

FIAT LUX 1870

DEPARTMENT OF CHEMICAL ENGINEERING

GRADUATE PROGRAM

Graduate assistant stipends for teaching and research start at $7,800.
Industrially sponsored fellowships available up to $17,000.
In addition to stipends, tuition and fees are waived. • Ph.D. students may get some incentive scholarships.

The deadline for assistantship applications is February 15th.

FACULTY		RESEARCH INTERESTS
G. A. ATWOOD [1]	•	Digital Control, Mass Transfer, Multicomponent Adsorption
G. G. CHASE	•	Multiphase Processes, Heat Transfer, Interfacial Phenomena
H. M. CHEUNG	•	Colloids, Light Scattering Techniques
S. C. CHUANG	•	Catalysis, Reaction Engineering, Combustion
J.R. ELLIOTT	•	Thermodynamics, Material Properties
L. G. FOCHT	•	Fixed Bed Adsorption, Process Design
K. L. FULLERTON	•	Fuel Technology, Process Engineering, Environmental Engineering
M. A. GENCER[2]	•	Biochemical Engineering, Environmental Biotechnology
H. L. GREENE[1]	•	Oxidative Catalysis, Reactor Design, Mixing
L.K. JU	•	Biochemical Engineering, Enzyme and Fermentation Technology
S. LEE	•	Fuel and Chemical Process Engineering, Reactive Polymers, Waste Clean-Up
D. MAHAJAN[2]	•	Homogeneous Catalysis, Reaction Kinetics
J. W. MILLER[2]	•	Polymerization Reaction Engineering
H. C. QAMMAR	•	Hazardous Waste Treatment, Nonlinear Dynamics
R. W. ROBERTS[1]	•	Plastics Processing, Polymer Films, System Design
N.D. SYLVESTER	•	Environmental Engineering, Flow Phenomena
M. S. WILLIS	•	Multiphase Transport Theory, Filtration, Interfacial Phenomena

[1] *Professor Emeritus* [2] *Adjunct Faculty Member*

Cooperative Graduate Education Program is also available.

• For Additional Information, Write •

Chairman, Graduate Committee
Department of Chemical Engineering • The University of Akron • Akron, OH 44325-3906

Chemical Engineering Programs at . . .

The University of Alabama

The University of Alabama, located in the sunny South, offers excellent programs leading to M.S. and Ph.D. degrees in Chemical Engineering.

Our research emphasis areas are concentrated in environmental studies, reaction kinetics and catalysis, alternate fuels, and related processes. The faculty has extensive industrial experience, which gives a distinctive engineering flavor to our programs.

For further information, contact the Director of Graduate Studies
Department of Chemical Engineering
Box 870203
Tuscaloosa, AL 35487-0203
(205-348-6450).

FACULTY

G. C. April, Ph.D. (Louisiana State)

D. W. Arnold, Ph.D. (Purdue)

W. C. Clements, Jr., Ph.D. (Vanderbilt)

R. A. Griffin, Ph.D. (Utah State)

I. A. Jefcoat, Ph.D. (Clemson)

A. M. Lane, Ph.D. (Massachusetts)

M.D. McKinley, Ph.D. (Florida)

L. Y. Sadler III, Ph.D. (Alabama)

V. N. Schrodt, Ph.D. (Pennsylvania State)

RESEARCH INTERESTS

Biomass Conversion, Modeling Transport Processes, Thermodynamics, Coal-Water Fuel Development, Process Dynamics and Control, Microcomputer Hardware, Catalysis, Chemical Reactor Design, Reaction Kinetics, Environmental, Synfuels, Alternate Chemical Feedstocks, Mass Transfer, Energy Conversion Processes, Ceramics, Rheology, Mineral Processing, Separations, Computer Applications, and Bioprocessing.

An equal employment/equal educational opportunity institution.

UNIVERSITY OF ALBERTA

Degrees: M.Sc., Ph.D. in Chemical Engineering and in Process Control

FACULTY AND RESEARCH INTERESTS

K. T. CHUANG, Ph.D. (University of Alberta)
Mass Transfer • Catalysis • Separation Processes • Pollution Control

I. G. DALLA LANA, Ph.D. (University of Minnesota)
EMERITUS • *Chemical Reaction Engineering • Heterogeneous Catalysis • Hydroprocessing*

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

M. R. GRAY, Ph.D. (California Institute of Technology)
DEAN OF GRADUATE STUDIES • *Bioreactors • Chemical Kinetics • Characterization of Complex Organic Mixtures*

R. E. HAYES, Ph.D. (University of Bath)
Numerical Analysis • Reactor Modeling • Conputational Fluid Dynamics

S. M. KRESTA, Ph.D. (McMaster University)
Fluid Mechanics • Turbulence • Mixing

D. T. LYNCH, Ph.D. (University of Alberta)
Catalysis • Kinetic Modeling • Numerical Methods • Reactor Modeling and Design • Polymerization

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

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

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

K. NANDAKUMAR, Ph.D. (Princeton University)
Transport Phenomena • Multicomponent Distillation • Computational Fluid Dynamics

F. D. OTTO, Ph.D. (Michigan)
Mass Transfer • Gas-Liquid Reactions • Separation Processes

M. RAO, Ph.D. (Rutgers University)
AI • Intelligent Control • Process Control

D. B. ROBINSON, Ph.D. (University of Michigan)
EMERITUS • *Thermal and Volumetric Properties of Fluids • Phase Equilibria • Thermodynamics*

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

S. L. SHAH, Ph.D. (University of Alberta)
Computer Process Control • System Identification • Adaptive Control

U. SUNDARARAJ, Ph.D. (University of Minnesota)
Polymer Processing • Reactive Polymer Blending • Interfacial Phenomena

S. E. WANKE, Ph.D. (University of California, Davis) CHAIR
Heterogeneous Catalysis • Kinetics • Polymerization

M. C. WILLIAMS, Ph.D. (University of Wisconsin)
Rheology • Polymer Characterization • Polymer Processing

R. K. WOOD, Ph.D. (Northwestern University)
Process Modeling and Dynamic Simulation • Distillation Column Control • Dynamics and Control of Grinding Circuits

For further information, contact
Graduate Program Officer SYK • Department of Chemical Engineering
University of Alberta • Edmonton, Alberta, Canada T6G 2G6
PHONE (403) 492-4221 • FAX (403) 492-2881

THE UNIVERSITY OF ARIZONA

FACULTY / RESEARCH INTERESTS

ROBERT ARNOLD, Associate Professor (Caltech)
Microbiological Hazardous Waste Treatment, Metals Speciation and Toxicity

JAMES BAYGENTS, Assistant Professor (Princeton)
Fluid Mechanics, Transport and Colloidal Phenomena, Bioseparations, Electrokinetics

MILAN BIER, Professor Emeritus (Fordham)
Protein Separation, Electrophoresis, Membrane Transport

CURTIS W. BRYANT, Associate Professor (Clemson)
Biological Wastewater Treatment, Industrial Waste Treatment

WILLIAM P. COSART, Associate Professor and Associate Dean (Oregon State)
Heat Transfer in Biological Systems, Blood Processing

EDWARD FREEH, Adjunct Professor (Ohio State)
Process Control, Computer Applications

JOSEPH GROSS, Professor Emeritus (Purdue)
Boundary Layer Theory, Pharmacokinetics, Microcirculation, Biorheology

ROBERTO GUZMAN, Assistant Professor (North Carolina State)
Protein Separation, Affinity Methods

BRUCE E. LOGAN, Associate Professor (Berkeley)
Bioremediation, Biological Wastewater Treatment, Fixed Film Bioreactors

KIMBERLY OGDEN, Assistant Professor (Colorado)
Bioreactors, Bioremediation, Organics Removal from Soils

THOMAS W. PETERSON, Professor and Head (CalTech)
Aerosols, Hazardous Waste Incineration, Microcontamination

ALAN D. RANDOLPH, Professor Emeritus (Iowa State)
Crystallization Processes, Nucleation, Particulate Processes

THOMAS R. REHM, Professor (Washington)
Mass Transfer, Process Instrumentation, Computer Aided Design

FARHANG SHADMAN, Professor (Berkeley)
Reaction Engineering, Kinetics, Catalysis, Reactive Membranes, Microcontamination

RAYMOND A. SIERKA, Professor (Oklahoma)
Adsorption, Oxidation, Membranes, Solar Catalyzed Detox Reactions

JOST O. L. WENDT, Professor (Johns Hopkins)
Combustion-Generated Air Pollution, Incineration, Waste Management

DON H. WHITE, Professor Emeritus (Iowa State)
Polymers, Microbial and Enzymatic Processes

DAVID WOLF, Visiting Professor (Technion)
Fermentation, Mixing, Energy, Biomass Conversion

For further information, write to

Chairman,
Graduate Study Committee
Department of
Chemical and Environmental Engineering
University of Arizona
Tucson, Arizona 85721

The University of Arizona is an equal opportunity educational institution/equal opportunity employer.
Women and minorities are encouraged to apply.

The Chemical and Environmental Engineering Department at the University of Arizona offers a wide range of research opportunities in all major areas of chemical engineering and environmental engineering, and graduate courses are offered in most of the research areas listed here. The department offers a fully accredited undergraduate degree as well as MS and PhD graduate degrees. Strong interdisciplinary programs exist in bioprocessing and bioseparations, microcontamination in electronics manufacture, and environmental process modification.

Financial support is available through fellowships, government and industrial grants and contracts, teaching and research assistantships.

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.

CHEMICAL, BIO, AND MATERIALS ENGINEERING AT

ARIZONA STATE UNIVERSITY

Graduate Research in a High Technology Environment

Chemical Engineering

Beckman, James R., Ph.D., University of Arizona • Crystallization and Solar Cooling

Bellamy, Lynn, Ph.D., Tulane • Process Simulation

Berman, Neil S., Ph.D., University of Texas, Austin • Fluid Dynamics and Air Pollution

Burrows, Veronica A., Ph.D., Princeton University • Surface Science, Semiconductor Processing

Cale, Timothy S., Ph.D., University of Houston • Catalysis, Semiconductor Processing

Garcia, Antonio A., Ph.D., U.C., Berkeley • Acid-Base Interactions, Biochemical Separation, Colloid Chemistry

Henry, Joseph D., Jr., Ph.D., University of Michigan • Biochemical, Molecular Recognition, Surface and Colloid Phenomena

Kuester, James L., Ph.D., Texas A&M University • Thermochemical Conversion, Complex Reaction Systems

Raupp, Gregory B., Ph.D., University of Wisconsin • Semiconductor Materials Processing, Surface Science, Catalysis

Rivera, Daniel, Ph.D., Cal Tech • Process Control and Design

Sater, Vernon E., Ph.D., Illinois Institute of Tech • Heavy Metal Removal from Waste Water, Process Control

Torrest, Robert S., Ph.D., University of Minnesota • Multiphase Flow, Filtration, Flow in Porous Media, Pollution Control

Zwiebel, Imre, Ph.D., Yale University • Adsorption of Macromolecules, Biochemical Separations

Bioengineering

Dorson, William J., Ph.D., University of Cincinnati • Physicochemical Phenomena, Transport Processes

Guilbeau, Eric J., Ph.D., Louisiana Tech University • Biosensors, Physiological Systems, Biomaterials

Kipke, Daryl R., Ph.D., University of Michigan • Computation Neuroscience • Machine Vision, Speech Recognition, Robotics • Neural Networks

Pizziconi, Vincent B., Ph.D. Arizona State University• Artificial Organs, Biomaterials, Bioseparations

Sweeney, James D., Ph.D., Case-Western Reserve University• Rehab Engineering, Applied Neural Control

Towe, Bruce C., Ph.D., Pennsylvania State University• Bioelectric Phenomena, Biosensors, Biomedical Imaging

Yamaguchi, Gary T., Ph.D., Stanford University • Biomechanics, Rehab Engineering, Computer-Aided Surgery

Materials Science & Engineering

Alford, Terry L., Ph.D., Cornell University • Electronic Materials • Physical Metallurgy • Electronic Thin Films • Surface/Thin Film

Dey, Sandwip K., Ph.D., NYSC of Ceramics, Alfred University • Ceramics, Sol-Gel Processing

Hendrickson, Lester E., Ph.D., University of Illinois • Fracture and Failure Analysis, Physical and Chemical Metallurgy

Jacobson, Dean L., Ph.D., UCLA • Thermionic Energy Conversion, High Temperature Materials

Krause, Stephen L., Ph.D., University of Michigan • Ordered Polymers, Electronic Materials, Electron X-ray Diffraction, Electron Microscopy

Mayer, James, Ph.D., Purdue University •Thin Film Processing • Ion Bean Modification of Materials

Stanley, James T., Ph.D., University of Illinois • Phase Transformations, Corrosion

For more details regarding the graduate degree programs in the Department of Chemical, Bio, and Materials Engineering, please call (602) 965-3313 or (602) 965-3676, or write to: Dr. Eric Guilbeau, Chair of the Graduate Committee, Department of Chemical, Bio, and Materials Engineering, Arizona State University, Tempe, Arizona 85287-6006.

AUBURN UNIVERSITY

We want you to be yourself...

The Department of Chemical Engineering at Auburn University knows you have unique talents and ideas to contribute to our research programs. And because you are an individual, we will value you as an individual. That is what makes our department one of the top 20 in the nation. Don't become just another graduate student at some other institution. Come to Auburn and discover your potential.

We want you to be your best!

We have a research area tailored to you!

RESEARCH APPLICATION AREAS
- Asphalt Chemistry
- Biotechnology
- Carbon Chemistry
- Coal Science and Conversion
- Chemical Engineering of Composites
- Environmental Chemical Engineering
- Pulp and Paper Chemical Engineering

FUNDAMENTAL RESEARCH AREAS
- Biochemical Engineering
- Catalysis
- Fluid Mechanics
- Interfacial Fundamentals
- Mass and Heat Transport
- Optimization
- Process Modeling and Identification
- Process and Control
- Process Simulation
- Process Synthesis
- Computer Aided Process Design
- Reaction Kinetics and Engineering
- Surface Science
- Thermodynamics
- Transport Phenomena

THE FACULTY

Robert P. Chambers
(University of California, 1965)
Harry Cullinan
(Carnegie Mellon, 1965)
Christine W. Curtis
(Florida State University, 1976)
Mahmoud M. El-Halwagi
(UCLA, 1990)
James A. Guin
(University of Texas, 1970)
A. Krishnagopalan
(University of Maine, 1976)
Jay H. Lee
(California Institute of Technology, 1991)
Y. Y. Lee
(Iowa State University, 1972)
Glenn Maples
(Mississippi State University, 1966)
Ronald D. Neuman
(Institute of Paper Chemistry, 1973)
Timothy D. Placek
(University of Kentucky, 1978)
Chris Roberts
(Notre Dame, 1994)
A.R. Tarrer
(Purdue University, 1973)
Bruce J. Tatarchuk
(University of Wisconsin, 1981)

For information and application write:
Dr. R.P. Chambers
Chemical Engineering
Auburn University, AL 36849-5127

DEPARTMENT OF
Chemical ENGINEERING

Get your M.S. or Ph.D. degree from one of the fastest growing chemical engineering departments in the Southeast. *Last year our research expenditures topped $3 million. Our research emphasizes experimental and theoretical work in areas of national interest, with state-of-the-art research equipment. Generous financial assistance is available to qualified students.*

BRIGHAM YOUNG UNIVERSITY

THE WORLD IS OUR CAMPUS

GRADUATE STUDIES IN CHEMICAL ENGINEERING

in the beautiful Rocky Mountains of Utah

Biomedical Engineering

Chemical Propulsion

Coal Combustion & Gasification

Computer Simulation

Electrochemistry

Thermodynamics

Fluid Mechanics

Kinetics & Catalysis

Mathematical Modeling

Materials

Transport Phenomena

Molecular Dynamics

Process Design

Process Control

For additional information write to:

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

Tel: (801) 378-2586

DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

FACULTY

R. G. Moore, Head *(Alberta)*
A. Badakhshan *(Birmingham, U.K.)*
L. A. Behie *(Western Ontario)*
J. D. M. Belgrave *(Calgary)*
F. Berruti *(Waterloo)*
P. R. Bishnoi *(Alberta)*
R. M. Butler *(Imperial College, U.K.)*
A. Chakma *(UBC)*
R. A. Heidemann *(Washington U.)*
A. A. Jeje *(MIT)*
N. Kalogerakis *(Toronto)*
A. K. Mehrotra *(Calgary)*
B. B. Pruden *(McGill)*
P. M. Sigmund *(Texas)*
J. Stanislav *(Prague)*
W. Y. Svrcek *(Alberta)*
E. L. Tollefson *(Toronto)*
M. A. Trebble *(Calgary)*

The Department offers graduate programs leading to the M.Sc. and Ph.D. degrees in Chemical Engineering (full-time) and the M.Eng. degree in Chemical Engineering, Petroleum Reservoir Engineering or Engineering for the Environment (part-time) in the following areas:

- **Biochemical Engineering & Biotechnology**
- **Biomedical Engineering**
- **Environmental Engineering**
- **Modeling, Simulation & Control**
- **Petroleum Recovery & Reservoir Engineering**
- **Process Development**
- **Reaction Engineering/Kinetics**
- **Thermodynamics**
- **Transport Phenomena**

Fellowships and Research Assistantships are available to all qualified applicants.

• ***For Additional Information Write*** •
Dr. A. K. Mehrotra • Chair, Graduate Studies Committee
Department of Chemical and Petroleum Engineering
The University of Calgary • Calgary, Alberta, Canada T2N 1N4

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 center. Beautiful Banff National Park is 110 km west of the City and the ski resorts of Banff, Lake Louise,and Kananaskis areas are readily accessible. In the above photo the University Campus is shown with the Olympic Oval and the student residences in the foreground. The Engineering complex is on the left of the picture.

THE UNIVERSITY OF CALGARY

The UNIVERSITY OF CALIFORNIA at 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

Biochemical Engineering
Electrochemical Engineering
Electronic Materials Processing
Energy Utilization
Fluid Mechanics
Kinetics and Catalysis
Polymer Science and Technology
Process Design and Development
Separation Processes
Surface and Colloid Science
Thermodynamics

FACULTY

ALEXIS T. BELL
HARVEY W. BLANCH
ELTON J. CAIRNS
ARUP K. CHAKRABORTY
DOUGLAS S. CLARK
MORTON M. DENN
SIMON L. GOREN (Chairman)
DAVID B. GRAVES
ENRIQUE IGLESIA
JAY D. KEASLING
C. JUDSON KING
ROYA MABOUDIAN
SUSAN J. MULLER
JOHN S. NEWMAN
JOHN M. PRAUSNITZ
CLAYTON J. RADKE
JEFFREY A. REIMER
DOROS N. THEODOROU

PLEASE WRITE:

DEPARTMENT OF CHEMICAL ENGINEERING • UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720-1462

UNIVERSITY OF CALIFORNIA

I • R • V • I • N • E

Graduate Studies in

Chemical and Biochemical Engineering

and

Materials Science and Engineering

for

Chemical Engineering, Engineering, and Science Majors

PROGRAM

Offers degrees at the M.S. and Ph.D. levels. Research in frontier areas in chemical engineering, including biochemical engineering, biotechnology and materials science and engineering. Strong physical and life science and engineering groups on campus.

LOCATION

The 1,510-acre UC Irvine campus is in Orange County, five miles from the Pacific Ocean and 40 miles south of Los Angeles. Irvine is one of the nation's fastest growing residential, industrial, and business areas. Nearby beaches, mountain and desert area recreational activities, and local cultural activities make Irvine a pleasant city in which to live and study.

FACULTY

Nancy A. Da Silva *(California Institute of Technology)*
James C. Earthman *(Stanford University)*
G. Wesley Hatfield *(Purdue University)*
Juan Hong *(Purdue University)*
James T. Kellis, Jr. *(University of California, Irvine)*
Enrique J. Lavernia*(Massachusetts Institute of Technology)*
Henry C. Lim *(Northwestern University)*
Martha L. Mecartney *(Stanford University)*
Farghalli A. Mohamed *(University of California, Berkeley)*
Betty H. Olson *(University of California, Berkeley)*
Frank G. Shi *(California Institute of Technology)*
Jeffrey B. Wolfenstine *(Cornell University)*
Thomas K. Wood *(North Carolina State University)*

RESEARCH AREAS

- **Bioreactor Engineering**
- **Bioremediation**
- **Control and Optimization**
- **Environmental Engineering**
- **Interfacial Engineering**
- **Materials Processing**
- **Mechanical Properties**
- **Metabolic Engineering**
- **Microstructure of Materials**
- **Protein Engineering**
- **Recombinant Cell Technology**
- **Separation Processes**
- **Sol-Gel Processing**
- **Water Pollution Control**

For further information and application forms, contact

Department of Chemical and Biochemical Engineering
School of Engineering
University of California
Irvine, CA 92717-2575

CHEMICAL ENGINEERING AT

UCLA

RESEARCH AREAS

- Thermodynamics and Cryogenics
- Process Design, Dynamics, and Control
- Polymer Processing and Transport Phenomena
- Kinetics, Combustion, and Catalysis
- Surface and Interface Engineering
- Electrochemistry and Corrosion
- Biochemical Engineering
- Aerosol Science and Technology
- Air Pollution Control and Environmental Engineering

FACULTY

D. T. Allen
Y. Cohen
T. H. K. Frederking
S. K. Friedlander
R. F. Hicks
E. L. Knuth
(Prof. Emeritus)
V. Manousiouthakis
H. G. Monbouquette
K. Nobe
L. B. Robinson
(Prof. Emeritus)
S. M. Senkan
O. I. Smith
W. D. Van Vorst
(Prof. Emeritus)
V. L. Vilker
A. R. Wazzan

PROGRAMS

UCLA's Chemical Engineering Department offers a program of teaching and research linking fundamental engineering science and industrial practice. Our Department has strong graduate research programs in environmental chemical engineering, biotechnology, and materials processing. With the support of the Parsons Foundation and EPA, we are pioneering the development of methods for the design of clean chemical technologies, both in graduate research and engineering education.

Fellowships are available for outstanding applicants in both M.S. and Ph.D. degree programs. A fellowship includes a waiver of tuition and fees plus a stipend.

Located five miles from the Pacific Coast, UCLA's attractive 417-acre campus extends from Bel Air to Westwood Village. Students have access to the highly regarded science 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 90024-1592
(310) 825-9063

UNIVERSITY OF CALIFORNIA

SANTA BARBARA

FACULTY AND RESEARCH INTERESTS

L. GARY LEAL Ph.D. *(Stanford)* **(Chairman)** • Experimental and Computational Fluid Mechanics; Suspension and Polymer Physics.

ERAY S. AYDIL Ph.D. *(University of Houston)* • Microelectronics and Plasma Processing

SANJOY BANERJEE Ph.D. *(Waterloo)* • Two-Phase Flow, Chemical & Nuclear Safety, Computational Fluid Dynamics, Turbulence.

BRADLEY F. CHMELKA Ph.D. *(U.C. Berkeley)* • Guest/Host Interactions in Molecular Sieves, Dispersal of Metals in Oxide Catalysts, Molecular Structure and Dynamics in Polymeric Solids, Properties of Partially Ordered Materials, Solid-State NMR.

GLENN H. FREDRICKSON Ph.D. *(Stanford)* • Electronic Transport, Glasses, Polymers, Composites, Phase Separation.

JACOB ISRAELACHVILI Ph.D. *(Cambridge)* • Surface and Interfacial Phenomena, Adhesion, Colloidal Systems, Surface Forces.

FRED F. LANGE Ph.D. *(Penn State)* • Powder Processing of Composite Ceramics; Liquid Precursors for Ceramics; Superconducting Oxides.

GLENN E. LUCAS Ph.D. *(M.I.T.)* **(Vice Chairman)** • Mechanics of Materials, Radiation Damage.

DIMITRIOS MAROUDAS Ph.D. *(M.I.T.)* • Computational Simulation of Structure, Dynamics in Heterogeneous Materials.

ERIC McFARLAND Ph.D. *(M.I.T.)* M.D. *(Harvard)* • Biomedical Engineering, NMR and Neutron Imaging, Transport Phenomena in Complex Liquids, Radiation Interactions.

DUNCAN A. MELLICHAMP Ph.D. *(Purdue)* • Computer Control, Process Dynamics, Real-Time Computing.

G. ROBERT ODETTE Ph.D. *(M.I.T.)* • High Performance Structural Materials

PHILIP ALAN PINCUS Ph.D. *(U.C. Berkeley)* • Theory of Surfactant Aggregates, Colloid Systems.

ORVILLE C. SANDALL Ph.D. *(U.C. Berkeley)* • Transport Phenomena, Separation Processes.

DALE E. SEBORG Ph.D. *(Princeton)* • Process Control, Computer Control, Process Identification.

PAUL SMITH Ph.D. *(State University of Groningen, Netherlands)* • High Performance Fibers; Processing of Conducting Polymers; Polymer Processing.

T. G. THEOFANOUS Ph.D. *(Minnesota)* • Nuclear and Chemical Plant Safety, Multiphase Flow, Thermalhydraulics.

W. HENRY WEINBERG Ph.D. *(U.C. Berkeley)* • Surface Chemistry; Heterogeneous Catalysis; Electronic Materials

JOSEPH A. N. ZASADZINSKI Ph.D. *(Minnesota)* • Surface and Interfacial Phenomen, Structure of Microemulsions.

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.

THE UNIVERSITY

One of the world's few seashore campuses, UCSB is located on the Pacific Coast 100 miles northwest of Los Angeles. The student enrollment is over 18,000. 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

Chair • Graduate Admissions Committee • Department of Chemical Engineering • University of California • Santa Barbara, CA 93106

Chemical Engineering at the

CALIFORNIA INSTITUTE OF TECHNOLOGY

"At the Leading Edge"

FACULTY

Frances H. Arnold
John F. Brady
Mark E. Davis
Richard C. Flagan
George R. Gavalas
Konstantinos P. Giapis
Julia A. Kornfield
Manfred Morari
John H. Seinfeld
Nicholas W. Tschoegl (Emeritus)
Zhen-Gang Wang

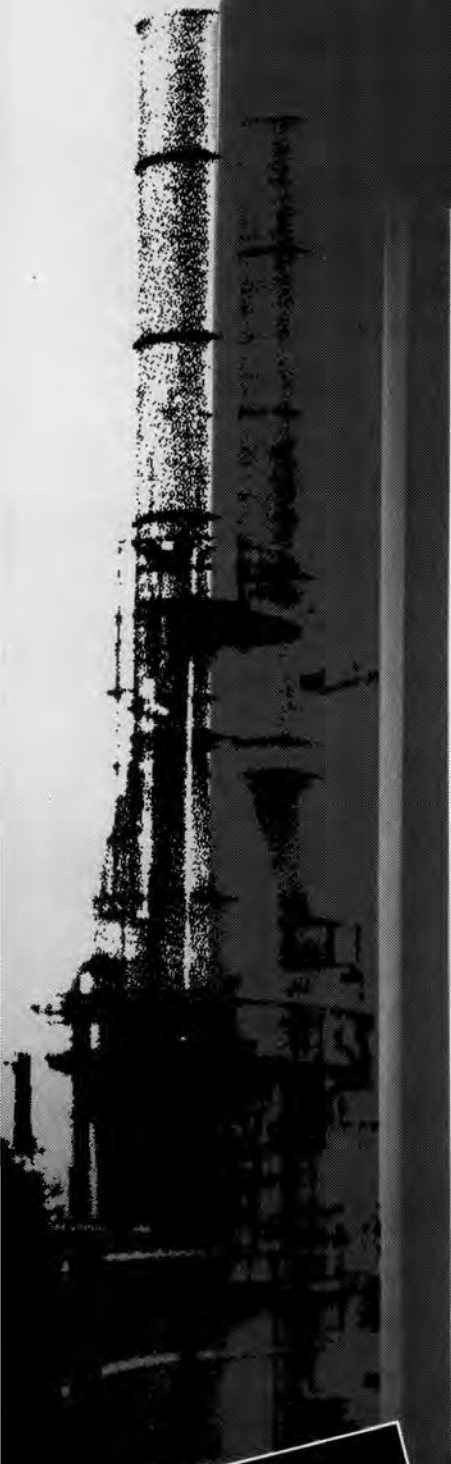
RESEARCH INTERESTS

Aerosol Science
Applied Mathematics
Atmospheric Chemistry and Physics
Biocatalysis and Bioreactor Engineering
Bioseparations
Catalysis
Chemical Vapor Deposition
Combustion
Colloid Physics
Fluid Mechanics
Materials Processing
Microelectronics Processing
Microstructured Fluids
Polymer Science
Process Control and Synthesis
Protein Engineering
Statistical Mechanics of Heterogeneous Systems

For further information, write

Director of Graduate Studies
Chemical Engineering 210-41 • California Institute of Technology • Pasadena, California 91125

Come Click with an Icon



Faculty

John L. Anderson
Membrane and colloid transport phenomena

Lorenz T. Biegler
Process simulation and optimization

Paul A. DiMilla
Cellular engineering and biomechanics

Michael M. Domach
Biochemical engineering and cell biology

Andrew J. Gellman
Surface chemistry and tribology

Ignacio E. Grossmann
Batch process synthesis and design

William S. Hammack
Effect of pressure on solid state materials

Annette M. Jacobson
Solubilization and adsorption phenomena

Myung S. Jhon
Information storage technology

Edmond I. Ko
Heterogeneous catalysis and chemistry of materials

Spyros N. Pandis
Environmental engineering

Gary J. Powers
Decision-making in the design of chemical processes

Dennis C. Prieve
Transport phenomena and colloids

Paul J. Sides
Electrochemical engineering and growth of advanced materials

Jennifer L. Sinclair
Multiphase flow

Robert D. Tilton
Interfacial biophysics and colloid science

Herbert L. Toor
Transport phenomena and energy utilization

Arthur W. Westerberg
Engineering design

B. Erik Ydstie
Self learning and adaptive control

Carnegie Mellon

Carnegie Mellon

For Information please write:
Director of Graduate Admissions
Department of Chemical Engineering
Carnegie Mellon University
Pittsburgh, PA 15213-3890

CASE WESTERN RESERVE UNIVERSITY

Research Opportunities in:

► Advanced Energy Conversion ◄
► Chemical/Biological Sensors ◄
► Intelligent Control ◄
► Micro- and Nano-Materials ◄
► Novel Separations/Processing ◄

For more information, contact

Graduate Coordinator
Department of Chemical Engineering
Case Western Reserve University
Cleveland, Ohio 44106-7217

At CWRU, graduate students, faculty, and alumni teamed together to develop CWRU's electric race car. Chemical Engineers were responsible for the design of the battery systems used to power the vehicle.

Faculty and Specializations

John C. Angus
Diamond and diamond-like films, redox equilibria

Coleman B. Brosilow
Adaptive inferential control, multi-variable control, coordination algorithms

Robert V. Edwards
Laser anemometry, mathematical modeling, data acquisition

Donald L. Feke
Colloidal phenomena, ceramic dispersions, fine-particle processing

Nelson C. Gardner
High-gravity separations, sulfur removal processes

Uziel Landau
Electrochemical engineering, current distributions, electrodeposition

Chung-Chiun Liu
Electrochemical sensors, electrochemical synthesis, electrochemistry related to electronic materials

J. Adin Mann, Jr.
Interfacial structure and dynamics, light scattering, Langmuir-Blodgett films, stochastic processes

Philip W. Morrison, Jr.
Materials synthesis, semiconductor processing, in-situ diagnostics

Syed Qutubuddin
Surfactant and polymer solutions, metal extraction, enhanced oil recovery

Robert F. Savinell
Applied electrochemistry, electrochemical systems simulation and optimization, electrode processes

CASE WESTERN RESERVE UNIVERSITY

Opportunities for Graduate Study in Chemical Engineering at the

UNIVERSITY OF CINCINNATI

M.S. and PhD Degrees in Chemical Engineering

• Financial Aid Available •

Location

The city of Cincinnati is the 23rd largest city in the United States, with a greater metropolitan population of 1.7 million. The city offers numerous sites of architectural and historical interest, as well as a full range of cultural attractions, such as an outstanding art museum, botanical gardens, a world-famous zoo, theaters, symphony, and opera. The city is also home to the Cincinnati Bengals and the Cincinnati Reds. The business and industrial base of the city includes pharmaceutics, chemicals, jet engines, autoworks, electronics, printing and publishing, insurance, investment banking, and health care. A number of Fortune 500 companies are located in the city.

Faculty

Amy Ciric
Joel Fried
Stevin Gehrke
Rakesh Govind
David Greenberg
Daniel Hershey
Sun-Tak Hwang
Robert Jenkins
Yuen-Koh Kao
Soon-Jai Khang
Y. S. Lin
Neville Pinto
Sotiris Pratsinis

- **Biotechnology (Bioseparations)**

  Novel bioseparation techniques, chromatography, affinity separations, biodegradation of toxic wastes, controlled drug delivery, two-phase flow, suspension rheology.

- **Chemical Reaction Engineering and Heterogeneous Catalysis**

  Modeling and design of chemical reactors, deactivation of catalysts, flow pattern and mixing in chemical equipment, laser induced effects.

- **Coal Research**

  New technology for coal combustion power plant, desulfurization and denitritication.

- **Material Synthesis**

  Manufacture of advanced ceramics, optical fibers and pigments by aerosol processes.

- **Membrane Separations**

  Membrane gas separations, membrane reactors, sensors and probes, pervaporation, dynamic simulation of membrane separators, membrane preparation and characterization for polymeric and inorganic materials, inorganic membranes.

- **Particle Technology**

  Flocculation of liquid suspensions, granulation of fine powders, grinding of agglomerate particles.

- **Polymers**

  Thermodynamics, polymer blends and composites, high-temperature polymers, hydrogels, rheology, computational polymer science.

- **Process Synthesis**

  Computer-aided design methodologies, design for waste minimization, design for dynamic stability, separation system synthesis.

• For Admission Information •

Director, Graduate Studies • Department of Chemical Engineering, PO Box 210171
University of Cincinnati • Cincinnati, Ohio 45221-0171

Graduate Study in Chemical Engineering at Clarkson University

M.S., M.ENG., AND PH.D. PROGRAMS

Teaching and Research Assistantships available to M.S. and Ph.D. students

Research Areas:

- Electrochemical Engineering
- Chemical Kinetics
- Chemical Metallurgy
- Nucleation
- Corrosion Engineering
- Crystal Growth
- Space Processing
- Process Control
- Fluid Mechanics
- Bubble Dynamics
- Heat Transfer
- Mass Transfer
- Laser and Plasma Technology
- Polymer Processing and Rheology
- Biochemical Engineering
- Process Design
- Solid State Reactions

For information write to:
Dr. Suzanne Liberty
Dean of the Graduate School
CLARKSON UNIVERSITY
P.O. Box 5625
Potsdam, NY 13699-5625
315-268-6442
Fax 315-268-7994

Graduate Study at

Clemson University

in Chemical Engineering

No matter where you do your graduate work, your nose will be in your books and your mind on your research. But at Clemson University, there's something for you when you *can* stretch out for a break.

Like enjoying the beautiful mountain scenery. Or fishing, swimming, sailing, and water skiing in the clean lakes. Or hiking in the nearby Blue Ridge Mountains. Or driving to South Carolina's famous beaches for a weekend. Something that can *really* relax you.

Photo Courtesy of Patrick Wright

All this and a top-notch Chemical Engineering Department, too.

With active research and teaching in polymer processing, composite materials, process automation, thermodynamics, catalysis, and membrane applications — what more do you need?

The University

Clemson, the land-grant university of South Carolina, offers 72 undergraduate and 70 graduate fields of study in its nine academic colleges. Present on-campus enrollment is about 17,000 students, one-third of whom are in the College of Engineering. There are about 4,100 graduate students. The 1,400-acre campus is located on the shores of Lake Hartwell in South Carolina's Piedmont, and is midway between Charlotte, N.C., and Atlanta, Ga.

The Faculty

Charles H. Barron, Jr.
John N. Beard
Dan D. Edie
Charles H. Gooding
James M. Haile
Douglas E. Hirt
Stephen S. Melsheimer
Amod A. Ogale
Richard W. Rice
Mark C. Thies

Programs lead to the M.S. and Ph.D. degrees.
Financial aid, including fellowships and assistantships, is available.

For further information and a descriptive brochure, contact:
Graduate Coordinator, Department of Chemical Engineering
Clemson University • Clemson, South Carolina 29634-0909 • (803) 656-3055

CLEMSON
UNIVERSITY
College of Engineering

UNIVERSITY OF COLORADO BOULDER

CHRISTOPHER N. BOWMAN
Assistant Professor
Ph.D., Purdue University, 1991

DAVID E. CLOUGH
Professor
Ph.D., University of Colorado, 1975

ROBERT H. DAVIS
Professor and Chair
Co-Director of Colorado Institute for Research in Biotechnology
Ph.D., Stanford University, 1983

JOHN L. FALCONER
James and Catherine Patten Professor
Ph.D., Stanford University, 1974

YURIS O. FUENTES
Assistant Professor
Ph.D., University of Wisconsin-Madison, 1990

R. IGOR GAMOV
Associate Professor
Ph.D., University of Colorado, 1967

HOWARD J. M. HANLEY
Professor Adjoint
Ph.D., University of London, 1963

DHINAKAR S. KOMPALA
Associate Professor
Ph.D., Purdue University, 1984

WILLIAM B. KRANTZ
Professor and President's Teaching Scholar,
Co-Director of NSF I/UCRC Center for Separations Using Thin Films
Ph.D., University of California, Berkeley, 1968

RICHARD D. NOBLE
Professor
Co-Director of NSF I/UCRC Center for Separations Using Thin Films
Ph.D., University of California, Davis, 1976

W. FRED RAMIREZ
Professor
Ph.D., Tulane University, 1965

THEODORE W. RANDOLPH
Associate Professor
Ph.D., University of California, Berkeley, 1987

ROBERT L. SANI
Professor
Director of Center for Low-gravity Fluid Mechanics and Transport Phenomena
Ph.D., University of Minnesota, 1963

EDITH M. SEVICK
Assistant Professor
Ph.D., University of Massachusetts, 1989

KLAUS D. TIMMERHAUS
Professor and President's Teaching Scholar
Ph.D., University of Illinois, 1951

PAUL W. TODD
Research Professor
Ph.D., University of California, Berkeley, 1964

RONALD E. WEST
Professor
Ph.D., University of Michigan, 1958

➢ *Graduate students in the Department of Chemical Engineering may also participate in the popular interdisciplinary Biotechnology Training Program at the University of Colorado and in the interdisciplinary NSF Industry/University Cooperative Research Center for Separations Using Thin Films.*

RESEARCH INTERESTS

Biotechnology and Bioengineering
- Bioreactor Design and Optimization
- Mammalian Cell Cultures
- Protein Folding and Purification

Chemical Environmental Engineering
- Global Change
- Pollution Remediation

Materials Science and Engineering
- Catalysis and Surface Science
- Colloidal Phenomena
- Polymerization Reaction Engineering

Membrane Science
- Chemically Specific Separations
- Membrane Transport and Separations
- Polymeric Membrane Morphology

Modeling and Control
- Expert Systems
- Process Control and Identification

Thermodynamics
- Cryogenics
- Statistical Mechanics
- Supercritical Fluids

Transport Phenomena
- Fluid Dunamics and Suspension Mechanics
- Materials Processing in Low-G

FOR INFORMATION AND APPLICATION, WRITE TO

Director, Graduate Admissions Committee • Department of Chemical Engineering
University of Colorado, Boulder • Boulder, Colorado 80309-0424
FAX (303) 492-4341

COLORADO SCHOOL OF MINES

THE FACULTY AND THEIR RESEARCH

R. M. BALDWIN, Professor and Head; Ph.D., Colorado School of Mines. *Mechanisms and kinetics of coal liquefaction, catalysis, oil shale processing, fuels science.*

A. L. BUNGE, Professor; Ph.D., University of California, Berkeley. *Membrane transport and separations, mass transfer in porous media, ion exchange and adsorption chromatography, in place remediation of contaminated soils, percutaneous absorption.*

J.R. DORGAN, Assistant Professor; Ph.D., University of California, Berkeley. *Polymer science and engineering.*

J. F. ELY, Professor; Ph.D., Indiana University. *Molecular thermodynamics and transport properties of fluids.*

J. H. GARY, Professor Emeritus; Ph.D., University of Florida. *Petroleum refinery processing operations, heavy oil processing, thermal cracking, visbreaking and solvent extraction.*

J.O. GOLDEN, Professor; Ph.D., Iowa State University. *Hazardous waste processing, polymers, fluidization engineering*

M.S. GRABOSKI, Research Professor; Ph.D., Pennsylvania State University. *Fuels Synthesis and evaluation, engine technology, alternate fuels*

A. J. KIDNAY, Professor and Graduate Dean; D.Sc., Colorado School of Mines. *Thermodynamic properties of gases and liquids, vapor-liquid equilibria, cryogenic engineering.*

J.T. McKINNON, Assistant Professor; Ph.D., Massachusetts Institute of Technology. *High temperature gas phase chemical kinetics, combustion, hazardous waste destruction.*

R. L. MILLER, Associate Professor; Ph.D., Colorado School of Mines. *Liquefaction co-processing of coal and heavy oil, low severity coal liquefaction, particulate removal with venturi scrubbers, interdisciplinary educational methods*

M. S. SELIM, Professor; Ph.D., Iowa State University. *Heat and mass transfer with a moving boundary, sedimentation and diffusion of colloidal suspensions, heat effects in gas absorption with chemical reaction, entrance region flow and heat transfer, gas hydrate dissociation modeling.*

E. D. SLOAN, JR., Professor; Ph.D. Clemson University. *Phase equilibrium measurements of natural gas fluids and hydrates, thermal conductivity of coal derived fluids, adsorption equilibria, education methods research.*

J. D. WAY, Associate Professor; Ph.D. University of Colorado. *Novel separation processes, membrane science and technology, membrane reactors, ceramic and metal membranes, biopolymer adsorbents for adsorption of heavy metals.*

V. F. YESAVAGE, Professor; Ph.D., University of Michigan. *Vapor liquid equilibrium and enthalpy of polar associating fluids, equations of state for highly non-ideal systems, flow calorimetry.*

For applications and further information on M.S. and Ph.D. programs, write
Chemical Engineering and Petroleum Refining • Colorado School of Mines • Golden, CO 80401

University of Connecticut

Graduate Study in Chemical Engineering

M.S. and Ph.D. Programs for Scientists and Engineers

FACULTY RESEARCH AREAS

Luke E.K. Achenie, Ph.D., Carnegie Mellon University
Modeling and Optimization, Neural Networks, Process Control

Thomas F. Anderson, Ph.D., University of California, Berkeley
Modeling of Separation Processes, Fluid-Phase Equilibria

James P. Bell, Sc.D., Massachusetts Institute of Technology
Structure-Property Relations in Polymers and Composites, Adhesion

Carroll O. Bennett, Professor Emeritus, Ph.D., Yale University
Catalysis, Chemical Reaction Engineering

Douglas J. Cooper, Ph.D., University of Colorado
Process Control, Neural Networks, Fluidization Technology

Robert W. Coughlin, Ph.D., Cornell University
Biotechnology, Biochemical and Environmental Engineering, Catalysis, Kinetics, Separations, Surface Science

Michael B. Cutlip, Ph.D., University of Colorado
Kinetics and Catalysis, Electrochemical Reaction Engineering, Numerical Methods

Anthony T. DiBenedetto, Ph.D., University of Wisconsin
Composite Materials, Mechanical Properties of Polymers

James M. Fenton, Ph.D., University of Illinois, Urbana-Champaign
Electrochemical and Environmental Engineering, Mass Transfer Processes, Electronic Materials, Energy Systems

Suzanne (Schadel) Fenton, Ph.D., University of Illinois
Computational Fluid Dynamics, Turbulence, Two-Phase Flow

Robert J. Fisher, Ph.D., University of Delaware
Biochemical Engineering and Environmental Biotechnology

G. Michael Howard, Ph.D., University of Connecticut
Process Systems Analysis and Modeling, Process Safety, Engineering Education

Herbert E. Klei, Professor Emeritus, Ph.D., University of Connecticut
Biochemical Engineering, Environmental Engineering

Jeffrey T. Koberstein, Ph.D., University of Massachusetts
Polymer Blends/Compatibilization, Polymer Morphology, Polymer Surface and Interfaces

Harold R. Kunz, Ph.D., Rensselaer Polytechnic Institute
Fuel Cells, Electrochemical Energy Systems

Montgomery T. Shaw, Ph.D., Princeton University
Polymer Rheology and Processing, Polymer-solution Thermodynamics

Richard M. Stephenson, Professor Emeritus, Ph.D., Cornell University
Mutual Solubility Measurements, Liquid-Liquid Equilibrium

Donald W. Sundstrom, Professor Emeritus, Ph.D. University of Michigan
Environmental Engineering, Hazardous Wastes, Biochemical Engineering

Robert A. Weiss, Ph.D., University of Massachusetts
Polymer Structure-Property Relationships, Ion-Containing and Liquid Crystal Polymers, Polymer Blends

FOR MORE INFORMATION

Graduate Admissions, 191 Auditorium Road
University of Connecticut, Storrs, CT 06269-3222
Tel. (203) 486-4020

CORNELL
UNIVERSITY

Chemical Engineering

At Cornell University, graduate students in chemical engineering have the flexibility to design research programs that take full advantage of Cornell's unique interdisciplinary environment and enable them to pursue individualized plans of study.

Cornell graduate programs may draw upon the resources of many excellent departments and NSF-sponsored research centers such as the Biotechnology Center, the Cornell National Supercomputing Facility, and the Materials Science Center.

Degrees granted include Master of Engineering, Master of Science, and Doctor of Philosophy. All M.S. and Ph.D. students are fully funded with attractive stipends and tuition waivers.

Distinguished Faculty

A. Brad Anton
Paulette Clancy
Claude Cohen
T. Michael Duncan
James R. Engstrom*
Keith E. Gubbins†
Daniel A. Hammer*
Peter Harriott
Donald L. Koch*
Robert P. Merrill
William L. Olbricht
Athanassios Panagiotopoulos*
Ferdinand Rodriguez‡
Michael L. Shuler†
Paul H. Steen
William B. Streett
John A. Zollweg

* recipient, NSF PYI Award
† member, National Academy of Engineering
‡ member, AIChE

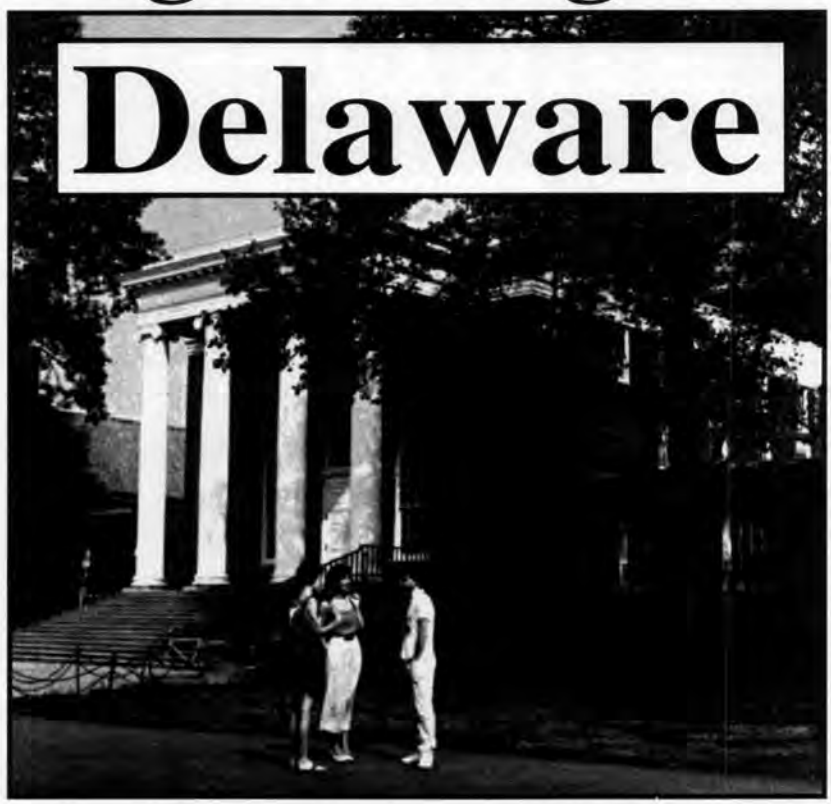
Research Areas

- Advanced Materials Processing
- Biochemical and Biomedical Engineering
- Fluid Dynamics, Stability, and Rheology
- Molecular Thermodynamics and Computer Simulation
- Polymer Science and Engineering
- Reaction Engineering: Surface Science, Kinetics, and Reactor Design

Situated in the scenic Finger Lakes region of New York State, the Cornell campus is one of the most beautiful in the country. Students enjoy sailing, skiing, fishing, hiking, bicycling, boating, wine-tasting, and many other activities in this popular vacation region.

For further information, write:
Graduate Field Representative, School of Chemical Engineering, Cornell University, 120 Olin Hall, Ithaca, NY 14853-5201

Chemical Engineering at



The Faculty

Giovanni Astarita
Mark A. Barteau
Antony N. Beris
Kenneth B. Bischoff
Douglas J. Buttrey
Stuart L. Cooper
Costel D. Denson
Prasad S. Dhurjati
Henry C. Foley
Marylin Huff
Eric W. Kaler
Michael T. Klein
Abraham M. Lenhoff
Raul Lobo
Roy L. McCullough
Arthur B. Metzner
Jon H. Olson
Michael E. Paulaitis
T.W. Fraser Russell
Stanley I. Sandler
Jerold M. Schultz
Annette D. Shine
Norman J. Wagner
Andrew L. Zydney

The University of Delaware offers M.ChE and Ph.D. degrees in Chemical Engineering. Both degrees involve research and course work in engineering and related sciences. The Delaware tradition is one of strong interdisciplinary research on both fundamental and applied problems. Current fields include **Thermodynamics, Separation Processes, Polymer Science and Engineering, Fluid Mechanics and Rheology, Transport Phenomena, Materials Science and Metallurgy, Catalysis and Surface Science, Reaction Kinetics, Reactor Engineering, Process Control, Semiconductor and Photovoltaic Processing, Biomedical Engineering, Biochemical Engineering, and Colloid and Surfactant Science.**

For more information and application materials, write:

Graduate Advisor
Department of Chemical Engineering
University of Delaware
Newark, Delaware 19716

The University of Delaware

University of Florida

Modern Applications of Chemical Engineering

Graduate Study Leading to the MS and PhD

• FACULTY •

TIM ANDERSON • *Semiconductor Processing, Thermodynamics*

IOANNIS BITSANIS • *Molecular Modeling of Interfaces*

OSCAR D. CRISALLE • *Electronic Materials, Process Control*

RICHARD B. DICKINSON • *Biomedical Engineering*

ARTHUR L. FRICKE • *Polymers, Pulp & Paper Characterization*

GAR HOFLUND • *Catalysis, Surface Science*

LEW JOHNS • *Applied Mathematics, Dispersion*

DALE KIRMSE • *Computer Aided Design, Process Control*

RANGA NARAYANAN • *Transport Phenomena, Low Gravity Fluid Mechanics*

MARK E. ORAZEM • *Electrochemical Engineering, Semiconductor Processing*

CHANG-WON PARK • *Fluid Mechanics, Polymer Processing*

DINESH O. SHAH • *Surface Sciences, Biomedical Engineering*

SPYROS SVORONOS • *Process Control, Biochemical Engineering*

GERALD WESTERMANN-CLARK • *Electrochemical Engineering, Bioseparations*

For more information, please write:

Graduate Admissions Coordinator ■ Department of Chemical Engineering
P.O. Box 11605 ■ University of Florida ■ Gainesville, Florida 32611-6005
or call (904) 392-0881

Research and Graduate Studies in Chemical Engineering

Florida A & M University/ Florida State University Joint College of Engineering

M.S. and Ph.D. Programs

Faculty

Pedro Arce Ph.D.
Purdue University, 1990

Ravi Chella Ph.D.
University of Massachusetts, 1984

Hamid Garmestani, Ph.D.*
Cornell University, 1989

Peter Gielisse Ph.D.*
Ohio State University, 1967

Bruce Locke Ph.D.
North Carolina State University, 1989

Srinivas Palanki, Ph.D.
University of Michigan, 1992

Michael Peters Ph.D.
Ohio State University, 1981

Sam Riccardi Ph.D.
Ohio State University, 1949

John Telotte Ph.D.
University of Florida, 1985

Jorge Viñals Ph.D.*
University of Barcelona, Spain, 1981

*Afiliate Faculty

Areas of Research and Research Interest

Advanced Materials (Ceramics, Colloids, and Polymers

- Brownian Motion
- Chemical Vapor Deposition
- Composite Materials
- Complex Fluids
- Phase Transitions
- Macromolecular Phenomena
- Macromolecular Transport in Polymer Gel Media
- Polymer Processing
- Semiconductor and Superconductor Processing
- Thermodynamics

Bioengineerin

- Biocatalysis
- Bioseparations

Process Synthesis and Contr

- Non-Linear Process Control
- Process Optimization
- Expert Systems

Surface Science, Catalysis and Inorganic Materia

- Fluid Mechanics of Crystal Growth
- Heterogenous Catalysis and Reactor Design
- Molecular Transport Mechanics in Material Design

Other Are

- Applied and Computational Mathematics
- Air and Water Pollution Control

For Information Write to:

Chair of Graduate Studies
Department of Chemical Engineering
FAMU/FSU College of Engineering
2525 Pottsdammer Street
Tallahassee, FL 32316-2175
Ph (904) 487-6151 Fax (904) 487-6150

Georgia Tech

Home of the 1996 Olympic Village

CHEMICAL ENGINEERIN

The Faculty and Their Research

Polymer science and engineering

S. Abhiraman

Heterogeneous catalysis, surface chemistry, reaction kinetics

Pradeep K. Agrawal

Process design and control, spouted-bed reactors

Yaman Arkun

Microelectronics, polymer processing

Sue Ann Bidstrup

Mo the dy ch kir sep

Charles A. Eckert

Reactor design, catalysis

illiam R. Ernst

Mechanics of aerosols, buoyant plumes and jets

Larry J. Forney

Heat transport phenomena, fluidization

Charles W. Gorton

Pulp and paper

Jeffrey S. Hsieh

Ph pr ch va de

Paul A. Kohl

Molecular modeling of polymeric materials

ter J. Ludovice

Aerocolloidal systems, interfacial phenomena, fine-particle technology

Michael J. Matteson

Polymer engineering, energy conservation, economics

John D. Muzzy

Biomechanics, mammalian cell structures

Robert M. Nerem

En po tio tec

Gary W. Poehlein

Optimal process design and scheduling

ıtthew J. Realff

Membrane separations, mass transfer

Mary E. Rezac

Biochemical engineering, mass transfer, reactor design

Ronnie S. Roberts

Separation processes, crystallization

Ronald W. Rousseau

Bi en mi an ce

Athanassios Samb

Polymer science and engineering

ıbert J. Samuels

Reactor engineering, process control, polymerization, reactor dynamics

F. Joseph Schork

Mass transfer, extraction, mixing, non-Newtonian flow

A. H. Peter Skelland

Process design and simulation

Jude T. Sommerfeld

Pro syn sim che sep wa me rec

D. William Tedder

Thermodynamic and transport properties, phase equilibria, supercritical gas extraction

ıyn S. Teja

Catalysis, kinetics, reactor design

Mark G. White

Biochemical engineering, cell-cell interactions, biofluid dynamics

Timothy M. Wick

Electrochemical engineering, thermodynamics, air pollution control

Jack Winnick

Bi dy rh tra ph

Ajit P. Yoganathan

For more information, contact:
Professor Ronald Rousseau, director
School of Chemical Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332-0100
(404) 894-2867

What do graduate students say about the

University of Houston

Department of Chemical Engineering?

"It's great!"

"Houston is a university on the move. The chemical engineering department is ranked among the top ten schools, and you can work in the specialty of your choice. The choice of advisor is yours, too, and you're given enough time to make the right decision. You can see your advisor almost anytime you want because the student-to-teacher ratio is low."

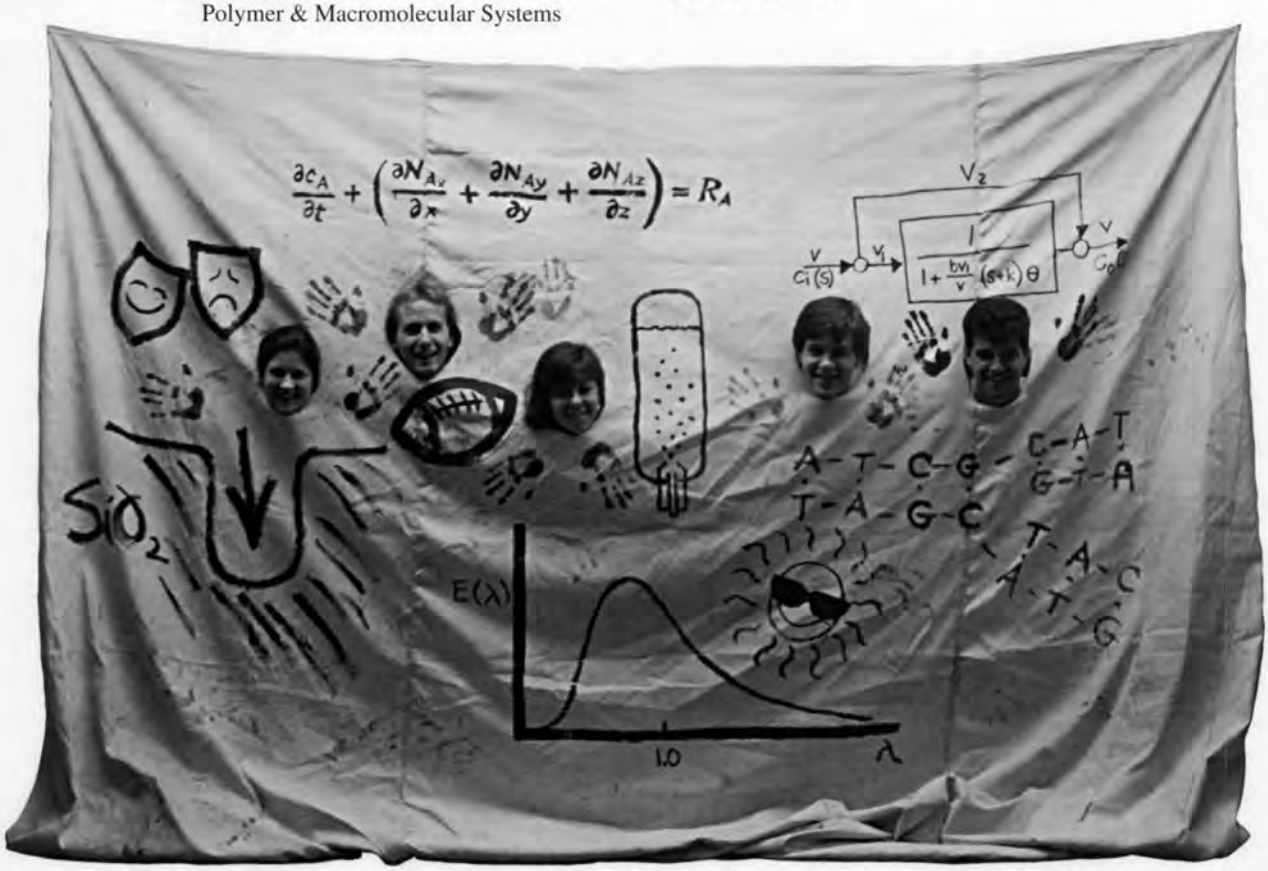
If you'd like to be part of this team, let us hear from you!

AREAS OF RESEARCH STRENGTH

Biochemical & TissueEngineering
Reaction Engineering & Catalysis
Electronic and Ceramic Materials
Environmental Remediation
Improved Oil Recovery
Multiphase Flow
Nonlinear Dynamics
Polymer & Macromolecular Systems

FACULTY

Neal Amundson
Vemuri Balakotaiah
Demetre Economou
Ernest Henley
John Killough
Dan Luss
Kishore Mohanty
Richard Pollard
William Prengle
Raj Rajagopalan
Jim Richardson
Jay Schieber
Cynthia Stokes
Frank Tiller
Richard Willson
Frank Worley



For an application, write: Dept. of Chemical Engineering, University of Houston, 4800 Calhoun, Houston, TX 77204-4792, or call 713/743-4300.
The University is an Equal Opportunity/Affirmative Action Institution

Chemical Engineering at

Howard University

Where modern instructional and research laboratories, together with computing facilities, support both student and faculty research pursuits on an eighty-nine acre main campus three miles north of the heart of Washington, DC.

Faculty and Research Interests

Mobolaji E. Aluko, Professor and Chair
PhD, University of California, Santa Barbara
Reactor modeling • crystallization • microelectronic and ceramic materials processing • process control

Joseph N. Cannon, Professor • PhD, University of Colorado
Transport phenomena in environmental systems • computational fluid mechanics • heat transfer

Ramesh C. Chawla, Professor • PhD, Wayne State University
Mass transfer and kinetics in environmental systems • thermal processes • biodegradation• bioremediation • incineration • environmental engineering

William E. Collins, Assistant Professor • PhD, University of Wisconsin-Madison
Polymer science • biomaterials • bioseparations • surface science and instrumentation

M. Gopala Rao, Professor • PhD, University of Washington, Seattle
Adsorption and ion exchange • process energy systems • radioactive waste management

John P. Tharakan, Assistant Professor • PhD University of California, San Diego
Bioprocess engineering • protein separations • biological hazardous waste treatment • environmental engineering

Robert J. Lutz, Visiting Professor • PhD, University of Pennsylvania
Hemodynamics • intra-arterial drug delivery

Herbert M. Katz, Professor Emeritus • PhD, University of Cincinnati
Environmental engineering

M.S. Program

For further information and applications, write to

Director, Graduate Studies • Chemical Engineering Department
Howard University Washington, DC 20059
Phone 202-806-6624 Fax 202-806-4635

UIC

The University of Illinois at Chicago
Department of Chemical Engineering

• MS and PhD Graduate Program •

FACULTY

Irving F. Miller
Ph.D., University of Michigan, 1960
Professor and Head

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

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

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

Ludwig C. Nitsche
Ph.D., Massachusetts Institute of Technology, 1989
Assistant Professor

John Regalbuto
Ph.D., University of Notre Dame, 1986
Associate Professor

Hector R. Reyes
Ph.D., University of Wisconsin, Madison, 1991
Assistant Professor

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

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

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

RESEARCH AREAS

Transport Phenomena: Slurry transport, multiphase fluid flow and heat transfer, fixed and fluidized bed combustion, indirect coal liquefaction, porous media.

Thermodynamics: Transport properties of fluids, statistical mechanics of liquid mixtures, bioseparations, superficial fluid extraction/retrograde condensation, asphaltene characterization.

Kinetics and Reaction Engineering: Gas-solid reaction kinetics, diffusion and adsorption phenomena, energy transfer processes, laser diagnostics, combustion chemistry, environmental technology, surface chemistry, optimization, catalyst preparation and characterization, structure sensitivity, supported metals.

Bioengineering: Membrane transport, pulmonary deposition and clearance, biorheology, physiological control systems, bioinstrumentation.

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

Chemical Engineering at the

University of Illinois

at Urbana-Champaign

The combination of distinguished faculty, outstanding facilities and a diversity of research interests results in exceptional opportunities for graduate education.

The chemical engineering department offers graduate programs leading to the M.S. and Ph.D. degrees.

Richard C. Alkire	Electrochemical Engineering
Richard D. Braatz	Advanced Process Control
Thomas J. Hanratty	Fluid Dynamics
Jonathan J. L. Higdon	Fluid Mechanics and Transport Phenomena
Douglas A. Lauffenburger	Cellular Bioengineering
Richard I. Masel	Fundamental Studies of Catalytic Processes and Semiconductor Growth
Anthony J. McHugh	Polymer Science and Engineering
William R. Schowalter	Mechanics of Complex Fluids
Edmund G. Seebauer	Laser Studies of Semiconductor Growth
Mark A. Stadtherr	Chemical Process Flowsheeting and Optimization
K. Dane Wittrup	Biochemical Engineering
Charles F. Zukoski IV	Colloid and Interfacial Science

For information and application forms write:

Department of Chemical Engineering

University of Illinois at Urbana-Champaign

Box C-3 Roger Adams Lab

600 S. Mathews Ave.

Urbana, Illinois 61801-3792

A TRADITION OF EXCELLENCE

GRADUATE STUDY
IN CHEMICAL ENGINEERING AT

Illinois Institute of Technology

THE UNIVERSITY

◆ Private, coeducational and research university ◆ 2500 undergraduate students ◆ 3200 graduate students ◆ Campus recognized as an architectural landmark ◆ Three miles from downtown Chicago and one mile west of Lake Michigan

THE CITY

◆ One of the largest cities in the world ◆ Enormous variety of cultural resources ◆ National and international center of business and industry ◆ Excellent recreational facilities ◆ Industrial collaboration and job opportunities

THE DEPARTMENT

◆ One of the oldest in the nation ◆ Approximately 40 full-time and 40 part-time graduate students ◆ M.Ch.E., M.S., and Ph.D. degrees ◆ Financially attractive fellowships and assistantships available to outstanding students

APPLICATIONS

Dr. A. Cinar • Graduate Admissions Committee
Department of Chemical Engineering
Illinois Institute of Technology
IIT Center
Chicago, IL 60616

FACULTY AND RESEARCH AREAS

- ***HAMID ARASTOOPOUR***
  (Ph.D., IIT)
  Multiphase flow and fluidization, flow through porous media, and powder and material processing
- ***RICHARD L. BEISSINGER***
  (D.E.Sc., Columbia)
  Transport processes in chemical and biological systems, and rheology of polymeric and biological fluids
- ***BARRY BERNSTEIN***
  (Ph.D., Indiana University)
  Rheology, non-newtonian flows, and mechanical behavior of polymers
- ***ALI CINAR***
  (Ph.D., Texas A & M)
  Chemical process control, distributed parameter systems, and expert systems
- ***DIMITRI GIDASPOW***
  (Ph.D., IIT)
  Hydrodynamics of fluidization, multiphase flow, and separations processes
- ***HENRY R. LINDEN***
  (Ph.D., IIT)
  Energy policy, planning, and forecasting
- ***SATISH J. PARULEKAR***
  (Ph.D., Purdue)
  Biochemical engineering, and chemical reaction engineering
- ***J. ROBERT SELMAN***
  (Ph.D., California-Berkeley)
  Electrochemical engineering, and electrochemical energy storage
- ***FYODOR A. SHUTOV***
  (Ph.D., Institute for Chemical Physics, Moscow)
  Polymer composite materials, and plastic recycling
- ***FOUAD TEYMOUR***
  (Ph.D., University of Wisconsin, Madison)
  S.C. Johnson Polymer Assistant Professor
  Polymerization reaction engineering, and dynamic system analysis
- ***DAVID C. VENERUS***
  (Ph.D., Pennsylvania State U)
  Polymer rheology and processing, and transport phenomena
- **DARSH T. WASAN**
  (Ph.D., California-Berkeley)
  Interfacial phenomena, separation processes, and enhanced oil recovery

Adjunct Faculty

Michael Caracotsios • Transport phenomena computation

Ellis K. Fields • Industrial chemistry

Ted Knowlton • Fluidization

Harold Lindahl • Process design

CHEMICAL AND BIOCHEMICAL ENGINEERING

GRADUATE PROGRAM FOR M.S. & PH.D. DEGREES IN CHEMICAL AND BIOCHEMICAL ENGINEERING

FACULTY

GREG CARMICHAEL
Chair; *U. of Kentucky, 1979,* Global Change/ Supercomputing

J. KEITH BEDDOW
U. of Cambridge, 1959
Particle Morphological Analysis

AUDREY BUTLER
U. of Iowa, 1989
Chemical Precipitation Processes

RAVI DATTA
UCSB, 1981
Reaction Engineering/ Catalyst Design

JONATHAN DORDICK
MIT, 1986,
Biocatalysis and Bioprocessing

DAVID MURHAMMER
U. of Houston, 1989
Animal Cell Culture

JOHN M. WIENCEK
Case Western Reserve U., 1989
Dilute Separation Technology

DAVID RETHWISCH
U. of Wisconsin, 1984
Membrane Science/ Catalysis and Cluster Science

V.G.J. RODGERS
Washington U., 1989
Transport Phenomena in Bioseparations

TONYA L. PEEPLES
Johns Hopkins, 1994
Bioremediation; Extremophile Physiology and Biocatalysis

For Information and application write to:

GRADUATE ADMISSIONS
Chemnical and Biochemical Engineering
The Univesity of Iowa
Iowa City, Iowa 52242
319-335-1400

THE UNIVERSITY OF IOWA

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Chemical Engineering Graduate Program

Biochemical and Biomedical Engineering

Charles E. Glatz, Ph.D.
Wisconsin

Carole A. Heath, Ph.D.
R.P.I.

Peter J. Reilly, Ph.D.
Pennsylvania

Richard C. Seagrave, Ph.D.
Iowa State

Catalysis and Reaction Engineering

L. K. Doraiswamy, Ph.D.
Wisconsin

Terry S. King, Ph.D.
M.I.T.

Glenn L. Schrader, Ph.D.
Wisconsin

Energy and Environment

Robert C. Brown, Ph.D.
Michigan State

Thomas D. Wheelock, Ph.D.
Iowa State

Materials and Crystallization

Kurt R. Hebert, Ph.D.
Illinois

Maurice A. Larson, Ph.D.
Iowa State

Gordon R. Youngquist, Ph.D.
Illinois

Process Design and Control

Derrick K. Rollins, Ph.D.
Ohio State

Dean L. Ulrichson, Ph.D.
Iowa State

Transport and Thermodynamics

James C. Hill, Ph.D.
Washington

Kenneth R. Jolls, Ph.D.
Illinois

R. Dennis Vigil, Ph.D.
Michigan

For additional information:
Graduate Committee
Department of Chemical Engineering
Iowa State University
Ames, Iowa 50011
Telephone: 515-294-7643
E-mail: seagrave@iastate.edu
Fax: 515-294-3177

Graduate Study and Research in

Chemical Engineering

Timothy A. Barbari
Ph.D., University of Texas, Austin
- Membrane Science
- Sorption and Diffusion in Polymers
- Polymeric Separation Media

Michael J. Betenbaugh
Ph.D., University of Delaware
- Biochemical Kinetics
- Insect Cell Culture
- Recombinant DNA Technology

Marc D. Donohue
Ph.D., University of California, Berkeley
- Equations of State
- Statistical Thermodynamics
- Phase Equilibria

Joseph L. Katz
Ph.D., University of Chicago
- Nucleation
- Crystallization
- Flame Generation of Ceramic Powders

Mark A. McHugh
Ph.D., University of Delaware
- High-Pressure Thermodynamics
- Polymer Solution Thermodynamics
- Supercritical Solvent Extraction

W. Mark Saltzman
Ph.D., Massachusetts Institute of Technology
- Transport in Biological Systems
- Polymeric Controlled Release
- Cell-Surface Interactions

W. H. Schwarz
Dr. Engr., The Johns Hopkins University
- Liquid Crystals
- Non-Newtonian Fluid Dynamics
- Physical Acoustics and Fluids
- Turbulence

Kathleen J. Stebe
Ph.D., The City University of New York
- Interfacial Phenomena
- Electropermeability of Biological Membranes
- Surface Effects at Fluid-Droplet Interfaces

Denis Wirtz
Ph.D., Stanford University
- Phase Transitions and Critical Phenomena
- Polymer Systems Far from Equilibrium
- Pattern Selection in Convective Systems

Johns Hopkins

For further information contact:

The Johns Hopkins University
G.W.C. Whiting School of Engineering
Department of Chemical Engineering
34th and Charles Streets
Baltimore, MD 21218
(410) 516-8480

E.O.E./A.A.

GRADUATE STUDY IN CHEMICAL AND PETROLEUM ENGINEERING

THE UNIVERSITY OF KANSAS

The University of Kansas is the largest and most comprehensive university in Kansas. It has an enrollment of more than 28,000 and almost 2,000 faculty members. KU offers more than 100 bachelors', nearly ninety masters', and more than fifty doctoral programs. The main campus is in Lawrence, Kansas, with other campuses in Kansas City, Wichita, Topeka, and Overland Park, Kansas.

GRADUATE PROGRAMS

- M.S. degree with a thesis requirement in both chemical and petroleum engineering
- Ph.D. degree characterized by moderate and flexible course requirements and a strong research emphasis
- Typical completion times are 16-18 months for a M.S. degree and 4 1/2 years for a Ph.D. degree (from B.S.)

FINANCIAL AID

Financial aid is available in the form of fellowships and research and teaching assistantships ($13,000 to $16,000 a year)

For more information and application material, write or call

The University of Kansas • The Graduate Adviser
Department of Chemical and Petroleum Engineering
4006 Learned Hall
Lawrence, KS 66045-2223

FACULTY

Kenneth A. Bishop (Ph.D., Oklahoma)
John C. Davis (Ph.D., Wyoming)
Don W. Green (Ph.D., Oklahoma)
Colin S. Howat (Ph.D., Kansas)
Carl E. Locke, Jr., Dean (Ph.D., Texas)
Trung V. Nguyen (Ph.D., Texas A&M)
Russell D. Osterman (Ph.D., Kansas)
Marylee Z. Southard (Ph.D., Kansas)
Bala Subramaniam (Ph.D., Notre Dame)
Galen J. Suppes (Ph.D., Johns Hopkins)
Brian E. Thompson (Ph.D., MIT)
Shapour Vossoughi (Ph.D., Alberta, Canada)
G. Paul Willhite, Chairman (Ph.D., Northwestern)

RESEARCH AREAS

Catalytic Kinetics and Reaction Engineering
Chemical Vapor Deposition
Controlled Drug Delivery
Corrosion
Electrochemical Reactor and Processes
Enhanced Oil Recovery Processes
Fluid Phase Equilibria and Process Design
Kinetics and Homogeneous Catalysis for Polymer Reactions
Plasma Modeling and Plasma Reactor Design
Phase Behavior
Process Control
Supercomputer Applications
Supercritical Fluid Applications
Waste Heat and Pollution of Combustion Processes

RESEARCH FACILITIES

Excellent facilities are available for research and instruction. Extensive equipment and shop facilities are available for research in such areas as enhanced oil recovery processes, fluid phase equilibria, catalytic kinetics, plasma processing, and supercritical fluid applications. The VAX 9000, along with a network of Macintosh personal computers and IBM, Apollo, and Sun workstations, support computational and graphical needs.

Graduate Study

CHEMICAL ENGINEERING

Durland Hall — Home of Chemical Engineering

KANSAS STATE UNIVERSITY

M.S. and Ph.D. Programs

- Chemical Engineering
- Interdisciplinary Areas of Systems Engineering
- Food Science
- Environmental Engineering

Financial Aid Available

Up to $17,000 Per Year

For More Information Write To

Professor B.G. Kyle
Durland Hall
Kansas State University
Manhattan, KS 66506

Areas of Study and Research

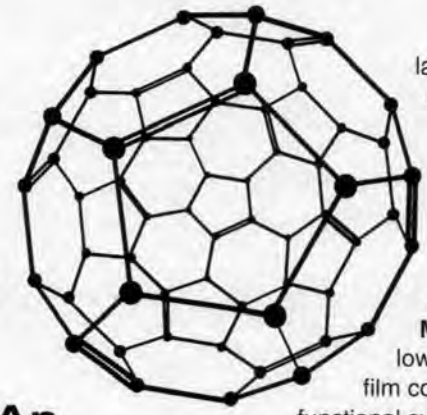
Transport Phenomena
Energy Engineering
Coal and Biomass Conversion
Thermodynamics and Phase Equilibrium
Biochemical Engineering
Proces Dynamics and Control
Chemical Reaction Engineering
Materials Science
Catalysis and Fuel Synthesis
Process System Engineering and Artificial Intelligence
Environmental Pollution Control
Fluidization and Solid Mixing
Hazardous Waste Treatment

KSU
KANSAS STATE UNIVERSITY

University of Kentucky

Far From An Ordinary Ball

Research with advanced materials (carbon fibers, nitride catalysts, superconducting thin films, and liquid crystalline polymers) and with Buckyballs is ongoing here in Lexington.



Anything But An Ordinary University

At the University of Kentucky—designated by the Carnegie Foundation as a Research University of the First Class, and included in the NSF's prestigious listing of Top 100 research institutions in America—*CHOICES* for Chem. E. graduate students are anything but ordinary. There are joint projects with Pharmacy, the Medical School, the Markey Cancer Center, and Chemistry researchers. And abundant opportunities for intense interaction with extraordinary faculty, as well as access to state-of-the-art facilities and equipment, including an IBM ES 3900/600J Supercomputer.

From A Uniquely Un-Ordinary Faculty

Ph.D.

Recent national awards won by our faculty include: Larry K. Cecil AIChE Environmental Division; AIChE Outstanding Counselor Award, 1983, 1991; ASM Henry Marion Howe Medal; AAAR Kenneth T. Whitby Memorial Award; BMES Dr. Harold Lamport Award for a Young Investigator; and two NSF-Presidential Young Investigators. Recent University-wide awards by faculty include: Great Teacher; Research Professor; Excellence in Undergraduate Education; and Alumni Professor.

With Out-Of-The-Ordinary Chem. E. Specialties

Aerosol Chemistry and Physics—Weighing picogram particles in electrodynamic balance, measuring monolayer adsorption, data with seven significant figures.
Cellular Bioengineering—Rheological and transport properties of cell membranes; cell adhesion, cancer research, transport of drugs across membranes, and membrane biofouling.
Computational Engineering—Modeling turbulent diffusion in atmospheric convective boundary layers; modeling growth of multicomponent aerosol systems.
Environmental Engineering—EPA-approved analytical laboratory; global atmospheric transport models; atmospheric photochemistry; control of heavy metals and hazardous organics; water pollution research.
Membrane Science—Development of low pressure charged membranes; thin film composite membranes; development of biofunctional synthetic membranes.

All Of Which Create Some Extraordinary Opportunities For You

Doctoral incentives well worth your consideration: Up to $15,000 per year stipends plus tuition, books, research supplies, travel allowances. Interested in obtaining a degree of extraordinary worth? Contact **Dr. K.W. Anderson, Department of Chemical and Materials Engineering, University of Kentucky, Lexington, KY 40506-0046**

606-257-4956

University of Kentucky Department of Chemical and Materials Engineering

UNIVERSITÉ LAVAL

Québec, Canada

Ph.D. and M.Sc. in Chemical Engineering

Research Areas

- *CATALYSIS (S. Kaliaguine, A. Sayari)*
- *BIOCHEMICAL ENGINEERING (A. LeDuy, J. -R. Moreau, J. Thibault)*
- *ENVIRONMENTAL ENGINEERING (C. Roy)*
- *COMPUTER AIDED ENGINEERING (R. Lacroix)*
- *MODELLING AND CONTROL (J. Thibault)*
- *RHEOLOGY AND POLYMER ENGINEERING (A. Ait-Kadi)*
- *THERMODYNAMICS (S. Kaliaguine)*
- *CHEMICAL AND BIOCHEMICAL UPGRADING OF BIOMASS (S. Kaliaguine, A. LeDuy, C. Roy)*
- *FLUIDISATION AND SEPARATIONS BY MEMBRANES (B. Grandjean)*

Université Laval is a French speaking University. It provides the graduate student with the opportunity of learning French and becoming acquainted with French culture.

Please write to:

Le Responsable du Comité d'Admission et de Supervision
Département de génie chimique
Faculté des sciences et de génie
Université Laval
Sainte-Foy, Québec, Canada G1K 7P4

The Faculty

ABDELLATIF AIT-KADI
Ph.D. École Poly. Montreal
Professeur agrégé

MOSTAPHA BOUSMINA
Ph.D. École Poly. Montreal
Professeur adjoint

BERNARD GRANDJEAN
Ph.D. École Poly. Montreal
Professeur adjoint

SERGE KALIAGUINE
D.Ing. I.G.C. Toulouse
Professeur titulaire

R. LACROIX
Ph.D. Laval
Professeur adjoint

ANH LEDUY
Ph.D. Western Ontario
Professeur titulaire

J. -CLAUDE METHOT
D.Sc. Laval
Professeur titulaire

JEAN-R. MOREAU
Ph.D. M.I.T.
Professeur titulaire

CHRISTIAN ROY
Ph.D. Sherbrooke
Professeur titulaire

PAUL-H. ROY
Ph.D. Illinois Inst. of Technology
Professeur titulaire

ABDELHAMID SAYARI
Ph.D. Tunis/Lyon
Professeur adjoint

JULES THIBAULT
Ph.D. McMaster
Professeur titulaire

LEHIGH UNIVERSITY

Synergistic, interdisciplinary research in. . .

- Biochemical Engineering
- Catalytic Science & Reaction Engineering
- Environmental Engineering
- Interfacial Transport
- Materials Synthesis Characterization & Processing
- Microelectronics Processing
- Polymer Science & Engineering
- Process Modeling & Control
- Thermodynamic Properties
- Two-Phase Flow & Heat Transfer

. . . leading to M.S. and Ph.D. degrees in chemical engineering and polymer science and engineering

Highly attractive financial aid packages, which provide tuition and stipend, are available.

FACULTY AND RESEARCH AREAS

Philip A. Blythe (University of Manchester) ■ fluid mechanics • heat transfer • applied mathematics
Hugo S. Caram (University of Minnesota) ■ gas-solid and gas-liquid systems • optical techniques • reaction engineering
Marvin Charles (Polytechnic Institute of Brooklyn) ■ biochemical engineering • bioseparations
Manoj K. Chaudhury (SUNY-Buffalo) ■ adhesion • thin films • surface chemistry
John C. Chen (University of Michigan) ■ two-phase vapor-liquid flow • fluidization • radiative heat transfer • environmental technology
Mohamed S. El-Aasser (McGill University) ■ polymer colloids and films • emulsion copolymerization • polymer synthesis and characterization
Christos Georgakis (University of Minnesota) ■ process modeling and control • chemical reaction engineering • batchreactors
Dennis W. Hess (Lehigh University) ■ microelectronics processing • thin film science and technology
James T. Hsu (Northwestern University) ■ separation processes • adsorption and catalysis in zeolites
Andrew J. Klein (North Carolina State University) ■ emulsion polymerization • colloidal and surface effects in polymerization
William L. Luyben (University of Delaware) ■ process design and control • distillation
Janice A. Phillips (University of Pennsylvania) ■ biochemical engineering • instrumentation/control of bioreactors • mammalian cell culture
Maria M. Santore (Princeton University) ■ polymers adsorption processes and blend stability
William E. Schiesser (Princeton University) ■ numerical algorithms and software in chemical engineering
Cesar A. Silebi (Lehigh University) ■ separation of colloidal particles • electrophoresis • mass transfer
Leslie H. Sperling (Duke University) ■ mechanical and morphological properties of polymers • interpenetrating polymer networks
Fred P. Stein (University of Michigan) ■ thermodynamic properties of mixtures
Harvey G. Stenger, Jr. (Massachusetts Institute of Technology) ■ reactor engineering
Israel E. Wachs (Stanford University) ■ materials synthesis and characterization • surface chemistry • heterogeneous catalysis
Leonard A. Wenzel, Emeritus (University of Michigan) ■ thermodynamics

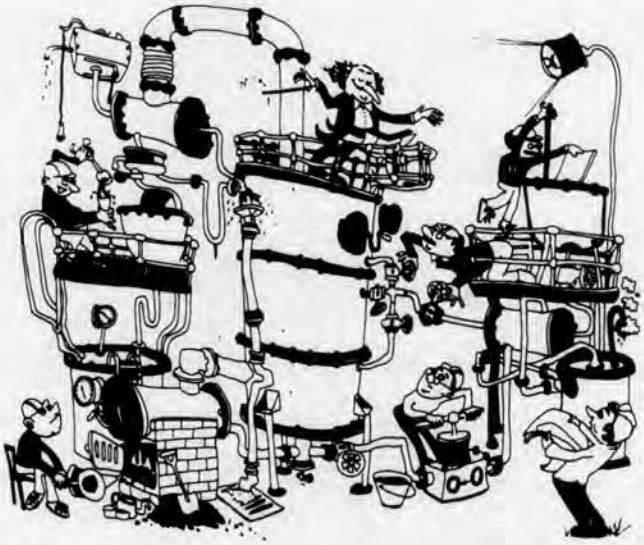
Living in Bethlehem, PA allows easy access to cultural and recreational opportunities in the New York-Philadelphia area.

Additional information and applications may be obtained by writing to:

Dr. Hugo S. Caram, Chairman • Graduate Admissions Committee
Department of Chemical Engineering • Lehigh University • 111 Research Drive • Iacocca Hall • Bethlehem, PA 18015

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. Baton Rouge is one of the nation's busiest ports and the city's economy rests heavily on the chemical, oil, plastics, and agricultural industries. The great outdoors provide excellent recreational activities year-round, especially fishing, hunting, and water sports. The proximity of New Orleans provides for superb nightlife, especially during Mardi Gras. The city is also only two hours away from the Mississippi Gulf Coast, and four hours from either Gulf Shores or Houston.

THE DEPARTMENT

- M.S. and Ph.D. Programs
- Approximately 70 Graduate Students
- More than $3 million in Research Funding

DEPARTMENTAL FACILITIES

- Departmental computing—IBM 9370 and RS 6000 with LAN and more than 100 PCs
- Extensive laboratory facilities, especially in reaction and environmental engineering, transport phenomena and separations, polymer, textile and materials procesing, biochemical engineering, thermodynamics

TO APPLY, CONTACT

DIRECTOR OF GRADUATE INSTRUCTION
Department of Chemical Engineering
Louisiana State University
Baton Rouge, LA 70803
Telephone: 1(800) 256-2084 FAX: (504) 388-1476

FACULTY

J.R. COLLIER (Ph.D., Case Institute)
Polymer and Textile Processing

A.B. CORRIPIO (Ph.D., Louisiana State University)
Control, Simulation, Computer-Aided Design

K.M. DOOLEY (Ph.D., University of Delaware)
Heterogeneous Catalysis, High-Pressure Separations

G.L. GRIFFIN (Ph.D., Princeton University)
Electronic Materials, Surface Chemistry, CVD

D.P. HARRISON (Ph.D., University of Texas)
Fluid-Solid Reactions, Hazardous Waste Treatment

M.A.HENSON (Ph.D., UC Santa Barbara)
Nonlinear Process Control, Neural Networks

M. HJORTSØ (Ph.D., University of Houston)
Biochemical Reaction Engineering, Applied Math

F.C. KNOPF (Ph.D., Purdue University)
Supercritical Fluid Extraction, Ultrafast Kinetics

E. McLAUGHLIN (D.Sc., University of London)
Thermodynamics, High Pressures

R.W. PIKE (Ph.D., Georgia Institute of Technology)
Fluid Dynamics, Reaction Engineering, Optimization

G.L. PRICE (Ph.D., Rice University)
Heterogeneous Catalysis, Zeolites

D.D. REIBLE (Ph.D., California Institute of Technology)
Environmental Transport, Transport Modeling

R.G. RICE (Ph.D., University of Pennsylvania)
Mass Transfer, Separation Processes, Two-Phase Flow

A.M. STERLING (Ph.D., University of Washington)
Transport Phenomena, Combustion

L.J. THIBODEAUX (Ph.D., Louisiana State University)
Chemodynamics, Hazardous Waste Transport

D.M. WETZEL (Ph.D., University of Delaware)
Hazardous Waste Treatment

FINANCIAL AID

- Assistantships at $14,400 - $16,800, with waiver of out-of-state tuition
- Dean's Fellowships at $17,000 per year with no tuition

UNIVERSITY OF

MAINE

The University

The spacious campus is situated on 1,200 acres overlooking the Penobscot and Stillwater Rivers. Present enrollment of 12,000 offers the diversity of a large school, while preserving close personal contact between peers and faculty. The University's Maine Center for the Arts, the Hauck Auditorium, and Pavilion Theatre provide many cultural opportunites, in addition to those in the nearby city of Bangor. Less than an hour away from campus are the beautiful Maine Coast and Acadia National park, alpine and cross-country ski resorts, and northern wilderness areas of Baxter State Park and Mount Katahdin.

Faculty and Research Interests

DOUGLAS BOUSFIELD Ph.D. (U.C.Berkeley)
Fluid Mechanics, Rheology, Coating Processes, Particle Motion Modeling

WILLIAM H. CECKLER Sc.D. (M.I.T.)
Heat Transfer, Pressing & Drying Operations, Energy from Low BTU Fuels, Process Simulation & Modeling

ALBERT CO Ph.D. (Wisconsin)
Polymeric Fluid Dynamics, Rheology, Transport Phenomena, Numerical Methods

JOSEPH M. GENCO Ph.D. (Ohio State)
Acting Chair
Process Engineering, Pulp and Paper Technology, Wood Delignification

JOHN C. HASSLER Ph.D. (Kansas State)
Process Control, Numerical Methods, Instrumentation and Real Time Computer Applications

MARQUITA K HILL Ph.D. (U.C. Davis)
Environmental Science, Waste Management Technology

JOHN J. HWALEK Ph.D. (Illinois)
Liquid Metal Natural Convection, Electronics Cooling, Process Control Systems

ERDOGAN KIRAN Ph.D. (Princeton)
Polymer Physics & Chemistry, Supercritical Fluids, Thermal Analysis & Pyrolysis, Pulp & Paper Science

PIERRE LEPOUTRE Ph.D. (North Carolina State University)
Surface Physics and Chemistry, Materials Science, Adhesion Phenomena

KENNETH I. MUMME Ph.D. (Maine)
Process Simulation and Control, System Identification & Optimization

HEMANT PENDSE Ph.D. (Syracuse)
Colloidal Phenomena, Particulate & Multiphase Processes, Porous Media Modeling

EDWARD V. THOMPSON Ph.D., (Polytechnic Institute of Brooklyn)
Thermal & Mechanical Properties of Polymers, Papermaking and Fiber Physics, Recycle Paper

Programs and Financial Support

Industrial fellowships, university fellowships, research assistantships and teaching assistantships are available. Many research programs have industrial advisory boards. These boards provide students contact with industry researchers.

Obtain your graduate degree in en enjoyable setting!

Call Collect or Write

Doug Bousfield
Department of Chemical Engineering
Jenness Hall, Box B
University of Maine
Orono, Maine 04469-5737
(207) 581-2300
e-mail: bousfld@maine.maine.edu

University of Maryland

College Park

Location

The University of Maryland at College Park is located approximately ten 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 brings one to the historic Chesapeake Bay.

Degrees Offered

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

Financial Aid Available

Fellowships, Teaching and Research Assistantships

Faculty:

William E. Bentley
Richard V. Calabrese
Kyu Yong Choi
Larry L. Gasner
James W. Gentry
Thomas J. McAvoy
Thomas M. Regan
Jan V. Sengers
Theodore G. Smith
Nam Sun Wang
William A. Weigand
Evanghelos Zafiriou

Research Areas:

Aerosol Science
Biochemical Engineering
Multiphase Flow
Neural Network Applications
Polymer Processing
Polymer Reaction Engineering
Process Control
Recombinant DNA Technology
Separation Processes
Systems Engineering
Thermophysical Properties
Turbulence and Mixing

For Applications and Further Information, Write

Graduate Admissions Officer • Department of Chemical Engineering
University of Maryland • College Park, MD 20742-2111

UMBC
University of Maryland
Baltimore County

Graduate Study in BIOCHEMICAL ENGINEERING
for Engineering and Science Majors

EMPHASIS
The Department of Chemical and Biochemical Engineering at UMBC offers graduate programs leading to M.S. and Ph.D. degrees in Chemical Engineering. Our research is heavily focused in biochemical and bioprocess engineering and covers a wide range of areas including fermentation, cell culture, downstream processing, drug delivery, protein engineering and protein stability. Unique programs in the regulatory-engineering interface of bioprocessing are offered as well.

FACILITIES
The Department offers state-of-the-art facilities for faculty and graduate student research. These modern facilities have been developed primarily in the last six years and comprise 6,000 square feet of laboratory space in the Technology Research Center plus 7,000 square feet of departmental laboratories in the new Engineering and Computer Science building, a $26 million facility opened in the Fall of 1992.

LOCATION
UMBC is located in the Baltimore-Washington corridor and within easy access to both metropolitan areas. A number of government research facilities such as NIH, FDA, USDA, NSA and a large number of biotechnology companies are located nearby and provide excellent opportunities for research interactions.

FOR FURTHER INFORMATION CONTACT:
Graduate Program Coordinator
Department of Chemical and
Biochemical Engineering
University of Maryland Baltimore County
5401 Wilkens Avenue
Baltimore, Maryland 21228-5398
Phone: (410) 455-3400
FAX: (410) 455-1049

FACULTY

D. F. Bruley, Ph.D. *Tennessee*
Biodownstream processing and processes in the microcirculation; Process simulation and control.

T. W. Cadman, Ph.D. *Carnegie Mellon*
Bioprocess modeling, control, and optimization; Educational software development.

D. D. Frey, Ph.D. *California-Berkeley*
Chromatographic separations; Electrophoresis.

A. Gomezplata, Ph.D.* *Rensselaer*
Heterogeneous flow systems; Simultaneous mass transfer and chemical reactions.

K. A. Kang, Ph.D. *California-Davis*
Immuno-affinity chromatography; Characterization and imaging of biological systems; Transport phenomena.

J. A. Lumpkin, Ph.D. *Pennsylvania*
Protein oxidation; Kinetics of enzymatic reactions; Analytical chemi- and bioluminescence.

A. R. Moreira, Ph.D. *Pennsylvania*
rDNA fermentation; Regulatory issues; Scale-up; Downstream processing.

G. F. Payne, Ph.D.** *Michigan*
Plant cell tissue culture; *Streptomyces* bioprocessing; Adsorptive separations; Toxic waste treatment.

G. Rao, Ph.D.** *Drexel*
Animal cell culture; Oxygen toxicity; Biosensing.

M. R. Sierks, Ph.D. *Iowa State*
Protein engineering; Site-directed mutagenesis; Catalytic antibodies.

D. I.C. Wang, Ph.D.† *Pennsylvania*
Bioreactors; Bioinstrumentation; Protein refolding.

T. F. Wiesner, Ph.D. *Georgia Institute of Technology*
Cellular biomechanics; Bio-mathematical modeling and simulation; Process control.

* *Emeritus*
** *Joint appointment with the University of Maryland Biotechnology Institute*
† *Adjunct Professor*

CHEMICAL ENGINEERING AT MIT

MIT is located in Cambridge, just across the Charles River from Boston, a few minutes by subway from downtown Boston and Harvard Square. The heavy concentration of colleges, hospitals, research facilities, and high technology industry provides a populace that demands and finds an unending variety of theaters, concerts, restaurants, museums, bookstores, sporting events, libraries, and recreational facilities.

RESEARCH AREAS

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

With the largest chemical engineering research faculty in the country, the Department of Chemical Engineering at MIT offers programs of research and teaching which span the breadth of chemical engineering with unprecedented depth in fundamentals and applications. The Department offers three levels of graduate programs, leading to Master's, Engineer's, and Doctor's degrees. In addition, graduate students may earn a Master's degree through the ***David H. Koch School of Chemical Engineering Practice****, a unique internship program that stresses defining and solving industrial problems by applying chemical engineering fundamentals. Students in this program spend half a semester at each of two Practice School Stations, including Dow Chemical in Midland, Michigan, and Merck Pharmaceutical Manufacturing Division in West Point, Pennsylvania, in addition to one or two semesters at MIT.*

FOR MORE INFORMATION CONTACT

Chemical Engineering Graduate Office, 66-366
Massachusetts Institute of Technology, Cambridge, MA 02139-4307
Phone • (617) 253-4579; FAX • (617) 253-9695; E-Mail • info@chemegrad.mit.edu

FACULTY

R.A. Brown, *Head*
R.C. Armstrong
P.I. Barton
E.D. Blankschtein
H. Brenner
L.G. Cima
R.E. Cohen
C.K. Colton
C.L. Cooney
W.M. Deen
L.B. Evans
K.K. Gleason
P.T. Hammond
J.G. Harris
T.A. Hatton
J.B. Howard
K.F. Jensen
P.E. Laibinis
R.S. Langer
G.J. McRae
E.W. Merrill
G.C. Rutledge
A.F. Sarofim
H.H. Sawin
K.A. Smith
Ge. Stephanopoulos
Gr. Stephanopoulos
J.W. Tester
P.S. Virk
D.I.C. Wang
J.Y. Ying

University of Massachusetts
Amherst

M.S. and Ph.D. Programs in

Chemical Engineering

Faculty

M. F. Doherty, Ph.D. *(Cambridge)*, Head
W. C. Conner, Ph.D. *(Johns Hopkins)*
M. R. Cook, Ph.D. *(Harvard)*
J. M. Douglas, Ph.D. *(Delaware)*
V. Haensel, Ph.D. *(Northwestern)*
R. L. Laurence, Ph.D. *(Northwestern)*
M. F. Malone, Ph.D. *(Massachusetts)*
P. A. Monson, Ph.D. *(London)*
K. M. Ng, Ph.D. *(Houston)*
M. Tsapatsis, *Ph.D. (Caltech)*
J. W. van Egmond *(Stanford)*
D. G. Vlachos, Ph.D. *(Minnesota)*
P. R. Westmoreland, Ph.D. *(M.I.T.)*
H. H. Winter, Ph.D. *(Stuttgart)*

Current Areas of Research

- Combustion, Plasma Processing
- Process Synthesis, Design of Polymer and Solids Processes
- Statistical Thermodynamics, Phase Behavior
- Control System Synthesis
- Fluid Mechanics, Rheology
- Polymer Processing, Composites
- Catalysis and Kinetics, Reaction Dynamics
- Design of Multiphase and Polymerization Reactors
- Nonideal Distillation, Adsorption, Crystallization
- Computer Aided Design, Optimization
- Computational Chemistry

Design and Control Center

The Department has a research center in design and control, which is sponsored by industrial companies.

Financial Support

All students are awarded full financial aid at a nationally competitive rate.

Location

The Amherst Campus of the University is in a small New England town in Western Massachusetts. Set amid farmland and rolling hills, the area offers pleasant living conditions and extensive recreational facilities.

For application forms and further information on fellowships and assistantships, academic and research programs, and student housing, write:

GRADUATE PROGRAM DIRECTOR
DEPARTMENT OF CHEMICAL ENGINEERING
159 GOESSMANN LABORATORY
UNIVERSITY OF MASSACHUSETTS
AMHERST, MA 01003

Chemical Engineering at

The University of Michigan

Faculty

1. **Johannes Schwank** Chair, Heterogeneous catalysis, surface science
2. **Stacy G. Bike** Colloids, transport, electrokinetic phenomena
3. **Dale E. Briggs** Coal processes
4. **Mark A. Burns** Biochemical and field-enhanced separations
5. **Brice Carnahan** Numerical methods, process simulation
6. **Rane L. Curl** Rate processes, mathematical modeling
7. **Frank M. Donahue** Electrochemical engineering
8. **H. Scott Fogler** Flow in porous media, microelectronics processing
9. **John L. Gland** Surface science
10. **Erdogan Gulari** Interfacial phenomena, catalysis, surface science
11. **Robert H. Kadlec** Ecosystems, process dynamics
12. **Costas Kravaris** Nonlinear process control, system identification
13. **Jennifer J. Linderman** Engineering approaches to cell biology
14. **Susan Montgomery** Computers and multimedia in ChE instruction.
15. **Bernhard O. Palsson** Cellular bioengineering
16. **Phillip E. Savage** Reaction pathways in complex systems
17. **Levi T. Thompson, Jr.** Catalysis, processing materials in space
18. **Henry Y. Wang** Biotechnology processes, industrial biology
19. **James O. Wilkes** Numerical methods, polymer processing
20. **Robert M. Ziff** Aggregation processes, statistical mechanics


1


2


3


4


5


6


7


8


9


10


11


12


13


14


15


16


17


18


19


20

For More Information, Contact:

Graduate Program Office, Department of Chemical Engineering / The University of Michigan / Ann Arbor, MI 48109-2136 / 313 763-1148

GRADUATE STUDY IN CHEMICAL ENGINEERING AT

MICHIGAN STATE UNIVERSITY

The Department of Chemical Engineering offers Graduate Programs leading to M.S. and Ph.D. degrees in Chemical Engineering. The faculty conduct fundamental and applied research in a variety of Chemical Engineering disciplines. The Michigan Biotechnology Institute, the Composite Materials and Structures Center, and the Crop and Food Bioprocessing Center provide a forum for interdisciplinary work in current high technology areas.

ASSISTANTSHIPS • Half-time graduate assistantships for incoming Master's candidates are expected to pay $14,748 per year plus a tuition waiver of six credits for Fall and Spring Semesters, four credits for Summer Semester. University paid health insurance is also provided. Theses may be written on the subject covered by the research assistantship.

FELLOWSHIPS • Available appointments pay up to $18,000 per year.

FACULTY AND RESEARCH INTERESTS

- **D. K. ANDERSON**, Chairperson • *Ph.D., 1960, University of Washington*
  Transport Phenomena, Diffusion in Polymer Solutions
- **K. A. BERGLUND** • *Ph.D., 1981, Iowa State University*
  Sensors, Applied Spectroscopy, Food and Biochemical Engineering, Crystallization from Solution
- **D. M. BRIEDIS** • *Ph.D., 1981, Iowa State University*
  Surface Phenomena in Crystallization Processes, Biochemical and Food Engineering, Bioadhesion
- **L. T. DRZAL** • *Ph.D., 1974, Case Western Reserve University*
  Surface and Interfacial Phenomena, Adhesion, Composite Materials, Surface Characterization, Surface Modification of Polymers, Composite Processing
- **M. C. HAWLEY** • *Ph.D., 1964, Michigan State University*
  Kinetics, Catalysis, Reactions in Plasmas, Polymerization Reactions, Composite Processing, Biomass Conversion, Reaction Engineering
- **K. JAYARAMAN** • *Ph.D., 1975, Princeton University*
  Polymer Rheology, Processing of Polymer Blends and Composites, Computational Methods
- **C. T. LIRA** • *Ph.D., 1986, University of Illinois at Urbana-Champaign*
  Thermodynamics and Phase Equilibria of Complex Systems, Supercritical Fluid Studies
- **D. J. MILLER** • *Ph.D., 1982, University of Florida*
  Kinetics and Catalysis, Reaction Engineering, Coal Gasification, Catalytic Conversion of Biomass-Based Materials
- **R. J. MORGAN** • *Ph.D., 1968, University of Manchester*
  High Performance Fibers, Polymer Matrices, Fast Processing, Composite Materials, Reliability and Durability
- **R. NARAYAN** • *Ph.D., 1976, University of Bombay*
  Polymer Blends and Alloys, Biodegradable Plastics, Low-Cost Composites Using Recycled/Reclaimed and Natural Polymers, Biodegradation and Composting Studies
- **R. Y. OFOLI** • *Ph.D., 1994, Carnegie Mellon University*
  Colloid and Interfacial Science, Colloid Stability, Adsorption of Proteins at the Liquid-Liquid Interface
- **C. A. PETTY** • *Ph.D., 1970, University of Florida*
  Fluid Mechanics, Turbulent Transport Phenomena, Solid-Fluid and Liquid-Liquid Separations, Polymer Composite Processing
- **A. B. SCRANTON** • *Ph.D., 1990, Purdue University*
  Polymer Science and Engineering, Polymer Complexation and Network Formation, Applications of NMR Spectroscopy, Molecular Modeling, Crosslinking Photopolymerizations
- **B. W. WILKINSON** • Professor Emeritus • *Ph.D., 1958, Ohio State University*
  Energy Systems and Environmental Control, Nuclear Reactor, Radioisotope Applications
- **R. M. WORDEN** • *Ph.D., 1986, University of Tennessee*
  Biochemical Engineering, Immobilized Cell Technology, Food Engineering

FOR ADDITIONAL INFORMATION WRITE

Chairperson • Department of Chemical Engineering • A202 Engineering Building
Michigan State University • East Lansing, Michigan 48824-1226

MSU is an Affirmative Action/Equal Opportunity Institution

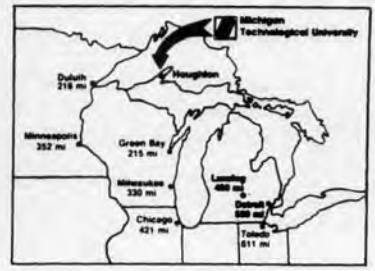
Michigan Technological University

Add your name to the ranks of the prestigious engineering alumni from Michigan Tech

Combine a first-rate chemical engineering education with the environmentally exciting surroundings of the Keweenaw Peninsula.

Michigan Tech. Established in 1885. One of four nationally-recognized research institutions in the state of Michigan. 6,000 undergraduate students. 700 graduate students.

Michigan Tech. The 8th largest chemical engineering program in the country, with a vital and focused graduate program.



CONTACT

Department of Chemical Engineering
Michigan Technological University
1400 Townsend Drive
Houghton, MI 49931-1295
906/487-3132
FAX 906/487-3213

Chemical Engineering Faculty

Process and plant design
Bruce A. Barna, Associate Professor • Ph.D., New Mexico State, 1985

Demixing-polymerization, polymer materials
Gerard T. Caneba, Assistant Professor • Ph.D., University of California Berkeley, 1985

Process control, neural networks, fuzzy logic control
Tomas B. Co, Assistant Professor • Ph.D., Massachusetts, 1988

Chemical process safety
Daniel A. Crowl, Professor • Ph.D., University of Illinois Urbana 1975

Excited state chemistry and transport processes
Edward R. Fisher, Professor and Department Head • Ph.D., Johns Hopkins University, 1965

Transport processes and process scaleup
Davis W. Hubbard, Professor • Ph.D., University of Wisconsin Madison, 1964

Process control, energy systems
Nam K. Kim, Associate Professor • Ph.D., Montana State, 1982

Polymer rheology, instabilities, complex fluids
Faith A. Morrison, Assistant Professor • Ph.D., Massachusetts, 1988

Surface science, sol-gel processing
Michael E. Mullins, Professor • Ph.D., Rochester, 1983

Numerical analysis, process safety
Anton J. Pintar, Associate Professor • Ph.D., Illinois Institute of Technology, 1968

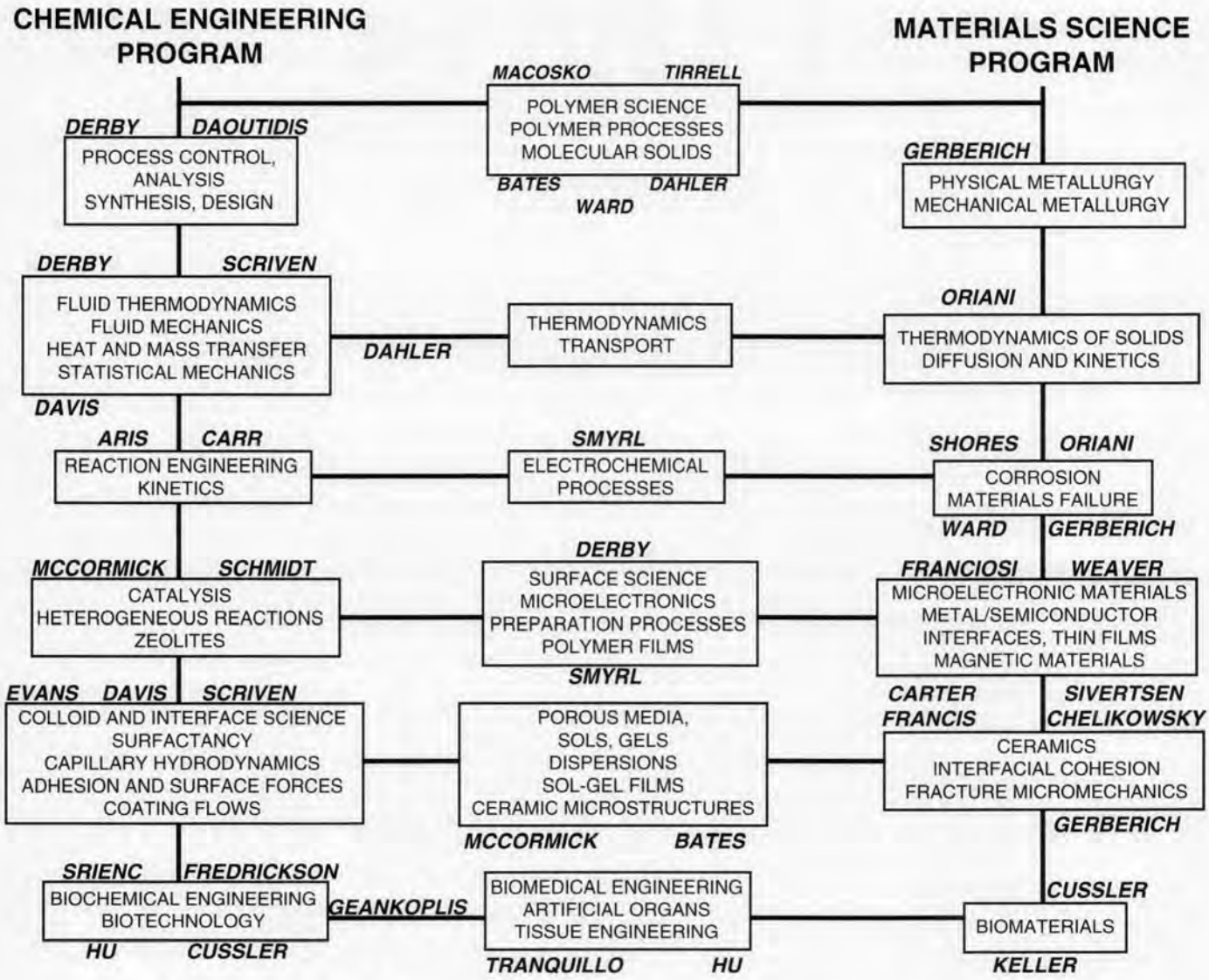
Environmental thermodynamics
Tony N. Rogers, Assistant Professor • Ph.D., Michigan Technological University, 1994

Environmental and biochemical engineering
David R. Shonnard, Assistant Professor • Ph.D., University of California Davis, 1991

Polymer Science, polymer and composite processing
John G. Williams, Professor • Ph.D., Melbourne University, 1971

UNIVERSITY OF MINNESOTA

Chemical Engineering and Materials Science



THE FACULTY

R. Aris	J.J. Derby	K.H. Keller	J.M. Sivertsen
F.S. Bates	D.F. Evans	C.W. Macosko	W.H. Smyrl
R.W. Carr, Jr.	L.F. Francis	A.V. McCormick	F. Srienc
C. B. Carter	A.G. Fredrickson	R.A. Oriani	M. Tirrell
J.R. Chelikowsky	C.D. Frisbie	C.J. Palmstrøm	R. Tranquillo
E.L. Cussler	C.J. Geankoplis	L.D. Schmidt	M.D. Ward
J.S. Dahler	W.W. Gerberich	L.E. Scriven	J.H. Weaver
P. Daoutidis	W-S. Hu	D.A. Shores	R. Wentzcovitch
H.T. Davis			

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

UMR

MISSOURI'S TECHNOLOGICAL UNIVERSITY

UNIVERSITY OF MISSOURI-ROLLA

M.S. and Ph.D. Degrees

FACULTY AND RESEARCH INTERESTS

N. L. BOOK ***(Ph.D., Colorado)***
- Computer Aided Process Design • Bioconversion

D. FORCINITI ***(Ph.D., North Carolina State)***
- Bioseparations • Thermodynamics
- Statistical Mechanics

J. W. JOHNSON ***(Ph.D., Missouri)***
- Electrode Reactions • Adsorption

A. I. LIAPIS ***(Ph.D., ETH-Zurich)***
- Adsorption • Affinity Chromatography • Perfusion Chromatography • Transport Phenomena
- Lyophilization (Freeze Drying)

D. B. MANLEY ***(Ph.D., Kansas)***
- Thermodynamics • Vapor-Liquid Equilibrium
- Process Development

N. C. MOROSOFF ***(Ph.D., Brooklyn Polytech)***
- Plasma Polymerization • Membranes

P. NEOGI ***(Ph.D., Carnegie-Mellon)***
- Interfacial and Transport Phenomena

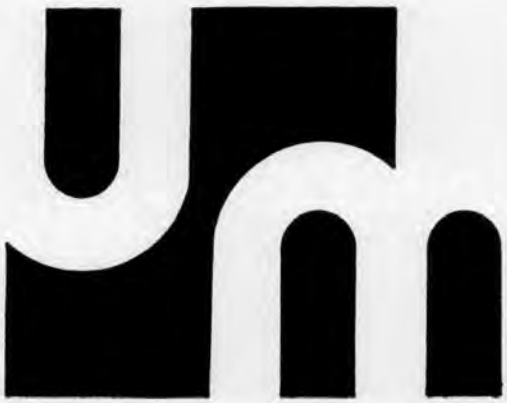
G. K. PATTERSON ***(Ph.D., Missouri-Rolla)***
- Mixing • Polymer Rheology • Computational Fluid Dynamics and Turbulent Transport

X B REED, JR. ***(Ph.D., Minnesota)***
- Fluid Mechanics • Drop and Particle Mechanics
- Transport Phenomena • Turbulence Structure
- Turbulence Modeling, including Reactions

S. L. ROSEN ***(Ph.D., Cornell)***
- Polymerization Reactions • Applied Rheology
- Polymeric Materials

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

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.

Contact Dr. X B Reed, Graduate Coordinator
Chemical Engineering Department
University of Missouri - Rolla
Rolla, Missouri 65401
Telephone (314) 341-4416

The University of New Mexico

Research Areas

Toxic and radioactive waste management
Superconducting ceramics
Microelectronics processing
Heterogeneous catalysis
Laser-enhanced CVD
Sol-gel and colloidal processing of ceramics
Biomedical engineering
Plasma science
Surface science
Aerosol physics
Materials characterization
Uncertainty and risk assessment

Faculty

Harold Anderson
C. Jeffrey Brinker
Joseph L. Cecchi, Chair
Abhaya K. Datye
David Kauffman
Toivo T. Kodas
Ronald E. Loehman
Gabriel P. López
Richard W. Mead
H. Eric Nuttall
Douglas M. Smith
Timothy L. Ward
Ebtisam S. Wilkins

The **University of New Mexico** along with **Sandia and Los Alamos National Laboratories,** and local industry, make Albuquerque a major scientific and research center. The chemical engineering department houses the NSF-supported **Center for Micro-Engineered Ceramics** and the DOE sponsored **Center for Radioactive Waste Management.** Faculty participate in the **SEMATECH Center of excellence in semiconductor research, The Center for High Technology Materials, and the Institute for Space Nuclear Power Studies.**

The Chemical Engineering Department offers financial aid in the form of research assistantships paying $10-15,000 per year, plus tuition.

Albuquerque's southwestern climate and rugged mountainous terrain provide plenty of opportunities for outdoor recreation such as skiing, hiking, and whitewater rafting.

For more information, write to:
Timothy L. Ward, Graduate Advisor
Department of Chemical and Nuclear Engineering
The University of New Mexico
Albuquerque, NM 87131-1341
Phone (505) 277-5431

North Carolina

State University

DEPARTMENT OF CHEMICAL ENGINEERING

Biochemical Engineering
Catalysis, Kinetics, and Reaction Engineering
Computer-Aided Design and Manufacturing
Electronic Materials
Electrochemical Engineering
Environmental Engineering
Polymer Science and Engineering
Thermodynamics and Computer Simulation

FACULTY AND THEIR RESEARCH INTERESTS

Ruben G. Carbonell • ***Princeton***
Bioseparations; Colloid and Surface Science; Multiphase Transport Phenomena

Peter S. Fedkiw • ***Cal-Berkeley***
Electrochemical Engineering; Electrocatalysis

Richard M. Felder• ***Princeton***
Computer-Aided Manufacturing of Specialty Chemicals; Process Simulation and Optimization

James K. Ferrell • ***NC State***
Waste Minimization; Heat Transfer; Process Control

Benny D. Freeman • ***Cal-Berkeley***
Polymer Physical Chemistry

Christine S. Grant • ***Georgia Tech***
Colloid and Surface Science; Environmental Engineering

Carol K. Hall • ***Stony Brook***
Statistical Thermodynamics; Computer Simulation; Polymers; Protein Folding

Harold B. Hopfenberg • ***MIT***
Transport and Aging in Glassy Polymers; Controlled Release; Membranes; Barrier Packaging

Saad Khan • ***MIT***
Polymer Rheology; Rheology of Reactive Polymer Solutions and Melts; Polymer Spectroscopy

Robert M. Kelly • ***NC State***
Bioenergetics and Physiology of Microorganisms from Extreme Environments; Biocatalysis

Peter K. Kilpatrick • ***Minnesota***
Interfacial and Surface Science; Biotechnology

H. Henry Lamb • ***Delaware***
Heterogeneous Catalysis; Microelectronics; Surface Science

P. K. Lim • ***Illinois***
Interfacial Phenomena; Homogeneous Catalysis; Free Radical Chemistry

David F. Ollis • ***Stanford***
Biochemical Engineering; Photochemical Engineering

Michael R. Overcash • ***Minnesota***
Environmental Engineering; Improved Manufacturing Productivity by Waste Reduction

Gregory N. Parsons • ***N.C. State***
Semiconductor and Insulator Growth Chemistry; Physics of Amorphous Materials and Devices

Steven W. Peretti • ***Caltech***
Genetic and Metabolic Engineering; Microbial, Plant and Animal Cell Culture; Bioremediation

George W. Roberts • ***MIT***
Heterogeneous Catalysis; Reaction Kinetics and Engineering; Pollution Prevention

C. John Setzer • ***Ohio State***
Plant and Process Economics and Management

Vivian T. Stannett, Emeritus • ***Brooklyn Poly***
Pure and Applied Polymer Science

Robert Thorogood • ***London***
Process Design and Modeling; Adsorptive and Membrane Separations

Inquiries to:
Professor Robert M. Kelly, Recruiting Coordinator, (919) 515-6396

Box 7905 • North Carolina State University • Raleigh, North Carolina 27695-7905

Chemical Engineering at

Northwestern University

Linda J. Broadbelt, Ph.D., Delaware, 1994
Reaction engineering, polymers, recycling technology

Wesley R. Burghardt, Ph.D., Stanford, 1990
Polymer science, rheology

Stephen H. Carr, Ph.D., Case Western Reserve, 1970
Solid state properties of polymers

Buckley Crist, Jr., Ph.D., Duke, 1966
Polymer science

Joshua S. Dranoff, Ph.D., Princeton, 1960
Chemical reaction engineering, chromatographic separations

Thomas K. Goldstick, Ph.D., Berkeley, 1966
Biomedical engineering, oxygen transport in the human body

Harold H. Kung, Ph.D., Northwestern, 1974
Kinetics, heterogeneous catalysis

Richard S. H. Mah, Ph.D., London, 1961
Computer-aided process planning, design and analysis

Michael L. Mavrovouniotis, Ph.D., MIT, 1989
Computer-aided process engineering and pathway analysis

William M. Miller, Ph.D., Berkeley, 1987
Cell culture for biotechnology and medicine

Lyle F. Mockros, Ph.D., Berkeley, 1962
Biomedical engineering, fluid mechanics in biological systems

Monica Olvera de la Cruz, Ph.D., Cambridge, 1984
Statistical mechanics in polymer systems

Julio M. Ottino, Ph.D., Minnesota, 1979
Fluid mechanics, chaos, mixing in materials processing

E. Terry Papoutsakis, Ph.D., Purdue, 1980
Biotechnology of animal and microbial cells

Bruce E. Rittmann, Ph.D., Stanford, 1979
In situ bioremediation, biofilms

Gregory Ryskin, Ph.D., Caltech, 1983
Fluid mechanics, computational methods, polymeric liquids

Wolfgang M. H. Sachtler, Dr. rer.nat., Braunschweig, 1952
Heterogeneous catalysis

Randall Q. Snurr, Ph.D., Berkeley, 1994
Adsorption and diffusion in porous media, molecular modeling

John M. Torkelson, Ph.D., Minnesota, 1983
Polymer science, membranes

For information and application to the graduate program, write

Director of Graduate Admissions
Department
of Chemical Engineering
McCormick School of Engineering
and Applied Science
Northwestern University
Evanston, Illinois 60208-3120
Phone (708) 491-2776
or (800) 848-5135 (U.S. only)

Chemical Engineering at Notre Dame

The University of Notre Dame offers programs of graduate study leading to the Master of Science and Doctor of Philosophy degrees in Chemical Engineering. The requirements for the master's degree are normally completed in sixteen to twenty-four months. The doctoral program requires about four years of full-time study beyond the bachelor's degree. These programs can usually be tailored to accommodate students whose undergraduate degrees are in areas of science or engineering other than chemical engineering.

Financially attractive fellowships and assistantships, which include a full tuition waiver, are available to students pursuing either program.

FACULTY

J. T. Banchero
J. F. Brennecke
J. J. Carberry
H. -C. Chang
D. A. Hill
J. C. Kantor
J. P. Kohn
D. T. Leighton, Jr.
P.J. McGinn
A.E. Miller
M. J. McCready
R. A. Schmitz
W. C. Strieder
A. Varma
E. E. Wolf

RESEARCH AREAS

Advanced Ceramic Materials
Artificial Intelligence
Catalysis and Surface Science
Chemical Reaction Engineering
Gas-Liquid Flows
Nonlinear Dynamics
Phase Equilibria
Polymer Science
Process Dynamics and Control
Statistical Mechanics
Superconducting Materials
Supercritical Fluids
Suspension Rheology
Thermodynamics and Separations
Transport Phenomena

For further information, write to:

Dr. M. J. McCready • Department of Chemical Engineering
University of Notre Dame • Notre Dame, Indiana 46556

Ohio University

Chemical Engineering

Graduate Programs

The Department of Chemical Engineering offers programs leading to both the M.S. and Ph.D. degrees. The department is located in the Stocker Engineering Center, which recently (1985) underwent extensive modernization and now contains some of the finest state-of-the-art equipment available. The department's activities are enhanced by the Stocker endowment, which was made possible by the generosity of Dr. C. Paul and Beth K. Stocker and which has now grown to over $14 million. The interest on this endowment is used to help support research efforts in such ways as providing competitive graduate fellowships and associateships, matching equipment funds, and seed money for new project areas.

Research Areas

Multiphase Flow and Associated Corrosion
Coal Conversion Technology and Desulfurization
Aerosol Science and Technology
Process Control
Transport Processes and Modeling
Separations
Energy and Environmental Engineering
Thin Film Materials
Metallic Corrosion
Chemical Reaction Engineering
Wastewater Treatment
Bioreactor Analysis
Downstream Processing of Proteins

Financial Aid

Financial support includes teaching and grant-related associateships and fellowships ranging from $10,000 to $15,000 per twelve months. In addition, students are granted a full tuition scholarship for both the regular and summer academic terms. Stocker Fellowships are available to espeically well-qualified students.

The Faculty

William D. Baasel, P.E., Emeritus *(Ph.D., Cornell, 1962)*
Calvin H. Baloun, P.E. *(Ph.D., Cincinnati, 1962)*
W. J. Russell Chen *(Ph.D., Syracuse, 1974)*
Nicholas Dinos *(Ph.D., Lehigh, 1967)*
Tingyue Gu *(Ph.D., Purdue, 1991)*
Daniel A. Gulino *(Ph.D., Illinois, 1983)*
W. Paul Jepson, Chair *(Ph.D., Heriot-Watt, 1980)*
Michael E. Prudich *(Ph.D., West Virginia, 1979)*
Darin Ridgway, P.E. *(Ph.D., Florida State, 1990)*
Kendree J. Sampson *(Ph.D., Purdue, 1981)*
Robert L. Savage, P.E., Emeritus *(Ph.D., Case Institute of Technology, 1948)*

For More Information Contact:

Director of Graduate Studies
Department of Chemical Engineering, 172 Stocker Center • Ohio University, Athens OH 45701-2979

Ohio University is an affirmative action institution.

Oklahoma State University

"Where People Are Important"

OSU's School of Chemical Engineering offers programs leading to M.S. and Ph.D. degrees. Qualified students receive financial assistance at nationally competitive levels.

Faculty

Gary L. Foutch (Ph.D., University of Missouri-Rolla)
K.A.M. Gasem (Ph.D., Oklahoma State University)
Karen A. High (Ph.D., Pennsylvania State University)
Martin S. High (Ph.D., Pennsylvania State University)
A.J. Johannes (Ph.D., University of Kentucky)
Randy Lewis (Ph.D., Massachusetts Institute of Technology)
Robert L. Robinson, Jr. (Ph.D., Oklahoma State University)
D. Alan Tree (Ph.D., University of Illinois)
Jan Wagner (Ph.D., University of Kansas)
James R. Whiteley (Ph.D., Ohio State University)

Research Areas

Adsorption
Air Pollution
Artificial Intelligence
Biochemical Processes
Corrosion
Design
Environmental Engineering
Fluid Flow
Gas Processing
Hazardous Wastes
Ion Exchange
Kinetics
Mass Transfer
Modeling
Phase Equilibria
Polymers
Process Control
Process Simulation
Thermodynamics

For more information contact

Graduate Coordinator
School of Chemical Engineering
Oklahoma State University
Stillwater, OK 74078

OREGON STATE UNIVERSITY

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

Our programs reflect not only traditional chemical engineering fields but also new technologies important to the Northwest's industries, such as electronic material processing, forest products, food science, and ocean products.

Oregon State is located only a short drive from the Pacific Ocean, white-water rivers, and hiking / skiing / climbing in the Cascade Mountains

FACULTY

W. J. Frederick	•	Chemical Recovery Technology (Pump and Paper), Combustion
T. M. Grace	•	Chemical Recovery Technology
M.K. Iisa	•	Combustion, Waste Minimization
G. N. Jovanovic	•	Fine Particle Processing, Transport Phenomena
S. Kimura	•	Reaction Engineering, High-Temperature Materials
J. G. Knudsen	•	Heat Transfer
M. D. Koretsky	•	Electronic Materials Processing
O. Levenspiel	•	Fluidization, Chemical Reaction Engineering
K. L. Levien	•	Process Optimization and Control
J. McGuire	•	Protein Adsorption, Biofilm Development
W. E. Rochefort	•	Rheology, Characterization of Polymers
G. L. Rorrer	•	Biochemical Reaction Engineering
C. E. Wicks	•	Mass Transfer

Competitive research and teaching assistantships are available.

For further information, write:

Chemical Engineering Department
Oregon State University • Gleeson Hall, Room 103
Corvallis, Oregon 97331-2702

PENN

UNIVERSITY of PENNSYLVANIA

University of Pennsylvania Chemical Engineering

Stuart W. Churchill
Combustion, incineration, Czochralski crystallization, rate processes

Russell J. Composto
Polymeric materials science, surface and interface studies

Gregory C. Farrington
Electrochemistry, solid state and polymer chemistry

William C. Forsman
Polymer science and engineering, graphite intercalation

Eduardo D. Glandt
Classical and statistical thermodynamics, random media

Raymond J. Gorte
Heterogeneous catalysis, supported metals, zeolites

David J. Graves
Biochemical and biomedical engineering, biotechnology

Mitchell Litt
Biorheology, biofluids, hemorheology, biomedical instrumentation

Alan L. Myers
Adsorption of gases and liquids, molecular simulation

Daniel D. Perlmutter
Chemical reactor design, gas-solid reactions, gel kinetics

John A. Quinn
Membrane transport, biochemical/biomedical engineering

Warren D. Seider
Process analysis, simulation, design, and control

Lyle H. Ungar
Artificial intelligence in process control, neural networks

T. Kyle Vanderlick
Thin-film and interfacial phenomena

John M. Vohs
Surface science, catalysis, electronic materials processing

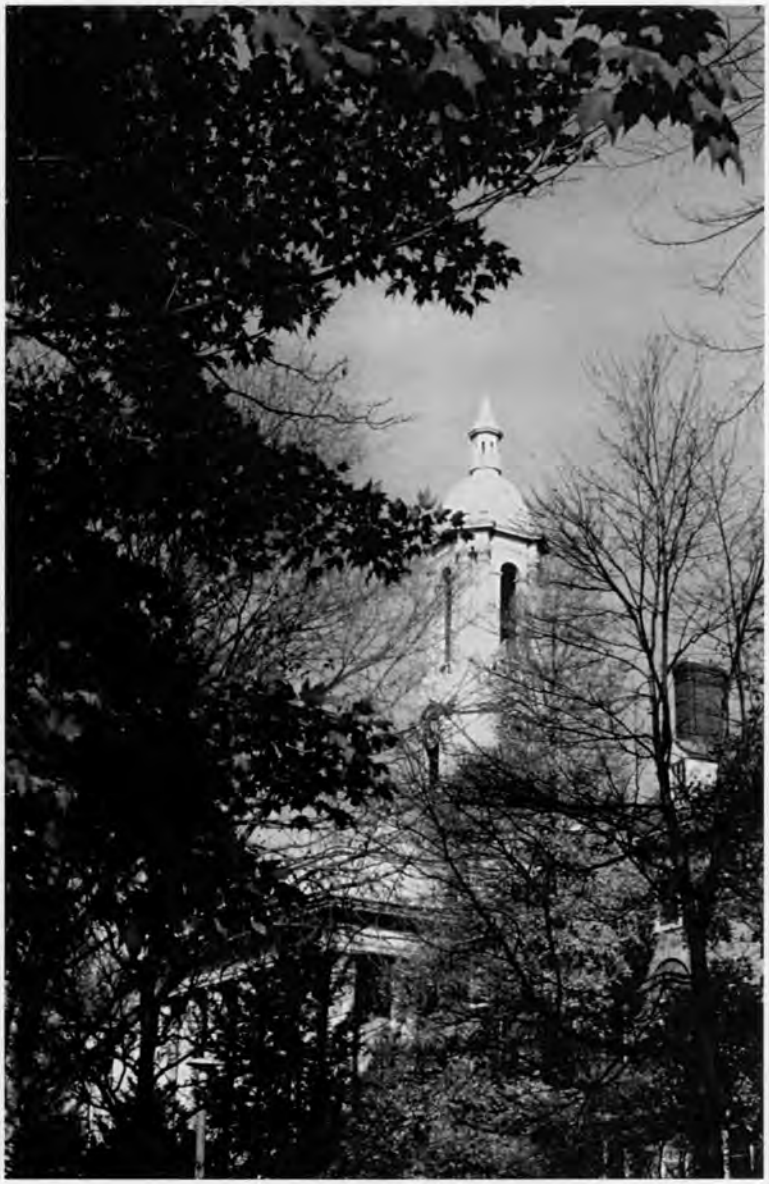
Karen I. Winey
Polymer morphology, processing, and property interrelationships

Pennsylvania's chemical engineering program is designed to be flexible while emphasizing the fundamental nature of chemical and physical processes. Students may focus their studies in any of the research areas of the department. The full resources of this Ivy League university, including the Wharton School of Business and one of this country's foremost medical centers, are available to students in the program. The cultural advantages, historical assets, and recreational facilities of a great city are within walking distance of the University.

For additional information, write:

Director of Graduate Admissions
Department of Chemical Engineering
311A Towne Building
University of Pennsylvania
Philadelphia, Pennsylvania 19104-6393

PENN STATE



Individuals holding the B.S. in chemistry or other related areas are encouraged to apply.

For more information, contact
Chairman, Graduate Admissions Committee
The Pennsylvania State University
Department of Chemical Engineering
158 Fenske Laboratory
University Park, PA 16802

Ali Borhan (Stanford)
Fluid Dynamics, Transport Phenomena

Alfred Carlson (Wisconsin)
Biotechnology, Bioseparations

Lance R. Collins (Penn)
Turbulent Flow, Combustion

Wayne Curtis (Purdue)
Plant Biotechnology

Ronald P. Danner (Lehigh)
Applied Thermodynamics, Adsorption Phenomena

Thomas E. Daubert *(Penn State)*
Applied Thermodynamics

J. Larry Duda (Delaware)
Polymers, Diffusion, Tribology, Fluid Mechanics, Rheology

David A. Edwards (Illinois Institute of Tech.)
Transport Phenomena, Fluid Dynamics

John A. Frangos (Rice)
Biomedical Engineering, Biotechnology

Kristen Fichthorn (Michigan)
Statistical Mechanics, Surface Science, Catalysis

W. Patrick Hegarty (Michigan)
Plant Design

Arthur E. Humphrey (Columbia)
Biotechnology

Themis Matsoukas (Michigan)
Aerosol Processes, Colloidal Particles, Ceramic Powders

John R. McWhirter (Penn State)
Gas-Liquid Mass Transfer, Microencapsulation

R. Nagarajan (SUNY Buffalo)
Colloid and Polymer Science

Jonathan Phillips (Wisconsin)
Heterogeneous Catalysis, Surface Science

John M. Tarbell (Delaware)
Cardiovascular Fluid Mechanics and Mass Transfer, Turbulent Reacting Flows

James S. Ultman (Delaware)
Mass Transport in the Human Lung, Intensive Care Monitoring

M. Albert Vannice (Stanford)
Heterogeneous Catalysis

James S. Vrentas (Delaware)
Transport Phenomena, Applied Mathematics, Polymer Science

DEGREE PROGRAMS
PhD and MS in Chemical Engineering
MS in Petroleum Engineering
PhD and MS in Bioengineering

What is chemical engineering at Pitt?

A short answer:

applied enzymology
biochemical engineering
biotechnology
chemistry of fossil fuels
coal science
colloidal suspensions
combustion
flow through porous media
heterogeneous catalysis
kinetics
microemulsions
molecular thermodynamics
organometallic chemistry
petroleum engineering
phase equilibria
polymers
process design
protein engineering
reaction engineering
recycling technology
separation science
solids processing
supecritical fluids
surface chemistry
transport phenomena

For a more detailed answer, and information about fellowships and applications, write or call the

Graduate Coordinator
Department of Chemical and Petroleum Engineering
1242 Benedum Hall
University of Pittsburgh
Pittsburgh, PA 15261
412-624-9630

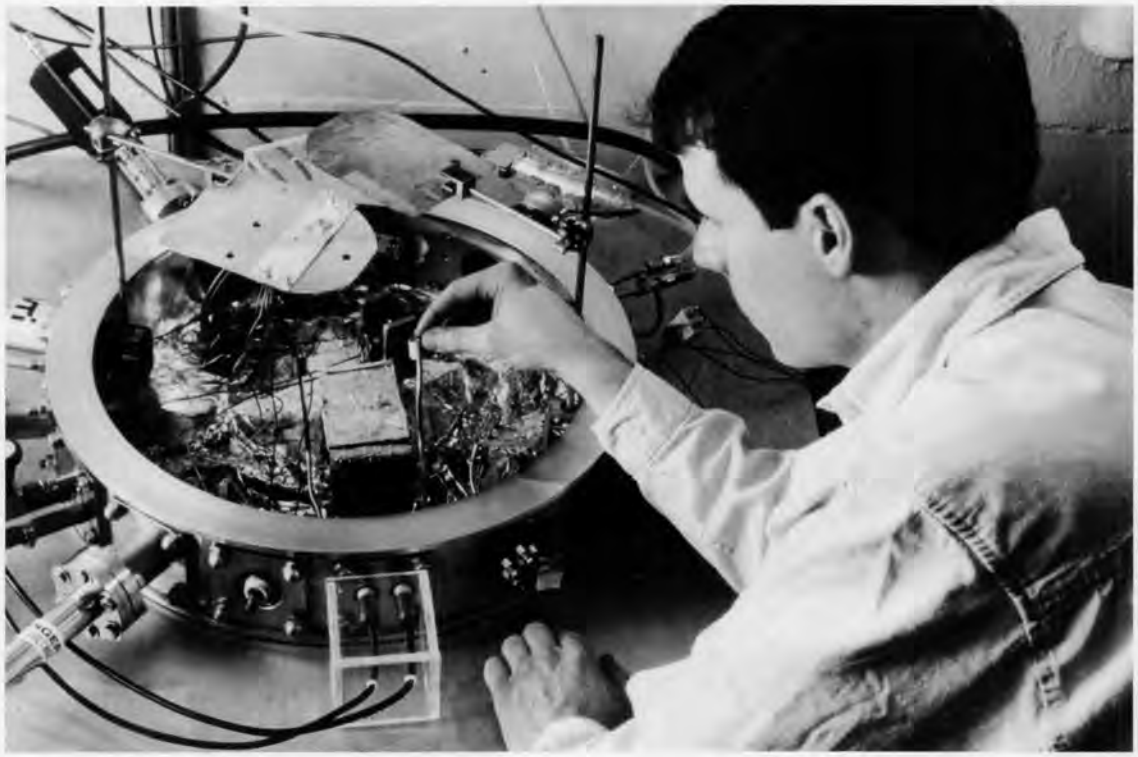
FACULTY

Mohammad M. Ataai	Robert M. Enick	Alan J. Russell
Eric J. Beckman	Dan Farcasiu	James S. Schultz
Alan J. Brainard	James G. Goodwin, Jr.	Sindee Simon
Edward Cape	Gerald D. Holder	John W. Tierney
Shiao-Hung Chiang	George E. Klinzing	William Wagner
James T. Cobb, Jr.	George Marcelin	Irving Wender
Julie d'Itri	Badie I. Morsi	

University of Pittsburgh

The University of Pittsburgh is an affirmative action, equal opportunity institution

Graduate Studies in Chemical Engineering Purdue University



Research Areas

- Applied Mathematics
- Artificial Intelligence
- Biochemical Engineering
- Biomedical Engineering
- Catalysis and Reaction Engineering
- Colloids and Interfacial Engineering
- Process Operations and Design
- Environmental Science
- Materials and Microelectronics Processing
- Parallel Computing and Combinatorics
- Polymer Science and Engineering
- Process Control
- Separation Processes
- Surface Science and Engineering
- Thermodynamics and Statistical Mechanics
- Transport Phenomena

Faculty

L.F. Albright, *Emeritus*
R.P. Andres
J.M. Caruthers
K.C. Chao, *Emeritus*
W.N. Delgass
F.J. Doyle
R.E. Eckert
A.H. Emery
E.I. Franses
R.A. Greenkorn
R.E. Hannemann
R.N. Houze
D.P. Kessler
H.S. Lackritz
J.F. Pekny
N.A. Peppas
D. Ramkrishna
G.V. Reklaitis
E.M. Sevick-Muraca
R.G. Squires
C.G. Takoudis
J. Talbot
G.T. Tsao
V. Venkatasubramanian
N.H.L. Wang
P.C. Wankat

For more information about our graduate studies program please contact:

Graduate Studies
Purdue University
1283 Chemical Engineering Building
West Lafayette, Indiana 47907-1283

Phone: (317) 494-4057

Degrees Offered

Master of Science
Doctor of Philosophy

Financial Assistance

Fellowships
Research Assistantships
Teaching Assistantships

THE UNIVERSITY OF QUEENSLAND

25,000 reasons why you should join our postgraduate program...

The Department of Chemical Engineering at The University of Queensland is recognised as one of the foremost schools in the world.

The University is one of the top four research institutions in Australia and unique opportunities for postgraduate study exist now... we'd like you to join us.

We're looking specifically for graduates with Class I or IIA Honours in the disciplines of •Chemical Engineering •Civil Engineering •Electrical Engineering •Mechanical Engineering •Physics •Chemistry •Biochemistry •Microbiology •Computer Science or •Mathematics.

To help you decide, we're offering scholarships of up to $A25,000, unique research projects, the chance to work with our authoritative and world-recognised staff, an excellent climate and standard of living, in one of the most popular tourist destinations in the world.

To find out more, obtain a copy of our postgraduate prospectus by contacting: Mrs Christine Smith at the Department of Chemical Engineering, The University of Queensland Q. 4072 on 61 7 365 4202 or by faxing 61 7 365 4199.

Applications close annually at the end of October - so you 'll need to contact us as soon as possible to register your interest.

RESEARCH AREAS CURRENTLY AVAILABLE INCLUDE :

- ***Fluidisation Modelling • Catalysis • Environmental Systems***
- ***Systems Analysis • Process Simulation • Computer Control***
- ***Fermentation Systems • Applied Mathematics • Tissue Culture***
- ***Transport Phenomena • Enzyme Engineering • Crystallisation***
- ***Environmental Control • Polymer Processing • Process Economics***
- ***Chemical Reactor Design • Mineral Processing • Adsorption***
- ***Energy Resource Studies • Numerical Analysis • Oil Shale Processing***
- ***Membrane Processes • Particle Mechanics • Hybridoma Technology***
- ***Large Scale Chromatography • Water and Wastewater Treatment***
- ***Solid Waste Management • Rheology***

Rensselaer

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

Advanced Study and Research Areas

- Advanced materials
- Air pollution control
- Biochemical engineering
- Bioseparations
- Combustion
- Fluid-particle systems
- Heat transfer
- High temperature kinetics
- Interfacial phenomena
- Microelectronics manufacturing
- Multiphase flow
- Polymer reaction engineering
- Process control and design
- Separation engineering
- Mixing
- Thermodynamics
- Transport Processes

For full details write
Department Head
Department of Chemical Engineering
Rensselaer Polytechnic Institute
Troy, New York 12180-3590

The Faculty

Michael M. Abbott *Ph.D., Rensselaer*

Elmar R. Atwicker *Ph.D., Ohio State*

Georges Belfort *Ph.D., California–Irvine*

B. Wayne Bequette *Ph.D., Texas–Austin*

Henry R. Bungay, III *Ph.D., Syracuse*

Steven M. Cramer *Ph.D., Yale*

Arthur Fontijn *D.Sc., Amsterdam*

William N. Gill *Ph.D., Syracuse*

Martin E. Glicksman *Ph.D., Rensselaer*

Richard T. Lahey, Jr. *Ph.D., Stanford*

Howard Littman *Ph.D., Yale*

Morris H. Morgan, III *Ph.D., Rensselaer*

E. Bruce Nauman *Ph.D., Leeds*

Joel L. Plawsky *D.Sc., M.I.T.*

Todd M. Przybycien *Ph.D., Cal. Tech*

Hendrick C. Van Ness *D.Eng., Yale*

Peter C. Wayner, Jr. *Ph.D., Northwestern*

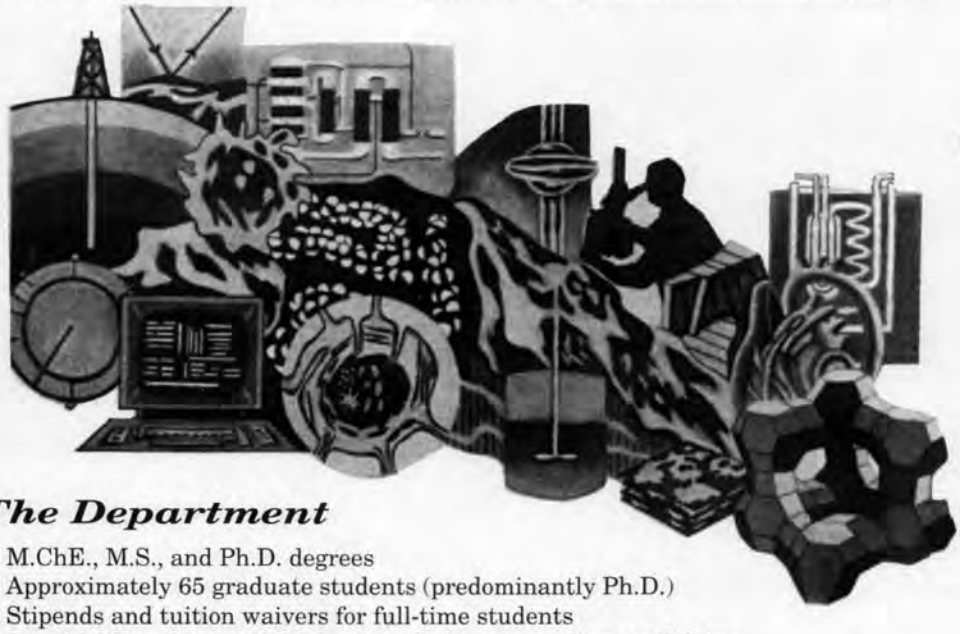
Robert H. Wentorf, Jr. *Ph.D., Wisconsin*

Graduate Study in Chemical Engineering at

Rice University

The University

- ☐ Privately endowed coeducational school
- ☐ 2600 undergraduate students
- ☐ 1300 graduate students
- ☐ Quiet and beautiful 300-acre tree-shaded campus
- ☐ 3 miles from downtown Houston ☐ Architecturally uniform and aesthetic campus



The Department

- ☐ M.ChE., M.S., and Ph.D. degrees
- ☐ Approximately 65 graduate students (predominantly Ph.D.)
- ☐ Stipends and tuition waivers for full-time students
- ☐ Special fellowships with high stipends for outstanding candidates

The City

- ☐ Large metropolitan and cultural center
- ☐ Petrochemical capital of the world
- ☐ Industrial collaboration and job opportunities
- ☐ World renowned research and treatment medical center
- ☐ Professional sports
- ☐ Close to recreational areas

Send Applications and Inquiries to

Chairman
Graduate Committee
Department of Chemical Engineering
PO Box 1892
Rice University
Houston, TX 77251

Research Interests

- Applied Mathematics
- Biochemical Engineering
- Biomedical Engineering
- Equilibrium Thermodynamic Properties
- Fluid Mechanics
- Interfacial Phenomena
- Kinetics and Catalysis
- Polymer Science
- Process Control
- Reaction Engineering
- Rheology
- Statistical Mechanics
- Tissue Engineering
- Transport in Porous Media
- Transport Processes
- Transport Properties

Faculty

- ▶ **William W. Akers** *(Michigan, 1950)*
- ▶ **Constantine D. Armeniades** *(Case Western Reserve, 1969)*
- ▶ **Thomas A. Badgwell** *(Texas, 1992)*
- ▶ **Walter Chapman** *(Cornell, 1988)*
- ▶ **Sam H. Davis, Jr.** *(MIT, 1957)*
- ▶ **Derek C. Dyson** *(London, 1966)*
- ▶ **J. David Hellums** *(Michigan, 1961)*
- ▶ **Joe W. Hightower** *(Johns Hopkins, 1963)*
- ▶ **George J. Hirasaki** *(Rice, 1967)*
- ▶ **Riki Kobayashi** *(Michigan, 1951)*
- ▶ **Larry V. McIntire** *(Princeton, 1970)*
- ▶ **Antonios G. Mikos** *(Purdue, 1988)*
- ▶ **Clarence A. Miller** *(Minnesota, 1969)*
- ▶ **Mark A. Robert** *(Swiss Fed. Inst. of Tech., 1980)*
- ▶ **Ka-Yiu San** *(CalTech, 1984)*
- ▶ **Jacqueline Shanks** *(CalTech, 1989)*
- ▶ **Kyriacos Zygourakis** *(Minnesota, 1981)*

Chemical Engineering at the
UNIVERSITY OF ROCHESTER

JOIN US

Graduate Study and Research leading to M.S. and Ph.D. degrees

Fellowships to $16,000

For further information and application, write

Professor Harvey J. Palmer, Chair
Department of Chemical Engineering
University of Rochester
Rochester, New York 14627
Phone: (716) 275-4042
Fax: (716) 442-6686

Faculty and Research Areas

S. H. CHEN, Ph.D. 1981, Minnesota
Polymer Science and Engineering, Transport Phenomena, Optical Materials

E. H. CHIMOWITZ, Ph.D. 1982, Connecticut
Critical Phenomena, Statistical Mechanics of Fluids, and Computer-Aided Design

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

J. C. FRIEDLY, Ph.D. 1965, California (Berkeley)
Process Dynamics, Control, Groundwater Transport

R. H. HEIST, Ph.D. 1972, Purdue
Nucleation, Aerosols, Ultrafine Particles

S. A. JENEKHE, Ph.D. 1985, Minnesota
Polymer Science and Engineering, Materials Chemistry, Optoelectronic and Photonic Materials and Devices

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

R. H. NOTTER, Ph.D. 1969, Washington (Seattle)
M.D. 1980, Rochester
Biomedical Engineering, Lung Surfactant, Molecular Biophysics

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

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

S. V. SOTIRCHOS, Ph.D. 1982, Houston
Reaction Engineering, Transport and Reaction in Porous Media, Processing of Ceramic Materials and Composites

J. H. D. WU, Ph.D. 1987, M.I.T.
Biochemical Engineering, Fermentation , Biocatalysis, Bone Marrow Tissue Engineering, Molecular Biology

The University of South Carolina

Graduate Studies in
CHEMICAL ENGINEERING

The Department of Chemical Engineering at the University of South Carolina is booming! External research funding is at an all-time high—exceeding $4,000,000—and the department is still growing with a charter to increase its faculty size by at least one more faculty member. As a result, this progressive department, with its young and dynamic faculty, is already recognized as one of the top teaching and research programs in the Southeast. Chemical engineering occupies over one-third of the new and innovative 220,000-square-foot John E. Swearingen Engineering Center, where the faculty teach and conduct research in state-of-the-art facilities. In addition, programs are offered that lead to both MS and PhD degrees; and PhD candidates are offered full tuition waiver and highly competitive, twelve-month stipends ranging from $1,475 to $1,975 per month. So, come to one of the fastest growing areas in the country, enjoy the beautiful weather and the ideal location (1.5 hrs to the beach, 2 hrs to the mountains), and be part of the explosion in Chemical Engineering at the University of South Carolina.

► *Stipend Levels*

$17,700 to $23,700/yr

Full Tuition Waiver

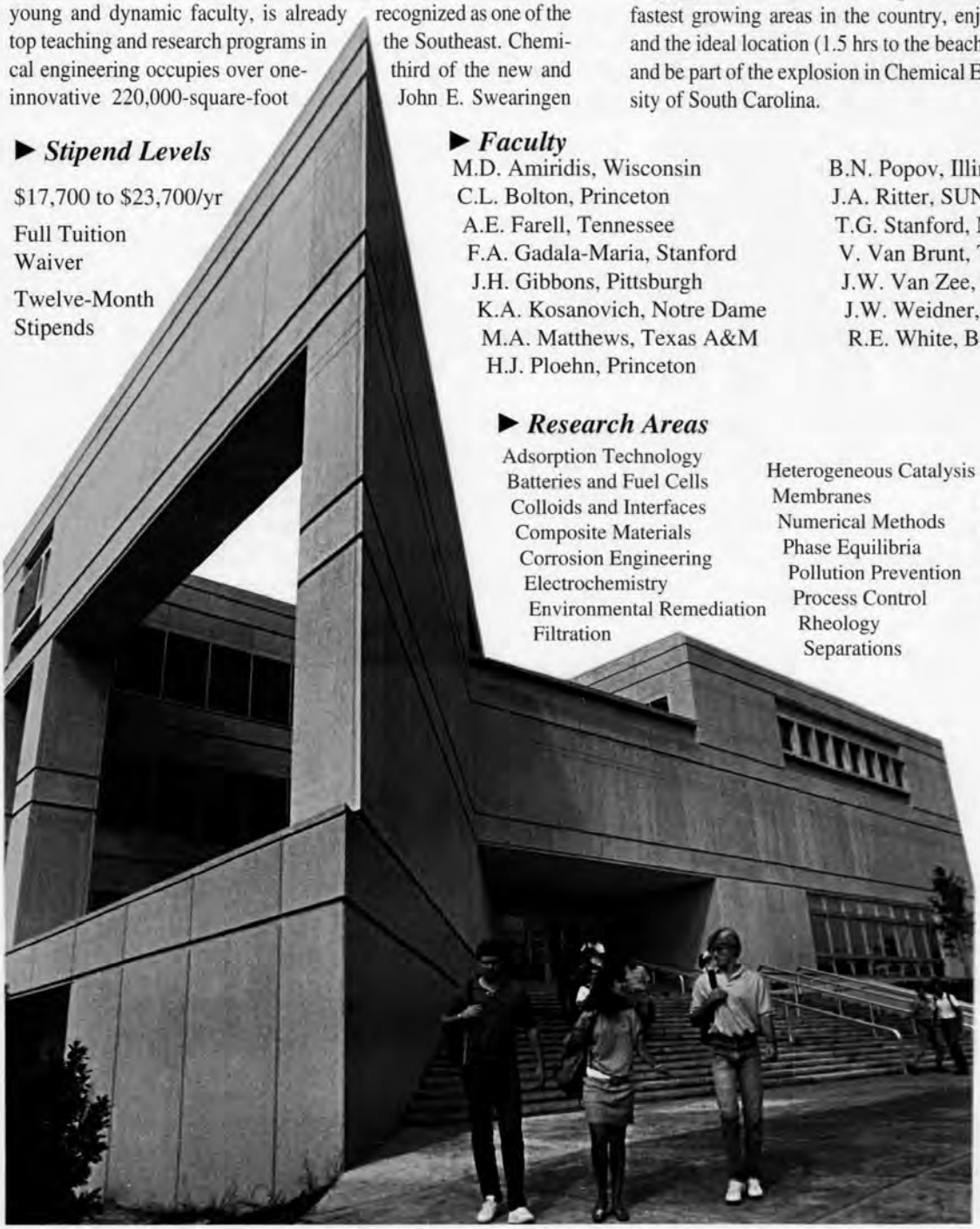
Twelve-Month Stipends

► *Faculty*

M.D. Amiridis, Wisconsin
C.L. Bolton, Princeton
A.E. Farell, Tennessee
F.A. Gadala-Maria, Stanford
J.H. Gibbons, Pittsburgh
K.A. Kosanovich, Notre Dame
M.A. Matthews, Texas A&M
H.J. Ploehn, Princeton
B.N. Popov, Illinois
J.A. Ritter, SUNY Buffalo
T.G. Stanford, Michigan
V. Van Brunt, Tennessee
J.W. Van Zee, Texas A&M
J.W. Weidner, NC State
R.E. White, Berkeley

► *Research Areas*

Adsorption Technology
Batteries and Fuel Cells
Colloids and Interfaces
Composite Materials
Corrosion Engineering
Electrochemistry
Environmental Remediation
Filtration
Heterogeneous Catalysis
Membranes
Numerical Methods
Phase Equilibria
Pollution Prevention
Process Control
Rheology
Separations
Sol-Gel Processing
Solvent Extraction
Surface Science
Surface Spectroscopy
Supercritical Fluids
Transport Processes
Waste Minimization
Waste Processing



► *For further information, contact*

The Graduate Director

Department of Chemical Engineering

Swearingen Engineering Center

University of South Carolina

Columbia, South Carolina 29208

phone: (803) 777-4181

fax: (803) 777-8265

STEVENS
INSTITUTE OF TECHNOLOGY

- *Multidisciplinary department consisting of chemical and polymer engineering, chemistry, and biology*
- *Site of two major polymer engineering research centers*
- *Scenic campus overlooking the Hudson River and metropolitan New York City*
- *Beautiful campus on the Hudson River overlooking metropolitan New York City*
- *Close to the world's center of science and culture*
- *At the hub of major highways, air, rail, and bus lines*
- *At the center of the country's largest concentration of research laboratories and chemical, petroleum, pharmaceutical, and biotechnology companies*

GRADUATE PROGRAMS IN CHEMICAL ENGINEERING

Full and part-time
Day and evening programs

- **MASTERS**
- **CHEMICAL ENGINEER**
- **PH.D.**

Faculty

M. Avgousti (PhD, University of Delaware)
J. A. Biesenberger (PhD, Princeton University)
G.B. DeLancey (PhD, University of Pitsburgh)
C. G. Gogos (PhD, Princeton University)
D. M. Kalyon (PhD, McGill University)
S. Kovenklioglu (PhD, Stevens Institute of Technology)
S. Rivera (PhD, Colorado State University)
D. H. Sebastian (PhD, Stevens Institute of Technology)
H. Silla, Head, (PhD, Stevens Institute of Technology)

Research in

Fluid Mechanics
Biochemical Reaction Engineering
Polymer Reaction Engineering
Polymer Rheology and Processing
Polymer Characterization
Bioprocessing
Wastewater Treatment
Process Design and Development
Process Control and Identification

For application, contact:
Office of Graduate Studies
Stevens Institute of Technology
Hoboken, NJ 07030
201-216-5234

For additional information, contact:
Department of Chemistry and Chemical Engineering
Stevens Institute of Technology
Hoboken, NJ 07030
201-216-5546

Financial Aid is Available to qualified students.

Stevens Institute of Technology does not discriminate against any person because of race, creed, color, national origin, sex, age, marital status, handicap, liability for service in the armed forces or status as a disabled or Vietnam era veteran.

UNIVERSITY OF TEXAS AT AUSTIN

The University of Texas at Austin's Department of Chemical Engineering is a cutting-edge, well-funded program. The Department has been among the top five in the U.S. in sponsored research and Ph.D. degrees granted for the last five years. Both the M.S. and the Ph.D. degrees are offered, with most students pursuing the Ph.D. Fellowships and research assistantships are provided, including tuition and fees.

FACULTY AND RESEARCH

Joel W. Barlow *(University of Wisconsin)* • polymer blends, properties, processing
Roger T. Bonnecaze *(Caltech)* • suspension rheology, transport phenomena, electrical impedance tomography
James R. Brock *(University of Wisconsin)* • aerosols, electronic materials processing
Thomas F. Edgar *(Princeton University)* • process modeling, control, optimization
John G. Ekerdt *(University of California, Berkeley)* • catalysis, electronic materials chemistry
James R. Fair *(University of Texas, Austin)* • process design, separation processes
George Georgiou *(Cornell University)* • microbial, protein biotechnology
Adam Heller *(Hebrew University)* • electrochemical biosensing, environmental photoelectrochemistry
David M. Himmelblau *(University of Washington)* • artificial neural networks, fault detection and diagnosis
Jeffrey A. Hubbell *(Rice University)* • biocompatibility of biomaterials and tissue engineering
Keith P. Johnston *(University of Illinois)* • molecular thermodynamics, supercritical fluid science
William J. Koros *(University of Texas, Austin)* • membrane and structure-permeability relationships for polymers
Douglas R. Lloyd *(University of Waterloo)* • polymeric membrane formation, liquid separations
C. Buddie Mullins *(Caltech)* • surface science, molecular beams, semiconductor thin-film growth
Donald R. Paul *(University of Wisconsin)* • polymer blends, membranes, barrier materials
James B. Rawlings *(University of Wisconsin)* • process modeling, dynamics, control
Gary T. Rochelle *(University of California, Berkeley)* • air pollution control, reactive mass transfer
Isaac C. Sanchez *(University of Delaware)* • statistical thermodynamics of polymer liquids and solutions
Robert S. Schechter *(University of Minnesota)* • surface phenomena, flow in porous media with reaction
Hugo Steinfink *(Polytechnic University, New York)* • crystal chemistry, structure-property relationship
James E. Stice *(Illinois Institute of Technology)* • engineering teaching effectiveness, process control
Isaac Trachtenberg *(Louisiana State University)* • semiconductor materials processing
C. Grant Willson *(University of California, Berkeley)* • polymer synthesis, photochemical processing

Inquiries should be sent to

Graduate Advisor • Department of Chemical Engineering • University of Texas • Austin, TX 78712-1062
(512) 471-6991: Fax (512) 471-7060: utgrad@che.utexas.edu

Texas A&M University

Chemical Engineering — An Emerging Department

- ❑ *Large Graduate Program*
  - *Approximately 130 Graduate Students*
- ❑ *Strong Ph.D. Program*
  - *2/1 Ph.D./MS Student Ratio*
- ❑ *Diverse Research Areas*
- ❑ *Top 10 in Research Funding*
- ❑ *Quality Living / Work Environment*
- ❑ *Financial Aid to All Qualified Students*
  - *Up to $21,600/yr plus Medical Insurance Benefits*

RESEARCH AREAS

- ❑ *Advanced Materials*
- ❑ *Biochemical Engineering*
- ❑ *Catalysts and Reaction Engineering*
- ❑ *Environmental Remediation/Restoration*
- ❑ *Interfacial Transport*
- ❑ *Polymers*
- ❑ *Process Control*
- ❑ *Separations*
- ❑ *Thermodynamics*

A. Akgerman, Interim Head
Ph.D., Virginia, 1971
Reaction engineering, waste treatment

R. G. Anthony, Ph.D.
Texas, 1966
Catalysis, reaction engineering

L. A. Archer, Ph.D.
Stanford, 1993
Polymers, rheology

D. B. Bukur, Ph.D.
Minnesota, 1974
Reaction engineering, math methods

J. A. Bullin, Ph.D.
Houston, 1972
Gas sweetening, asphalt characterization

B. E. Dale, Ph.D.
Purdue, 1979
Biochemical engineering

R. Darby, Ph.D.
Rice, 1962
Rheology, polymers

R. R. Davison, Ph.D.
Texas A&M, 1962
Methanol fuel, asphalt characterization

L. D. Durbin, Ph.D.
Rice, 1961
Process control

P. T. Eubank, Ph.D.
Northwestern, 1961
Thermodynamics

R. W. Flumerfelt, Ph.D.
Northwestern, 1965
Fluid mechanics, interfacial phenomena

C. J. Glover, Ph.D.
Rice, 1974
Polymer solutions

K.R. Hall, Ph.D.
Oklahoma, 1967
Thermodynamics

D. T. Hanson, Ph.D.
Minnesota, 1968
Biochemical engineering

C.D. Holland, Ph.D.
Texas A&M, 1953
Separation processes, distillation, unsteady-state processes

J. C. Holste, Ph.D.
Iowa State, 1973
Thermodynamics

M. T. Holtzapple, Ph.D.
Pennsylvania, 1981
Biochemical engineering

K. G. Honnell, Ph.D.
Princeton, 1990
Polymers, molecular thermodynamics

J. C. Liao, Ph.D.
Wisconsin, 1987
Biochemical engineering, metabolic engineering

M. Nikolaou, Ph.D.
UCLA, 1989
Process control, optimization and design

A. T. Watson, Ph.D.
Cal Tech, 1979
Porous media, math modeling

For More Information

Graduate Admissions Office • Department of Chemical Engineering
Texas A&M University
College Station, Texas 77843-3122 • (409) 845-3361

The University of Toledo

Graduate study toward the M.S. and Ph.D. Degrees.
Assistantships and Fellowships available.

CHEMICAL ENGINEERING FACULTY

Kenneth J. De Witt, Professor
Ph.D., Northwestern University
Transport Phenomena, Mathematical Modeling and Numerical Methods

Ronald L. Fournier, Professor
Ph.D., University of Toledo
Bioartificial Organs, Tissue Engineering, Bioengineering

Saleh Jabarin, Professor
Ph.D., University of Massachusetts
Physical Properties of Polymers, Polymer Orientation and Crystallization

Steven E. LeBlanc, Professor, Chairman
Ph.D., University of Michigan
Environmental, Membrane Processes, Nonlinear Dynamics and Control

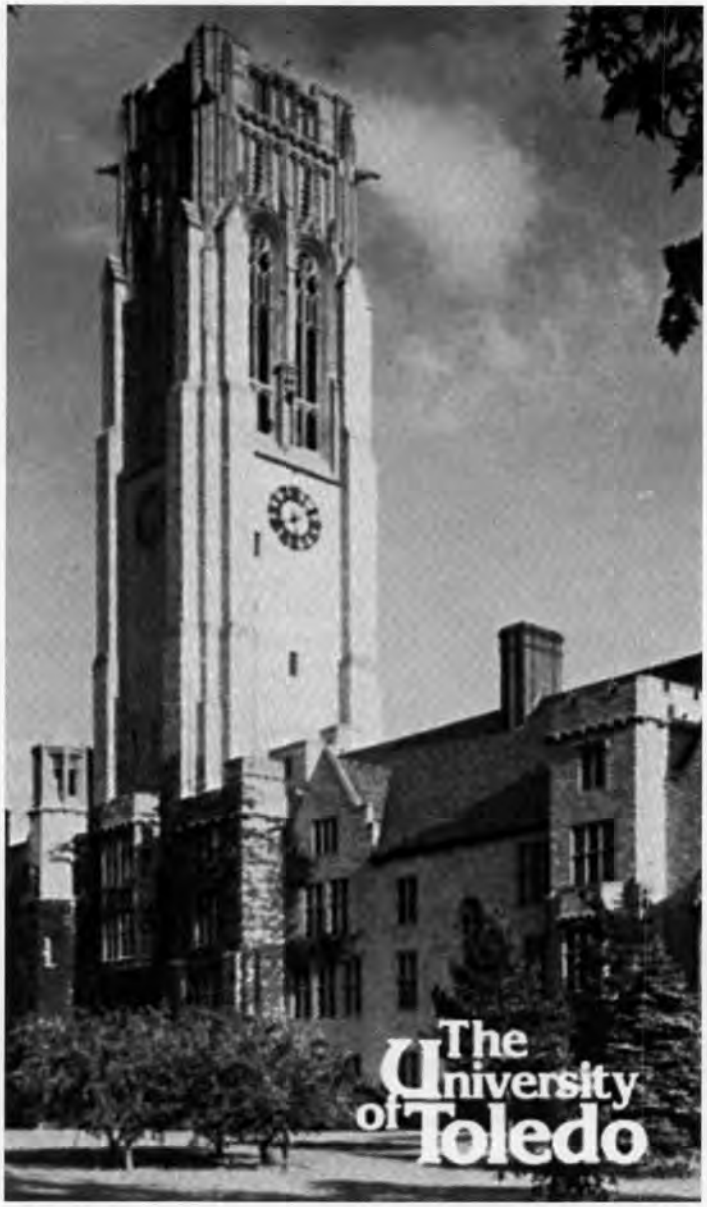
Richard M. Lemert, Assistant Professor
Ph.D., University of Texas at Austin
Thermodynamics and Supercritical Fluids, Polymer Synthesis and Properties

G. Glenn Lipscomb, Assistant Professor
Ph.D., University of California at Berkeley
Membrane Separations, Polymer Science and Engineering

Patricia A. Mahama, Assistant Professor
Ph.D., University of Michigan
Mathematical Modeling, Bioengineering

Bruce E. Poling, Professor
Ph.D., University of Illinois
Thermodynamics and Physical Properties

Sasidhar Varanasi, Professor
PhD., State University of New York at Buffalo
Colloidal and Interfacial Phenomena, Enzyme Kinetics, Membrane Transport



For Details Contact:

Dr. S. E. LeBlanc, Chairman
Department of Chemical Engineering
The University of Toledo
Toledo, OH 43606-3390
(419) 537-7736

Regarded as one of the nation's most attractive campuses, The University of Toledo is located in a beautiful residential area of the city approximately seven miles from downtown. The University's main campus occupies more than 200 acres with 40 major buildings. A member of the state university system of Ohio since July 1967, The University of Toledo observed its 100th anniversary as one of the country's major universities in 1972.

Tulane University

Department of Chemical Engineering

Faculty and Research Areas

Richard Gonzalez • *Synthesis and Characterization of Supported Metal Catalysts • Fundamental Studies in Reactor Design • In-situ Spectroscopic Methods • Reactions in Organized Media*

Vijay T. John • *Biomimetic and Nanostructured Materials • Interfacial Phenomena • Polymer-Ceramic Composites • Surfactant Science*

Daniel J. Lacks • *Molecular Simulation • Thermodynamics of Condensed Phases • Dynamical Processes in Solids • Physical Properties of Polymer Materials • Density Functional Theory*

Victor J. Law • *Modeling Environmental Systems • Nonlinear Optimization and Regression • Transport Phenomena • Numerical Methods*

Brian S. Mitchell • *Fiber Technology • Materials Processing • Composites*

Kim O'Connor • *Animal-Cell Technology • Organ/Tissue Regeneration • Recombinant Protein Expression*

Kyriakos D. Papadopoulos • *Colloid Stability • Coagulation • Transport of Multi-Phase Systems Through Porous Media • Colloidal Interactions*

Peter N. Pintauro • *Electrochemical Engineering • Membrane Separations • Electro-organic Synthesis • Environmental Remediation*

Samual L. Sullivan, Jr. • *Separation Processes • Transport Phenomena • Numerical Methods*

John Y. Walz • *Colloidal Forces • Optical Methods for Studying Colloidal Systems • Particle Interactions in the Environment*

Tulane is located in a quiet, residential area of New Orleans, approximately six miles from the world-famous French Quarter. The chemical engineering department currently enrolls approximately 40 full-time graduate students. Graduate fellowships include a tuition waiver plus stipend.

For Additional Information, Please Contact

Graduate Advisor
Department of Chemical Engineering
Tulane University
New Orleans, LA 70118

Engineering the World

The University of Tulsa

The University of Tulsa is Oklahoma's oldest and largest independent university. Approximately 4,900 students pursue more than 70 major fields of study and graduate programs in more than 25 disciplines.

Tulsa, Oklahoma

Off-campus activities abound in Tulsa, one of the nation's most livable cities. Our temperate climate, with four distinct seasons, is perfect for year-round outdoor activities. With a metropolitan population of 450,000, the city of Tulsa affords opportunities for students to gain internship and work experience in its dynamic data processing, petroleum, medical, and financial industries. One can also enjoy world-class ballet, symphony and theatre performances, and exhibits in the cultural community. Annual events include Mayfest, Oktoberfest, the Chili Cook-off and Bluegrass Festival, the Tulsa Run, and the Jazz and Blues festivals.

Chemical Engineering at TU

TU enjoys a solid international reputation for expertise in the petroleum industry, and offers environmental and biochemical programs. The department places particular emphasis on experimental research, and is proud of its strong contact with industry.

The department offers a traditional Ph.D. program, and three master's programs:

- Master of Science degree (thesis program)
- Master of Engineering degree (a professional degree that can be completed in 18 months without a thesis)
- Special Master's degree for nonchemical engineering undergraduates

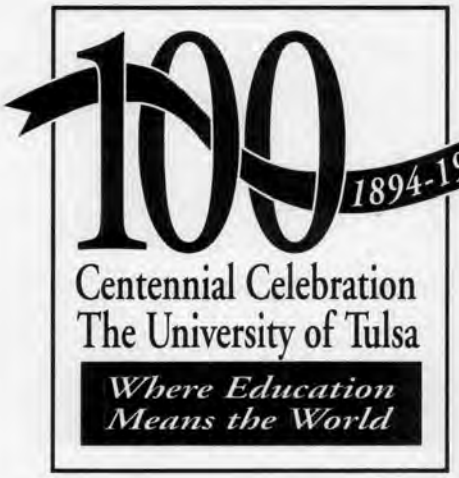
Financial aid is available, including fellowships and research assistantships.

The Faculty

M.A. Abraham • Reaction kinetics, catalysis, supercritical fluids
T. Ariman • Particulate science and technology, multiphase separation processes
R.L. Cerro • Capillary hydrodynamics, multiphase flows
R.P. Hesketh • Combustion, incineration and pollution control
K.D. Luks • Thermodynamics, phase equilibria
F.S. Manning • Industrial pollution control, surface processing of petroleum
K.L. Sublette • Fermentation, biocatalysis, biological waste treatment
R.E. Thompson • Oil and gas processing, computer-aided process design
K.D. Wisecarver • Fluidization, bioreactor modeling, mass transfer and adsorption in porous solids

Further Information

Graduate Program Director • Chemical Engineering Department
The University of Tulsa • 600 South College Avenue • Tulsa, Oklahoma 74104-3189
(918) 631-2974 • Fax number: (918) 631-3268
E-Mail: che_maa@vax1.utulsa.edu • Graduate School application: 1-800-882-4723



VANDERBILT UNIVERSITY

Department of Chemical Engineering
Graduate Study Leading to the M.S. and Ph.D. Degrees

Kenneth A. Debelak ***(Ph.D., Kentucky)***

Artificial intelligence in process control; coal conversion with emphasis on particle structure and diffusional processes; hazardous waste minimization.

Tomlinson Fort ***(Ph.D., Tennessee)***

Adsorption; surfactant spreading on liquid surfaces; monolayers and thin films; tribology; flow in unsaturated porous media; applications to drying, mining, and environmental cleanup.

Todd D. Giorgio ***(Ph.D., Rice)***

Rheological aspects of blood/endothelial cell response; structured lipid systems; biochemical cell-cell interaction; mechanism and kinetics of cellular ion transport.

David Hunkeler ***(Ph.D., McMaster)***

Water soluble polymers and polyelectrolytes, heterophase polymerizations, polymer characterization, light scattering, liquid chromatography, birefringence.

John A. Roth ***(Ph.D., Louisville)***

Physical-chemical wastewater treatment; hazardous waste management; corrosion mechanisms in microcircuitry.

Karl B. Schnelle, Jr. ***(Ph.D., Carnegie Mellon)***

Environmental dispersion modeling; use of natural gas in atmospheric pollution control; supercritical extraction of toxic materials in the environment.

Robert D. Tanner ***(Ph.D., Case Western Reserve)***

Biochemical engineering; effect of light on yeast growth and protein secretion; aerated solid fermentation fluidized bed processes; bubble and aerosol fractionation of proteins.

For further information:

VANDERBILT ENGINEERING

Professor Tomlinson Fort
Chemical Engineering Department
Box 1604 Station B
Vanderbilt University
Nashville, TN 37235
1-800-288-7722

University of Virginia

Graduate Studies in Chemical Engineering

"Academic research should provide the opportunity for students to improve their methods of rational thought and inquiry with the advisor supplying insight and direction. The faculty here at UVa seem dedicated to allowing students the freedom to learn, but with guidance available when needed."

Jamie Rudisill, B.S.ChE
Ph.D. 1992

Faculty and Research Areas

Giorgio Carta, *Ph.D., University of Delaware*
Absorption, adsorption, ion exchange, biological separations

Robert J. Davis, *Ph.D., Stanford University*
Heterogeneous catalysis, characterization of metal clusters, reaction kinetics

Erik J. Fernandez, *Ph.D., University of California, Berkeley*
Mammalian cell biocatalysis, metabolism in diseased tissues

Roseanne M. Ford, *Ph.D., University of Pennsylvania*
Bioremediation, bacterial migration (chemotaxis)

John L. Gainer, *Ph.D., University of Delaware*
Mass transfer including biomedical applications, biochemical engineering

John L. Hudson, *Ph.D. Northwestern University*
Dynamics of chemical reactors, electrochemical and multiphase reactors

Donald J. Kirwan, *Ph.D., University of Delaware*
Biochemical engineering, mass transfer, crystallization

M. Douglas LeVan, *Ph.D., University of California, Berkeley*
Adsorption, fluid mechanics, process design

Lembit J. Lilleleht, *Ph.D., University of Illinois*
Fluid mechanics, heat transfer, multiphase systems, alternative energy

John P. O'Connell, *Ph.D., University of California, Berkeley*
Statistical thermodynamics with applications to physical and biological systems

To receive application materials and further information, please write to

Graduate Admissions Coordinator • Department of Chemical Engineering • Thornton Hall
University of Virginia • Charlottesville, VA 22903-2442 • Phone (804) 924-7778

Catch the Excitement!

Chemical Engineering at Virginia Tech

"This program is giving me maximum flexibility in my career choices — that's the most important thing I'll take home to France when I graduate. On the job market I'll have specialized research skills and the facility to develop myself in new research areas. I'm even thinking about teaching — Dr. Cox, my faculty advisor, has inspired that in me. He's great to work with because he's excited about his research. He lets you pursue your own research interests, encourages you to think for yourself; that's as important as the great lab facilities."

— Anne-Claire Christiaen, Ph.D. candidate, Solid Surface Chemistry

FACULTY

William L. Conger
Professor and Department Head
(Ph.D. University of Pennsylvania)
Analysis of Coal Gasification Processes

Donald G. Baird
The Harry C. Wyatt Professor
(Ph.D. University of Wisconsin)
Polymer Processing and non-Newtonian Fluid Mechanics

David F. Cox
Associate Professor
(Ph.D. University of Florida)
Catalysis, Ultrahigh Vacuum Surface Science

Richey M. Davis
(Ph.D. Princeton University)
Assistant Professor
Physical Chemistry and Rheology of Colloids and Polymer Solutions

Kimberly E. Forsten
(Ph.D. University of Illinois)
Associate Professor
Computational Bioengineering

Y.A. Liu
(Ph.D. Princeton University)
The Frank C. Vilbrandt Professor
Artificial Intelligence and Engineering Design

Eva Marand
(Ph.D. University of Massachusetts)
Assistant Professor
Transport through Polymer Membranes, Polymer Spectroscopy

Henry A McGee Jr.
(Ph.D. Georgia Tech)
Professor
Molecular Engineering, Science Policy

Donald L. Michelsen
(Ph.D. Cornell)
Associate Professor Emeritus
Waste Minimization/Treatment, Adsorption, and Indoor Air Quality

S. Ted Oyama
(Ph.D. Stanford University)
Associate Professor
Heterogeneous Catalysis and New Materials

Len Peters
(Ph.D. University of Pittsburgh)
Professor
Atmospheric Transport

Peter R. Rony
(Ph.D. University of California at Berkeley)
Professor
Instrumentation

William H. Velander
(Ph.D. Pennsylvania State University)
Associate Professor
Transgenic Livestock Bioreactors & Immunopurification of Therapeutics

Garth L. Wilkes
(Ph.D. University of Massachusetts)
The Fred W. Bull Professor
Structure-Property Behavior of Polymeric Materials

For further information, contact the

Department of Chemical Engineering, Virginia Tech
133 Randolph Hall, Blacksburg, VA 24061-0211
Telephone (703) 231-6631 • FAX (703) 231-5022

Virginia Tech

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

- Vigorous research program
- Excellent physical facilities
- Financial support for all full-time graduate students
- 65 graduate students from 30 universities and 20 states
- 10 students from foreign countries

Graduate students and faculty enjoy a fine *esprit de corps* in a stimulating and supportive research environment. Seattle, *The Emerald City,* provides outstanding cultural opportunities and unparalleled outdoor activities throughout the year.

Inquiries welcome. Please contact:
Graduate Admissions
Department of Chemical Engineering, BF-10
University of Washington
Seattle, Washington 98195
Phone: (206) 543-2250 Fax: (206) 543-3778
E-mail: grad@cheme.washington.edu

Chemical Engineering Faculty • Research Areas

Albert L. Babb, Ph.D., Illinois	•	Biomedical Engineering; Hemodialysis
François Baneyx, Ph.D., Texas (Austin)	•	Biotechnology; Protein Technology; Biochemical Engineering
John C. Berg, Ph.D., California (Berkeley)	•	Interfacial Phenomena; Surface and Colloid Science
E. James Davis, Ph.D., Washington	•	Colloid Science; Aerosol Chemistry and Physics; Electrokinetics
Bruce A. Finlayson, Ph.D., Minnesota	•	Mathematical Modeling
Bradley R. Holt, Ph.D., Wisconsin	•	Process Design and Control
Barbara Krieger-Brockett, Ph.D., Wayne State	•	Reaction Engineering
N. Lawrence Ricker, Ph.D., California (Berkeley)	•	Process Control and Optimization
J. W. Rogers, Jr., Ph.D., Texas (Austin)	•	Surface Science; Thin-Film Deposition
Daniel T. Schwartz, Ph.D., California (Davis)	•	Electrochemical Engineering; Electrolytic Thin-Film Science
James C. Seferis, Ph.D., Delaware	•	Polymeric Composites; Manufacturing and Teaming
Eric M. Stuve, Ph.D., Stanford	•	Catalytic and Electrochemical Surface Science
Lewis E. Wedgewood, Ph.D., Wisconsin	•	Polymer Rheology
Gene L. Woodruff, Ph.D., MIT	•	Nuclear Engineering

Research Faculty

David G. Castner, Ph.D., California (Berkeley) • Biomaterials; Surface Science

Adjunct and Joint Faculty Active in Department Research

G. Graham Allan, Ph.D., D.Sc., Glasgow	•	Fiber and Polymer Science
Michael W. Chang, Ph.D., Washington; M.D., Texas	•	Rehabilitation Medicine
Richard R. Gustafson, Ph.D., Washington	•	Pulp and Paper
Allan S. Hoffman, Sc.D., MIT	•	Biomaterials in Medicine and Biotechnology
Thomas A. Horbett, Ph.D., Washington	•	Biomaterials; Peptide Drug Delivery
William T. McKean, Ph.D., Washington	•	Pulp and Paper Science
Buddy D. Ratner, Ph.D., Brooklyn Polytechnic	•	Biomaterials; Polymers; Surface Characterization

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 interest 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

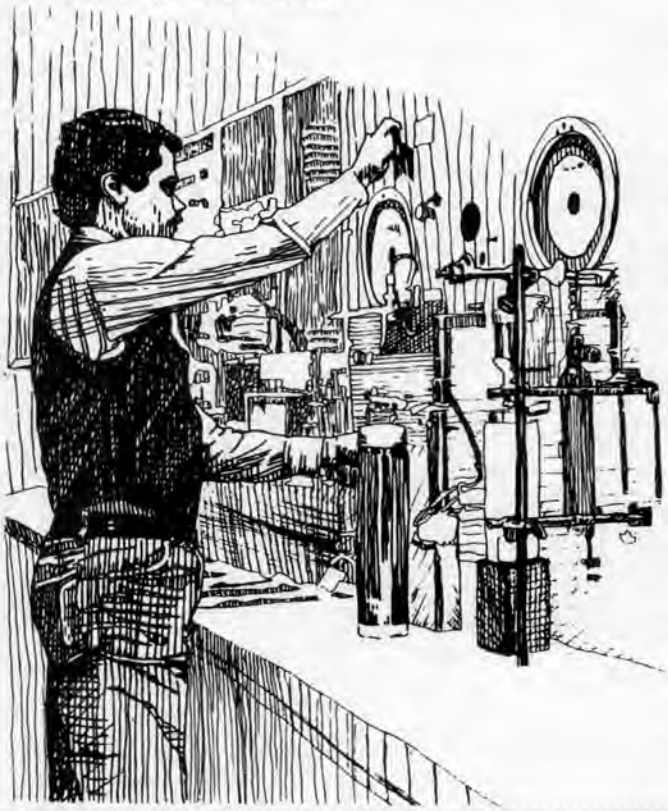
C. F. Ivory (Ph.D., Princeton): bioseparations, including electrophoresis, electrochromatography and field flow fractionation.

J. M. Lee (Ph.D., University of Kentucky): plant tissue cultivation, genetic engineering, enzymatic hydrolysis, mixing

K. C.Liddell (Ph.D., Iowa State University): semiconductor electrochemistry, reactions on fractal surfaces, separations, radioactive waste management

R. Mahalingam (Ph.D., University of Newcastle-upon-Tyne): multiphase systems, physical and chemical separations, particulate phoretic phenomena, electronic materials and polymers, synfuels and environment

J. N. Petersen (Ph.D., Iowa State University); adaptive on-line optimization of biochemical processes, adaptive control, drying of food products



R. C. Miller (Ph.D., University of California, Berkeley); thermodynamic properties of natural gases and liquified petroleum gases; thermophysical properties of cryogenic liquids; environmentaly compatible refrigerants

W. J. Thomson (Ph.D. University of Idaho); kinetics of solid state reactions, sintering rates of ceramic and electronic material precursers, chemical reaction engineering

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

R. L. Zollars (Ph.D., University of Colorado); multiphase reactor design, polymer reactor design, colloidal phenomena, 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.

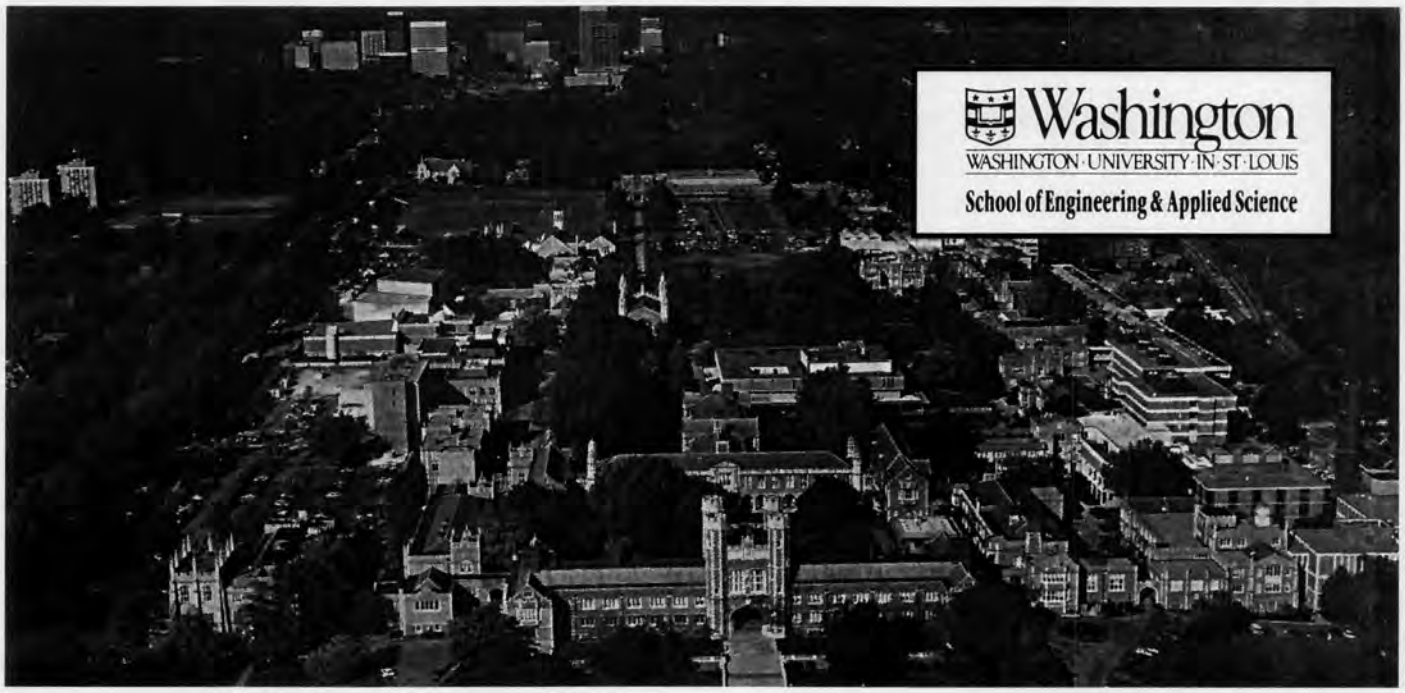
Conversion Program

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. B. J. Van Wie, Graduate Coordinator, Department of Chemical Engineering, Washington State University, Pullman, WA 99164-2710
509/335-4332 or 509/335-4103



GRADUATE STUDY IN **CHEMICAL ENGINEERING**

MASTER'S AND DOCTORAL PROGRAMS

• *Faculty and Research Areas* •

M. Al-Dahhan Unit Operations, Multiphase Reactors, Mass Transfer

M. P. Dudukovic Chemical Reaction Engineering

J. T. Gleaves Heterogeneous Catalysis, Surface Science, Microstructured Materials

B. Joseph Process Control, Process Optimization, Expert Systems

J. L. Kardos Composite Materials and Polymer Engineering

B. Khomami Rheology, Polymer and Composite Materials Processing

J. M. McKelvey Polymer Science and Engineering

R. L. Motard Computer Aided Process Engineering, Knowledge-Based Systems

P. A. Ramachandran Chemical Reaction Engineering

R. E. Sparks Biomedical Engineering, Micro-encapsulation, Transport Phenomena

C. Thies Biochemical Engineering, Microencapsulation

J. Turner Environmental Reaction Engineering, Air Quality Policy and Analysis, Air Pollution Control

For Information Contact

Graduate Admissions Committee • Washington University
Department of Chemical Engineering
Campus Box 1198 • One Brookings Drive
St. Louis, Missouri 63130-4899

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.

WAYNE STATE UNIVERSITY

The Carnegie I Research University in Motown

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

M.S. and Ph.D. in Materials Science and Engineering

Graduate Certificate in Polymer Engineering

M.S. and Graduate Certificate in Hazardous Waste Management

For information, contact
Esin Gulari, Chair
Chemical Engineering and Materials Science Department
Wayne State University
Detroit, Michigan 48202

John Benci, Ph.D., Pennsylvania, 1989
Deformation and fracture of materials ◆ High temperature mechanical properties of alloys, intermetallic compounds and ceramics

Esin Gulari, Ph.D., Caltech, 1973
Thermodynamics and transport properties of polymer solutions and melts ◆ Processing of polymers with supercritical fluids ◆ Light scattering based particle and drop sizing techniques

Yinlun Huang, Ph.D., Kansas State, 1992
Pollution prevention and waste minimization ◆ Process design and synthesis

Ralph Kummler, Ph.D., John Hopkins, 1966
Modeling of combined sewer overflows and sediments ◆ Chemical kinetics ◆ Computer simulation

William Madden, Ph.D., Pennsylvania, 1975
Computer simulation and statistical mechanical theories ◆ Complex materials and polymers

Charles Manke, Ph.D., California, Berkeley, 1983
Polymer processing and rheology ◆ Molecular dynamics and kinetic theory of polymeric liquids

Richard Marriott, Ph.D., London, 1956
Nuclear engineering and computer applications

Howard Matthew, Ph.D., Wayne State, 1992
Tissue engineering and biomaterials ◆ Artificial organ substitutes

James McMicking, Ph.D., Ohio State, 1961
Correlation of thermodynamic data

Simon Ng, Ph.D., Michigan, 1985
Heterogeneous catalysis ◆ Polymer kinetics ◆ Spectroscopic and thermal analysis of material surfaces

Susil Putatunda, Ph.D., IIT Bombay, 1983
Effects of microstructure on fatigue ◆ Fracture toughness ◆ Creep in metals and alloys

Erhard Rothe, Ph.D., Michigan, 1959
Applications of high-powered UV lasers ◆ Machining of electronic chips ◆ Diagnostics of internal combustion

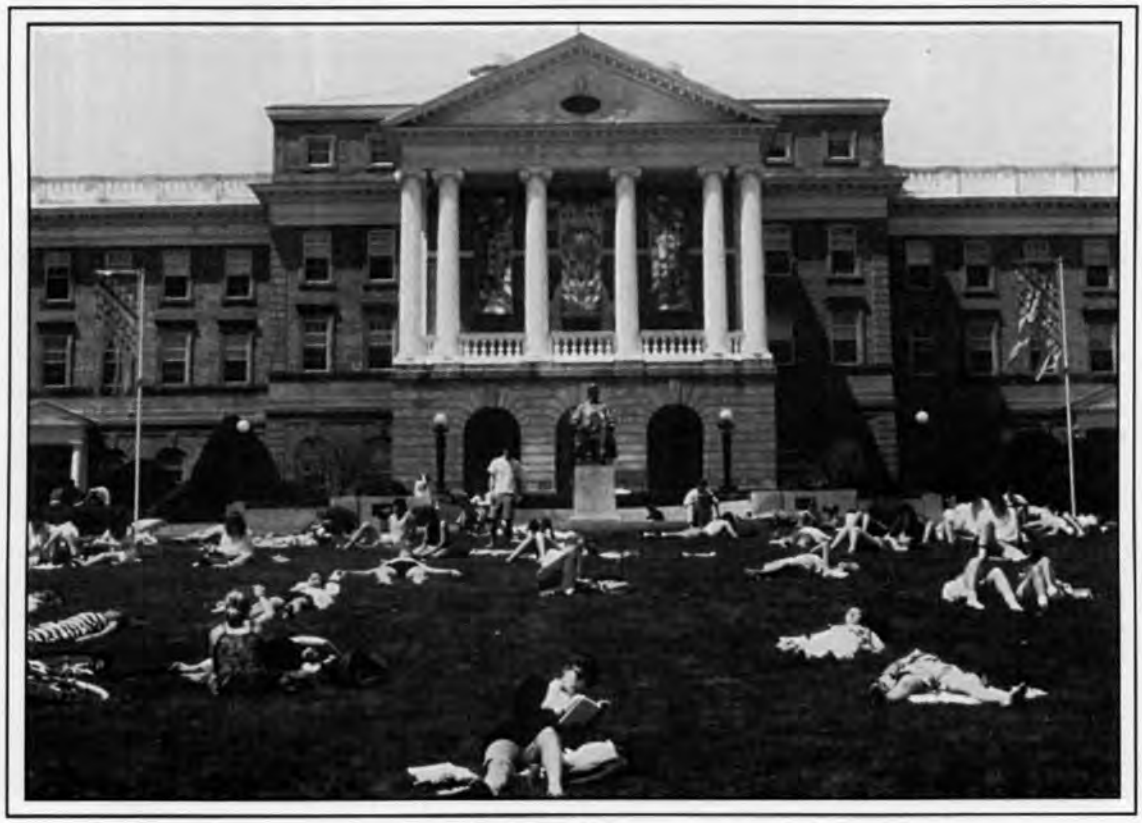
Steven Salley, Ph.D., Detroit, 1976
Biochemical/medical engineering ◆ Design of artificial organs ◆ Immobilized enzyme reactors

Gina Shreve, Ph.D., Michigan, 1991
Environmental and biochemical applications ◆ Microbially mediated biotransformations

Gregory Yawson, Ph.D., Harkov State, USSR, 1977
Analytical chemistry ◆ Hazardous waste characterization

WISCONSIN

A tradition of excellence in Chemical Engineering



Faculty Research Interests

Kevin L. Bray
Sol-gel synthesis, optical and electrical materials, high pressure properties

Douglas C. Cameron
Biotechnology, metabolic engineering

Thomas W. Chapman
Electrochemical reaction engineering

Juan de Pablo
Molecular thermodynamics, statistical mechanics

James A. Dumesic (Chairman)
Kinetics and catalysis, surface chemistry

Michael D. Graham
Fluid mechanics, reaction-transport systems, applied and computational mathematics

Charles G. Hill, Jr.
Kinetics, catalysis, photocatalysis, immobilized enzymes, membrane separations

Sangtae Kim
Fluid mechanics and rheology, protein dynamics, parallel computing

Daniel J. Klingenberg
Colloid science, transport phenomena

James A. Koutsky
Polymer science, adhesives, composites

Thomas F. Kuech
Semiconductor and materials processing, solid-state and electronic materials, thin films

Stanley H. Langer
Kinetics, catalysis, electrochemistry, chromatography, hydrometallurgy

E. N. Lightfoot, Jr.
Mass transfer and separations processes, biochemical engineering

Regina M. Murphy
Biomedical engineering, applied immunology, protein-protein interactions

Paul F. Nealey
Polymer synthesis and characterization, nonlinear optical properties

W. Harmon Ray
Process dynamics and control, reaction engineering, polymerization

Thatcher W. Root
Surface chemistry, catalysis, solid-state NMR

Warren E. Stewart
Reactor modeling, fractionation modeling, transport phenomena, applied mathematics

Ross E. Swaney
Process design, synthesis, modeling, and optimization

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 53706-1691

Graduate Studies in Chemical Engineering

Areas of Research:

Advanced Materials
- Carbon Filaments
- Inorganic Membranes
- Materials Processing in Space
- Molecular Sieve Zeolites

Biochemical Engineering
- Biopolymer Engineering
- Bioreactor Analysis
- Bioseparations

Catalysis and Reaction Engineering
- Adsorption and Transport in Porous Media
- Heterogeneous and Homogeneous Catalysis
- Zeolite Catalysis

Environmental Engineering
- Aerosol Dynamics
- Nucleation and Phase Transitions
- Waste Reduction Technology

Faculty:

William M. Clark • *Ph.D., Rice*

David DiBiasio • *Ph.D., Purdue*

Anthony G. Dixon • *Ph.D., Edinburgh*

Yi Hua Ma • *Sc.D., MIT*

William R. Moser • *Ph.D., MIT*

James E. Rollings • *Ph.D., Purdue*

Albert Sacco, Jr. • *Ph.D., MIT*

Robert W. Thompson •
Ph.D., Iowa State

Barbara E. Wyslouzil •
Ph.D., CalTech

The Central New England Area:
WPI is situated on a 62-acre hilltop site in a residential area of Worcester, Massachusetts, New England's second largest city and a leading cultural, educational, and entertainment center. It is a one-hour drive from Boston and only two hours from the beaches of Cape Cod and the ski slopes and hiking trails of Vermont and New Hampshire.

For further information on the M.S. and Ph.D. programs, contact:

Graduate Coordinator
Chemical Engineering Department
100 Institute Road
Worcester Polytechnic Institute
Worcester, MA 01609-2280

WORCESTER POLYTECHNIC INSTITUTE

Persons seeking admission, employment or access to programs of the University of Wyoming shall be considered without regard to race, color, national origin, sex, age, religion, policitical belief, handicap or veteran status.

UNIVERSITY OF WYOMING

Department of Chemical and Petroleum Engineering

C. Y. Cha	*solid waste utilization • microwave reactors • gas clean-up*
D. O. Cooney	*mass transfer • scrubbers • air and water pollution*
H. A. Deans	*enhanced oil recovery • carbon dioxide flooding*
J. F. Evers	*drilling hydraulics • drilling fluids • rock/bit interactions*
G. W. Harris	*EORI/unconventional gas*
H. W. Haynes	*catalysis • reaction kinetics • synthetic fuels*
N. R. Morrow	*Oil recovery, surface chemistry • wettability • low permeability media • multi fluids in porous media*
M. P. Sharma	*enhanced oil recovery • two phase flows • air pollution*
P. K. Agarwal	*coal combustion/gasification • fluidization • image analysis*
W. P. Iverson	*formation evaluation • engineering geophysics*
D. L. Whitman	*EORI/microcomputers/economics*
B. F. Towler	*reservoir simulation and modeling • phase behavior • enhanced oil recovery*
D. A. Bell	*recycling processes*
J. W. Glass	*environmental*
R. D. Gunn	*coal drying • active carbon • mathematical modeling*
J. G. Speight	*coal chemistry • environmental chemistry*

We offer exciting opportunities for research in many processing areas, especially energy related technology development. In recent years we have developed enhanced oil recovery, clean coal, solid waste utilization, and advance gas clean-up technologies up to bench scale levels. Currently we are working with industry to construct and operate pilot units of these technologies. This will provide excellent opportunities for students to obtain hands-on experience on industrial projects. Also, research has been conducted in the areas of kinetics, catalysis, adsorption, extraction, computer modeling, coal processing, and enhanced oil recovery.

The Western Coal Consortium has been established by the Chemical and Petroleum Engineering Department with western coal producers and utilities. The Western Coal Consortium and Enhanced Oil Recovery Institute and NSF/EPSCoR Program provide excellent financial aid packages to graduate students.

The University of Wyoming is located in Laramie, Wyoming at an elevation of 7200 feet. The town is surrounded by state and national parks which allow for beautiful year-round outdoor activities. The nearby Snowy Range mountains provide ideal sources of recreation for mountain and rock climbing, skiing, fishing, and hunting.

Graduates of any accredited chemical and petroleum engineering engineering programs are eligible for admission, and the department offers both an M.S. and Ph.D. chemical and petroleum accredited programs. Financial aid is available, and all recipients receive full fee waivers.

For more information contact

Dr. Chang-Yul Cha, Head • Department of Chemical & Petroleum Engineering • University of Wyoming
P. O. Box 3295 • Laramie, WY 82071-3295 • Telephone (307) 766-2837

YALE Department of Chemical Engineering

Eric Altman, *Ph.D. Pennsylvania*

Gary L. Haller, *Ph.D. Northwestern*

Csaba G. Horváth, *Ph.D. Frankfurt*

Michael Loewenberg, *Ph.D. Cal Tech*

James A. O'Brien, *Ph.D. Pennsylvania*

Lisa D. Pfefferle, *Ph.D. Pennsylvania*

Daniel E. Rosner, *Ph.D. Princeton*

Robert S. Weber, *Ph.D. Stanford*

Adjunct Professors:

- **Leslie S. Ettre**
- **John P. Marano**

Lecturers:

- **Joseph J. Levitzky**
- **Jovan Boskovic**
- **Yehia Khalil**
- **Carol Steiner**

Department of Chemical Engineering
Yale University
208286 Yale Station
New Haven, Ct 06520-8286
Phone: (203) 432-2222
FAX: (203) 432-7232

Aggregation, Clustering

Biochemical Engineering

Catalysis

Chemical Reaction Engineering

Chemical Vapor Deposition

Chromatography

Combustion

Enzyme Technology

Fine Particle Technology

Heterogeneous Kinetics

Interfacial Phenomena

Molecular Beams

Multiphase Transport Phenomena

Separation Science and Technology

Statistical Thermodynamics

Supercritical Fluid Phenomena

Surface Science

BUCKNELL

Department of Chemical Engineering

MS PROGRAM

W. E. KING, JR., Chair (PhD, Univ. of Pennsylvania)
Biomedical engineering

J. CSERNICA (PhD, M.I.T.)
Materials science, polymer structures/property relations

W. A. GEISZLER, JR. (PhD, Univ. of Wisconsin)

M. E. HANYAK, JR. (PhD, Univ. of Pennsylvania)
Computer-aided design, thermodynamics, applied software engineering

F. W. KOKO, JR. (PhD, Lehigh Univ.)
Optimization, fluid mechanics, direct digital control

J. M. POMMERSHEIM (PhD, Univ. of Pittsburgh)
Transport phenomena, mathematical modeling, cement hydration

M. J. PRINCE (PhD, Univ. of California, Berkeley)
Biochemical engineering, interfacial phenomena

D. S. SCHUSTER (PhD, West Virginia Univ.)
Fluidization, particulate systems, agglomerations

W. J. SNYDER (PhD, Pennsylvania State Univ.)
Catalysis, polymerization, instrumentation

Bucknell is a small, private, highly selective university with strong programs in engineering, business, and the liberal arts. The Department is located in the newly renovated Charles A. Dana Engineering Building which provides ample facilities for both computational and experimental research. State-of-the-art computing for both research and course work and modern laboratory equipment are readily available. Graduate students have a unique opportunity to work very closely with a faculty research advisor.

Lewisburg, located in the center of Pennsylvania, provides the attraction of a rural setting while conveniently located within 200 miles of New York, Philadelphia, Washington, D.C., and Pittsburgh.

For further information, write or phone

Dr. William E. King, Jr., Chair
Department of Chemical Engineering
Bucknell University • Lewisburg, PA 17837
717-524-1114

UNIVERSITY OF WATERLOO

Canada's largest Chemical Engineering Department offers regular and co-operative M.A.Sc., Ph.D., and post-doctoral programs in:

- Biochemical and Food Engineering
- Industrial Biotechnology
- Chemical Kinetics, Catalysis, and Reactor Design
- Environmental and Pollution Control
- Extractive and Process Metallurgy
- Polymer Science and Engineering
- Mathematical Analysis, Statistics, and Control
- Transport Phenomena, Multiphase Flow
- Enhanced Oil Recovery
- Electrochemical Processes, Solids, Handling

Financial Aid: RA: $14,500/yr
TA: $5,000/yr (approximate)
Scholarships

G. L. Rempel, Ph.D. *(UBC)*, Chair; **P. L. Douglas,** PhD *(Waterloo)*, Associate Chair Graduate; **I. F. Macdonald,** PhD *(Wisconsin)*, Associate Chair Undergraduate; **W. A. Anderson,** PhD *(Waterloo)*; **H. Budman,** PhD *(Technion-Israel)*; **C. M. Burns,** PhD *(Polytech. Inst. Brooklyn)*; **J. J. Byerley,** PhD *(UBC)*; **I. Chatzis,** PhD *(Waterloo)*; **T. A. Duever**, PhD *(Waterloo)*; **F. A. L. Dullien**, PhD *(UBC)*; **T. Z. Fahidy**, PhD *(Illinois)*; **G. J. Farquhar**, PhD *(Wisconsin)*; **B. R. Glick,** PhD *(Waterloo)*; **R. Y. M. Huang,** PhD *(Toronto)*; **R. R. Hudgins**, PhD *(Princeton)*; **R. L. Legge,** PhD *(Waterloo)*; **M. Moo-Young,** PhD *(London)*; **F. T. T. Ng,** PhD *(UBC)*; **K. F. O'Driscoll,** PhD *(Princeton)*; **R. Pal,** PhD *(Waterloo)*; **A. Penlidis,** PhD *(McMaster)*; **M. D. Pritzker**, *(V.P.I.)*; **P. M. Reilly,**PhD *(London)*; **C. W. Robinson,** PhD *(Berkeley)*; **A. Rudin,** PhD *(Northwestern)*; **J. M. Scharer,** PhD *(Pennsylvania)*; **D. S. Scott,** PhD *(Illinois)*; **P. L. Silveston,** Dr.Ing. *(Munich)*; **C. Tzoganakis,** PhD *(McMaster)*; **J. R. Wynnyckyj,** PhD *(Toronto)*

To apply or request information, send e-mail to
gradapp@cape.uwaterloo.ca
or contact
The Associate Chair (Graduate Studies)
Department of Chemical Engineering • University of Waterloo
Waterloo, Ontario, Canada N2L 3G1
Phone: 519-885-1211 • FAX: 519-746-4979

UC DAVIS

Department of Chemical Engineering and Materials Science

Offering M.S. and Ph.D. degree programs in both chemical engineering and materials science and engineering

► ***Chemical Engineering***

Abbott, Nicholas L. • Nanostructured fluids, surfactants, molecular assemblies, liquid crystals
Boulton, Roger • Fermentation and reaction kinetics, crystallization
Dungan, Stephanie R. • Micelle transport, colloid and interfacial science in food processing
Gates, Bruce C. • Catalysis, solid superacid catalysis, zeolite catalysts, bimetallic catalysts, catalysis by metal clusters
Higgins, Brian G. • Fluid mechanics and interfacial phenomena, sol gel processing, coating flows
Alan P. Jackman • Protein production in plant cell cultures, bioremediation
McCoy, Benjamin J. • Supercritical extraction, pollutant transport
McDonald, Karen M. • Plant cell culture bioprocessing, algal cell cultures
Palazoglu, Ahmet N. • Process control and process design of environmentally benign processes
Phillips, Ronald J. • Transport processes in bioseparations, Newtonian and non-Newtonian suspension mechanics
Powell, Robert L. • Rheology, suspension mechanics, magnetic resonance imaging of suspensions
Ryu, Dewey D.Y. • Biomolecular process engineering and recombinant bioprocess technology
Stroeve, Pieter • Membrane separations, Langmuir Blodgett films, colloid and surface science
Whitaker, Stephen • Multiphase transport phenomena

► ***Materials Science and Engineering***

Gibeling, Jeffery C. • Deformation and fatique of metals and metal matrix composites
Groza, Joanna R. • Plasma activated sintering and processing of nanostructured materials
Howitt, David G. • Radiation effects, film growth, electron microscopy and image processing
Mukherjee, Amiya K. • Superplasticity of intermetallic alloys and ceramics, high temperature creep deformation
Munir, Zuhair A. • Combustion synthesis, multilayer combusion systems, functionally gradient materials
Risbud, Subhash • Semiconductor quantum dots, high T_0 superconducting ceramics, polymer composites for optics
Shackelford, James F. • Structure of materials, biomaterials, nondescrictive testing of engineering materials

Financial support is available through fellowships, research assistantships and teaching assistantships.

Write to: Graduate Admissions Advisor • Department of Chemical Engineering and Materials Science
University of California, Davis • Davis, CA 95616-5294 • Telephone (916) 752-2504 • Fax (916) 752-1031

The University of California, San Diego

Graduate Programs in Chemical Engineering leading to the M.S. and Ph.D. Degrees

Located in a park-like setting high on the bluffs overlooking the Pacific Ocean at La Jolla, UCSD is recognized today as a major center for innovation in science and technology. The Chemical Engineering Program, established in 1979, exists as a formal program within the large, broad-based engineering department, the Department of Applied Mechanics and Engineering Sciences.

The Faculty	Research Areas
Pao C. Chau	Biochemical Engineering
Joe D. Goddard	Mechanics and Transport Processes
Richard K. Herz	Catalysis, Chemical Reaction Engineering
Stanley Middleman	Fluid Dynamics
David R. Miller	Gas/Surface Interactions and Gas Dynamics
C. Pozrikidis	Fluid Mechanics
K. Seshadri	Reactive Gas Flows
Jan B. Talbot	Electrochemical Engineering
Jack L. White	Materials Engineering

For further information, please write: University of California, San Diego • Department of AMES/Chemical Engineering Graduate Student Affairs • 9500 Gilman Drive • La Jolla, CA 92093-0413

University of Idaho

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

FACULTY

W. ADMASSU	*Synthetic Membranes for Gas Separations, Biochemical Engineering with Environmental Applications*
T. E. CARLESON	*Mass Transfer Enhancement, Chemical Reprocessing of Nuclear Wastes, Bioseparation*
D. C. DROWN	*Process Design, Computer Application 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*
D. S. HOFFMAN	*Alternative Fuels, Process Analysis and Design*
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*
M. VON BRAUN	*Hazardous Waste Site Analysis, Computer Mapping*

The department has a highly active research program covering a wide range of interests. The northern Idaho region offers a year-round complement of outdoor activities including hiking, white water rafting, skiing, and camping.

A wide range of fellowships and assistantships is available.

FOR FURTHER INFORMATION AND APPLICATION WRITE

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

LAMAR UNIVERSITY

GRADUATE STUDY IN CHEMICAL ENGINEERING

Master of Engineering ■ Master of Engineering Science ■ Master of Environmental Engineering ■ Doctor of Engineering

FACULTY

- ✦ D. H. CHEN *(Ph.D., Oklahoma State University)*
- ✦ J. R. HOPPER *(Ph.D., Louisiana State University)*
- ✦ T. C. HO *(Ph.D., Kansas State University)*
- ✦ K. Y. LI *(Ph.D., Mississippi State University)*
- ✦ C. L. YAWS *(Ph.D., University of Houston)*

RESEARCH AREAS

- ✦ Computer Simulation, Process Dynamics and Control
- ✦ Heterogeneous Catalysis, Reaction Engineering
- ✦ Fluidization, Incineration
- ✦ Transport Properties, Mass Transfer, Gas-Liquid Reactions
- ✦ Computer-Aided Design
- ✦ Thermodynamic Properties, Cost Engineering, Photovoltaics
- ✦ Air Pollution, Bioremediation, Waste Minimization
- ✦ Hazardous Waste Management, Pollution Prevention

For further information, please write

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

An equal opportunity/affirmative action university.

UNIVERSITY OF SOUTHERN CALIFORNIA

GRADUATE STUDY IN CHEMICAL ENGINEERING

Please write for further information about the program, financial support, and application forms to:

Graduate Admissions
Department of Chemical Engineering
University of Southern California
University Park
Los Angeles, CA 90089-1211

• FACULTY •

W. VICTOR CHANG
(Ph.D., Ch.E., Caltech, 1976) • Physical properties of polymers and composites; adhesion; finite element analysis

ELMER L. DOUGHERTY, JR.
(Ph.D., Ch.E., Illinois, Urbana, 1955) • Optimization of oil and gas producing operations; simulation of hydrocarbon reservoir behavior; energy and environmental economics

IRAJ ERSHAGHI
(Ph.D., PTE, Southern Cal, 1972) • Well test analyses of fractured, geothermal, and gas storage reservoirs; reservoir characterization; petrophysical modeling

RONALD G. MINET
(Ph.D., Ch.E., New York University, 1959) *(Adjunct)* • Computer aided chemical process and plant design; catalysis; ceramic membranes

MUHAMMAD SAHIMI
(Ph.D., Ch.E., Minnesota, 1984) • Transport and mechanical properties of disordered systems; percolation theory and non-equilibrium growth processes; flow, diffusion, dispersion and reaction in porous media

RONALD SALOVEY
(Ph.D., Phys. Chem., Harvard, 1958) • Physical chemistry and irradiation of polymers; characterization of elastomers and filled systems; polymer crystallization

JAMES SCOTT SHAFFER
(Ph.D., Ch.E., California, Berkeley, 1993) • Interfacial phenomena in polymeric composites; rheology of confined polymeric materials

KATHERINE S. SHING
(Ph.D., Ch.E., Cornell, 1982) • Thermodynamics and statistical mechanics; supercritical extraction

THEODORE T. TSOTSIS
(Ph.D., Ch.E., Illinois, Urbana, 1978) • Chemical reaction engineering; process dynamics and control

IAN A. WEBSTER
(D.Sc., Ch.E., M. I. T., 1984) *(Adjunct)* • Catalysis and reaction kinetics; transport phenomena, chemical reaction engineering; surface spectroscopy, biochemical engineering

YANIS C. YORTSOS
(Ph.D., Ch.E., Caltech, 1979) • Mathematical modeling of transport processes; flow and transport in porous media

---

CHEMICAL ENGINEERING AT

STATE UNIVERSITY OF NEW YORK AT BUFFALO

FACULTY

S. L. Diamond
P. Ehrlich
R. J. Good
V. Hlavacek
K. M. Kiser
D. A. Kofke
D. E. Leckband
C. R. F. Lund
T. J. Mountziaris
J. M. Nitsche
E. Ruckenstein
M. E. Ryan
J. A. Tsamopoulos
C. J. van Oss
T. W. Weber
S. W. Weller
R. T. Yang

RESEARCH AREAS

Adsorption
Applied Mathematics
Biochemical & Biomedical
Catalysis, Kinetics, & Reactor Design
Ceramics
Coal Conversion
Electronic Materials
Environmental Engineering
Fluid Mechanics
Polymer Processing & Rheology
Process Control
Reaction Engineering
Separation Processes
Surface Phenomena & Colloids
Thermodynamics
Transport Phenomena

Academic programs for MS and PhD candidates are designed to provide depth in chemical engineering fundamentals while preserving the flexibility needed to develop special areas of interest. The Department also draws on the strengths of being part of a large and diverse university center. This environment stimulates interdisciplinary interactions in teaching and research. The new departmental facilities offer an exceptional opportunity for students to develop their research skills and capabilities. These features, combined with year-round recreational activities afforded by the Western New York countryside and numerous cultural activities centered around the City of Buffalo, make SUNY/Buffalo an especially attractive place to pursue graduate studies.

For information and applications, write to:

Chairman, Graduate Committee
Department of Chemical Engineering
State University of New York at Buffalo
Buffalo, New York 14260

THE UNIVERSITY OF BRITISH COLUMBIA

The Department of Chemical Engineering invites applications for graduate study from candidates who wish to proceed to the M.Eng., M.Eng. (Pulp & Paper), M.A.Sc., or Ph.D. degree. For the latter two degrees, Assistantships or Fellowships are available.

AREAS OF RESEARCH

Air Pollution
Biochemical Engineering
Biomedical Engineering
Biotechnology
Catalysis
Coal, Natural Gas and Oil Processing
Electrochemical Engineering
Electrokinetic and Fouling Phenomena
Fluid Dynamics
Fluidization
Heat Transfer
Kinetics
Liquid Extraction
Magnetic Effects
Mass Transfer
Modeling and Optimization
Particle Dynamics
Process Dynamics
Pulp & Paper
Rheology
Rotary Kilns
Separation Processes
Spouted Beds
Sulphur
Thermodynamics
Water Pollution

Inquiries should be addressed to:

Graduate Advisor
Department of Chemical Engineering
THE UNIVERSITY OF BRITISH COLUMBIA
Vancouver, B.C., Canada V6T 1Z4
FAX: (604) 822-6003

Ph.D./M.S. in Bioengineering-Chemical Engineering

Carnegie Mellon

CELLULAR AND MOLECULAR SYSTEMATICS

membrane diffusion; mutagenesis and protein stability; dynamics of cytoplasmic molecules; cytoskeleton assembly; cell adhesion and motility; metabolic networks and flux control.

SIGNAL AND IMAGE PROCESSING

pattern recognition; monitoring of physiological rates; signal processing in sensory systems; three-dimensional cell imaging; fluorescent probe molecular design and application; development of in situ fluorescence and NMR spectra to investigate cell suspensions; bio-sensory perception; modeling of peripheral auditory system.

MATERIALS AND MECHANICS

orthopedic biomechanics; bipedal locomotion; regulatory standards and testing of implantable devices; surface-protein interaction.

Who Should Apply?

We are looking for graduate students who are capable of solving biological problems from an engineering perspective. Write for information on graduate studies in Bioengineering to:

CARNEGIE MELLON UNIVERSITY
Biomedical Engineering Program
Graduate Admissions, DH 2313
Pittsburgh, PA 15213
Phone: (412)268-2521 or Fax: (412)268-7139

UNIVERSITY OF DAYTON

Graduate Study in Chemical and Materials Engineering

Research assistantships (including competitive stipend and tuition) are available for students pursuing M.S. in Chemical Engineering or M.S. or Ph.D. in Materials Engineering in the following research areas:

- **PROCESS MODELING**
- **EXPERT SYSTEM PROCESS CONTROL**
- **COMBUSTION**
- **AGITATION**
- **COMPOSITE MATERIALS**
- **MANUFACTURING SYSTEMS**

We specialize in offering each student an individualized program of study and research with most projects involving pertinent interaction with industrial personnel.

For further information write to:

Director of Graduate Studies
Department of Chemical and Materials Engineering
University of Dayton • 300 College Park Avenue
Dayton, Ohio 45469-0246
or call (513) 229-2627

University of Dayton

University of Massachusetts Lowell

College of Engineering

Department of Chemical and Nuclear Engineering

We offer professionally oriented engineering education at the M.S., Ph.D., and D.E. levels

In addition we offer specialization in

• PAPER ENGINEERING •
• COMPUTER-AIDED PROCESS CONTROL •
• ENGINEERED MATERIALS •
• POLYMERIC MATERIALS •
• BIOENGINEERED MATERIALS •
• ENERGY ENGINEERING •

Please call (508) 934-3171 or write for specifics to

Dr. T. Vasilos (Chemical Engineering)
Dr. James Sheff (Energy Engineering)
Graduate Coordinators
One University Avenue
Lowell, MA 01854

ACKNOWLEDGEMENT

DEPARTMENTAL SPONSORS

The following 154 departments contribute to the support of *CEE* with bulk subscriptions.

If your department is not a contributor, write to
CHEMICAL ENGINEERING EDUCATION,
c/o Chemical Engineering Department • University of Florida • Gainesville, FL 32611-6005
for information on bulk subscriptions

University of Akron
University of Alabama
University of Alberta
University of Arizona
Arizona State University
University of Arkansas
Auburn University
Brigham Young University
University of British Columbia
Brown University
Bucknell University
University of Calgary
University of California, Berkeley
University of California, Davis
University of California, Irvine
University of California, Los Angeles
University of California, San Diego
University of California, Santa Barabara
California Institute of Technology
California State Poly Institute
California State University
Carnegie-Mellon University
Case Western Reserve University
University of Cincinnati
Clarkson University
Clemson University
Cleveland State University
University of Colorado
Colorado School of Mines
Colorado State University
Columbia University
University of Connecticut
Cooper Union
Cornell University
University of Dayton
University of Delaware
Drexel University
University of Edinburgh
University of Florida
Florida Institute of Technology
Florida State/Florida A&M University
Georgia Institute of Technology
University of Houston
Howard University
University of Idaho
University of Illinois, Chicago
University of Illinois, Urbana
Illinois Institute of Technology
University of Iowa
Iowa State University
Johns Hopkins University
University of Kansas
Kansas State University
University of Kentucky
Lafayette College
Lakehead University
Lamar University
Laval University
Lehigh University
University of London (Imperial College)
Loughborough University
Louisiana State University
Louisiana Technical University
University of Louisville
Lowell University
Manhattan College
University of Maryland
University of Maryland, Baltimore County
University of Massachusetts
McGill University
McMaster University
McNeese State University
University of Michigan
Michigan State University
Michigan Technical University
University of Minnesota
University of Minnesota, Duluth
University of Mississippi
Mississippi State University
University of Missouri, Columbia
University of Missouri, Rolla
Montana State University
University of Nebraska
University of New Hampshire
University of New Haven
New Jersey Institute of Technology
University of New Mexico
New Mexico State University
North Carolina A & T University
North Carolina State University
University of North Dakota
Northeastern University
Northwestern University
University of Notre Dame
Technical University of Nova Scotia
Ohio State University
Ohio University
University of Oklahoma
Oklahoma State University
Oregon State University
University of Ottawa
University of Pennsylvania
Pennsylvania State University
University of Pittsburgh
Polytechnic Institute of New York
Princeton University
Purdue University
Queen's University
Rensselaer Polytechnic Institute
University of Rhode Island
Rice University
University of Rochester
Rose-Hulman Institute of Technology
Rutgers, The State University
University of Sherbrooke
University of South Alabama
University of South Carolina
South Dakota School of Mines
University of South Florida
University of Southern California
University of Southwestern Louisiana
State University of New York, Buffalo
Stevens Institute of Technology
University of Sydney
University of Syracuse
University of Tennessee
Tennessee Technological University
University of Texas
Texas A & M University
Texas Tech University
University of Toledo
Tri-State University
Tufts University
University of Tulsa
Tuskegee Institute
University of Utah
Vanderbilt University
Villanova University
University of Virginia
Virginia Polytechnic Institute
University of Washington
Washington State University
Washington University
University of Waterloo
Wayne State University
West Virginia Graduate College
West Virginia Institute of Technology
West Virginia University
Widener University
University of Wisconsin
Worcester Polytechnic Institute
University of Wyoming
Yale University
Youngstown State University