



THE UNIVERSITY OF ARIZONA

TUCSON, AZ

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

THE FACULTY AND THEIR RESEARCH INTERESTS ARE:

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

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

THOMAS R. REHM, Professor and Acting Head
Ph.D., University of Washington, 1960
Mass Transfer, Process Instrumentation, Packed Column Distillation, Applied Design

JOST O.L. WENDT, Professor
Ph.D., Johns Hopkins University, 1968
Combustion Generated Air Pollution, Nitrogen and Sulfur Oxide Abatement, Chemical Kinetics, Thermodynamics Interfacial Phenomena

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

WILLIAM P. COSART, Assoc. Professor
Ph.D. Oregon State University, 1973
Transpiration Cooling, Heat Transfer in Biological Systems, Blood Processing

THOMAS W. PETERSON, Asst. Professor
Ph.D., California Institute of Technology, 1977
Atmospheric Modeling of Aerosol Pollutants, Long-Range Pollutant Transport, Particulate Growth Kinetics.

FARHANG SHADMAN, Asst. Professor
Ph.D., University of California-Berkeley, 1972
Reaction Engineering, Kinetics, Catalysis

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

**For further information,
write to:**

*Dr. J. O. L. Wendt
Graduate Study Committee
Department of
Chemical Engineering
University of Arizona
Tucson, Arizona 85721*

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





THE UNIVERSITY OF ALABAMA

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

The University of Alabama, enrolling approximately 18,000 undergraduate and 5,000 graduate students per year, is located in Tuscaloosa, a town of some 70,000 population in West Central Alabama. Since the climate is warm, outdoor activities are possible most of the year.

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

Faculty and Research Interests

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

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

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

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

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

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

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

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

Chemical Engineering at

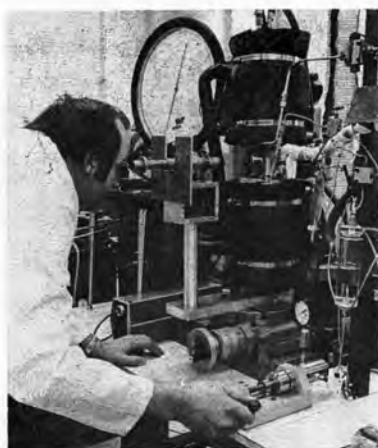
UNIVERSITY OF ALBERTA

EDMONTON, CANADA



Faculty and Research Interests

- I. G. Dalla Lana, Ph.D. (Minnesota): Kinetics, Heterogeneous Catalysis.
- D. G. Fisher, Ph.D. (Michigan): Process Dynamics and Control, Real-Time Computer Applications, Process Design.
- C. Kiparissides, Ph.D. (McMaster): Polymer Reactor Engineering, Optimization, Modelling, Stochastic Control.
- D. Lynch, Ph.D. (Alberta): Kinetic Modelling, Numerical Methods, Computer Aided Design.
- J. H. Masliyah, Ph.D. (British Columbia): Transport Phenomena, Numerical Analysis, In-Situ Recovery of Oil Sands.
- A. E. Mather, Ph.D. (Michigan): Phase Equilibria, Fluid Properties at High Pressures, Thermodynamics.
- W. Nader, Dr. Phil. (Vienna): Heat Transfer, Air Pollution, Transport Phenomena in Porous Media, Applied Mathematics.
- F. D. Otto (Chairman), Ph.D. (Michigan): Mass Transfer, Gas-Liquid Reactions, Separation Processes, Environmental Engineering.
- D. Quon, Sc.D. (MIT), Professor Emeritus: Energy Modelling and Economics, Linear Programming, Network Theory.
- D. B. Robinson, Ph.D. (Michigan): Thermal and Volumetric Properties of Fluids. Phase Equilibria, Thermodynamics.
- J. T. Ryan, Ph.D. (Missouri): Process Economics, Energy Economics and Supply.
- S. L. Shah, Ph.D. (Alberta): Linear Systems Theory, Adaptive Control, Stability Theory, Stochastic Control.
- S. E. Wanke, Ph.D. (California-Davis): Catalysis, Kinetics.
- R. K. Wood, Ph.D. (Northwestern): Process Dynamics and Identification, Control of Distillation Columns, Modelling of Crushing and Grinding Circuits.



Graduate Study

U of A's Chemical Engineering graduate program offers exciting research opportunities to graduate students motivated towards advanced training and research. Graduate programs leading to the degrees of Master of Science, Master of Engineering and Doctor of Philosophy are offered. There are currently 13 full-time faculty members, a few visiting faculty, several post-doctoral research associates and 35 graduate students.

Financial Aid

Financial support is available to full-time graduate students in the form of fellowships, teaching assistantships and research assistantships.

The University of Alberta

U of A is one of Canada's largest Universities and engineering schools with total enrollment of over 25,000 students. The campus is located in the city of Edmonton and overlooks the scenic North Saskatchewan River Valley.

Edmonton is a cosmopolitan modern city of over 600,000 people. It enjoys a renowned resident professional theatre, symphony orchestra and professional football, hockey and soccer leagues. The famous Banff and Jasper National Parks in the Canadian Rocky Mountains are within easy driving distance.

Applications for additional information write to:

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

DEPARTMENT OF CHEMICAL ENGINEERING

GRADUATE PROGRAM

FACULTY

RESEARCH INTERESTS

G. A. ATWOOD	Digital Control, Polymeric Diffusivities, Multicomponent Adsorption.
J. M. BERTY	Reactor Design.
L. G. FOCHT	Fixed Bed Adsorption, Design and Process Analysis.
H. L. GREENE	Biorheology, Kinetic Modeling, Contaminant Removal from Coal Gasification.
S. LEE	Coal Gasification, Kinetic Modeling, Digital Simulation.
J. P. LENCZYK	High Pressure Kinetics, Activity and Diffusion Coefficients via Ultracentrifuge.
R. W. ROBERTS	Atomization Processes, Fusion and Adhesion Characteristics of Polymer Powders.
R. F. SAVINELL	Electrochemical Phenomena.
M. S. WILLIS	Multiphase Theory, Filtration and Diffusion in Foamed Plastics.

Graduate assistant stipends for teaching and research start at \$4,200. Industrially sponsored fellowships available up to \$9,000. These awards include waiver of tuition and fees. Cooperative Graduate Education Program is also available. The deadline for assistantship application is March 1.

ADDITIONAL INFORMATION WRITE:

Dr. Howard L. Greene, Head
Department of Chemical Engineering
University of Akron
Akron, Ohio 44325

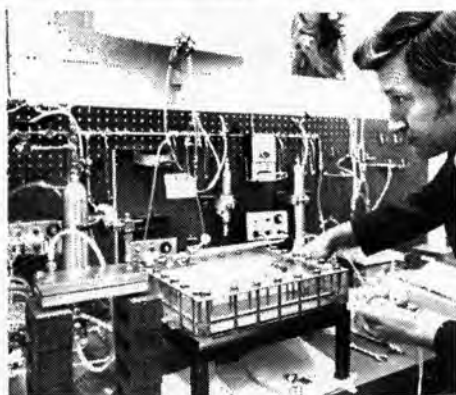


ASU

ARIZONA STATE UNIVERSITY

Graduate Programs

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



Research Specializations Include:

ENERGY CONVERSION • ADSORPTION/SEPARATION •
BIOMEDICAL ENGINEERING • TRANSPORT PHENOMENA •
SURFACE PHENOMENA • REACTION ENGINEERING •
ENVIRONMENTAL CONTROL • ENGINEERING DESIGN •

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

James R. Beckman, University of Arizona, 1976
Lynn Bellamy, Tulane University, 1966
Neil S. Berman, University of Texas, 1962
William J. Crowe, University of Florida, 1969 (Adjunct)
William J. Dorson, Jr., University of Cincinnati, 1967
Eric J. Guilbeau, Louisiana Tech University, 1971
James T. Kuester, Texas A&M University, 1970
Kim L. Nelson, University of Delaware, 1981
Castle O. Reiser, University of Wisconsin, 1945 (Emeritus)
Vernon E. Sater, Illinois Institute of Technology, 1963
Robert S. Torrest, University of Minnesota, 1967
Bruce C. Towe, Pennsylvania State University, 1978
Imre Zwiebel, Yale University, 1961

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

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

FOR INFORMATION, CONTACT:

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



AUBURN UNIVERSITY

CHEMICAL ENGINEERING GRADUATE STUDIES

Graduate Degrees

The Department of Chemical Engineering at Auburn University offers graduate work leading to the M.S. and Ph.D. degrees in chemical engineering. The research emphasizes experimental and theoretical work in areas of current national interest. Modern research equipment is available for analytical, process and computational studies. Auburn University is an equal opportunity Institution.

Area Description

Auburn University, which has 18,000 students, is located in Alabama between Atlanta and Montgomery, Ala., with Columbus, the second largest city in Georgia, only 35 miles away. The local population is about 75,000. University-sponsored activities include a lecture series with nationally known speakers, a series of plays and artistic and cultural presentations of all kinds. Recreational opportunities include equipment at the University for participation in almost every sport.

Research Areas

COAL: Coal liquefaction, magnetic desulfurization and beneficiation, solvent refining.

BIOMASS: Chemical and enzymatic conversion of forest and agricultural waste to fuels, petrochemicals and animal feed.

FUNDAMENTALS: Kinetics, catalysis, enzymatic and fermentation reactors, high gradient magnetic separation, transport phenomena, solid-liquid separation, biomedical engineering.

ENVIRONMENTAL: Air and water pollution control processes.

NEW TECHNOLOGY: Advanced coal conversion, novel enzymatic reactors, applications of high gradient magnetic separation, photography by immobilized enzymes, novel thickener design, polymeric replacement of textile size, enzymatic artificial liver.

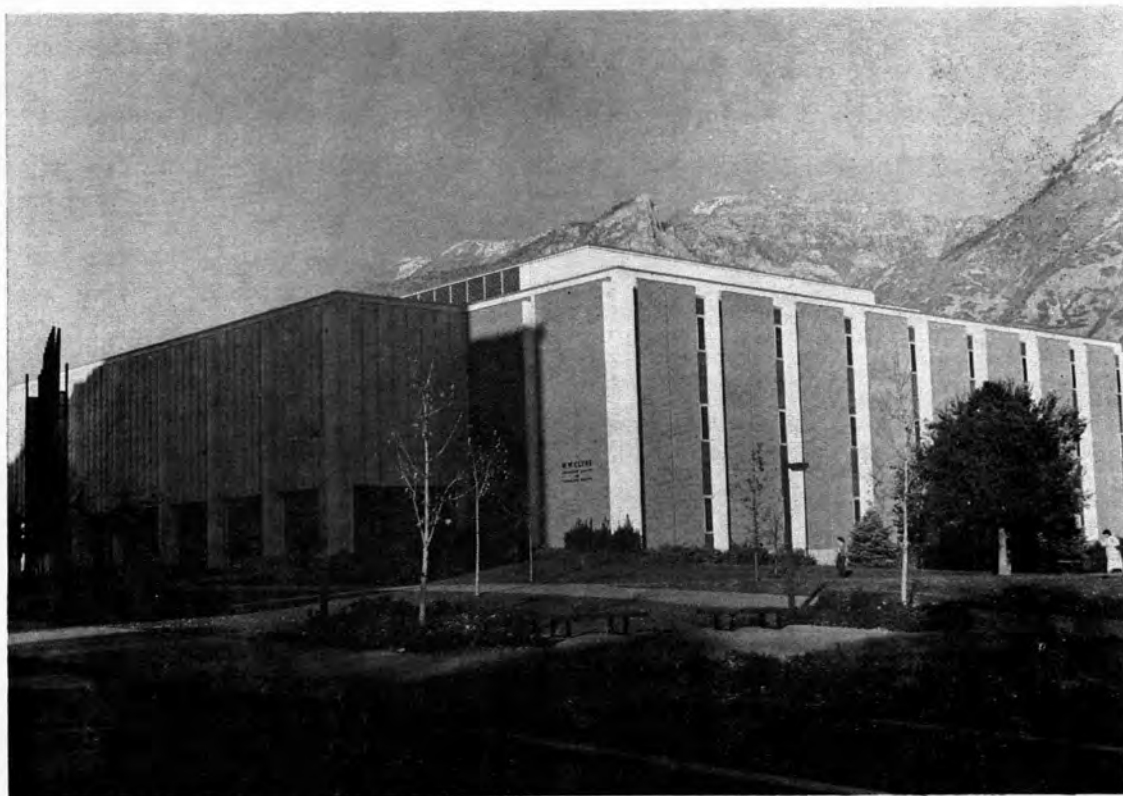
PROCESS SYNTHESIS AND CONTROL: Design of optimal energy-integrated processes and control of interactive, multivariable, nonlinear processes.



For financial aid and admission application forms write:

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

BRIGHAM YOUNG UNIVERSITY PROVO, UTAH



- **Ph.D., M.S., & M.E.**
- **ChE. Masters for Chemists Program**
- **Research**

Biomedical Engineering
Catalysis
Coal Gasification

Combustion
Electrochemical Engineering
Fluid Mechanics

Fossil Fuels Recovery
High Pressure Chemistry
Thermochemistry &
Calorimetry

- **Faculty**

D. H. Barker, (Ph.D., Utah, 1951)
C. H. Bartholomew, (Ph.D., Stanford, 1972)
M W. Beckstead, (Ph.D., Utah, 1965)
D. N. Bennion, (Ph.D., Berkeley, 1964)
B. S. Brewster, (Ph.D., Utah, 1979)
J J. Christensen, (Ph.D., Carnegie Inst. Tech, 1958)
J. M. Glassett, (M.S., MIT, 1948)

R. W. Hanks, (Ph.D., Utah, 1961)
W. C. Hecker, (Ph.D., U.C. Berkeley, 1981)
P O. Hedman, (Ph.D., BYU, 1973)
J. L. Oscarson, (Ph.D., Michigan, 1979)
P. J. Smith, (Ph.D., BYU, 1979)
L. D. Smoot, (Ph.D., Washington, 1960)
K. A. Solen, (Ph.D., Wisconsin, 1974)

- **Beautiful campus located in the rugged Rocky Mountains**
- **Financial aid available (We have lots of money.)**

Address Inquiries to: Brigham Young University, Dr. Richard W. Hanks, Chairman
Chemical Engineering Dept. 350 CB Provo, Utah 84602

The University of Calgary

Program of Study

The Department of Chemical Engineering provides unusual opportunities for research and study leading to the M.Eng., M.Sc. or Ph.D. degrees. This dynamic department offers a wide variety of course work and research in the following areas: Petroleum Reservoir Engineering, Environmental Engineering, Fluid Mechanics, Heat Transfer, Mass Transfer, Process Engineering, Rheology and Thermodynamics. The University operates on an eight-month academic year, thus allowing four full months per year for research.

The requirements for the M.Eng. and M.Sc. degrees are 4 to 8 courses with a B standing or better and the submission of a thesis on a research project.

The requirements for the Ph.D. degree are 6 to 10 courses and the submission of a thesis on an original research topic for those with a B.Sc. degree.

The M.Eng. program is a part-time program designed for those who are working in industry and would like to enhance their technical education. The M.Eng. thesis is usually of the design type and related to the industrial activity in which the student is engaged. Further details of this program are available from the Department Head, or the Chairman of the Graduate Studies Committee.

Research Facilities

The Department of Chemical Engineering occupies one wing of the Engineering Complex. The building was designed to accommodate the installation and operation of research equipment with a minimum of inconvenience to the researchers. The Department has at its disposal an EA1 690 hybrid computer and a TR48 analog computer an Interdata 7132 mini computer for data acquisition and control and numerous direct access terminals to the University's Honeywell level 68 DPS computing system. In addition, a well equipped Machine Shop and Chemical Analysis Laboratory are operated by the Department. Other major research facilities include a highly instrumented and versatile multiphase pipeline flow loop, an automated pilot plant unit based on the Girbotol Process for natural gas processing, an X-ray scanning unit for studying flow in porous media, a fully instrumented adiabatic combustion tube for research on the in-situ recovery of hydrocarbons from oil sands, a laser anemometer unit, and environmental research laboratories for air pollution, water pollution and oil spill studies.

Financial Aid

Fellowships and assistantships are available with remuneration of up to \$15,000 per annum, with possible remission of fees. In addition, new students may be eligible for a travel allowance of up to a maximum of \$300. If required, loans are available from the Federal and Provincial Governments to Canadian citizens and Landed Immigrants. There are also a number of bursaries, fellowships, and scholarships available on a competition basis to full-time graduate students. Faculty members may also provide financial support from their research grants to students electing to do research with them.

Cost of Study

The tuition fees for a full-time graduate student are \$756 per year plus small incidental fees. Most full-time graduate students to date have had their tuition fees remitted.

Cost of Living

Housing for single students in University dormitories range from \$259/mo. for a double room, to \$320/mo. for a single room, including board. There are a number of new townhouses for married students available, ranging from \$240/mo. for a 1-bedroom, to \$300/mo. for a 2-bedroom and to \$278/mo. for a 3-bedroom unit, including utilities, major appliances and parking. Numerous apartments and private housing are within easy access of the University. Food and clothing costs are comparable with those found in other major North American urban centres.

Student Body

The University is a cosmopolitan community attracting students from all parts of the globe. The current enrollment is about 11,000 with approximately 1,280 graduate students. Most full-time graduate students are currently receiving financial assistance either from internal or external sources.

The Community

The University is a cosmopolitan community attracting students from all parts of the globe. The current enrollment is about 13,000 with the Old West with the sophistication of a modern, dynamic urban centre. Beautiful Banff National Park is 60 miles from the city and the ski resorts of the Banff and Lake Louise areas are readily accessible. Jasper National Park is only five hours away by car via one of the most scenic highways in the Canadian Rockies. A wide variety of cultural and recreational facilities are available both on campus and in the community at large. Calgary is the business centre of the petroleum industry in Canada and as such has one of the highest concentrations of engineering activity in the country.

The University

The University operated from 1945 until 1966 as an integral part of the University of Alberta. The present campus situated in the rolling hills of northwest Calgary, was established in 1960, and in 1966 The University of Calgary was chartered as an autonomous institution by the Province of Alberta. At present the University consists of 14 faculties. Off-campus institutions associated with The University of Calgary include the Banff School of Fine Arts and Centre of Continuing Education located in Banff, Alberta, and the Kananaskis Environmental Research Station located in the beautiful Bow Forest Reserve.

Applying

The Chairman, Graduate Studies Committee
Department of Chemical and Petroleum Engineering
The University of Calgary
Calgary, Alberta T2N 1N4
Canada

UNIVERSITY OF CALIFORNIA

BERKELEY, CALIFORNIA



RESEARCH

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

FACULTY

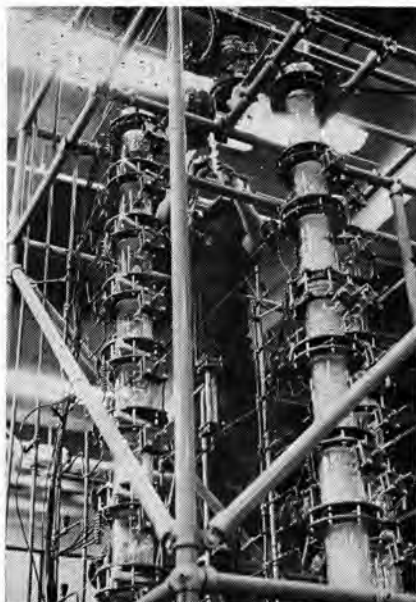
Alexis T. Bell (Chairman)
Harvey W. Blanch
Elton J. Cairns
Morton M. Denn
Alan S. Foss
Simon L. Goren
Edward A. Grens
Donald N. Hanson
Dennis W. Hess
C. Judson King
Scott Lynn
David N. Lyon
John S. Newman
Eugene E. Petersen
John M. Prausnitz
Clayton J. Radke
Edward K. Reiff, Jr
David S. Soong
Charles W. Tobias
Theodore Vermuelen
Charles R. Wilke
Michael C. Williams

FOR APPLICATIONS AND FURTHER INFORMATION, WRITE:

**Department of Chemical Engineering
UNIVERSITY OF CALIFORNIA
Berkeley, California 94720**

UNIVERSITY OF CALIFORNIA

DAVIS



Course Areas

Applied Kinetics and Reactor Design
Applied Mathematics
Biomedical, Biochemical Engineering
Catalysis
Fluid Mechanics
Heat Transfer
Mass Transfer
Process Dynamics
Separation Processes
Thermodynamics
Transport Processes in Porous Media

Faculty

RICHARD L. BELL, University of Washington
Mass Transfer, Biomedical Applications
RUBEN G. CARBONELL, Princeton University
Enzyme Kinetics, Applied Kinetics, Quantum
Statistical Mechanics, Transport Processes in
Porous Media
ALAN P. JACKMAN, University of Minnesota
Environmental Engineering, Transport Phenomena
BEN J. McCOY, University of Minnesota
Separation and Transport Processes
DAVID F. OLLIS, Stanford University
Catalysis, Biochemical Engineering
JOE M. SMITH, Massachusetts Institute of Technology
Applied Kinetics and Reactor Design
PIETER STROEVE, Massachusetts Institute of Technology
Mass Transfer, Colloids
STEPHEN WHITAKER, University of Delaware
Fluid Mechanics, Interfacial Phenomena, Transport
Processes in Porous Media

Degrees Offered

Master of Science
Doctor of Philosophy

Program

UC Davis, with 17,500 students, is one of the major campuses of the University of California system and has developed great strength in many areas of the biological and physical sciences. The Department of Chemical Engineering emphasizes research and a program of fundamental graduate courses in a wide variety of fields of interest to chemical engineers. In addition, the department can draw upon the expertise of faculty in other areas in order to design individual programs to meet the specific interests and needs of a student, even at the M.S. level. This is done routinely in the areas of environmental engineering, food engineering, biochemical engineering and biomedical engineering.

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

Davis and Vicinity

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

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

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

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

CHEMICAL ENGINEERING

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ALIFORNIA

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PROGRAMS

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

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

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

CONTACT

Admissions Officer
Chemical Engineering
5405 Boelter Hall
UCLA
Los Angeles, CA 90024

FACULTY

D. N. Bennion
Yoram Cohen
S. M. Dinh
S. Fathi-Afshar
T. H. K. Frederking
S. K. Friedlander
E. L. Knuth
J. W. McCutchan

Ken Nobe
L. B. Robinson
O. I. Smith
W. D. Van Vorst
V. L. Vilker
F. E. Yates
M. M. Baizer

RESEARCH AREAS

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

UNIVERSITY OF CALIFORNIA

SANTA BARBARA



FACULTY AND RESEARCH INTERESTS

SANJOY BANERJEE

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

H. CHIA CHANG Ph.D. (Princeton)

Chemical Reactor Modeling,
Applied Mathematics

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

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

HUSAM GUROL Ph.D. (Michigan)

Statistical Mechanics, Polymers,
Radiation Damage to Materials,
Nuclear Reactor Theory.

OWEN T. HANNA Ph.D. (Purdue)

(Chairman)
Theoretical Methods, Chemical
Reactor Analysis, Transport
Phenomena.

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

Radiation Damage, Mechanics of
Materials.

DUNCAN A. MELLICHAMP

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

JOHN E. MYERS

Ph.D. (Michigan)
(Dean of Engineering)
Boiling Heat Transfer.

G. ROBERT ODETTE

Ph.D. (M.I.T.)
(Vice Chairman, Nuclear Engineering)
Radiation Effects in Solids, Energy
Related Materials Development.

A. EDWARD PROFIO

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

ROBERT G. RINKER

Ph.D. (Caltech)
Chemical Reactor Design, Catalysis,
Energy Conversion, Air Pollution.

ORVILLE C. SANDALL

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

DALE E. SEBORG

Ph.D. (Princeton)
Process Control, Computer Control,
Process Identification.

PROGRAMS AND FINANCIAL SUPPORT

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

THE UNIVERSITY

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

For additional information and applications, write to:

Professor Owen T. Hanna, Chairman
Department of Chemical & Nuclear
Engineering
University of California,
Santa Barbara, CA 93106

Caltech



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

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

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

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

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

It is advisable to submit applications before February 15, 1982.

FACULTY IN CHEMICAL ENGINEERING

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

WILLIAM H. CORCORAN, Institute Professor
Ph.D. (1948), California Institute of Technology
Kinetics and catalysis; biomedical engineering; air and water quality.

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

ERIC HERBOLZHEIMER, Assistant Professor
Ph.D. (1979), Stanford University
Fluid mechanics and transport phenomena

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

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

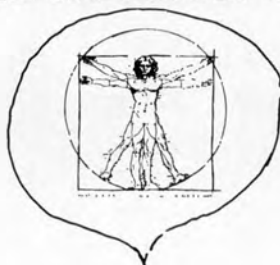
FRED H. SHAIR, Professor
Ph.D. (1963), University of California, Berkeley
Plasma chemistry and physics; tracer studies of various environmental problems.

GREGORY N. STEPHANOPOULOS, Assistant Professor
Ph.D. (1978), University of Minnesota
Biochemical engineering; chemical reaction engineering.

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

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

Have you considered Graduate Studies in Biomedical Engineering/ Chemical Engineering at CARNEGIE-MELLON UNIVERSITY?



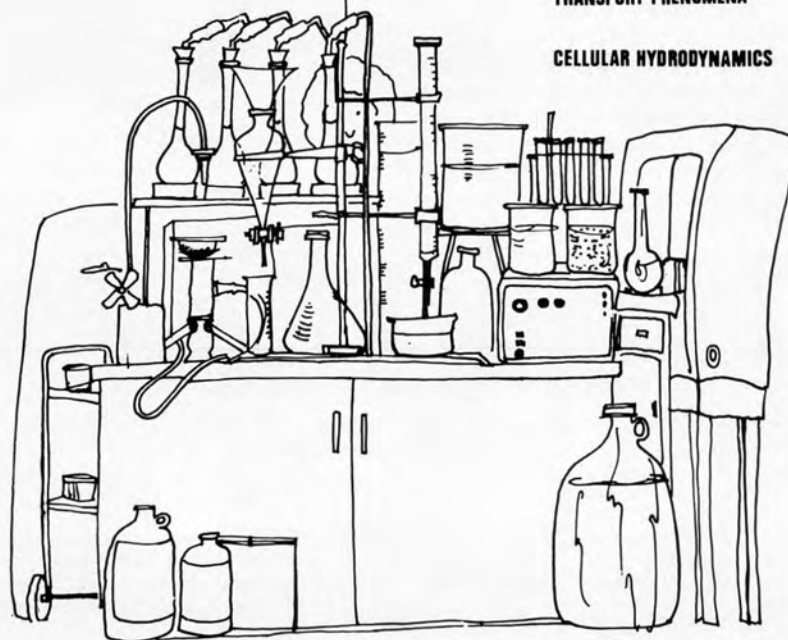
VASCULAR PHYSIOLOGY

PHARMACOKINETICS

MEMBRANES

TRANSPORT PHENOMENA

CELLULAR HYDRODYNAMICS



Break Through

Write: Chairman Carnegie Mellon University Biomedical Engineering Program
Science 1325 Pgh. Pa 15213

THE FINEST CHOICE



write

Graduate Chemical Engineering
Carnegie-Mellon University
Pittsburgh, Pennsylvania 15213



IS THERE LIFE AFTER GRADUATE STUDY?

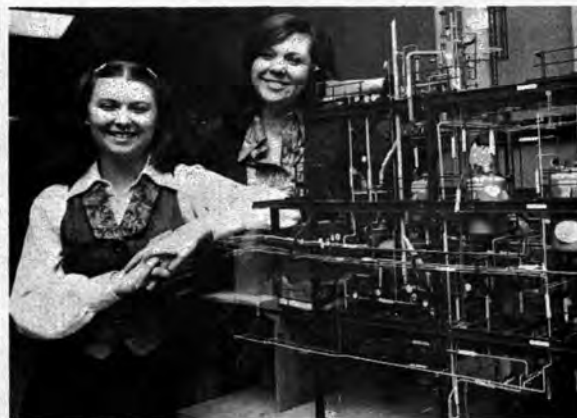
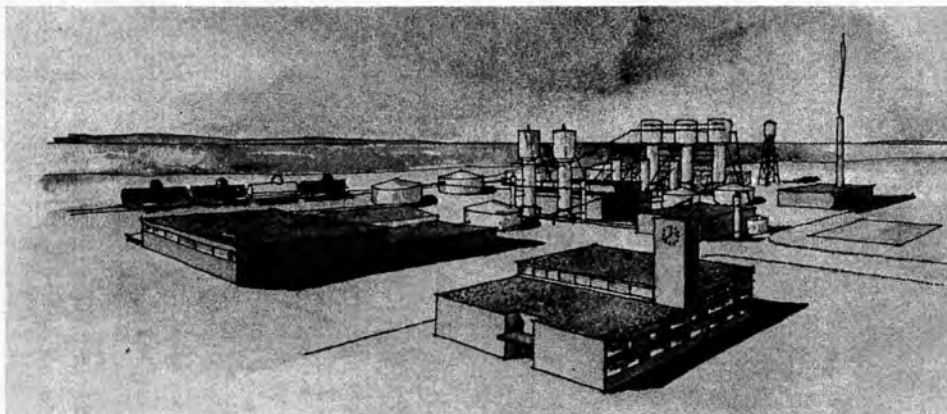
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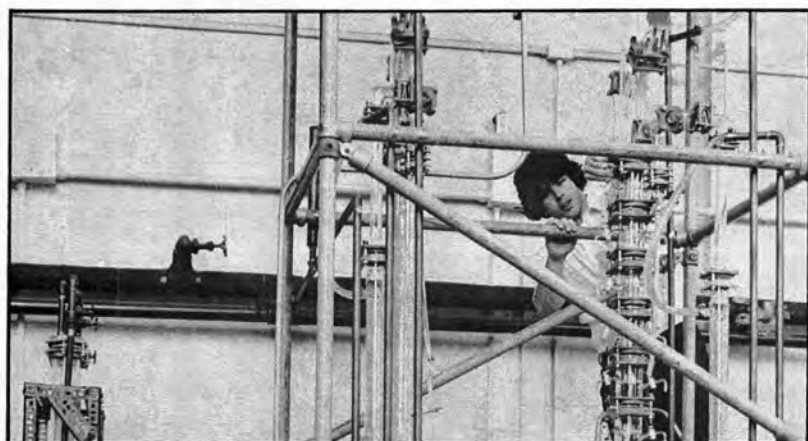
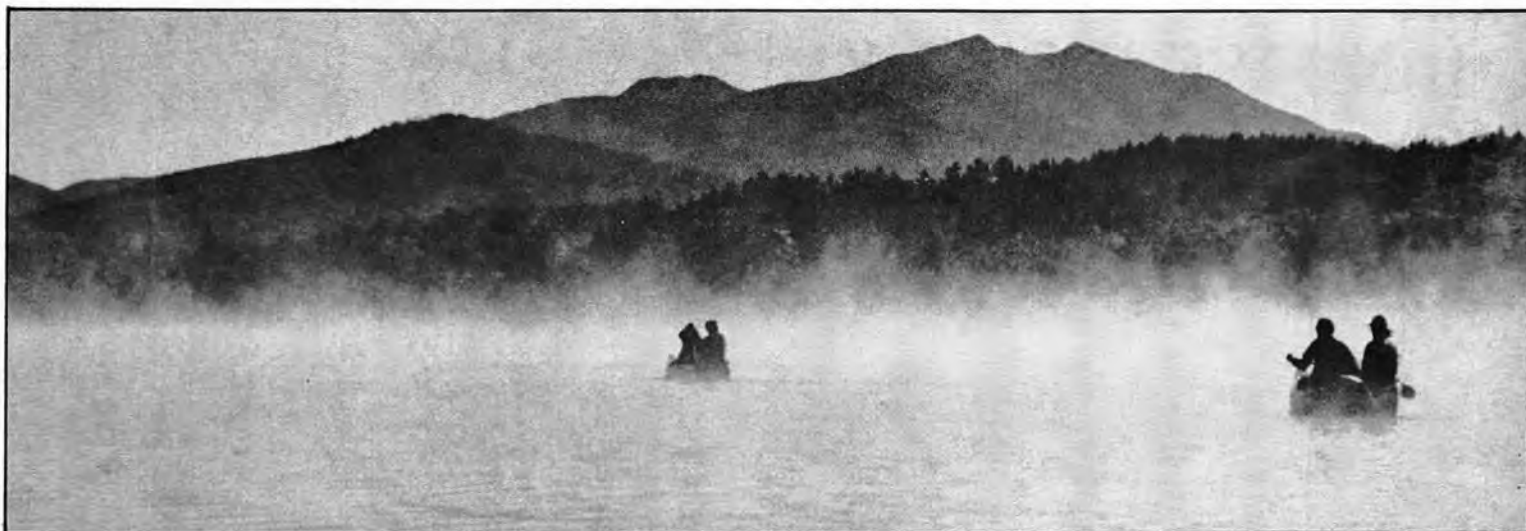
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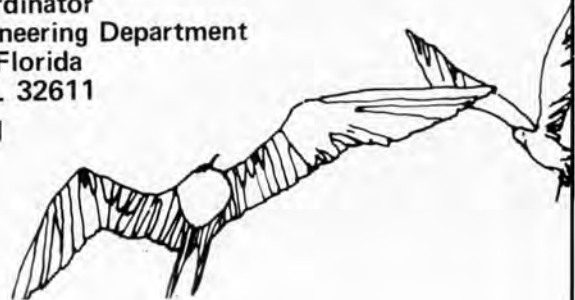
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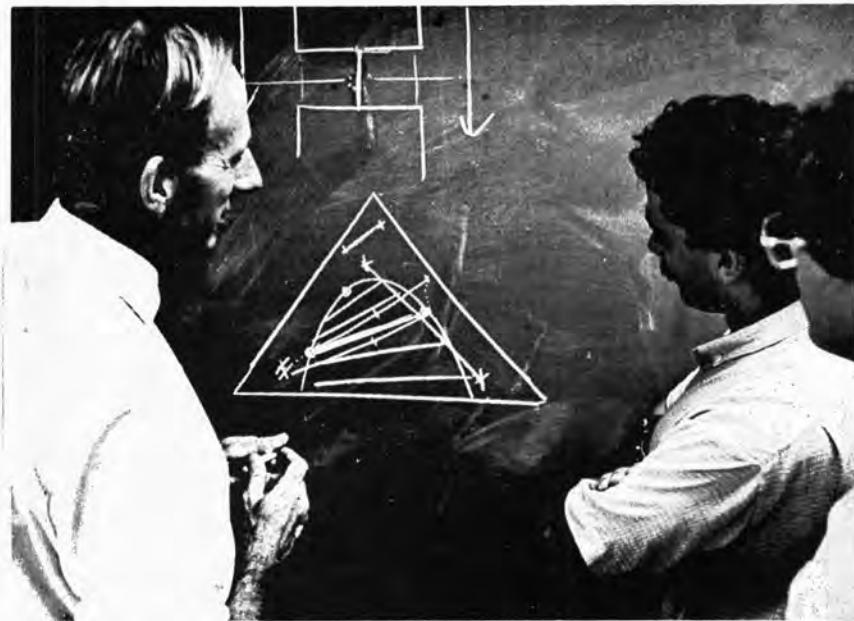
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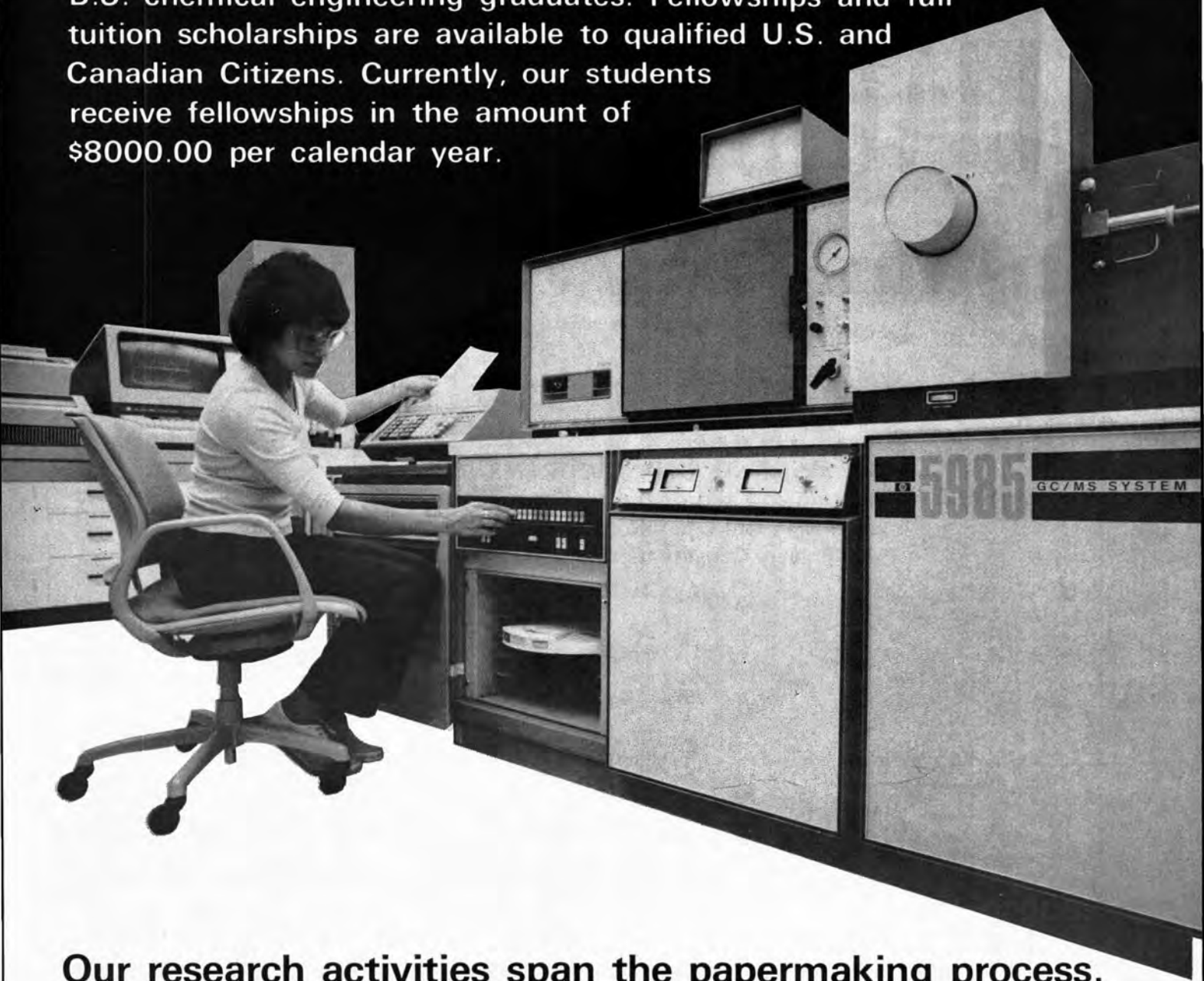
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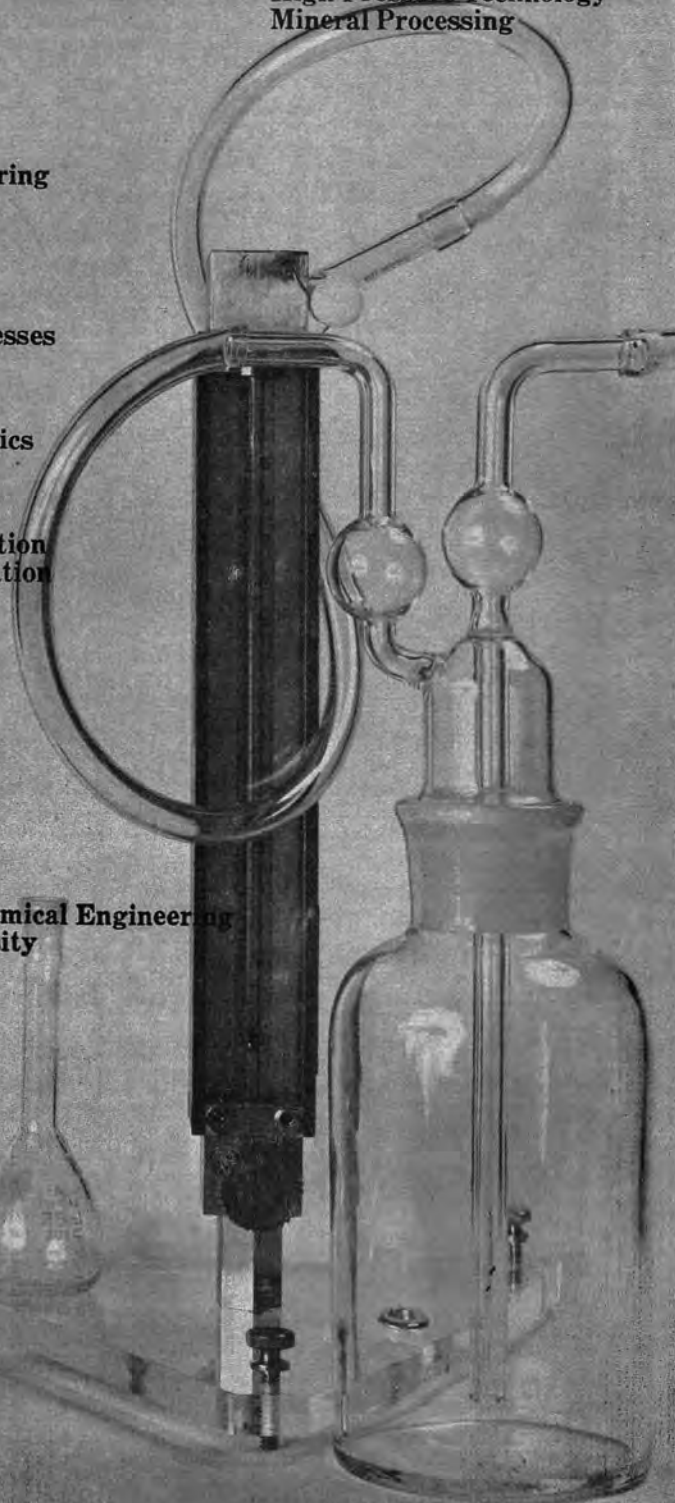
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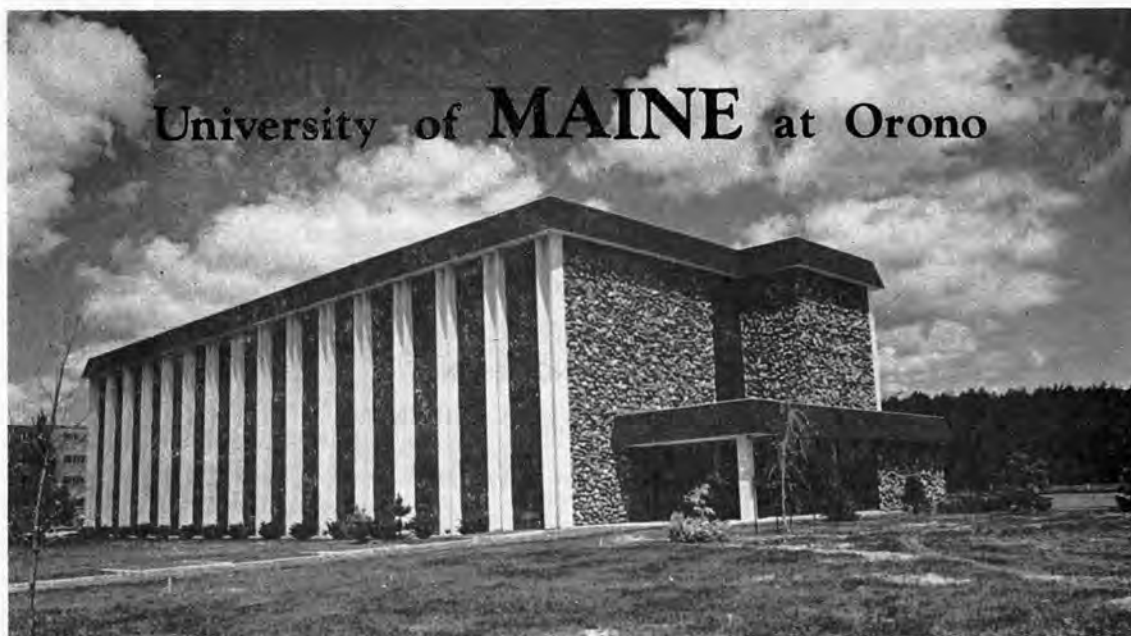
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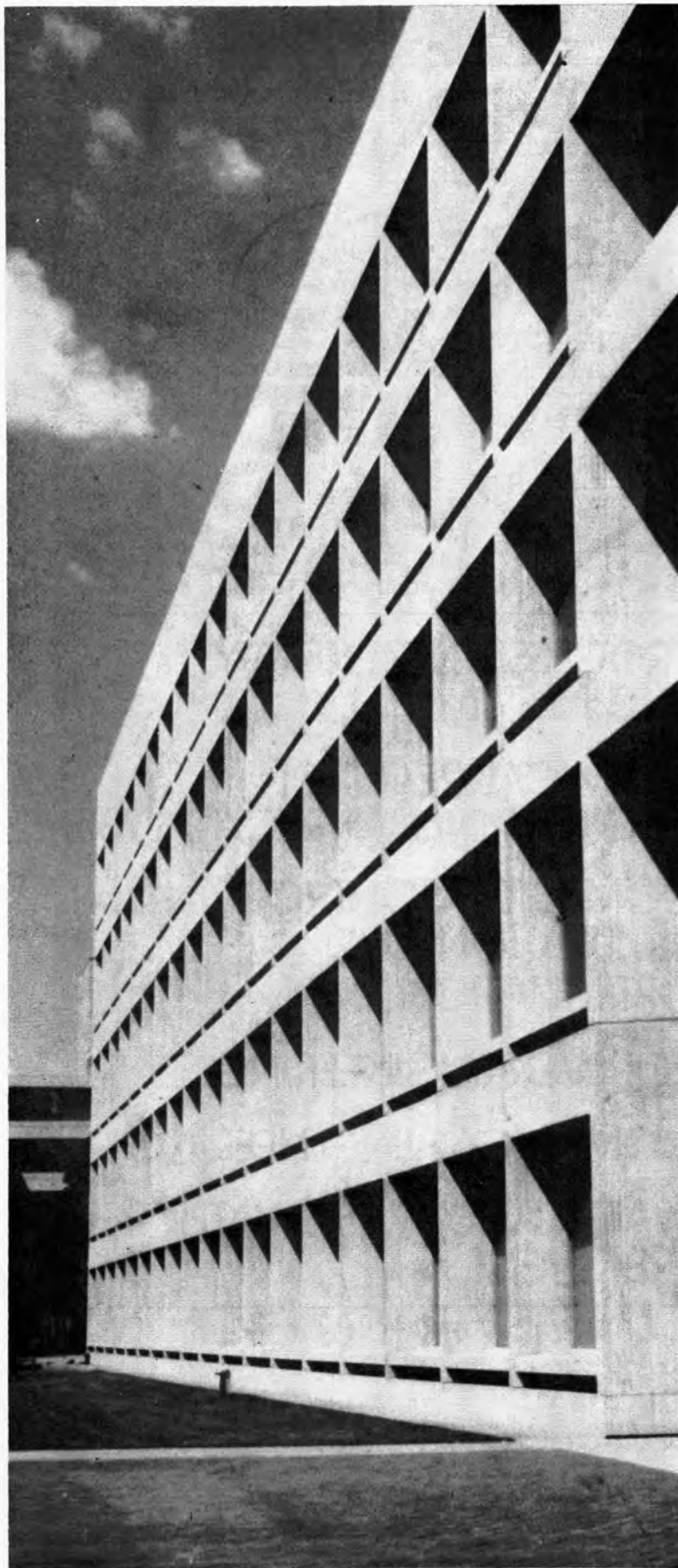


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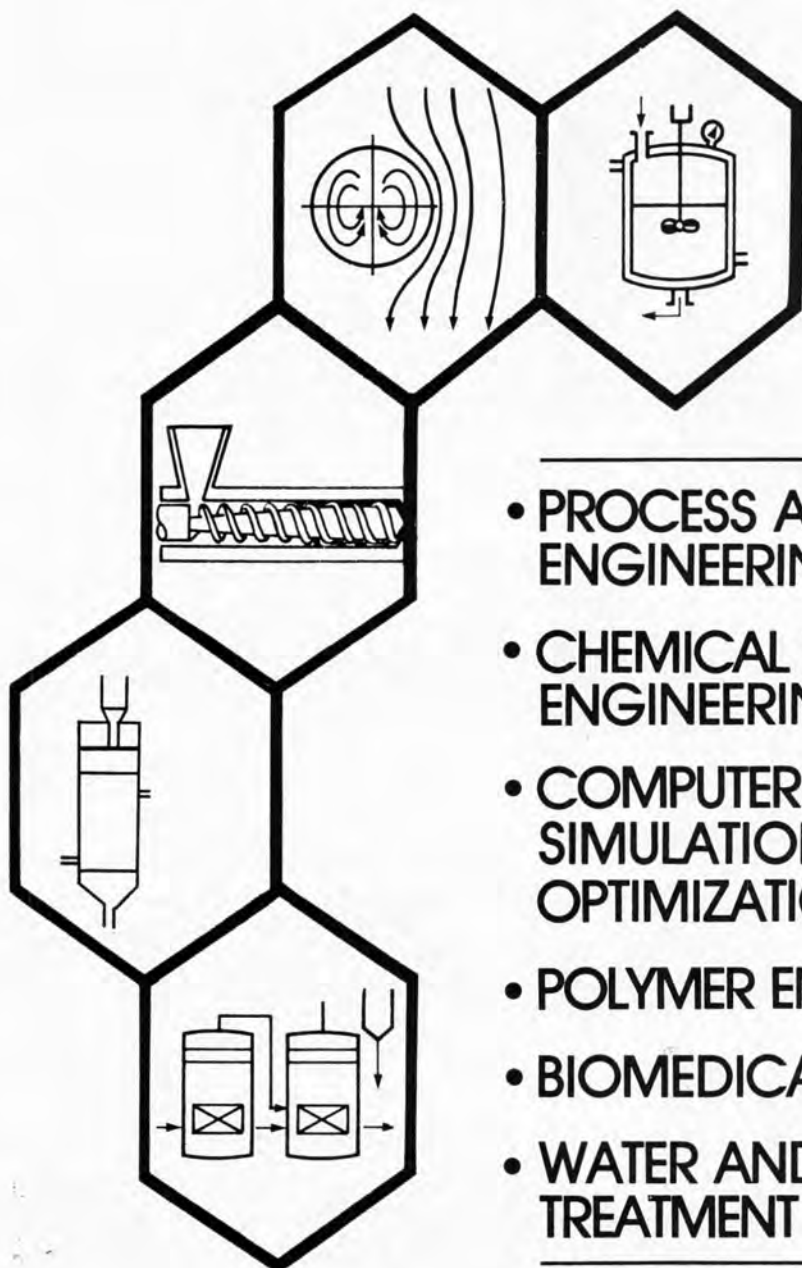
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P. NEOGI (Ph.D., Carnegie-Mellon)—Interfacial Phenomena

R. A. MOLLENKAMP (Ph.D., Louisiana State)—Process Dynamics and Control.

G. K. PATTERSON (Ph.D., Missouri-Rolla)—Turbulence, Mixing, Mixed Reactors, Polymer Rheology.

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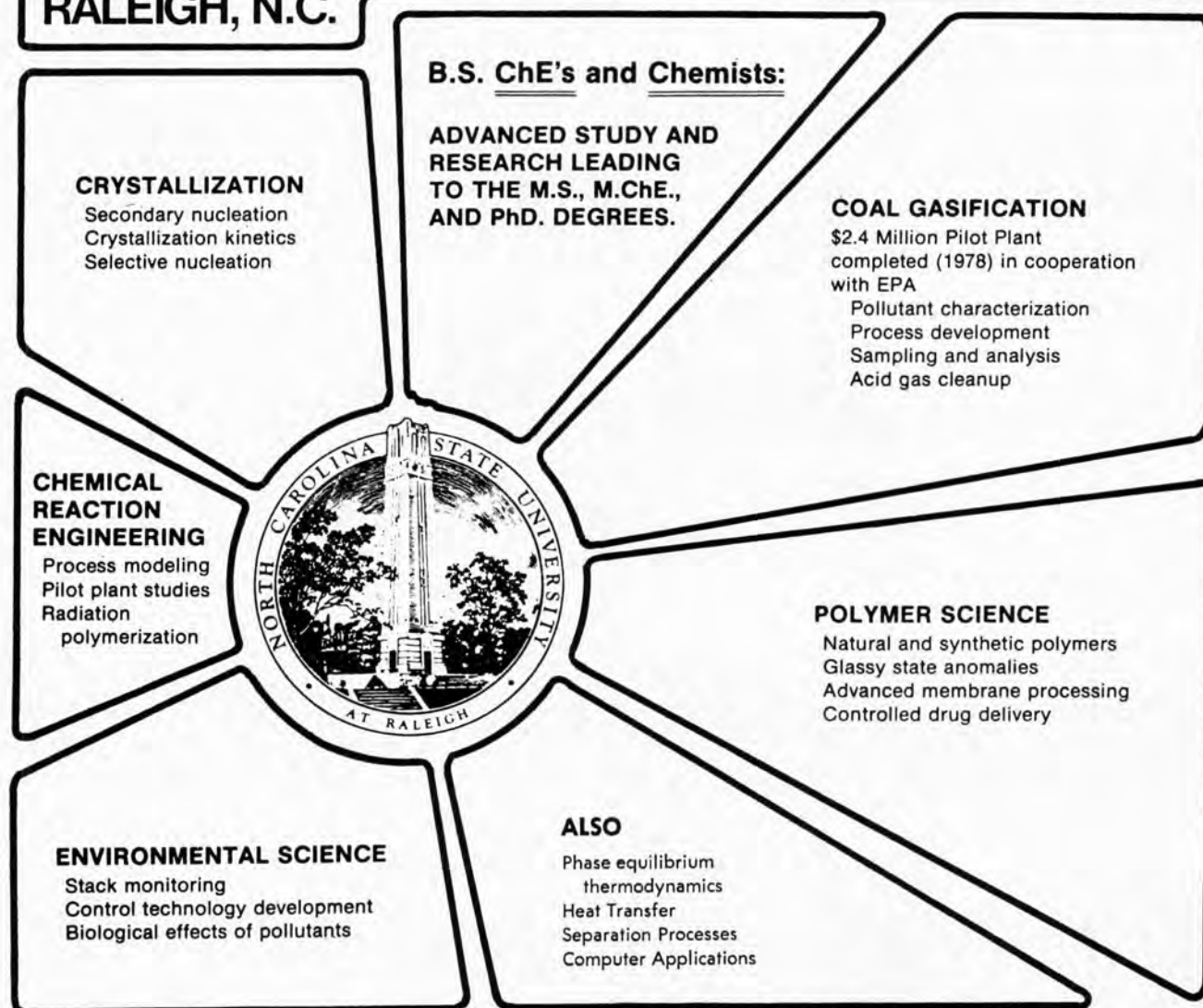
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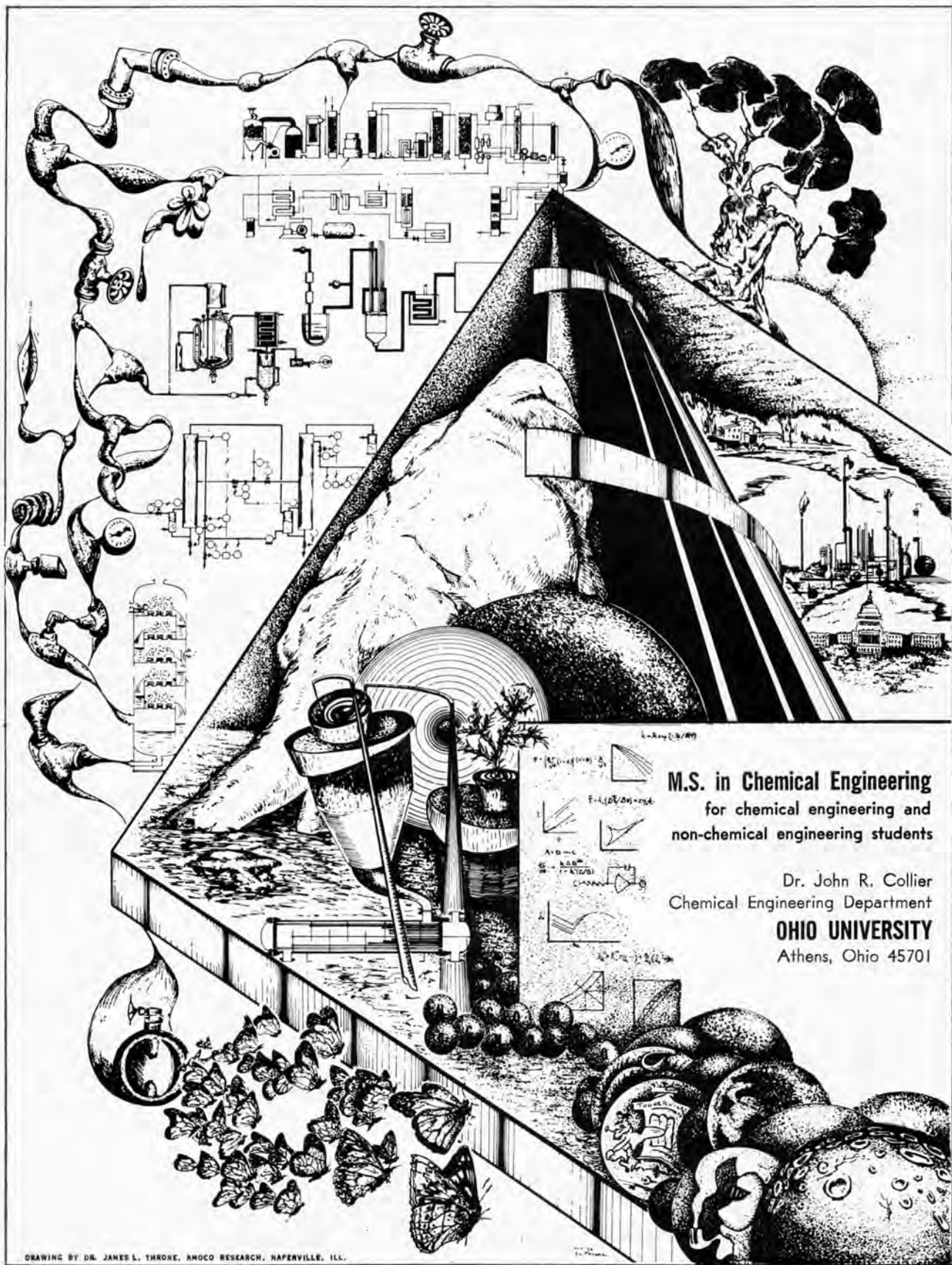
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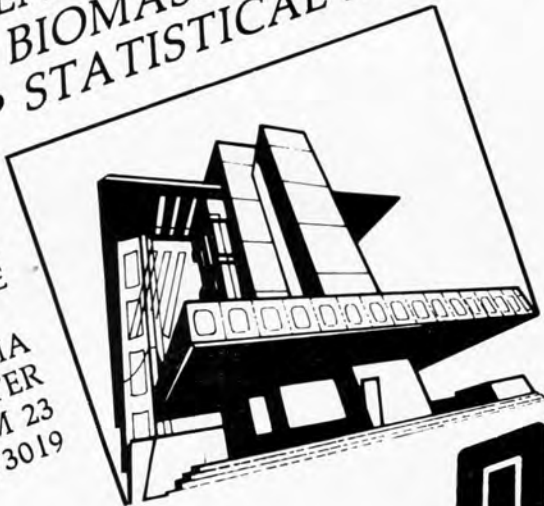
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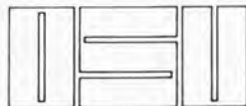


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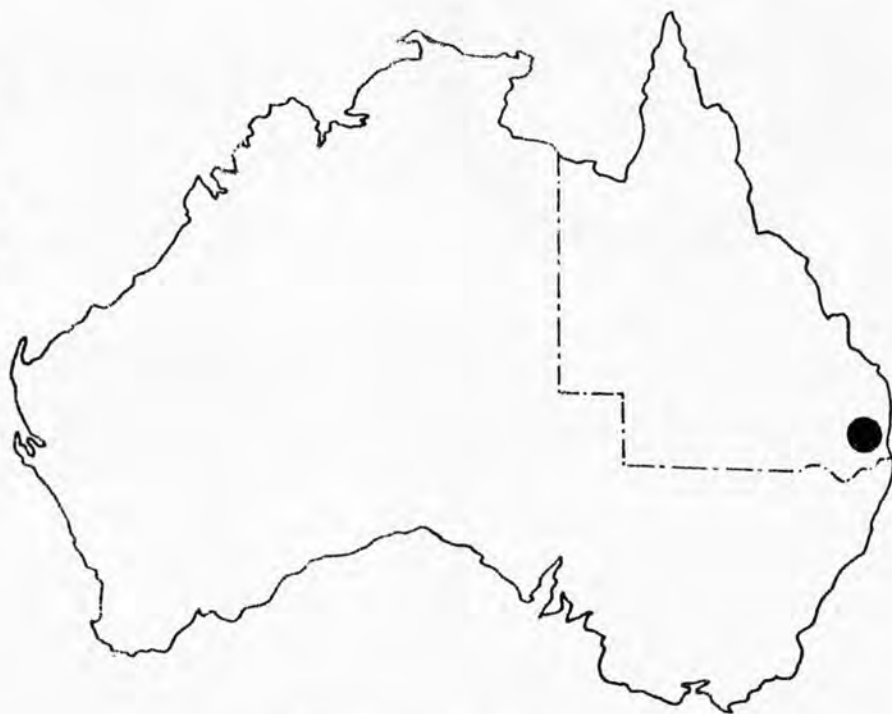


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M.W. Davis, Jr., Professor, Ph.D., University of California (Berkeley), 1951 (Kinetics and catalysis, chemical process analysis, solvent extraction, waste treatment)

J.H. Gibbons, Professor, Ph.D., University of Pittsburgh, 1961 (Heat transfer, fluid mechanics).

F.P. Pike, Professor Emeritus, Ph.D., University of Minnesota, 1949 (Mass transfer in liquid-liquid systems, vapor-liquid equilibria).

T.G. Stanford, Assistant Professor, Ph.D., The University of Michigan, 1977 (Chemical reactor engineering, mathematical modeling of chemical systems, process design, thermodynamics).

V. Van Brunt, Associate Professor, Ph.D., University of Tennessee, 1974 (Mass transfer, computer modeling, fluidization).

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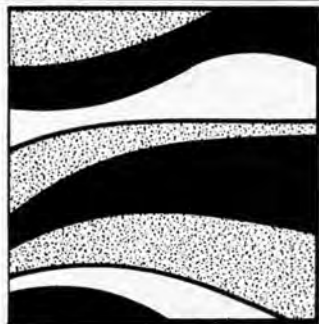
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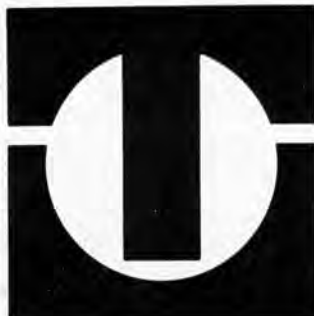
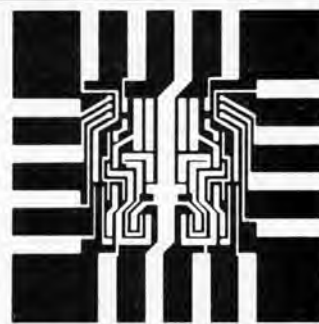
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of Polymer Engineering

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Chromatographic
and Ultracentrifuge
Studies of Macromolecules
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Corrosion
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The University of Texas at Austin

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for additional information:

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



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- R. G. Anthony—catalysis
- D. B. Bukur—simulation
- J. A. Bullin—pollution
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- L. D. Durbin—process control
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FOR INFORMATION CONTACT:

**Graduate Advisor
Chemical Engineering Dept.
Texas A&M University
College Station, TX 77843
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Thermodynamics
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Biomedical Engineering
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Biochemical Engineering

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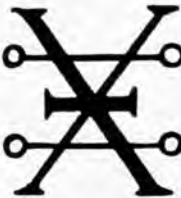


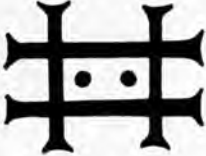
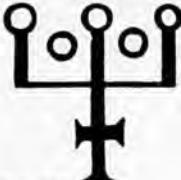







Surface Activity

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

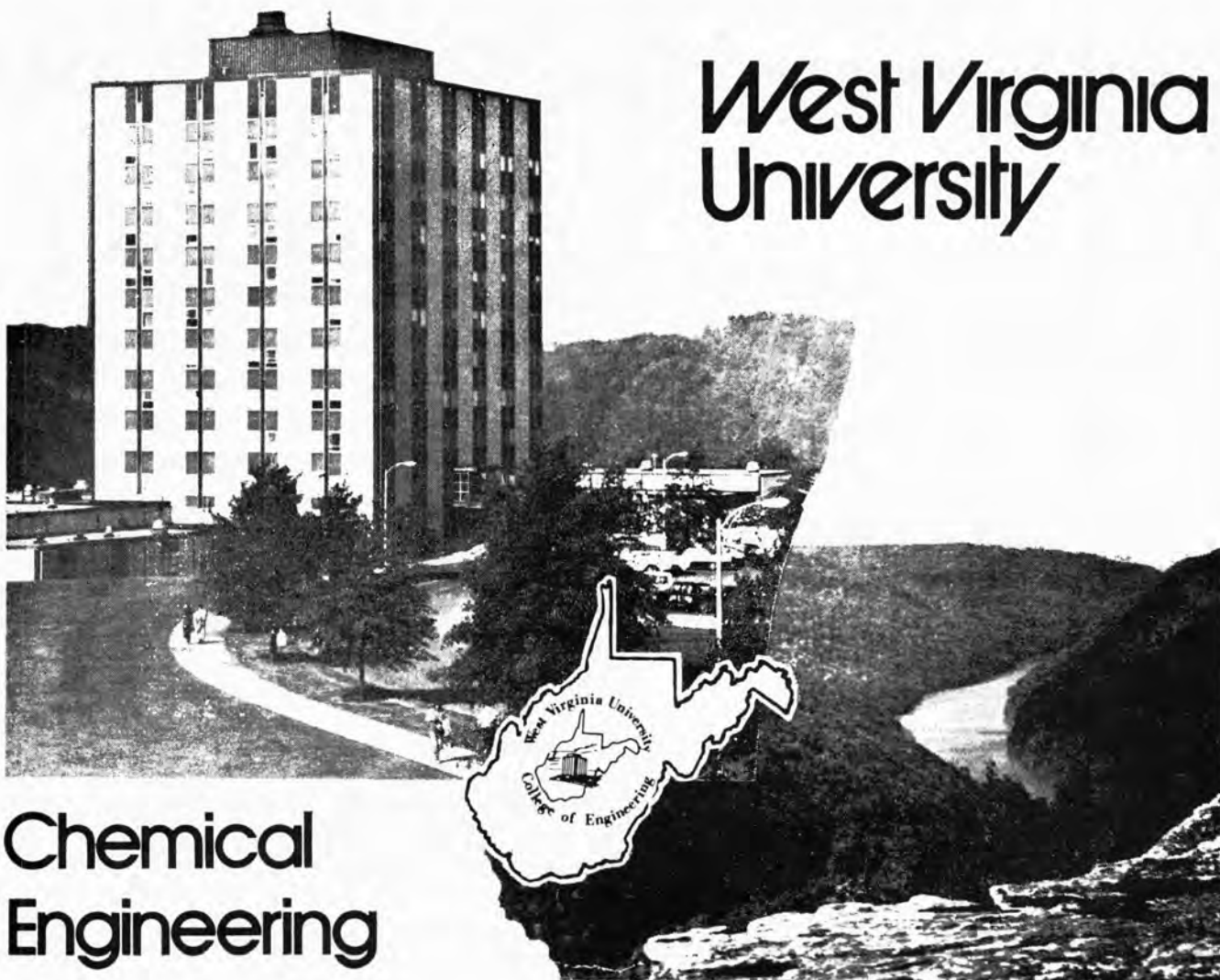
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 Mercury	 Zinc
 Aqua Vitae	 White Arsenic
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West Virginia University



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- Combustion
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- SO₂ Scrubbing
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- Economic Impact of Environmental Regulations

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- Chemical Kinetics
- Separation Processes
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- Polymers
- Fluidization
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- Transport Phenomena
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M.S. and Ph.D. Programs

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Department of Chemical Engineering
West Virginia University
Morgantown, West Virginia 26506
CHEMICAL ENGINEERING EDUCATION

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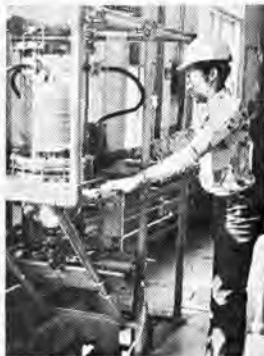
BUCKNELL UNIVERSITY
Department of
Chemical Engineering

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M. E. Hanyak, Jr. (Ph.D., University of Pennsylvania). Computer-aided design and instruction, problem-oriented languages, numerical analysis.

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The Associate Chairman (Graduate Studies)
Department of Chemical Engineering
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Canada N2L 3G1

Further information: See CEE, p. 4, Winter 1975



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Professor J. Calo, Coordinator
Chemical Engineering Program
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DOCTOR OF ENGINEERING

MASTER OF SCIENCE PROGRAM IN

CHEMICAL ENGINEERING



AREAS OF SPECIALIZATION

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Porous Media

Bioengineering

Reaction Engineering

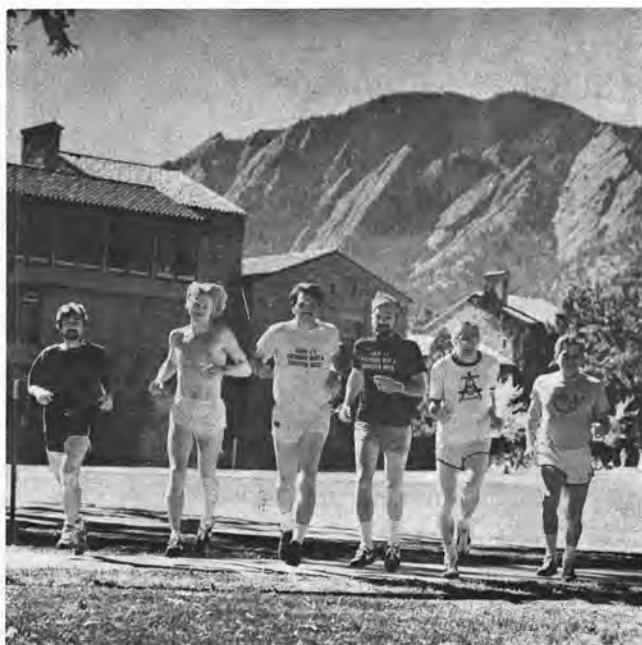
Simulation Processes

Zeolites

The program may be designed as terminal or as preparation for further advance study leading to the doctorate. Financial assistance is available.

FOR FURTHER INFORMATION, PLEASE CONTACT:

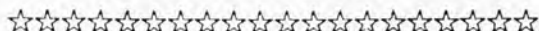
Department of Chemical Engineering
The Cleveland State University
Euclid Avenue at East 24th Street
Cleveland, Ohio 44115



l to r: Professors R. J. MacGregor, J. L. Falconer, W. F. Ramirez, W. B. Krantz, K. D. Timmerhaus, and M. S. Peters
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Professor Max S. Peters, Chairman
Department of Chemical Engineering
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M. L. JACKSON	—Mass Transfer in Biological Systems, Particulate Control Technology
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Research Areas

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Nucleation and Crystallization
Electrochemical Engineering
Rheology
Coal Conversion
Turbulence and Mixing
Mass and Heat Transfer
Process Modeling and Control

Please contact:
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Department of Chemical Engineering
The Johns Hopkins University
Baltimore, Maryland 21218
301-338-7761



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Thermochemical Hydrogen Production; 2nd Law
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Transport Phenomena
Simultaneous Heat and Mass Transfer; Fuel Gas
Desulfurization

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J. T. Schrodt
Director for
Graduate Studies
Chemical Engineering Dept.
University of Kentucky
Lexington, Kentucky 40506



Department of Chemical Engineering

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Department of Chemical Engineering
Whitaker Laboratory, Bldg. 5
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Degrees

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Biomedical Engineering

Catalysis

Energy Sources and Systems

Environmental Control Engineering

Heat and Mass Transport Influence by Fields

Newtonian and Non-Newtonian Fluid Mechanics

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G. R. Cokelet, Sc. D., 1963, MIT	Blood & Suspension Rheology, Biotechnology
R. F. Eisenberg, M.S., 1948, Rochester	Corrosion, Physical Metallurgy
M. R. Feinberg, Ph.D., 1968, Princeton	Complex Reaction Systems, Continuum Mechanics
J. R. Ferron, Ph.D., 1958, Wisconsin	Molecular Transport Processes, Applied Mathematics
J. C. Friedly, Ph.D., 1965, California (Berkeley)	Process Dynamics, Control, Heat Transfer
R. H. Heist, Ph.D., 1972, Purdue	Nucleation, Solid State, Atmospheric Chemistry
R. H. Notter, Ph.D., 1969, Washington (Seattle)	Interfacial Phenomena, Bioengineering
M.D., 1980, Rochester	
H. J. Palmer, Ph.D., 1971, Washington (Seattle)	Interfacial Phenomena, Mass Transfer
H. Saltsburg, Ph.D., 1955, Boston	Surface Phenomena, Catalysis, Molecular Scattering
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Rheology and mechanics of non-Newtonian fluids and composite materials, transport processes

LYMAN L. HANDY

(Ph.D., Phys. Chem., U. of Wash., 1951)
Fluid flow through porous media and petroleum reservoir engineering

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Distillation, air pollution, design of chemical plants

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Thermodynamics, statistical mechanics and liquid state physics

CHARLES J. REBERT

(Ph.D., Ch.E., Ohio State U., 1955)
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RONALD SALOVEY

(Ph.D., Phys. Chem., Harvard, 1958)
Physical chemistry and irradiation of polymers, characterization of elastomers and polyurethanes

THEODORE T. TSOTSIS

(Ph.D., Ch.E., U. of Ill., Urbana, 1978)
Chemical reaction engineering, process dynamics and control

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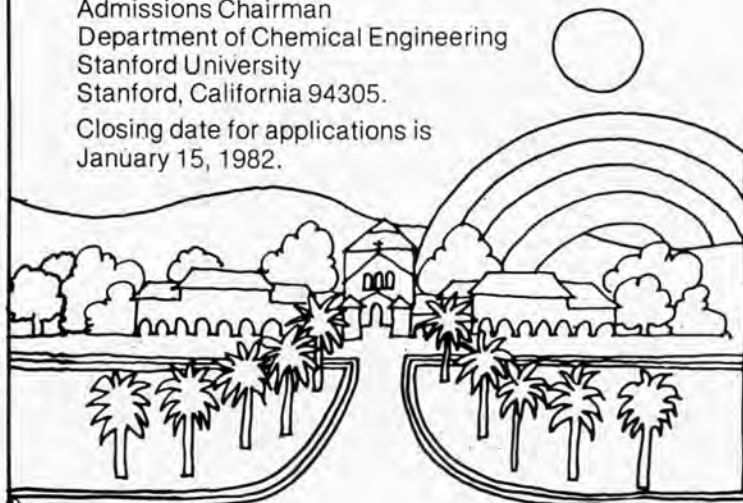
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