UNIVERSITY OF ALBERTA

EDMONTON, ALBERTA, CANADA

Graduate Programs in Chemical Engineering

Financial Aid

Ph.D. Candidates: up to $6,500/year.
M.Sc. Candidates: up to $6,000/year.

Commonwealth Scholarships, Industrial Fellowships and limited travel funds are available.

Costs.

Tuition: $535/year.
Married students housing rent: $154/month.
Room and board, University Housing: $190/month.

Department Size

13 Professors, 20 Research Associates
30 Graduate Students.

Applications

For additional information write to:

Chairman
Department of Chemical Engineering
University of Alberta
Edmonton, Alberta, Canada T6G 2E6

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.

J. H. Masliyah, Ph.D. (Brit. 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, Computer Design of Separation Processes, Environmental Engineering.

D. Quon, (Associate Dean), Sc.D. (M.I.T.): Applied Mathematics, Optimization, Statistical Decision 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.

D. E. Seborg, Ph.D. (Princeton): Process Control, Computer Control, Process Identification

F. A. Seyer, Ph.D. (Delaware): Turbulent Flow, Rheology of Complex Fluids.

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

R. K. Wood, Ph.D. (Northwestern): Process Dynamics and Identification, Control of Distillation Columns.

The University of Alberta

One of Canada's largest universities and engineering schools.

Enrollment of 19,000 students.

Co-educational, government-supported, non-denominational.

Five minutes from city centre, overlooking scenic river valley.

Edmonton

Fast growing, modern city; population of 500,000.

Resident professional theatre, symphony orchestra, professional sports.

Major chemical and petroleum processing centre.

Within easy driving distance of the Rocky Mountains and Jasper and Banff National Parks.

THE UNIVERSITY OF ARIZONA

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, 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:

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

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

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

RICHARD D. WILLIAMS, Assoc. Professor
Ph.D., Princeton University, 1972
Catalysis, Chemical Reactor Engineering, Energy and Environmental Problems, Kinetics of Heterogenous Reaction—Applications to the Minerals Industry.

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

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

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

JAMES WM. WHITE, Assoc. Professor
Ph.D., University of Wisconsin, 1968
Real-Time Computing, Process Instrumentation and Control, Model Building and Simulation

Tucson has an excellent climate and many recreational opportunities. It is a growing, modern city of 400,000 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 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 6 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 8 to 12 courses and the submission of a thesis on an original research topic.

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 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 and numerous direct access terminals to the University's CDC Cyber 172 digital computer. 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 $6,000 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 $625 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 $172/mo. for a double room, to $205/mo. for a single room, including board. There are a number of new townhouses for married students available, ranging from $177/mo. for a 1-bedroom, to $193/mo. for a 2-bedroom and to $209/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 enrolment is about 12,000 with approximately 1,000 graduate students. Most full-time graduate students are currently receiving financial assistance either from internal or external sources.

The Community

The University is located in Calgary, Alberta, home of the world famous Calgary Stampede. This city of 570,000 combines the traditions of 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

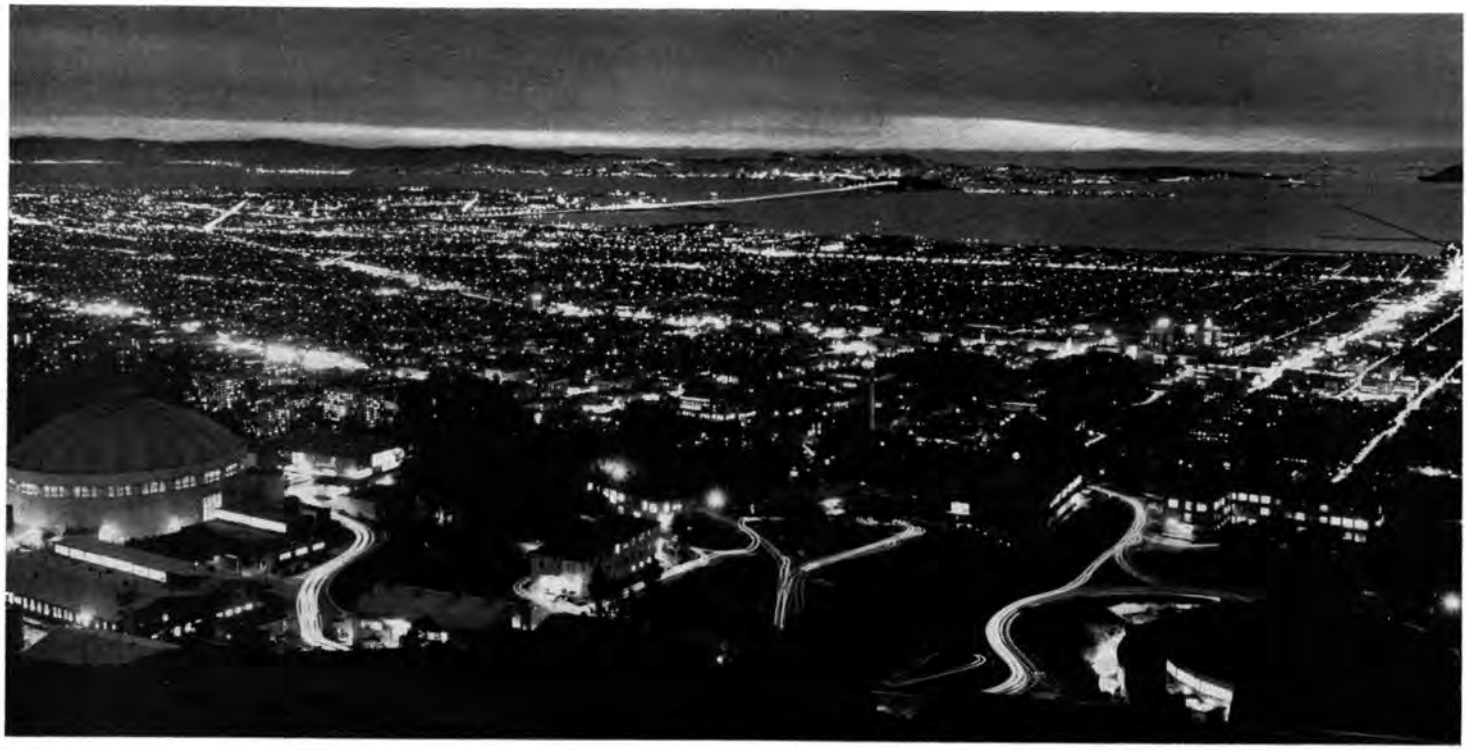
The University operated from 1945 until 1966 as an integral part of the University of Alberta. The present campus situated in the rolling hills of northwest Calgary, was established in 1960, and in 1966 The University of Calgary was chartered as an autonomous institution by the Province of Alberta. At 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 Engineering
The University of Calgary
Calgary, Alberta T2N 1N4
Canada

UNIVERSITY OF CALIFORNIA

BERKELEY, CALIFORNIA



RESEARCH

ENERGY UTILIZATION

ENVIRONMENTAL

KINETICS AND CATALYSIS

THERMODYNAMICS

ELECTROCHEMICAL ENGINEERING

PROCESS DESIGN
AND DEVELOPMENT

BIOCHEMICAL ENGINEERING

MATERIAL ENGINEERING

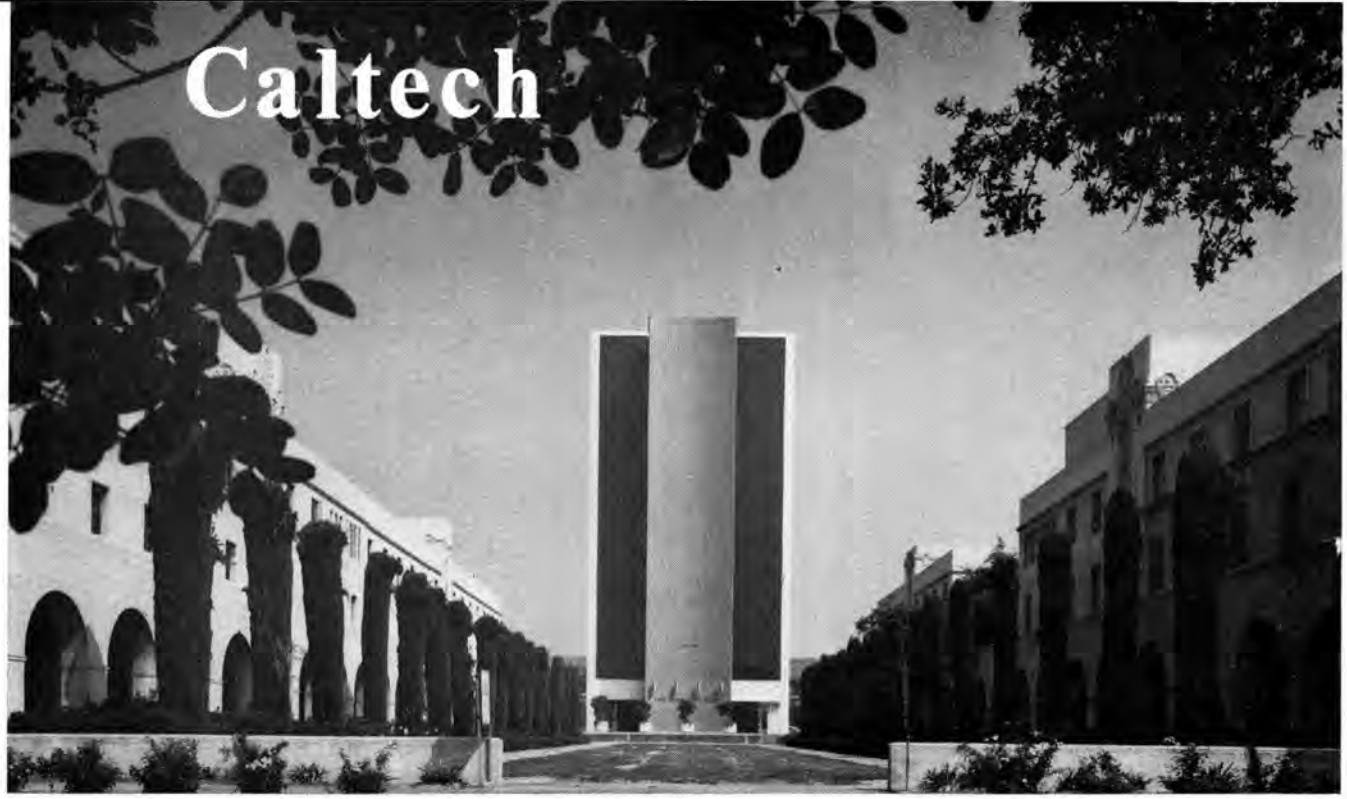
FLUID MECHANICS
AND RHEOLOGY

FACULTY

Alexis T. Bell
Alan S. Foss
Simon L. Goren
Edward A. Grens
Donald N. Hanson
C. Judson King (Chairman)
Scott Lynn
David N. Lyon
John S. Newman
Eugene E. Petersen
John M. Prausnitz
Clayton J. Radke
Mitchel Shen
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



PROGRAM OF STUDY Distinctive features of study in chemical engineering at the California Institute of Technology are the creative research atmosphere in which the student finds himself and the strong emphasis on basic chemical, physical, and mathematical disciplines in his program of study. In this way a student can properly prepare himself 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 terminal M.S. option, involving either research or an integrated design project, is a newly added 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 J. H. Seinfeld
Executive Officer for Chemical Engineering
California Institute of Technology
Pasadena, California 91125

It is advisable to submit applications before February 15, 1977.

FACULTY IN CHEMICAL ENGINEERING

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

SHELDON K. FRIEDLANDER, Professor
Ph.D. (1954), University of Illinois
Aerosol chemistry and physics; air pollution; biomedical engineering; interfacial transfer; diffusion and membrane transport.

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

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

CORNELIUS J. PINGS, Professor,
Vice-Provost, and Dean of Graduate Studies
Ph.D. (1955), California Institute of Technology
Liquid state physics and chemistry; statistical mechanics.

JOHN H. SEINFELD, Professor,
Executive Officer
Ph.D. (1967), Princeton University
Control and estimation theory; air pollution.

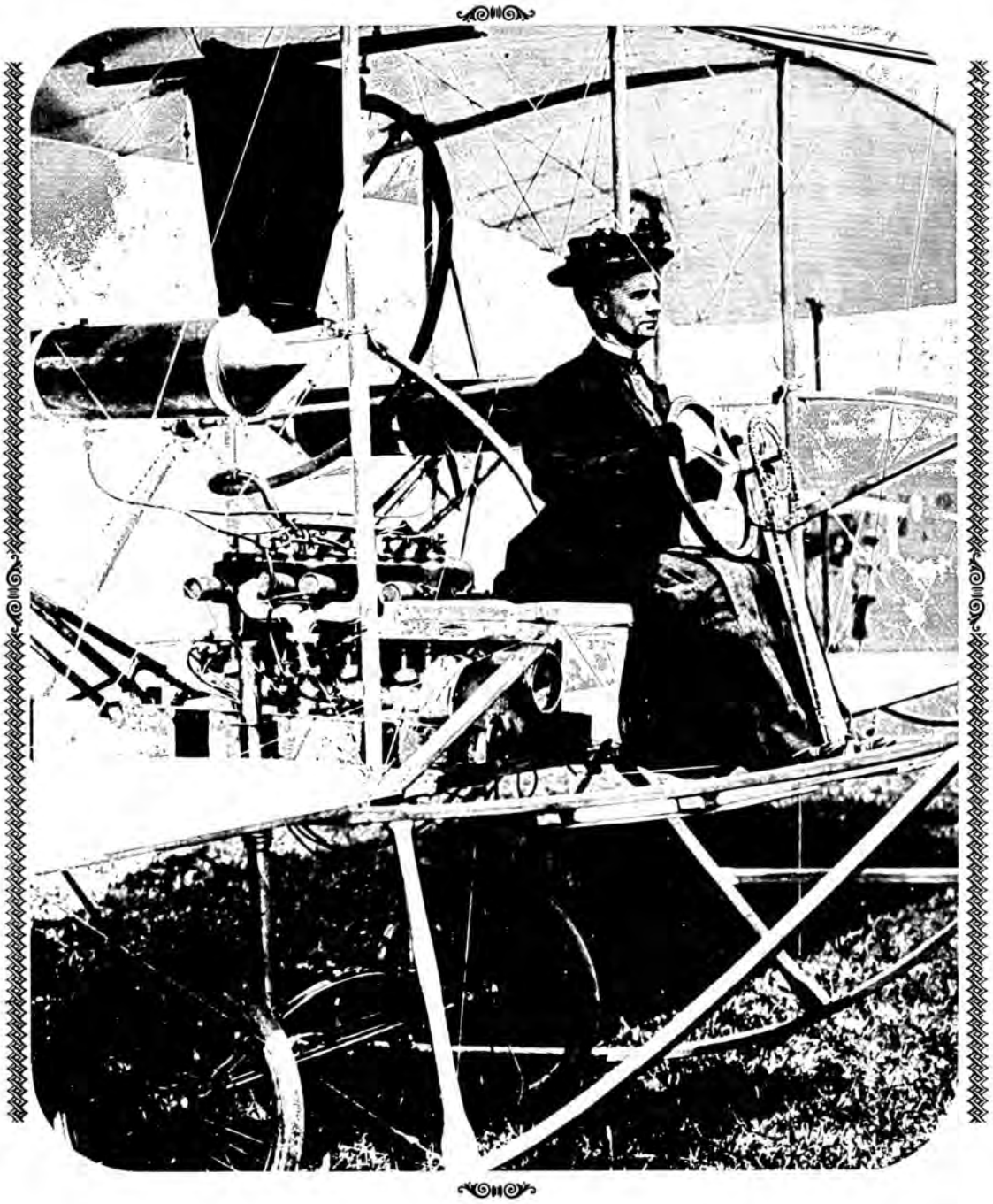
FRED H. SHAIR, Professor
Ph.D. (1963), University of California, Berkeley
Plasma chemistry and physics; tracer studies of various environmental problems.

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

ROBERT W. VAUGHAN, Associate Professor
Ph.D. (1967), University of Illinois
Solid state and surface chemistry.

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

Get your career off the ground.



Graduate Chemical Engineering

Carnegie-Mellon University
Schenley Park Pittsburgh Pennsylvania 15213

M.S. and Ph.D. Programs
in
CHEMICAL ENGINEERING
at
Case Institute of Technology
of
CASE WESTERN RESERVE UNIVERSITY

THE UNIVERSITY

Case Institute of Technology is a privately endowed institution with traditions of excellence in Engineering and Applied Science since 1880. In 1967, Case Institute and Western Reserve University joined together. The enrollment, endowment and faculty make Case Western Reserve University one of the leading private schools in the country. The modern, urban campus is located in Cleveland's University Circle, an extensive concentration of educational, scientific, social and cultural organizations.

CHEMICAL ENGINEERING DEPARTMENT

The department is growing and has recently moved to a new complex. This facility provides for innovations in both research and teaching. Courses in all of the major areas of Chemical Engineering are available. Case Chemical Engineers have founded and staffed major chemical and petroleum companies and have made important technical and entrepreneurial contributions for over a half a century.

ACTIVE RESEARCH AREAS IN CHEMICAL ENGINEERING

Environmental Engineering
Control & Optimization
Computer Simulation
Systems Engineering
Foam & Colloidal Science
Transport Processes
Coal Gasification
Biomedical Engineering
Surface Chemistry & Catalysis
Crystal Growth & Materials
Laser Doppler Velocimetry
Chemical Reaction Engineering

FINANCIAL AID

Fellowships, Teaching Assistantships and Research Assistantships are available to qualified applicants. Applications are welcome from graduates in Chemistry and Chemical Engineering.

FOR FURTHER INFORMATION
Contact: Graduate Student Advisor
Chemical Engineering Department
Case Western Reserve University
Cleveland, Ohio 44106

DEPARTMENT OF CHEMICAL ENGINEERING

CLARKSON

PROGRAMS LEADING TO THE DOCTORAL DEGREE IN CHEMICAL ENGINEERING AND ENGINEERING SCIENCE

Clarkson's multimillion dollar Science Center was dedicated in 1970 and is one of the finest facilities of its kind in New York.

CHEMICAL ENGINEERING FACULTY

W.R. WILCOX—Prof. and Chmn. (Ph.D., 1960, University of California, Berkeley) Crystal growth phenomena, new separation techniques.

M. G. ANTONIADES—Asst. Prof. (Ph.D., 1976, University of Rochester) Surface films at fluid interfaces, interfacial reactions, interphase mass transfer.

D-T. CHIN—Assoc. Prof. (Ph.D., 1969, University of Pennsylvania) Electrochemical engineering, transport phenomena, waste treatment and resource recovery, energy conversion, corrosion.

R. COLE—Assoc. Prof. (Ph.D., 1966, Clarkson College of Technology) Boiling heat transfer, bubble dynamics, boiling nucleation, holographic interferometry.

D. O. COONEY—Assoc. Prof. (Ph.D., 1966, University of Wisconsin) Mass transfer in fixed beds, biomedical engineering, pharmacokinetics.

E. J. DAVIS—Prof. (Ph. D., 1960, University of Washington) Heat transfer and fluid mechanics associated with two-phase flow, convective diffusion, aerosol physics, transport phenomena, mathematical modeling.

M. DONAHUE—Asst. Prof. (Ph.D., 1976, University of California, Berkeley) Thermodynamics and phase equilibria.

J. ESTRIN—Prof. (Ph.D., 1960, Columbia University) Nucleation phenomena, crystallization, phase change processes, analysis of energy consuming processes.

J. L. KATZ—Prof. (Ph.D., 1963, University of Chicago) Homogeneous nucleation of vapors, homogeneous boiling, heterogeneous nucleation, aerosols, nucleation of voids in metals, chemical nucleation, thermal conductivity of gases.

R. J. NUNGE—Prof., Dean of the Graduate School and Director, Division of Research. (Ph.D., 1965, Syracuse University) Transport phenomena, multistream forced convection transport processes, structure of pulsating turbulent flow, flow through porous media, atmospheric transport processes.

H. L. SHULMAN—Prof., Dean of Eng. and Vice Pres of the College. (Ph.D., 1950, University of Pennsylvania) Mass Transfer, packed columns, adsorption of gases, absorption.

R. S. SUBRAMANIAN—Asst. Prof. (Ph.D., 1972, Clarkson College of Technology) Heat and mass transfer, unsteady convective diffusion — miscible dispersion, chromatographic and other interphase transport systems, fluid mechanics, mathematical modeling.

P. C. SUKANEK—Asst. Prof. (Ph.D., 1972, University of Massachusetts) Rheology, polymer degradation, continuum mechanics.

T. J. WARD—Assoc. Prof. (Ph.D., 1959, Rensselaer Polytechnic Institute) Process control, nuclear engineering, ceramic materials.

G. R. YOUNGQUIST—Prof. (Ph.D., 1962, University of Illinois) Adsorption, crystallization, diffusion and flow in porous media, waste conversion processes.

For information concerning Assistantships and Fellowships contact the Dean of the Graduate School, Clarkson College of Technology, Potsdam, New York 13676

CLARKSON COLLEGE OF TECHNOLOGY / POTSDAM, NEW YORK 13676

CORNELL UNIVERSITY

Graduate Study in Chemical Engineering

Three graduate degree programs in several subject areas are offered in the Field of Chemical Engineering at Cornell University. Students may enter a research-oriented course of study leading to the degrees of Doctor of Philosophy or Master of Science, or may study for the professional degree of Master of Engineering (Chemical). Graduate work may be done in the following subject areas.

Chemical Engineering (general)

Thermodynamics; applied mathematics; transport phenomena, including fluid mechanics, heat transfer, and diffusional operations.

Bioengineering

Separation and purification of biochemicals; fermentation engineering and related subjects in biochemistry and microbiology; mathematical models of processes in pharmacology and environmental toxicology; artificial organs.

Chemical Microscopy

Light and electron microscopy as applied in chemistry and chemical engineering.

Kinetics and Transport Processes.

Homogeneous kinetics; catalysis by solids and enzymes; catalyst deactivation; simultaneous mass transfer and reaction; diffusion in liquids and membranes.

Chemical Processes and Process Control

Advanced plant design; process development; petroleum refining; chemical engineering economics; process control; related courses in statistics and computer methods.

Materials Engineering

Polymeric materials and related course work in chemistry, materials, mechanics, metallurgy, and solid-state physics, biomaterials.

Nuclear Process Engineering

Nuclear and reactor engineering and selected courses in applied physics and chemistry.

Faculty Members and Research Interests

George G. Cocks, Ph.D. (Cornell): light and electron microscopy, properties of materials, solid-state chemistry, crystallography.
Robert K. Finn, Ph.D. (Minnesota): waste treatment, agitation and aeration, microbial kinetics, enzyme purification.
Keith E. Gubbins, Ph.D. (London): transport properties and thermodynamics of liquids.
Peter Harriott, Sc.D. (M.I.T.): kinetics and catalysis, process control, diffusion in membranes and porous solids.
Robert P. Merrill, Sc.D. (M.I.T.): gas-solid chemical reactions, adsorption and catalysis, chemical kinetics, reactor design.
Ferdinand Rodriguez, Ph.D. (Cornell): polymerization, properties of polymer systems.
George F. Scheele, Ph.D. (Illinois): hydrodynamic stability, coalescence, fluid mechanics of liquid drops and jets.
Michael L. Shuler, Ph.D. (Minnesota): biochemical engineering, novel food sources, plant cells, biological reactors.
Julian C. Smith, Chem.E. (Cornell): conductive transfer processes, heat transfer, mixing, mechanical separations.
James F. Stevenson, Ph.D. (Wisconsin): transport phenomena, rheology.
Raymond G. Thorpe, M.Chem.E. (Cornell): phase equilibria, fluid flow, kinetics of polymerization.
Robert L. Von Berg, Sc.D. (M.I.T.): liquid-liquid extraction, reaction kinetics, effect of radiation on chemical reactions, saline-water conversion.
Herbert F. Wiegandt, Ph.D. (Purdue): crystallization, petroleum processing, saline-water conversion, direct contact heat transfer.
Robert York, Sc.D. (M.I.T.): molecular sieves; chemical market analyses; chemical economics; process development, design, and evaluation.

FURTHER INFORMATION. Write to Professor P. Harriott, Olin Hall of Chemical Engineering, Cornell University, Ithaca, New York 14853.

UNIVERSITY OF DELAWARE

Newark, Delaware 19711

The University of Delaware awards three graduate degrees for studies and practice in the art and science of chemical engineering:

An M.Ch.E. degree based upon course work and a thesis problem.

An M.Ch.E. degree based upon course work and a period of industrial internship with an experienced senior engineer in the Delaware Valley chemical process industries.

A Ph.D. degree.

The regular faculty are:

Gianni Astarita (½ time)
C. E. Birchenall
K. B. Bischoff
H. W. Blanch
M. M. Denn
B. C. Gates
J. R. Katzer
R. L. McCullough
A. B. Metzner
J. H. Olson
M. E. Paulaitis
R. L. Pigford
T. W. F. Russell
S. I. Sandler
G. L. Schrader
G. C. A. Schuit (½ time)
J. M. Schultz
L. Spielman
James Wei

Visiting Faculty
R. I. Tanner
D. V. Boger

The adjunct and research faculty who provide extensive association with industrial practice are:

R. L. Dedrick ——— Biomedical engineering
T. R. Keane ——— Polymer Science & Engineering
W. H. Manogue ——— Catalysis, reaction engineering
F. E. Rush, Jr. ——— Mass transfer—distillation, absorption, extraction
R. J. Samuels ——— Polymer science
A. B. Stiles ——— Catalysis
K. F. Wissbrun ——— Polymer engineering
P. M. Gullino, M.D. ——— Biomedical engineering
H. F. Haug ——— Chemical engineering design

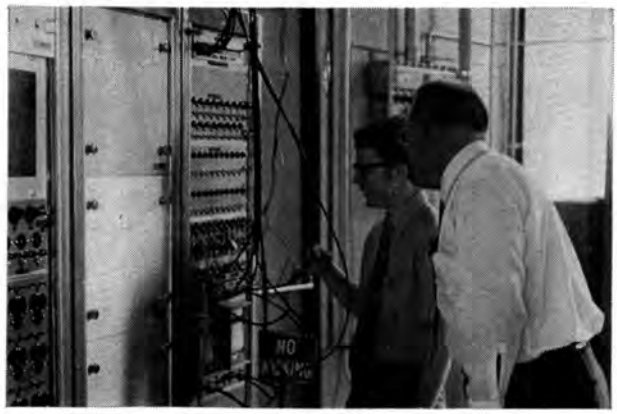
For information and admissions materials contact:

A. B. Metzner, Chairman

The university of florida offers you

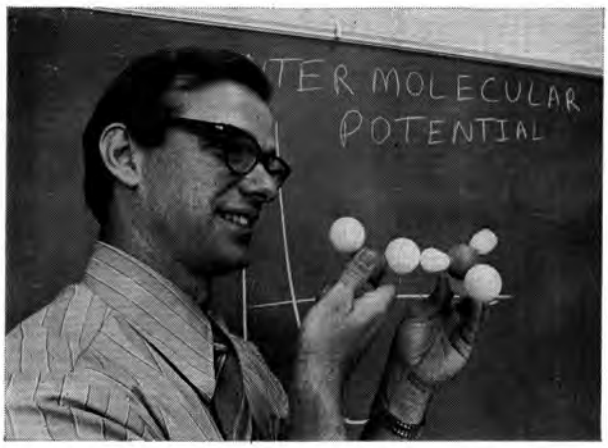
Transport Phenomena & Rheology

Drag-reducing polymers greatly modify the familiar bathtub vortex, as studied here by dye injection.



Optimization & Control

Part of a computerized distillation control system.



Thermodynamics & Statistical Mechanics

Illustrating hydrogen-bonding forces between water molecules.

Biomedical Engineering & Interfacial Phenomena

Oxygen being extracted from a substance similar to blood plasma.

and much more...

A young, dynamic faculty
Wide course and program selection
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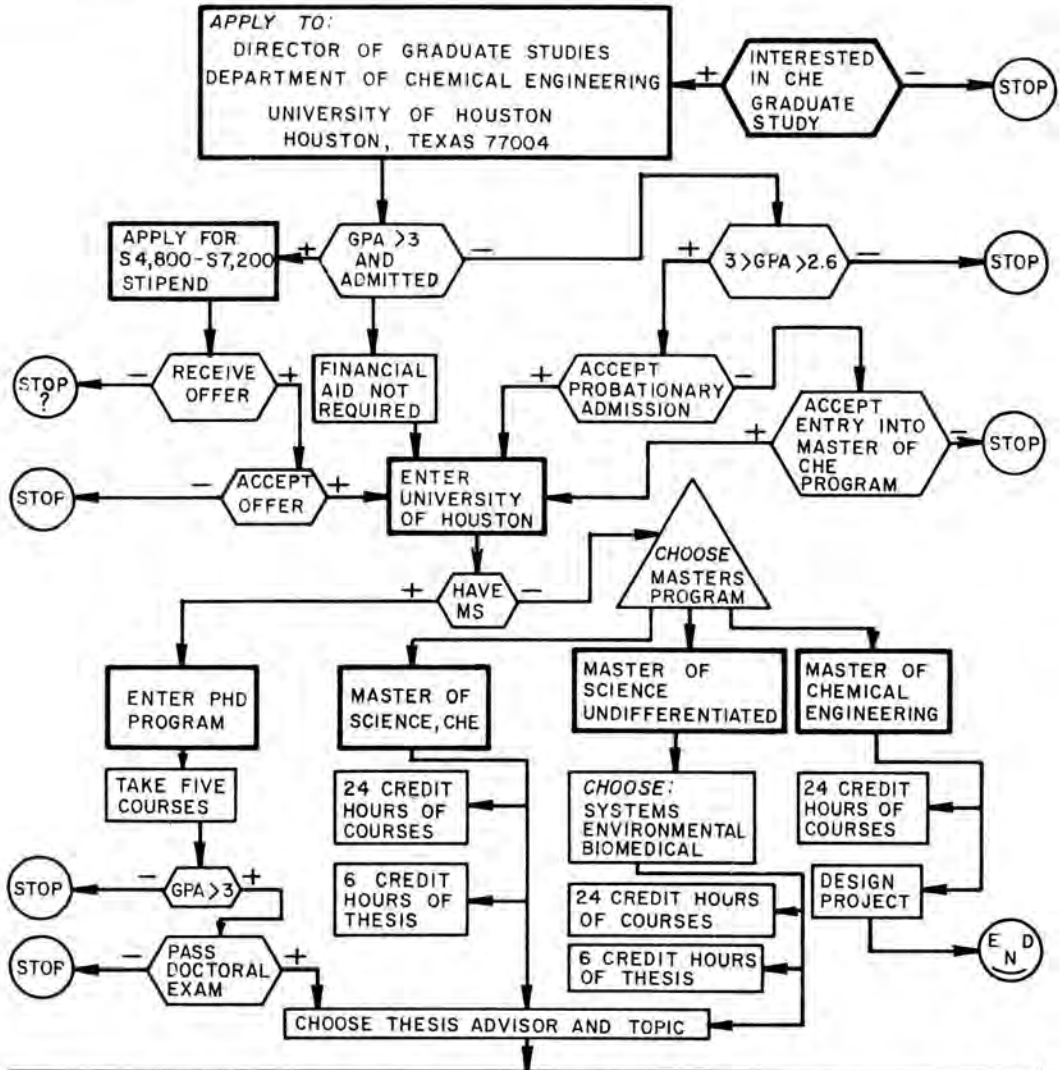
Write to:
Dr. John C. Biery, Chairman
Department of Chemical Engineering - Room 227
University of Florida
Gainesville, Florida 32611

Chemical Engineering
Graduate Study Programs
UNIVERSITY OF HOUSTON



N.R. AMUNDSON	A.E. DUKLER	C.J. HUANG	A.C. PAYATAKES
A. ATTAR	R.W. FLUMERFELT	C.V. KIRKPATRICK	H.W. PRENGLE, JR.
J.E. BAILEY	E.J. HENLEY	D. LUSS	J.T. RICHARDSON
J.R. CRUMP	W.I. HONEYWELL	R.L. MOTARD	F.M. TILLER
			F.L. WORLEY, JR.

CATALYSIS ... CONTROL AND OPTIMIZATION ... TWO PHASE FLOW ... KINETICS ... ENERGY CONVERSION ... ENZYME KINETICS ... HEAT AND MASS TRANSFER ... THERMODYNAMICS ... AIR POLLUTION ... COMPUTER AIDED DESIGN ... FERMENTATION PROCESSES ... PROCESS DYNAMICS ... BIOMEDICAL SYSTEMS RHEOLOGY ... FLUID - PARTICLE SEPARATIONS ... PROCESS SYNTHESIS REACTOR DESIGN ..

ILLINOIS

THE DEPARTMENT OF CHEMICAL ENGINEERING

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

- **GOALS OF GRADUATE STUDY:** This Department offers M.S. and Ph.D. programs with a strong emphasis on creative research, either in fundamental engineering science or its application to the solution of current problems of social concern. Truly exceptional educational experiences may be achieved from the close one-to-one interaction of a student with a professor as together they develop relevant scientific contributions.

- **STAFF AND FACILITIES:** The faculty of the Department are all highly active in both teaching and research; they have won numerous national and international awards for their achievements. Moreover, outstanding support for graduate research is available, not only in terms of equipment and physical facilities but also from the many shops, technicians, and service personnel.

- **AREAS OF RESEARCH:** Applied Mathematics
  Biological Applications of Chemical Engineering
  Chemical Kinetics
  Chemical Reactor Dynamics
  Corrosion
  Electronic Structure of Matter
  Electrochemical Engineering
  Energy Sources and Conservation
  Environmental Engineering
  Fluid Dynamics
  Heat Transfer
  High Pressure
  Mass Transfer
  Materials Science and Engineering
  Molecular Thermodynamics
  Phase Transformations
  Process Control
  Process Design
  Reaction Engineering
  Statistical Mechanics
  Systems Analysis
  Two-Phase Flow

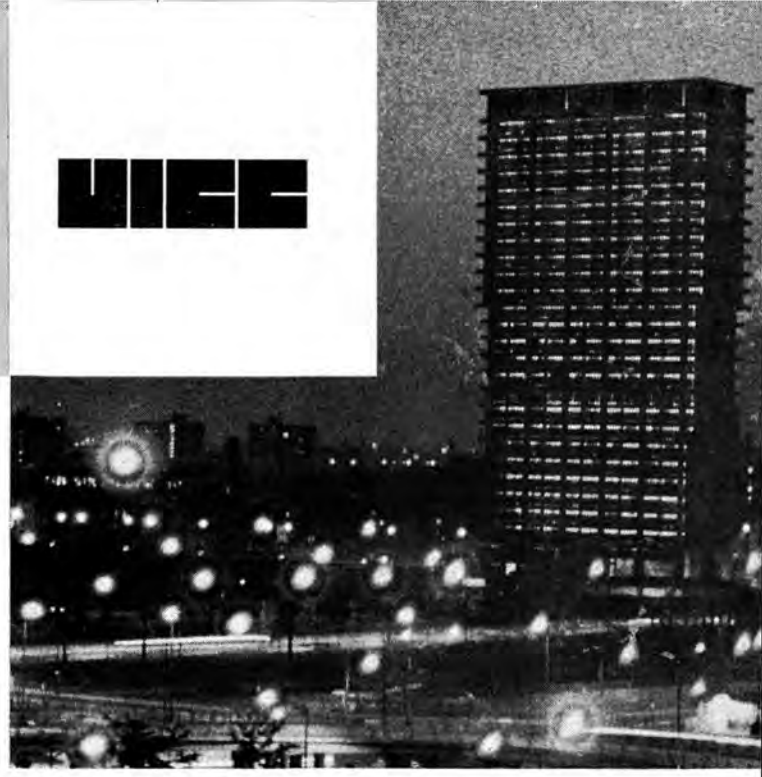
- **FOR INFORMATION AND APPLICATIONS:** **Professor J. W. Westwater**
  Department of Chemical Engineering
  113 Adams Laboratory
  University of Illinois
  Urbana, Illinois 61801

GRADUATE STUDY AND RESEARCH

The Department of Energy Engineering

UNIVERSITY OF ILLINOIS AT CHICAGO CIRCLE

UICC



Graduate Programs in

The Department of Energy Engineering

leading to the degrees of

MASTER OF SCIENCE and

DOCTOR OF PHILOSOPHY

Faculty and Research Activities in CHEMICAL ENGINEERING

Paul M. Chung
Ph.D., University of Minnesota, 1957
Professor and Head of the Department

Fluid mechanics, combustion, turbulence, chemically reacting flows

David S. Hacker
Ph.D., Northwestern University, 1954
Associate Professor

Chemical kinetics, mass transport phenomena, chemical process design, particulate transport phenomena

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

Kinetics of gas reactions, energy transfer processes, molecular lasers

Victor J. Kremesec, Jr.
Ph.D., Northwestern University, 1975
Assistant Professor

Multi-phase flow, flow in porous media, mass transfer, interfacial behavior, biological applications of transport phenomena, thermodynamics of solutions

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

Thermodynamics and statistical mechanics of fluids, solids, and solutions, kinetics of liquid reactions, cryobioengineering

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

Thermodynamics, biotransport, artificial organs, biophysics

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

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

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

Catalysis, chemical reaction engineering, optimization, environmental and pollution problems

The MS program, with its optional thesis, can be completed in one year.

The department invites applications for admission and support from all qualified candidates. Special fellowships are available for minority students. To obtain application forms or to request further information write:

Professor W. J. Minkowyz, Chairman
The Graduate Committee
Department of Energy Engineering
University of Illinois at Chicago Circle
Box 4348, Chicago, Illinois 60680

IOWA STATE UNIVERSITY

OF SCIENCE AND TECHNOLOGY

Energy Conversion
(Coal Tech, Hydrogen Production, Atomic Energy)

Renato G. Bautista
Lawrence E. Burkhart
George G. Burnet
Allen H. Pulsifer
Dean L. Ulrichson
Thomas D. Wheelock

GRADUATE STUDY and GRADUATE RESEARCH in Chemical Engineering

Transport Processes
(Heat, mass & momentum transfer)

William H. Abraham
Renato G. Bautista
Charles E. Glatz
James C. Hill
Frank O. Shuck
Richard C. Seagrave

Process Chemistry and Fertilizer Technology

David R. Boylan
George Burnet
Maurice A. Larson

Biomedical Engineering

(System Modeling, Transport. process)
Richard C. Seagrave
Charles E. Glatz

Biochemical Engineering

(Enzyme Technology)
Charles E. Glatz
Peter J. Reilly

Polymerization Processes

Wiilliam H. Abraham
John D. Stevens

Crystallization Kinetics
Maurice A. Larson
John D. Stevens

Process Instrumentation and System Optimization and Control
Lawrence E. Burkhart
Kenneth R. Jolls

as well as

Air Pollution Control
Solvent Extraction
High Pressure Technology
Mineral Processing

write to:

Prof. D. L. Ulrichson
Dept. of Chem. Engr. & Nuc. Engr.
Iowa State University
Ames, Iowa 50010

UNIVERSITY OF KANSAS

Department of Chemical and Petroleum Engineering

M.S. and Ph.D. Programs
in
Chemical Engineering
M.S. Program
in
Petroleum Engineering
also
Doctor of Engineering (D.E.)
and
M.S. in Petroleum Management

The Department is the recent recipient of a large state grant for research in the area of Tertiary Oil Recovery to assist the Petroleum Industry.

Financial assistance is available for Research Assistants and Teaching Assistants

Research Areas

Transport Phenomena

Fluid Flow in Porous Media

Process Dynamics and Control
Water Resources and Environmental Studies

Mathematical Modeling of Complex Physical Systems

Reaction Kinetics and Process Design

Nucleate Boiling

High Pressure, Low Temperature Phase Behavior

For Information and Applications write:

Floyd W. Preston, Chairman
Dept. of Chemical and Petroleum Engineering
University of Kansas
Lawrence, Kansas, 66044
Phone (913) UN4-3922

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Professor B. G. Kyle
Durland Hall
Kansas State University
Manhattan, Kansas 66502

AREAS OF STUDY AND RESEARCH

DIFFUSION AND MASS TRANSFER
HEAT TRANSFER
FLUID MECHANICS
THERMODYNAMICS
BIOCHEMICAL ENGINEERING
PROCESS DYNAMICS AND CONTROL
CHEMICAL REACTION ENGINEERING
MATERIALS SCIENCE
SOLID MIXING
CATALYSIS
OPTIMIZATION
FLUIDIZATION
PHASE EQUILIBRIUM

Massachusetts
Institute
of Technology

DEPARTMENT OF CHEMICAL ENGINEERING

- ENVIRONMENTAL QUALITY
- BIOCHEMICAL ENGINEERING
- BIOMEDICAL ENGINEERING
- TRANSPORT PHENOMENA
- CHEMICAL ENGINEERING SYSTEMS
- SURFACE CHEMISTRY AND TECHNOLOGY
- POLYMERS AND MACROMOLECULES
- ENERGY

For decades to come, the chemical engineer will play a central role in fields of national concern. In two areas alone, energy and the environment, society and industry will turn to the chemical engineer for technology and management in finding process-related solutions to critical problems. MIT has consistently been a leader in chemical engineering education with a strong working relationship with industry for over a half century. For detailed information, contact Professor Kenneth A. Smith, Acting Head of the Department of Chemical Engineering, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Massachusetts 02139.

FACULTY

Raymond F. Baddour
Janos M. Beer
Clark K. Colton
Lawrence B. Evans
Hoyt C. Hottel
Jack B. Howard
John P. Longwell
Herman P. Meissner
Edward W. Merrill
J. Th. G. Overbeek
Robert C. Reid
Adel F. Sarofim
Charles N. Satterfield
Kenneth A. Smith
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Ronald A. Hites
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Robert E. Cohen
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Richard G. Donnelly
Christos Georgakis
Michael P. Manning
Frederick A. Putnam
Jefferson W. Tester

Department of Chemical Engineering

UNIVERSITY OF MISSOURI — ROLLA

ROLLA, MISSOURI 65401

Contact Dr. M. R. Strunk, Chairman

Day Programs M.S. and Ph.D. Degrees

Established fields of specialization in which research programs are in progress are:

(1) Fluid Turbulence Mixing and Drag Reduction Studies—Drs. J. L. Zakin and G. K. Patterson

(2) Electrochemistry and Fuel Cells—Dr. J. W. Johnson

(3) Heat Transfer (Cryogenics) Dr. E. L. Park, Jr.

(4) Mass Transfer Studies—Dr. R. M. Wellek

In addition, research projects are being carried out in the following areas:

(a) Optimization of Chemical Systems; Energy Conversion from Agricultural Products—Prof. J. L. Gaddy

(b) Design Techniques and Fermentation Studies —Dr. M. E. Findley

(c) Multi-component Distillation Efficiencies and Separation Processes—Dr. R. C. Waggoner

(d) Separations by Electrodialysis Techniques—Dr. H. H. Grice

(e) Process Dynamics and Control; Computer Applications to Process Control—Ds. M. E. Findley, R. C. Waggoner, and R. A. Mollenkamp

(f) Transport Properties, Kinetics, enzymes and catalysis—Dr. O. K. Crosser and Dr. B. E. Poling

(g) Thermodynamics, Vapor-Liquid Equilibrium —Dr. D. B. Manley

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

university of

pennsylvania chemical and biochemical engineering

FACULTY

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Elizabeth B. Dussan V. (Johns Hopkins)
William C. Forsman (Pennsylvania)
Eduardo D. Glandt (Pennsylvania)
David J. Graves (M.I.T.)
A. Norman Hixson (Columbia)
Arthur E. Humphrey (Columbia)
Mitchell Litt (Columbia)
Alan L. Myers (California)
Melvin C. Molstad (Yale)
Daniel D. Perlmutter (Yale)
John A. Quinn (Princeton)
Warren D. Seider (Michigan)

RESEARCH SPECIALTIES

Energy Utilization
Enzyme Engineering
Biochemical Engineering
Biomedical Engineering
Computer-Aided Design
Chemical Reactor Analysis
Environmental and Pollution Control
Polymer Engineering
Process Simulation
Surface Phenomena
Separations Techniques
Transport Phenomena

The faculty includes two members of the National Academy of Engineering and three recipients of the highest honors awarded by the American Institute of Chemical Engineers. Staff members are active in teaching, research, and professional work. Located near one of the largest concentrations of chemical industry in the United States, the University of Pensylvania maintains the scholarly standards of the Ivy League and numbers among its assets a superlative Medical Center and the Wharton School of Business.

PHILADELPHIA: The cultural advantages, historical assets, and recreational facilities of a great city are within walking distance of the University. Enthusiasts will find a variety of college and professional sports at hand. The Pocono Mountains and the New Jersey shore are within a two-hour drive.

For further information on graduate studies in this dynamic setting, write to Dr. A. L. Myers,
Department of Chemical and Biochemical Engineering / D3, University of Pennsylvania, Philadelphia, PA 19174.

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Energy Research

And Other Areas

WRITE TO

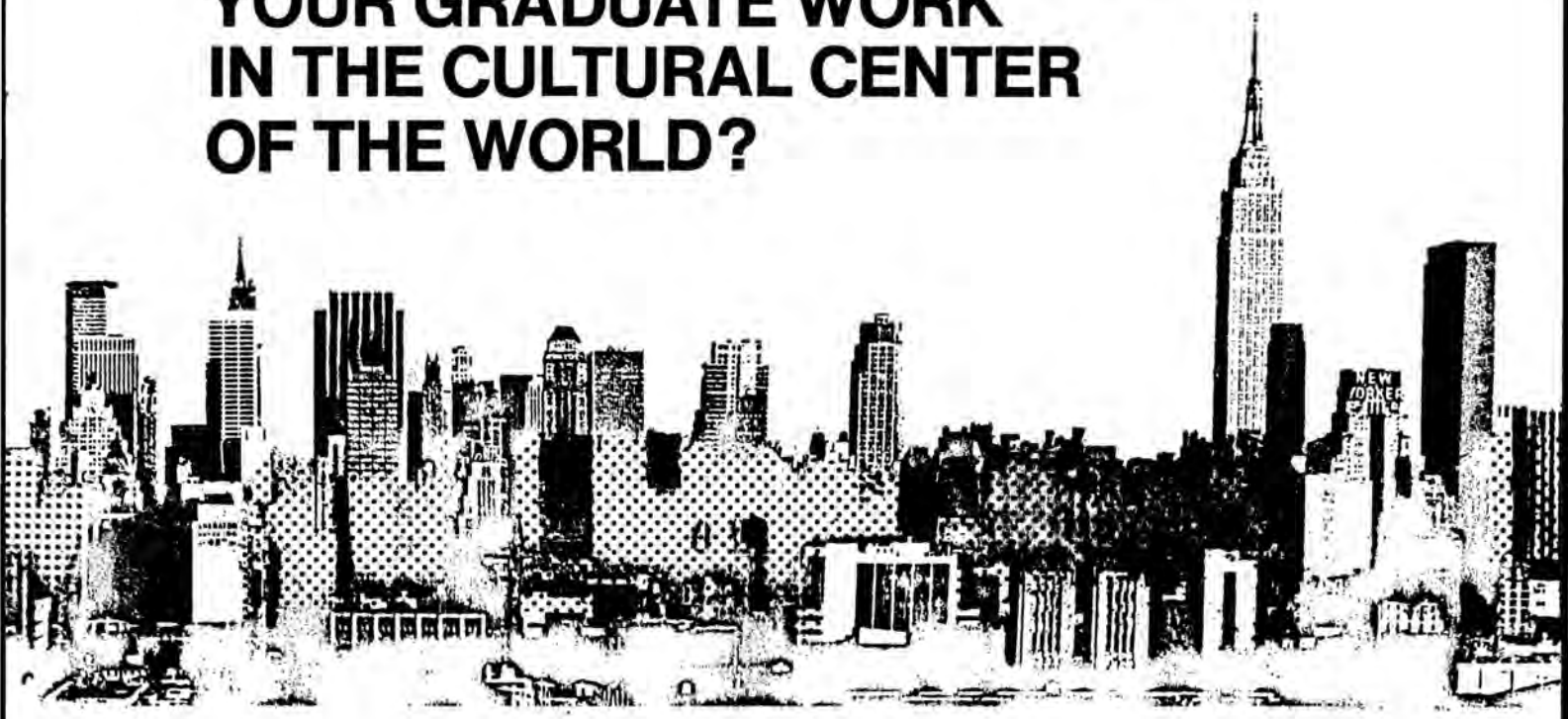
Prof. Lee C. Eagleton, Head

160 Fenske Laboratory

The Pennsylvania State University

University Park, Pa. 16802

HOW WOULD YOU LIKE TO DO YOUR GRADUATE WORK IN THE CULTURAL CENTER OF THE WORLD?



CHEMICAL ENGINEERING

POLYMER SCIENCE & ENGINEERING

FACULTY

R. C. Ackerberg
R. F. Benenati
J. J. Conti
C. D. Han
R. D. Patel
E. M. Pearce
E. N. Ziegler

RESEARCH AREAS

Air Pollution
Biomedical Systems
Catalysis, Kinetics and Reactors
Fluidization
Fluid Mechanics
Heat and Mass Transfer
Mathematical Modelling
Polymerization Reactions
Process Control
Rheology and Polymer Processing

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Department of Chemical Engineering

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For further information contact

Professor C. D. Han
Head, Department of Chemical Engineering
Polytechnic Institute of New York
333 Jay Street
Brooklyn, New York 11201

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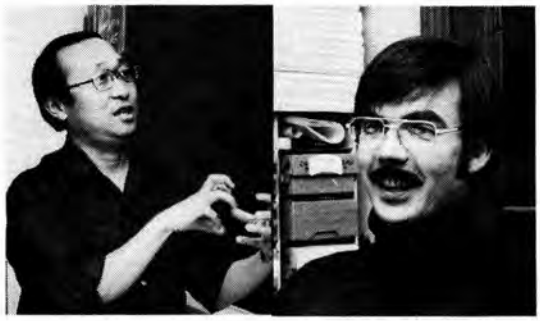
Wankat
Weigand
Woods



Chemical Engineering
Purdue University
West Lafayette, Indiana 47907

Graduate Study in Chemical Engineering at Rice University

Graduate study in Chemical Engineering at Rice University is offered to qualified students with backgrounds in the fundamental principles of Chemistry, Mathematics, and Physics. The curriculum is aimed at strengthening the student's understanding of these principles and provides a basis for developing in certain areas the necessary proficiency for conducting independent research. A large number of research programs are pursued in various areas of Chemical Engineering and related fields, such as Biomedical Engineering and Polymer Science. A joint program with the Baylor College of Medicine, leading to M.D.-Ph.D. and M.D.-M.S. degrees is also available.

The Department has approximately 30 graduate students, predominantly Ph.D. candidates. There are also several post-doctoral fellows and research engineers associated with the various laboratories. Permanent faculty numbers 12, all active in undergraduate and graduate teaching, as well as in research. The high faculty-to-student ratio, outstanding laboratory facilities, and stimulating research projects provide a graduate education environment in keeping with Rice's reputation for academic excellence. The Department is one of the top 15 Chemical Engineering Departments in the U.S., ranked by graduate faculty quality and program effectiveness, according to a recent evaluation by the American Council of Education.

MAJOR RESEARCH AREAS

Thermodynamics and Phase Equilibria
Chemical Kinetics and Catalysis
Chromatography
Optimization, Stability, and Process Control
Systems Analysis and Process Dynamics
Rheology and Fluid Mechanics
Polymer Science

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Blood Flow and Blood Trauma
Blood Pumping Systems
Biomaterials

Rice University

Rice is a privately endowed, nonsectarian, coeducational university. It occupies an architecturally attractive, tree-shaded campus of 300 acres, located in a fine residential area, 3 miles from the center of Houston. There are approximately 2200 undergraduate and 800 graduate students. The school offers the benefits of a complete university with programs in the various fields of science and the humanities, as well as in engineering. It has an excellent library with extensive holdings. The academic year is from August to May. As there are no summer classes, graduate students have nearly four months for research. The school offers excellent recreational and athletic facilities with a completely equipped gymnasium, and the southern climate makes outdoor sports, such as tennis, golf, and sailing year-round activities.

FINANCIAL SUPPORT

Full-time graduate students receive financial support with tuition remission and a tax-free fellowship of $333-400 per month.

APPLICATIONS AND INFORMATION

Address letters of inquiry to:

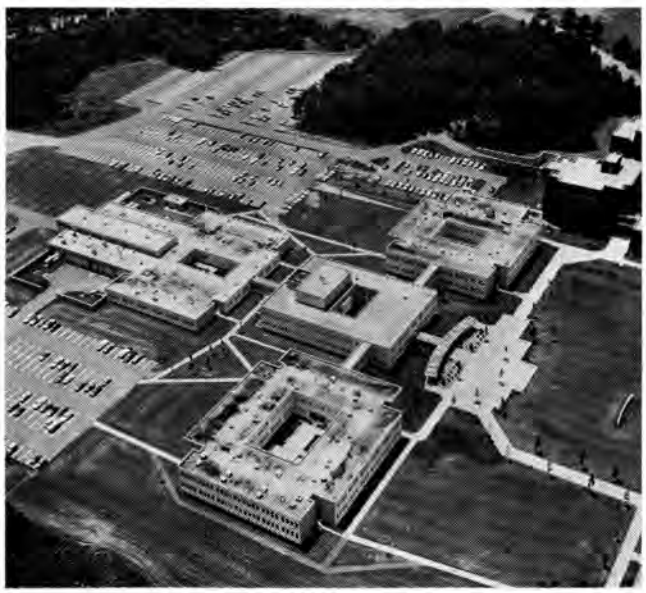
Chairman
Department of Chemical Engineering
Rice University
Houston, Texas 77001

Houston

With a population of nearly two million, Houston is the largest metropolitan, financial, and commercial center in the South and Southwest. It has achieved world-wide recognition through its vast and growing petrochemical complex, the pioneering medical and surgical activities at the Texas Medical Center, and the NASA Manned Spacecraft Center.

Houston is a cosmopolitan city with many cultural and recreational attractions. It has a well-known resident symphony orchestra, an opera, and a ballet company, which perform regularly in the newly constructed Jesse H. Jones Hall. Just east of the Rice campus is Hermann Park with its free zoo, golf course, Planetarium, and Museum of Natural Science. The air-conditioned Astrodome is the home of the Houston Astros and Oilers and the site of many other events.

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY



College of Engineering

M.S. and Ph.D. PROGRAMS

IN THE DEPARTMENT OF

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AREAS OF TEACHING AND RESEARCH

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• ENZYME AND FERMENTATION REACTORS

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  - INDUSTRIAL FERMENTATIONS
  - ENZYMES IN THERAPEUTIC MEDICINE, PHARMACEUTICAL PROCESSING AND WASTE TREATMENT
  - FOOD PROCESSING
- CHEMICAL TECHNOLOGY
  - FLAMMABILITY OF MATERIALS
  - PACKAGING
  - POLYMER PROCESSING
  - PLANT DESIGN AND ECONOMICS
- WATER RESOURCES ANALYSES
  - OCEANS AND ESTUARIES
  - QUALITY MANAGEMENT
  - WASTES RECOVERY

FELLOWSHIPS AND ASSISTANTSHIPS ARE AVAILABLE

For Application Forms and Further Information Write To:
Dr. A. Constantinides, Graduate Director
Department of Chemical and Biochemical Engineering
College of Engineering
Rutgers, The State University
New Brunswick, N.J. 08903

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For particulars and application forms write to:

Dr. M. W. Davis, Jr., Chairman
Chemical Engineering Program
College of Engineering
University of South Carolina
Columbia, S.C. 29208

THE CHEMICAL ENGINEERING FACULTY

B. L. Baker, Professor, Ph.D., North Carolina State University, 1955 (Process design, environmental problems, ion transport)

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, 1976 (Chemical reactor engineering, mathematical modeling of chemical systems, process design, thermodynamics)

G. B. Tatterson, Assistant Professor, Ph.D., Ohio State University, 1977 (Process control, real time computing, mixing phenomena)

V. Van Brunt, Assistant Professor, Ph.D., University of Tennessee, 1974 (Mass Transfer, Computer Modeling)

LOOK WHAT'S COMING TO BUFFALO!

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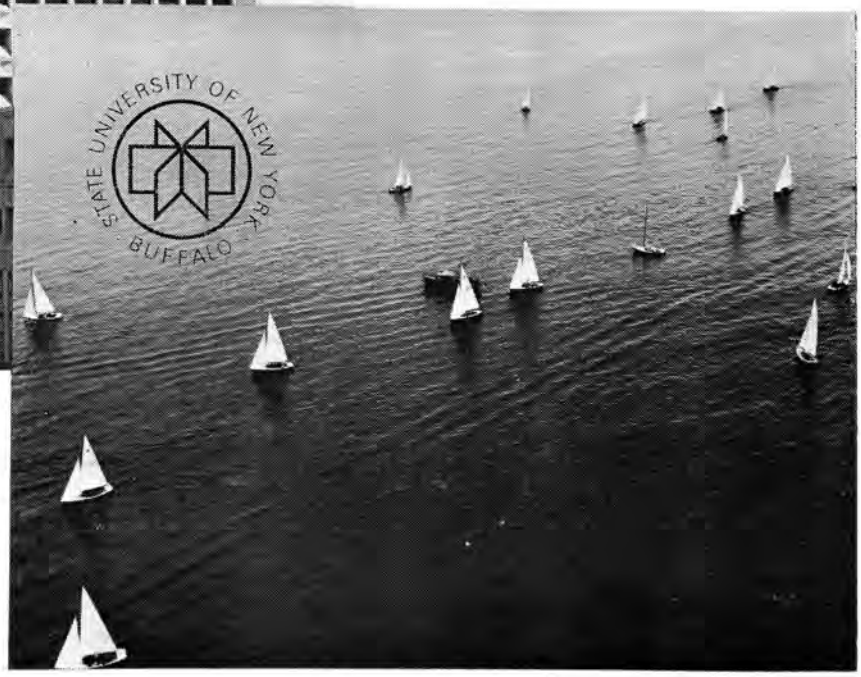
Clifford C. Furnas Hall



Sailing on nearby Lake Erie

The Department of Chemical Engineering at the State University of New York at Buffalo is proud to have the only State-supported chemical engineering program in New York. In the Fall of 1977, the Department will move into Furnas Hall on the new Amherst Campus on the outskirts of Buffalo. The building is ten stories and contains 75,000 square feet of offices and laboratories. This 1200-acre campus represents a $650 million investment in education. While it is part of a large university, Chemical Engineering at Buffalo is a highly personal educational experience.

RESEARCH

Energy Utilization
Environmental Problems
Kinetics and Catalysis

Process Design and Development
Biochemical Engineering

Fluid Mechanics and Rheology
Polymer Science and Engineering
Surface Science

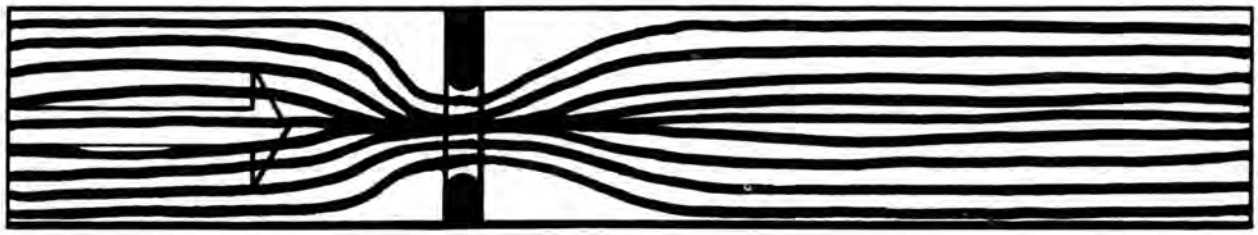
FACULTY

D. R. Brutvan	Staged operations
P. Ehrlich	Polymeric materials, thermodynamics
W. N. Gill	Dispersion, reverse osmosis
R. J. Good	Surface phenomena, adhesion
A. E. Hamielec (Adjunct)	Polymer synthesis and reactor engineering
K. M. Kiser	Blood flow, turbulence, pollution in lakes
P. J. Phillips	Polymer morphology, mechanical and electrical properties
M. Ryan	Polymer rheology, process optimization
E. Ruckenstein	Catalysis, interfacial phenomena, bioengineering
T. W. Weber	Process control, dynamics of adsorption
S. W. Weller	Catalysis, catalytic reactors
D. Zabriskie	Biochemical engineering, fermentation

Financial aid available for undergraduate and graduate students.

For further information please write or call me personally.

Dr. Sol W. Weller
Chemical Engineering Building
State University of New York
Buffalo, N.Y. 14214
(716) 831-3105



THE UNIVERSITY OF TENNESSEE

Graduate Studies in Chemical, Metallurgical & Polymer Engineering

Programs

Programs for the degrees of Master of Science and Doctor of Philosophy are offered in chemical engineering, metallurgical engineering and polymer engineering. The Master's program may be tailored as a terminal one with emphasis on professional dvelopment, or it may serve as preparation for more advanced work leading to the Doctorate.

Faculty

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George C. Frazier
Hsien-Wen Hsu
Homer F. Johnson, Department Head
Stanley H. Jury
Peter J. Meschter
Charles F. Moore
Ben F. Oliver, Professor-in-Charge of Metallurgical Engineering
Joseph J. Perona
Joseph E. Spruiell
E. Eugene Stansbury
James L. White

Research

Process Dynamics and Control
Sorption Kinetics and Dynamics of Packed Beds
Chromatographic and Ultracentrifuge Studies of Macromolecules
Development and Synthesis of New Engineering Polymers
Fiber and Plastics Processing
Chemical Bioengineering
X-Ray Diffraction, Transmission and Scanning Electron Microscopy
Solidification, Zone Refining and Welding
Cryogenic and High Temperature Calorimetry
Flow and Fracture in Metallic and Polymeric Systems
Corrosion
Solid State Kinetics

Financial Assistance

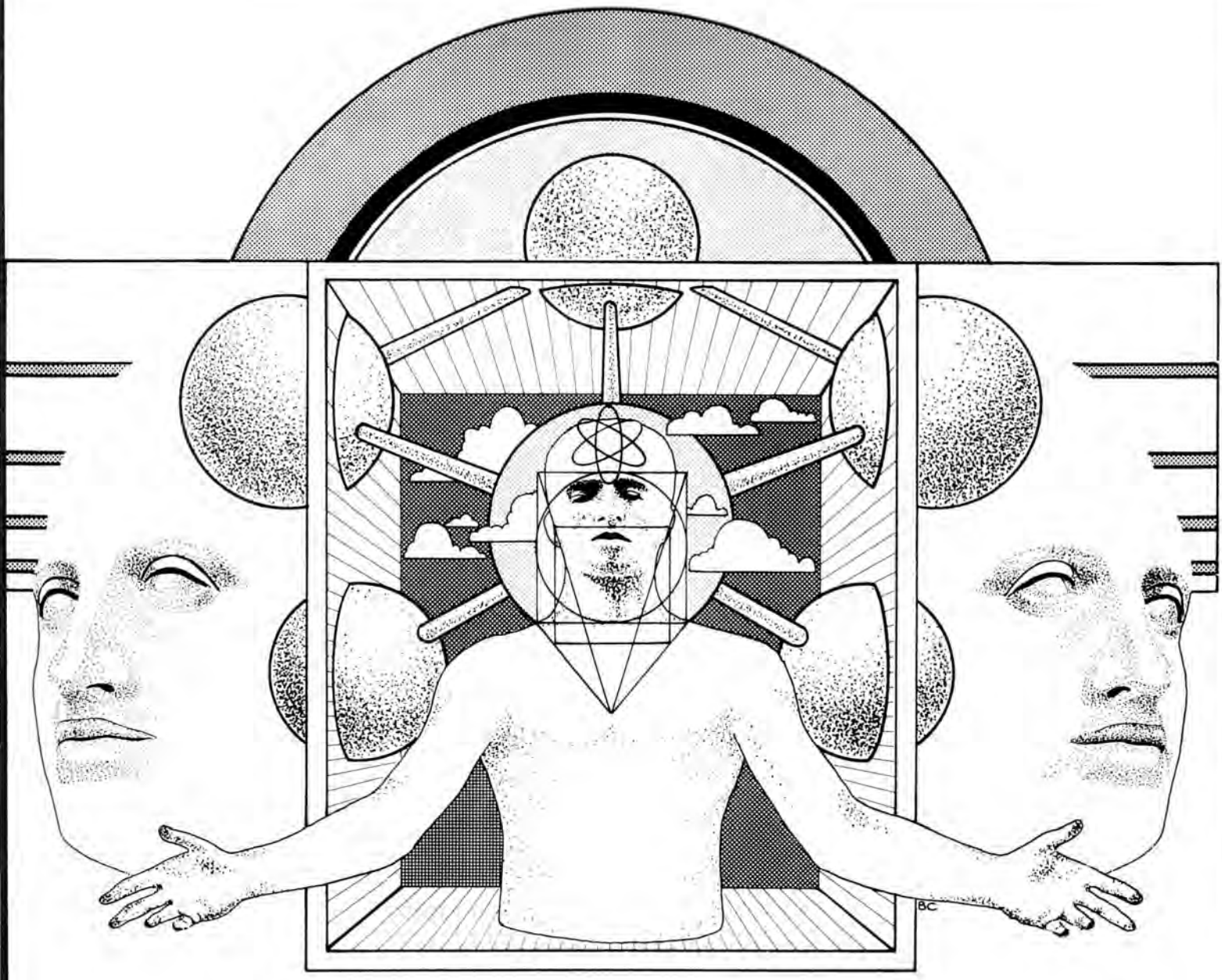
Sources available include graduate teaching assistantships, research assistantships, and industrial fellowships.

Knoxville and Surroundings

With a population near 200,000, Knoxville is the trade and industrial center of East Tennessee. In the Knoxville Auditorium-Coliseum and the University theaters, Broadway plays, musical and dramatic artists, and other entertainment events are regularly scheduled. Knoxville has a number of points of historical interest, a symphony orchestra, two art galleries, and a number of museums. Within an hour's drive are many TVA lakes and mountain streams for water sports, the Great Smoky Mountains National Park with the Gatlinburg tourist area, two state parks, and the atomic energy installations at Oak Ridge, including the Museum of Atomic Energy.

Write

Chemical and Metallurgical Engineering
The University of Tennessee
Knoxville, Tennessee 37916



UNIVERSITY OF TORONTO

TORONTO, CANADA

DEPARTMENT OF CHEMICAL ENGINEERING & APPLIED CHEMISTRY

The Department offers a wide range of research topics for the creative student including:

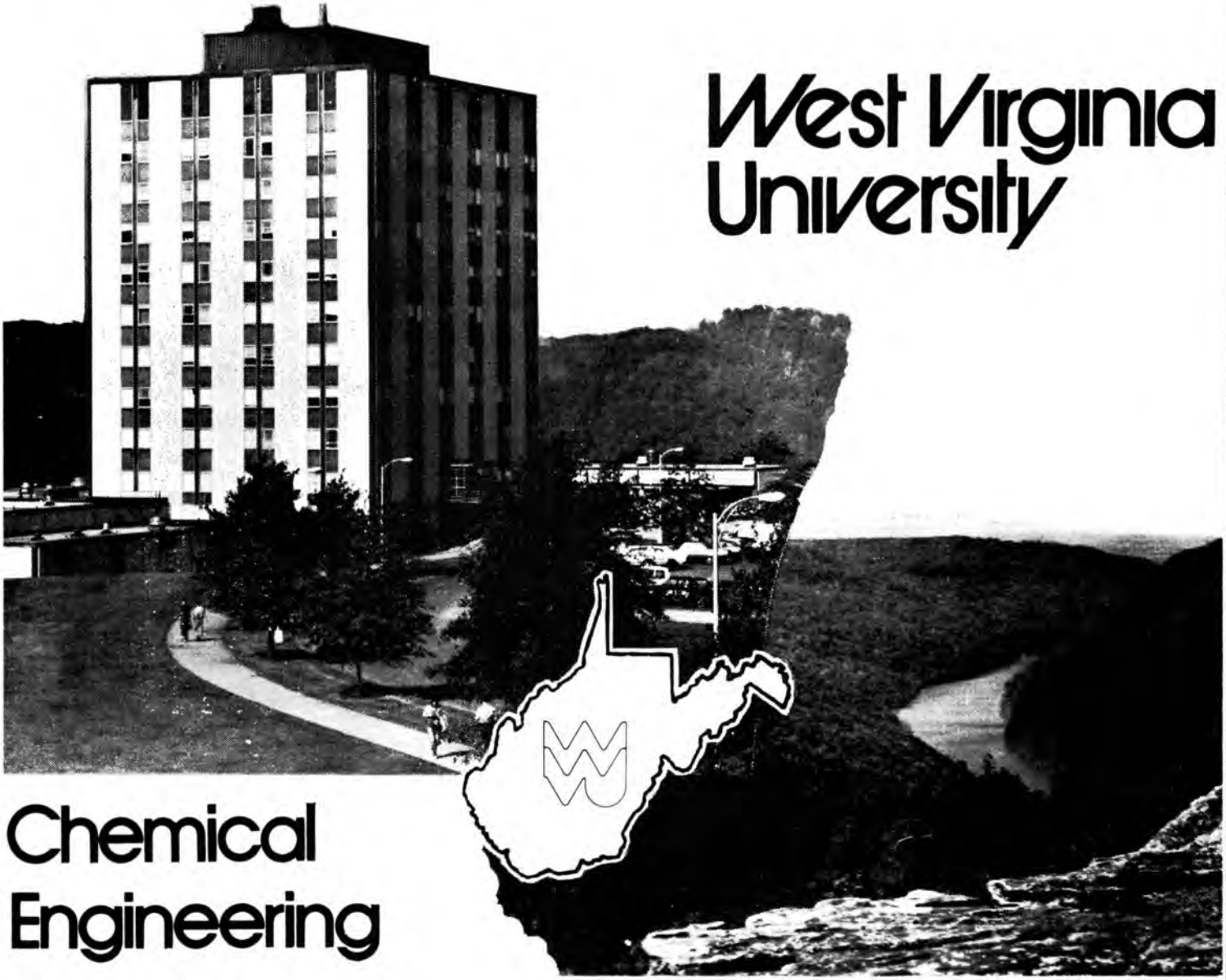
- nuclear power engineering
- energy engineering, solar heating
- electrochemical engineering and corrosion
- polymer science and engineering
- plastics engineering and composite materials
- process modelling and optimal control
- fluid mechanics and pipeline transportation
- petrochemistry and tar sands development
- ceramics engineering
- heat, mass and momentum transport
- radiochemistry and radioanalysis
- analytical chemistry and instrumentation
- thermodynamics, kinetics and catalysis
- applied organic chemistry
- environmental engineering
- biomedical engineering
- bioengineering and food synthesis
- pulp and paper chemistry

The Department ranks as one of the largest chemical engineering schools in the world with a total professorial staff of 33 and an enrolment of 160 graduate students. Interdisciplinary research is fostered through joint projects with the Institute for Environmental Studies, the Institute for Biomedical Engineering, the Centre for the Study of Materials, the Systems Building Centre, and the Institute for Aerospace Studies.

Admission to the School of Graduate Studies is based solely on academic standing and availability of space and facilities. A graduate brochure entitled "Graduate Research and Career Development" which describes current research programs is available on request. Adequate financial support in the form of scholarships, fellowships or bursaries is available to qualified students.

For further details write:
Professor R.T. Woodhams, Graduate Secretary
Department of Chemical Engineering
and Applied Chemistry
University of Toronto
Toronto, Ontario
Canada M5S 1A4

West Virginia University



Chemical Engineering

Energy Engineering

- Coal Conversion
- Potential of Coal Based Energy Complexes
- Conversion of Solid Wastes to Low BTU Gas

Environmental Engineering

- Purification of Acid Mine Drainage Water by Reverse Osmosis
- Sludge and Emulsion Dewatering
- SO_2 Scrubbing
- Economic Impact of Environmental Regulations
- River & Lake Modeling

Other Topics

- Optimization
- Chemical Kinetics
- Separation Processes
- Fluidization
- Bioengineering
- Transport Phenomena
- Utilization of Ultrasonic Energy

M.S. and Ph.D. Programs

For further information in financial aid write:

Dr. J. D. Henry
Department of Chemical Engineering
West Virginia University
Morgantown, West Virginia 26506

CHEMICAL ENGINEERING

DEGREES: M.S., Ph.D.

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- PROCESS DYNAMICS AND CONTROL
- PROCESS MODELING

IN: COAL GASIFICATION, CHEMICALS FROM WOOD, ECOSYSTEM ANALYSIS, AND THEORETICAL STUDIES

CONTACT: DR. WILLIAM J. HATCHER, JR., HEAD
P. O. BOX G
University, Alabama 35486

DEPARTMENT OF CHEMICAL ENGINEERING

BUCKNELL UNIVERSITY

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For admission, address

Dr. George F. Folkers
Coordinator of Graduate Studies

- **Graduate degrees granted: Master of Science in Chemical Engineering**
- **For the usual candidate with a B.S. in Chemical Engineering, the equivalent of thirty semester-hours of graduate credit including a thesis is the requirement for graduation. Special programs are arranged for candidates with baccalaureate degrees in the natural sciences.**
- **Assistantships and scholarships are available.**
- **Typical interests of the faculty include the areas of: reaction kinetics and catalyst deactivation; thermodynamics; process dynamics and control, including direct digital control; computer-aided design; science of materials, particularly metallurgy and polymer technology; numerical analysis; statistical analysis; mathematical modeling; operations research.**

CLEMSON UNIVERSITY

Chemical Engineering Department

M.S. and Doctoral Programs

THE FACULTY AND THEIR INTERESTS

Alley, F. C., Ph.D., U. North Carolina—Industrial Pollution Control
Barlage, W. B., Ph.D., N. C. State—Transfer Processes in Non-Newtonian Fluids, Interfacial Phenomena
Beard, J. N., Ph.D., L.S.U.—Digital Computer Process Control, Textile Dyeing and Finishing
Beckwith, W. F., Ph.D., Iowa State—Transport Phenomena, Pulp and Paper Processing
Edie, D. D., Ph.D., U. Virginia—Crystallization, Polymer Processing
Haile, J. M., Ph.D., U. Florida—Statistical Thermodynamics, Computer Simulation of Fluids
Harshman, R. C., Ph.D., Ohio State—Kinetics and Reactor Design, Membrane Processes
Melsheimer, S. S., Ph.D., Tulane—Membrane Transport, Numerical Methods, Process Control
Mullins, J. C., Ph.D., Georgia Tech—Thermodynamics, Adsorption
Talbott, W. H., Ph.D., U. Michigan—Rheology, Fluid Mechanics, Heat Transfer

FINANCIAL ASSISTANCE—Fellowships, Assistantships, Traineeships

Contact:

D. D. Edie, Graduate Coordinator
Department of Chemical Engineering
Clemson University
Clemson, S. C. 29631

COLORADO SCHOOL OF MINES

GRADUATE STUDY IN CHEMICAL ENGINEERING

PROGRAM—The Chemical and Petroleum-Refining Engineering Department offers graduate programs leading to M.S., or Ph.D. degrees in chemical engineering. Three semesters will normally be required for the M.S. degree, and three or more years for the Ph.D. degree. These degree programs are flexible in scope, and will be adjusted to meet the needs and desires of each student.

FINANCIAL ASSISTANCE—Both research assistantships and teaching assistantships are available with stipends to $450 per month plus tuition for the academic year.

LOCATION—The Colorado School of Mines, in Golden, Colorado, is picturesquely situated in the foothills of the Rocky Mountains, 13 miles west of Denver. Most of Colorado's beautiful recreation areas for hiking, camping, or skiing are easily reached from Golden.

LIVING ACCOMODATIONS—Most graduate students, both single and married, prefer to live in private apartments in the Golden-Denver area. For those students desiring to live on campus, the School maintains resident halls for single students and apartments for married students.

McMASTER UNIVERSITY

Hamilton, Ontario, Canada

M. ENG. & PH.D. PROGRAMS

THE FACULTY AND THEIR INTERESTS

R. B. Anderson (Ph. D., Iowa)	Catalysis, Adsorption, Kinetics
M. H. I. Baird (Ph.D., Cambridge)	Oscillatory Flows, Transport Phenomena
A. Benedek (Ph.D., U. of Washington)	Wastewater Treatment, Novel Separation Techniques
J. L. Brash (Ph.D., Glasgow)	Polymer Chemistry, Use of Polymers in Medicine
C. M. Crowe (PhD., Cambridge)	Optimization, Chemical Reaction Engineering, Simulation
I. A. Feuerstein (Ph.D., Massachusetts)	Biological Fluid and Mass Transfer
A. E. Hamielec (Ph.D., Toronto)	Polymer Reactor Engineering, Transport Processes
T. W. Hoffman (Ph.D., McGill)	Heat Transfer, Chemical Reaction Engr., Simulation
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W. J. Snodgrass (Ph.D., U. of N. Carolina, Chapel Hill)	Modelling of Aquatic Systems
J. Vlachopoulos (D.Sc., Washington U.)	Polymer Rheology and Processing, Transport Processes
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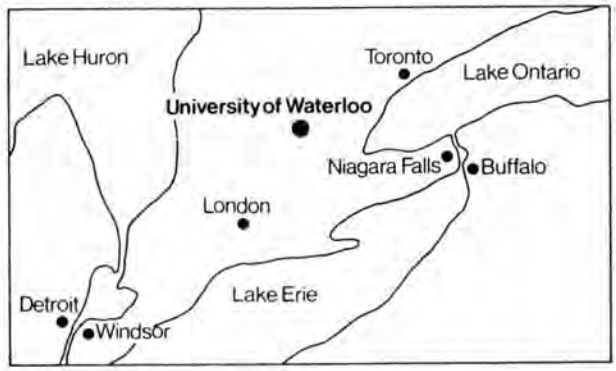

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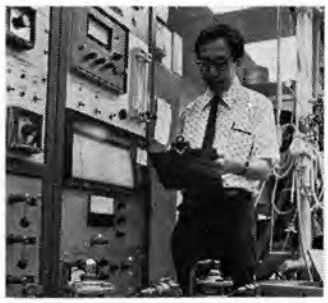

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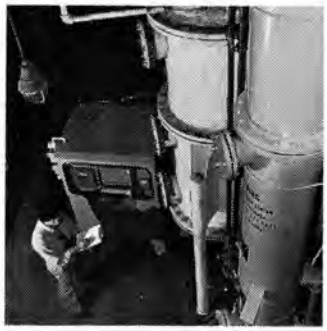
Rahway Plant
Chemical Manufacturing Unit



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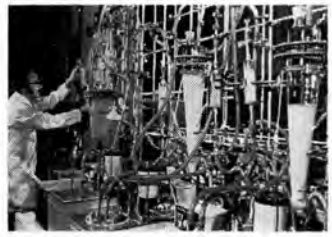

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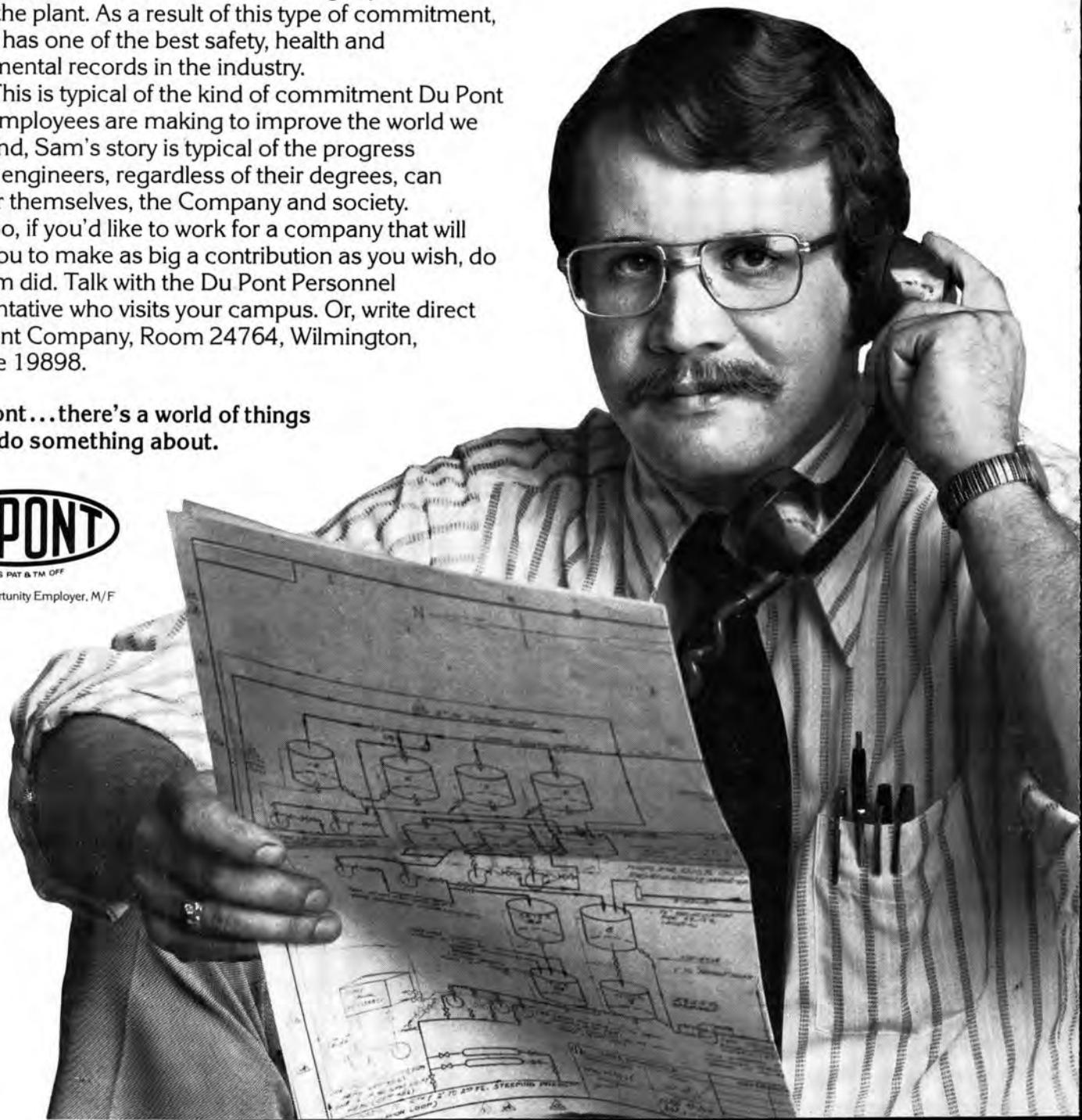

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