MISSION STATEMENT
The Department will regain international prominence within five years, through leadership in three core research areas and our graduating students becoming leaders in the field. The Department will create the highest level of enthusiasm, collegiality, and citizenship among our faculty. The Department will lead in research and teaching.

1. To provide a high-quality education for undergraduate and graduate Chemical Engineering students through a comprehensive curriculum that emphasizes basic science, mathematics, engineering science, and engineering design. UH ChE faculty members are expected to maintain their reputations as superior teachers and to provide a stimulating educational environment.

2. To engage in research programs that train graduate students, provide support for this research on a continuous basis, and contribute to the development of fundamental knowledge in the field of chemical engineering. Our Department’s varied and progressively pursued research ensures that our faculty members remain at the technological forefront of their respective areas of specialization.

3. To be of service to the community at large and, in particular, to the State of Texas, and to provide the local engineering community opportunities for advanced and continuing education.

INTRODUCTION
This Annual Report describes the activities and accomplishments of the Chemical Engineering Department at the University of Houston during the 2001–2002 academic year. Information is provided regarding Departmental activities spanning education and research.

VISION STATEMENT
The Department of Chemical Engineering at the University of Houston is committed to:

1. Providing a high-quality education for undergraduate and graduate Chemical Engineering students through a comprehensive curriculum that emphasizes basic science, mathematics, engineering science, and engineering design. UH ChE faculty members are expected to maintain their reputations as superior teachers and to provide a stimulating educational environment.

2. Engaging in research programs that train graduate students, provide support for this research on a continuous basis, and contribute to the development of fundamental knowledge in the field of chemical engineering. Our Department’s varied and progressively pursued research ensures that our faculty members remain at the technological forefront of their respective areas of specialization.

3. Being of service to the community at large and, in particular, to the State of Texas, and to provide the local engineering community opportunities for advanced and continuing education.

The University of Houston provides equal treatment and opportunity to all persons without regard to race, color, religion, national origin, sex, age, disability, veteran status or sexual orientation except where such distinction is required by law. This statement reflects compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Educational Amendments of 1972 and all other federal and state regulations.

A special thanks to Mr. Toban Dvoretzky for compilation of this Report, as he has done in stellar fashion on a regular basis since he conceived and produced the inaugural issue in 1992.

Prepared by the University of Houston Department of Chemical Engineering, Toban Dvoretzky
Produced by the UH Cullen College of Engineering Office of Communications, Harriet Yim, Angela Shortt

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CONTACT INFORMATION
This is the 2001–2002 Annual Report of the University of Houston Department of Chemical Engineering. In it, we provide a snapshot of the current state of the department, highlighting the past year’s accomplishments.

The department is in the midst of an ambitious period of growth. This past year, we have hired two new faculty members. Dr. Vincent M. Donnelly, a renowned expert in the area of plasma science and engineering, earned his B.A. in Chemistry from LaSalle College (Philadelphia) in 1972, and his PhD in Physical Chemistry from the University of Pittsburgh in 1977.

Dr. Adam Capitano is our newest Assistant Professor. Adam joins us from MIT where he was a postdoctoral researcher. Adam earned his B.S. in Chemistry from the University of Iowa (1998) and his PhD in Chemistry from the University of Michigan (1999). Adam brings to the Department a unique combination of expertise—he holds the distinction of having completely and successfully changed his research focus from surface science of reaction systems to biological systems.

The department is doing very well in spite of this period of tremendous change for the field of chemical engineering. Undergraduate enrollments are stabilizing while graduate enrollments are growing. The research programs of our faculty are very healthy, with a strong surge in research support. The faculty are growing and thrive as a department. We look forward to continuing to increase the number of incoming graduate students, including at least three Chemical Engineering faculty members in each. These centers should attract major funding from industrial and governmental sources. The centers are key to enhancing the external visibility and reputation of the Department.

Graduate Program
- Increase scholarly output and recognition in terms of doctoral students, publications, invited lectures, and awards.
- Improve the quality of incoming graduate students.
- Establish three research centers of excellence that involve at least three Chemical Engineering faculty members in each. These centers should attract major funding from industrial and governmental sources. The centers are key to enhancing the external visibility and reputation of the Department.
- Increase the number and percentage of domestic graduate students.
- Through research partnerships and programs, take full advantage of the unique geographical location that the Department enjoys as a result of its proximity to the chemical, energy, and medical industries.

Undergraduate Program
- Recruit more and better full-time undergraduate students, focusing on both academic ability and leadership potential.
- Create an undergraduate curriculum that is responsive to changes in the Chemical Engineering field and which prepares students for a breadth of employment opportunities. The curriculum should include training that prepares students for employment, including communication skills, ethics, and financial engineering.
- Sustain high ranking of undergraduate program.

Outreach
- Conduct research that will directly benefit the State of Texas, particularly the greater-Houston area.
- Enhance the interactions with Chemical Engineering alumni, particularly those who reside in the local area.
- Provide educational opportunities for the community through specialized courses and short courses.

We look forward to continuing to grow and thrive as a department. I invite you to review this report, and I hope that you find it informative. We look forward to any feedback that you may have.

Michael Harold
Dow Chair Professor & Department Chair

STRATEGIC PLAN

DEPARTMENT OF CHEMICAL ENGINEERING

Long-Range Goals
- Sustain top ranking among Chemical Engineering Departments.
- Increase the number of incoming graduate students.
- Improve the quality of incoming graduate students.
- Establish three research centers of excellence that involve at least three Chemical Engineering faculty members in each.
- Increase the number and percentage of domestic graduate students.
- Through research partnerships and programs, take full advantage of the unique geographical location that the Department enjoys as a result of its proximity to the chemical, energy, and medical industries.

Short-Term Objectives
1. Overall Program
   a. Grow the department by at least four full-time faculty members, with at least one hire in materials and two in bioengineering.
   b. Implement new Departmental name and undergraduate curriculum.
   c. Improve research infrastructure.
   d. Establish a critical size in at least two core research areas that are central to the future of the Chemical Engineering profession.
   e. Establish two research centers of excellence, one in materials and one in bioengineering.
   f. Continue to adhere to Year-2000 ABET guidelines and criteria.
   g. Reduce teaching loads for full-time, research-active faculty from average of 2.5–3 to 2–2.5 courses per academic year.

2. Graduate Program
   a. Increase research expenditures from approximately $150K to $200K per FTE (or a 33% increase).
   b. Continually improve the quality of graduate students.
   c. Increase the number of incoming domestic graduate students to at least 40% of the incoming full-time students (or a 100% increase).
   d. Establish a critical size in at least two core research areas that are central to the future of the Chemical Engineering profession.
   e. Establish two research centers of excellence in the Department, one in materials and one in bioengineering.
   f. Continue to adhere to Year-2000 ABET guidelines and criteria.
   g. Reduce teaching loads for full-time, research-active faculty from average of 2.5–3 to 2–2.5 courses per academic year.

3. Undergraduate Program
   a. Enhance size and quality of the undergraduate student body.
   b. Continually upgrade undergraduate curriculum by (i) being more flexible for student interns, (ii) being more responsive to the emerging materials and biotechnology trends in the field, and (iii) delivering excellent and up-to-date courses to our students.
   c. Implement new information technology into at least three undergraduate courses, including but not limited to visualization tools, computational examples using fluid dynamics and finite-element codes, and web-based instruction.
   d. Continue to adhere to Year-2000 ABET guidelines and criteria.
   e. Modernize the undergraduate lab by investing in new experiments and upgrading existing experiments.

4. Income-Producing Programs
   a. Establish and run at least three income-producing educational or research programs, including
      - Petroleum Engineering MS in Mexico
      - Chemical Engineering MS in Mexico
      - Licensing of "Toluene Methylation Technology"

5. Outreach and Communication
   a. Establish semiannual Departmental Newsletter, Annual Report, and continually upgraded Departmental web site and Graduate Brochure.
   b. Increase contributions from industry for undergraduate and graduate scholarships, facilities, and equipment by 100%.
   c. Establish improved relations with alumni through activities and alumni involvement in departmental initiatives. Seek to increase alumni contributions by 100%.
As of Fall 2002, the Department of Chemical Engineering will comprise 10 full professors, four associate professors, one assistant professor, two professors emeriti, three affiliated faculty, three adjunct associate professors, and 22 lecturers.

PROFESSORS


ECONOMIDES, MICHAEL J. (PhD Petr. E., Stanford, 1984). University Professor. Petroleum-production engineering; reservoir stimulation (fracturing and acidizing); advanced reservoir-exploration strategies; next-generation high-intensity-design.

ECONOMOU, DIEMETRE J. (PhD CHE, Illinois, 1988). John and Rebecca Moores Professor, Associate Department Chairman. Director of Undergraduate Admissions Plasma reactor modeling and simulation; plasma diagnostics; processing with energetic neutral beams; etching and deposition of thin solid films for microelectronic-device fabrication; environmental remediation; surface modification of materials.

FLUMERFELT, RAYMOND W. (PhD CHE, Northwestern, 1980). Dean of Engineering. Processing of cellular material; environmental surface-burning agents; nucleation in low-surface-energy materials; rheological behavior of tissue polymers; viscoelasticity flows and stability; biodegradable products for consumer applications.

HAROLD, MICHAEL P. (PhD CHE, Houston, 1981). One Chain Professor & Department Chairman. Multifunctional chemical reactor synthesis and analysis; high-purity hydrogen generation for fuel cells; integrated catalysis--filtration devices for diesel-exhaust abatement; multiphase selective oxidation of hydrocarbons.

LUSS, DAN (PhD CHE, Minnesota, 1965). Cullen Professor. Chemical reaction engineering--dynamics of chemically reacting systems; hot-spot formation in packed-bed reactors; production of synthesis gas in membrane reactors; electrical and magnetic-field formation during high-temperature solid reactions.

MONHANTY, KISHORE K. (PhD CHE, Minnesota, 1976). Transport in microstructured media; improved oil-recovery; colloids and complex fluids; functional biomaterials.

RICHARDSON, JAMES T. (PhD Physics/Chemistry, Seoul, 1955). Heterogeneous catalysis; catalytic processes; reactor engineering; solar energy; catalytic destruction of hazardous wastes; gas-to-liquid conversion processes; high-temperature superconductivity; solid-oxide fuel cells; ceramic membrane reactors; combination catalysis.

ASSOCIATE PROFESSORS

KRISHNAMOORTI, RAMANAN (PhD CHE, Princeton, 1994). Director of Graduate Admissions. Structure-processing-property relations for multiphase polymers; polymer crystallinity in bulk and thin films; thermodynamics and viscoelasticity of polymer blends and copolymers; nanocomposite structure and viscoelasticity.

NIKOLAOU, MICHAEL (PhD CHE, UCLA, 1988). Process simulation; control; optimization; computer-aided process engineering.

VEKILLOV, PETER G. (PhD Chemistry, Russian Academy of Sciences, 1981). Protein crystallization, intermolecular interactions, phase diagrams, thermodynamics, reaction, phase transitions in protein solutions; physical-chemical aspects of sickle-cell anemia; structural biology; crystal growth.

PROFESSORS EMERITI

HENLEY, ERNEST J. (PhD CHE, Columbia, 1953).

TILLER, FRANK M. (PhD CHE, Cincinnati, 1946). M.D. Anderson Professor; joint Professor of Civil & Environmental Engineering. Fluid/particle separation; solid processing; radiant drying; moisture transport in drying solids; solution of equations in stagewise operations.

AFFILIATED FACULTY

BRIGGS, JAMES M. (PhD Chemistry, Purdue, 1993). Assistant Professor. Biochemical & Biophysical Sciences. Computer simulation of biomolecules; HR-1 integrase inhibitor design; re-engineering of enzyme substrate specificity.

FOX, GEORGE E. (PhD Chemistry, Syracuse, 1974). Professor of Biology & Biophysical Sciences. Artificial RNA technology; microbial monitoring; RNA design.


ADJUNCT ASSOCIATE PROFESSORS

FLEISCHER, MICKY T. (PhD CHE, Houston, 1987).

MARPLE, STANLEY JR. (PhD CHE, MIT, 1943).


ADJUNCT PROFESSORS


ROOKS, CHARLES W. “MICKEY” (PhD CHE, Oklahoma, 1973). Director, Undergraduate Practices Laboratory.

LECTURERS

CHE. Dr. Yu-Min Chen, Mark Dajnak, Dr. Saoud Khoury, Dr. Joseph M. Lee, Dr. Jagdish C. Maheshri, Dr. Soundar Ramchandran, Dr. Jeffrey Smith, Dr. Raymond D. Sable, Albert Swarts.

PETS. E. Dr. Jaffrey F. App, Dr. Jon Burger, Dr. Abhil Ossman-Gupta, Dr. Aarnu David, Dr. Bindi Dindoruk, Dr. J. Robert Gocherov, Robert C. Hubbard, Ross Kaste, John Martinez, David Murphy, Miles R. Palke, Dean C. Pratt, Dr. Grant E. Robertson.
Prof. VEMURI BALAKOTAIAH: research involves the mathematical modeling and analysis of the interactions between the transport processes and chemical reactions in various systems of engineering interest. The objective of the research is to gain a fundamental understanding of the complex behavior of these systems and use this understanding to practical advantage. His group’s current research projects include modeling and analysis of catalytic monoliths (for pollution-reduction in automobiles, oxidation of VOCs, power generation, and removal of NOx from exhaust gases); numerical computation and bifurcation analysis of homogeneous and wall-catalyzed reacting flows; spatiotemporal patterns in catalytic reactions and reactors; studies on wavy films in gas-liquid two-phase flows; and studies on gas-liquid two-phase flows through packed beds under normal and microgravity conditions.

The research performed by Prof. JIM BRIGGS focuses on computational studies of protein structure and function, inhibitor design, investigations of possible inhibition resistance pathways, and development of methods for the above work. Targets for these studies include those important in the treatment of AIDS, cancer, tuberculosis, and other disease states.

Prof. MICHAEL ECONOMIDES research involves the optimization of the design and operation of the overall hydrocarbon production system from the reservoir and the wellbore to the market. He is currently conducting industry efforts for developing deep offshore technology, world energy scenario forecasts, and natural-gas development. His group’s current research projects include petroleum production engineering (improving reservoir deliverability through fracturing, acidizing, and lift performance); complex well architecture in petroleum production; reservoir stimulation; advanced reservoir-exploitation strategies; and next-generation high-intensity design.

The research of Prof. DEMIOTRE ECONOMOU includes: (a) Plasma etching and deposition: large-scale numerical simulations of plasma flow and chemistry in complex multidimensional geometries; fluid and direct-simulation Monte Carlo (DSMC) approaches; plasma diagnostics, involving laser-induced fluorescence, mass spectrometry, in situ real-time multichannel laser interferometry, and ion-energy and angular-distribution detectors; (b) Plasma physics, including electron velocity distribution functions; plasma heating; and new plasma sources and chemistries for advanced integrated-circuit manufacturing. (c) Chemical vapor deposition, specifically metalorganic chemical vapor deposition (MOCVD) of thin films. (d) Atomic-layer processing, involving nanofabrication, and experimental realization of atomic-layer etching and molecular-dynamics simulation of the interaction of energetic beams with crystal surfaces.

The unifying theme behind the projects in the laboratory of Prof. GEORGE FOX is seeking an understanding of the role of RNA in the early evolution of life. Bioinformatics studies are performed on viral RNA components in bacterial genomes et al., and multiple bacterial species are monitored in spacecraft environments. Artificial RNAs are used as a possible monitoring system for genetically modified bacteria.

The research interests of Prof. MIKE HAROLD are in the area of chemical reaction engineering. His groups carry out fundamental experiments complemented by mathematical modeling in order to understand reaction-transport interactions in chemical reactors, and to develop customized reactors for specialized applications. Areas of particular interest include reaction-separation devices and materials, environmental reaction engineering, and multiphase transport and reaction. Ongoing projects include multiphase chemical reactor synthesis and analysis (considering heat-exchange and separation into simple, multifunctional devices), high-purity hydrogen generation for fuel cells (converting methanol into high-purity hydrogen for on-demand supply to a protein-exchange membrane fuel cell); integrated catalytic filtration devices for diesel-exhaust abatement (reducing particulates and NOx in the net-oxidizing exhaust of lean-burn gasoline and diesel vehicles); and multiphase selective oxidation of hydrocarbons (oxidizing the interactions of free-radical chemistry and transport phenomena). Developing operating schemes to optimize the contacting of hydrocarbon and oxygen.

Prof. RANAMAN KRISHNAMOORTI and his group undertake research that aims to understand the structure-processing-property relations in nano- and microstructured multiphase polymer materials, building on strong collaborations with industry, national laboratories, and academia. The foremost and unique aspect of the research program has been the capability to synthesize well-defined and controlled materials (polymers and inorganic materials) and combine this with well-established measurement techniques to examine fundamental molecular and macroscopic properties that determine and characterize the final properties of multiphase polymer systems. Five specific current projects are: effect of pressure on the phase behavior of polyolefin blends; polymer crystallinity in bulk and thin films; phase transitions in block copolymers and block-copolymer-based balanced microemulsions; structure and viscoelasticity of macro- and nanocomposites; and structure and transport in biopolymers.

Prof. RANDY LEE and his group focus on organic and materials research chemistry. The six general areas include selectively fluorinated organic thin films; complex organic interfaces with controlled local composition, structure, and function; biologically active interfaces; nanoparticle growth and manipulation; biospolymers and conducting polymers; and polymerization catalyst development. The common thread tying all of these research areas together is synthesis, whether organic, inorganic, organometallic, or solid-state, with the goal of preparing new materials for technological applications.

Several projects of Prof. DAN LUSS research groups are associated with the dynamic features of chemically reacting systems, such as reverse-flow reactors, hot-spot formation in packed-bed reactors, and the temperature-rise during polyelefin-polymerization via metallocene catalysts. Dr. Luss’ groups also conduct research on the use of membrane reactors to produce synthesis gas, the destruction of nitrogen oxides in reverse-flow reactors, and the formation of electrical and magnetic fields during high-temperature solid reactions. Specific projects include: dynamics of chemically reacting systems (using bifurcation theory to classify the dynamic features of various chemical reactors, with application to the destruction of NO); hot-spot formation in packed-bed reactors; production of synthesis gas in membrane reactors (optimizing the operation of a novel membrane reactor); and electrical and magnetic-field formation during high-temperature solid reactions (during the combustion of various metals).

Prof. KISHORE MOHANTY’s research focuses on transport of simple and complex fluids in complex microstructured materials for applications in energy, environment, and biotechnology. This research is aimed at imaging structures, understanding the physics of transport, relating the microstructures to transport coefficients, and developing new materials for enhanced targeted transport. Current research includes: transport in microstructured media (using microscopy, microtomography, CT-scanning, and NMR to image microstructured materials and the transport within); improved oil recovery (studying oil extraction by miscible flooding, and probing the interaction between flow and phase behavior); colloids and complex fluids (fluids containing surfactants and polymers are developed for stable foams, low-tension micellar solutions, and micelle-enhanced separation processes, with kinetics of hydrate dissociation being studied for potential production of natural gas from subsea hydrates); and
functional biomaterials for controlled and targeted drug-delivery (probing the relations between the molecular interaction, material nanostructure, and transport/interfacial properties).

Prof. MIKE NIKOLAOU’s research interests are in computer-aided systems engineering. His work emphasizes the interplay between theory and applications in a number of industries, including chemicals, energy & petroleum, microelectronics, and food processing. Prof. Nikolaou’s group develops new approaches for broad classes of problems, screens candidate technologies for specific applications, and develops proofs of concept or working prototypes, frequently in collaboration with industrial sponsors. Recent topics of interest with general applicability include model prototypes, frequently in collaboration with industrial sponsors.

Profs. MIKE NIKOLAOU and JIM RICHARDSON work in the field of patterned catalysis as related to industrial processes. Topics include heterogeneous catalysis and catalytic processes, reactor engineering, and catalyst preparation, characterization, and design; solar energy, solar-receiver design, and solar-related chemical processes; gas-to-liquid conversion processes; high-temperature superconductivity and processing of ceramic superconductors; solid-oxide fuel cells; ceramic membrane reactors; and combinatorial catalysis.

Prof. PETER VEKILOV carries out pioneering research in biomolecular engineering, with a focus on phase transitions occurring in solutions of biological macromolecules. Application areas include protein-condensation diseases, structural biology, and bio-based nanotechnology. His current research interests include: protein crystallization; physico-chemical aspects of sickle-cell anemia; crystalization tools for structural genomics; nucleation and phase transitions in protein solutions; protein intermolecular interactions and phase diagrams; criteria for the impact of reduced gravity on protein-crystal perfection; and kinetics and stability of crystal growth.

The major research interests of Prof. RICHARD WILLSON are at the interface between the life sciences and engineering, and range from fairly basic investigations of fundamental phenomena to development of novel technologies. Specific areas: molecular recognition and adhesion, including separations of proteins and nucleic acids for purification and analysis, antibody and aptamer affinity and selectivity, and biophysical and structural characterization of proteins and nucleic acids for purification and analysis, antibody and aptamer affinity and selectivity, and biophysical and structural characterization of driving forces and kinetics of interactions involving biological macromolecules; and environmental biotechnology, including microbial and enzymatic degradation of wastes, DNA probe technology, ribosomal RNA technology, and combinatorial methods.

// Current Research Projects & Grants //

Awards granted to the Department of Chemical Engineering

**BALAKOTAIAH, VEMURI**

- $190,000 Robert A. Welch Foundation

- $110,000 Texas Higher Education Coordinating Board (ATP)
  - “Novel Catalysts & Reactors for Air Pollution Control” (2000–2001)

- $60,000 The Dow Chemical Company
  - “Bifunctional Analysis of Catalytic Reactors” (2001)

- $44,000 NASA—Glenn Research Center

- $12,000 Schlenkerla
  - “Modeling of Ormosil Formation in Carbonate Reservoirs” (2001)

**ECONOMIDES, MICHAEL J.**

- $324,831.98 Halliburton Energy Services

- $60,000.00 Weatherford (Engineering Foundation)

**ECONOMOU, DEMETRE J.**

- $394,907 National Science Foundation

- $35,000 Materials Research Science & Engineering Center

- $30,000 Sandia National Laboratories
  - “Plasma Molding over Surface Topography” (2001–2002)

**HAROLD, MICHAEL**

- $26,000 NIST

**KRISHNAMOORTI, RAMANAN**

- $369,195 National Science Foundation

- $249,000 ExxonMobil Chemical Company

- $145,000 Robert A. Welch Foundation

- $26,000 DuPont Company

- $199,300 Texas Higher Education Coordinating Board (ATP)

- $60,000 ACS—Petroleum Research Fund

- $31,865 BASF Corporation
  - “Multiple Reaction System for Air Chemical Engineering Undergraduate Laboratory” (2001; equipment)

- $26,000 ACS—Petroleum Research Fund

- $60,000 NIST

- $26,000 NIST

- $199,300 Texas Higher Education Coordinating Board (ATP)

- $60,000 ACS—Petroleum Research Fund

- $31,865 BASF Corporation
  - “Multiple Reaction System for Air Chemical Engineering Undergraduate Laboratory” (2001; equipment)
MOHANTY, KISHORE K.

- U.S. Department of Energy
  - "Development of Shallow Viscous Oil Reserves in North Slope" (2001–2004)
  - "Innovative and Inexpensive Approach to the Production of Synthetic Fuels from Coal and Coal-derived Materials" (2000–2002)
  - "Numerical Simulation of the Evolution of Heterogeneous Catalysts" (1999–2001)
  - "Improved Sabatier Reactors for Natural Gas" (2000–2002)

- National Science Foundation
  - "Control of Protein Nucleation & Crystallite Growth" (1998–2001)
  - "Protein & Precipitant-Specific Criteria for Impact of Reduced Gravity on Protein-Crystal Growth" (1997–2001)

- NASA
  - "Control of Protein Nucleation & Crystallite Growth" (1998–2001)
  - "Improved Halogen Resistance of Catalytic Oxidation through Efficient Catalyst Tailoring" (2000–2001)

- DARPA

- NASA
  - "Ribosomal RNA Probe Design for Microbial Monitoring" (2000–2002)
  - "Imaging Phasor for Screening of Chiral Librations" (2000–2001)

- Texas Higher Education Coordinating Board (ATP)

- A&M University
  - "Improved Sabatier Reactors for Natural Gas" (2000–2002)

- U.S. Department of Energy
  - "Improved Sabatier Reactors for Natural Gas" (2000–2002)

- National Institutes of Health/NHLBI

- National Institutes of Health/NHLBI

- National Institutes of Health/NHLBI
  - "Development of Virtual-Reality Modules for the Visualization of Industrial Facilities by Engineering Students" (2001)
  - "A Study on Plasma-Etching Yield Improvements through a Faculty-in-Industry Internship" (2001)

- National Institutes of Health/NHLBI
  - "Imaging Phasor for Screening of Chiral Librations" (2000–2001)

- National Institutes of Health/NHLBI

- National Institutes of Health/NHLBI

- National Institutes of Health/NHLBI
The addition of Prof. Donnelly enhances the Department’s research efforts in the areas of microelectronics and plasma science and engineering, as Prof. Demetre Economou has already established a renewed program in plasma and microelectronics in our Department.

The University of Pittsburgh in 1977.

 Prof. Vincent M. Donnelly was hired as Full Professor, effective Fall 2002. Prof. Donnelly was most recently a Distinguished Member of Technical Staff of Agere Systems, Inc. (formerly Lucent Technologies and AT&T Bell Laboratories) in Murray Hill, NJ. He is a world-renowned expert in the field of plasma reactions and dynamics. Prof. Donnelly earned his B.A. in Chemistry from LaSalle College (Philadelphia) in 1972, and his PhD in Physical Chemistry from the University of Pittsburgh in 1977. Appointed a Fellow of the American Vacuum Society in 1997, Prof. Donnelly chaired its Plasma Science & Technology division from 1989 until 2001. He has organized and chaired professional symposia, and serves on numerous advisory committees and boards. He has won six educational, corporate, and professional awards. Early in his career, he served as a National Research Council Postdoctoral Fellow at the Naval Research Laboratory in Washington, DC. Prof. Donnelly’s research interests include plasma diagnostic techniques, plasma processing chemistry and physics, plasma etching for microelectronics and nanotechnology applications, plasma-surface interactions, and applications for plasma-treated surfaces. He has more than 150 scientific publications, and nine patents. He has given approximately 100 invited lectures worldwide.

Prof. Donnelly enhances the Department’s research efforts in the areas of microelectronics and plasma science and engineering, as Prof. Demetre Economou has already established a renewed program in plasma and microelectronics in our Department.

PROF. PETER VEKILOV joined the Department as Associate Professor effective Fall 2001. He taught a short course, entitled “Mechanisms of Crystallization Form Solutions,” in Helsinki, Finland. During 2001, he served as Session Chair of the 13th International Conference on Crystal Growth (Kyoto, Japan) and as Discussion Leader of “Protein Crystals” at a Gordon Conference. He delivered two invited seminars during Fall 2001.

PROF. RICHARD WILLSON delivered 11 invited seminars during the academic year. His international talks were for the Czech Academy of Sciences (Prague), Gigagon Corporation (Hilden, Germany), Recovery of Biological Products X (Cancun, Mexico), and the 14th International Symposium on Affinity Technology & Biocognition (San Carlos, Mexico). His presentations of research at other conferences occurred at the AIChE National Meeting (Pensacola), the Gordon Research Conference on Applied Environmental Microbiology, and the ACS National Meeting. He was a featured investigator at “Research in Texas Day” at the Texas State Capitol. Prof. Willson served as Chair of the UH Intellectual Property Committee, and he is the President-elect of the International Society for Molecular Recognition.

The University of Pittsburgh in 1977.

 Prof. Adam T. Capitano was hired as Assistant Professor, effective Fall 2002. Prof. Capitano earned his B.S. in Chemistry from the University of Iowa (1994) and his PhD in Chemistry from the University of Michigan (1998). Since 1999, he served as a postdoctoral associate at M.I.T. in the Liver-Based Tissue-Sensing program of Prof. Linda Griffith. He holds the distinction of having completely and successfully changed his research focus from surface science of reaction systems to biological systems.

Prof. Capitano’s current research interests reflect his diverse training, including the design of tissue-based biosensors for passive defense of water systems, development of fluorescent assays for differentiated cell function, two-photon microscopic characterization of three-dimensional cultures, tissue engineering of heart valves, and adaptation of three-dimensional printing technology for tissue engineering. His addition to our Department will strengthen even further the biomolecular and biochemical programs of Prof. Richard Willson and Peter Vekilov.

PROF. RICHARD WILLSON.

DONNELLY HIRED.

PROF. PETER VEKILOV

CAPITANO HIRED.

PRF. RICHARD WILLSON.
During the academic year, and committees. 
numerous national and international panels. 
Professors (University). He serves on 
Engineering); and Distinguished & Named 
Undergraduate Curriculum, ABET (College of 
Curriculum, Scholarship, Honors Program, 
Department's Associate Chairman, and he 
project with the City of Houston to abate 
Professor by the University of Houston, and 
two prestigious awards during the year: He 
Department in the spring of 2001 after 
Tenure-Track Faculty. Dr. Rooks, who joined 
College of Engineering's 
ADJUNCT PROF. CHARLES “MICKEY” 
ROOKS was the College of Engineering’s 
award for Outstanding Instruction, Non- 
Tenure-Track Faculty. Dr. Rooks, who joined 
The Chemical Engineering Building at 
The Dow Chemical Company presented him 
Professor by the University of Houston, and 
The U.S. Department of Energy and other entities have estimated that less than one-third of the original oil in place 
can be produced with existing technologies. Hence, recovery of the remaining two-thirds constitutes the target for 
development of improved technologies. Approximately 341 billion barrels of mobile and immobile oil will remain 
recovered. Of this remaining oil, it is estimated that an additional 78 billion barrels are recoverable by currently identified technologies with the 
application of well-designed R&D and technology-transfer strategies. This would sustain current levels of U.S. 
production for several decades, which is necessary for an orderly transition to alternative transportation fuels. 
 Improved technology allows producers to work more efficiently and to extract more oil than otherwise. 
The natural-gas supply from conventional resources is estimated to be approximately 800 trillion cubic feet (Tcf), 
of which 160 Tcf are proven reserves and 640 Tcf are inferred or undiscovered reserves. Half the conventional 
production for several decades, which is necessary for an orderly transition to alternative transportation fuels. 
Improved technology allows producers to work more efficiently and to extract more oil than otherwise. 
reduce NOx emissions from diesel exhaust. 
Technology can make a difference. 
Improved technology allows producers to work more efficiently and to extract more oil than otherwise. 
The mission of the Institute for Improved Oil Recovery (IIOR) is to improve recovery of crude oil and natural gas under present-day economics, apply improved oil-recovery technology to the in situ clean-up of hazardous wastes, and transfer technology to industry and national laboratories. The scope of the program encompasses R&D and field demonstration, testing, and evaluation.

THE SIGNIFICANCE OF IMPROVED OIL-RECOVERY TECHNOLOGY:

The Institute for Improved Oil Recovery (IIOR) conducts its university research via a research consortium that is funded by major oil and gas producers, service companies, the U.S. Department of Energy, and the state of Texas. After research has been conducted through cooperative university and industrial projects, results are presented in conferences and workshops around the United States.

Research areas include:
- Advanced computing technology applied to reservoir engineering
- Three-dimensional imaging of flow through porous media
- Gas flooding methods (CO2, hydrocarbon, N2)
- Displacement mechanisms
- Foams
- Fractured reservoirs
- Formation evaluation
- Environmental engineering/containment technologies
- Particle transport, surface chemistry, wettability

Figure 3. Trends in Research Expenditures

He was instrumental in organizing and carrying off a unique cooperative program involving the University of Houston, LaSalle University (Mexico), and PEMEX. In this program, students in Mexico undergo a combination of classroom and remote instruction, all from UH lecturers, and ultimately earn an MS PetrE degree from the University of Houston. This cooperation has proven extremely popular, and the program will be refined and expanded during its subsequent years.

PROF. NEAL R. AMUNDSON is a member of the National Academy of Engineering, the National Academy of Sciences, and the American Academy of Arts & Sciences. He was the first recipient of the Neal R. Amundson Prize, awarded at each IORE meeting to a recognized leader in the field of chemical reaction engineering. He also holds four honorary doctorates.

In his first full year with the Department, ADJUNCT PROF. CHARLES “MICKEY” ROOKS won the College of Engineering’s award for Outstanding Instruction, Non-Tenure-Track Faculty. Dr. Rooks, who joined the Department in the spring of 2001 after many years in industry with Monsanto and Solvita, directs the Department’s Undergraduate Practices Laboratory. He is also working with Prof. V. Balakotaiah, M. Harold, and J. T. Richardson on the establishment of a diesel-emissions testing facility.

PROF. VEMURI BALAKOTAIAH raked in two prestigious awards during the year. He was named as a John and Rebecca Moores Professor by the University of Houston, and The Dow Chemical Company presented him with its Ya. B. Zel’dovich Award. Prof. Balakotaiah presented six papers at the AIChE National Meeting, and he served as the Department’s Director of International Graduate Admissions during 2001. In collaboration with Profs. M. Harold, C. Rooks, and J. T. Richardson, he is pursuing a project with the City of Houston to abate NOx emissions from diesel exhaust.

The Institute for Improved Oil Recovery (IIOR) is to improve recovery of crude oil and natural gas under present-day economics, apply improved oil-recovery technology to the in situ clean-up of hazardous wastes, and transfer technology to industry and national laboratories. The scope of the program encompasses R&D and field demonstration, testing, and evaluation.

Contact:
Prof. Kishore K. Mohanty, Director
University of Houston
Department of Chemical Engineering
5222 Engineering Blvd, 1
Houston, TX 77204-4004
713-743-4321
713-743-4322 fax

The mission of the Institute for Improved Oil Recovery (IIOR) is to improve recovery of crude oil and natural gas under present-day economics, apply improved oil-recovery technology to the in situ clean-up of hazardous wastes, and transfer technology to industry and national laboratories. The scope of the program encompasses R&D and field demonstration, testing, and evaluation.
DEPARTMENTAL SUPPORT & GRADUATE FELLOWSHIPS
As of June 2002, the UH CHE research program comprised 54 full-time graduate students, 8 postdoctoral fellows, 46 Petroleum Engineering students, and 21 part-time Master of Chemical Engineering students (the industrially employed professionals who are attracted to our non-thesis terminal-degree option). The program is supported by the following sources:

State Budget
- Departmental: $1,775,591.07
- Research: $192,471.07
- HEAP: $113,076.27
- $2,001,138.41

Federal
- NSF: $601,889.90
- NASA: $162,376.97
- Sandia: $21,366.38
- US Foreign Support: $26,697.93
- DOE/EPA: $239,886.44
- US-Foreign Support: $26,697.93
- DOE/EPA: $239,886.44
- NSA: $21,366.38
- AEC: $218,374.69
- DOE/EPA: $239,886.44
- $1,084,436.59

University Funds
- Endowments & Fees: $392,950.53
- $392,950.53

Private Grants
- Welch Foundation: $192,754.17
- ACS PRF: $192,754.17
- ACS PRF: $25,620.52
- $218,744.17

Industrial
- ExxonMobil, Shell, Dow, BP/Amoco: $200,387.82
- Pennzoil Products Company: $232,088.98
- $432,477.00
- Hercules: $20,000.00
- Pennzoil-Quaker State: $20,000.00
- $20,000.00
- Sandia: $21,366.38
- $432,477.00

GRAND TOTAL
- $4,209,117.22

OUTSTANDING ALUMNI
These graduates of the UH Chemical Engineering program have received the UH Engineering Alumni Association’s “Distinguished Alumnus” Award:

- Robert Baldwin, BS, 1949
- William Brookshire, BS, 1957
- Robert M. Zoch, Jr., BS, 1968
- J.C.M. “Jimmy” Lee, PhD, 1970
- Ravi Singhalia, PhD

DONOR ORGANIZATIONS
The Department of Chemical Engineering is most grateful for the support contributed by these industrial, educational, and nonprofit organizations:

American Institute of Chemical Engineers
- BASF Corporation
- BP/Amoco
- CACHe Corp.
- Chevron U.S.A. Inc.
- Council for Chemical Research
- The Dow Chemical Company Foundation
- The Dow Chemical Company
- E.I. du Pont de Nemours & Company
- ExxonMobil
- Fluor Corp.
- Halliburton Foundation, Inc.
- The Lubrizol Foundation
- Marathon Oil Company
- Pennzoil Products Company
- Rohm and Haas Company
- Shell Oil Company Foundation
- The University of Houston Foundation
- Welch Foundation
- The Dow Chemical Company Foundation
- The Dow Chemical Company Foundation

INDUSTRIAL ADVISORY BOARD
The Chemical Engineering Department has an Industrial Advisory Board (IAB). The IAB provides the Chemical Engineering chairman and faculty an industrial perspective on important strategic and operational issues. With input and advice, the IAB addresses such salient topics as faculty hiring, student recruitment, curriculum content, and graduate research programs. The IAB members also provide a network through which fundraising efforts, student recruiting and internships, and engagement of alumni are enhanced.

Members of the IAB are:
- Air Products & Chemicals, Inc. (Houston, TX)
- Steve Hepler, Area Manager
- Andersen (Houston, TX)
- Robert Baldwin, BS, 1949
- Anderson (Houston, TX)
- F. Bernardini Celoron, Senior Manager
- Aspen Technology, Inc. (Houston, TX)
- Ravi Singhalia, PhD
- AT&F/A Petrochemicals, Inc. (Deer Park, TX)
- Dr. Michel Daumerie, Vice-President of Research & Technology
- BP/Amoco (Houston, TX)
- Dr. José Sosa, Research Scientist
- BASF Corporation (Freepoint, TX)
- James P. Sassonaro, Operations Director
- Bayer Corporation (Baytown, TX)
- Dr. Thomas Dackiw, Manager, Process Technology Group
- Bechtel Corp. (Houston, TX)
- Lance Murray, Principal VP, Manager of Refining Center of Excellence
- Bolidin Corp. (Houston, TX)
- Chemstations, Inc. (Houston, TX)
- Richard D. Messer, President
- Chevrontex, Inc. (Houston, TX)
- Michael J. Colorio, Director, Process Marketing
- Ciba Corning, Inc. (Houston, TX)
- Dr. Ahmed Alim, Senior VP of Research & Development and Chief Technology Officer
- Conoco Inc. (Houston, TX)
- John Zinno, Manager, Process Technology Group
- CVX Energy, Inc. (Houston, TX)
- Dr. William D. Hill, Global Technology Manager—Terathane®
- DaFron Lyndsys (Wilmington, DE)
- Dr. William D. Hill, Global Technology Manager—Terathane®
- M.A. Fertik & Associates (Austin, TX)
- Dr. Michael A. Fertik, President
- Ethyl Corporation (Pasadena, TX)
- Kang Busy, Plant Manager
- ExxonMobil Chemical (Baytown, TX)
- Joseph E. Gery, Manager, Polypropylene Technology
- ExxonMobil Chemical (Baytown, TX)
- Fluor Corp. (Sugar Land, TX)
- Michael J. Peveo, Vice-President, Process Engineering
- Halliburton—Oilfield Chemicals (Sugar Land, TX)
- Alex E.M. Barloewen, Executive VP & General Manager
- Halliburton Energy Services (Duncan, OK)
- Dr. Ron Morgan, Technical Excellence Leader, Research
- Halliburton—Oilfield Chemicals (Sugar Land, TX)
- Dr. David H. Brinly, Executive VP of Research & Development and Chief Technology Officer
- Haldor Topsoe, Inc. (Houston, TX)
- Dr. Ahmed Alim, Senior VP of Research & Development and Chief Technology Officer
- Harvest Chemical Company (Sugar Land, TX)
- Howard Smith, Technology Manager for the Texas Plants
- Marathon Ashland (Dallas, TX)
- Michael S. Brinkley, Division Manager
- Mitek, Inc.,—Houston Operations (Sugar Land, TX)
- Kenneth J. Carlson, Technical Manager, Oils-Akard
- Pennzoil-Quaker State Co. (The Woodlands, TX)
- Dr. Ahmed Alim, Senior VP of Research & Development and Chief Technology Officer
- Phillips 66 Co. (Geology, TX)
- Robert J. Mitchell, Refining Process Engineering Manager
- Rohm and Haas Texas Incorporated (Deer Park, TX)
- Robert W. Brinly, President & Plant Manager
- Sabic (Piper), Inc. (Sugar Land, TX)
- Dr. Saded Al-Baladi, Division Manager
- Schaltbau—Oilfield Chemicals (Sugar Land, TX)
- Dr. Keith D. Dismuke, Department Head
- Shell Chemical Company (Houston, TX)
- Dr. Carlos E. Garcia, Technology Manager—POD/Oxirane Polymers
- Shell Chemical Company (Houston, TX)
- Craig W. Snook, Director of Process Analytical, Texas Operations
UNDERGRADUATE ENROLLMENT & DEGREES CONFERRED:

YEAR: 1994

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GRADUATE ENROLLMENT & DEGREES CONFERRED:

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</table>

// Graduate Ranking: National Research Council //

Besides featuring the top ranked doctoral program in the University of Houston, the Chemical Engineering Department ranked in the top 20 nationally out of 93 ChE doctoral programs rated by the National Research Council (1995):

RELATIVE RANKINGS FOR RESEARCH-DOCTORATE PROGRAMS IN CHEMICAL ENGINEERING

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<tr>
<th>OVERALL RANKING</th>
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<tr>
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<td>3</td>
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<td>University of Illinois (Chicago)</td>
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<td>6</td>
<td>California Institute of Technology</td>
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<td>8</td>
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<tr>
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<td>Princeton University</td>
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<td>14</td>
<td>University of California, Santa Barbara</td>
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<td>Rice University</td>
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<td>24</td>
<td>University of Notre Dame</td>
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<td>University of Colorado</td>
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<td>Lehigh University</td>
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<td>University of California, Davis</td>
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<td>State University of New York at Buffalo</td>
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<td>30</td>
<td>University of Virginia</td>
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<tr>
<td>31</td>
<td>Georgia Institute of Technology</td>
<td>3.01</td>
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// Enrollment Trends & Degrees Conferred //

Enrollment figures are as of the start of the Fall semesters in the years indicated.
Degree figures are totals of those conferred at the ends of the Spring semesters in the years indicated.

UNDERGRADUATE ENROLLMENT & DEGREES CONFERRED:

YEAR: 1994

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GRADUATE ENROLLMENT & DEGREES CONFERRED:

YEAR: 1994

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Figure 4. Weighted Student Credit Hours
A trendline of the weighted student credit hours shows a modest growth over the past year.

YEAR: 1994

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<td>28</td>
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</table>


Figure 4. Weighted Student Credit Hours
A trendline of the weighted student credit hours shows a modest growth over the past year.

Figure 5. Faculty and Student-Body Trends

*Includes MNE students
RECIPIENTS (since Summer 2001)

Master of Chemical Engineering

Amita Agrawal
Michael Callefon
Kathleen Dixon
Hung M. Nguyen

M.S. in Chemical Engineering

Barbara F. Casanova
Karen S. Cyn
Emmanuelle M. Croix
Jirina Dang
Lars Fitta
William B. Focke
Maria Gennaro
Ksenia Jem
David L. Jewell
Shruti K. Modi

M.S. in Petroleum Engineering

Salvin A. Ayadde
Richard P. Dixon
Cesar Portilla
Agustin Presas, Jr.
Anne Taillifert
Ivan E. Torez
Yvonne C. Trujillo
Lewis M. Warlick

2001–2002 RECIPIENTS, PHD IN CHEMICAL ENGINEERING

David L. Jewell (D. Luss, advisor)
Keesu Jeon
William B. Focke
Urs Fitzi
Jinxia Deng
Emmanuelle M. Croze

Rajeev J. Das (M. Nikolaou, advisor)
Maricela Amador
Avelino Reyes-Alfonso, Jr.
Yasser Qutub
David L. Jewell
Keesu Jeon
William B. Focke
Urs Fitzi
Jinxia Deng
Emmanuelle M. Croze

Amita Agrawal (M. Nikolaou, advisor)

Michael Callefon (M. Nikolaou, advisor)

Kathleen Dixon (M. Nikolaou, advisor)

Hung M. Nguyen (M. Nikolaou, advisor)

2001–2002 BS CHE GRADUATES WITH HONORS AND/OR MEMBERSHIP IN THE HONORS COLLEGE

Mancotta Amador (Honors)
Tharth D. Bui (Cum laude)
Charles H. Campbell (Cum laude, Honors)
Brian S. Daly (Honors)
Rajeev J. Das (Cum laude)

Tanya Gutierrez (Cum laude)
Alexandrou Royo-Afreros, Jr. (Cum laude, Honors)
Thomas E. Wilson (Cum laude)

NOTES: Some students have filed Privacy Requests and are thus not listed here.

Haiyang Zhang
Mohit Singh
(R. Nikolos, advisor)
Sathish Sankaran
Ying Peng
Doosik Kim
Eric K. Dao
Jeffrey F. App

2001–2002 RECIPIENTS, PHD IN CHEMICAL ENGINEERING

Jeffrey F. App, Relative Permeability Estimation through Production Data (R. Mohanty, advisor)
Stefanie A. Brown, The Kinetics of Exothermic Reactions on Ceramic Foam Catalysts (J.T. Richardson, advisor)
Eric K. Dao, Modeling & Experimental Studies on Wave Erosion & Occlusion for Gas-Liquid Flows through Pipes (V. Balakotaiah, advisor)
Robin Garg, Dynamic of Countercurrent Flow & Reverse-flow Reactors (D. Luo, advisor)
Dusok Kim, Plasma Molding over Nonplanar Surfaces (E. Economides, advisor)
Ying Peng, Transport Properties of Ceramic Foam for Catalyst-Support Application (J.T. Richardson, advisor)
Sathish Sankaran, Development of Process Models from Operation Data: Studies in Hydraulic Fracturing & Predictive Control (M. Nikolaou, advisor)
Mohit Singh, Dynamic Pore-Level Modeling of Two-phase Flow through Porous Media (J. Mohanty, advisor)
Koray Yurekli, Structure & Dynamics of Filled Polymeric Systems (J. Kimballman, advisor)
Haiyang Zhang, Spatial Uniformity Control of Plasma Etching in Inductively Coupled Plasma Reactors (E. Economides & M. Nikolaou, advisor)

BaluKotaiAh, Vemuri

Conference proceedings:
Books & book chapters:
BRIGGS, James M.

Economides, Michael J.

Nonreferred publications:


Faculty Publications

Following are authored works accepted for or pending publication since January 2001. Reprints may be requested from the professors through the Departmental mailing address, by phone, or by e-mail.
Conference proceedings:

Books & book chapters:

VEKILOV, PETER G.


Book chapters:


THE UNDERGRADUATE PROGRAM

The UNDERGRADUATE CHEMICAL PROGRAM of the UNIVERSITY OF HOUSTON is consistently rated among the top programs in the country (10th in the recent Gourman Report).
Students seeking admission as freshmen to the Cullen College of Engineering should refer to:

www.uh.edu/enroll/admis/freshman_req.html for the current and complete requirements.

Students aspiring toward undergraduate Chemical Engineering study at the University of Houston may request applications from:

Undergraduate Admissions Office
University of Houston
122 E. Cullen Bldg.
Houston, TX 77204-2023, U.S.A.

Transfer applicants who have earned fewer than 15 semester hours of college credit must meet the engineering requirements for high school graduates. Applicants who have earned between 15 and 29 semester hours of college credit must meet all of these requirements:
1. A grade point average (GPA) of 2.50 or higher for all college-level work attempted.
2. A GPA of 2.50 or higher for all college-level mathematics courses attempted.
3. A GPA of 2.50 or higher for all college-level chemistry and physics courses attempted.
4. A GPA of 2.50 or higher for all college-level English courses attempted; international students must have a TOEFL score of 550.
5. A GPA of 2.50 or higher for all college-level engineering courses attempted.
6. Must have attempted at least one college-level mathematics course and at least one college-level physics or chemistry course.

Transfer applicants who have earned 30 or more semester hours of college credit must meet all of these requirements:
1. A GPA of 2.25 or higher for all college-level work attempted.
2. A GPA of 2.25 or higher for all college-level mathematics courses attempted.
3. A GPA of 2.25 or higher for all college-level chemistry and physics courses attempted.
4. A GPA of 2.25 or higher for all college-level English courses attempted; international students must have a TOEFL score of 550.
5. A GPA of 2.25 or higher for all college-level engineering courses attempted.
6. Must have attempted at least one college-level mathematics course and at least one college-level physics or chemistry course.

Applicants with special questions about the undergraduate Chemical Engineering program may contact:

Mrs. Sharon Gates
Undergraduate Admissions Analyst
University of Houston
Chemical Engineering
2222 Engineering Bldg., 2
Houston, TX 77204-4004, U.S.A.
Phone: 713-743-4325
E-mail: SMGates@uh.edu

ENROLLMENT TRENDS:

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<td>2001</td>
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</tbody>
</table>

* at the beginning of the academic period.

Figures since 1981 include students registering as Postbaccalaureates. Enrollment figures have followed national trends.

The success of our program is due to the soundness of our undergraduate curriculum, the commitment of our faculty (all of whom teach undergraduate courses), and the support of local petroleum and petrochemical industries. We look forward to continued growth in the future and to the changes in chemical engineering education demanded by the 21st century.
Undergraduate Courses: Chemical Engineering (CHEE) //

3300: Materials Science & Engineering I 3 (3-0). Prerequisites: CHEE 1331, MATH 2433, PHYS 1351, CHEE 1331. Fundamental concepts of thermodynamic systems, heat and work, properties of pure substances, first and second laws.

3301: Materials Science & Engineering II 3 (3-0). Prerequisites: CHEE 2301, CHEM 1332, PHYS 1351, MATH 3342, and credit for or concurrent enrollment in MATH 3321. Properties of materials, with emphasis on metals, ceramics, polymers, and electronic materials.

3333: Chemical Engineering Thermodynamics I 3 (3-0). Prerequisites: CHEE 1332, MATH 2433, PHYS 1351, CHEE 1331. Fundamental concepts of thermodynamic systems, heat and work, properties of pure substances, first and second laws.

3334: Statistical & Numerical Techniques for Chemical Engineers 3 (3-0). Prerequisites: CHEE or CHEE 1331, CHEE 2352, MATH 3321 or equivalent, and credit for or concurrent enrollment in MATH 2433. Statistics for chemical engineers, curve-fitting, numerical methods in linear algebra, nonlinear algebraic equations, ordinary and partial differential equations, optimization. Special emphasis on problems appearing in chemical engineering applications.

3363: Fluid Mechanics for Chemical Engineers (formerly ENGI 3363) 3 (3-0). Prerequisites: CHEE 2352, MATH 3321 or equivalent, MACS 3340, PHYS 1351, and credit for or concurrent enrollment in CHEE 3334. Foundations of fluid mechanics, fluid statics, kinematics, laminar and turbulent flow, macroscopic balance, dimensional analysis and flow simulations.

3367: Process-Modeling & Control 3 (3-0). Prerequisites: CHEE 3334, CHEE or ENGI 3363, MATH 3321. CHEE 3332. Modeling techniques of chemical engineering problems, with emphasis on process control.

3369: Chemical Engineering Transport Processes 3 (3-0). Prerequisites: CHEE or ENGI 3363. Mass transfer in single- and multiphase systems and combined heat- and mass-transfer. Selected topics in heat and mass transfer, and in heat and momentum transfer.

3399-4399: Senior Honors Thesis 3 per semester. Prerequisites: senior standing; 3.0 cumulative grade point average in chemical engineering and overall.

3402: Unit Operations 4 (3-1). Prerequisites: CHEE 3333, CHEE or ENGI 3363, and credit for or concurrent enrollment in CHEE 3369. Unit operations, with emphasis on distillation, absorption, extraction, and fluid-solid systems.

3466: Biological & Physical Chemistry 4 (4-0). Prerequisites: CHEE 3301, CHEE 3302. Introduction to biochemistry, and physical-chemical topics including chemical kinetics and adsorption.

4198: 4298: 4398: 4498: Special Problems 1-4 per semester, or more by concurrent enrollment. Approval of the Chairman.

4300: Materials Science & Engineering II 3 (3-0). Prerequisites: CHEE 3300, CHEE 3332, advanced topics in the selection and design of materials. Topics covered will include phase diagrams, corrosion and degradation, property selection and control, and four topical case studies.

4321-4322: Chemical Engineering Design 3 per semester (3-0). Prerequisites: CHEE 3300, 3462, 3389, and credit for or concurrent enrollment in CHEE 4387. Computer-aided design of chemical processes, with emphasis on process economics, profitability analysis, and optimal operating conditions.

4361: Chemical Engineering Practices 3 (3-0). Prerequisites: CHEE 3461, 3389, and credit for or concurrent enrollment in CHEE 4387. Design and execution of experiments, with emphasis on heat and mass transport, unit operations, process control, and reactors. Written reports.

4366: Biophysical Engineering 3 (3-0). Prerequisites: CHEE 3466 and credit for or concurrent enrollment in CHEE 4387. Analysis and design fundamentals for biomedical process, reactor design, transported phenomena, applications of enzymes and microbial populations.

4367: Chemical Reaction Engineering 3 (3-0). Prerequisites: CHEE 3366, 3399, and 3462. Chemical-reaction kinetics, mechanisms, and reactor design in static and flow systems; introduction to heterogeneous catalytic reactions in flow systems.

5360: Chemical Engineering Fundamentals 3 (3-0). Prerequisites: credit for or concurrent enrollment in CHEE 4387. Analytic and design fundamentals for biochemical process, reactor design, transport phenomena, applications of enzymes and microbial populations.

5367: Advanced Process Control 3 (3-0). Prerequisites: CHEE 3301 or consent of instructor. Application of use of high-speed computers in the control of chemical processes, reactors, and units.

5371: Pollution-Control Engineering 3 (3-0). Prerequisites: credit for or concurrent enrollment in CHEE 4221 and CHEE 4367. Pollution problems and remedies with the Earth as an environmentally closed system. Limitations of absorption and self-cleaning for ternary phase, hydrophobic and hydrophilic, and their interrelationship.

5373: Environmental Remediation 3 (3-0). Prerequisites: CHEE 4361. Credit for or concurrent enrollment in CHEE 4387. In situ and ex situ methods of remediation or restoration of contaminated environmental sites. Emphasis is on hydrocarbon contaminants in soil, surface water, and groundwater.


5375: Chemical Processing in Microelectronics 3 (3-0). Prerequisites: CHEE 4387 or consent of instructor. Producing cloned proteins in useful amounts; use of recent advances in DNA technology; protein production, characterization methods.

5380: Biochemical Separations 3 (3-0). Prerequisites: senior standing in Chemical Engineering, or consent of instructor. Production of multicomponent fluids. Advanced principles of heat-exchanger design, multicomponent fractionation, absorption, stripping, and extraction.

5384: Petrochemical Processes 3 (3-0). Prerequisites: consent of instructor. Description of the petrochemical industry in terms of products, feedstocks, companies, and future trends. Markets, technology, and economics are provided for each of the major building blocks and derived to the end products.

5388: Air-Pollution Problems & Control 3 (3-0). Prerequisites: consent of instructor. Application of identification and control technology, estimation of pollutant transport, dispersion, and conversion; computer application for design of control units.

5387: Plasma Processing: Principles & Applications 3 (3-0). Prerequisites: senior standing in Engineering or Natural Sciences, or consent of instructor. Principles of low-pressure glow-discharge plasmas; plasma generation and maintenance, plasma chemistry, plasma diagnostics. Applications with emphasis on semiconductor manufacturing.

5377: Introduction to Polymer Science 3 (3-0). Prerequisites: CHEE 3362, and either CHEE or ENGI 3363 or consent of instructor. Synthesis, characterization, physical properties and processing of polymeric materials. Methods to measure and characterize the correlations among structure-processing-properties of polymeric materials.


5380: Biochemical Separations 3 (3-0). Prerequisites: senior standing in Chemical Engineering, or consent of instructor. Producing cloned proteins in useful amounts; use of recent advances in DNA technology; protein production, characterization methods.
// Undergraduate Chemical Engineering Curriculum //

1. Arrow to top of box (C is prerequisite for B)
2. Arrow to side of box (credit or registration in A at the same time as B)

* From Approved Courses

1. Total 130
UNDERGRADUATE SCHOLARSHIP RECIPIENTS

Our undergraduate program enjoys a robust level of support from industrial and organizational donors. Following are the 2001–2002 recipients of these undergraduate scholarships:

BP/AMOCO FOUNDATION
Jason Ellis
José A. Hinojosa
Juan R. Leal
Michael Rauschhuber

LUBRIZOL FOUNDATION
James Aguine
Milo Yue Khoo
Marsha Thomas-Blades
Cong Trinh

SOUTHWEST CHEMICAL ASSOCIATION
Brooke L. Butts

DONALD F. OTHMER SOPHOMORE ACADEMIC EXCELLENCE AWARD
Ngoc D. Pham

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS (to be announced in March 2003)

// Scholarships //
The Department offers four graduate programs:

1. **FULL-TIME MS/PHD**: This program supports the research activity of the faculty and is designed for full-time graduate students receiving financial support. Most students pursue the PhD degree, which may be completed (without an intermediate MS) in four years of study.

2. **PART-TIME MS (NON-THESIS OPTION)**: Intended for part-time students from local industry who have a BS ChE degree, this program requires 30 semester hours of coursework, including the same core required for full-time MS students.

3. **PART-TIME MCHE**: This is a separate Master’s program that emphasizes advanced engineering and business management. Admission and graduation requirements are the same as for the MS degree, but mastery of advanced engineering is the main goal. Approximately 25 students enroll annually. The MCHE degree may be completed in four semesters (two years).

4. **MASTERS OF PETROLEUM ENGINEERING**: Similar to the MCHE degree, this program offers advanced thesis or non-thesis studies to full- or part-time students in petroleum engineering. Annual enrollments range from 40 to 80 students, with an additional number of postbaccalaureate students involved in the coursework.

Details of these programs, and descriptions of the coursework offered, appear on the pages following.
FULL-TIME PROGRAMS OF STUDY (REQUIRING A THESIS)
The Department of Chemical Engineering offers Master of Science (MS) and Doctor of Philosophy (PhD) degree programs, both of which focus on advanced engineering fundamentals and research.

Recipients of the MS degree are qualified for employment in industry or for continued studies toward the PhD degree. Coursework for the MS degree includes four specific classes (Engineering Mathematics, Reaction Engineering, Transport Processes, and Classical & Statistical Thermodynamics) and two electives of the student's choice. The student also completes a research project and writes a Master's thesis describing the work. Candidates entering the program with a Bachelor of Science in Chemical Engineering can complete all requirements in 12 to 18 months.

Candidates for the PhD degree enjoy intensive exposure to a specific field of engineering research in addition to continued study of engineering fundamentals. Individual research is the major focal point for these students, who will learn, absorb, and otherwise experience the general philosophy, methods, and concepts of research and scholarly inquiry. After graduation, UH ChE PhD recipients will be qualified to contribute to the solution of significant problems related or unrelated to their doctoral research. For students considering an academic career, instructorships are available. Coursework for the PhD degree includes six specific courses (Engineering Mathematics II, Transport Processes II, and the four courses listed in the preceding paragraph) and six elective courses, which allow for specialization in the student's research area. In addition, all students undertake a doctoral research project and dissertation to expand the frontiers of knowledge in their research areas. Acceptance into this full-time program is generally accompanied by Departmental financial support. Candidates with a BS in Chemical Engineering can complete all requirements in about four years.

A student must pass the PhD Qualifying Exam to be formally accepted as a doctoral candidate. To be eligible to take this examination, a student must have completed the six specifically required PhD courses with a minimum cumulative GPA of 3.0/4.0. There is no foreign-language requirement. Highly qualified students may bypass the MS degree and pursue the doctorate directly.

The ratio of graduate students to faculty is low, typically four to six students per research advisor. After new students have spent their first semester in the Department, the ChE faculty make presentations of their research programs and interests to better enable the students to submit their requests for choice of research advisor. Every reasonable effort is made to accommodate students' first choice of advisor.

RESEARCH AREAS & EQUIPMENT
The Department's research programs are broad and innovative, encompassing traditional and emerging chemical engineering disciplines. Departmental research equipment includes an X-ray diffractometer with a hot stage, a pulsed excimer pumped dye laser, a quasielastic laser-light scattering spectroscopy unit, a computerized axial tomographic scanner (CATscan) system, rheometers, a fluorescence-polarization stopped-flow kinetics apparatus, and a titration microcalorimeter. Additionally, the Department houses numerous workstations and personal computers for graduate research. Access to a university VAX network and Hitachi AS/9000N mainframe is also available. For large computations, many faculty have reserved time on various national supercomputers.

ENTRANCE REQUIREMENTS (U.S. STUDENTS)
Admission to the Department's graduate programs is competitive, based on GPAs from undergraduate and graduate studies, GRE scores, and letters of recommendation. The U.S. applicant must generally have achieved a minimum undergraduate GPA of 3.0/4.0 and a minimum GRE score (Verbal + Quantitative) of 1100. Students with undergraduate degrees in fields other than Chemical Engineering may apply, but these students may need to take preparatory courses prior to or concurrently with ChE graduate study.

ENTRANCE REQUIREMENTS (INTERNATIONAL STUDENTS)
The international students offered admission over recent years have ranked in the top 10% of their class, and they have scored over 1200 on the GRE (Verbal + Quantitative) and over 550 on the TOEFL.

International applicants thus qualified should be prepared to submit unofficial copies of GRE scores, TOEFL scores, and transcripts well in advance of the Department's request for official documents. Official GRE and TOEFL scores should then be sent, using ETS Institutional Code 6870. The TOEFL requirement is waived for applicants from primarily English-speaking countries and for applicants who have earned a lesser ChE degree from a U.S. institution. The University of Houston requires a fee of $75 (in U.S. funds) to process graduate applications from non-U.S. citizens.

All applicants (U.S. and international) must also submit a completed University of Houston application form and a Chemical Engineering Department application form. Transcripts and all other documents should be mailed directly to one of the two addresses below, as application requests or components addressed to the UH Office of Admissions frequently fail to reach the Chemical Engineering Department in timely fashion. Note: Incoming UH ChE graduate students are admitted for Fall semesters only. Fall-semester applications that are received by the preceding February 1 are most favorably considered, although later applications may also be considered.

Qualified U.S. and international students may request a complete application package for the full-time, thesis-option MS or PhD programs from the appropriate agent below.

U.S. CITIZENS/PERMANENT RESIDENTS: Graduate Studies Coordinator University of Houston Department of Chemical Engineering S222 Engineering Bldg 1 Houston, TX 77204-4004

INTERNATIONAL CITIZENS: International Graduate Coordinator University of Houston Department of Chemical Engineering S222 Engineering Bldg 1 Houston, TX 77204-4004, U.S.A.

FINANCIAL AID
 Fellowships that typically consist of a stipend, tuition and fees are available for qualified PhD and full-time MS candidates. These fellowships are awarded on a competitive basis. Applicants may apply for financial assistance when requesting admission to the graduate program.
MASTER OF CHEMICAL ENGINEERING (MChE) DEGREE

The MChE degree is a non-thesis program for the working professional. This program has been designed for those persons who plan careers in plant operations, design, and management. It is intended to be competitive neither with the Master of Science degree (which is specifically research-oriented) nor with an MBA degree. Rather, the goal of this program is to impart earlier productive use of young engineers’ technical skills and to impart broad concepts of systems analysis, advanced process economics, and technical management. The program is aimed at improving opportunities for chemical engineers in chemical-process and related industries. The program comprises a core of six required courses, plus four elective courses selected to meet the student’s interests in the areas of process control, management and business economics, biochemical and environmental engineering, and petroleum engineering. The courses are available in the late afternoon and evenings, and the degree program can be completed in two to three years of part-time study.

Entrance requirements include a Bachelor’s degree in Chemical Engineering, industrial employment, and approvals of the MChE Program Director, the Chairman of the Chemical Engineering Department, and the Dean of Engineering. Unconditional admission may be granted for a minimum undergraduate GPA of 3.0 (4.0 scale) and a minimum GRE score (verbal + quantitative) of 1100. Conditional admission may be granted for a minimum undergraduate GPA of 2.6/4.0 and a minimum GRE of 1000, with special permission of the Program Director and the Dean of Engineering. Achievement of a grade of “B” or better in the first 12 hours of coursework removes the conditional status.

MASTER OF SCIENCE IN PETROLEUM ENGINEERING (MSPE)

The MSPE degree is ideal for any engineering graduate who desires to begin working or to improve his position in the upstream petroleum industry. This program offers courses held 5:30–8:30 p.m. Monday through Thursday, enabling attendance after business hours for full-time professionals. Students may elect whether to complete the Nonthesis Option, which requires 30 credit hours of approved courses beyond the introductory level in Petroleum Engineering, or the Thesis Option, which requires 18 credit hours of approved courses beyond the introductory level in Petroleum Engineering plus 12 credit hours dedicated to the Master's thesis. Petroleum Engineering courses can also be taken for Continuing Education credit, and they can be applied as Professional Development Hours for maintaining professional competency for the Professional Engineer (PE) certification.

A Bachelor’s degree in Engineering from an accredited institution is normally required for admission to the MSPE program. Undergraduate degrees in Petroleum, Chemical, or Mechanical Engineering provide all or most of the prerequisite courses for this program. Holders of other scientific degrees, as well as some Engineering graduates, must complete prerequisite requirements. All candidates should have credit for courses equivalent to the University of Houston’s prerequisites for this degree.

For unconditional admission to the program, a minimum undergraduate GPA of 3.0 (4.0 scale) and an acceptable GRE score (verbal + quantitative) are required. For conditional admission, a minimum undergraduate GPA of 2.6, an acceptable GRE score, and special consent of the Program Director and the Dean of Engineering are required. International applicants must qualify for unconditional admission and satisfy the University of Houston’s requirement of a minimum TOEFL score of 550.

For application forms, contact the Program Director. All correspondence and supporting documents (official transcripts and test scores) should also be mailed to this address:

Dr. Christine A. Economides
University of Houston
Chemical Engineering
S222 Engineering Bldg 1
Houston, TX 77204-4004

Once accepted into the graduate program, part-time students will be advised how to schedule courses sufficient for the MSPE degree program. (Part-time students commonly take one or two courses per semester.) Full-time students will be advised how to complete the required courses within a period of 1.5 years.
CHEMICAL ENGINEERING (CHEE)

41. **CHEE 3911:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.

42. **CHEE 3912:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.

43. **CHEE 5911:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.

44. **CHEE 5912:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.

45. **CHEE 6911:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.

46. **CHEE 6912:** Graduate Seminar: Prerequisite: consent of instructor. May be repeated for credit. 2 Cr. 2-0.
ORGANIZATION OF CHEMICAL ENGINEERING GRADUATE STUDENTS (OChEGS) is an educational and social student group that supplements formal departmental activities and functions. As part of the Department’s weekly seminar program (p. e.), OChEGS annually organizes and conducts an all-day symposium, featuring keynote speakers specially recruited from industry, academia, or government. At the symposium, several students give oral presentations of their research while others display posters. The organization holds social events (picnics, get-togethers for sports, etc.), and elects officers annually.

Corporate sponsors of the 2001 OChEGS Symposium, to whom the Department and OChEGS are most grateful, were: BP Chemicals; Cutler Johnston Corporation; ExxonMobil Chemical Co.; ExxonMobil Upstream Research; Halliburton; Shell International; and Stone Bond Corporation. Additional support was provided by the University of Houston Chemical Engineering Department and the University of Houston Activities Funding Board.

Here is the technical program of the 18th-annual Chemical Engineering Graduate Students’ Symposium (Fall 2001). Luigi Saputelli presided as OChEGS President.

Friday, 26 October 2001
7:30 – 8:30 a.m. Registration & Breakfast
8:30 – 8:40 a.m. Opening Remarks
8:40 – 9:25 a.m. Keynote Speaker: Dr. Bob Heinemann, Chief Technology Officer, Halliburton, “Technology in the Oil & Gas Industry: Does It Make a Difference?”
9:30 – 9:55 a.m. Sathish Sankaran, “Plant-Friendly Assessment of Model Quality in Model-Predictive Control Systems”
9:55 – 10:20 a.m. Dr. Oleg Galkin, “Liquid-Liquid Phase Boundary and Protein Homogeneous Nucleation Rate”
10:20 – 10:30 a.m. Coffee Break
10:30 – 10:55 a.m. Irwan Hidajat, “Study of Carbonate Morphology by using X-ray, CT-scanner, & NMR”
10:55 – 11:20 a.m. Jiaxin Dong, “MUSIC Simulations on Molecular-Dynamics Structures of the HIV-1 Integrase to Develop a Dynamic Pharmacophore Model for Anti-AIDS Drug Design”
11:20 – 1:00 p.m. Lunch & Poster Session
1:00 – 1:25 p.m. Dr. Wenping Li, “Pressure Filtration of Supercompatible Materials”
1:25 – 1:50 p.m. Bharat Marwaha, “Formation & Dynamics of Hot Regions in Packed-Bed Reactors”
1:50 – 2:15 p.m. Jiaxiang Ren, “Viscoelastic Properties of Layered-Silicate-Based Polymer Nanocomposites”
2:15 – 2:25 p.m. Coffee Break
2:25 – 2:50 p.m. Mohammad Shafiei, “Catalytic Steam-Reforming for Detoxification of Chlorocarbons”
2:50 – 3:15 p.m. Dimitris Sagias, “Closed-Loop Identification of Processes Operating under Model-Predictive Control”
3:40 p.m. Reception

Here are the technical program of the 16th-annual Chemical Engineering Graduate Students’ Symposium (Fall 2001). Luigi Saputelli presided as OChEGS President.

Friday, 26 October 2001
7:30 – 8:30 a.m. Registration & Breakfast
8:30 – 8:40 a.m. Opening Remarks
8:40 – 9:25 a.m. Keynote Speaker: Dr. Bob Heinemann, Chief Technology Officer, Halliburton, “Technology in the Oil & Gas Industry: Does It Make a Difference?”
9:30 – 9:55 a.m. Sathish Sankaran, “Plant-Friendly Assessment of Model Quality in Model-Predictive Control Systems”
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10:20 – 10:30 a.m. Coffee Break
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1:50 – 2:15 p.m. Jiaxiang Ren, “Viscoelastic Properties of Layered-Silicate-Based Polymer Nanocomposites”
2:15 – 2:25 p.m. Coffee Break
2:25 – 2:50 p.m. Mohammad Shafiei, “Catalytic Steam-Reforming for Detoxification of Chlorocarbons”
2:50 – 3:15 p.m. Dimitris Sagias, “Closed-Loop Identification of Processes Operating under Model-Predictive Control”
3:40 p.m. Reception

The Department attracts renowned speakers to address our graduate students on virtually a weekly basis. These speakers provide lecture abstracts that are distributed not just intradepartmentally, but to key industrial and academic figures statewide who may wish to attend. Unless exceptional circumstances apply, all CHE seminars are held on Fridays at 10:30 a.m. in room W122 of Bldg. D3, Cullen College of Engineering.

These seminars were presented in 2001–2002:

**SPRING SEMESTER 2001**

<table>
<thead>
<tr>
<th>DATE</th>
<th>SPEAKER</th>
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<tbody>
<tr>
<td>JANUARY 9</td>
<td>Dr. James Wei</td>
<td>Dose of Engineering &amp; Applied Sciences, Princeton University</td>
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<tr>
<td>FEBRUARY 19</td>
<td>Prof. H.H. Rottenberg</td>
<td>Department of Physical Chemistry, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Berlin, Germany)</td>
</tr>
<tr>
<td>FEBRUARY 19</td>
<td>Prof. Jennifer L. West</td>
<td>Chemical Engineering &amp; Bioengineering Department, Rice University (Houston, TX)</td>
</tr>
<tr>
<td>FEBRUARY 2</td>
<td>Prof. Michael V. Piskia</td>
<td>Chemical Engineering Department, Texas A&amp;M University (College Station, TX)</td>
</tr>
<tr>
<td>FEBRUARY 9</td>
<td>Prof. Donald Daydeh</td>
<td>Mechanical &amp; Aerospace Engineering Department, University of California (Irvine, CA)</td>
</tr>
<tr>
<td>FEBRUARY 16</td>
<td>Prof. Peter G. Veikilev</td>
<td>Chemistry Department, University of Alabama (Montevallo, AL)</td>
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**MARCH 2:**
<table>
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<th>DATE</th>
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<tr>
<td>MARCH 2</td>
<td>Dr. Victor M. Ugu</td>
<td>Chemical Engineering Department, University of Michigan (Ann Arbor)</td>
</tr>
<tr>
<td>MARCH 26</td>
<td>Prof. Michael R. King</td>
<td>Chemical Engineering Department, University of Pennsylvania (Philadelphia, PA)</td>
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<tr>
<td>MARCH 30</td>
<td>Prof. Gilbert F. Frenzen</td>
<td>Chemical Engineering Department, Texas A&amp;M University (College Station, TX)</td>
</tr>
<tr>
<td>APRIL 6</td>
<td>Maria I. Kaya</td>
<td>Chemical Engineering Department, Massachusetts Institute of Technology (Cambridge, MA)</td>
</tr>
</tbody>
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**FEBRUARY 23:**
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<tr>
<th>DATE</th>
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<tbody>
<tr>
<td>FEBRUARY 23</td>
<td>Dr. Alan W. Mahoney</td>
<td>School of Chemical Engineering, Purdue University (West Lafayette, IN)</td>
</tr>
</tbody>
</table>

The Department attracts renowned speakers to address our graduate students on virtually a weekly basis. These speakers provide lecture abstracts that are distributed not just intradepartmentally, but to key industrial and academic figures statewide who may wish to attend. Unless exceptional circumstances apply, all CHE seminars are held on Fridays at 10:30 a.m. in room W122 of Bldg. D3, Cullen College of Engineering.
SPRING SEMESTER 2002

JANUARY 11: Dr. Dinesh N. Patole, Center for Microscopy & Materials Research, University of Alabama at Huntsville (Huntsville, AL) "Molecular Interactions & Phase Behavior in Protein Solutions"

JANUARY 18: Dr. John H. Siebenthal, Chemistry & Chemical Engineering Division, California Institute of Technology (Pasadena, CA) "Third Annual Naval R. Amundson Lecture—Astronauts & Climate"

JANUARY 25: Lingsheng Yue, Chemical Engineering Department, University of Wisconsin-Madison, WI "From Bacteriophage T7 to Phenabrin: Mathematical Modeling for Integrated Understanding of Biological Systems"

FEBRUARY 1: Dr. Ying Song Cheng, Leeceens Respiratory Research Institute (Auburndale, MA) "Pharmaceutical Aerosols: Development of Better Delivery Systems"

FEBRUARY 8: Aaron Sin, Chemical Engineering Department, Cornell University (Ithaca, NY) "Development of a Microscale Cell Culture Analog Device"

FEBRUARY 18 (Mon.): Dr. Cameron F. Abrams, Max-Planck-Institut fur Polymer Research (Munich, Germany) "Molecular & Materials Simulation: From Semicontinuum to Polymers"

FEBRUARY 22: Prof. Paul E. Leibnitz, Chemical Engineering Department, Massachusetts Institute of Technology (Cambridge, MA) "Tailoring Surfaces for Adsorption of Halides, DNA, & Other Species: New Approaches for Chemical Sensing & Delivery"

MARCH 1: Dr. Rachel A. Segalman, Chemical Engineering Department, University of California (San Diego, CA) "Controlled Long-Range Order for Nanopatterning with Block Copolymers"

MARCH 5 (Tues.): Dr. Flav R. Sipristein, Chemical Engineering Department, North Carolina State University (Raleigh, NC) "Simulation of Surfactant-Template of Nanoporous Materials"

MARCH 15: Dr. Vasuilen I. Sivathivas, Chemical Engineering Department, Rice University (Houston, TX) "Biocatalyst Design for Bone Tissue-Engineering"

MARCH 27: Dr. Adam T. Caplan, Chemical Engineering Department, Massachusetts Institute of Technology (Cambridge, MA) "Design of a Liver-Tissue-Based Toxin Sensor"

FALL SEMESTER 2002

AUGUST 30: Prof. Greg McKenna, Chemical Engineering Department, Texas Tech University (Lubbock, TX) "Everything’s in Order! You Always Wanted to Know about the Glass Transition, but were Afraid to Ask"

SEPTEMBER 6: Prof. Plamen B. Atanassov, Chemical Engineering Department, Georgia Institute of Technology (Atlanta, GA) "Studies of Chirality Plasmas & Silicon Etching"

SEPTEMBER 14: Prof. Kyriacos Zygourakis, Chemical Engineering Department, University of Cincinnati (Cincinnati, OH) "Simulation of Surfactant-Template of Nanoporous Materials"

SEPTEMBER 20: Dr. Yoram Shoham, Chemical Engineering Department, University of California (Berkeley, CA) "Equilibrium-Free Multiscale Computation: Enabling Microscopic Simulators to Perform System-Level Tasks"

SEPTEMBER 27: Prof. Yanni P. Dervan, Chemical Engineering Department, University of California (Santa Barbara, CA) "Catalysis in Supercritical Fluids"

SEPTEMBER 28: Prof. Jason Y. Ching, Universite de Lorraine—University of Nancy I (Nancy, France) "Interfacial Instability & Capillary Micro-Switches"

OCTOBER 1: Prof. Calvin H. Bartholomew, Chemical Engineering Department, Brigham Young University (Provo, UT) "Hydrothermal Deposition of Cobalt Fischer-Tropsch Catalysts"

OCTOBER 8: Prof. Paul H. Steen, Chemistry & Chemical Engineering Department, University of New Mexico (Albuquerque, NM) "Enzyme-Catalyzed Direct Electron Transfer: Applications in Sensor & Power Sources"

OCTOBER 11: Prof. Demetre Economou, Electrical & Computer Engineering Department, University of the South Carolina (Columbia, SC) "Catalytic Systems"
The following fee-basis Continuing Education course is presented semiannually (generally in May and December) by a team of UH ChE professors and outside experts:

"APPLICATIONS OF HETEROGENEOUS CATALYSIS"

INSTRUCTORS:
Prof. Dan Luss (University of Houston)
Prof. James T. Richardson (University of Houston)
Prof. Joe W. Hightower (Rice University)
Dr. Vern W. Weekman, Jr. (Retired Director, Central Research, Mobil R&D Corporation)

HIGHLIGHTS OF THE COURSE DESCRIPTION:
Successful applications of the principles of catalysis to process design require a combination of physics, chemistry and engineering, together with state-of-the-art "know-how." Contemporary catalysis has made significant progress in recent years toward the scientific design of optimal catalyst systems for specific process requirements. The purpose of this course is to cover current knowledge for both the researcher in catalysis and the engineer interested in process applications. It will serve as a review for those knowledgeable in the subject and as an introduction to newcomers to the field.

The course considers how to select, prepare, characterize, test, and use a catalyst. Both laboratory and commercial methods of catalyst preparation are reviewed, with emphasis on practical applications. Modern instrumental methods for the characterization of catalysts' physical and chemical properties are also included. Techniques for the measurement of surface areas, pore properties, diffusivities, crystallite sizes, acidities, etc. are discussed. All aspects of catalytic kinetics, both chemical and diffusional, are considered with reference to specific problems. Common mechanisms and their relationship to catalyst properties are outlined fully.

To inquire about course dates, registration, and fees, contact:

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