

FUELING THE FUTURE

UNIVERSITY of HOUSTON | PETRO





Letter from the Chair

I am delighted to introduce you to our department. In comparison to other petroleum engineering departments around the country, ours is a relative newcomer; the bachelor's degree program in petroleum engineering was relaunched in 2009 and received ABET accreditation in 2015 — the same year the department launched its doctoral degree program. The UH Petroleum Engineering Department has been lauded as a “model partnership between industry and academia” by the Business-Higher Education Forum, which cited the department's dedication to addressing industry and workforce gaps by leveraging partnerships with companies operating in the sector.

The petroleum engineering curricula emphasizes connecting-the-dots between classroom lessons and their real-world applications through professional development and research opportunities. Located in the heart of the Energy Capital of the World, students in the UH Petroleum Engineering Department hold internships in some of the world's most

prestigious offices while obtaining their degrees. Petroleum engineering faculty members conduct research in areas including unconventional reservoirs, hydraulic fracturing, molecular simulation of rocks, rock mechanics and physics, reservoir management and stimulation and enhanced oil recovery. Our students are also involved in high-impact, influential research, so it is no wonder why we are improving the future of the global energy market! I look forward to seeing how current and future UH petroleum engineers will shape the energy landscape and solve the most critical energy challenges facing humanity.

Thank you,

Mohamed Soliman, Ph.D., P.E., NAI
William C. Miller Chair
Petroleum Engineering Department
University of Houston



ABOUT PETROLEUM ENGINEERING

WHAT IS PETROLEUM ENGINEERING?

Global economies would collapse without it. Life as we know it would cease to exist without oil and gas, and petroleum engineers are the only ones who know how to extract it safely and efficiently from underground reservoirs. They solve the most critical and pressing challenges facing humanity, including how to meet an increasing global demand for energy while ensuring the safety and cleanliness of our environment.

WHY THE UNIVERSITY OF HOUSTON?

The vision for the UH Cullen College of Engineering petroleum engineering program is to be the center of world-class petroleum engineering education, research and service in the city of Houston, the center of the world's petroleum industry. Petroleum engineering students are taught by leading educators with strong research and industrial backgrounds. Students are prepared to address the challenges of the world's energy needs responsibly, to exceed the evolving expectations of employers in the petroleum and energy industries, to sustain industry leading skills and to be leaders in industry, academia and government.



WHAT CAN I DO WITH A PETROLEUM ENGINEERING GRADUATE DEGREE?

Career opportunities for petroleum engineers are continually available in Texas and around the world. Employment opportunities are widely accessible with the major integrated international energy companies and service providers, or the many intermediate and independent oil and gas producers, drilling companies, special equipment companies and industry support companies. Employment can be domestic or international, onshore or offshore, and can involve the most sophisticated intelligent systems and technologies. Early on, career opportunities may involve specific technical and operational assignments, and later, engineering and business leadership positions. Many petroleum engineers with appropriate experience and knowledge have started their own oil and gas companies.

ABOUT PETROLEUM ENGINEERING

RESEARCH

At the University of Houston Cullen College of Engineering, the Petroleum Engineering Department offers state-of-the-art research opportunities for undergraduate and graduate students. The University of Houston is home to some of the world's most advanced energy research and houses a 74-acre campus, called the Technology Bridge, dedicated to bringing industry and academia together to conduct energy research in clean engines and fuels, wind energy, superconductivity and petroleum engineering. All undergraduate and graduate students in engineering are strongly encouraged to get hands-on research experience in one of the many faculty research groups, labs or centers on campus while they are pursuing their degrees.

The petroleum department has numerous funded research projects funded by domestic and international companies, including Shell, Chevron and Marathon Oil, just to name a few.

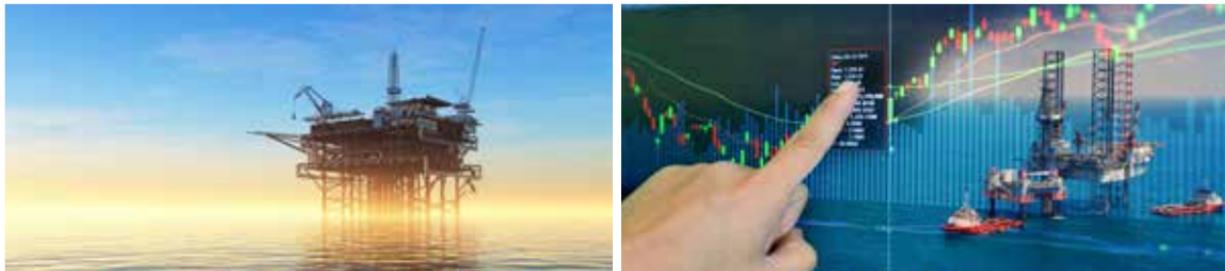
UNIVERSITY OF HOUSTON



INTERNSHIPS

Almost half of Houston's economy is driven by energy, with more than 3,600 energy-related companies based in Houston. All of the major oil and gas companies have operations in Houston, and the region boasts almost 40,000 jobs just in oil and gas extraction, representing a third of such positions worldwide! The petroleum engineering department at UH is located just a few miles down the road from the world's leading energy companies, so you are likely to hold internships in some of the world's most prestigious offices while working to obtain your degree in petroleum engineering. Internships can be summer-based or can involve 10-20 hours per week throughout the year while taking classes, which is difficult at universities that aren't located in the city of Houston. Interns receive compensation and valuable experience in real petroleum engineering assignments, enhancing the opportunity for direct hire upon graduation.

PETROLEUM ENGINEERING



UNDERGRADUATE OFFERINGS

B.S. in Petroleum Engineering

We offer a curriculum designed to cover the broad fundamentals and advanced topics of petroleum engineering including drilling, formation evaluation, production and reservoir engineering. In addition, broadening electives include geoscience, project management and economics.

The overall curriculum involves 127 semester credit hours. It is designed to enable students qualified to start in Calculus I to complete a B.S. in 4 years. The curriculum includes the core curriculum mandated by the state of Texas. For more detailed information and admission requirements, please visit our website at: <http://petro.egr.uh.edu/>.

GRADUATE OFFERINGS

Masters in Petroleum Engineering (courses only) and Masters of Science in Petroleum Engineering (Thesis Option)

Our Master's Degrees in Petroleum Engineering requires the completion of 30 semester credit hours. It is designed to further the knowledge base of the undergraduate engineer in the four major pillars of upstream petroleum engineering: drilling, formation evaluation, production and reservoir engineering. It also offers the opportunity to specialize in advanced course material or by thesis with the large selection of courses offered in the four pillars.

Dual M.S. Degree in Petroleum Engineering and Subsea Engineering

Our Dual M.S. Degree in Petroleum and Subsea Engineering is for students interested in the related fields of petroleum engineering and subsea engi-

neering and allows them to obtain both a master's degree in petroleum engineering and a master's degree in subsea engineering completing, 45 credit hours of relevant graduate coursework. Hence, with the appropriate selection of graduate course within the Petroleum Engineering Department and subsea engineering program, students can be awarded both degrees, thereby significantly reducing the total number of credit hours needed if the two degrees were pursued separately.

Ph.D. Degree in Petroleum Engineering

Our Ph.D. degree students conduct original research in advanced petroleum production concepts and collaborate on multi-disciplinary research projects to continue the development of their petroleum engineering skill set and professional careers. We have world class laboratories and train our students in the latest technology. Our class size is designed to be small to achieve a rich and personalized learning experience.

THE DEPARTMENT OF PETROLEUM ENGINEERING CURRENTLY OFFERS TWO CERTIFICATE PROGRAMS.



UNCONVENTIONAL ENERGY SOURCES CERTIFICATE PROGRAM:

The certificate program in Unconventional Energy Sources is a specialized certification to meet the current demands of the oil industry for professionals with better understanding of the exploitation and performance of unconventional resources. Tailored for working engineers, courses are delivered asynchronously, meaning students may view recorded lectures at their convenience. Additional guidance and interaction is provided between students and professors in online meetups and discussions.

Courses and Curriculum:

For this certificate, students are required to take four of the five offered courses:

- PETR 6332 Reserves Estimation I
- PETR 6318 Horizontal Drilling
- PETR 6330 Fundamentals of Hydraulic Fracturing
- PETR 6340 Unconventional Resource Engineering
- PETR 6352 Shale Reservoirs

FUNDAMENTALS OF PETROLEUM ENGINEERING CERTIFICATE PROGRAM:

The certificate program in Fundamentals of Petroleum Engineering is a certification to introduce working professionals in the Oil and Gas industry to a better understanding of the academic fundamentals of petroleum engineering. Tailored for working engineers, courses are delivered face to face in the evenings or online.

Courses and Curriculum:

For this certificate, students are required to take the following four courses:

- PETR 6351 Introduction to Petroleum Engineering
- PETR 6328 Petroleum Fluid Property & Phase Equilibria (PVT)
- PETR 6362 Reservoir Engineering I
- PETR 6364 Origins and Development of Oil and Gas Reservoirs

A description of the certificate courses and all graduate petroleum engineering courses can be obtained from the UH Graduate Catalog:
<http://publications.uh.edu/index.php?catoid=33>

ADDITIONAL INFORMATION:

For degree objectives and application information:
www.petro.uh.edu/graduate/degree

For admission requirements, advising, and other information specific to the petroleum engineering program:
www.petro.uh.edu/graduate

STUDENT ORGANIZATIONS



AADE STUDENT CHAPTER

aadeuh.org

The University of Houston has established an American Association of Drilling Engineers (AADE) Student Chapter to further increase the knowledge of students interested in the drilling aspect of the oil & gas industry.



OILFIELD CHRISTIAN FELLOWSHIP

<http://oilfieldchristianfellowship.com/AboutUs.asp>

PI EPSILON TAU

universityofhouston.piet@gmail.com

Pi Epsilon Tau is the national petroleum engineering honor society.



SPE STUDENT CHAPTER

uhspe.org

University of Houston has established a Society of Petroleum Engineers student chapter (SPE).

FACULTY



M. Y. SOLIMAN, NAI

Department Chair, and William C. Miller Endowed Chair, Professor

Research Interests: Waterless stimulation/fracturing; diagnostic testing; analysis of fracturing data; numerical simulation of fracture propagation; refracturing of unconventional reservoirs; stimulation of unconventional reservoirs.



BIROL DINDORUK, NAE

Professor

Research Interests: Multi-scale interaction of phase behavior and flow; multi-scale compositional and black oil modeling; conventional and unconventional enhanced oil recovery/improved oil recovery and implementation mathematics of oil and gas recovery.



CHRISTINE EHLIG-ECONOMIDES, NAE

Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair

Research Interests: Shale gas and tight oil reservoir and production engineering; complex well design; integrated reservoir characterization and pressure transient testing.



S.M. FAROUQ ALI, NAE

Distinguished Professor

Research Interests: Improving oil recovery from reservoirs; heavy oil recovery, steam injection, in situ combustion, chemical flooding; micellar flooding; numerical reservoir simulation; research and education.



LORI HATHON

Assistant Professor

Research Interests: Routine and special core analysis; clastic petrology; reservoir quality analysis and predictive modeling; applications of image analysis to rock physics; organic petrography; and thermal maturity analysis.



DIMITRIOS GEORGIOS HATZIGNATIOU

Professor

Research Interests: EOR/IOR; Reservoir engineering; reservoir characterization; production optimization; reservoir simulation; water management; CO₂ sequestration.



SHAH KABIR

Lecturer

Research Interests: Roots of production decline analysis, CO₂ sequestration, & thermal wellbore modeling in drilling & production operations.



KONSTANTINOS KOSTARELOS

Associate Professor

Research Interests: Chemical enhanced oil recovery recycling surfactants; supercritical hydrocarbon gas flooding; synthetic sandpicks for flow assurance; electro-kinetic behavior of asphaltenes; and environmental restoration.



KYUNG JAE LEE

Assistant Professor

Research Interests: Multiscale modeling of unconventional reservoirs; forward simulation, inversion, and data-driven modeling of engineering processes; experimental characterization and computational modeling of kerogen maturation to discover fluid-and-mineral compositions in reservoirs.



MICHAEL T. MYERS

Associate Professor and Ali Daneshy Endowed College Professor and Director of Graduate Programs

Research Interests: Connecting petrophysical and geomechanical models to rock characterization using image data; static and dynamic properties of porous media and formation evaluation.



GUAN QIN

Associate Professor and Gulf Coast Section of the Society of Petroleum Engineers Endowed College Professor

Research Interests: Mechanistic and kinetic study of CO₂ and methane exchange process in methane hydrates using md simulations; competitive absorption of CO₂ and methane between zeolite and organic matters; estimation of permeability, relative permeability and capillary pressure functions for shale rocks based on multi-scale rock images.



AHMAD SAKHAE-POUR

Assistant Professor

Research Interests: Pore-scale processes; petrophysics; geomechanics; unconventional resources.



GANESH THAKUR, NAE

Distinguished Professor and Director of UH Energy Industrial Partnerships

Research Interests: Integrated reservoir management of conventional and unconventional reservoirs; water-flooding and gas injection, including CO₂ flood; eor – polymer flooding, low salinity, and unconventional reservoirs; deep water, heavy oil, and tight oil and gas field optimization; horizontal well technology applications.



GEORGE K. WONG

Associate Professor

Research Interests: Well production operations & surveillance (bean-up and ramp-up); sand management and sand production for producers and injectors; sand control completions for producers and injectors; fracturing in unconsolidated sand; geomechanics and hydraulic fracturing.

The University of Houston

Cullen College of Engineering

The University of Houston Cullen College of Engineering addresses key challenges in energy, healthcare, infrastructure and the environment by conducting cutting-edge research and graduating hundreds of world-class engineers each year. With research expenditures topping \$30 million and increasing each year, we continue to follow our tradition of excellence in spearheading research that has a real, direct impact in the Houston region and beyond.



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