2021–2022 HILDEBRAND DEPARTMENT ENDOWMENT IMPACT REPORT

Cultivate Connect Lead

PREPARING TOMORROW'S ENERGY LEADERS

The University of Texas at Austin
Hildebrand Department of Petroleum and Geosystems Engineering
Cockrell School of Engineering

Our Bold Vision

Our goal is simple — to maintain UT Austin's position as the nation's top petroleum engineering program for decades to come by achieving three strategic priorities.

CREATING A GLOBAL HUB FOR OIL AND GAS INNOVATION

By recruiting top talent and hosting thought leaders and professionals from around the world, the Hildebrand Department will strengthen its position as the preeminent destination for energy research.

ADVANCING OIL AND GAS EDUCATION

By designing and implementing new and engaging approaches to teaching, hands-on learning and experiential energy education, the department will graduate future leaders who are willing to take risks and change the world.

SHAPING THE ENERGY NARRATIVE

Amid the noise and competing voices that can impact public perception of the energy industry, the department will illustrate the value of oil and gas and serve as a champion for societal improvement.

From Our Chair

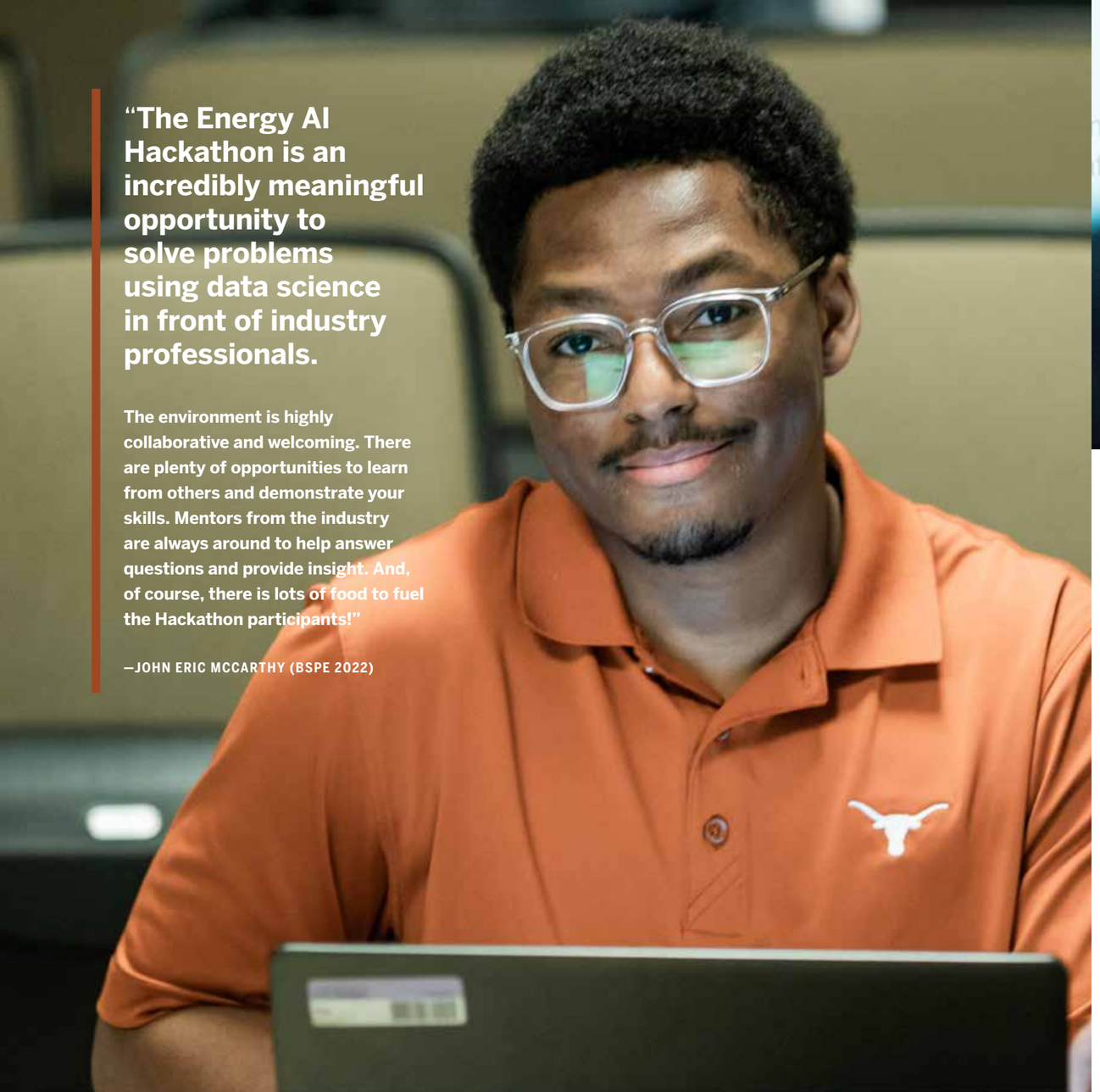
The Forty Acres is a lively, engaging place to be this fall. Our world-class faculty is developing new technologies to produce more oil and gas while mitigating associated emissions. They are also innovating with our petroleum engineering curriculum, adding timely engineering content that makes our students' career paths more resilient. The faculty are aided in their efforts by our dedicated staff, who are focused on creating student-centered activities to recruit and retain the best and the brightest students who aspire to change the world of energy for the future. This vibrant atmosphere is palpable far beyond our corner of campus — we continue to be ranked the top undergraduate and graduate petroleum engineering program in the country.

With funding from the Hildebrand endowment, we have been able to amplify the tremendous work of our faculty, staff and students over the last year. We provided graduate students with much-needed stipends to further their research and awarded grants to two faculty members through a new partnership with the Southwest Research Institute. We supported students through our PEN Pal and Alumni in Residence programs. And we funded innovative initiatives like our annual Energy AI Hackathon and Petroleum Science and Technology Institute.

As we work to keep UT PGE a premier program at the forefront of education and technology, we are especially grateful for the generosity of the Hildebrand family. Thanks in large part to their support, we are providing an oil and gas workforce for today, focused on keeping energy reliable, affordable and sustainable — and we are creating energy leaders for tomorrow, who will find solutions for the world's growing energy appetite while addressing demands for a reduced carbon footprint and continued environmental stewardship.

Hook 'Em!

Lois K. and Richard D. Folger Leadership Chair
Cockrell Family Chair in Engineering #17



“The Energy AI Hackathon is an incredibly meaningful opportunity to solve problems using data science in front of industry professionals.

The environment is highly collaborative and welcoming. There are plenty of opportunities to learn from others and demonstrate your skills. Mentors from the industry are always around to help answer questions and provide insight. And, of course, there is lots of food to fuel the Hackathon participants!”

—JOHN ERIC MCCARTHY (BSPE 2022)

Energy AI Hackathon

Associate Professors John Foster and Michael Pyrcz co-hosted the Hildebrand Department’s second annual Energy AI Hackathon last March. About 100 students, fueled by bottomless cups of coffee and endless breakfast tacos, competed on 20 teams representing schools and departments across The University of Texas at Austin, including the Cockrell School of Engineering, the College of Natural Sciences, the Jackson School of Geosciences and the McCombs School of Business.

Teams spent the weekend solving a challenging real-world energy problem designed by two UT PGE graduate students. After a refresher on data analytics and machine learning from Pyrcz and Foster, students used Python to code their proposed solutions under the guidance of expert mentors from BakerHughes, BP, Chevron, ExxonMobil, Pioneer and SparkCognition. A panel of data science experts from Amazon, BP, ComboCurve and Pioneer judged each team’s solution, and $9,000 in prize money was awarded to the top four teams.

Petroleum Science and Technology Institute

Twenty Texas high school STEM teachers spent five days collaborating over the summer for UT PGE's annual Petroleum Science and Technology Institute led by Associate Professor of Instruction Hilary Olson. Over the course of the week, teachers participated in hands-on activities and labs, faculty-led discussions, and peer brainstorming and breakout sessions on energy topics including the global energy marketplace, enhanced oil recovery, and carbon capture and storage. They also toured Weiss Energy Hall at the Houston Museum of Natural Science and the Ocean Star Offshore Drilling Rig Museum and Education Center in Galveston.

Participants also experienced PSTI's new Energy Excursions curriculum, a series of free online courses developed by UT PGE subject matter and educational experts for high school STEM students and teachers. Designed to align with Texas Essential Knowledge and Skills (TEKS) and College Board standards, Energy Excursions makes it easy for high school teachers to include energy topics in their classrooms.

"Even having some experience teaching environmental science, I learned a lot at the institute and plan to implement much of it into my school through some hands-on workshops in the spring," says Brownwood ISD Secondary Curriculum Coordinator Kristina Owen *(above, center)*. "My favorite part of the week was the debate. We utilized all our knowledge gained from prior lessons to determine what energy sources we would keep, change or get rid of in Texas to be more efficient using and producing less water."

"I developed a new understanding that non-renewable resources are not going away any time soon — a misconception that many hold true. In my classroom, I plan to incorporate the institute's Energy Excursions lesson on water use/misuse to stress the importance of conservation and the lesson on geologic considerations of drilling wells since it applies directly to the Chemistry TEKS."

—FARHANA RAZZAQUE, IMAGINE INTERNATIONAL ACADEMY OF NORTH TEXAS
(Pictured above, right)

“Being funded by the Hildebrand Department has been a great aid and has allowed me to really focus on succeeding in graduate school.

The Hildebrand donation has inspired numerous students like me to continue their studies and advance innovative research on topics relevant to petroleum engineering and the energy transition. For me personally, I’ve focused my research on a regional life cycle assessment of hydrogen production from natural gas of the Marcellus Shale and Permian Basin.”

—VALERIA VALLEJO (MSPE 2023)

Graduate Scholars

The Graduate Scholars program provides generous financial support for master’s and PhD students from across the globe. By offering either a full semester of assistance or supplemental aid, the graduate admissions committee is better able to attract and recruit top students, who can in turn focus on identifying their areas of research and connecting with potential faculty sponsors rather than how to pay for their education.

As a result, the department’s robust graduate research program in unconventionals, enhanced oil recovery, carbon storage, porous media, machine learning, subsurface data analytics and more continues to bolster our reputation as a global hub for oil and gas innovation that is changing the world of energy for the better.

LEFT: Graduate Scholar Valeria Vallejo works through a petroleum data analytics case study at the Hildebrand Department’s annual Energy AI Hackathon.

“Financial support has allowed me to maximize my graduate school experience by participating in seminars, conferences and competitions, enriching my formation as a researcher. It would be difficult to reach my academic goals without this extra support.”

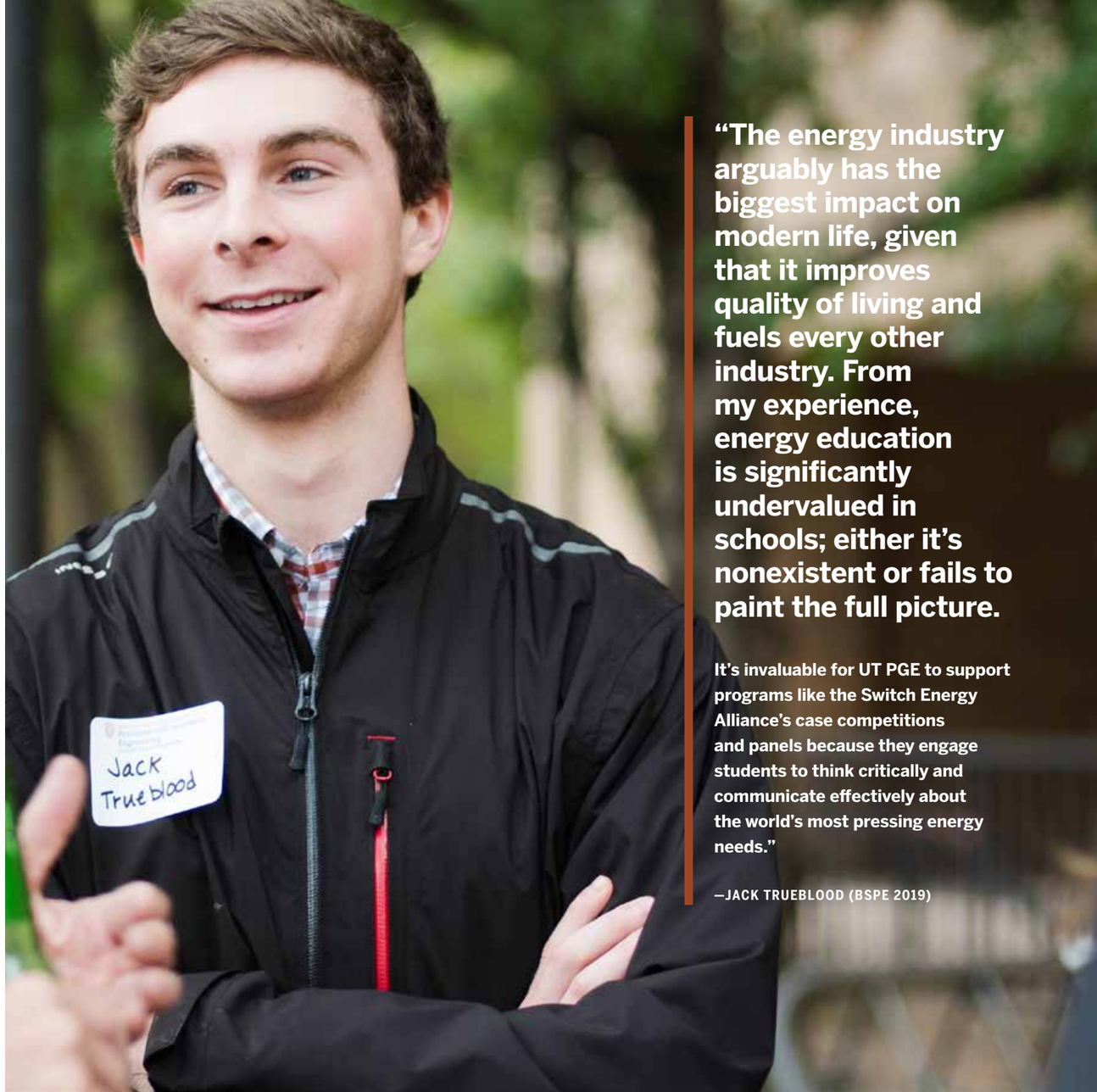
—VIRIDIANA SALAZAR (PHD PE 2024)

Switch Energy Alliance

The Hildebrand Department provided support for Switch Energy Alliance's second annual International Switch Energy Case Competition last fall, with nearly 1,000 students from about 40 countries participating in the online event designed to challenge students to think critically about how the world can transition to a sustainable, equitable energy future. Another 100+ energy professionals volunteered as mentors and judges.

UT PGE also helped fund SEA's "Breaking Into The Energy Industry" panel that included graduate student Syed Talha Tirmizi (MSPE 2023) and alumnus Taylor Lopez-Huebner (BSPE 2016), an associate at Ares Management Corporation. Tirmizi, Lopez-Huebner and fellow panelists discussed their interest in the energy sector, their career goals, technical and nontechnical aspects of their jobs, and the factors that influenced their decision to accept a position or attend graduate school.

RIGHT: Jack Trueblood (BSPE 2019) is a former Switch Energy Alliance intern whose responsibilities included growing the annual case competition on the Forty Acres and beyond.



"The energy industry arguably has the biggest impact on modern life, given that it improves quality of living and fuels every other industry. From my experience, energy education is significantly undervalued in schools; either it's nonexistent or fails to paint the full picture.

It's invaluable for UT PGE to support programs like the Switch Energy Alliance's case competitions and panels because they engage students to think critically and communicate effectively about the world's most pressing energy needs."

—JACK TRUEBLOOD (BSPE 2019)

“Oil and gas companies are actively seeking to produce more oil and gas while also being carbon-conscious and addressing stakeholders’ sustainability concerns. New research challenges are brought up that require innovative solutions. As the top petroleum engineering department, we are well equipped to explore these areas and help shape the picture.”

—ASSISTANT PROFESSOR YINGDA LU

SwRI Partnership

The Hildebrand Department and UT Austin’s Energy Institute have collaborated with the Southwest Research Institute (SwRI) to launch the Energize Program, a new opportunity for enhanced scientific collaboration focused on energy research, including oil and gas, renewable resources, hydrogen, carbon storage, and geothermal energy. In its first year, the Energize Program funded five projects, including two by UT PGE faculty that were made possible by Hildebrand Seed Grant matching moneys:

UT PGE Associate Professor David DiCarlo and Professor Maša Prodanović will work with SwRI’s Angel Wileman and Sarah Stuart to study CO_2 foams in an effort to improve long-term carbon storage in depleted oil and gas reservoirs. The team will leverage traditional CO_2 enhanced oil recovery methods to investigate the stability and behavior of foam-entrapped CO_2 in high-temperature and high-pressure reservoir conditions.

UT PGE Assistant Professor Yingda Lu will collaborate with SwRI’s Kevin Supak, Jordan Nielson and Kelsi Katcher to study CO_2 pipeline flow behaviors as part of a larger effort to facilitate large-scale carbon capture utilization and storage (CCUS). The team aims to identify cost-effective methods for transporting large quantities of CO_2 under typical pipeline transportation conditions.

“I’m excited for this project with SwRI as we plan to test flow processes that we observe at the laboratory scale and see how they perform on larger scales. Foams can control how flow occurs in the lab, and we will optimize this control and then test our best formulations at a meter-sized scale with SwRI. It’s not often you can find projects that span scales like this one.”

—ASSOCIATE PROFESSOR DAVID DICARLO

PEN Pal Mentors

The Hildebrand Department provides exceptional one-on-one advising and academic support for incoming freshmen, but perhaps the most meaningful relationships are forged among students themselves through the PEN Pals mentor program. About 20 upperclassmen serve as mentors each year, welcoming accepted students with hand-written postcards, meeting with them in small groups during the annual two-day First-Year Fall Retreat, introducing them to student organizations and events, helping them navigate campus and classes, and more. The goal? Help ensure the academic and co-curricular success of the freshman class.

"Last year, as a freshman, I came from out of state not knowing anyone, so having PEN Pal mentors was a great way to meet upperclassmen, as well as other students in my year. Both of my mentors were very helpful in teaching me about the department and how to get involved," says sophomore and first-time PEN Pal mentor Zoe Boychuk. "As a mentor myself this year, I have put a lot of emphasis on encouraging my mentees to take advantage of all the opportunities available, whether it be the career fair, club meetings with company representatives, research opportunities, symposiums or other university-sponsored events."

LEFT: PEN Pal mentor Zoe Boychuk (BSPE 2025) listens to freshman students talk about their first week on campus at the First-Year Fall Retreat in August.

"The most important thing I try to tell the freshmen is their career starts now. It's essential to network and gain experience early on. I know that can be intimidating, so I offer to take my mentees to the career fair and SPE meetings because those opportunities helped me secure an internship as a freshman and, now, a full-time engineering role after graduation."

—MAGGIE GEHRING (BSPE 2023), 3RD-YEAR PEN PAL MENTOR

Energy Transition Impact Workshop

Chair Jon Olson and Associate Professor Hugh Daigle recently took part in "Petroleum Engineering Education: Energy Transition Impact," a workshop co-hosted by the Society of Petroleum Engineers (SPE) and the Petroleum Engineering Department Heads Association (PEDHA). The two-day event highlighted strategies to recruit, educate and retain petroleum engineers amid downward enrollment trends, societal stigma toward the oil and gas industry, and the emergence of new technologies related to the energy transition. Industry and academia representatives from across the world attended.

Olson, a member of the workshop planning committee, co-chaired a session on how petroleum engineering departments are adapting their curricula to address demands related to the energy transition, which included a presentation from Daigle on UT PGE's new Sustainable Energy minor. The minor launched in September and is available to students across engineering and the natural sciences. Course work focuses on sustainability issues, energy technology and policy, climate change and global warming mitigation, and renewable energy technologies.

"Creating a global sustainable energy future will require new and innovative technology — and scientists and engineers with the expertise and ingenuity to develop it.

These energy leaders will also need a broad understanding of energy policy past and present. Our Sustainable Energy minor offers this unique combination of knowledge and skills that will help students stand out as they begin their careers in the energy industry."

—ASSOCIATE PROFESSOR HUGH DAIGLE, DIRECTOR, SUSTAINABLE ENERGY MINOR

"The industry is constantly changing, perhaps now more than ever as we transition to a new mix of energy solutions for the world. Petroleum engineers are a key part of this transition, and I'm excited to talk with students about all that we've accomplished and all the opportunities they might choose to pursue."

—KAREN HAGEDORN (BSPE 1986), ALUMNA IN RESIDENCE

Alumni in Residence Program

The Hildebrand-funded Alumni in Residence program brings experienced UT PGE alumni to campus to mentor and teach students about real-world industry processes and challenges. Longtime ExxonMobil executive Karen Hagedorn (BSPE 1986) began her residency in the spring with a reception hosted by the Women in Petroleum and Geosystems Engineering student organization.

Hagedorn continues to meet with students, faculty and staff at monthly office hours to talk about a variety of topics — internships, technical challenges, international experiences, resiliency in the industry, the future of oil and gas, and more. She is also hosting a panel discussion with fellow Class of 1986 alumni on what it was like to graduate during a downturn and how they found their way to success.

Hagedorn is the third participant in the Alumni in Residence program, following Pioneer Natural Resources CEO Scott Sheffield and VTX Energy Partners CEO Gene Shepherd.

LEFT: Alumna in Residence Karen Hagedorn (BSPE 1986) speaks to incoming freshmen at the Hildebrand Department's annual First-Year Fall Retreat.

"It's inspiring to hear about Karen's experience as a female engineer in a male-dominated industry. She is so authentic and candid, which is refreshing to see as a future female engineer. Talking to Karen has allowed me to see up close what success without compromising yourself looks like. She acts with excellence and honesty, which has really reinforced what I want in my career."

—BROOKE FRANKLIN (BSPE 2023)

Facts AND Figures

NO. 1 PETROLEUM ENGINEERING UNDERGRADUATE PROGRAM

U.S. News and World Report

NO. 1 PETROLEUM ENGINEERING GRADUATE PROGRAM

U.S. News and World Report

374

UNDERGRADUATE STUDENTS ENROLLED

- 35% from underrepresented communities
- 21% women
- 15% international students

141

GRADUATE STUDENTS ENROLLED

- 23% women
- 83% international students
- 317 average GRE score for the incoming class

FACULTY

- 21 tenure/tenure track faculty
- 3 National Academy of Engineering members
- 13 Society of Petroleum Engineers distinguished members

RESEARCH

- $9.2 million in annual research expenditures
- 11 Industrial Affiliate Programs
- 272 published journal and conference papers annually

The University of Texas at Austin
Hildebrand Department of Petroleum and Geosystems Engineering
Cockrell School of Engineering