

Petroleum Engineering  
Newsletter SPRING 2024

# FUELLING

## THE FUTURE

ENGINEERED FOR  
**WHAT'S NEXT.**



Cullen College of Engineering  
UNIVERSITY OF HOUSTON

# Letter from the Chair



## Dear Colleagues,

I am delighted to share some of our department's highlights and advancements from the last six months. We are currently ranked as a top 10 petroleum engineering department, and have made great strides in research and academia. I invite you to read through the following stories, and if you see opportunities for collaboration, do not hesitate to reach out.

Warm Regards,

### Mohamed Soliman, Ph.D., P.E., NAI

Department Chair and William C. Miller Endowed Chair Professor  
Petroleum Engineering Department  
Cullen College of Engineering  
University of Houston

## UH PE **BY THE NUMBERS**



### FACULTY (FALL 2022)

**5** NATIONAL ACADEMY OF  
ENGINEERING MEMBERS

**3** NATIONAL ACADEMY OF  
INVENTORS FELLOWS



### DEGREES AWARDED (FY 23)



**15** B.S.



**15** M.S.



**10** PH.D.

### UH PETROLEUM PROFESSOR NAMED **NATIONAL ACADEMY OF INVENTORS FELLOW**

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**Christine Ehlig-Economides**, Hugh Roy and Lillie Cranz Cullen Distinguished University Chair of Petroleum Engineering, has secured coveted positions as Fellows in the National Academy of Inventors (NAI).

A legend in her field, Ehlig-Economides was the first woman in the United States to earn a doctorate degree in petroleum engineering.

She was elevated to NAI fellow for her creative research leading to innovative solutions in the energy and industrial fields. She leverages her years of managing research in production and reservoir engineering in conventional and shale reservoirs for the energy transition.

Among her patents are innovative well testing methodologies designed to enable quantification of reservoir parameters layer-by-layer and well pattern design for enhancing hydrocarbon recovery that could enable doubling or tripling the very low recovery factor that currently occurs from wells in tight oil formations. ⚙️



***Pictured:** Christine Ehlig-Economides*

### A PIONEER IN PETROLEUM ENGINEERING: **A** **LEGACY OF INNOVATION**

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For nearly seven decades, hydraulic fracturing technology has been the cornerstone of economic production from low permeability formations, unlocking vast reserves of natural gas and oil. The success of this technology relies on the collaboration of experts from various disciplines, including rock and fluid mechanics, geoscience, completion engineering, reservoir engineering and production engineering. At the forefront of this multi-disciplinary approach is **Mohamed Soliman**, the distinguished William C. Miller Endowed Chairman of the Petroleum Engineering Department at the University of Houston's Cullen College of Engineering.

In recognition of his illustrious 50-plus year career, Soliman has recently been honored as a member of the inaugural class of Hart Energy's Hall of Fame and Agents of Change in Energy (ACEs). This accolade, bestowed as part of Hart's 50th-anniversary celebration, pays tribute to Soliman's exceptional contributions to the field. ⚙️



*Pictured: Mohamed Soliman*

### UH PETROLEUM ENGINEERING GRADUATE PROGRAM RANKED NO.9 IN **U.S. NEWS & WORLD REPORT RANKINGS**

The Petroleum Engineering graduate level program at the University of Houston's Cullen College of Engineering was named a top 10 school for 2023, according to the latest rankings edition of U.S. News & World Report. It's official rank is No. 9.

Overall, the Cullen College of Engineering was rated as the No.69 graduate school in the nation. As of Fall 2022, the Cullen College of Engineering had an undergraduate enrollment of 3,266, an increase from the previous year. Master's degree enrollment is 1,044, and 558 students are pursuing a doctoral degree. The College awarded 569 undergraduate degrees, 212 Master's degrees and 101 doctorates in FY 2022.

The University of Houston is a Carnegie-designated Tier One public research university recognized by The Princeton Review as one of the nation's best colleges for undergraduate education. UH serves the globally competitive Houston and Gulf Coast Region by providing world-class faculty, project-based learning, high impact research and strategic industry partnerships. Located in the nation's fourth-largest city, UH serves more than 45,000 students in the most ethnically and culturally diverse region in the country.

For the full list of rankings from U.S. News and World Report, please visit: <https://www.usnews.com/best-graduate-schools>. ⚙️



### THREE CULLEN PROJECTS RACK UP **\$ 3 MILLION IN DOE FUNDING FOR CLEAN ENERGY PROJECTS**

The U.S. Department of Energy (DOE) recently announced \$17.4 million funding for 19 early-stage research projects focused on expanding clean energy technologies at colleges and universities across America. These projects will establish visiting scholars' programs, create new academic curricula related to geosciences, and provide interdisciplinary training in humanities-driven science, technology, engineering, and mathematics fields.

The list includes two projects from the Petroleum Department at the University of Houston's Cullen College of Engineering. The Houston Hydrogen Transportation Pilot project received \$750,000 in DOE funding, and is led by **Christine Ehlig-Economides**, Hugh Roy and Lillie Cranz Cullen Distinguished University Chair of Petroleum Engineering, and managed by **Joe Powell**, founding executive director of the UH Energy Transition Institute. Co-PIs are **Stanko Brankovic**, professor of electrical and computer engineering at UH.

The Synergizing Minority-Serving Institution Partnerships for Carbon-Negative Geologic Hydrogen Production — For this multi-institutional \$1.5 million project, Stanford Doerr School of Sustainability is establishing a visiting scholars program that will bring students from Texas Tech University and UH to the Stanford campus to focus on creating carbon-negative hydrogen from rocks beneath the Earth's surface. **Kyung Jae Lee**, associate professor in the Department of Petroleum Engineering at UH is on the team that will train the next generation of engineers and scientists to advance early carbon-negative hydrogen production.

The goal is to train the next generation of engineers and scientists from UH and Texas Tech, two Hispanic-serving institutions, to advance early-stage carbon-negative hydrogen production. The research focus will include studying rock properties, reactions during carbon dioxide carbonation and hydrogen generation, optimizing performance, and assessing economic and environmental impacts. ⚙️



*Pictured: Top: Christine Ehlig-Economides  
Bottom: Kyung Jae Lee*



## STUDENT SUCCESS



*Pictured: Abdulrahman Abdulwarith, Ahmed Kareb, Mohamed Gabry and Sameer Salasaka*

PETROLEUM ENGINEERING

## UH PETROLEUM PH.D. STUDENTS **TAKES** **2ND PLACE IN CHEVRON** **COMPETITION**

Four Ph.D. students from the Department of Petroleum Engineering at the Cullen College of Engineering secured second place in the 2024 Chevron National Engineering Week Competition, held in February.

**Abdulrahman Abdulwarith, Ahmed Kareb, Mohamed Gabry and Sameer Salasakar** worked together to create their winning presentation. It focused on optimal AI applications in drilling engineering for enhancing the Rate of Penetration (ROP) and expediting well drilling, in reservoir engineering for accelerating Reservoir simulation models, and in production engineering for detecting Sucker rod failures and preventing the loss of oil production.

“The competition provided a great opportunity to represent the University of Houston and the Department of Petroleum Engineering, showcasing our skills and applying what we’ve learned in petroleum engineering,” he said. “We utilized AI algorithms while adhering to engineering physics principles and integrating them with data-driven models.” ⚙️



## UH PETROLEUM DOCTORAL STUDENT PART OF INAUGURAL COHORT **OF UH CHEVRON ENERGY GRADUATE FELLOWS**



University of Houston, the Energy University, is proud to introduce the inaugural cohort of UH-Chevron Energy Graduate Fellows – eight graduate students who are actively involved in innovative energy-related research across the UH campus. Funded by Chevron, the program supports graduate students' research efforts through a one-year, \$12,000 fellowship which includes mentoring by faculty experts and the opportunity to engage with subject matter experts at Chevron.

**Mohamad Sarhan** is a Ph.D. student in the petroleum engineering department at the University of Houston's Cullen College of Engineering. He is a teaching assistant and has earned his bachelor's degree and a master's degree in petroleum engineering from Cairo University. His doctoral research focuses on seasonal hydrogen storage, in particular the geochemical and geomechanical stability of storage candidates during hydrogen cycling. His research interests include reservoir geomechanics and image analysis. ⚙️





*Pictured: Mayra Martinez*

## MARTINEZ EARNS AADE'S ELLIS MEMORIAL SCHOLARSHIP AWARD

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When **Mayra Martinez** was growing up in San Luis Potosi in Mexico, she described it as a very small place with limited opportunities for education. She only attended school until sixth grade, and when she came to the United States in 2014, she was told it was “too late” for her to attend high school.

“I started working in a fast food restaurant, as a custodian in a school district, as a cashier, because I didn’t speak any English,” she said. “I was not even able to order food.”

Martinez has continued to work hard at the University of Houston, where she is a Petroleum Engineering student. Her effort has been recognized, as she is one of two recipients from UH of this year’s Andy Ellis Memorial Scholarship Award from the American Association of Drilling Engineers (AADE).

Martinez graduates in May 2024. She completed an internship as a field engineer with Helmerich & Payne this year, and she also works for Oxy part-time in well servicing. She is exploring her opportunities in industry after graduation, ideally in drilling or production. ⚙️

## TORRES TABBED FOR AAEDE'S ANDY ELLIS MEMORIAL SCHOLARSHIP

**Eden Torres**, a senior studying Petroleum Engineering at the Cullen College of Engineering, is one of two recipients from the University of Houston of this year's Andy Ellis Memorial Scholarship Award from the American Association of Drilling Engineers (AADE).

Torres, a father of two, was also the 2023 Outstanding Junior for the Petroleum Engineering Department. He said that three AAEDE was one of the first student organizations he got involved with after enrolling at UH.

During his time at Cullen, Torres has held several roles with the student chapter of AAEDE.

"The first year, I got involved as a chair in the board. The following school year I then got the opportunity to serve as Vice President," he said. "That year I was able to grow in my leadership skills. The part I enjoyed the most was that I was able to help my peers in their professional development too. Helping those around me is truly an honor and I enjoy doing it."

Torres completed an internship with bp. He graduated from the Cullen College of Engineering in December 2023, and will begin a full-time position with the company. ⚙️



*Pictured: Eden Torres*

# CULLEN

## 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 \$40 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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**THE FUTURE**