

RESEARCH MILESTONES



Petroleum Engineering • Spring 2021

FUELING
THE FUTURE

UNIVERSITY of
HOUSTON
PETROLEUM ENGINEERING

Letter from the Chair



Dear Colleagues,

I hope you are well. Our department is doing very well despite ongoing challenging circumstances. Our professors and students continue to conduct impactful research, bringing in numerous grant awards and accolades to our department.

I am delighted to share some of our recent highlights with you, including some exciting research breakthroughs and newly-funded projects. If you would like to learn more about how to support a project or collaborate with our department, please do not hesitate to let me know.

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



#11

BEST PETROLEUM
ENGINEERING
PROGRAM IN THE U.S.

*Source: US News & World Report

TOP 100
ENGINEERING SCHOOLS
IN THE NATION

*Source: US News & World Report



22:1 UNIVERSITY-WIDE
STUDENT TO FACULTY RATIO



117 UNDERGRADUATE
STUDENTS

88 GRADUATE
STUDENTS

205 TOTAL STUDENTS
IN DEPARTMENT

*Student Totals are from Fall 2020



35M+ IN RESEARCH
EXPENDITURES AT THE CULLEN
COLLEGE OF ENGINEERING



80% OF UH ENGINEERING
UNDERGRADUATES ARE EMPLOYED
WITHIN 1 YEAR OF GRADUATION



55 RESEARCH LABS, CENTERS,
INSTITUTES & INDUSTRY CONSORTIUMS

KYUNG JAE LEE, Ph.D.

ASSISTANT PROFESSOR OF PETROLEUM ENGINEERING
AT THE UNIVERSITY OF HOUSTON
CULLEN COLLEGE OF ENGINEERING

WINNER OF THE



FROM THE NATIONAL SCIENCE
FOUNDATION (NSF)



NEW NSF CAREER AWARD-WINNING RESEARCH

ADVANCING SUSTAINABLE, RENEWABLE ENERGY STORAGE

Dr. Kung Jae Lee, assistant professor of petroleum engineering, has received a Faculty Early Career Development (CAREER) Award from the National Science Foundation. NSF CAREER awards are granted to highly promising junior faculty members who exemplify the role of teacher-scholars through *“outstanding research, excellent education and the integration of education and research.”*

The CAREER award will provide Lee with \$500,000 to identify a new source of lithium for sustainable and renewable energy storage. ⚙️



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UH ANNOUNCES FUNDING FOR **CARBON MANAGEMENT PROJECTS**

The Center for Carbon Management in Energy at the University of Houston has awarded \$275,000 in research funding for projects focused on carbon management and the energy transition.

The award covers a range of projects, from converting carbon to fuel and other useful products to a proposed new wireless monitoring system for carbon capture storage.

The Center for Carbon Management in Energy was launched as a University research center in 2019 to form an academic-industry consortium to reduce industry's carbon footprint and find new business opportunities for carbon dioxide, methane and other greenhouse gas emissions.

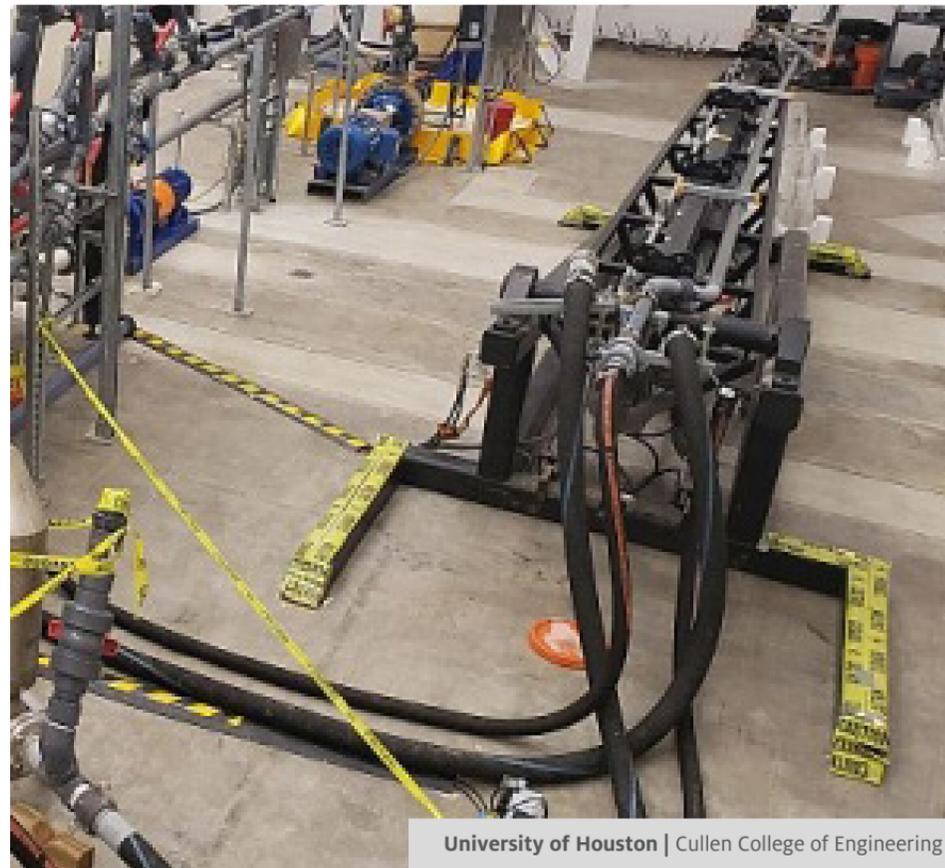
Dr. Dimitrios G. Hatzignatiou, professor of petroleum engineering, was one of the principal investigators selected for funding for his project focused on carbon capture and storage in depleted gas fields along the Gulf of Mexico. 

UH'S NEWEST FLOW LOOP TESTING HELPS SHELL ACHIEVE INDUSTRY-FIRST IN DEEPWATER GULF OF MEXICO

Thanks to laboratory testing contributed by a team led by **Dr. George K. Wong** of Petroleum Engineering at the University of Houston's Cullen College of Engineering, a controlled mud level horizontal gravel pack – an industry first – was executed by Shell at the Perdido field in the Gulf of Mexico.

According to Wong, testing for verifying placement of light weight proppant and gravel pack modeling were done with the department's newest 30-foot flow loop. Test results were deployed successfully in Shell's Perdido, the world's deepest offshore drilling and production spar, in early September.

Wong said the effort took roughly six months for his team, which consisted of himself as PI, Petroleum Engineering Research Lab Supervisor **Carlos Ortiz**, and two consultants, Tony Bernardi and Mike Vann. Engineers from Shell were also involved with the design of the test program. ⚙️



NEW CLUES HELP EXPLAIN WHY PFAS CHEMICALS RESIST REMEDIATION

The synthetic chemicals known as PFAS, short for perfluoroalkyl and polyfluoroalkyl substances, are found in soil and groundwater where they have accumulated, posing risks to human health ranging from respiratory problems to cancer. New research from the University of Houston and Oregon State University published in *Environmental Science and Technology Letters* suggests why these “forever chemicals” – so called because they can persist in the environment for decades – are so difficult to permanently remove and offers new avenues for better remediation practices.

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The work focused on the interactions sparked when firefighters use firefighting foam, which contains PFAS, to combat fires involving jet fuel, diesel or other hydrocarbon-based fuels. Firefighter training sites are well-documented sources of PFAS pollution.

Dr. Konstantinos Kostarelos, a researcher with UH Energy and an associate professor in the Cullen College of Engineering’s Petroleum Engineering Department, is the corresponding author for the work. He said the interactions form a viscous water-in-oil microemulsion, which chemical analysis determined retains a high level of the PFAS.

The project was funded by the Strategic Environmental Research and Development Program of the U.S. Department of Defense. In addition to Kostarelos, co-authors on the publication include Pushpesh Sharma of UH; and Emerson Christie, Thomas Wanzek and Jennifer Field, all of Oregon State University. ⚙️

STUDENT

SUCCESS



A pair of petroleum engineering students from the University of Houston's Cullen College of Engineering took home first place honors from the 61st annual Society of Petrophysicists and Well Log Analysts International Student Paper Contest last summer.



Naveen Krishnaraj, a doctoral candidate, won first place in the Oral Presentation PhD Category.

Krishnaraj specializes in the fields of machine learning, inverse problems, and oil and gas. He is interested in empowering society with data-driven insights and analytics. His vision is to apply curiosity and empathy to innovate and build products for the future.



Makpal Sariyeva won first place in the Oral Presentation Undergrad Category.

Sariyeva, who graduated in 2020, has a strong interest in the oil and gas industry, and a desire to contribute to developing solutions to its challenging problems. Her research on analyzing the performance between child and parent wells in the Eagle Ford basin won numerous awards within one semester. ⚙️

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 \$35 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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Research 

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