The Department of Earth, Environmental and Planetary Sciences has opened enrollment in its graduate program in subsurface geoscience, through which the energy data management track will be offered, along with existing tracks in geology and geophysics.

Rice faculty have collaborated with leading Houston oil and gas companies to develop this new focus area that promotes modern understanding of exploration and production as a data-driven business, emphasizing the importance of the curation and exploitation of data within the upstream oil and gas industry. This program provides an opportunity for students to become data-enabled geoscientists to match the current demands in industry.

The first core course, Energy Data Management and Governance, was offered in Fall 2018. Two new courses are available in 2019:

**ESCI 570 Computational & Data Science in the Energy Sector**

This course will be dedicated to problems and topics occurring in the energy industry, in both R&D and operations. It has three main components: geophysics fundamentals, reservoir simulation fundamentals, and machine learning.

**ESCI 571 Tools, Methods & Best Practices for Data Management and Science**

Data has become a critical asset for enabling organizations to be competitive, make better decisions and support diverse stakeholders. In recent years, new methods, tools and techniques for data management and processing have been developed. In this vein, ensuring that users have the knowledge and skills to profit from this wealth of information is critical. In this course, participants will acquire a holistic overview of infrastructure, data life cycles, metadata standards, and policies and techniques for successfully managing and using data for decision-making in the oil and gas and energy industries.

Discussions are underway to potentially offer these courses bundled in a certificate that will allow working professionals to add understanding and new skill sets to their background without enrolling in a full graduate program.

“Energy data management is increasingly recognized as a discipline critical to the energy industry.”

DAGMAR BECK, Director, PSM Program

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**CORPORATE SCHOLARSHIPS PROVIDED BY:**

Eleven students received partial scholarships in 2018/19.
Why do companies value our graduates?

Over the last 16 years, 275 students have graduated from Rice with a professional science master’s degree. Their success has proven that the skills they gained in the program are valued by a broad range of companies, large and small.

Employers look for professional skills in addition to the scientific journey our students took. They value communication and presentation skills, marketability, engagement, involvement with their immediate and broader environment, adaptability to working in teams, resilience, and flexibility to changing demands.

Ninety-eight percent of our graduates have found employment. The majority were hired by industry (78%), 14% joined non-profits and governmental organizations, and 8% went into PhD programs or other post-grad programs, such as medical, pharmaceutical and veterinary school.

Data gathered by the Council of Graduate Schools shows that MS degrees, especially Professional Science Master’s competencies, are in high demand.

According to the Payscale 2017 report, 33% of occupations require master’s competencies and 189 occupations offer significant increases in compensation to students with master’s degrees. These students also experience a 57% wage premium for MS degrees over a BS. They enjoy low unemployment — only 2.4% of those with master’s degrees were unemployed in 2017 according to the Bureau of Labor Statistics.

We have been very successful in attracting women to our science programs. In most years, up to 40% of students were female; this year female students topped 55%.

Seminar series & corporate interactions

To help our students to build a network of contacts, speakers are invited to campus for our weekly seminars or lunch. In 2018, we organized corporate field trips to Baker Hughes’ Innovation Technology Center, Chevron’s downtown office and BioHouston and J&J Labs. Kristen Boyd, SG alum, also met with enrolled students to provide answers to their career questions about Shell.

The following speakers came to Rice:
- Don Lyons/Radiant Health/InterOPERANT
- Ann Tanabe/BioHouston
- Carolyn White/Memorial Park Conservancy
- Katherine Decamps/BP Wind
- Craig Kovacevich/UTMB
- Lisa Goggin/Chevron, Senior Geologist
- Tom McHugh/GSI Environmental, VP
- Sergio Kapusta/Rice Energy and Environmental Initiative
- Alberto Tohme/Thome Consulting, President
- Amy McGuire/Baylor Center for Medical Ethics and Health Policy, Director

PSM Board NEWS

Program welcomes new board members

Space Studies
Heather Cowardin/Jacobs Engineering, Section Manager, Project Manager, Research and Development Task Lead
Steve Altemus/Intuitive Machines, President and CEO
Larry Strader/GeoControls Systems, General Manager

Environmental Analysis
Deborah January-Bevers/Houston Wilderness, President & CEO

Board member mentorship program

This is the second year that we have coordinated a mentorship program. Students are matched with board members and encouraged to set up an informal phone call or meeting. We developed a “board member involvement” checklist to make sure board members have a better understanding of how they can help and be involved. Feedback has shown that students enjoy the interaction with board members, confirming that it strengthens their confidence, helps their conversational skills, and provides career guidance and a better understanding of the corporate world. Thanks to our very responsive and active board members!

Corporate scholarships 2018

Despite economic downturn in the energy industry, our corporate sponsors have continued to support our students, proving that they value Rice and our program. We’d like to thank Baker Hughes, Chevron, Houston SpacePort, and Shell for their continued support. We would like to encourage other industry partners to join their peers and provide a scholarship for our students. This will show that corporations value a program designed to prepare students for the workforce needs of their industry. Students enrolled in our degree programs pursue their field of interest and get the education that equips them with advanced technical skills, enhanced professional skills, improved communication skills and presentation and social interaction readiness.

The fall Space Studies seminar brought an impressive selection of expert speakers from the space industries:
- Mark Jernigan/NASA
- Olga Bannova/Space Architecture and Design
- Mihriban Whitmore/NASA
- Jon Olansen/NASA
- Gordon Vos/NASA
- Nancy Currie/NASA Astronaut
- Mike Gernhardt/NASA Astronaut
- Adam Launcher/NASA
- Mark Matney/JSC
- John Scott/NASA
- Patrick Rodi/LMCO
- Ed Harris/Edge of Space
**Internship reports & research**  FALL 2018

**BIOSCIENCE AND HEALTH POLICY**
Sai Chipatali/Policy Fellow for the Sri Kulkarni Campaign for U.S. Congress in Texas District 22
Advising and writing briefs on health care and education policy, gun violence and immigration reform, as well as organizing a healthcare advisory council with key physicians and community leaders

**ENVIRONMENTAL ANALYSIS**
Ankur Shah/H2O Midstream
Developing market fundamentals, project economics, GIS/mapping functionality, and water type curves at H2O Midstream, whose focus is developing sustainable water infrastructure in the Permian Basin of West Texas
Publication of the article, LNG bridging the gap between fossil fuels and renewable energy, as part of a course in international energy development taught by Scott Gaill

Morgan Garner/Mickey Leland Environmental Interns with the TCEQ
Investigation of air quality issues at a landfill near Pearland, TX

Nivi Sundaravadivelu/CAMS eSpark Consulting
Taking an in-depth look into the Tier II reporting process for fifteen energy and chemical refining facilities in 2018 through participation in various aspects of reporting, data collection and calculations

Michelle Rowan/Emission Advisors
Delivering client value in the California-Quebec Cap and Trade Program: applying regulations, analyzing data and information from clients, including involvement in the process of carbon-offsets for both compliance and voluntary adaptation

**SUBSURFACE GEOSCIENCE**
Zach Steel/Cabot Energy
Using traditional methods of seismic interpretation, as well as interpretation facilitated by artificially intelligent software, to understand the subsurface of Cabot-owned acreage. His research was aimed at determining whether AI software helped create superior maps and if it should be used on future projects.

Will Pollard/BXP Energy Resources
Examination of the Minnelusa sand interval within the Reel Field, Campbell Co. Wyoming, to provide a solution to decreased production

Kimberly Birjue/Research project under Gary Gray, PhD
Investigation of the shape of the S-reflector and post-rift faulting offshore Galicia, Spain

Mallory Ramos/IHS Markit
Benching the Wolfcamp Shale within the Midland Basin

Erik Fathy/Chevron
Evaluation of a new software plugin's capability to become Chevron's system of record for G&G Knowledge Management Documents

Keith Crawford/LLOG Exploration
Field study of the Thunder Horse Field and surrounding area in the Gulf of Mexico deepwater. The study entailed correlating logs, creating structure maps of the tops of the main reservoirs, and constructing isopachs of the main pay intervals.

Nicole Pham/IHS Markit
Development of a detailed stratigraphic model of the subsurface, familiarization with Kindom Geosteering, re-steering approximately 1800 Permian Basin wells and developing a semi-automated process for extracting data

Zuyue Zhang and Andres Barrios/Research project under Gary Gray, PhD
Publication of research article: Basement-involved, shallow detachment faulting in the Bighorn Basin, Wyoming and Montana

**SPACE STUDIES**
Nathan Tat/NASA Johnson Space Center at JSC Information Resources Directorate IRD
Streamlining IRDs business operations and conducting work on NASA projects requiring financial analysis and project management. Establishing Office Business Integrator role to improve work flow.

*We are always proud of our students who go above and beyond the framework of our degree program.*
The PSM office staff participated in the 2018 National Professional Science Master’s Conference in Washington DC. Program administrator Lindsey Hodge collaborated with colleagues from Illinois Institute of Technology and University of Illinois at Urbana-Champaign.

**Pre-Conference workshop: Connecting with Students**
*Lindsey Hodge and Dagmar Beck, Rice University*

**Generational differences: What messages and platforms appeal to the student audience today?**
*Lindsey Hodge, Rice University, and Amy Dauernheim, Illinois Institute of Technology*

Nicole Mitchell, University of Illinois at Urbana-Champaign, Amy Dauernheim, IIT and Lindsey Hodge, Rice University

It’s important to understand who students today actually are. From a generation’s perspective, many people apply the blanket “millennial” term to the younger generation today, but in reality most millennials are already in the workforce, with some of the youngest nearing their mid-twenties. The post-millennials, or Generation Z, are the generation that is primarily in school right now. They were born after 1997, making the oldest among them in their early 20s.

PSM programs should be turning their attention to Generation Z. This is the first generation to have never known life without internet and technology, and as a result they are actually much different than millennials in terms of what platforms and messaging appeals to them. Generation Z has had quick, easy access to the internet and social media for most of their lives. They rely on social media for a number of reasons—so much that they check their accounts as frequently as 100 times per day. Eighty percent of social media time is spent on a mobile device. Because of this, programs should make sure that they are optimizing their websites, images, and messages for a mobile device.

This generation wants simple, to-the-point messaging. Feedback and content must be available right away in order to pass through that 8-second filter and capture their focus. Programs must communicate their message and value clearly and quickly or run the risk of losing their audience.

**What makes a web site stick?**
*Dagmar Beck, Rice University, and Carey Snowden, Middle Tennessee State University*

Rice’s Professional Science Master’s website won the attention of the NPSMA Committee, and we were asked to discuss the thoughts behind the layout of the site, the concepts behind final design, and the rationale behind the site’s flow and navigation.

Shola Ayandele received his BS in geology and geophysics with a minor in mathematics from Boston College in 2013. In his final year of undergraduate study, he undertook a senior thesis to investigate if a spatial relationship exists between zones of past earthquakes in the Africa Plate Region. For his efforts, he was awarded the best student paper/presentation in the B.C. Earth Sciences Department. After graduating, he consulted for BP Toledo refinery in their Major Projects group. In the fall of 2015, Shola joined the coordinated MBA and Science Master’s Program in Subsurface Geosciences to expand his knowledge in geology/geophysics and management to further his career.

“*The coordinated MBA/SG program is a challenging and unique program that allowed me to advance my science background and combine it with a MBA degree from one of the top programs in the country.*”

“The Subsurface Geoscience curriculum includes diverse coursework that provides the education that industry demands, including professional development, communication skills and extensive networking opportunities. The MBA program offers many additional benefits that helped me fulfill this unusual career path. I received a merit-based scholarship, worked with great mentors and advisors, and took on challenging courses that helped me develop myself and my skill set. The class sizes at Rice are small, which allows you to build relationships with the faculty, many of whom have industry ties. During the course of the program at Rice, I have been able to build my network, start new friendships and take advantage of the great resources available to me. After graduation in 2018, I accepted employment at Goldman-Sachs as an investment banking associate.”
CURRENT STUDENT PROFILE

HOIK JANG
Space Studies, International student from South Korea

Hoik Jang graduated from Chung-Ang University in 2018 with a BS and MS in mechanical engineering. While at Chung-Ang University, he worked as a researcher and lecturer. As a researcher he developed a new graphic user interface for CAD (Computer Aided Design) systems which utilize physical blocks with wireless communication capabilities to make 3D models. As a lecturer he taught undergraduate students how to utilize CATIYA (CAD Program) and C programming skills.

During his undergraduate studies, he served in the military as a KATUSA (Korean Augmentee to The United States Army) under U.S. Army as an intelligence analyst/administrative specialist/interpreter in FROKA (First Republic of Korean Army) and TROKA (Third Republic of Korean Army).

In addition to his military service, he was chosen to attend the state-run Institute for Research on Science Policy, advising policy makers and government organizations. Hoik participated in the development of a policy that would help underdeveloped countries via cooperation and development in education and science fields rather than pursuing a hands-off policy that would only provide funding. Through his research he collected primary data and developed a policy proposal.

Hoik was a founder and leader of the Christian Student Union at Chung-Ang University which united 20 missionary groups, and participated in establishing the Christian Union of students, staff, professors, and mission group leaders. He drafted a constitution for the Christian Union and successfully resolved one of the most significant crises in the history of the university. When the university attempted to remove a chapel, he organized a student petition and represented the union in a meeting with university officials including the president of the university.

Hoik was always interested in space flight and rocket building— the movie Apollo 13 inspired him to pursue a career related to aerospace. He enrolled in the PSM Space Studies program to take advantage of Rice’s close relationship with NASA/Johnson Space Center.

ALUMNI PROFILE

SARAH HUSSAIN
S18, Environmental Analysis
Environmental Engineer at BP

Sarah Hussain graduated from the PSM program in 2018. Prior to Rice, she completed a BA in environmental science and policy from Smith College. While she was an undergraduate Sarah interned with the City of Houston Parks and Recreation Department and the U.S. Department of Interior. Both experiences emphasized environmental management methods and sustainability practices.

After completing her BA, Sarah worked at ExxonMobil in their midstream operations where she focused on leak detection and operational safety. After two years, she moved to Enterprise Products, where she oversaw the company’s environmental management system.

“The PSM Program perfectly mixes classroom knowledge with practical application. The Rice experience has proved invaluable in my professional life.”

Deciding to further her education, Sarah joined the PSM program in 2016 as an environmental analysis student, with a focus on management and policy. After graduating from Rice, she joined BP America as an environmental engineer in their Upstream Gulf of Mexico operations. She serves as an environmental advisor for offshore platforms as well as the ISO 14001 advisor for the region.
Students organized several events that provided community and collaboration between students from all programs:

- Social at the Ginger Man hosted by RUNPSMA and PSM, and attended by board members, alumni and students
- January social sponsored by Shell, with Shell board members, alumni mentors and students
- The end-of-semester social and celebration for graduating students at Valhalla with board members, alumni and students
- Field trip to Houston Livestock Show and Rodeo
- Internship search session where current students answered questions from new students regarding the internship/job search process

AWARDS AND COMPETITIONS

**2018 Imperial Barrel Contest**

Students from the Subsurface Geoscience program participated in the 2018 Imperial Barrel contest under the guidance of Kevin Biddle and Kurt Rudolph, adjunct professors in EEPS. Pictured here are Shola Ayandele, Renn Chang, Nikki Phan, Mallory Ramos and Yue Hou.

**Promoting our programs — Inside and outside the hedges**

To increase Rice undergraduates’ awareness of our programs, we held an information session at the Center for Career Development where faculty and advisors shared information about our programs. We also hosted study breaks at three of the residential colleges: Hanszen, Lovett, and Sid Richardson.

In November, we participated in the 1st Professional Master’s Open House at the Glasscock School of Continuing Studies. We joined other professional master’s programs such as energy economics, global affairs, business accounting, MBA, engineering and human factors, providing materials and participating in information and Q&A sessions. We look forward to doing this again in 2019.

The PSM office was busy in the fall attending grad fairs and conferences at Texas A&M, UTD, TCU, UT Science/Tech Fair, Brown University, Cornell University, Rochester Institute of Technology, Purdue University, University of Illinois Urbana-Champaign, Georgia Tech, Emory, UGA, and Duke University.

As part of program marketing and corporate relationship building, the program staff attended the Offshore Technology Conference, the NAGAP Conference, Rice’s Data Science Conference, Rice Family Fair, and the SpaceCom Conference.

**2018 PetroChallenge Competition**

Environmental Analysis student Ankur Shah (far right) participated in the PetroChallenge. His team won the North America University Finals at Schlumberger HQ against Penn State. The intense two-day economic/strategy competition was a real team effort, although there was some luck involved.
FOCUS AREA WITHIN THE PROFESSIONAL MASTER’S PROGRAM IN SUBSURFACE GEOSCIENCE

ENERGY DATA MANAGEMENT

Interested in adding a new skill set to your background or broadening your existing education with training to prepare you for advancement in the energy industry?

In collaboration with leading Houston oil and gas companies, Rice faculty has developed this new focus area that promotes modern understanding of exploration and production as a data-driven business, emphasizing the importance of the curation and exploitation of data within the upstream oil and gas industry. This program provides a graduate study opportunity for students to become data-enabled geoscientists to match current demands in the industry.

DATA MANAGEMENT — An emerging workforce need

Demand in this field is steadily growing in a variety of industries, and in response to this need Rice’s M.S. in subsurface geoscience has expanded the focus areas to include courses in data science, management and governance. Energy data management is increasingly recognized as a discipline critical to the energy industry.

PROGRAM SCHEDULE

3 Semesters + Internship (16 months)

• 3 Geology/geophysics core course
• 4 Energy data management/science courses
• 3 Electives
• plus 3 management, business ethics and communication courses

CAREER OPPORTUNITIES

Positions in the oil-and gas industry, data science, GIS, analytics, and more

INTERESTED IN MOVING INTO THIS UP-AND-COMING FIELD?

contact profms@rice.edu

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