Reflecting on the benefits our programs reap from having established an advisory board, a requirement for PSM programs, we appreciate the direct and regular interaction with our board members who provide high quality, nonbinding strategic advice, especially in the areas of workforce demands and trends as well as skills that employers value. The Advisory Board provides an important network expansion for our programs and students.

Our board members are active as speakers, mentors, instructors, and program advisors. They also help us to promote our programs to their colleagues and counterparts in other companies. We appreciate their time and interest and want to remind them that they are part of a larger initiative, that they can change people’s lives.

The Rice PSM mentorship program is now in its third year, and things are running smoothly. The students have been proactive and have been reaching out to their mentors, and vice versa. One of our SG board members continues to host a reception for the SG students, alumni and faculty at his home. This helps students to start building their network and to get to know their mentors, faculty and colleagues better.

The program welcomes the following new board members:

- **Sushma Bhan**/Shell International E&P Inc. PTE /Global Functional Lead TDM –Wells, Development & WRFM, Engineering & Smart’s Data Program Lead (ESDV), Projects & Technology
- **Julie Garvin**/Roxanna Oil, President
- **Marisa Covington**/Johnson Space Center Program Integration and Strategic Planning Manager; Deputy Chief, JSC Office of Research Assurance, Space & Mission Solutions, HHP at KBR (taking over for Genie Bopp who is retiring)
- **Laura Isaacs**/Boeing ISS ATCS Manager (taking over for Darcie Durham)
- **Jenny Mertzman Quinn**/Jacobs Engineering, Section Manager, Basic and Applied Research

**Millenial and Gen X preferences reflected in new advertising**

To accommodate new styles of information delivery, we have been busy creating new videos for the PSM website. For the first, we asked our faculty advisors to share testimonials about our programs and their role related to the students. In addition, Dean Peter Rossky, Wiess School of Natural Sciences, sat down with us to express his opinions and support of the programs and the students. The results can be viewed on our web site (profms.rice.edu).

The second video revolves around our international students, as we had received requests to offer testimonials from students in their native language. We recorded Environmental Analysis alumna Millerlandy Romero-Diaz (Spanish); Selin Ergulen, Bioscience and Health Policy (Turkish); Nguyen Phan, Subsurface Geoscience (Vietnamese) and Adolpho Carvalho (Portuguese). We will continue to add more testimonials in the future to reflect the diversity of our students, which will include Mandarin, French and Japanese.

We are also working on a new print/digital advertising campaign. Several of our alumni who visited campus for Rice Homecoming were photographed for ads which will highlight their successes.

Rice alumna Christa Clarke, Bioscience and Health Policy
Energy Data Management certificate

This summer the Professional Science Master’s Office collaborated with the Glasscock School for Continued Studies to bundle the Energy Data Management courses and offer them as a certificate to working professionals who want to increase their knowledge in an area now in high demand with industry. The certificate consists of three evening courses, one offered in spring, two in fall. Registration is now available via this link: glasscock.rice.edu/energymanagement.

New class delivery option

One of our certificate courses will be offered in Fall 2020 in a high-tech flex-tech classroom at the Glasscock School building, allowing working professionals off campus to sign into the class without coming to campus. We anticipate strong interest in this course delivery style and look for professionals who want to participate in Fall 2020.

New M.S. in Applied Chemical Sciences

In collaboration with the Rice Chemistry department, the PSM office has developed a new Professional Science Master’s degree in Applied Chemical Sciences. Industry advisors from Shell Chemicals, Schlumberger, ExxonMobil, ImmunoMet Therapeutics, CellMdia, Baker Hughes and DOW gave their feedback on the curriculum and proposal for Rice’s Graduate Council. This degree will prepare students with a background in chemistry for employment in chemical industries or government organizations in positions that are less technically focused than a Ph.D. in chemistry and/or master’s in chemical engineering. With three different concentrations, bioorganic chemistry, computational chemistry and data science, and petroleum chemistry, students will be able to pursue advanced course work in the area that matches their interests. Faculty advisors in the Chemistry Department will work with students individually to create a custom curriculum. Graduates will be qualified for employment with government agencies, biotechnology units, labs, chemical manufacturing units, oil industry, petroleum sector, and the pharmaceutical sector.

On-line professional development course for incoming students

In collaboration with the Jones School for Business and the Rice Center for Career Development, PSM has developed an on-line professional development course for incoming students. The course will prepare students for their internship search as soon as they get to campus. We want to ensure that our students think about resumes, intro letters, networking skills, interview preparations and LinkedIn profiles early in the program. The course, which rolled out in June 2019, was well received by students.

D2K collaboration

The Center for Transforming Data to Knowledge (the D2K Lab) provides students with immersive, experiential learning opportunities in data science while enhancing data-intensive research at Rice and building partnerships with companies, institutions, and community organizations. D2K is seeking companies to submit data science/analytics problems that then would be solved by student groups under mentorship of Rice faculty and the corporation. Our program is collaborating with D2K, as these type of projects will qualify as internship projects for our international students! If you have any projects, please don’t hesitate to contact us at profms@rice.edu.

SEDS team scores with OwlSat

Rice’s Students for the Exploration and Development of Space (SEDS) team was runner-up in this month’s national Astranis SEDS Sat-2 competition to win a cube satellite launch.

The Rice students’ OwlSat is designed to analyze the relationship between solar activity and the Earth’s lower atmosphere to enable comprehensive predictions for space debris and small satellites. The Rice satellite would also measure the levels of ionizing radiation from the sun at low-Earth orbit to help plan for the health of astronauts during extreme solar weather events. Space Studies students Feni Pandya, Hoik Jang and Liane Johnson participated on the team.

The competition took place at SpaceVision, the SEDS-USA national conference, at Arizona State University in November 2019.
RUNPSMA activities

The RUNPSMA student chapter organized a professional development event, an end-of-semester social and a holiday social. In addition, several of our students volunteered to teach science at Poe Elementary School this December. Participants in this activity were Colin George, Tina Dantono, Chloe Wallace, Kirsten Vernin, Andrew Mike and Callie Ayers.

Students participated in the SEDS Conference (Students for the Exploration and Development of Space) on campus, the German Career Day hosted by the Houston Community College, volunteered at the Offshore Technology Conference at the NRG Conference Center, and at SPACECOM in the George R. Brown Convention Center.

Offshore energy professionals from around the world attended the 2019 Offshore Technology Conference—the 50th anniversary—at NRG Park to gain insights from global experts and colleagues. While speakers challenged ideas about the changing landscape of exploration and production, exhibitors displayed the impact of technology and digitalization on the science of energy supply and demand management.

“There were many measures of success for this year’s edition of OTC, and while it’s exciting that attendance was above average for the event, I’m even more gratified by the diverse representation of geographies, industries and topics,” OTC Board of Directors Chairman Wafik Beydoun said. “Beyond the hundreds of technical sessions and networking opportunities available, this year we featured numerous thought leadership discussions with energy executives, including an expanded global reach in our new Around the World series.” Rice was represented twice at the OTC: The Rice University’s Professional Science Master’s program participated again in the annual University Showcase, and Rice Alliance hosted its OTC Startup Roundup.

Fall 2019 graduation

As the number of fall graduates has been increasing, Rice now offers a fall graduation commencement ceremony. This fall we had 12 graduates who walked the stage. The majority of them have already found employment at Cheniere Energy, Energy Makers, Wood Mackenzie, Dow, Airbus, Baylor, and USI.
STUDENT PROFILE

SELIN ERGULEN
Bioscience and Health Policy

Selin Ergulen is a first-year student in the Bioscience and Health Policy track of the Professional Science Master’s Program. After completing a bilingual high school education in Istanbul, Turkey, Selin came to Rice where she received her bachelor’s degree in chemistry with a specialization in inorganic chemistry. She did research as part of the Marti Group and was awarded the Zevi and Bertha Salsburg Memorial Fellowship in Chemistry for the continuation of this research. Through her lab, she co-authored two publications and assisted in a patent application.

In addition to her academic endeavors, Selin continued her passion for equine sports as the president of the Rice Equestrian Team. Now as a master’s student she is the secretary of the Rice chapter of the National Professional Science Master’s Association.

Through the Bioscience and Health Policy Program she intends to expand and refine her research background with cross-curricular studies of management, leadership and policy. Her ultimate goal is to build experience in innovation management and in the commercialization of research products with a focus on the pharmaceutical industry.

ALUMNI PROFILE

CALYN JEW
Subsurface Geoscience, S17
Development Geologist, Repsol

Calyn received her BS in geology from the University of Texas at Austin in 2015. Her first internship confirmed her early aspirations to pursue a career in energy. The Subsurface Geoscience Program offered a unique track that Calyn wanted to pursue for the combined technical geoscience growth and the industry-focused business courses.

After completing the program in the fall of 2017, she joined Statoil to work US onshore unconventional as an operations geologist. After a year and a half of operations in continuous resource plays, she rotated to an offshore exploration geology role for Equinor (formerly Statoil). Beginning in early 2020, Calyn will be joining Repsol as a development geologist supporting the Eagle Ford asset.

ALUMNI PROFILE

SWATI PATEL
MBA/SPS Alumni, F19

Swati Patel graduated from Rutgers University in 2014 with a B.S. in Astrophysics with a focus on engineering. In 2016, she was accepted in Rice’s Coordinated Degree Program offering an M.S. in Space Studies and an MBA degree. The program catered to her unique interests in space operations and the business world. Rice offered an intimate learning environment, personal attention, and great exposure to the professional world. At Rice, Swati took on more leadership roles—she was elected to the Jones Student Association and the Rice University National Professional Science Masters Association. She was named one of Poets & Quants 2019 Best & Brightest MBAs. Swati comments, “PSM was the perfect combination of academic and professional experience that was essential to branch out in the aerospace industry. The diverse course work, amazing network of colleges, and exceptional professors were a one-of-a-kind experience.”

From 2017 to 2019, Swati interned for Boeing as a student engineer for the active thermal control systems for the International Space Station and joined Boeing Women in Leadership Communications Committee. She gained intimate knowledge of the environmental control and life support systems hardware requirements and verifications. She participated in a variety of projects and testing and analysis for Boeing. In a second internship, Swati worked with the Greater Houston Partnership as a project specialist researching economic development opportunities to foster the private space sector in Houston. After graduation, Swati accepted a position in space operations at Boeing.
Spring seminars & corporate interactions

- Craig Kovacevich/UTMB
- Heather Cowardin/Jacobs Engineering
- Cory Stull and Maggie Puckett/Freese and Nichols, Inc.
- John Candler/Schlumberger
- Brent Jones/Ramboll
- Stuart McGeoch/Shell Corp
- Jennifer Sawatzky/BP
- Sarah Mason/City of Houston
- Billy Cohn/J&J labs
- Michel Le-Vot/Total
- Cassie Lopez/Chevron
- John Charles/NASA, Wyle Laboratories

Space Studies seminar speakers

Space industry experts who came to campus this fall—listed by organization and topic:

- Mark Matney/Johnson Space Center, orbital debris
- David King/Lunar and Planetary Institute, lunar science and exploration
- Kimberly Hambuchen/NASA, robotics
- Mark Jernigan/NASA, space exploration
- Adam Lauchner/NASA, ISS payload integration (PSM Alumnus)
- Jon Olansen/NASA, Morpheus Lander
- John Scott/NASA, propulsion
- Gordon Vos/NASA, human system integration
- Mihriban Whitmore/NASA, human factors
- Patrick Rodi/Rice University, ORION Project
- Olga Bannova/University of Houston, space architecture
- Ed Harris/Edge of Space

Internships & Research

BIOSCIENCE AND HEALTH POLICY

Kaley Neugebauer/Baylor College of Medicine
Research environmental disruptors effect on embryo toxicity

Rosemary Richard/USI Southwest
ADA and wellness programs: Wellness for some or wellness for all?

Sydney Sheffield/Children's Nutrition Research Center
United States Department of Agriculture Dietary Guidelines for Americans (DGA), Agriculture Research Service (USDA/ARS) as a public policy intern

ENVIRONMENTAL ANALYSIS

Jasmin Alfaro/Cheniere Energy
Air permitting for LNG facilities

Callie Ayers/Dow Chemical
New environmental assessment tool used to evaluate ecosystem services on Dow Greenbelt property

Anita Chavez/City of Houston Health Department
Risks of secondary formation of formaldehyde to Houston’s air quality

SUBSURFACE GEOSCIENCE

Shannon Castro/Wood Mackenzie
Permian Midland Spraberry play consisting of the key play report, the upstream play service report, and the type curve report

Nguyen Phan/Energy Makers, Advisory Group
Use of Texas RailRoad Commision and drilling data to investigate regional competition, market profiles and risk analysis with regards to water pipeline acquisition transactions

Baijing Sun/SETLD Inc
Data analytics software development

Mitch Vanette/IBA project/Kurt Rudolph
Hydrocarbon exploration offshore New Zealand

Muni Zulkifli/Chevron
Frontier exploration and appraisal strategy software tool for upstream exploration portfolio analysis (analyzes data from air monitors regarding formaldehyde levels)

SPACE STUDIES

Steven Oliver/NASA
Validation of SRAG Timepix Monte Carlo simulation to monitor radiation exposure on the ISS and MPCV
The National Professional Science Master’s Association unveiled new affiliation guidelines for the Professional Science Master’s degree at the organization’s 10th annual conference, held in November at the University of Utah in Salt Lake City. The conference theme was: “Professional Science Master’s Serving Workforce Needs.”

The new process aligns with the National Academies of Sciences Engineering Medicine National Core Competency Recommendations. (Graduate STEM Education for the 21st Century.) The NPSMA will oversee affiliation of the 345 programs offered at 157 institutions.

“The Economy is moving in the PSM direction, with employers placing value on both domain knowledge and professional skills.”

Saeed Foroudastan, Ph.D.  
Associate Dean and PSM Program Director  
Middle Tennessee State University

Professional Science Master’s (PSM) graduates develop core disciplinary knowledge and an ability to work between disciplines, explore career options and develop abilities required by a given profession. Additionally, PSM graduates develop transferable skills that are applicable across disciplines and throughout their professional careers. With a STEM degree, PSM graduates can aptly apply the scientific method and statistical analysis; however, unlike traditional degree programs, they gain experience in conducting research/field studies by engagement in work-based learning and research.

For 22 years, PSM programs have committed to the goals and educational elements of the PSM degree which provide a non-academic science degree for people working—or who want to work—in the private and public sector. The PSM initiative was launched with startup funding from the Alfred P. Sloan Foundation to 14 universities in 1997. A unique component of PSM affiliated programs is the requirement of professional internships, or work experiences, where students demonstrate STEM expertise and professional skills.

“Students come to our programs to study science but want to make their contribution in leadership in the public and private sector.”

Norah McCabe, Ph.D.  
Clinical Associate Professor and PSM Director  
Washington State University

CONFERENCE PARTICIPATION

What sets our programs apart?  
Jennie Willis, Colorado State University; Dagmar Beck, Rice University and Deborah Silver, Rutgers University

How to Effectively Create/Use an Advisory Board  
Dagmar Beck, Rice University and Liz Friedman, IIT

Branding PSMs and Engaging Faculty via Accelerated Master’s Programs  
Lindsey Hodge, Rice University and Liz Friedmann, IIT
PSM value nationwide

“It is more important than ever for leaders of the PSM community to make the case for the value of the PSM as a cornerstone of a national strategy to develop a highly skilled STEM workforce to ensure America’s continued leadership in innovation and competitiveness.” (Patricia McAllister)

The number of jobs requiring substantial science, technology, engineering, and mathematics (STEM) expertise has grown nearly 34% over the past decade (National Science Foundation, 2018). The situation is similar in other countries, and many of them are investing in STEM education and are challenging U.S. leadership in science and technology. Between 2000 and 2014, the number of Americans with a four-year degree in S&E grew by 53%; in China, this number was 360%. China’s investments in higher education and research and development have driven the rapid growth of its technology industry.

As the transformative impact of science and technology continues, it is imperative that the U.S. increase its investment in STEM education to ensure our economic competitiveness in the future. The American public places a high value on STEM education and career paths. In a recent survey of global job market trends, 72% of Americans agree that students today should focus on STEM career paths and 60% believe their employers have trouble finding the right workers for STEM roles today (Randstad Survey, 2019).

Indeed, investing in higher education and creating policies to reduce student loan debt is a central issue in on-going policy debates among U.S. presidential candidates, especially on the Democratic side. Student debt totaled $1.5 trillion last year, exceeding all other forms of debt except mortgages (Wall Street Journal, 2019). Most of the policy discussion to date, however, is focused on reducing debt associated with undergraduate education. Unfortunately, decisions made by Congress in the past concerning student loans have made graduate and professional education more expensive for students. These decisions include eliminating the in-school interest subsidy for graduate students, making graduate students pay higher interest rates than under-graduates, and establishing higher interest rates on Federal Direct PLUS loans. These actions are not consistent with developing the highly skilled work-force that the country needs.

Promoting the value of the Professional Science Master’s (PSM) degree program has been important since the first program was started in 1997. Since that time, the number of PSM programs has grown steadily at institutions of higher education across the U.S. and internationally. In the current environment of competition for limited resources and ongoing scrutiny of higher education in general, it is more important than ever for leaders of the PSM community to make the case for the value of the PSM as a cornerstone of a national strategy to develop a highly skilled STEM workforce to ensure America’s continued leadership in innovation and competitiveness.

Source: Innovator Winter Issue 2019

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### Employment in STEM occupations, 2018 and projected 2028

(Numbers in thousands)

<table>
<thead>
<tr>
<th>Occupation category</th>
<th>Employment 2018</th>
<th>Employment 2028</th>
<th>Change, 2018-28</th>
<th>Median annual wage, 2018 (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total, all occupations</td>
<td>161,037.7</td>
<td>169,435.9</td>
<td>8,398.1</td>
<td>5.2 $36,640</td>
</tr>
<tr>
<td>STEM occupations (2)</td>
<td>9,708.3</td>
<td>10,566.8</td>
<td>858.5</td>
<td>8.8 $84,880</td>
</tr>
<tr>
<td>Non-STEM occupations</td>
<td>151,329.4</td>
<td>158,869.1</td>
<td>7,539.6</td>
<td>5.0 $37,020</td>
</tr>
</tbody>
</table>

(1) Data are from the Occupational Employment Statistics program, U.S. Bureau of Labor Statistics. Wage data cover non-farm wage and salary workers and do not cover the self-employed, owners and partners in unincorporated firms, or household workers.

(2) Science, technology, engineering, and math (STEM) occupations include computer and mathematical, architecture and engineering, and life and physical science occupations, as well as managerial and postsecondary teaching occupations related to these functional areas and sales occupations requiring scientific or technical knowledge at the postsecondary level. For more information, see https://www.bls.gov/oes/topics.htm#stem.

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