

VISION TO 2025



RICE

SCHOOL OF ENGINEERING
STRATEGIC PLAN



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Prepared with renewed energy and a vision for the future, the George R. Brown School of Engineering at Rice University is poised for significant growth, greater impact and elevation to the ranks of preeminent engineering programs in the nation. Upon successful implementation of this bold plan, the School of Engineering will be recognized, nationally and internationally, as a premier program, with a top-10 ranking for private engineering schools.

We will achieve excellence by bringing the very best talent to Rice, focusing our efforts in strategic areas, and providing the environment and resources for everyone in our community to flourish. We will be known for outstanding strength in research, unparalleled undergraduate and graduate education, and a strong culture of innovation and entrepreneurship.

At the founding of the Rice Institute in 1912, engineering was a central part of the school's focus and remains so today. Guided by Edgar Odell Lovett's notion of "No Upper Limit," the School

of Engineering has earned a place among the top schools in the country. We strive not to merely maintain that reputation but to exceed it. In a speech he gave in 1912, Dr. Lovett noted "pleasures of research" are necessarily related to the pleasures of "teaching and public lecturing," and that "interaction between graduate students and undergraduates was particularly beneficial to undergraduates." It is in this spirit that this strategic plan is focused on enhancing our research and graduate programs, which will have an undeniable benefit on our undergraduates.

As we look at the challenges facing the world, engineering is crucial to improving our quality of life, security and sustainability. To realize our ambitions, we must partner with the sciences, humanities, social sciences, architecture and business to ensure that our solutions are developed within the context of an increasingly complex world.

The background of the document is a photograph of a university campus. On the left, there is a large, multi-story building with a classical architectural style, featuring arched windows and a prominent entrance. To the right and in the foreground, there are large, leafy trees. The entire image is overlaid with a semi-transparent dark blue filter, which makes the text stand out while still allowing the details of the building and trees to be visible.

We are in a period of unprecedented challenges, but also of unique opportunities brought about through advances in computation and data science, nanotechnology, materials and biotechnology. We will focus our efforts on key strategic interdisciplinary areas that leverage these opportunities, including Engineering & Medicine, Molecular Nanotechnology & Materials, Cities of the Future, and Energy and the Environment.

All of these areas require that we continue to build strength in Computational and Data Sciences. We will leverage our unique location in the heart of Houston — one of the most dynamic, diverse, and entrepreneurial cities in world. We will maintain our strong local presence while enhancing our impact nationally and globally through our research, education and service. The School of Engineering will serve as a force for innovation and entrepreneurship, and help to power an innovation ecosystem at Rice and in Houston.

We will continue our strong tradition of excellence in education by fostering engineering students' intellectual curiosity, creativity and critical thinking skills. We will provide a foundation for impact through a strong scientific, technical and liberal arts education, and unparalleled research and engineering design opportunities. We will maintain our low student-to-faculty ratio, enabling students to fully engage with our faculty. We will continue to grow and enhance makerspaces for students to learn, create and translate their ideas. We will empower our students to be leaders in their fields, and fearless in the face of uncertainty and complexity.

While talented and dedicated people have always been our most valuable commodity, our infrastructure must support their need to grow and succeed. World-class research, teaching and collaboration require world-class facilities. Our classrooms, labs and other facilities must enable our faculty, staff and students to flourish in their studies and research inquiries. We must provide the infrastructure needed to remove barriers to excellence for everyone in our community.

The future of engineering depends on a diverse workforce with experiences and backgrounds that bring different ideas to the table. Diversity in STEM is important for the future of American competitiveness. We will create a series of programs that enable us to diversify our faculty, staff and student body.

Achieving our bold vision will require resources from our entrepreneurial activities and philanthropy. It will also require that we are better stewards of our current resources and remain efficient in everything we do. We will align administrative support with the research and educational mission of the School of Engineering to engage, equip, empower, enrich and enhance staff support to achieve maximum faculty productivity and impact, and improve the student experience.

2300+ STUDENTS

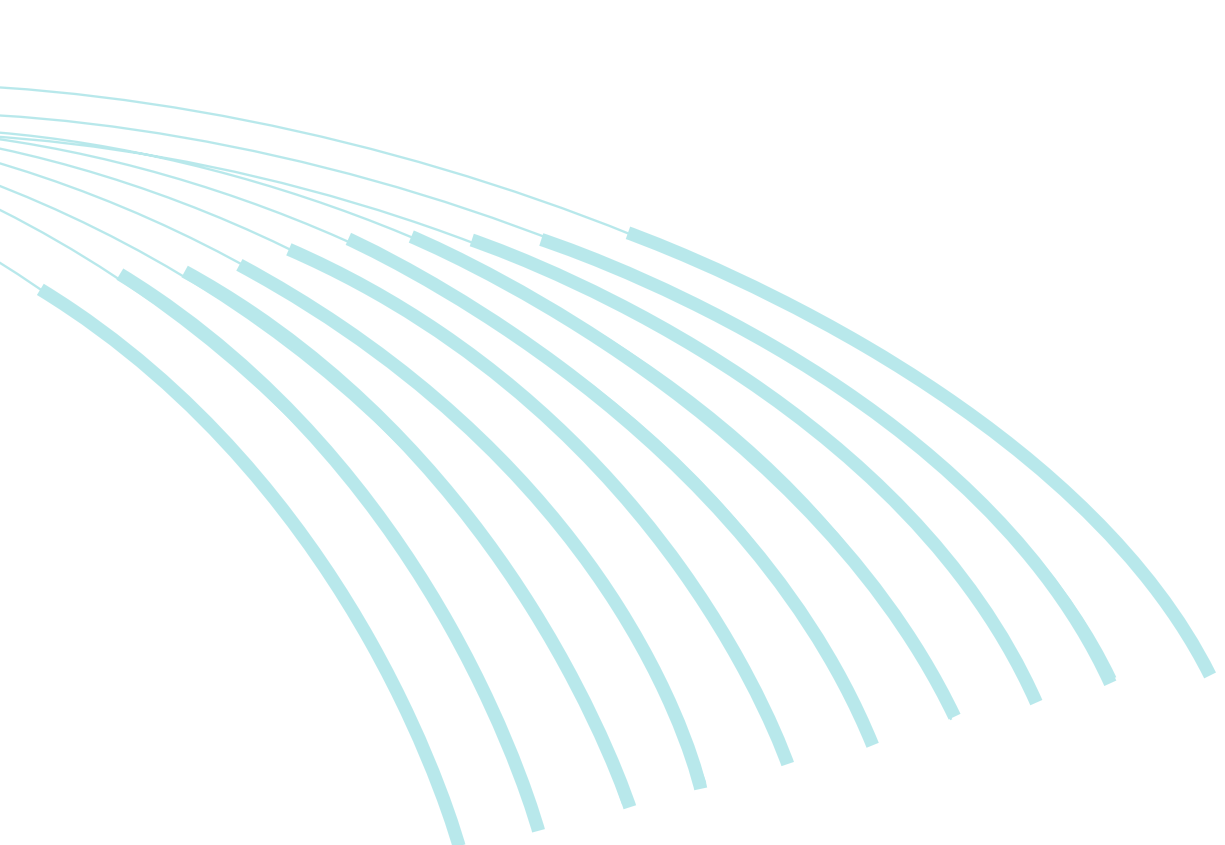
13,000+ ALUMNI

131 TENURED AND TENURE TRACK FACULTY

DEGREES AWARDED 2017-18

373 UNDERGRADUATE

354 GRADUATE



Vision to 2025 contains three strategic goals that will guide our investments in the School over the next seven years. As engineering is a key segment of the Rice community, our plan must align with Rice’s Vision for the Second Century (V2C2), while retaining the uniqueness that captures our history, culture and aspirations. This plan was developed based on input from faculty, staff, students and alumni, and represents a bold vision to propel the School to the next level of research, teaching, service and impact.

Vision Statement

By leveraging our unique strengths and culture, the School of Engineering at Rice University will be recognized as a leader in transformational research, unparalleled education and service to humanity.

Mission Statement

We will empower the next generation of leaders with strong technical, data science and creative problem solving skills, and the ability to integrate across disciplines to address humankind’s most pressing problems.

Core Values

Rigor, Excellence, Integrity, Curiosity, Leadership, Service, Collaboration, and Passion.



RESEARCH AND TRANSLATION

2017-2018 RESEARCH
EXPENDITURES69.2
MILLION

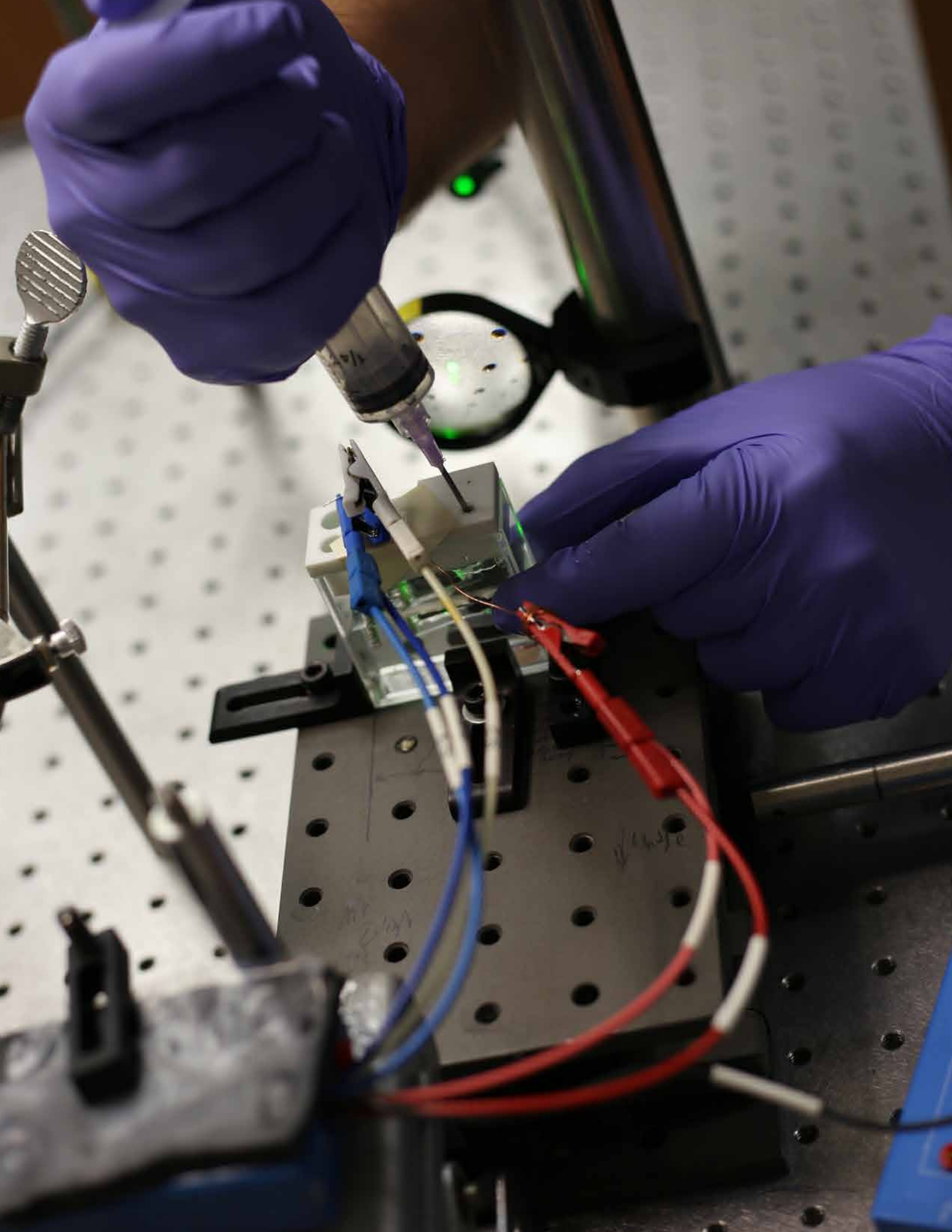
Goal 1

We will become a top-10 private School of Engineering by achieving research preeminence.

Our first goal is to become a top-10 private school of engineering by achieving research preeminence. To accomplish this, we will make investments in strategic research areas that leverage our strengths, location, agility and strong interdisciplinary culture to solve local and global societal challenges. We will recruit and retain excellent faculty to ensure growth in these areas, and foster research productivity and impact by providing state-of-the-art facilities and skilled staff. Our intent is to enhance our national and international visibility through targeted promotion of our achievements and pursuit of external partnerships that build our institutional network. We will broaden the School of Engineering's visibility, impact and influence on Houston and the rest of the world through intellectual leadership in emerging technologies, strategic industrial partnerships and active involvement in city-scale projects. We will partner with central administration to develop policies that help transform new ideas and inventions into valuable products and services, and build effective partnerships with our alumni, industry, the Texas Medical Center, NASA and other organizations.

Objective 1.1

We will grow the engineering faculty by 30 percent by investing in targeted and strategic areas that leverage our strengths so that the School of Engineering achieves preeminence nationally and internationally, with local, national and global impact. We will establish 20 new endowed chairs at all levels to attract top faculty and reward high achievers. These strategic areas include Engineering & Medicine, Molecular Nanotechnology & Materials, Cities of the Future, and Energy & the Environment. All require that we continue to build strength in computational and data sciences.





faculty are members of the
National Academies

Objective 1.2

World-class research requires world-class facilities. We will enhance existing space and create a new state-of-the-art facility to encourage research and translation at the intersection of engineering, science, business, social science, the humanities and architecture. This space will serve as a point of entry for external partners, as a makerspace for graduate students and as a center for entrepreneurial and translational activities.

Objective 1.3

Establishment of a named fellowship program will aid in recruiting the best doctoral students and postdoctoral scholars, and provide them with cross-disciplinary research and education, communication skills enhancement and opportunities for engagement with local and national industry, the City of Houston and local institutions. Excellence in our doctoral students and postdoctoral scholars, as mentors in classrooms and laboratories, will strengthen the undergraduate experience. We will establish strategic partnerships with highly ranked international universities/programs to recruit top doctoral students from diverse areas of the world, including Europe, Asia, Latin America and Africa.

Objective 1.4

We will support research institutes and centers at Rice to address cross-disciplinary problems and as a mechanism to pursue center-level projects (Engineering Research Centers, Science and Technology Centers, etc.). Leveraging existing institutes and centers will expand the School of Engineering's visibility, impact and influence through intellectual leadership in emerging technologies, strategic industrial partnerships and active involvement in city-scale projects. Joint programs with the Baker Institute will serve as a mechanism for engineering faculty to shape state and national discussions on critical global challenges and raise the visibility of significant research at Rice.

Objective 1.5

The School of Engineering will be a driving force in creating an innovation ecosystem in Houston to nurture entrepreneurship, strengthen industrial partnerships and enhance the commercial and societal impact of our research. This will entail maintaining and strengthening the technology incubation function and active translation, promotion and marketing of technologies developed at Rice.



EDUCATION AND OUTREACH

80%

of engineering undergrads have a research or intern experience by the time they graduate

Goal 2

We will encourage engineering students' intellectual curiosity, creativity, critical thinking skills and a foundation for impact through a strong scientific, technical and liberal arts education, unparalleled research and engineering design opportunities, data science capabilities and strong communication skills.

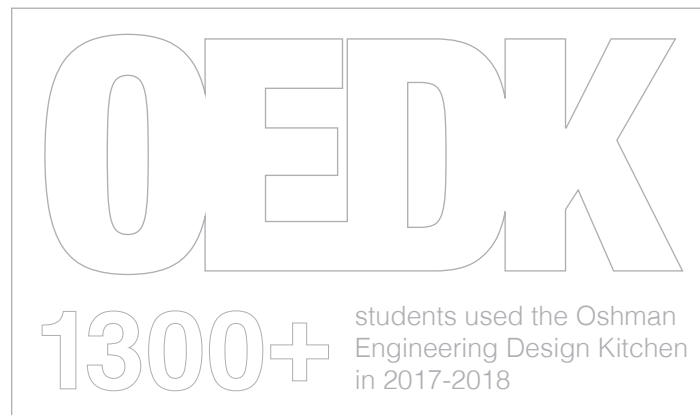
We will value excellence and passion in teaching and maintain our low student-to-faculty ratio, enabling students to engage with faculty in deep and meaningful ways. Our strength in research will enhance the educational experiences of our students. We will continue to grow and enhance unique makerspaces for students. We recognize the importance of data science in all future STEM professions and will be leaders in data-science education by developing new courses, minors and majors to ensure our students can lead in a data-intensive society. We will engage with the community and beyond by offering new professional master's programs and launching online courses, certificates and master's degrees.

Objective 2.1

We will expand the Oshman Engineering Design Kitchen and build the Data to Knowledge laboratory to provide design experiences that facilitate partnerships with industry, and local and national organizations. This will enable our students to work on real-world projects and ensure that all students are supported for undergraduate research experiences. We will lead in providing our students with design experiences and preparing them for a data-driven workplace by developing new courses, minors and majors in data science.

Objective 2.2

We will double the number of Rice undergraduate engineering students participating in international educational and service opportunities by identifying study-abroad opportunities, creating more flexible curricula in engineering, and developing a student global travel fund. We will develop service learning courses that will include study-abroad components that provide opportunities for Rice students to study grand-challenge projects within a global context, while immersing them in another culture.



Students participated in at least 141 design teams/clubs and 24 courses that actively used OEDK resources last year

Objective 2.3

We will enhance the impact and visibility of our professional master's program and ensure that our master's students have a strong technical foundation, interdisciplinary breadth, professional training, strong communication skills and ethics training. We will launch several new online master's programs and certificates in high-demand areas to meet the needs of industry (e.g., Data Science, Computer Science, Engineering Management).

Objective 2.4

Through the Rice Center for Engineering Leadership, the School of Engineering will serve as a central point of engineering leadership and entrepreneurship education and training. We will launch a certificate in engineering entrepreneurship that combines engineering ideation, business development, and legal skills, in concert with co-curricular experiences related to leadership in high-tech start-up companies.

Objective 2.5

We will help foster creative thinking among our students by launching an engineering and the arts initiative. We will work with the School of Music, School of Architecture, visual and dramatic arts, the Moody Center and the Houston arts community to develop programs that will foster cross-pollination between engineering and art.

Objective 2.6

We will develop structured STEM outreach programs for underrepresented middle and high school students through strategic partnerships with campus organizations and the city of Houston.







CULTURE AND OPERATIONS

32%

of Rice undergrads
are women

Goal 3

We will work to ensure that administrative effectiveness, interdisciplinary collaboration and diversity serve as core tenets for the School of Engineering.

We will make administrative effectiveness a key value across all units in the School of Engineering. We will align administrative support with the research and educational mission of the School of Engineering to encourage staff to help faculty achieve maximum productivity and improve the student experience. We will make diversity an integral part of our identity through recruiting and retaining a diverse population of students, faculty and staff. We will celebrate our successes by developing school-level awards programs to recognize excellence among faculty, staff and students, putting in place processes to increase the number of faculty and students nominated for prestigious national and international awards, and launching a public relations campaign to enhance the visibility of our students, faculty and programs.

Objective 3.1

We will continue to strengthen our interdisciplinary collaboration in strategic areas with the various schools at Rice. We will develop new interdisciplinary programs across schools to achieve our ambitious research and education goals. We will work closely with the various institutes and make certain they are central to the research and teaching mission.

Objective 3.2

We will operate an efficient and effective school. We will engage staff experts to develop effective and efficient procedures, equip staff through training on core competencies, and enable them to develop shared toolkits within sub-areas and across departments.

13%

of Rice undergrads
are first generation
college students

1st
NATIONALLY

with 11% of underrepresented
minority faculty*

7th
NATIONALLY

with 22% underrepresented
minority undergraduate students*

Objective 3.3

We will work with central administration to enhance infrastructure, policies and processes regarding technology translation. We will streamline the Rice IP/ patenting process. We will create an external advisory board focused on technology transfer and academic entrepreneurship to support the Rice Office of Technology Transfer.

Objective 3.4

We will create an office of engineering outreach and engagement to work closely with other efforts on campus and ensure best practices for diversity, equity and inclusion. We will create structured programs for enhancing recruitment and retention of diverse students and faculty.

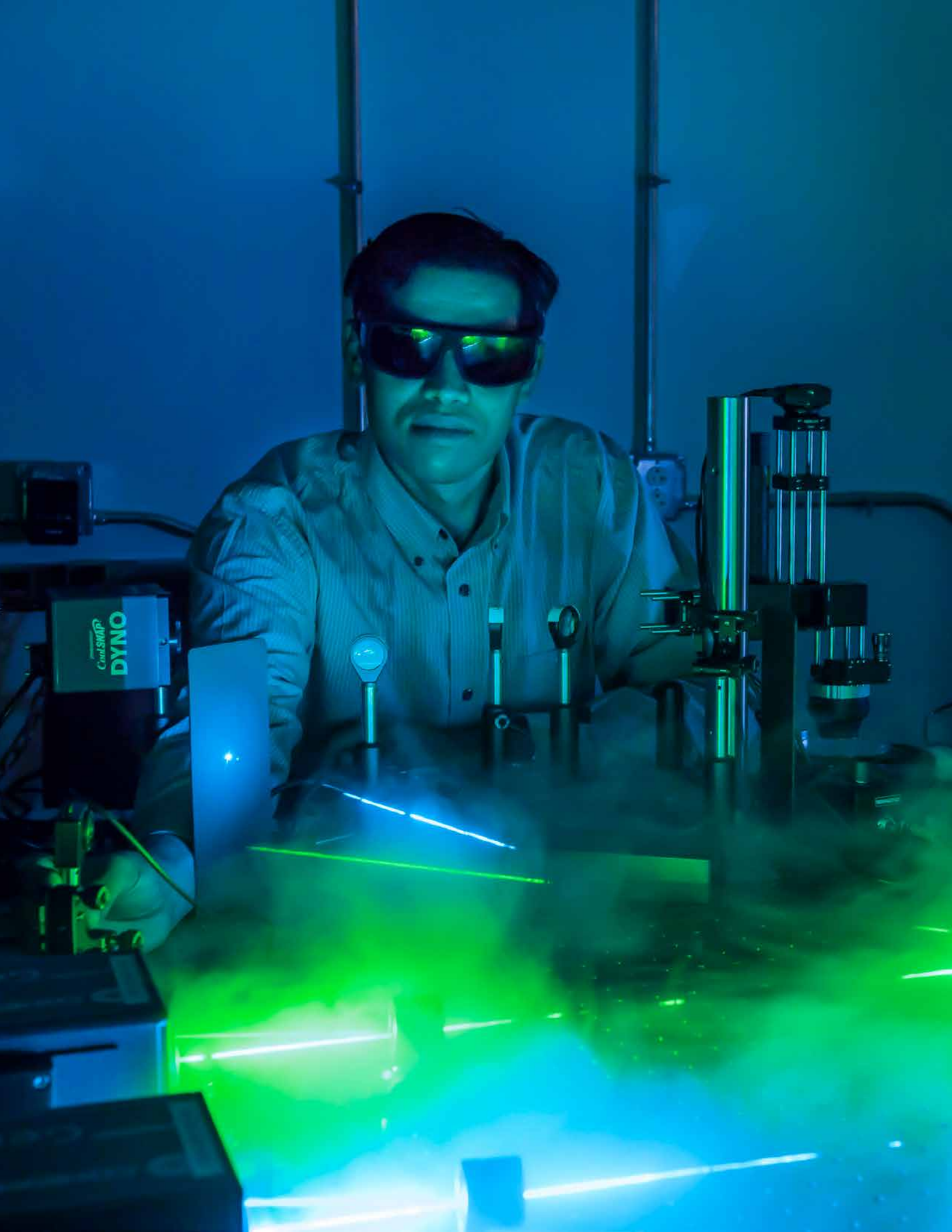
Objective 3.5

We will dramatically enhance our efforts in marketing and communication to ensure that we are highlighting our excellence and impact to prospective students, faculty and alumni. We will expand school-level awards to reward faculty accomplishments in teaching, research and service, identify external award opportunities and develop a system for regular identification and nomination of faculty and students for national awards.

12th
NATIONALLY

with 31% female
graduate students*

*among self-reporting AAU institutions (Fall 2018)





STRATEGIC PLANNING PROCESS

The strategic planning process for the George R. Brown School of Engineering at Rice commenced in August 2017 with the formation of the Strategic Planning Committee. The months that followed consisted of subcommittee meetings, along with meetings of groups of faculty, staff, students and alumni. Detailed surveys were also distributed to gather opinions on the strengths, weaknesses, opportunities and threats in the School. In total, the committee sought input from more than 2,000 students, faculty, staff and alumni.

In early spring of 2018, a daylong retreat was held with the department chairs and associate deans that resulted in the creation of a draft plan, which was further refined through the input of faculty, staff and students. The plan was presented to the School of Engineering External Advisory Board later that spring, resulting in further refinements. Finally, several focus groups of key alumni and local members of the Rice University Board of Trustees were held in Summer 2018 before a final plan was posted for faculty comment.

While several hundred people contributed to the process and the final plan, a special thanks goes out to the Strategic Planning Committee for their commitment, dedication and keen insight.



PROCESS TIMELINE

2017

August	Strategic Planning Committee formed
September	First Meeting of committee and subcommittees (7 subcommittees)
September-October	Dean meets with each subcommittee
October	Draft plan presented to Rice Engineering Alumni (REA) Board
October	Survey distributed to faculty, staff, students and alumni
November	Results of survey incorporated, resulting in new draft plan

2018

January	Second meeting of subcommittees to discuss draft plan
February	Retreat for department chairs and associate deans
February	Revised plan updated and posted for comments by faculty and Engineering Advisory Board (EAB)
April	Meeting of EAB to discuss Strategic Plan
May	Revised plan delivered to faculty based on input from EAB (plan reduced from 10 pages to 3 pages)
June/July	Focus groups held with alumni and Rice University Board of Trustee members
August	Revised plan presented to REA Board
Oct 1st	Plan finalized



COMMITTEE MEMBERS

Genevera Allen
Associate Professor of Statistics

Emma Baker
Senior, Mechanical Engineering

Irena Chang
Executive Administrator, Bioengineering

Zack Cordero
Assistant Professor of Materials Science and NanoEngineering

Maarten de Hoop
Simons Chair in Computational and Applied Mathematics and Earth Science

Leonardo Dueñas-Osorio
Associate Professor of Civil and Environmental Engineering

Ramon Gonzalez
Professor of Chemical and Biomolecular Engineering

Rudy Guerra
Professor of Statistics

Naomi Halas
Stanley C. Moore Professor of Electrical and Computer Engineering

Pedram Hassanzadeh
Associate Professor of Mechanical Engineering

Matthias Heinkenschloss
Noah G. Harding Chair and Professor of Computational and Applied Mathematics

Kazimir Karwowski
Executive Director, Rice Center for Engineering Leadership

Lydia Kavraki
Noah Harding Professor of Computer Science

Qilin Li
Professor of Civil and Environmental Engineering

Ann Lugg
Director of Communications, School of Engineering (Retired)

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Abercrombie Professor of Chemical and Biomolecular Engineering

Z. Maria Oden
Teaching Professor of Bioengineering

Marcia O'Malley
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