

College of Engineering

2023

ANNUAL PROGRESS REPORT



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NEW MEXICO STATE UNIVERSITY LEADS 2025



BE BOLD. Shape the Future.
New Mexico State University
nmsu.edu



Mission

The mission of the New Mexico State University system is to serve the diverse needs of the state through comprehensive programs of education, research, extension and outreach, and public service. As the state's land-grant and space-grant university and as an Hispanic-Serving Institution, NMSU fosters learning, inquiry, diversity and inclusion, social mobility and service to the broader community.

Vision

By 2025, the NMSU system will excel in student success and social mobility for our diverse student populations, achieve the highest Carnegie research status (R1), and maintain our Carnegie Community Engagement classification.

Values: NMSU 2025 LEADS

Leadership: Promoting and creating the ability for Aggies to shape the future

Excellence: Providing the highest level of education, research, outreach and service

Access: Welcoming diverse populations to higher education and to the NMSU community

Diversity and Inclusion: Embracing our differences as an asset and actively seeking to include wide-ranging perspectives

Student-Centered: Supporting the education of our students through every aspect of our university, every day

These values are encapsulated as: **BE BOLD. Shape the future.**

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



NMSU team selected for international finals of design competition. A student team from New Mexico State University, TF-575, traveled to Texas A&M University in College Station, Texas, in April for the final round of the Invent for the Planet design competition. From left: team members include Richard Cazares, Eddie Kemp, Patrick Menanteau, Olivia Belian and Victor Menanteau.

College of Engineering Peer Institutions

Selection Criteria: Carnegie classification, size of college, ascent in rankings

- ⇒ New Mexico State University
- ⇒ University of Arizona, Tucson
- ⇒ Texas Tech University, Whitacre
- ⇒ Florida International University
- ⇒ Oklahoma State University
- ⇒ Kansas State University
- ⇒ University of New Mexico
- ⇒ University of Nevada, Reno
- ⇒ University of Nevada, Las Vegas
- ⇒ Montana State University
- ⇒ University of Texas, San Antonio
- ⇒ Utah State University

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



Guiding Principles

The College of Engineering 2025 roadmap is intended to be a continuous improvement plan embraced by all faculty and staff members of the college. Its goals and objectives provide guidance for the next steps toward fulfilling the mission and vision of New Mexico State University.

The content presented in this document was planned in various stages and was developed and contributed to by all constituents of the college: faculty and staff, students, alumni, donors, industry representatives and NMSU administration. A committee with representation from each department, faculty and staff surveys, comment sessions, the College of Engineering Fact Book, and U.S. News and World Report data on peer institutions, were used in preparation of this document.

It is comprehensive and designed so that all faculty and staff members will be familiar with it and contribute to its objectives while conducting the business of the college. Departments will align their strategic plans with this roadmap.

The College of Engineering administrative team will be intentional in assessment of progress toward fulfilling the KPIs in this plan. Annual evaluations, as well as promotion and tenure documentation, will be aligned with this document, just as this strategic plan is aligned with the university-level plan.



COLLEGE OF ENGINEERING STRATEGIC ROADMAP



NMSU engineering students completing internships at Intel New Mexico may work in an Intel fabrication plant. Intel Corporation made a generous investment at NMSU for career mentoring and advising, enabling students to become more employable through internships and other programming that results in better retention of engineering majors.

GOAL 1. ENHANCE STUDENT SUCCESS AND SOCIAL MOBILITY

The College of Engineering is committed to student success through relevant programs, degree completion and career attainment. Our students are served by our culture of inclusivity and educational delivery that meets student needs and includes online and hands-on learning. We believe that providing students with interpersonal skills, entrepreneurial ideas and leadership abilities is essential to the education of engineering students.

Objective 1.1: Provide innovative and relevant educational and research programs

Actions

- Identify programs that fulfill regional workforce needs, and match teaching and research interests and expertise of faculty members.
- Increase online presence and expand delivery modes of degree/certificate/training programs.
- Foster exposure to entrepreneurship through collaborative activities with Arrowhead Center.
- Develop students' inter- and intrapersonal skills through the Ron Seidel Engineering Leadership Academy and the Eloy Torrez Family Engineering Learning Communities programs.

Objective 1.2: Promote student success (3Gs – Get the degree, Get a job and Give back)

Actions

- Actively recruit undergraduate and graduate students in all program offerings.
- Improve student retention, time to completion and graduation rates.
- Establish industry partnerships to improve student placement.

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



Liang Sun, mechanical and aerospace engineering associate professor, has been awarded a nearly \$6 million grant by NASA to solve key challenges facing the future of air travel.

- d. Provide industry-driven, interdisciplinary opportunities for experiential learning to all students through internships, cooperative education and/or capstone projects.
- e. Continually examine, assess, document and revise academic progress and strategies to align with ABET requirements.

GOAL 1. KPIs

1. Interdisciplinary faculty clusters and industry leaders will be organized to assess and develop curricular and programmatic opportunities in relevant areas to include additive manufacturing, cybersecurity, autonomous systems, data and information science, bioprocessing, space and launch systems, and the nexus of food, energy and water systems.
2. Each department will offer at least one online certificate program.
3. The college will have a 5% increase of students each year.
4. At least 20% of the student body will comprise graduate students.
5. The college will rank in the top quartile of peer institutions for retention and graduation rates. Measures will be adjusted for post-MATH 191 students and students who have participated in internships and co-ops.
6. One hundred percent of engineering graduates will be employed or pursuing graduate degrees.
7. All students will have the opportunity to engage in experiential learning through capstone projects and/or Aggie Innovation Space activities.

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

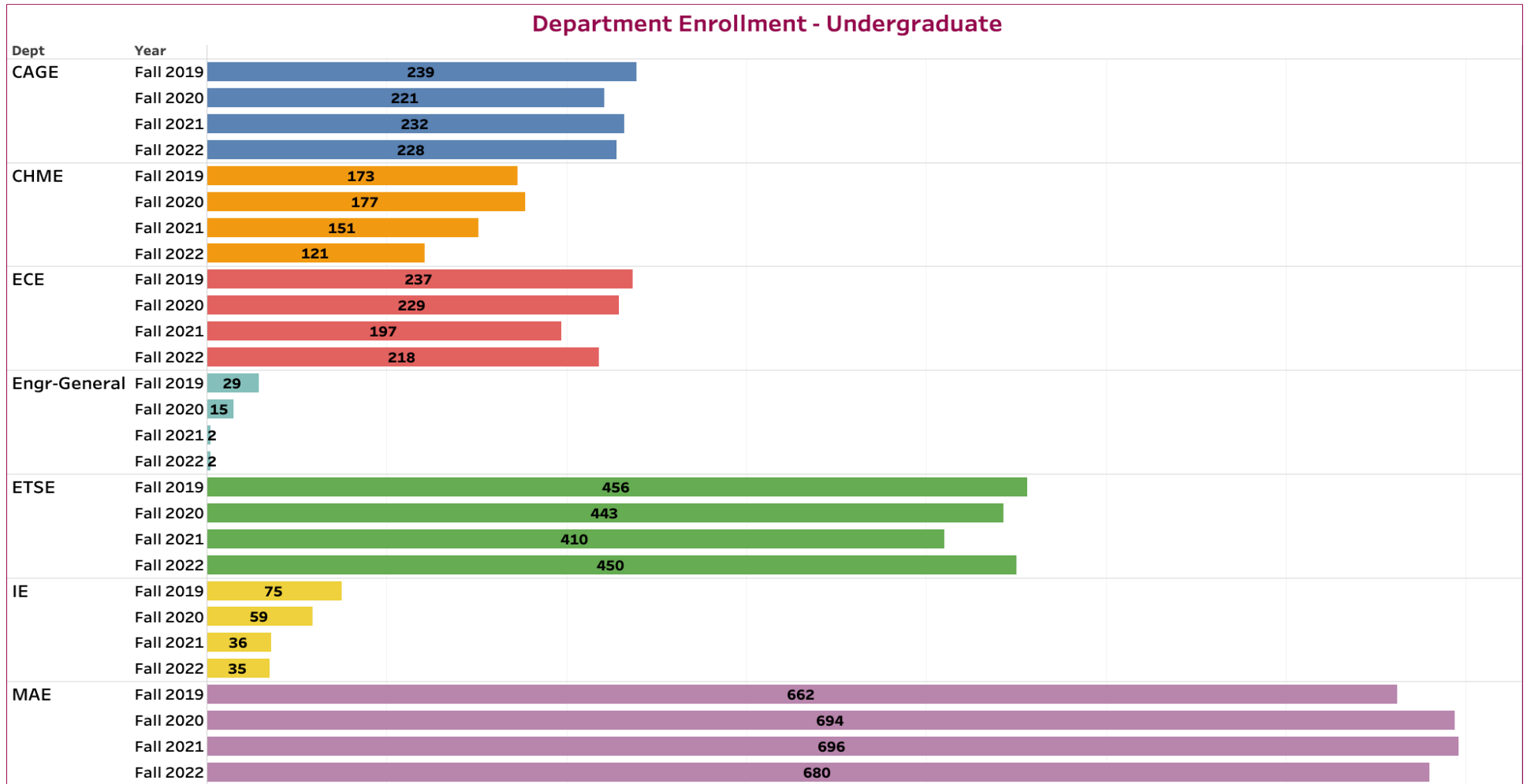
Increase in students visiting the Eloy Torrez Family Learning Communities:

Increased interest in undergraduate degree programs is reflected in the yield or percent of new students who enroll after applying. The number of students visiting the learning communities has increased significantly. From 1770 students in '20 - '21 to 2714 students in '21 - '22, which is a 53 percent increase in the number of students using the facility.



The number of students visiting the learning communities has increased 53 percent over the past year.

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS



Source: NMSU Office of Institutional Affairs - FA22 final census

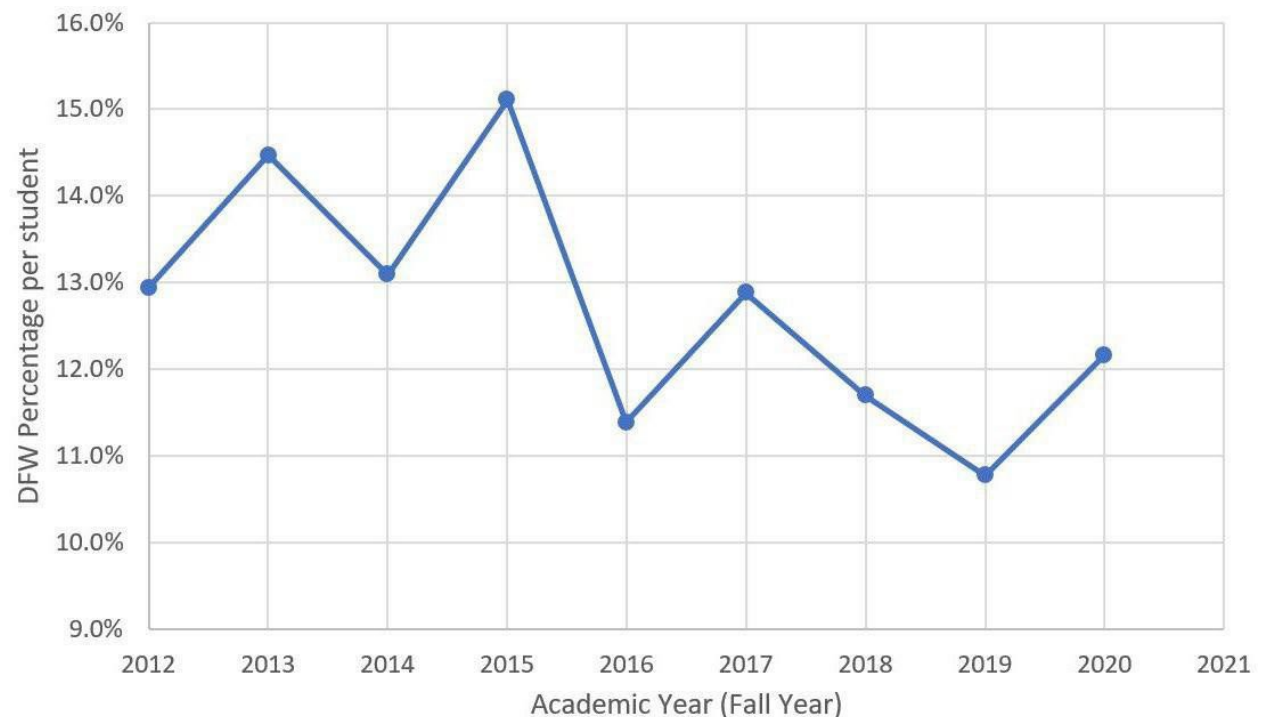
2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS



Student involvement is key to student success. The NMSU Atomic Aggies won the coveted 2022 Chile Cup at the Spaceport America Cup Intercollegiate Rocket competition. The Chile Cup is a face off amongst local rivals NMSU, New Mexico Tech, the University of Texas at El Paso and the University of New Mexico.

Lower D/W/F rates

A key indicator for future enrollment and graduation numbers is a sustained reduction in D, W and F grades. The goal of the college is to consistently be below 10 percent of this key indicator. The onset of the COVID pandemic certainly caused some anomalies in the data. The lowest DFW rate occurred in the fall 2019-spring 2020 data. When the pandemic hit in the spring 2020 semester students completed the semester online and were allowed to be graded on a Pass/Fail scale. It is believed that the grading scales were relaxed due to the pandemic and the need to complete the spring semester online. This resulted in a lower-than-normal DFW rate. In the fall 2020-spring 2021 academic year, NMSU was online. Although the DFW rate increased it was still below the average. For the fall 2021-spring 2022 academic year, the DFW rate jumped to 13.8 percent, which is the third highest rate over the past 10 years. This followed immediately after a year of classes being online. There is an adjustment taking place in moving from online back to in-person classes. It is expected that the DFW rate will drop for the next academic year.

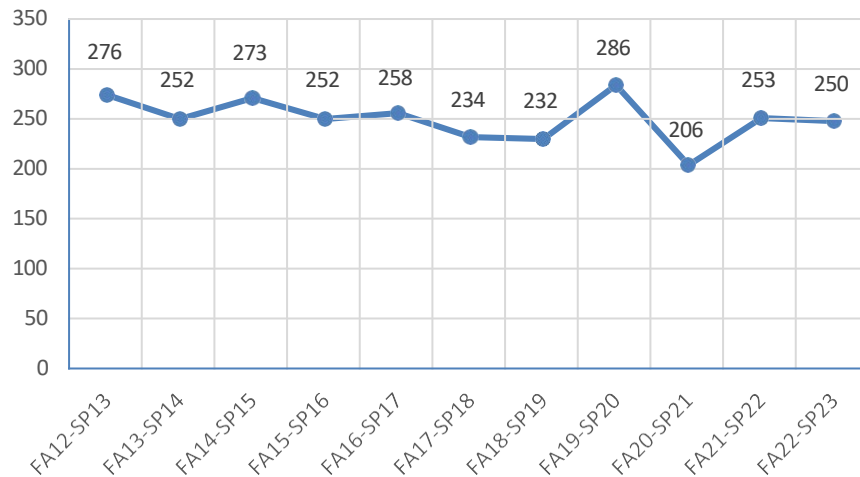


2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

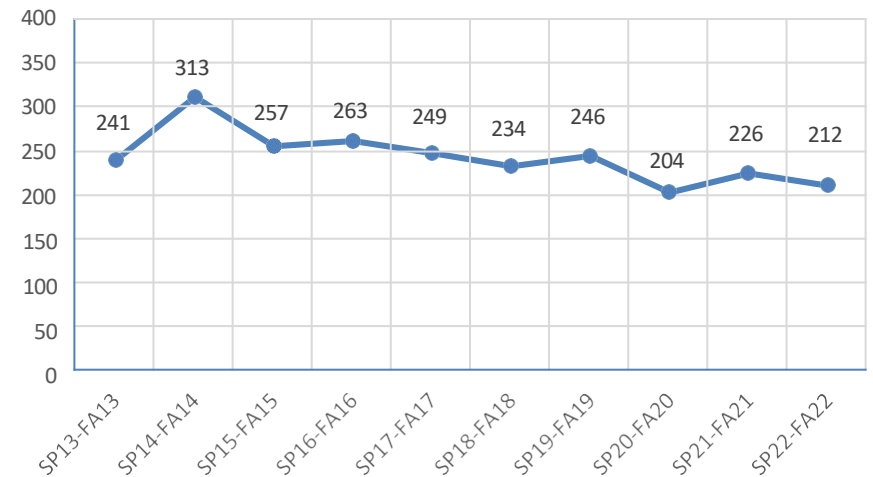
Curricular assessment to support student success

The College of Engineering studied and analyzed data to better understand student retention. Student enrollments were tracked from fall to spring and spring to fall for the past 10 academic years to identify students that were leaving the college. The transcripts of these students revealed a high retention rate at the freshmen level but not at the junior level. Although many of these students were classified as juniors based on student credit hours (SCH) completed, they were only at the freshman and sophomore level in the curriculum.

COE Students Lost - Fall to Spring



COE Students Lost - Spring to Fall



2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS



Professor Ahmed Elaksher received the 2022 Earle J. Fennell Award recognizing "outstanding contributions to surveying and mapping education" by the National Society of Professional Surveyors. Elaksher is program coordinator for NMSU's geomatics program, part of the Engineering Technology and Surveying Engineering Department.

Evaluating causes for dropouts

The courses that students were enrolled in when they left the college reveals that although they were at the junior level in terms of credit hours completed, they were only at the freshmen level based on the courses in their curriculum. The table below shows the six courses that most students were enrolled in and failed in the semester they dropped out of engineering. The average fail rate of these courses is 71 percent and are taught in departments outside the college of engineering.

Top Seven Courses Students Were Enrolled in at Time of Departure						
Course	No	Campus	Title	Total	% Pass	% Fail
CHEM	111G	MA	GENERAL CHEMISTRY I	220	34.09	65.91
MATH	121G	MA	COLLEGE ALGEBRA	162	24.69	75.31
MATH	190G	MA	TRIG AND PRE-CALCULUS	197	28.43	71.57
MATH	191G	MA	CALCULUS I	184	21.74	78.26
MATH	192G	MA	CALCULUS II	139	26.62	73.38
PHYS	215G	MA	ENGINEERING PHYS I	119	35.29	64.71
ENGR	100	MA	INTRO TO ENGINEERING	301	55.48	44.52

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS



Dr. Samah Ben Ayed, Mechanical Engineering Technology Assistant Professor, recently received the One College Synergy (faculty) award.

Solving the Math Problem

Mathematics courses remain the most difficult for engineering students are in the top six most repeated courses by engineering students. The calculus 1 and 2 courses are at the heart of all engineering degrees and students must successfully complete these courses to progress in the curriculum. When students have difficulty completing these courses, they are forced to take courses outside the engineering curriculum to maintain full-time enrollment. Student eventually become frustrated not being able to progress in their degree program and eventually leave the college. To address this problem, the following initiative was undertaken:

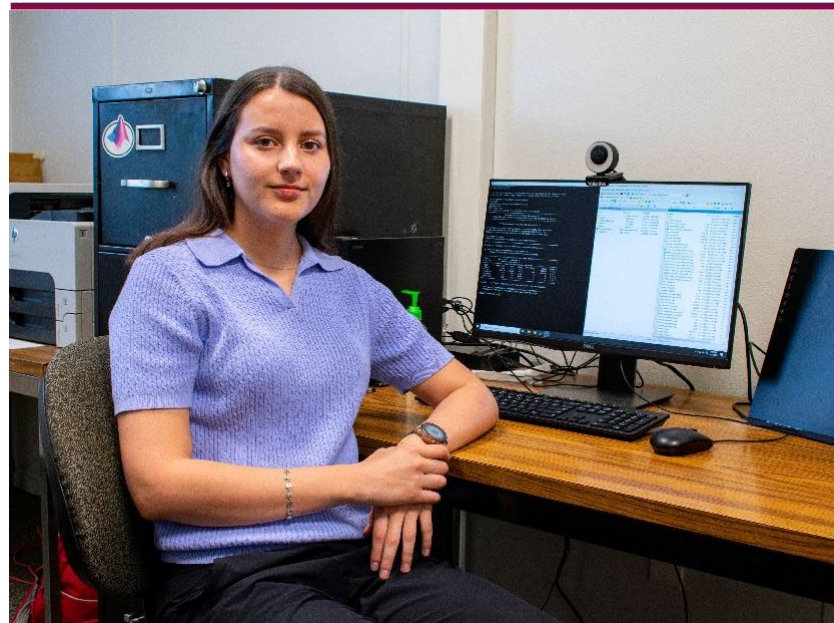
Teach Engineering Mathematics, ENGR 190 starting fall 2021. This course replaced Math 191 and 192 as prerequisites for engineering courses. Successful completion of this course allows students to advance in the curriculum, become better prepared for the calculus courses, and provides more time to complete the calculus courses requirements.

The overall DFW rate for ENGR 190 is 17 percent and for calculus 1 and 2 the corresponding rate is 24 percent The DFW rates for statics and dynamics is 11 percent and 14 percent respectively. With more effort put into tutoring for ENGR 190 it is believed that the DFW rate can be reduced. It is believed that the DFW rate for the calculus sequence will also decline as students will also be better prepared for these courses. The ENGR 190 course is also taught by the same highly qualified instructor every semester. It is believed that this also contributes to the success of the students in the course. We are currently working with the Math Department to have consistent instructors.

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

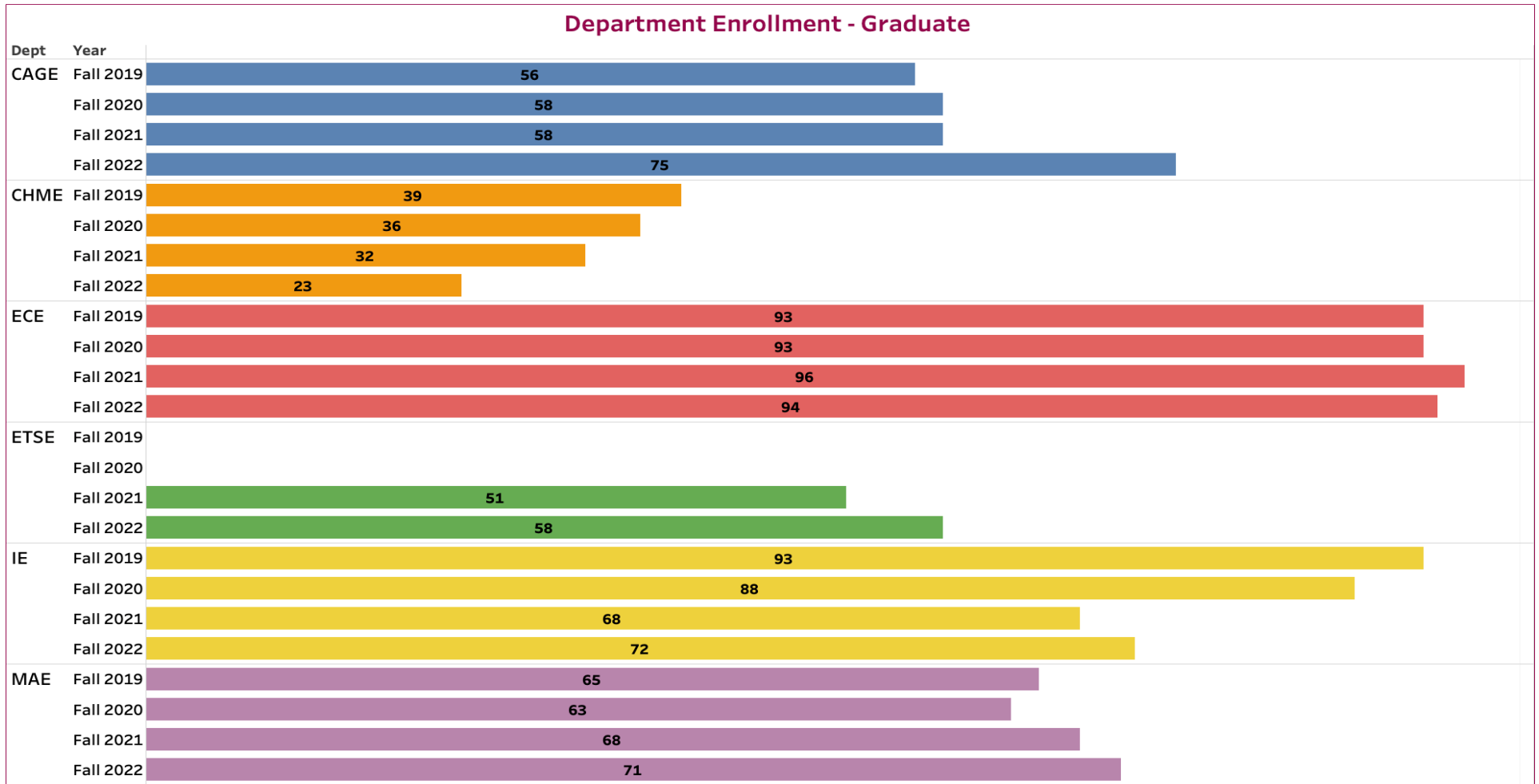
Increase graduate enrollment

Graduate enrollments increased 5 percent over last year. This may be attributed to joint master's degree programs with international universities, online professional master's programs and the accelerated master's program. Professional master of engineering degrees are designed to accommodate working professionals in multi-disciplinary engineering areas. Online master's degree programs in Industrial Engineering and Electrical Engineering offered through NMSU Global Campus and are 100 percent online.



Childhood dreams about creating mechanisms and processes set Alma Carolina Escobosa on a path to pursue a Ph.D. in chemical engineering at NMSU. As a result, she is one of five students to earn a competitive fellowship to work on the most powerful academic supercomputer in the world at the Texas Advanced Computing Center.

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS



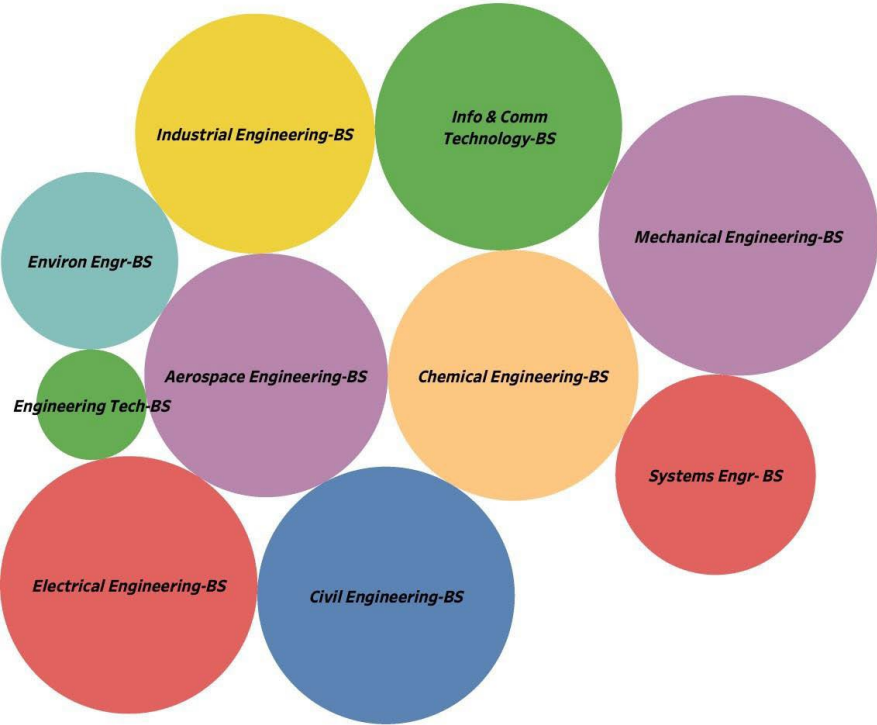
Source: NMSU Office of Institutional Affairs - FA22 final census

2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

Identification of market demand

Gray's Data has allowed NMSU engineering to strategically deploy its efforts and resources on programs with high-market scores.

Market Score - Las Cruces 350-Mile Radius



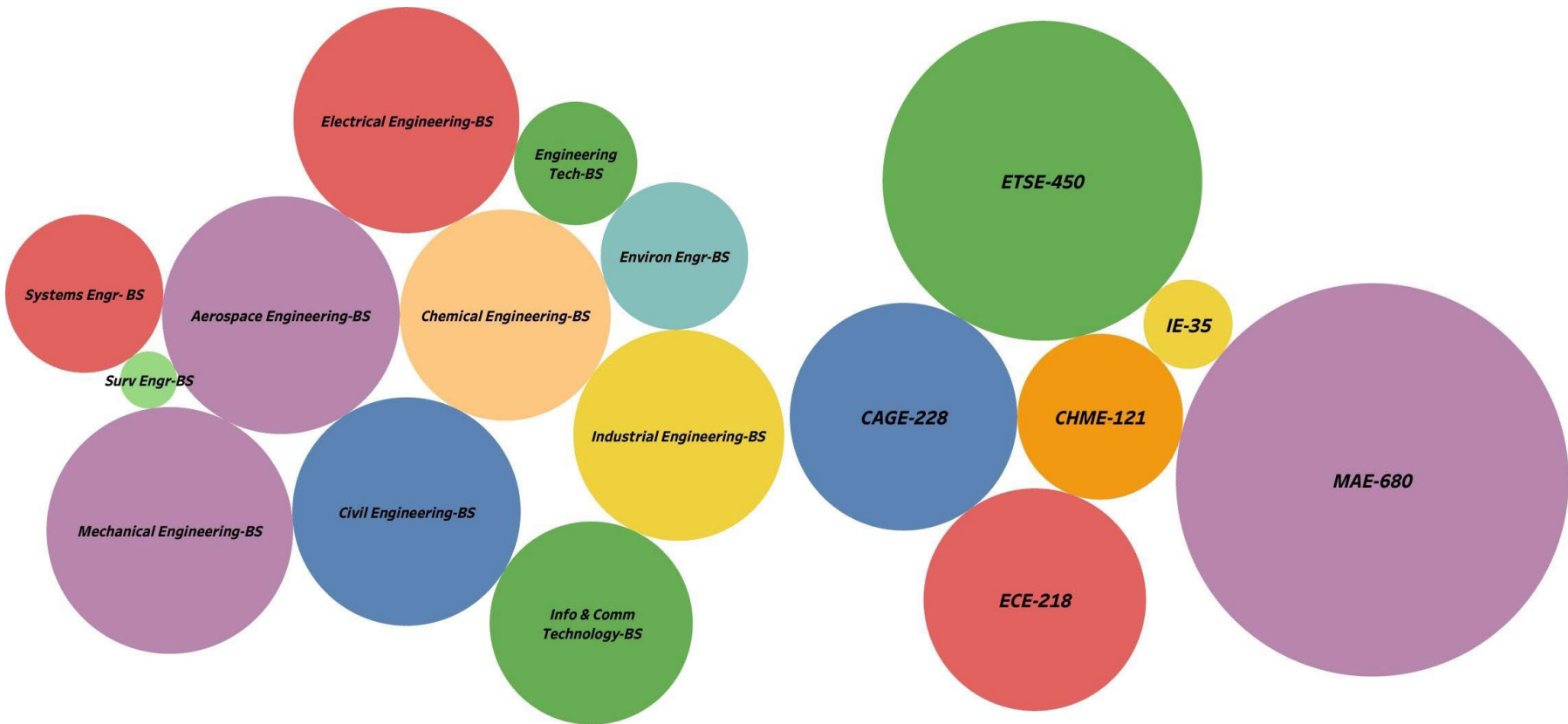
Undergraduate Enrollment - Fall 2022



2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

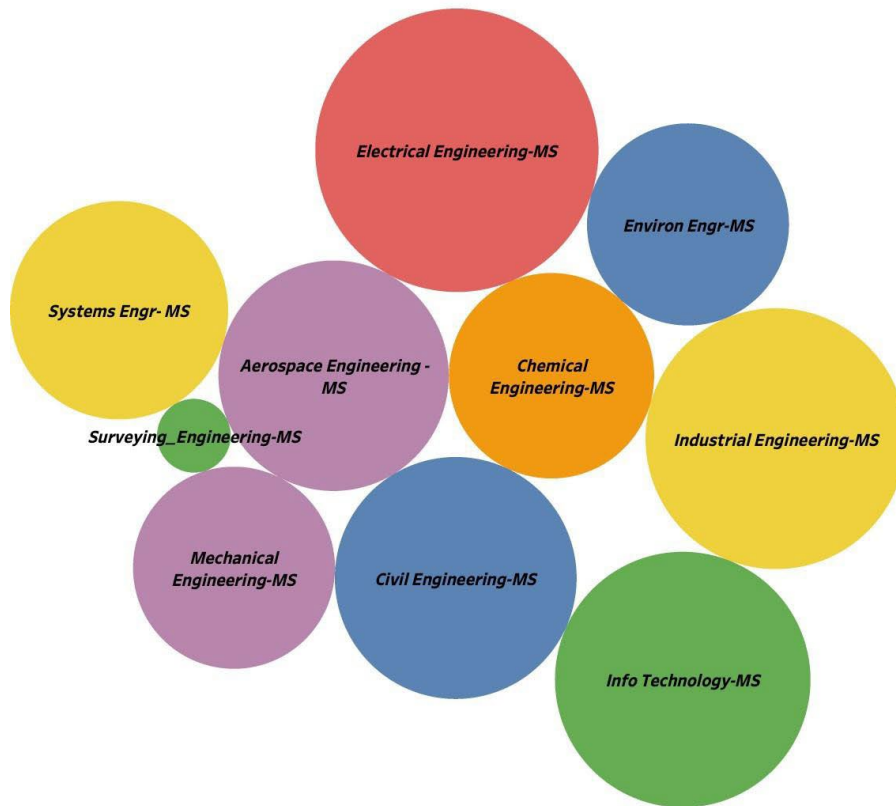
Market Score - National

Undergraduate Enrollment - Fall 2022

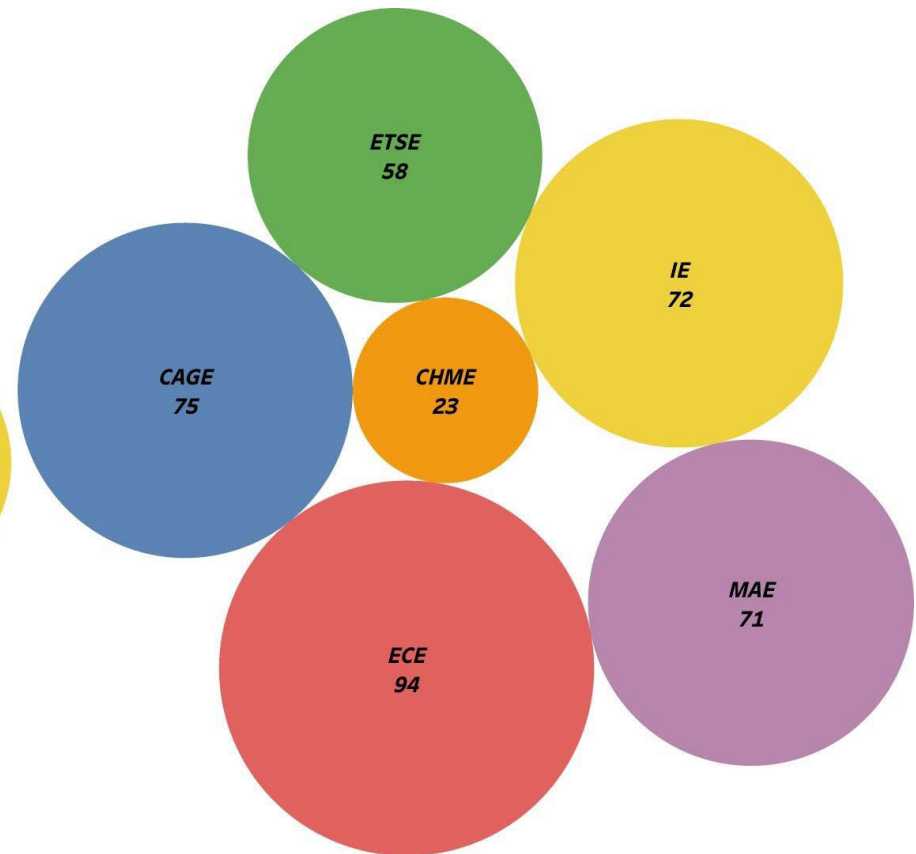


2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

Market Score - Las Cruces 350 - Mile Radius

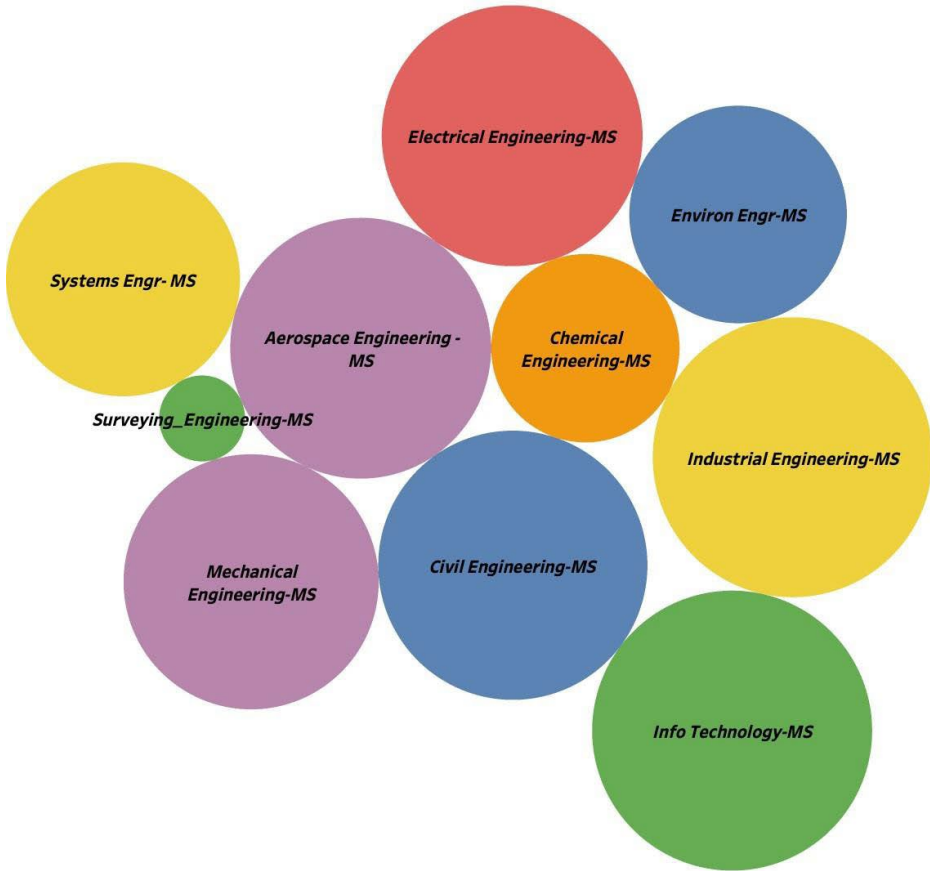


Graduate Enrollment - Fall 2022

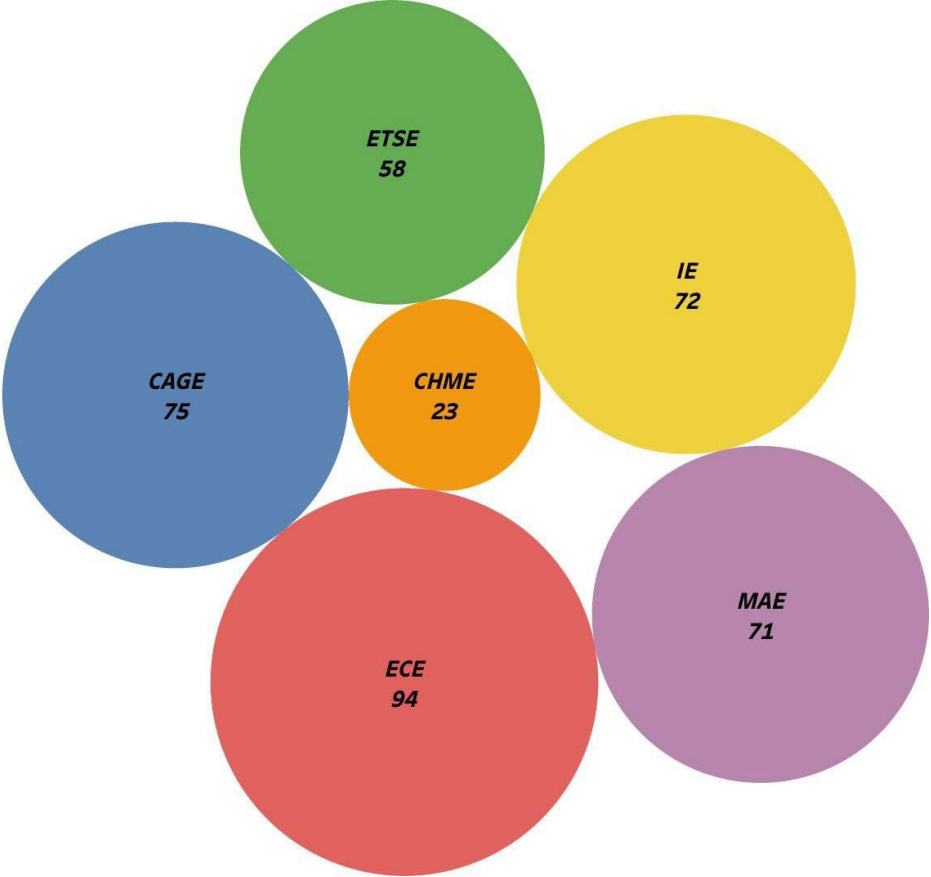


2023 COLLEGE OF ENGINEERING GOAL 1 ACCOMPLISHMENTS

Market Score—National



Graduate Enrollment—Fall 2022



COLLEGE OF ENGINEERING STRATEGIC ROADMAP



Professor Jessica Houston's research group at NMSU investigates the unique ways in which time-resolved measurements can be used in flow cytometry. An important area of focus for the group is metabolic mapping of cancer cells – assessing their vitality – in the presence of chemotherapeutics, using fluorescent lifetime measurements.

GOAL 2. ELEVATE RESEARCH AND CREATIVITY

Research, scholarship and creative activity provide the basis to advance excellence in teaching, learning, education, training, innovation and economic development.

Objective 2.1: Support thematic areas of research and enhance external funding.

Actions

- a. Establish thematic research areas and increase visibility of all research programs.
- b. Foster and promote research partnerships among colleges, facilitate faculty visitations to funding agencies, and invest in high-impact research ventures.
- c. Increase communication and marketing activities that promote college ranking.

Objective 2.2: Increase postdoctoral fellows, research faculty and new tenure/tenure-track startup funds for competitiveness.

Actions

- a. Increase graduate student production, with particular emphasis on the doctoral level.
- b. Increase postdoctoral and research faculty participation through partnerships with schools in the U.S. and abroad.
- c. Increase funding for graduate student stipends and diversify revenue sources.

GOAL 2. KPIs

1. Faculty average productivity will rank in the top two quartiles of our peers.
2. Each college faculty member, on an average, will have at least \$200 thousand in extramural funding per year.
3. Every tenure-track faculty member will rank in the top quartile of at least one college measure: research funding, scholarship, teaching quality and service.

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



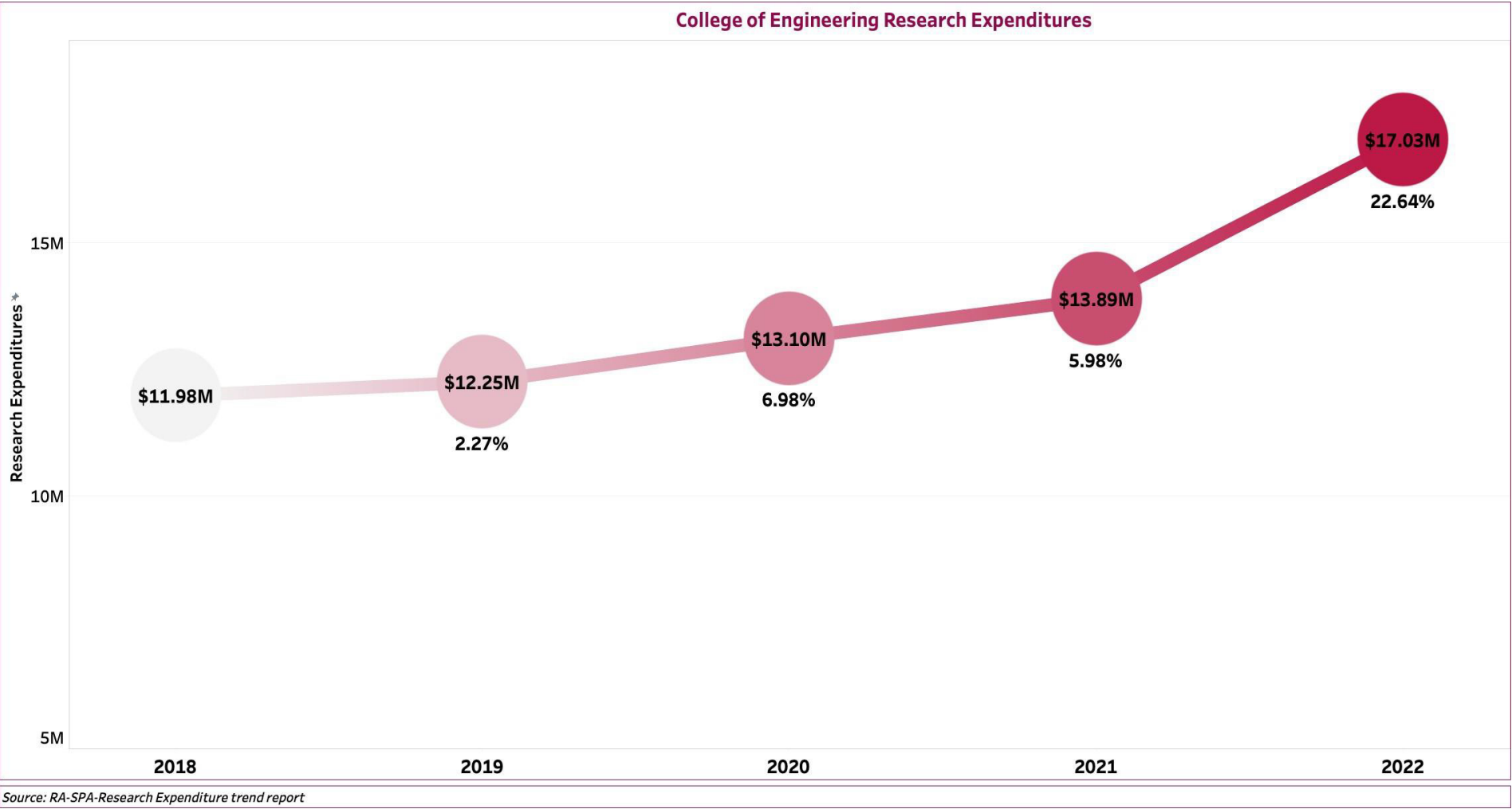
Andreas Gross, associate Professor in Department of Mechanical and Aerospace Engineering, recently received the Teaching Research Service Award from the College of Engineering.

4. Each faculty average advising load will be two Ph.D. and three M.S. students.
5. Average archival paper submissions will be 2.5 per year per faculty member.
6. NMSU College of Engineering peer assessment score will be in the top quartile of peer institutions.
7. Ratio of postdoctoral fellows and research associates to faculty will be in top two quartiles of peer institutions.

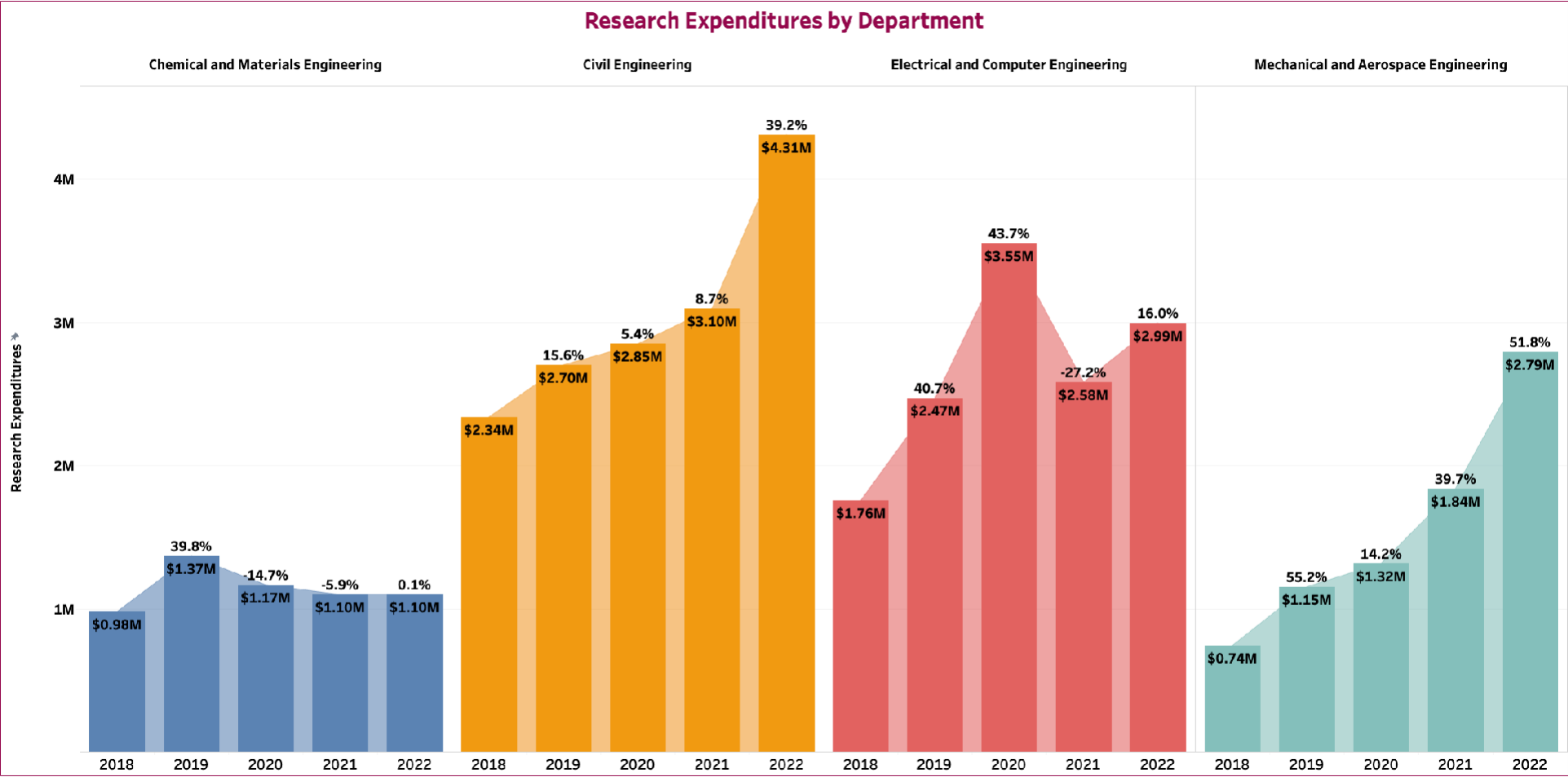
NMSU-BASED ENGINEERING RESEARCH CENTERS

- ⇒ Carlsbad Environmental Monitoring and Research Center
- ⇒ Engineering Research Center for Re-engineering the Nation's Water Infrastructure
- ⇒ Interdisciplinary Center for Research Excellence in Design of Intelligent Technologies for Smart Grids
- ⇒ Center for Bio-mediated and Bio-inspired Geotechniques
- ⇒ Transportation Consortium of South-Central States
- ⇒ National Alliance for Water Innovation
- ⇒ Southwest Technology Development Institute

2023 COLLEGE OF ENGINEERING GOAL 2 ACCOMPLISHMENTS



2023 COLLEGE OF ENGINEERING GOAL 2 ACCOMPLISHMENTS



Source: RA-SPA-Research Expenditure trend report

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



The Las Cruces Museum of Nature and Science and Sigma Xi's Science Café hosted a lecture entitled Bio-Inspiration and Extraterrestrial Subsurface Exploration presented by Douglas Cortes, Harold Foreman Endowed Professor for excellence in civil engineering.

GOAL 3. AMPLIFY EXTENSION AND OUTREACH

Our outreach programs extend knowledge beyond the traditional classroom environment. We strive to provide service to alumni, engineering professionals and other groups that can benefit with the various areas of expertise that our faculty and staff members have to offer. We are also committed to engage and inspire K-12 students to develop a passion for engineering and identify the NMSU College of Engineering as the place to pursue that interest.

Objective: Increase opportunities to engage alumni, engineering professionals, K-12 students and other groups.

Actions

- a. Develop and diversify revenue-generating programs for the engineering workforce (Professional Development Hours).
- b. Develop and participate in K-12 programs to recruit new engineering students.

GOAL 3. KPIs

1. Each department will develop and offer at least one revenue-generating professional development program each year.
2. Every outreach activity performed in the college will be leveraged as a recruitment opportunity.

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS

K-12 STEM PROGRAMS

- ⇒ Four formal STEM outreach programs
- ⇒ 1,705 high- and middle-school student participants
- ⇒ 17 school districts served
- ⇒ 18 New Mexico counties served

Engaging a wider community

The College of Engineering provides statewide engineering outreach services by leveraging a network of partnerships with industry, government agencies, K-12 school districts, community organizations, and academic institutions. Programs are recognized for fostering relatable and relevant content that spans K-16 student engagement, business assistance and professional development focused on upskilling, new-skilling and reskilling the current workforce.

Encouraging future students

The college met the challenge of broadening engagement in STEM by elevating program offerings encompassing in-person, online and hybrid delivery strategies to meet students where they are at. The program offerings foster community-based outreach programming by engaging NMSU engineering students as near-peer mentors, engaging faculty for program relevance in current and emerging areas, and engaging industry partners for relevance in real-world application.

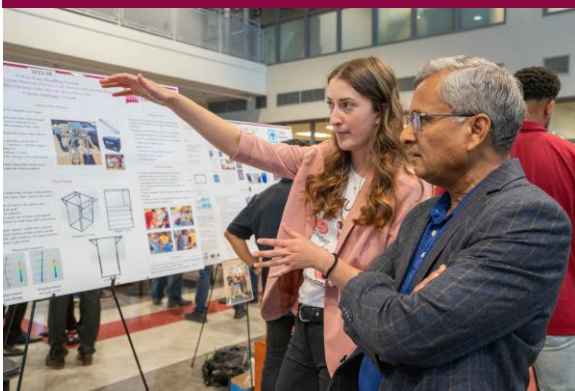
Engaging business and industry

Outreach and engagement with business and industry includes partnerships with the New Mexico Economic Development Department and the New Mexico Energy, Minerals and Natural Resources Department to offer a Green Business Webinar series and a Green Business Resource Fair. Additionally, eight businesses participated in the Clean Energy Sprint program offered through a partnership between the College of Engineering and NMSU's Arrowhead Center through a grant funded by the U.S. Economic Development Agency. Another 10 businesses received direct on-site energy efficiency and pollution prevention assessment services.

2021-2022 P2E3 Implementation Results

Greenhouse Gasses Elimination	14,952 MT CO ₂
Water Saving	140,671 Gallons
Energy Saving	4,017,000kWh
Hazardous Material/Solid Waste Reduction	1,164 Tons

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS



Students had the opportunity to show their capstone projects at Corbett Center. Some 30 companies and national laboratories sponsored projects this spring.

Connecting engineering students with real-world experience

The College of Engineering Aggie Innovation Space (AIS) and the Aggie Capstone Design program contribute to several of the objectives related to student engagement, experiential learning and outreach.

The AIS hosts workshops every semester on a variety of topics that are open to everyone, including NMSU students, faculty and community members. AIS personnel assist students and faculty with course projects, research and individual projects by providing expertise from product development and design to fabrication of a prototype.

One of the college's biggest collaborations is with Arrowhead Center and their Foster Innovation Exchange program and New Mexico Small Business Assistance programs. This collaboration has allowed students, faculty and staff to work with small business startups to develop and manufacture their prototypes as well as help solve their engineering design problems.

The Aggie Engineering Capstone Design Program provides students with a capstone experience attuned to real-life experience. Students work on projects defined by industry that are interdisciplinary and are overseen by professional mentors with a background in project management.

The college entrepreneurship program, allows engineering students the option to leverage the required capstone course sequence to develop a product idea. These students commit to following through all stages of the innovation process, from feasibility and planning through design and implementation. This creates a great learning environment where students develop their concept through a product.

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS

Capstone Projects and Sponsors: Fall 2022-Spring 2023

Afton Generating Station – Powering the Grid – Solid Problems - Prevention	PNM
BattleBots - Aggie Team	NMSU (Competition at NMT)
BattleBots - Crimson Team	NMSU (Competition at NMT)
Calculating Volume from Tactile CMM Pointclouds using Meshing Algorithms	Los Alamos National Laboratory
Capacitance Scaling/ESD Study	Los Alamos National Laboratory
Dak Stick	Dak Stick
Data Acquisition on Rugged Vehicles	Honeywell FM&T
Development of a 3-Way Gate Drafting System to Automatically Sort Cattle into Management Groups (Yr 2)	NMSU (faculty research)
Dock Diving Bumper	NMSU
EcoArt	NMSU (Entrepreneurship)
Evaluation of a Small Satellite Modular EPS (Electrical Power System) Pre and Post Exposure to Random Vibration and Mechanical Shock	The Aerospace Corporation
Evaluation of a Small Satellite Modular EPS (Electrical Power System) Pre and Post Exposure to Random Vibration and Mechanical Shock	The Aerospace Corporation
Home Grown Hydroponics	NMSU (Entrepreneurship)
JetCat P100 Turbojet Engine Electrical Power Generation	Air Force Research Laboratory (competition)

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS

Capstone Projects and Sponsors: Fall 2022-Spring 2023

Laser Ignition of Metals Test System	WHA International
Magnetostatic loudspeaker	NMSU (Entrepreneurship)
Nuclear Radiation Shield Design Using Metal-Epoxy Composites	Los Alamos National Laboratory
Optimizing geosynchronous orbital defense	The Aerospace Corporation
Polymer Additive Manufacturing Pressure Vessels	Kansas City National Security Campus
Radiation Damage to Circuit Components	WSMR
Sandia NM Capstone Challenge	Sandia National Laboratory (competition)
Smart Robot Suite	NMSU (faculty research)
Streamlined Custom Design to Manufacturing	Honeywell FM&T
Mitigation of Evaporation in Mine Tailings Storage Facilities	WERC Environmental Design Contest
Detecting and Quantifying Microplastics in Reservoirs	WERC Environmental Design Contest
The Minishop Multitool	JAAM Co.
Using Acoustics (e.g. Pulse-Echo Technique) to Interrogate AM Parts made with Polymer Blends of Nylon	Los Alamos National Laboratory
VFlow Wind Turbine	Three Crosses Innovations
Visual tracking and Motion planning of a 6-DoF Robot Arm for Robot-Assisted Handmade Tortillas	NMSU (faculty research)

Note: Some of the NMSU sponsored projects are tied to funded research.

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS



Edward Rivota, (from left) chemical and materials engineering student; Luis Rodolfo Garcia Carrillo, electrical and computer engineering assistant professor; and Alicia Gonzales, civil engineering student, analyze drones. Garcia Carrillo is a co-principal investigator for the National Science Foundation-grant funded Research-Oriented Learning Experiences Program at New Mexico State University.

Developing workforce-ready engineers

In fall 2020, the College of Engineering launched the Engineering Education Enrichment (e3) program through a grant from the National Science Foundation. This is a pilot program designed to enhance student marketability with career-ready skills and experience. The e3 initiative is designed to engage eligible engineering students in co-curricular learning strategies beyond the classroom. Grounded on increasing self-directed learning skills and hands-on training, e3 engages students in industry mentored design projects, industry-valued certifications and entrepreneurship training (offered in partnership with NMSU Arrowhead Center). To date, the program has engaged more than 198 students, with 110 of these students pursuing at least one certificate program or certification, and connected with 30 industry and national laboratory partners as design project mentors.

Career development programs aim to broaden engagement of students and employer partners. In the 2021-22 academic year, the college offered 37 direct career-development program offerings (resume review, mock interviews, industry information sessions, etc.) in which 1,062 students and 307 employers participated.

Inspiring future engineering leaders

In fall 2019, the college launched the Ron Seidel Engineering Leadership Institute, a two-year program with the goal of helping engineering students learn critical soft skills needed to become effective leaders and entrepreneurs who bring more than technical expertise to their profession. The institute is funded by engineering alum Ron Seidel and his wife Janice.

The third cohort will begin fall 2022. With the goal of exposing them to various ideas and approaches to leadership, the students are reading and discussing books written by various leadership authorities. They have the opportunity to meet with and engage in discussion with well-known leaders in the engineering field.

The students participate in a two-session workshop that includes discussions with successful entrepreneurs and a hands-on learning experience led by Arrowhead Center Studio G, NMSU's student business accelerator.

2023 COLLEGE OF ENGINEERING GOAL 3 ACCOMPLISHMENTS



The institute also requires students to participate in community service projects to reinforce the idea that engineers serve society and that service goes beyond the workplace. Using a real-world approach, students analyze a project by applying engineering process principles. They then responded to a formal request for proposal with their implementation plans, graphics, labor and materials requirements, budgets, timelines and plans for sustainability.

Serving the profession

Our faculty members are engaged in serving the profession in various leadership roles for a wide variety of professional societies and for the Engineering Accreditation Commission of ABET. The college also helps keep practicing engineers current through professional development offerings, workshops and seminars. Ad hoc programs presented in 2020 were Six Sigma Green Belt course, i-CREW Innovation and Commercialization for a Regional Energy Workforce, Electrify New Mexico and others.



COLLEGE OF ENGINEERING STRATEGIC ROADMAP



Emeritus Professor Kenny A. Stevens and the Aggies Without Limits organization that he advises received the first NMSU Community Engagement, Extension, and Outreach Award. Aggies Without Limits was founded in 2007 to bring students, faculty and community members together to assist with the development of local and international communities through sustainable infrastructure and educational opportunities.

GOAL 4. BUILD A ROBUST COLLEGE

We seek to provide an inviting, engaging and inspiring environment for faculty, staff, students, alumni, donors, stakeholders, prospective students and their families through diversity and empowerment. We value the diverse backgrounds of students and provide an environment that supports their success.

Objective 4.1: Promote faculty and staff excellence.

Actions

- a. Hire top-quality faculty and staff members with searches that leverage startup funds and that impact multiple areas in the college, for example, joint appointments.
- b. Establish development programs such as peer mentoring, workshops, conferences, training and research symposia for faculty and staff.
- c. Increase faculty and staff recognition with awards, professorships, chairs and staff-ships.
- d. Reward productivity with travel funds, media coverage, flexible teaching loads, graduate assistant allocations, mini-grants and seed grants.
- e. Provide technical support for research proposal development.
- f. Provide avenues for faculty and staff feedback to administration.

Since 2017, the College of Engineering has awarded \$10K each year to faculty and staff members as college awards for research, teaching, mentoring and advising. These awards are supported by private funding.

COLLEGE OF ENGINEERING STRATEGIC ROADMAP



In summer 2022, NMSU's student organization, Aggies Without Limits, spent three weeks in El Guanabano, Honduras, building a bridge and waterway to ensure safety for hundreds of people every day.

Objective 4.2 Develop and diversify gifts.

Actions

- a. Increase and diversify funding from foundations and private sources.
- b. Increase alumni engagement in college activities; establish a culture of giving back.

Objective 4.3: Advance access, diversity and internationalization.

Actions

- a. Increase representation of women and underrepresented minorities in faculty, staff and student ranks.
- b. Increase opportunities for students to transfer from New Mexico community colleges and increase partnerships with community colleges.
- c. Increase pipeline MOUs with universities in Mexico, China and India for student recruitment, faculty exchange and research opportunities.

GOAL 4. KPIs

- 1. Every faculty member will rank in the top quartile of at least one college measure of research, teaching or service.
- 2. Every department will have a mentoring program in place for both faculty and staff.
- 3. One hundred percent of staff members earning a performance rating of eight or above in their annual evaluation will be retained.
- 4. All staff members will earn a rating of at least six or above (meets expectations) on their annual performance evaluations.

COLLEGE OF ENGINEERING STRATEGIC ROADMAP

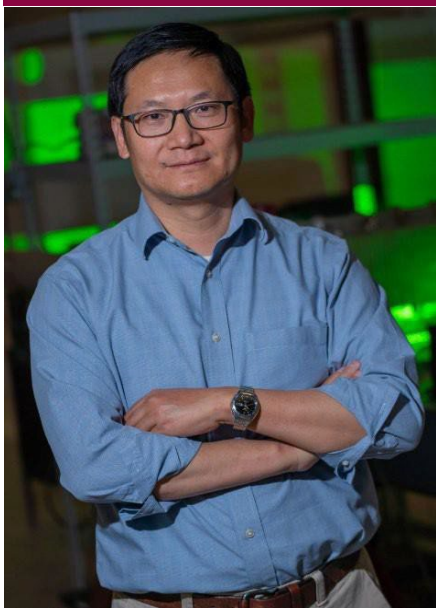
STUDENT SCHOLARSHIP SUPPORT 2022-'23

- ⇒ \$833,014 Total Awarded
- ⇒ 825 Students Awarded
- ⇒ 234 Scholarship Funds

5. Annual evaluation scores for all faculty members will increase every year.
6. Private funding for the college will increase by 10% each year.
7. Dollar amount of alumni gifts will increase by 15% each year.
8. Every unit in the college will participate in fundraising with giving increasing by 5% each year.
9. Every dollar raised for student scholarships will be matched with funding for other needs.
10. The percentage of female and ethnic minority faculty members and students will be in the top quartile of peer institutions.
11. The four-year graduation and retention rates for first-generation, female and ethnic minority students will be the same as that of majority segments of the engineering student population.
12. Each department will have a curricular collaboration or student pipeline with at least one community college in the state.
13. The college will have collaborative agreements and active student pipelines with at least six universities in Mexico, China and/or India.

**The college
has 24
established
endowed
chairs and
professorships
with several
more in the
works.**

2023 COLLEGE OF ENGINEERING GOAL 4 ACCOMPLISHMENTS



Fangjun Shu, D.L. and A.G. Chapman Endowed Associate Professor, recently received the Synergy - Leadership (faculty) award.

Recognizing faculty and staff excellence

As a means to support and reward excellence to College of Engineering faculty and staff members awards are conferred on an annual basis. The awards are administered by the College of Engineering Faculty and Staff Awards Committee, with final approval given by the dean. Awardees are recognized at a ceremony held during Engineers' Week. Engineering faculty and staff members have received a total \$58,000 in awards recognizing their contributions to the college since 2017.

ANNUAL ENGINEERING AWARDS

- Teaching-Research-Service Synergy (faculty)
- Ed Foreman Excellence Awards (faculty and staff)
- Bromilow Outstanding Staff Service
- Bromilow Teaching Excellence
- Bromilow Research Excellence
- Mentorship Award (Faculty or Staff)
- Bhatti Family Graduate Assistant Awards

2023 COLLEGE OF ENGINEERING GOAL 4 ACCOMPLISHMENTS



The New Mexico State University Foundation received a \$1 million charitable gift from New Mexico Mutual to support the NMSU College of Engineering, College of Business and Arrowhead Center.

New engineering facilities set for the future

New Mexico's voters and lawmakers have invested in the future of engineering students and the state's economic development with the approval of several general obligation bonds, okayed by voters on Nov. 8, 2022 and by legislators in Feb. 2023. GO Bond 3 will provide \$51.1 million for construction, renovation and modernization projects across the NMSU system, including \$22.5 million for engineering facilities. College of Engineering generous alumni and friends have pledged an additional \$3 million to support this project.

The funding will be used to replace and modernize the 50-year-old Thomas and Brown Hall to expand student-centric and experiential hands-on learning facilities for students from across campus. The project will foster research opportunities through multi-disciplinary laboratory space for student projects and faculty collaboration. The new design will also include a Learning Community designed to enhance student success.

Part of the funding (\$3 million) will be used to expand the Aggie Innovation Space. In addition, a metallic 3-D printing facility will be established using \$1 million gift made by New Mexico Mutual earlier this year, which gains the naming rights for a new Metal Additive Manufacturing Center for the College of Engineering. The center will bring metal additive manufacturing to the southern part of the state, enabling students and faculty to conduct research that meets the local and state manufacturing needs. The donation also encompasses entrepreneurship practices, skills development, and the exploration of innovations.

The New Mexico Mutual gift will equip engineering students for success, particularly as we develop a highly skilled workforce for the growing needs of new technologies and advanced products in the 21st century.

Beginning next spring, faculty and laboratories currently housed in Thomas and Brown Hall will temporarily be relocated for demolition and construction to begin next summer with an anticipated completion in 2026.

2023 COLLEGE OF ENGINEERING GOAL 4 ACCOMPLISHMENTS

A GLIMPSE OF THE FUTURE

- ⇒ Break down silos to enhance student success and research opportunities.
- ⇒ Build on student-centric and experiential learning focus of engineering
- ⇒ Increase efficiencies and lower costs
- ⇒ Embrace the new digital college experience
- ⇒ Capitalize opportunities to make changes across the engineering complex
- ⇒ Make active learning program space more visible and extend availability
- ⇒ Assess space usage: fewer classrooms, more laboratories for research, capstone projects and student organization competitions
- ⇒ House cross-disciplinary researchers together

Fewer classrooms, more laboratories

The plan will make active learning program space more visible and extend availability campus-wide for experiential learning opportunities. There will be fewer classrooms and more laboratories for research, capstone projects and student organization competitions. Cross-disciplinary researchers will have space to work together rather than in separate departments. Virtual communication technology will be incorporated to improve and grow online learning experiences.



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College of Engineering

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