

# NEW MEXICO STATE UNIVERSITY

## COLLEGE OF ENGINEERING

### 2025

## STRATEGIC ROADMAP

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**BE BOLD.** Shape the Future.  
**College of Engineering**

# NEW MEXICO STATE UNIVERSITY LEADS 2025

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**BE BOLD.** Shape the Future.  
**New Mexico State University**  
[nmsu.edu](http://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 a 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 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



## 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

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## Guiding Principles

The College of Engineering 2025 roadmap is intended to be a continuous improvement plan to be 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

## STEERING COMMITTEE

- ⇒ Antonio Garcia
- ⇒ Gabe Garcia
- ⇒ Rolfe Sassenfeld



STUDENTS IN THE AGGIE  
INNOVATION SPACE TEST  
A NEW ROBOTIC ARM.

## 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 are 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 completion rates.
- Establish industry partnerships to improve student placement.

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## NEW STUDENT-CENTRIC PROGRAMS

Ten students have been selected for first cohort of the Ron Seidel Engineering Leadership Academy to begin fall 2019.

More than \$12K in retention scholarships were provided to 85 students in financial need this past year.



THE NEW ELOY TORREZ FAMILY ENGINEERING LEARNING COMMUNITIES RIBBON CUTTING TOOK PLACE FEBRUARY 2019.

- 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

**Students visited the Eloy Torrez Family Engineering Learning Communities more than 3, 300 times during the 2018-19 academic year for assistance.**

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 five percent increase of students each year.
4. At least 20 percent of the total 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.

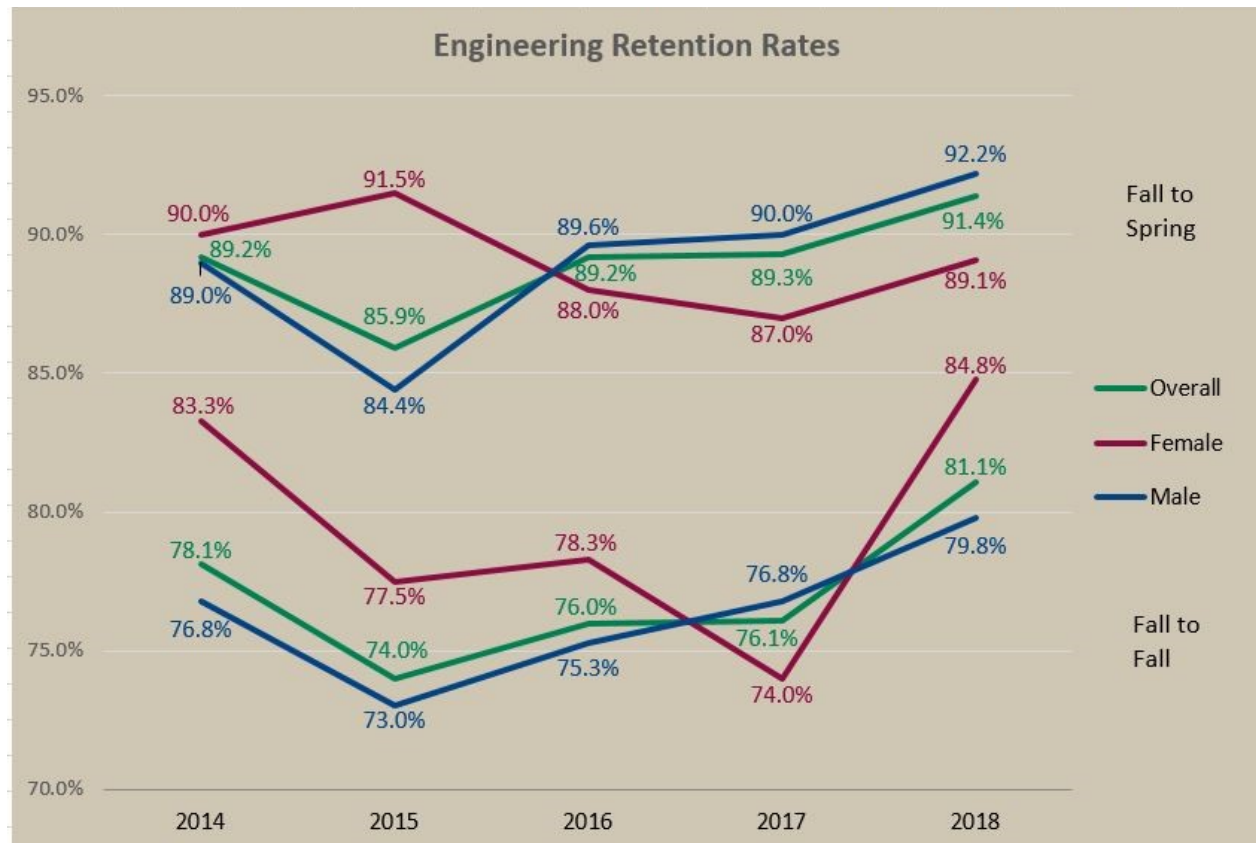
# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## INTRODUCTION OF PROFESSIONAL MASTER OF ENGINEERING

- ⇒ Chemical Engineering
- ⇒ Civil Engineering
- ⇒ Electrical and Computer Engineering
- ⇒ Industrial Engineering
- ⇒ Information Technology
- ⇒ Mechanical and Aerospace Engineering

**All NMSU  
College of  
Engineering  
programs  
successfully  
passed  
accreditation in  
2018-2019**

7. All students will have the opportunity to engage in experiential learning through capstone projects and/or Aggie Innovation Space activities.



THE COLLEGE OF ENGINEERING HAS REGAINED FRESHMAN RETENTION RATES.

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## STEERING COMMITTEE

- ⇒ Phillip DeLeon
- ⇒ Nirmala Khandan
- ⇒ Steve Stochaj



PEI XU, CIVIL ENGINEERING  
“INNOVATIVE ALGAL/MEMBRANE  
HYBRID SYSTEM FOR SUSTAINABLE  
WASTEWATER TREATMENT AND  
POTABLE WATER RECOVERY”  
U.S. BUREAU OF RECLAMATION

## 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 extramural funding.

#### Actions

- Establish thematic areas of research clusters and make them visible.
- Facilitate partnerships with faculty from other colleges, faculty visits to funding agencies, and invest in high-impact research ventures
- Emphasize communication and marketing activities in the college targeted toward peer assessment for ranking.

### Objective 2.2: Increase postdoctoral fellows, research faculty and Ph.D. startup funds.

#### Actions

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

## GOAL 2. KPIS

- Faculty average productivity will rank in the top two quartiles of our peers.
- Each college faculty member, on an average, will have at least \$200 thousand in extramural funding per year.



# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## FY 2018 TOP NEW GRANT RECIPIENTS

Sonya Cooper, College of Engineering  
"National Resource Hub for STEM Education at Hispanic-Serving Institutions National Science Foundation"

Steven Stochaj and Laura Boucheron, Electrical and Computer Engineering  
"Enhancing Research in the Solar-Terrestrial Environment at NMSU"  
U.S. Army Research Office

Ehsan Dehghan Niri, Civil Engineering  
"A Lizard-Inspired Tube Inspector Robot"  
U.S. Department of Energy

Pei Xu, Civil Engineering  
"Innovative Algal/Membrane Hybrid System for Sustainable Wastewater Treatment and Potable Water Recovery"  
U.S. Department of Interior/Bureau of Land Management

Jessica Houston, Chemical and Materials Engineering  
"Microflow Time-Resolved Cytometry for FRET and Fluorescent Protein Development"  
U.S. Department of Health and Human Services/National Institutes of Health

3. Every tenure-track faculty member will rank in the top quartile of at least one of the college measures: research funding, scholarship, teaching quality and service.
4. Faculty average advising load will be two Ph.D. and three M.S. students per faculty member.
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.

**College of Engineering  
FY 2019  
research expenditures  
are 27 percent higher than  
in FY 2018.  
New funding awarded is 52 percent higher.**

## 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
- ⇒ Southwest Technology Development Institute

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## STEERING COMMITTEE

- ⇒ Patricia Sullivan
- ⇒ David Jáuregui
- ⇒ Delia Julieta Valles-Rosales



SHOWING OFF AN EGG-DROP DESIGN AT AN ENGINEERING STEM PROGRAM.

## 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 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

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

**Engineering outreach STEM programs reached some 5,000 K-12 students in 58 New Mexico school districts during FY 2019.**

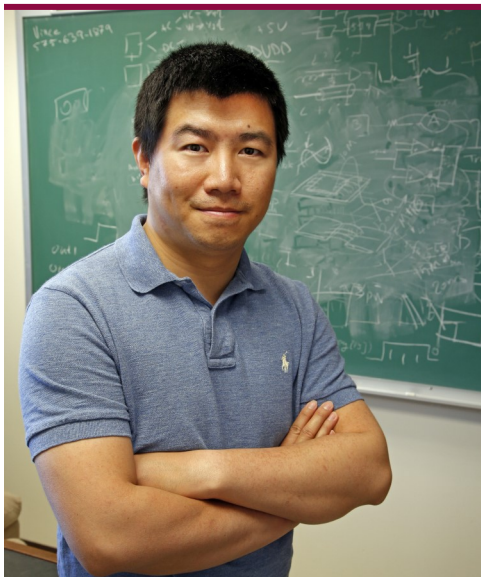
### GOAL 3. KPIs

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

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## STEERING COMMITTEE

- ⇒ Lakshmi Reddi
- ⇒ Stephanie Armitage-Sichler
- ⇒ Linda Fresques



WEI TANG, ELECTRICAL AND  
COMPUTER ENGINEERING,  
RECIPIENT OF THE 2019 SYNERGY  
TEACHING-RESEARCH-SERVICE  
AWARD.

## 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

- 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.
- Establish development programs such as peer mentoring, workshops, conferences, training and research symposia for faculty and staff.
- Increase faculty and staff recognition with awards, professorships, chairs and staff-ships.
- Reward productivity with travel funds, media coverage, flexible teaching loads, graduate assistant allocations, mini-grants and seed grants.
- Provide technical support for research proposal development.
- Provide avenues for faculty and staff feedback to administration.

**College faculty  
and staff  
members have  
been awarded  
\$10K for each  
of the past two  
years in  
recognition of  
excellence.**

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP

## MILESTONES

### Development Success

- ⇒ Three major initiatives: Eloy Torrez Learning Communities, Ron Seidel Leadership Institute and Aggie Innovation Space are supported entirely by private funds.
- ⇒ First time donors of more than \$10K increased by 42 percent in FY19.



DEAN LAKSHMI REDDI RECENTLY SIGNED AGREEMENTS WITH EIGHT UNIVERSITIES IN SOUTH INDIA TO RECRUIT MASTER'S-LEVEL STUDENTS TO NMSU.

## Objective 4.2 Develop and diversify gifts.

### Actions

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

## Objective 4.3: Advance access, diversity and internationalization.

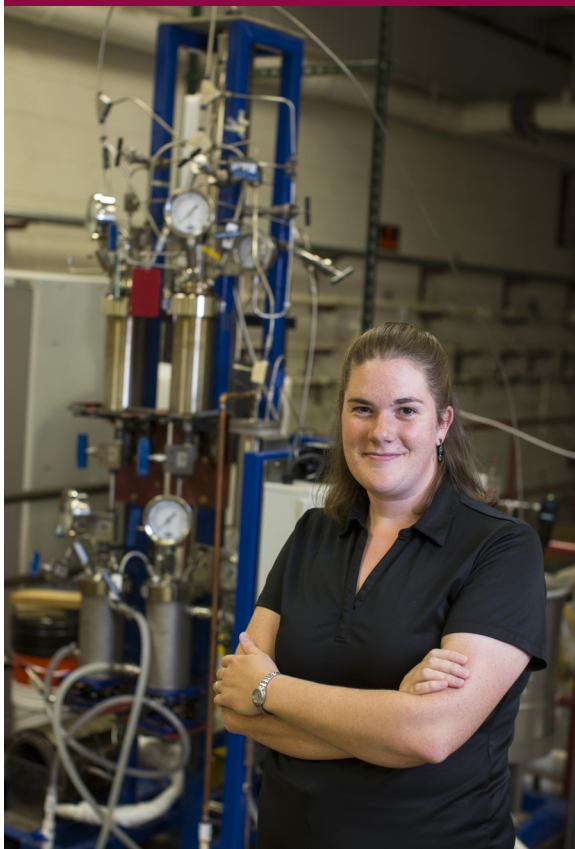
### Actions

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

## GOAL 4. KPIs

- Every faculty member will rank in the top quartile of at least one college measure of research, teaching, or service.
- Every department will have a mentoring program in place for both faculty and staff.
- One hundred percent of staff members earning a performance rating of eight or above in their annual evaluation will be retained.

# COLLEGE OF ENGINEERING STRATEGIC ROADMAP



CHEMICAL ENGINEERING ASSISTANT PROFESSOR CATHERINE BREWER WAS NAMED A NAKAYAMA PROFESSOR FOR RESEARCH EXCELLENCE AND TEACHING.

4. All staff members will earn a rating of at least six or above (meets expectations) on their annual performance evaluations.
  5. Annual evaluation scores for all faculty members will increase every year.
  6. Private funding for the college will increase by 10 percent each year.
  7. Dollar amount of alumni gifts will increase by 15 percent each year.
  8. Every unit in the college will participate in fundraising with giving increasing by 5 percent each year.
  9. Every dollar raised for student scholarships will be matched with funding for other needs.
- The college has 24 established endowed chairs and professorships.**
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.