

University of North Texas College of Engineering
Strategic Plan: UNT Engineering 2025
Approved April 8, 2020

This strategic plan, UNT Engineering 2025, sets a path for the College to become a top 100 engineering college in the United States by 2025. UNT has advanced from a Carnegie Tier Three to Tier One research university over a short period of 25 years, and UNT College of Engineering has become a preferred destination of highly talented students and a powerhouse of engineering research over a short period of 16 years since its creation in 2003. Starting with a summary of the College's current state, this Strategic Plan presents the College's Vision, Mission, Value, and Strategic Initiatives.

The College is home to about 80 tenured/tenure-track (TTT) and 20 non-TTT faculty members. Together with more than 50 administrative and technical staff members, the 100 faculty members support about 3,500 undergraduate and 500 graduate students, and carry out research with about \$11M external research grants. Among the faculty are two National Academy of Engineering members and more than a dozen professional society fellows. Enabled by world-class research facilities, such as those in the Materials Research Facility center, multiple research areas have grown to national and international excellence. For example, the additive manufacturing research has attracted \$10M from the State of Texas for research from 2019 to 2021. With computer science in the college, it is easier to develop future educational programs that combine computation, data and engineering. Building on the success of 10 undergraduate and 11 graduate programs, the College is launching new M.S. programs and certificates in the areas of Additive Manufacturing, Artificial Intelligence, Data Engineering, Cyber Security, Engineering Management and a Ph.D. program in Biomedical Engineering. The momentum for growth is strong.

Vision:

The College of Engineering will be an impactful institution that excels in knowledge creation, propagation, and application.

Mission:

The College of Engineering prepares a diverse pool of students to become future engineers and engineering leaders, and conducts basic and applied research of societal impact.

Value:

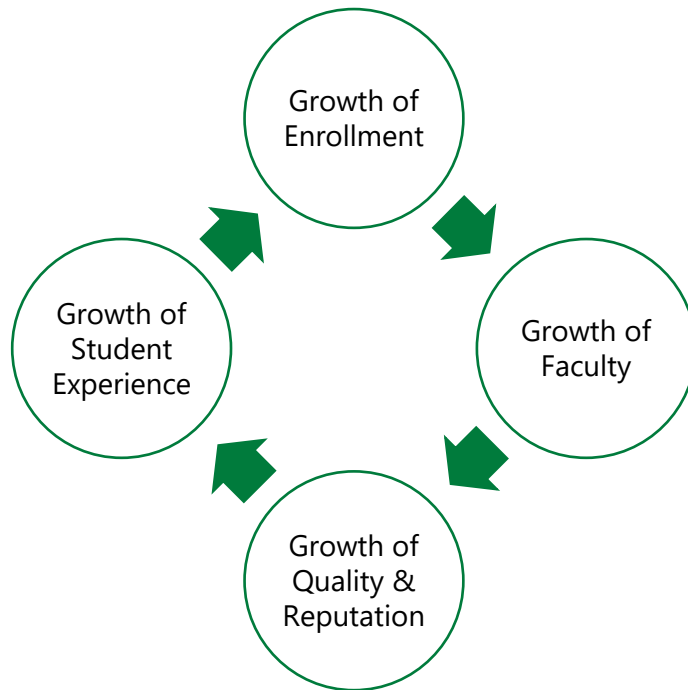
The College of Engineering strives to maximize everyone's potential to transform toward greater excellence. As the University continues to ascend in its Tier One designation and as the College excels in impactful research and education, all faculty and staff in the College will use their respective strengths to advance this shared mission.

The College of Engineering provides a caring and inclusive environment for students to learn and excel. As the University becomes a preferred destination of first-generation college students, underrepresented minority students, and non-traditional students, the College of

Engineering provides education through a combination of on-campus and online methods and offers a quality curriculum, accommodation, and dedicated mentoring.

Strategic Initiatives:

The overarching strategy is growth: the growth of enrollment, which powers the growth of faculty, which in turn leads to the growth of quality and reputation, which in turn leads to the growth of the student experience and thereby the growth of enrollment; as illustrated in the chart below.



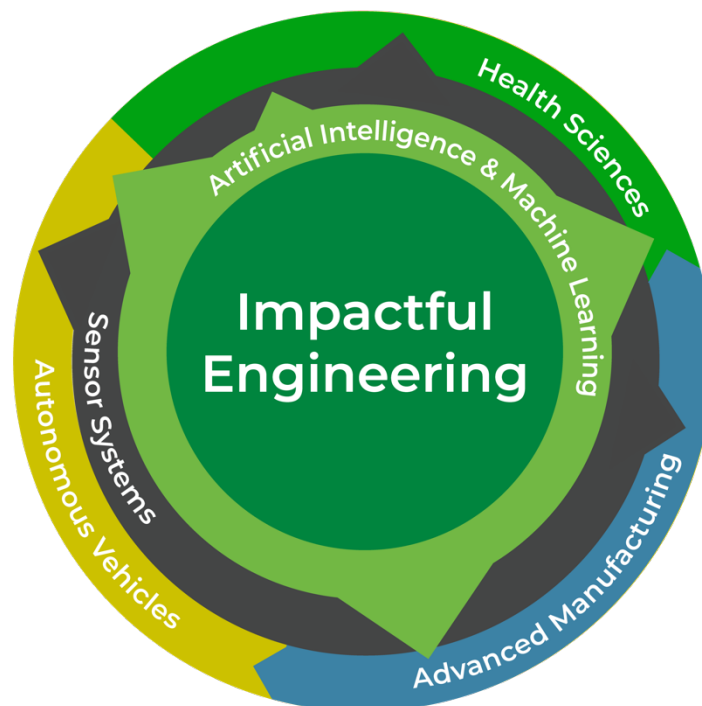
Growth of enrollment: Driven by the growing population of the Dallas metroplex and beyond, the need for more engineers and for engineering education grows. In response, the College seeks to grow enrollment through two parallel approaches: (1) developing new degree programs and (2) improving existing ones. The goal is to grow total enrollment from 4,000 to 6,000 while improving or maintaining the quality of education.

To improve existing programs, the College will focus on student learning and needs. For undergraduate programs, the College will establish stronger ties with regional high schools, increase the level of preparedness of incoming students, and utilize scholarships to attract a greater number of high academic achievers. The College will establish relationships with industry through its advisory board, capstone projects, research, and internships to create more job opportunities for our students. For graduate programs, the College will target the pool of domestic undergraduate students and domestic working professionals, and accommodate their needs. The College will utilize the current graduate track pathways to enroll more U.S. students, including our own undergraduate students, to our M.S. and Ph.D. programs. The College will increase international student enrollment through academic collaboration programs, marketing, and recruitment.

To develop new degree programs, the College will focus on progressive programs that combine computation, data, and engineering, as well as programs that intersect business and engineering. At the undergraduate level, these programs include B.S. in Engineering Management and B.S. in Cyber Security. At the graduate level, these programs include M.S. in Artificial Intelligence, M.S. in Engineering Management, M.S. in Cybersecurity, M.S. in Data Engineering, M.S. certificate in Advanced Manufacturing, and a Ph.D. in Biomedical Engineering.

Growth of Faculty: Both empirical experience and data show that engineering schools with a critical mass of about 120 tenured/tenure-track (TTT) faculty members enjoy the optimal marginal effects with respect to research productivity per faculty number and reputation. The College targets growing TTT faculty from 80 to 120 and total full-time faculty from 100 to 150. This is not only advantageous but also feasible through the growth of enrollment. This growth has three focuses.

The first focus is to attract prominent and middle career faculty members. In particular, the College aims to grow the number of National Academy of Engineering (NAE) members from two to five, and also to add multiple middle-career tenured associate or full professors. These hires will augment the rising stars among the recently recruited assistant professors. The College has established the Distinguished Engineering Lecture Series for NAE members to visit, and taken other proactive steps for faculty recruitment. One of the two NAE members joined the College in September 2019.



The second focus is to propel five areas of research to national prominence; as shown in the figure above. Building on existing strengths and advantages, these areas include Artificial Intelligence and Machine Learning, Sensor Systems, Autonomous Vehicles, Advanced Manufacturing, and Health Sciences. As part of the process for advancing these areas, the College seeks to emphasize industry partnership in addition to government sponsorship. Our approach of

impactful engineering has attracted generous support from both the U.S. Army and U.S. Air Force, and will take full advantage of the high-density of tech industry located in the Dallas metroplex.

The third focus is to ensure that everyone maximizes his/her potential as the College grows. It is an intrinsic challenge in a transforming institution that faculty members have a wide spectrum of research activity. To maximize everyone's potential, the College will employ a total-work-load concept in three areas: research, teaching, and service. The development of new degree programs and certificates, or the growth of enrollment in general, provide an opportunity for some faculty to contribute to and receive recognition in teaching and service (or leadership).

Growth of quality and reputation: Quality of research and education has been improving. The growth of faculty, particularly prominent and middle-career faculty, will further improve the quality of research and education at the College. By promoting "impactful engineering" research, the College will develop stronger ties with tech industry in the Dallas metroplex and beyond, as well as with defense agencies. This approach allows UNT Engineering to clearly demonstrate the impact of quality research. With the same philosophy of "impactful engineering," the College will develop programs that educate engineering leaders and also train engineers for fulfilling careers. The improved achievement of our graduates is key to an increased reputation of our educational programs.

In addition to the intrinsic quality of our research and education, the College recognizes that name recognition takes time. Therefore, the College will take proactive steps to reach out to other engineering colleges/schools and their leadership with communication about UNT Engineering. Further, the College will encourage faculty to actively participate in and lead professional societies to better serve the profession and to promote the College.

Growth of student experience: Through the development of new degree programs and certificates, students will have more choices. Through outreach with tech industries, students will have more experiential education experiences and have more opportunities to work on hands-on design projects. Through stronger research, students will have more opportunities to conduct undergraduate and graduate research. Through a larger team of faculty and staff, students will receive higher quality mentoring from well-established faculty members, and closer attention of academic advisors. The growth of the student experience on campus will enable further growth of enrollment.