

College of Engineering

Presentation to Academic & Student Affairs Committee
Board of Trustees

March 6, 2025



Overview



DEPARTMENTS



Chemical Engineering



Civil and Environmental Engineering



Computer Science



Electrical and Computer Engineering



General and Industrial Engineering



Mechanical and Nuclear Engineering



Manufacturing and Engineering Technology

COLLEGE SNAPSHOT

41 Academic Programs

- 9 Bachelor's Degree programs,
 - 17 concentrations
- 7 Minors
- 6 Master of Science programs
- 1 Graduate Certificate program
- 1 Ph.D. Engineering
 - 4 Concentrations
- 1 Ph.D. Computer Science

156 total faculty and staff

3,121 total students, 30% of university enrollment

5,542 degrees awarded over 10 years

\$42.7M in new external grants/contract funding in FY24



Overview: Academic Programs



UNDERGRADUATE DEGREES AND CONCENTRATIONS

B.S. CHEMICAL ENGINEERING

Energy & Environment
Bio-Molecular

B.S. CIVIL ENGINEERING

Environmental
Construction Engineering &
Management
Geological

B.S. COMPUTER ENGINEERING

Hardware and System Security

B.S. COMPUTER SCIENCE

Data Science and AI
High Performance Computing
Information Assurance and
Cybersecurity

B.S. ELECTRICAL ENGINEERING

Mechatronics
Vehicle

B.S. ENGINEERING (TTU-ETSU)

B.S. ENGINEERING TECHNOLOGY

Mechatronics
Smart Manufacturing
Technology Management

B.S. MECHANICAL ENGINEERING

Aerospace
Mechatronics and Robotics
Vehicle

B.S. NUCLEAR ENGINEERING

MINORS

Computer Science
Electrical and Computer
Engineering
Engineering Technology
Environmental
Engineering
General Engineering
Studies
Industrial and Systems
Engineering
Materials Science &
Engineering



Overview: Academic Programs



GRADUATE PROGRAMS

MASTER OF SCIENCE

M.S. Chemical Engineering
M.S. Civil Engineering
M.S. Computer Science
M.S. Electrical and Computer Engineering
M.S. Engineering Management
M.S. Mechanical Engineering

PH.D. ENGINEERING

Chemical Engineering Concentration
Civil Engineering Concentration
Electrical and Computer Engineering Concentration
Mechanical Engineering Concentration

PH.D. COMPUTER SCIENCE

ACCREDITATION & RANKINGS

- 8 undergraduate programs accredited by ABET
- *U.S. News and World Report*:
 - *Best Undergraduate Engineering Program*, among top 2 engineering programs for TN public universities
 - Computer Science a top 3 program for all TN institutions, top 2 among TN public universities
- *Colleges of Distinction*: 2024-25 Top Engineering College
- *Beacon Center of Tennessee*: Electrical Engineering has highest ROI in state for student debt-to-earnings. Six of the engineering programs are in the top 25.



Overview: Faculty and Staff



Academic Units	Faculty	Staff
Dept. of Chemical Engineering	7	2
Dept. of Civil and Environmental Engineering	14	2
Dept. of Computer Science	24	2 + 2 Temp
Dept. of Electrical and Computer Engineering	13	2
Dept. of General and Industrial Engineering	6	1
Dept. of Manufacturing and Engineering Technology	4	1
Dept. of Mechanical Engineering	18	3

Centers	Faculty	Staff
Cybersecurity Education, Research & Outreach Center	1 Admin. Fac.	4 + 5 Temp
Center for Energy Systems Research	3 Admin. Fac.	6 + 2 Temp 1 Post-doc
Center for Manufacturing Research	2 Admin. Fac.	5 + 2 Temp 4 Post-doc
Machine Intelligence & Data Sciences Center	2 Fac.	0

College Support	Faculty	Staff
Dean's Office	3 Admin. Fac.	9 + 1 Temp
Financial (for Depts.)	0	3
Facilities, Labs, and IT	0	11
Clay N. Hixson Student Success Center	0	9
Engineering Research Office	0	3
Center for Innovation in Teaching & Learning	0	1



Overview: Engineering Research



FY '24 METRICS

650% increase in new external awards since 2019

690% increase in average award per tenure/tenure-track faculty since 2019

\$29 million in activations – 63% of university total

\$42.7M

in research awards

\$11.8M

in research expenditures

\$577K

avg. award per tenured/tenure-track faculty

FY '24 TOP \$ AWARDS

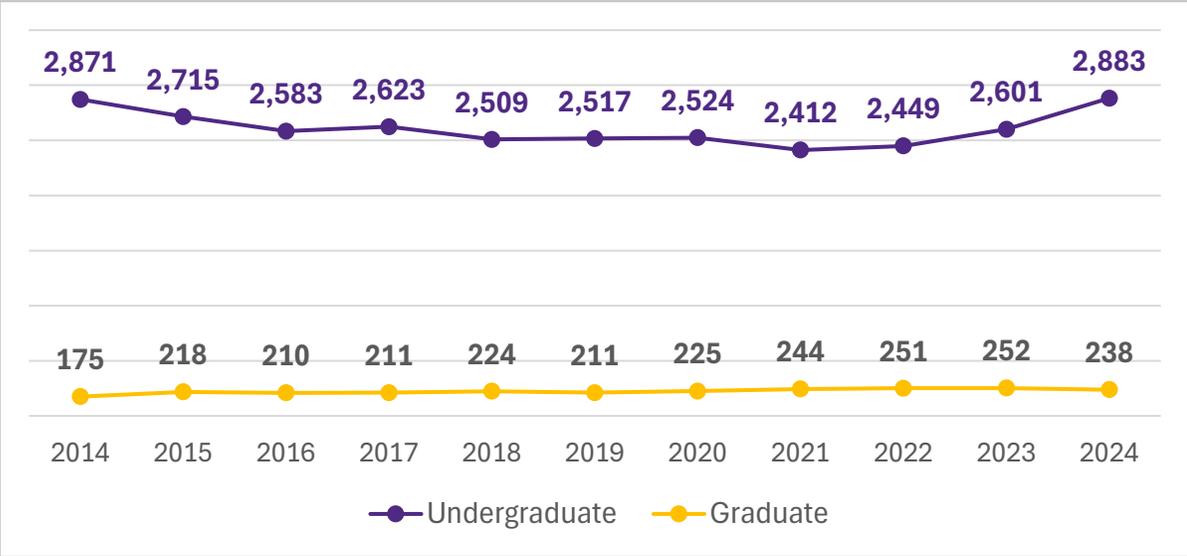
Grant	
\$18.2M ARC: Smart Grid Development Consortium and HiLLTOP Platform Expansion	Satish Mahajan, Michael Aikens, Ali Arzani
\$9.2M US DOE: Second-Life Battery in Mobile EV Charging Application for Rural Transportation	Pingen Chen, Nan Chen, Joseph Ojo
\$1.8M Applied Research Assoc.: Cybersecurity for Autonomous Ground Vehicle	Syed Hasan, Terry Guo, Doug Talbert
\$1.3M USDOE: Spray Deposition of Coal-Derived Graphene-Copper Nanocomposites for Advanced Conductors	Jiahong Zhu, Ying Zhang

CENTERS OF EXCELLENCE

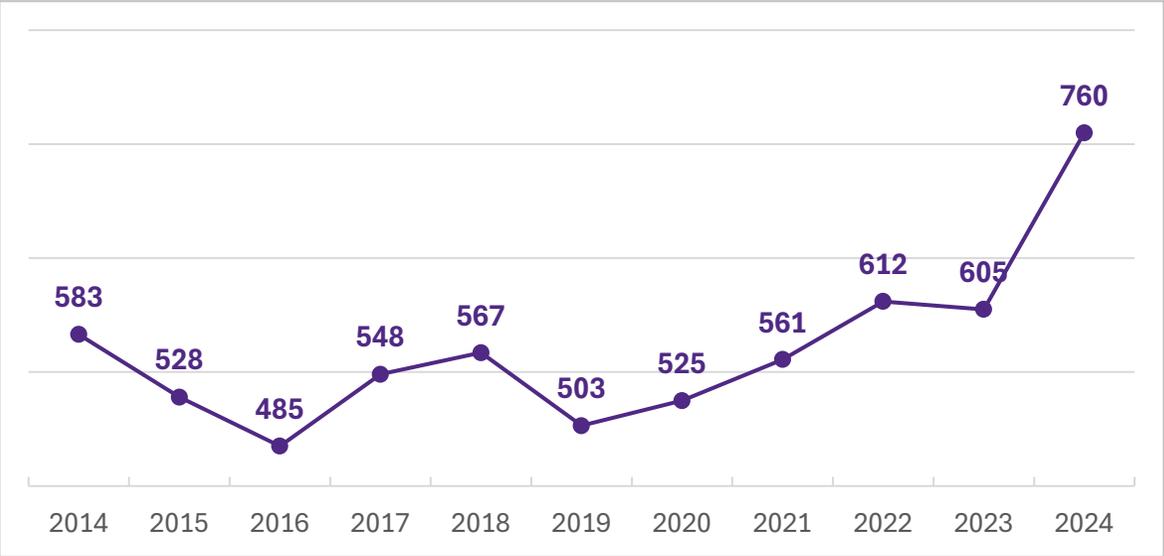
- Cybersecurity Education, Research & Outreach Center (CEROC)
- Center for Manufacturing Research (CMR)
- Center for Energy Systems Research (CESR)
- Machine Intelligence and Data Science (MInDS)



Performance Metrics – Enrollment Trends



Total Enrollment



First-Time Freshmen Enrollment



Performance Metrics – Fall 2024 Enrollment



UNDERGRADUATE STUDENTS	
B.S. Chemical Engineering	202
B.S. Civil Engineering	350
B.S. Computer Engineering	111
B.S. Computer Science	744
B.S. Electrical Engineering	289
Basic Engineering (non-degree granting)	18
B.S. General Engineering (TTU-ETSU)	87
B.S. Engineering Technology	234
B.S. Mechanical Engineering	830
B.S. Nuclear Engineering	18
Total	2,883

GRADUATE STUDENTS	
M.S. Chemical Engineering	8
M.S. Civil Engineering	18
M.S. Electrical & Computer Engineering	16
M.S. Computer Science	39
M.S. Engineering Mgt.	13
M.S. Mechanical Engineering	28
Ph.D. Engineering	116
Total	238

HIGHLIGHTS

- **Set recent enrollment record** for Fall 2024, with total 3,121 students
- **Nearly 11% increase** in enrollment over Fall 2023 (281 students)
- **Net increase of 220 UG students** when including Interdisciplinary Studies–Engineering or Computer Science Interest
- **25% increase** in first-time freshmen over Fall 2023, to 760
- **51% increase in** first-time freshmen over last 5 years
- **Represents over 30%** of university’s total enrollment (up from 27% five years ago)



Current Events



GRAND OPENING CELEBRATION: Ashraf Islam Engineering Building



- More than 1,000 people attended
- Governor Bill Lee delivered keynote and announced \$1 million for Nuclear Engineering program from state's Nuclear Energy Fund
- First classes held in Fall 2024

“... A really important moment not only in Tennessee Tech’s history, but in the history of the state of Tennessee.” – Governor Bill Lee

NUCLEAR ENGINEERING: Exceeding milestones

- Enrolled first class of 18 students
- 75+ student applications for Fall 2025
- Searching 3 new positions (2 tenured/tenure-track and 1 lecturer)
- Secured \$4M in federal and state funding
- Offering first NE course (Intro to Nuclear Energy Systems)
- Starting a student chapter of the American Nuclear Society
- Started procurement of specialized laboratory and classroom equipment



Student Success Programs



Fall 2024 Freshman Class

ACTIVITIES

- **Summer camp** capacity increased by 500%
- **RAMP:** Math bridge program for incoming first-year students
- **Mentoring and tutoring** programs for first-time freshmen and new transfer students
- **30+ student organizations** to cultivate belongingness

PERFORMANCE

- **First-to-second year retention** increased from 75% to 83%
- **At-risk student population** reduced from 19% to 11%



Student Highlights



COMPETING REGIONALLY, NATIONALLY, AND GLOBALLY!

- Global CyberSecurity Competitions
- National Cast In Steel Competition
- Robotics World Championship
- Steel Bridge & Concrete Canoe Competitions
- Baja and Formula Cars Competitions



