FLORIDA INTERNATIONAL UNIVERSITY

FIU is classified by Carnegie as R1: Doctoral Universities—Highest Research Activity since 2015

8th largest public university in the nation by enrollment

Ranked #1 for awarding bachelor’s and master’s degrees to Hispanic students

Source: www.asee.org
College of Engineering & Computing

Home to more than 8,700 highly diverse engineering & computing students

$74M in annual research awards

$372K research spending per faculty
College of Engineering & Computing

We award more undergraduate engineering and computing degrees to Hispanics and Minorities than any other college in the nation.

#1 in bachelor’s awarded to Hispanics

#9 in bachelor’s awarded to Black/African-Americans

#30 in bachelor’s awarded to women

Source: www.asee.org
One of the Largest Engineering & Computing Colleges in the Nation

More than 8,700 students

#16 in the nation for undergraduate engineering enrollment

Source: www.asee.org
College Enrollment  
Fall 2023

More than 8,700 students
7,482 Undergraduate
823 Master’s
407 Ph.D.

61% Hispanic
10% Black/African American
9% White
4% Asian
16% Other*

22% Female
17% First Generation

*Two or more races, not reported, Pacific Islander, American Indian, Nonresident Alien
Degrees Awarded
AY2023

+2,000 degrees awarded
1,586 Bachelor’s
450 Master’s
64 Ph.D.

**Bachelor’s**
- 62% Hispanic
- 8% White
- 9% Black/African American
- 5% Asian
- 21% Female

**Graduate**
- 35% Hispanic
- 7% Black/African American
- 7% White
- 3% Asian
- 28% Female
Academic Year 2023

Bachelor’s Degrees Awarded

<table>
<thead>
<tr>
<th>Field</th>
<th>Degrees Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer &amp; Information Science</td>
<td>494</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>212</td>
</tr>
<tr>
<td>Information Technology</td>
<td>207</td>
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<tr>
<td>Mechanical Engineering</td>
<td>177</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>144</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>119</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>79</td>
</tr>
<tr>
<td>Construction Management</td>
<td>70</td>
</tr>
<tr>
<td>Internet of Things</td>
<td>30</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>25</td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>22</td>
</tr>
<tr>
<td>Interdisciplinary Engineering</td>
<td>7</td>
</tr>
</tbody>
</table>

In the Nation:

#3 bachelor’s degrees awarded in electrical engineering

#4 bachelor’s degrees awarded in computer science

#21 in total bachelor’s degrees awarded

Source: www.asee.org
Schools

KNIGHT FOUNDATION SCHOOL OF COMPUTING AND INFORMATION SCIENCES

MOSS SCHOOL OF CONSTRUCTION, INFRASTRUCTURE AND SUSTAINABILITY

SCHOOL OF UNIVERSAL COMPUTING, CONSTRUCTION AND ENGINEERING EDUCATION

SCHOOL OF ELECTRICAL, COMPUTER AND ENTERPRISE ENGINEERING

SCHOOL OF BIOMEDICAL, MATERIALS AND MECHANICAL ENGINEERING
PUBLIC UNIVERSITY RANKINGS

**U.S. News and World Report Graduate Program Rankings**

- Engineering: #61
  - Master’s in Engineering (online): #37
- Biomedical: #56
- Materials: #66
- Computer Science: #79
- Civil: #77
- Electrical: #84

**Times Higher Education (THE) Rankings**

- #42-53 in engineering & technology

**QS World University Rankings**

- #39-43 in electrical and electronic engineering
- #44-45 in computer science & information systems
NEW INNOVATION & ENGINEERING COMPLEX

6-story, 121,000 square-feet (Phase 1) building
Student makerspaces
Industry-university interactive spaces
Research laboratories
Active learning classrooms
Project completion in Fall 2024
Initial occupancy in Spring 2025

Double click on the frame to play the video
125 Tenure/Tenure-Track Faculty

Many are fellows in their respective fields, our faculty is recognized for their expertise, leadership and their significant contribution to the engineering and computer science education and research.
Faculty Honors

• 25 NSF CAREER Award Recipients
• 6 National Academy of Inventors
• 6 Institute of Electrical and Electronics Engineers Fellows
• 5 American Association for the Advancement of Science Fellows
• 4 American Institute for Medical and Biological Engineering Fellows
• 4 National Academy of Inventors Senior Members
• 2 Test of Time Awards
• 1 URSI Booker Gold Medal Awardee
• 1 White House Champion of Change Recipient

Full list is at https://cec.fiu.edu/about/points-of-pride/faculty-achievements
Our partnerships with industry, federal and state agencies augment our efforts to graduate professionals who are prepared to tackle real-world problems while helping these organizations meet their strategic, short or long-term business needs.

**Opportunities:**
- Student senior design /capstone projects
- Hackathons
- Research
- Recruitment
- Academic Program Development
- Continuing Education
Knight Foundation

Knight Foundation, FIU to grow Miami tech ecosystem

Building on South Florida’s momentum around technology and entrepreneurship, the John S. and James L. Knight Foundation has made a $10 million gift to FIU’s School of Computing and Information Sciences to develop technical talent at scale to meet the demands of industry and Miamians seeking to advance their tech skills.
Trimble Technology

New Trimble Technology Lab provides construction management and engineering students access to industry-leading technologies and expands our capabilities in project management, estimating, architectural modeling and design, structural analysis and design, Mechanical Electrical Plumbing (MEP) design and estimating, mixed reality and office-to-field solutions.
Lennar Foundation

Construction Trades Certificate Program

constructiontrades.fiu.edu

Double click on the frame to play the video
Notable Partnerships

- State-of-the-art Trimble Technology Lab equipped with TRIMBLE solutions, providing training and research in engineering, construction and the sustainable built environment.

- Innovative energy microgrid with FLORIDA POWER & LIGHT COMPANY (FPL)

- Engineers on Wheels Program, Engineering EXPO, SAE/Formula One Partnership, Women’s Forum & Design Challenge with STELLANTIS (formerly known as FCA)

- Women of CEC program support from MOTOROLA SOLUTIONS

- Data Sciences for Airlines Informatics (DSAI) Program with FARELOGIX

- ULTIMATE SOFTWARE Academy for Computer Science Education

- Partnership with CHEVRON to support student organizations and first-generation scholarships

- Construction Trades Certificates Program with LENNAR FOUNDATION offering technical skills to underserved populations to find good-paying jobs in construction industry

- Notable Shell Hacks sponsorships: STELLANTIS, MICROSOFT, ASSURANT, CHEVRON, FARELOGIX, JP MORGAN CHASE, NIKE, DELL, FACEBOOK, MITRE, GOOGLE, CITRIX, CARNIVAL, ROYAL CARIBBEAN, STATE FARM, DELOITTE, XBOX
Notable Gifts

• A $10 million gift from **Knight Foundation** to develop technical talent at scale to meet the demands of industry and Miamians seeking to advance their tech skills.

• With a $10 million gift from the **Moss Foundation**, three endowments were created, with one entirely dedicated to helping first-generation students through scholarship awards.
Community & K-12 STEM Outreach

- **Annual Engineering Expo**: K-12 students from Miami-Dade & Broward counties
- **Annual Wall of Wind Challenge**: High school students build model structures to test their engineering skills
- **Annual Senior Design Showcase**: Senior students to demonstrate product ideas/prototypes for real industry challenges.
- **Engineers on Wheels STEM Presentations** targeting K-12 students
- **Girls Who Code Summer Program** for high school students
- **Visualization, Informatics, Technology, Automation Learning (VITAL) Summer Camp** for high schools
- **She Builds & Trimble Boot Camp** for students in grades 8-12 to help them explore innovative technologies and tools in the construction industry.
Research

$62M in annual spending
$74M in annual awards
3 NCF Engineering Research Centers
25 NSF CAREER awardees
6 Active NIH R01 projects
Research Areas

TELECOMMUNICATIONS
RF/Wireless comm., secure cyberspace, virtual reality, sensors, nanotechnology, 5G

SMART CITIES & GRIDS
Security treat analysis, power system design, cyber security solutions for energy systems

ROBOTICS, AUTOMATION & MANUFACTURING
Robotic inspection/sampling/surveying, 3D printing/packaging; additive manufacturing, bulk metallic glass manufacturing

BIG DATA & AI
System/cloud/social media analytics, machine learning, automated reasoning

MATERIALS & NANOFABRICATION
Device/sensor fabrication, thermal/fluid studies, nanostructured materials, computational analysis

RESILIENCE & INFRASTRUCTURE
Restore/improve urban infrastructure, construction technology, structural/wind engineering

TRANSPORTATION ENGINEERING
Research/training to improve transportation mobility & safety

HEALTH DIAGNOSTICS, NEUROTECHNOLOGY
Biomed devices/imaging, neurotech, cell/tissue engineering, reverse-engineer the brain

CYBERSECURITY
Wireless network encryption, mobile authentication, cryptocurrencies, malware detection

ENERGY, POWER & SUSTAINABILITY
Access to clean water, design/develop clean, reliable, efficient, economical energy solutions
RESEARCH AREA: Wireless Communications

RF COMMUNICATIONS (RFCOM) LAB

We are a Top 50 Public University: #42 in Electrical and Electronics Engineering (U.S. News Global)

rfcom.fiu.edu
RESEARCH AREA: Wireless Communications

Foldable, reconfigurable systems are powering the next generation of antennas at FIU’s Transforming Antennas Center.

We are a Top 50 Public University: #42 in Electrical and Electronics Engineering (U.S. News Global)
RESEARCH AREA: **Wireless Communications**

**Reconfigurable Systems**
- Center for Physically Reconfigurable and Deployable Multifunctional Antennas
- Next-Gen Air Force and Dept. of Defense Systems (drones, satellites, aircrafts)
- Compactly stowed, easily collapsed and quickly deployed
- Light-weight, smart, dynamic

*We are a Top 50 Public University: #42 in Electrical and Electronics Engineering (U.S. News Global)*
Tetherless Communications: Secure, high-data rate communications using ultra wideband, low power hardware

- Digital beamformers
- High-data rate communication with interference suppression and MIMO
- 5G Millimeter-Wave systems
- Integrated RF-photonic chips
RESEARCH AREA: Sensor Technology

Sensing For Medical Applications
• Design and fabrication of smart sensors
• Cortisol sensing; electrochemical biosensor for direct detection of analytes without any redox mediators
• Biological sample collection, microneedles
• Wearable sensors, activity sensing, alcohol sensing
RESEARCH AREA: Smart Cities & Grids

FIU established the Artificial Intelligence-based Renewable Microgrid, the one of its kind “living lab” that allows for research, design, study, simulation of future renewable power plant, microgrid, resiliency and many aspects of the smart grid.

Double click on the frame to play the video

We are a Top 50 Public University: #42 in Electrical and Electronics Engineering (U.S. News Global)
**RESEARCH AREA: Smart Cities and Disaster Management Tools**

Integration of computer-modeling data and remote-sensing data

- Storm surge
- Meteorological
- Topographical
- Real-time road data
RESEARCH AREA: **Smart Cities & Grids**

FIU receives **$3M** DoE grant to train next-generation workforce in power, energy and cybersecurity

*Double click on the frame to play the video*

*We are a Top 50 Public University: #42 in Electrical and Electronics Engineering (U.S. News Global)*
RESEARCH AREA: Smart Cities & Grids

A small-scale power system test-bed allows FIU engineers and researchers to test and implement new ideas and scenarios on a power system in a practical way.
RESEARCH AREA: **Smart Grid Test Bed**

- Smart grid security threat analysis
- Security aware power system design
- Cybersecurity solutions for energy systems
RESEARCH AREA: Manufacturing

Through a $5M U.S. Dept. of Energy grant, FIU faculty and researchers are developing state-of-the-art cyber manufacturing capabilities and installation of structural health monitoring for modular nuclear reactors, which are known for their minimal greenhouse gas emissions, relatively small footprints and the ability to be built in even the most remote areas.

We are a Top 50 Public University: #41-46 in Engineering & Technology (QS World)
RESEARCH AREA: Manufacturing

COLD SPRAY MANUFACTURING TECHNOLOGIES

FIU engineers received $22.9 million from U.S. Army to advance Cold Spray Additive Manufacturing (CSAM) technologies

colrad.fiu.edu

We are a Top 50 Public University: #41-46 in Engineering & Technology (QS World)
ColRAD: Cold Spray and Rapid Deposition

• Advanced Deposition
• Research, training and tech development in old spray, plasma spray, wire-arc additive manufacturing (WAAM) systems
• Focus areas:
  • High strength aluminum alloy coatings by cold spray
  • Microstructure based modeling to predict mechanical properties of cold sprayed deposits
  • Finite element studies
  • Multiscale mechanical behavior of cold sprayed materials

colrad.fiu.edu
RESEARCH AREA: Big Data / AI

NIH awards FIU $1M R01* grant to develop machine-learning algorithms to allow biologists to make sense of large-scale study of proteins.

*6 Active NIH R01 research projects
RESEARCH AREA: Big Data / AI

• Analytics: Cloud computing, system, service & social media
  • Variety: Data types, analytical methods
  • Velocity: Data flow, decision making
  • Volume: Available data & sources
• High performance algorithms & architectures
• Machine learning algorithms for cloud computing systems
RESEARCH AREA: Augmented Connectivity

- RF/Wireless communications
- Secure cyberspace
- Security of Wearables
- Internet of things
- Enhance virtual reality
- Sensors and nanotechnology
RESEARCH AREA: Digital Forensics

Amy Research Office awards FIU $2.25M to create Forensic Investigations Network in Digital Sciences (FINDS) Center of Excellence
RESEARCH AREA: Cybersecurity

FIU researchers are working on developing novel solutions to bolster cybersecurity for critical infrastructure resilience by using machine learning and AI through a $1M grant from U.S. DHS.

We are a Top 50 Public University: #40 in Engineering & Technology (QS World)
RESEARCH AREA: Resilience & Infrastructure

WALL OF WIND (WOW)

We are a Top 50 Public University: #23 in federally-funded civil engineering research expenditures (NSF-HERD)

wow.fiu.edu
RESEARCH AREA: Resilience & Infrastructure

WALL OF WIND

NSF experimental facility, capable of simulating Category 5 hurricane winds with water.

• Largest and most powerful university facility of its kind
• 16,000 ft² fenced-off secure area for wind testing
• Destructive tests to study failure modes

We are a Top 50 Public University: #23 in federally-funded civil engineering research expenditures (NSF-HERD)
RESEARCH AREA: Resilience & Infrastructure

$12.8M NSF grant to design national full-scale testing facility capable of wind speeds of up to 200 miles per hour, combined with a water basin to simulate storm surge and wave action.
RESEARCH AREA: Resilience & Infrastructure

TRANSPORTATION ENGINEERING
Lehman Center for Transportation Research
• Research and training to improve transportation mobility and safety
• Education of multi-disciplinary workforce
• Only transportation center of its kind in south Florida

lctr.eng.fiu.edu
RESEARCH AREA: Resilience & Infrastructure

BRIDGE ENGINEERING
Accelerated Bridge Construction University Transportation Center (ABC-UTC)
• Enhance mobility and safety
• Produce save and environmentally friendly long-lasting bridges

abc-utc.fiu.edu
RESEARCH AREA: Nanomaterials

NOVEL TWO-DIMENSIONAL (2D) FUNCTIONAL MATERIALS FOR SPACE EXPLORATION

$3M award from NASA supports research into materials for Mars and space exploration efforts.

nasa-cre2do.fiu.edu

Double click on the frame to play the video

We are a Top 50 Public University: #40 in Engineering & Technology (QS World)
NASA Center for Research and Education in 2D Optoelectronics (CRE2DO)

- Integrate 2D materials in space-resilient infrastructure materials, communication devices, and small satellite technology.
- Develop superconductor materials to eliminate the need for battery power,
- Material composites for spaceship infrastructure destined for Mars, and wearable space suit electronics to enable high-speed communication by astronauts back to the space station.

nasa-cre2do.fiu.edu
RESEARCH AREA: Battery Technologies

FIU engineers have developed a patented high-density lithium battery technology that relies on platinum and related chemical elements to boost energy storage for electric vehicles and next energy innovation.

We are a Top 50 Public University: #40 in Engineering & Technology (QS World)
RESEARCH AREA: Health Diagnostics, Neurotechnology, Brain Mapping

NIH awards FIU $2.6M R01* grant to research microvascular contributions to brain disorders such as cerebral small vessel diseases and Alzheimer's.

*6 Active NIH R01 research projects
RESEARCH AREA: Health Diagnostics, Neurotechnology, Brain Mapping

FIU engineers invented an optical device that helps doctors quickly and non-invasively diagnose diabetic ulcers under the skin.
RESEARCH AREA: Health Diagnostics, Neurotechnology, Brain Mapping

- Biomedical devices & systems
- Imaging, biodetectors/sensors
- Cell and tissue engineering
RESEARCH AREA: Health Diagnostics, Neurotechnology, Brain Mapping

NANOBIOENGINEERING & BIOELECTRONICS LAB

- Next gen of biosensors, Lab-on-Chip, micro/nano electrodes
- Biomed devices for neuron mapping, clinical diagnosis, Point-of-Care Testing (POCT), nano-scale drug design/delivery
CENTERS: AMERI

ADVANCED MATERIALS ENGINEERING RESEARCH INSTITUTE

ameri.fiu.edu

Double click on the frame to play the video
Advanced Materials Engineering Research Institute (AMERI)

• Provides infrastructure to support nanotechnology, device and sensor fabrication, materials development and failure analysis research and education over a broad range of technologies and capabilities.

• Analytical instrumentation, materials characterization, process development and 3D printing laboratories to support faculty, students and industry.
CENTERS: ARC

APPLIED RESEARCH CENTER

arc.fiu.edu

Double click on the frame to play the video
Applied Research Center (ARC)

ARC focuses on **solving real-world problems** through multi-disciplinary research collaborations.

**Key Research Areas**
- Environment and Energy
- Aerospace and Defense
- Cybersecurity and IT
- STEM Workforce Development
NSF Engineering Research Centers

- **CELL-MET**: Nanosystems Engineering Research Center for Directed Multiscale Assembly of Cellular Metamaterials with Nanoscale Precision, led by Boston Univ. --- Arvind Agarwal, Chenzhong Li, and Jin He

- **PATHS-UP**: Precise Advanced Technologies and Health Systems for Underserved Populations, led by Texas A&M --- Jessica Ramella-Roman, Chunlei Wang and Norman Munroe

- **ASSIST**: Advanced Self-Powered Systems of Integrated Sensors and Technologies, led by NC-State --- Shekhar Bhansali

Resources:
- https://mme.fiu.edu/research/cell-met-erc
- https://mme.fiu.edu/research/paths-up
- https://news.fiu.edu/2017/09/fiu-to-collaborate-on-health-breakthroughs-through-nsf-engineering-research-centers/115463
- https://assistcenter.org/facilities/florida-international-university/
Research Expenditures

(Million $)

FY2012-13: 17
FY2013-14: 19
FY2014-15: 21
FY2015-16: 23
FY2016-17: 25
FY2017-18: 28
FY2018-19: 33
FY2019-20: 36
FY2020-21: 43
FY2021-22: 52
FY2022-23: 62
Research Rankings

*NSF HIGHER EDUCATION RESEARCH AND DEVELOPMENT SURVEY (HERD):*

- Top 100 among more than 400 Universities and Colleges:
  - Civil Engineering: #15
  - Mechanical Engineering: #48
  - Electrical Engineering: #54
  - Biomedical Engineering #78
- Total R&D Expenditures in Computer & Information Sciences: #42 out of +600
- Total R&D Expenditures at High-Hispanic Institutions:
  - Computer and Information Sciences #7
  - Engineering #11

*Source: Higher Education Research and Development Survey (HERD) | NCSES | NSF*