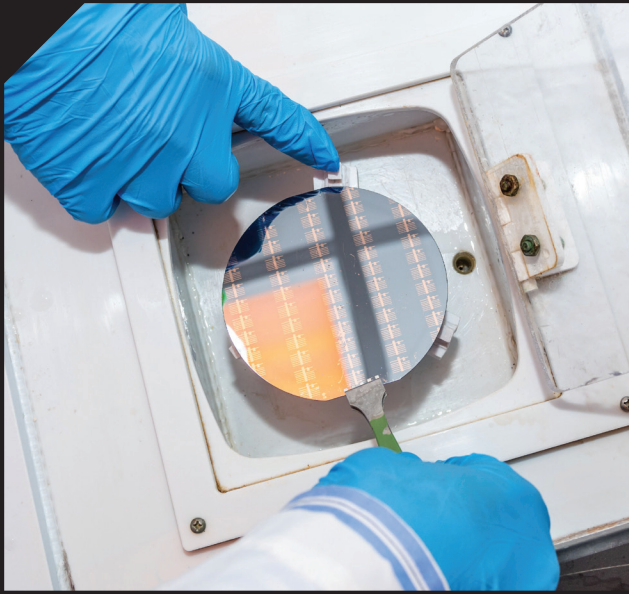




ROSE-HULMAN
INSTITUTE OF TECHNOLOGY



NanoEngineering



At the Forefront of Innovation

A strand of human hair measures approximately 70 microns wide. Imagine a nanostructure that is 1/1000th the size of a strand of hair —essentially invisible to the human eye. And yet, your cell phone is made of 500 billion devices this size. This journey into the nanoscopic is a glimpse into the world of NanoEngineering.

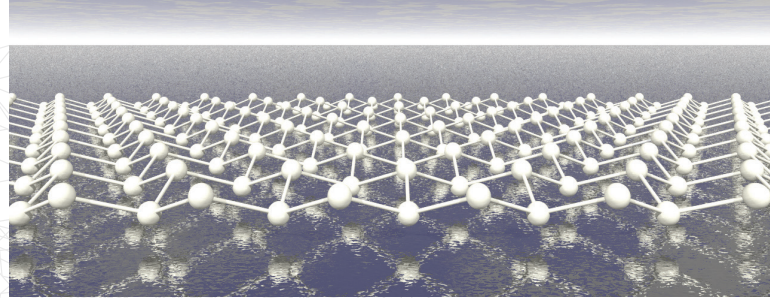


Nanotechnology has revolutionized fields such as medicine, photonics, electronics and energy. A degree in NanoEngineering will put you at the forefront of the next frontier in engineering and innovation — in careers such as semiconductor manufacturing, molecular electronics, integrated silicon photonics, micro- and nano-electromechanical systems, thin film technologies, and other applications of nanotechnology.

Through the NanoEngineering major, Rose-Hulman aims to equip students with the expertise and innovation mindset required to thrive in an ever-changing global landscape.



Students working on tools in the MiNDS facility.



2D materials simulation conducted by Rose-Hulman students.

Learning Through Excellence

Excellence in teaching is at the heart of Rose-Hulman's mission. Our faculty members are hired for their teaching skills and their passion for working one-on-one with students. NanoEngineering majors work closely with our expert faculty who help you become a seasoned engineer and build the skills relevant to working in industry. Additionally, our program gives you the flexibility to pursue independent projects in your chosen area of concentration, tailoring your education to fit your interests!

Many of our alumni and recent graduates are working at worldwide companies such as:

- Eli Lilly and Company
- Flex N Gate
- Hewlett Packard
- IBM
- Intel
- Los Alamos National Lab
- Micron
- MIT Lincoln Lab
- NSWC CRANE
- PAR Systems
- Samtec
- Texas Instruments
- Wolfspeed

Experiential Learning

Our state-of-the-art labs, project space, classroom facilities and academic buildings are designed to let you focus completely on your education experience. As a NanoEngineering major, you will engage in hands-on research projects, collaborate with leading experts in the field, conduct simulation and modeling, and have access to state-of-the-art laboratories such as the Micro-Nanoscale Devices and Systems (MiNDS) cleanroom facility equipped with cutting-edge nanofabrication and characterization tools – something almost unheard of at the undergraduate level anywhere else. NanoEngineering majors also work in the Characterization Lab (SEM / XRD), the Device Modeling and Testing Lab and faculty research labs. Hands-on experience in Rose-Hulman's laboratory facilities translates into enhanced professional and graduate school opportunities.

Additionally, many graduates pursue advanced degrees at some of the most prestigious institutions around the world, including:

- Carnegie Mellon University
- Cornell University
- North Carolina State University
- Northwestern University
- Purdue University
- The Ohio State University
- University of Arizona
- University of California Santa Barbara
- University of Colorado Boulder
- University of Florida
- University of Minnesota
- Virginia Tech

Types of jobs our students will be prepared for after graduation:

- Battery design
- Device design modeler
- MEMS device development
- Nanomaterials development and integration
- Photonic device and systems integration
- Process engineer
- Semiconductor fabrication
- Solar cell manufacturing



Curriculum, Minors and Certifications

The NanoEngineering major is a comprehensive curriculum designed to provide students with a strong foundation in fundamental engineering principles, coupled with a deep focus on nanoscale science and technology, including essential modeling and simulation techniques. The core of our curriculum is in nanomaterials and their properties, with an emphasis on materials fabrication and characterization, and applications in micro-nanoscale devices and systems.

Project work is centered in the curriculum, with device design, fabrication, integration, and testing. Students gain personal experience with advanced equipment starting in the first year. Design work throughout the curriculum culminates in projects with external industry clients.

Facilities / Labs

- Carbon nanotube growth
- Device and Testing and Modeling Lab Course projects
- Material Characterization Lab (SEM, XRD)
- Microelectromechanical actuator fabrication and testing
- Micro-Nano-Devices and Systems (MiNDS) facility
- Quantum dot fabrication and testing
- Silicon photonic circuit design, fabrication and testing
- Transistor design and fabrication

Tools

- Electron Beam Lithography
- Electron Beam Physical Vapor Deposition
- Micromanipulator Test Stations
- Photolithography
- Plasma Enhanced Chemical Vapor Deposition
- Reactive Ion Etch
- Scanning Electron Microscope
- X-ray Diffraction

Related Academic Minors

A minor in NanoEngineering is a great choice if you are majoring in another discipline and want to understand this emerging trend in engineering and innovation. Complementary minors for NanoEngineering include:

- Solid State Physics / Materials Science
- Materials Science and Engineering
- Optical Engineering
- Astronomy
- Physics

Semiconductor Materials and Devices Certificate Program
In addition to your degree in NanoEngineering, you can specialize in the related field of Semiconductor Materials and Devices and earn a certificate denoting your expertise.

Accreditation

The NanoEngineering program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria with no applicable program criteria.

NanoEngineering Students at Rose

100%
Placement Rate

"I use the problem-solving fundamentals I learned at Rose every day. One of the most powerful skills that the program ingrained in me is the importance of documenting assumptions at the start of every problem. It is a practice that is essential for getting alignment when developing and executing business strategies."

- Emma Barrasso (engineering physics — nanoengineering, 2011), Integration Management Director, Owens Corning



For more information on nanoengineering at Rose-Hulman, scan this code with your smartphone.

Get in Touch!

Department of Physics and
Optical Engineering

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www.rose-hulman.edu/phoe



ABOUT ROSE-HULMAN

Rose-Hulman is one of the nation's top undergraduate engineering, science, and mathematics colleges. Our 1,300-acre scenic campus is home to more than 2,200 students with a passion for STEM and learning. We are consistently rated among the best colleges and universities in the country for return on investment, internships, and career placement.

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