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MATERIALS SCIENCE &
ENGINEERING

Materials scientists and engineers make all engineering applications possible.

Materials science and engineering combines engineering, chemistry and physics principles to solve real world problems in industry and research environments. MSE practitioners modify existing materials or develop new materials that are harder or softer, more or less flexible, cheaper to produce, conduct electricity more efficiently, are less prone to failure, are more sustainable or biocompatible, or achieve other desirable characteristics. Materials are in all industries, so MSE is an excellent interdisciplinary choice.

What makes MSE special?

MSE is a small, close-knit department with many opportunities for hands-on team-based learning.

All students complete a senior capstone design project solving real-world problems with industry mentorship.

What problems are materials scientists and engineers trying to solve?

Materials scientists and engineers explore how materials perform and invent ways to improve their functional properties. Materials scientists and engineers ask questions such as:

- How do we develop advanced materials to make structures such as aircrafts and automobiles stronger, cheaper and more fuel efficient?
- How can we create novel energy storage nanostructures to improve fuel cells, batteries, super-capacitors and power grids?
- Can we develop computational tools to predict and control complex materials synthesis and structures?
- What organic, renewable materials can create bioplastics strong and stable enough to replace petroleum-based products?
- Can we engineer better materials for medical devices, medicines and disease detection?

WHERE DO MSE ALUMNI WORK?



Air and space

Materials testing, manufacturing, processes, physics, coatings and finishes | *Aerojet Rocketdyne, Boeing, Blue Origin, Crane Aerospace, Honeywell, LMI Aerospace, Janicki Industries, NASA, Space X, U.S. Air Force*

Computing, data and digital technologies

Data science, data analytics, e-beam and optical lithography, manufacturing, materials simulation modeling, semiconductor and fiber lasers, software and hardware development | *Apple, AT&T, Facebook, GeniSys GmbH, HCL Technologies, Infosys, Intel, Micron, Microsoft, nLight, Shin-Etsu America*

Environment, sustainability and energy

Clean energy development, waste management | *Cupertino Electric, Group14 Technologies, nLIGHT, PNNL, Sedron Technologies, Washington Clean Energy Testbeds*

Health and medicine

Medical devices, tissue engineering, health research and development | *Cardiac Dimensions, GT Medical Technologies, NanoString Technologies, Neoleukin Therapeutics, Rocket Science Health, Siemens Healthineers, UW School of Medicine*

Infrastructure, transportation and society

Cars, submarines, trucks, sporting goods and fabrics | *Crane Currency, PACCAR, PNNL, Promethean, Samsung Electronics, Tesla, Uphill Designs, W.L. Gore*

Robotics and manufacturing

Product development, materials manufacturing and processes, failure analysis, 3D printing | *Boeing, Boston Scientific, Fluke Corporation, Honeywell, General Dynamics, Intel, Toray Composite Materials America*

RECENT CAPSTONE PROJECTS

- Development and optimization of bio-based composite materials for aerospace applications, including sustainability analysis and prototype fabrication of biodegradable aerospace materials for Boeing/Hexel
- Leveraging data science and artificial intelligence to analyze and optimize semiconductor manufacturing processes to achieve improved production yield for memory chips for Micron

QUICK FACTS

All students complete an industry-linked capstone design project.

MSE offers a degree option in Nanoscience and Molecular Engineering (NME) as well as undergraduate concentration areas in Materials and Manufacturing; Electronic, Optical and Magnetic Materials; Energy/Environmental Materials; Materials in Medicine and Biomimetics; Structural Materials; and Materials Computation and Data Science.

LEARN MORE:

If you think MSE might be for you, we encourage you to join one of the MSE-affiliated registered student organizations. You can conduct research in an MSE lab or take an MSE class open to non-majors such as MSE 170: Fundamentals of Materials Science, or our 1-credit major exploration courses.

For information, schedule an advising appointment: mse.washington.edu/student/undergraduate/advising