

Materials Science and Engineering at Carnegie Mellon University

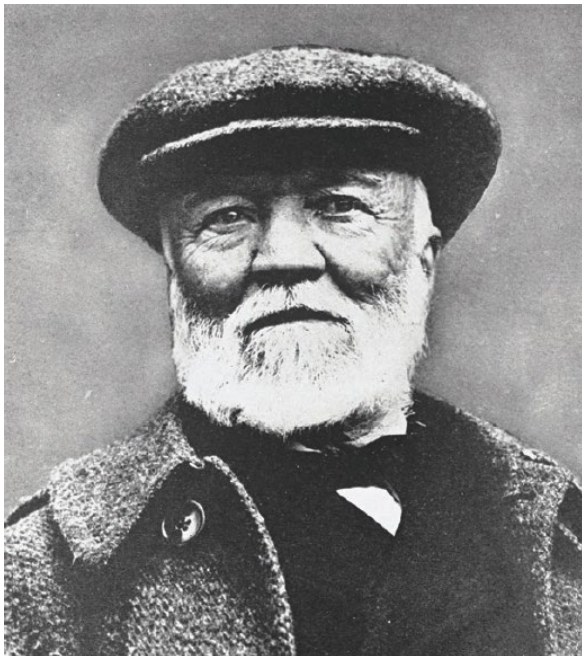
Gregory S. Rohrer

September 18, 2020

History of the MSE department

The department was founded more than 100 years ago as one of the first departments at Carnegie Tech.

The first three doctoral degrees were given in 1932 and 1933.



In the early days, each graduating class forged a new link in a chain.

MSE Masters Programs

Standard MSE programs

- Master of Science in Materials Science and Engineering (MSE): course work
- Master of Science in Materials Science (MATSCI) : courses plus research

Specialized programs

- Master of Science in Computational Materials Science and Engineering (CMSE)
- Master of Science in Additive Manufacturing (MSAM)
- Masters in Energy Science and Technology and Policy (ESTP)

All programs have staff dedicated to advising and career assistance.



Careers for Masters Graduates

Median = \$72,000

Maximum = \$93,000

TIMKEN

 **ALCOA**

 **NUCOR**

AGC ASAHI GLASS

 **Swagelok**

L'ORÉAL
MAKEUP DESIGNER/PARIS

 **intel**

CREE 
LEDs

 **BOEING**

LOCKHEED MARTIN 

Raytheon

MSE Placement in Graduate School

Carnegie Mellon University



Cornell University

Berkeley
UNIVERSITY OF CALIFORNIA



UNIVERSITY
of VIRGINIA

UCLA

UC San Diego

Duke
UNIVERSITY



THE UNIVERSITY OF
CHICAGO

The MSE Doctoral Program

- Research is emphasized in the qualifying process.
- Timetable is set to allow graduation in four years. Research begins intensively in second semester.
- All students have office space that is separate from the laboratory.
- There is an active graduate student advisory committee.
- Graduate Ombudsperson.



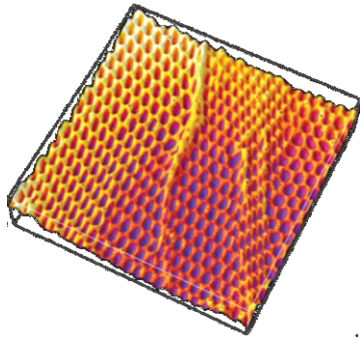
Careers for Doctoral Graduates

Mean = \$90,000

Maximum = \$120,000

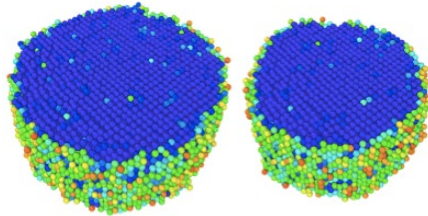


Principal Research Areas



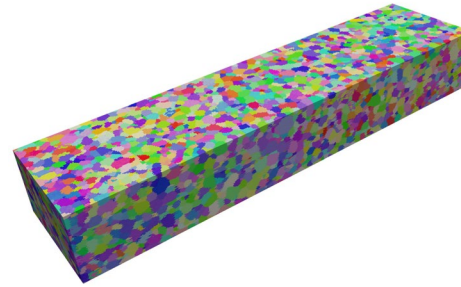
Soft, Nanostructured and Bioactive Materials

- Tissue Engineering and Biofabrication
- Bioelectronics and Biosensors
- Flexible and Wearable Electronics
- Medical Devices and Drug Delivery



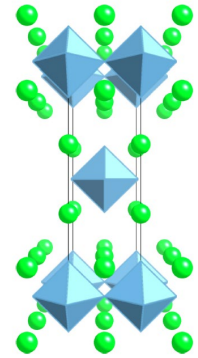
Computational Materials Science

- Macroscale and Mesoscale
- Atomic Scale and Quantum Mechanics
- Interfaces
- Data Science and Machine Learning



Manufacturing & Materials Microstructure

- Iron and steelmaking
- Additive manufacturing
- 3D and high-throughput characterization
- Orientation imaging
- SEM/TEM
- Quantitative Image Analysis



Inorganic Functional Materials

- Batteries and Fuel Cells
- Energy Efficient Computing
- Microelectronics and Quantum Computing
- Spintronics and Magnetics

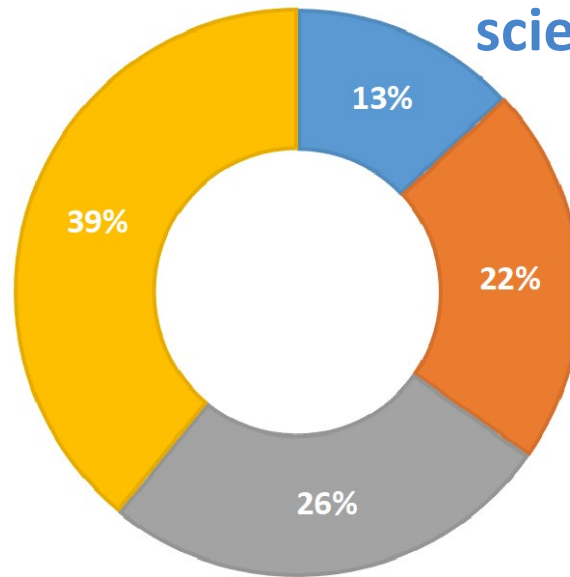
Department Research and Students

Research expenditures in FY 2020 of more than \$8 million
18.5 FTE faculty ~\$440,000 per FTE faculty

**inorganic
functional
materials**

**computational materials
science**

**soft,
nanostructured and
bioactive materials**



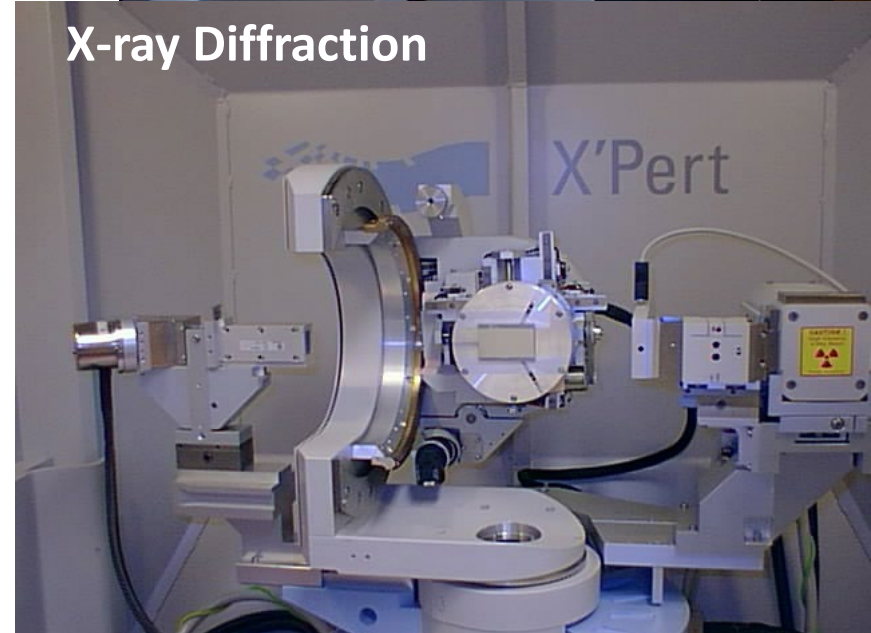
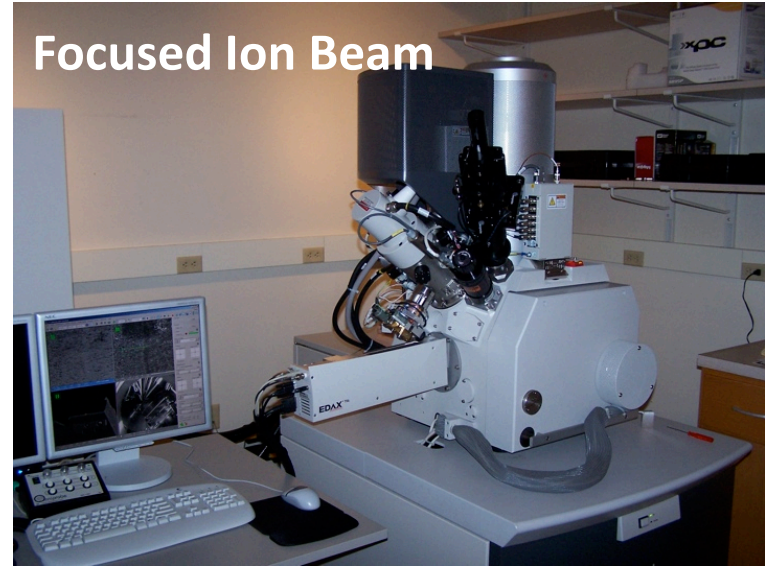
**manufacturing and
materials
microstructure**

- 120 Undergraduate students (3 classes)
- 135 graduate students
- ~ 7 grad students/faculty

Materials Characterization Facility



- 3 full time staff support research, education, and training
- wide range of instrumentation



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