College of Engineering & Honors College Thesis Mixer
Teaching
- Nuclear & Radiation Physics
- Materials for Power Systems
- Radiation Damage in Materials
- Nuclear Reactor Safety

Research
Focused on the design and development of materials that enable advanced and next generation nuclear technologies.

Interested in studying the effects of radiation damage on materials microstructure and properties; and degradation of materials in liquid metal and molten salt environments.

Thesis Topic Ideas/Opportunities
- Chemistry control of molten salt environments to mitigate corrosion
- Investigation of factors affecting materials degradation in liquid metal environments
- Characterization of materials degradation following exposure to extreme environments

Samuel A. Briggs
School of Nuclear Science and Engineering; Merryfield Hall 207
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The application advanced magnetic materials to the development novel devices for signal processing, communications and data storage.

Interested in developing new instrumentation to characterize magnetic materials.

- **Teaching**
  - Electricity and Magnetism
  - Semiconductor Processing
  - Electrical Engineering Fundamentals

- **Research**

- **Thesis Topic Ideas/Opportunities**
  - Build the world’s best Kerr (magnetic) microscope.
    - Design and build optics, hardware, software.
  - Design and test new devices for cell phones and IoT.
    - Learn about spin waves and acoustic waves and electronic test equipment.
  - Much, more!!! ❤️ magnets? Come see me.
Research

• Competency-aware machine learning (when can you trust it?)
• Machine learning applications to science (how can it help?)

Thesis Topic Ideas/Opportunities

• Create a competency-aware classifier for Mars data
• Anomaly/novelty detection in planetary science images
• Explainable machine learning for science applications
College of Engineering and HC Thesis Mixer

Teaching

CS 451/551: Computer Graphics
CS 452/552: Computer Animation
CS 453/553: Scientific Visualization
CS 454/554: Geometric Modeling

Eugene Zhang
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Research

Visualization: earthquake, hurricane data
Geometry: shape matching, texture synthesis
Art: computer-generated painting and drawing
Animation: solid/fluid simulation
Math visualization: a concept of your interest
Teaching

- Data Visualization for Machine Learning
- Human-Computer Interaction
- Introduction to Data Science (tentative)

(will be teaching UG courses next year)

Research

HUMAN-AI INTERACTION through Interactive Data Visualization

Research Topic Ideas

Q. How can we help people build, use, and understand AI?
A. Tools for visually & interactively exploring, analyzing data in AI

- Guidance for novices to build AI systems
- Interfaces for exploring text/video data
- Visual analysis of errors in AI

Minsuk Kahng
Assistant Professor of Computer Science
School of EECS
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**Teaching**

Prof. Jovanovic:
- Undergrad & Grad Fluid Flow
- Microreactors & Microscale Chemical Technologies

Prof. Jovanovic & Dr. Coblyn:
- Modular Chemical Process Intensification (MCPI)

**Research**

Therapeutic Medical Devices: **Extracorporeal Blood Processing** using **Microscale-based 2-D Lamina Plate** Technology

**Thesis Topic Ideas/Opportunities**

- Investigating **blood damage** within microchannel lamina systems
  - **Modeling & simulating** device operation and physiological responses
- **Blood oxygenation** and gas management applications
- Therapeutic plate **surface functionalization**: attachment, entrapment, encapsulation
- Advanced **manufacturing** of microchannel lamina plates (ATAMI)
College of Engineering and HC Thesis Mixer

Dr. Greg Rorrer  
School of CBEE  
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Teaching
- Mass transfer (CHE 333)
- Separation processes (CHE 411)
- Textbook co-author

Research
Photosynthetic organisms for sustainable CO₂ capture, biofuels, and valued products

Thesis Topic Ideas/Opportunities

Environment
- Experimentally based (lab environment, hands on)
- Work with a graduate student
- Projects based on current focus areas of the RorrerLab

Project areas (examples)
- CO₂ capture and nutrient removal by algae in engineered flow systems
- Product analysis
Teaching
- Introduction to CBEE
- Polymer Science & Engineering
- Transport Phenomena (3rd Yr CBEE)
- UHC Colloquia –
  - Plastics for Poets (Sp)
  - Energy IQ (W)
  - STEM Outreach (Sp)

Research
Anything related to POLYMERS!
- Plastics Processing and Recycling
- Biomaterials
- Environmental Sustainability
- Engineering Education
- K-12 Outreach

Thesis Topic Ideas/Opportunities
- Waste Plastics to Fuel (Pyrolysis/Gasification)
- Fire Resistant Roof Design for Wildfire areas
- Hydrogels for Delivery of Botanicals
- Menstrual Health & Hygiene - Botswana (Bill and Melinda Gates Foundation)
Teaching

CHE311, Thermodynamics (200+ students)

CHE444/544: Thin Film Materials Processing (40 students)

CHE452/552: Electrochemical Energy System (10~20 students)

Research

Energy storage: lithium/sodium batteries

Energy conversion: fuel cell, water splitting, CO₂ reduction

Thesis Topic Ideas/Opportunities

1. Aqueous lithium/sodium-ion batteries
   Safe, fast charging, towards high-energy
Teaching
- Composites Materials
- Aerospace Engineering
- Stress Analysis
- UAV Engineering

Research
Experimental aerodynamics and stress analysis of flexible structures, environmental impact of wind energy, high-performance sailboats testing techniques, fiber composites technology, micro air vehicles, and biological flight mechanics.

Thesis Topic Ideas/Opportunities
- Composites prosthetic feet
- Distributed propulsion
- Non-destructive inspections
- Wind energy and wildlife
- Albatross flights research

Roberto Albertani
School of Mechanical, Industrial, and Manufacturing Engineering
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OSU Robotics Faculty

• Robotic grasping and manipulation
• Legged robotics
• Marine robotics
• Energy generation and control
• Agricultural robotics
• Undulating robotic
• Manufacturing robotic
• Social robotics
• Drones
• Human-robot interaction
• Swarms
Robotics and Human Control Systems
Ravi Balasubramanian

• Research Interests:
  - Robotic Control and Dynamics
  - Human neuro-biomechanics

• Applications:
  - Mobile Robotics
  - Robotic Hands
  - Robotic Manipulation
  - Orthopedic implantable mechanisms
Teaching

• ME373/ME373H–Mechanical Engineering Methods
• ME331– Fluid Mechanics
• ME526 – Numerical Methods for Engineers

Research

• My group works on development and application of numerical algorithms for predictive simulations of fluid flows, often turbulent and particle-laden two-phase flows.
• Applications: Any problem that involves a turbulent flow with and without heat/mass transfer
• UHC students usually do some code development work in Matlab/Python and work with graduate students to conduct parallel computing on supercomputers using our in-house solvers.

Thesis Topic Ideas/Opportunities

• Modeling motion of spherical and non-spherical particles in turbulent flow with and without heat transfer (erosion of ducts, gas-turbine blades, solar receivers, sprays etc.)
• Effect of ventilation system on dispersion of pollutants (aerosols and droplets carrying bacteria or virus---Covid19)
• Cluster formation and data analysis using Voronoi tessellation
• Turbulent flow over rough surfaces (drag reduction, sediment transport)
Thesis Topic Ideas/Opportunities

- Thermal energy systems
- Thermal transport phenomena
- Energy efficiency
Teaching

- ME 373: Mechanical Eng. Methods
- ME 461/561: Gas Dynamics
- ME 599: Software Dev. for Eng. Research

Research

Project Ideas

- Reduce/simplify models for the combustion of fuels
- Simulate combustion, flames, and fires
- Develop Python software for testing combustion models against experimental data
- Simulate fluid mixing in the ocean