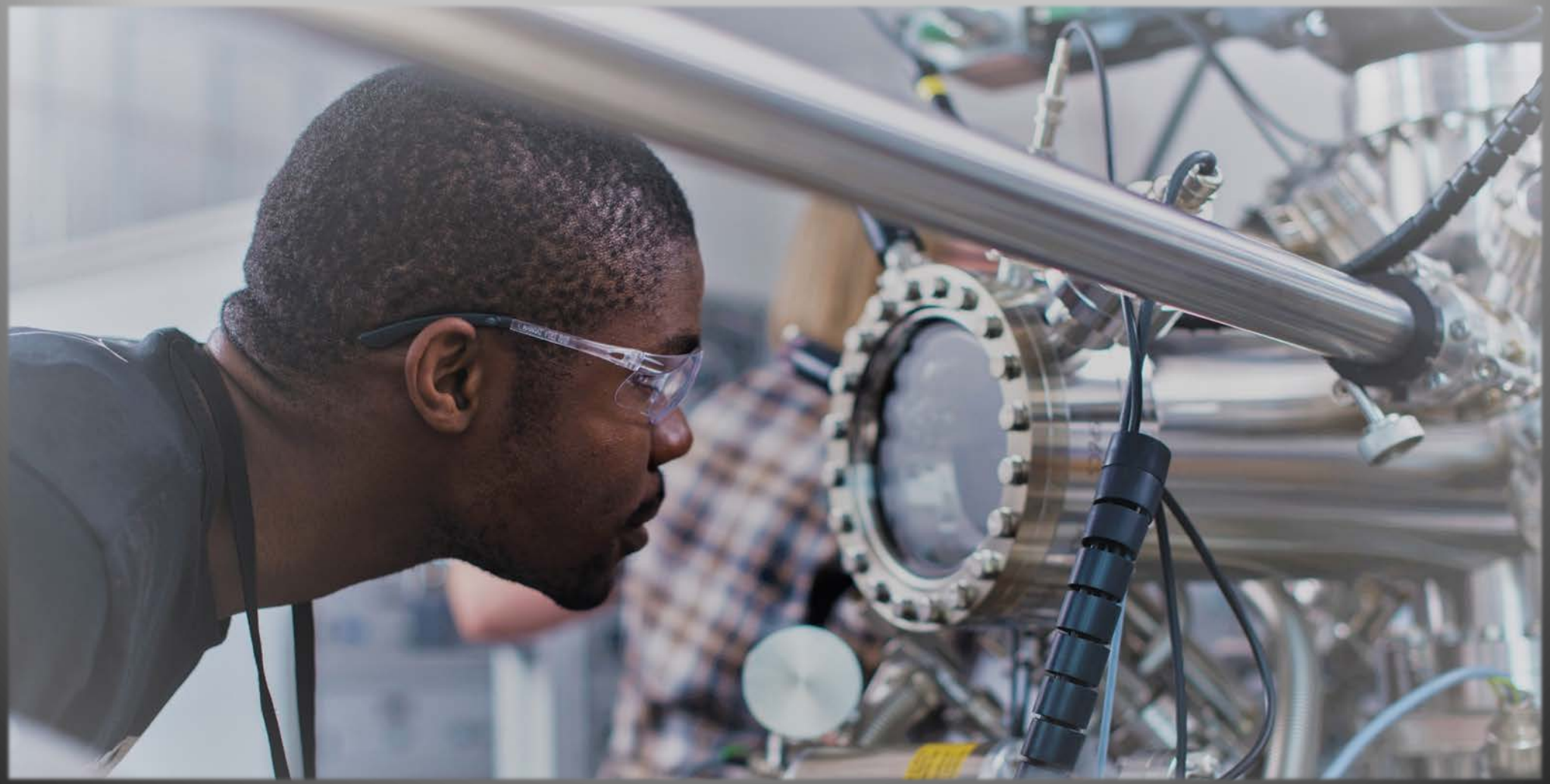
Oregon State University

COLLEGE OF ENGINEERING

College of Engineering & Honors College Thesis Mixer



College of Engineering and HC Thesis Mixer

Oregon State University
College of Engineering

Teaching

- *Nuclear & Radiation Physics*
- *Materials for Power Systems*
- *Radiation Damage in Materials*
- *Nuclear Reactor Safety*

Samuel A. Briggs

School of Nuclear Science and Engineering; Merryfield Hall 207
541-737-7838
samuel.briggs@oregonstate.edu

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*

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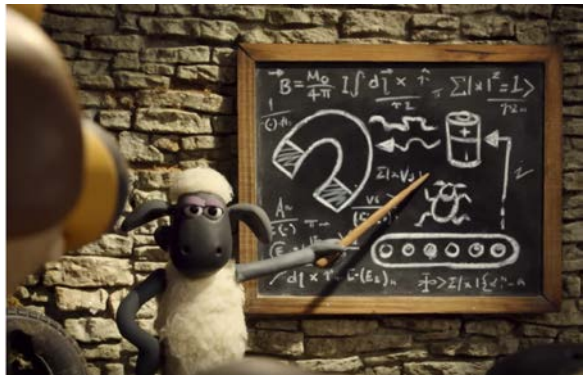
College of Engineering

Teaching



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

Albrecht Jander

School of Electrical and Computer Engineering
Kelley 3001
541-737-2974
jander@eecs.orst.edu

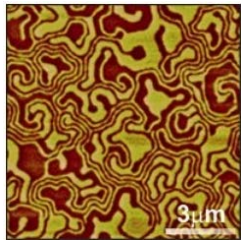
Research

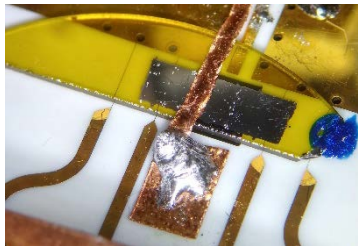
The application advanced **magnetic materials** to the development novel devices for **signal processing, communications and data storage**.

Interested in developing new **instrumentation** to characterize magnetic materials.

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.***

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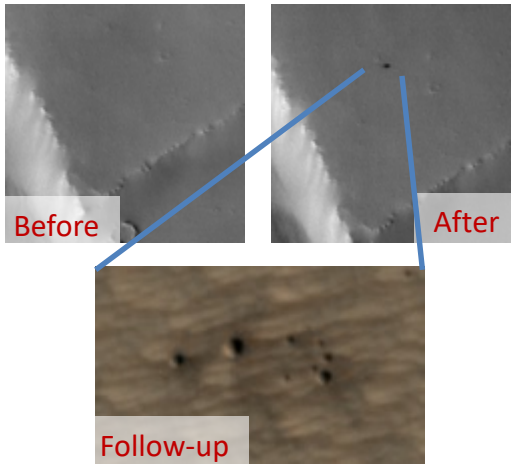
Unusual rocks on Mars

Fresh impacts on Mars



Kiri Wagstaff
OSU School of EECS
NASA Jet Propulsion Laboratory
KEC 2079
kiri.wagstaff@oregonstate.edu

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

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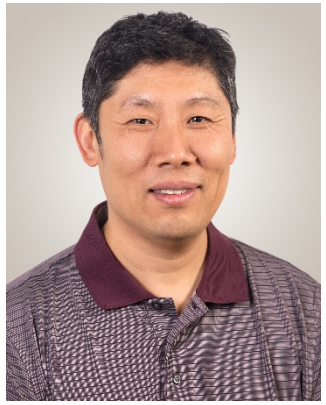
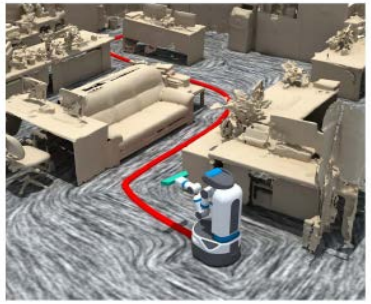
Teaching

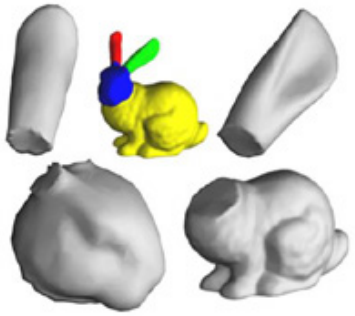
CS 451/551: Computer Graphics
CS 452/552: Computer Animation
CS 453/553: Scientific Visualization
CS 454/554: Geometric Modeling



Eugene Zhang
School of EECS
2111 Kelley Engineering
zhange@eecs.oregonstate.edu

Research





Thesis Topic Ideas/Opportunities

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

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Oregon State University
College of Engineering

Teaching

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

(will be teaching UG courses next year)

Minsuk Kahng

Assistant Professor of Computer Science
School of EECS
minsuk.kahng@oregonstate.edu
https://minsuk.com

Research

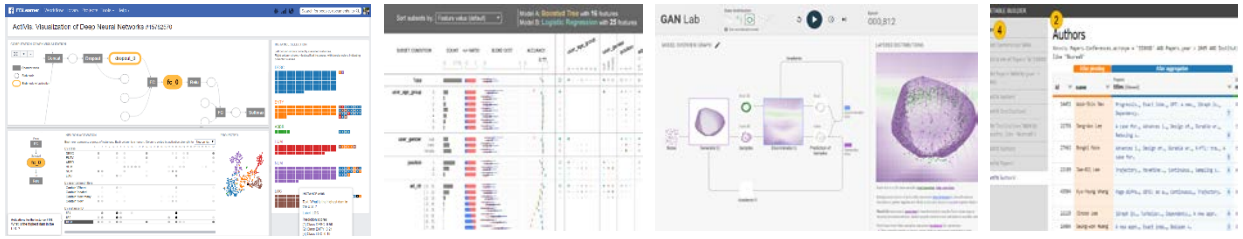
HUMAN-AI INTERACTION
through
Interactive Data Visualization

Thesis 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



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College of Engineering

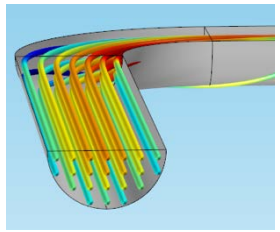
Teaching

Prof. Jovanovic:

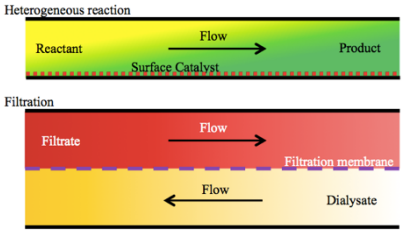
- Undergrad & Grad Fluid Flow
- Microreactors & Microscale Chemical Technologies

Prof. Jovanovic & Dr. Coblyn:

- Modular Chemical Process Intensification (MCPI)



Source: COMSOL Multiphysics

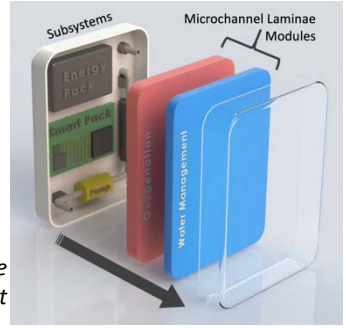


Prof. Goran Jovanovic
School of Chem, Bio, & Env Engineering
Johnson Hall 216
goran.Jovanovic@oregonstate.edu

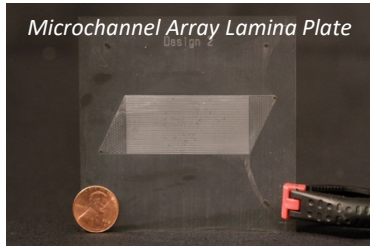
Dr. Matthew Coblyn
CBEE - Research Associate
ATAMI 1074
coblynm@oregonstate.edu

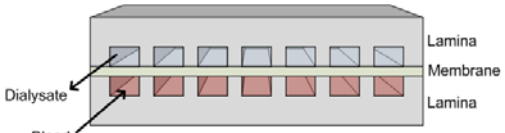
Research

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



i-Blood Wearable Device Concept





Microchannel Hemodialysis Project

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)

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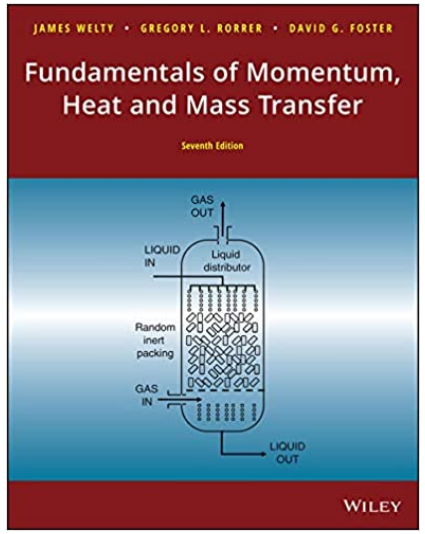
Teaching

- ❑ Mass transfer (CHE 333)
- ❑ Separation processes (CHE 411)
- ❑ Textbook co-author



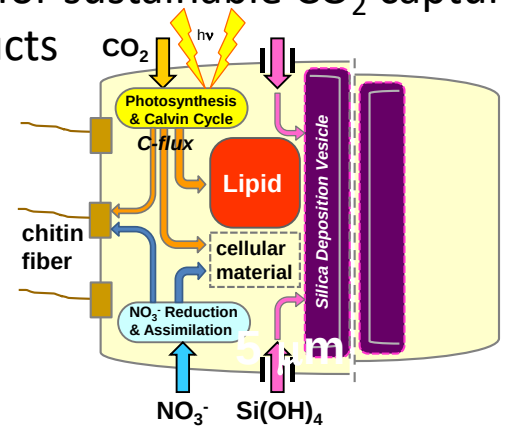
Dr. Greg Rorrer

School of CBEE

gregory.rorrer@oregonstate.edu

Research

Photosynthetic organisms for sustainable CO_2 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)

- ❑ CO_2 capture and nutrient removal by algae in engineered flow systems
- ❑ Product analysis

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Teaching

- *Introduction to CBEE*
- *Polymer Science &Engineering*
- *Transport Phenomena (3rd Yr CBEE)*
- *UHC Colloquia –*
  - *Plastics for Poets (Sp)*
  - *Energy IQ (W)*
  - *STEM Outreach (Sp)*

Skip Rochefort
School of Chemical, Biological, and Environmental Engineering
Gleeson 205
541-737-2408
skip.rochefort@oregonstate.edu

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)***

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College of Engineering

Teaching

CHE311, Thermodynamics (200+ students)

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

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

Zhenxing Feng

School of Chemical, Biological, and Environmental Engineering

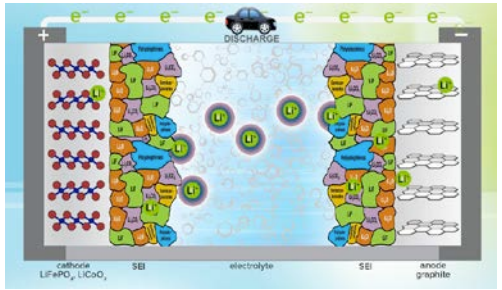
Johnson 216D

541-737-0508

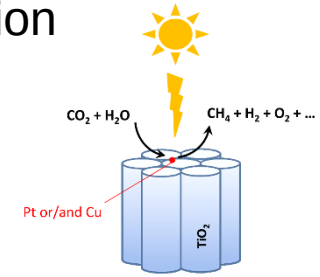
zhenxing.feng@oregonstate.edu

Research

Energy storage: lithium/sodium batteries



Energy coversion: fuel cell, water splitting, CO_2 reduction

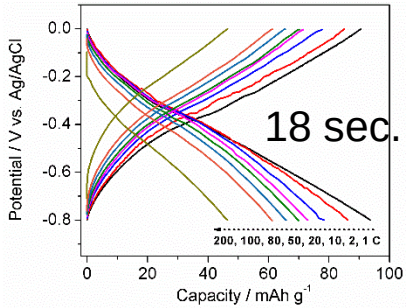


Thesis Topic Ideas/Opportunities

1. Aqueous lithium/sodium-ion batteries

Safe, fast charging, towards high-energy

Fast charging



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College of Engineering

Teaching

- *Composites Materials*
- *Aerospace Engineering*
- *Stress Analysis*
- *UAV Engineering*

Roberto Albertani

School of Mechanical, Industrial, and Manufacturing Engineering

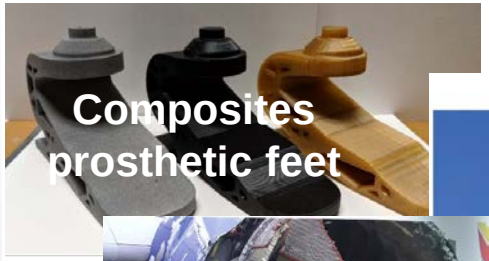
Dearborn 305 - Zoom

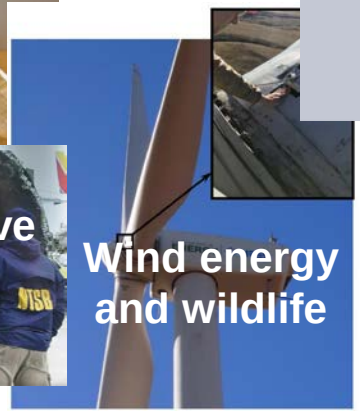
roberto.albertani@oregonstate.edu

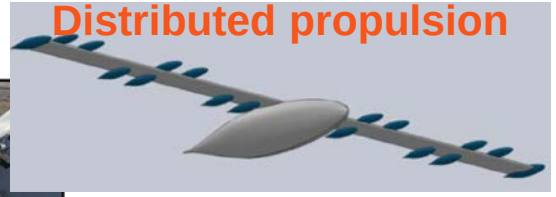
Research

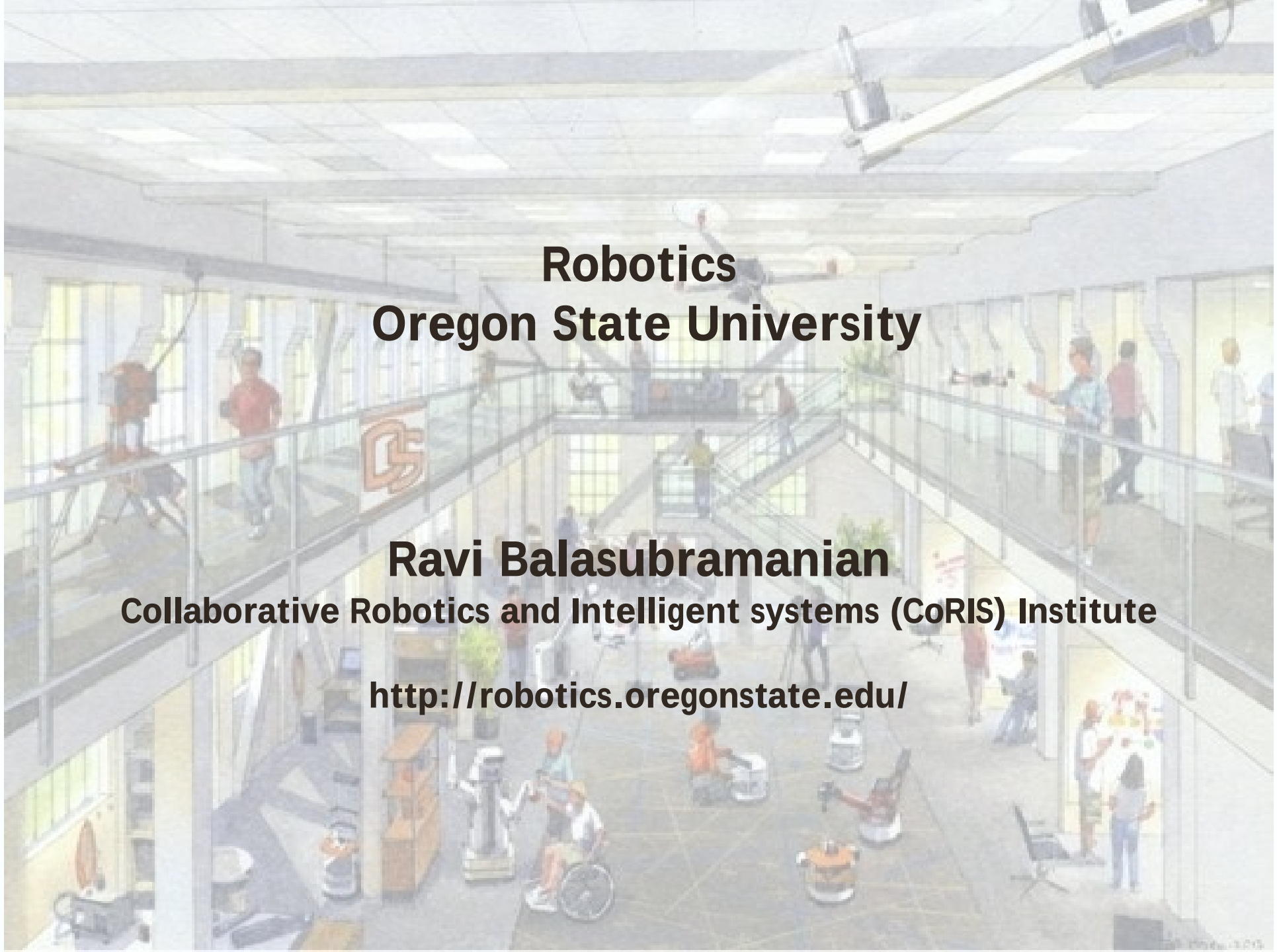
Experimental aerodynamics and stress analysis of flexible structures, environmental impact of wind energy, high-performance sailboats testing techniques, fiber composites technology, micro air vehicles, and biological flight mechanics.

Thesis Topic Ideas/Opportunities









Robotics
Oregon State University

Ravi Balasubramanian

Collaborative Robotics and Intelligent systems (CoRIS) Institute

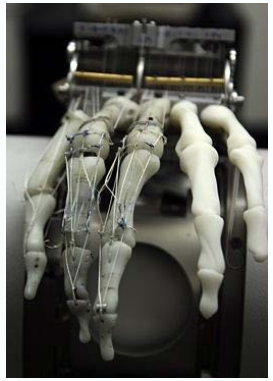
http://robotics.oregonstate.edu/

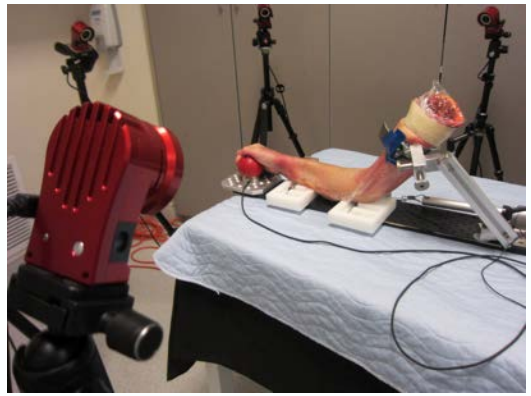
OSU Robotics Faculty

- 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

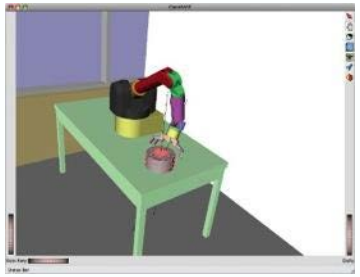
Robotics and Human Control Systems
Ravi Balasubramanian

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





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



College of Engineering and HC Thesis Mixer

Oregon State University
College of Engineering

Teaching

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

Sourabh V. Apte

School of MIME, Rogers 308

sourabh.apte@oregonstate.edu

http://web.engr.oregonstate.edu/~sva/

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)

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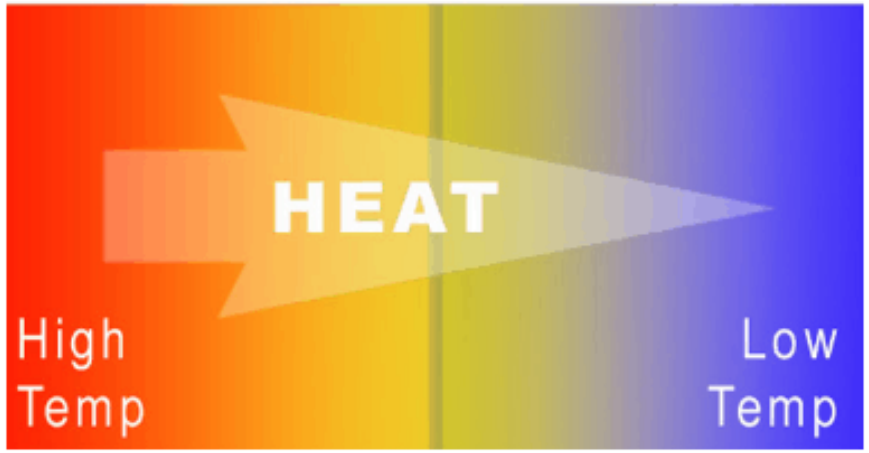
Teaching



Brian Fronk
School of MIME
Rogers 324
brian.fronk@oregonstate.edu

Research

- Thermal energy systems
- Thermal transport phenomena
- Energy efficiency

Thesis Topic Ideas/Opportunities

College of Engineering and HC Thesis Mixer

Oregon State University
College of Engineering

Teaching

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

python™ GitHub

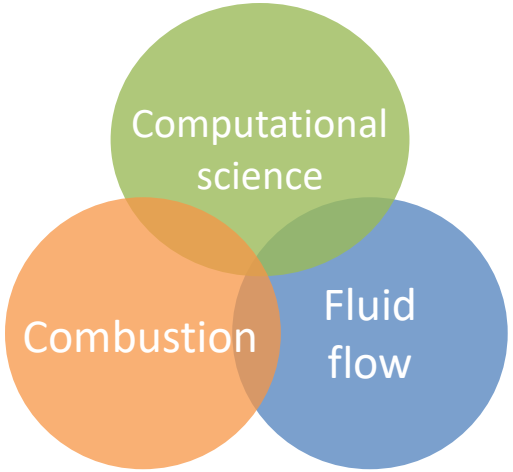
Kyle Niemeyer & Niemeyer Research Group

Kyle Niemeyer
Assistant Professor
Mechanical, Industrial, & Manufacturing Eng.
Rogers 320
kyle.niemeyer@oregonstate.edu
https://niemeyer-research-group.github.io

NRG

Research

OPEN SCIENCE



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