



MOLECULAR ENGINEERING & SCIENCES INSTITUTE

UNIVERSITY of WASHINGTON



Catalyzing world-class, cross-cutting molecular engineering research in BioTech and CleanTech theme areas at the University of Washington

Molecular engineering is a broad and evolving area of research that seeks to understand how molecular properties and interactions can be manipulated to design and assemble better materials, systems, and processes for a wide-variety of applications. The Molecular Engineering & Sciences Institute at the University of Washington is home to an interdisciplinary community of researchers who use molecular engineering to tackle grand challenges in health and energy, areas in which the outstanding needs are complex and call for creative solutions that transcend disciplines.

Research



MoES faculty and students utilize molecular engineering principles and methods to research innovative biotechnology and clean energy solutions. MoES builds on UW expertise in these areas by fostering interdisciplinary teams that bring fresh ideas to societal challenges.

Education



A pioneer in molecular engineering education, MoES launched one of the first molecular engineering PhD programs in 2014. MoE students receive exceptional training through core courses and research opportunities with distinguished faculty from across UW.

Community



The MoES community reflects the inherent interdisciplinary nature of molecular engineering with more than 130 faculty members from over 20 departments. Institute staff provide this growing research community with grant, communications, event and building support.

Facilities



Designed to promote collaborative molecular-scale research, the MoES building houses numerous faculty research groups as well as the Molecular Analysis Facility, a state-of-the-art facility with extensive microscopy, spectroscopy, and surface science capabilities.



Accelerating Molecular Engineering Through Modern Infrastructure

The Molecular Engineering & Sciences Building accommodates sophisticated molecular-level engineering research – its location and design minimize vibration and electromagnetic interference that could otherwise impact sensitive equipment and experiments.

This space is utilized by the Institute’s Molecular Analysis Facility (MAF), an advanced characterization facility for use by scientists and engineers at UW, outside institutions, and industry. MAF tools enable researchers to probe the properties of the molecular assemblies they’ve engineered, which can inform the design of advanced biomedical devices, drug delivery systems, solar cells, photonic sensors, and thin films for a variety of applications.

The open layout of MoES lab and office spaces promotes interaction and collaboration among scientists, creating a fertile and creative environment for research and discovery. The MoES Building is the permanent home of the research groups of UW faculty David Baker, James Carothers, Dave Castner, Corie Cobb, Lara Gamble, Hugh Hillhouse, Vince Holmberg, Eric Klavins, Christine Luscombe, and Georg Seelig.

MoES Building Overview

- ▶ Built 2012
- ▶ 90,300 sq ft
- ▶ 4 floors of research labs & offices, plus ground floor instrument facility
- ▶ Naturally vented offices & radiant heating
- ▶ LEED Gold rating

Institutes & Centers Located in MoES

- ▶ Center for Intracellular Delivery of Biologics
- ▶ Clean Energy Institute
- ▶ Institute for Protein Design
- ▶ Institute for Nano-Engineered Systems
- ▶ National ESCA & Surface Analysis Center for Biomedical Problems (NESAC/BIO)



Faculty members across UW



Departments represented



MoE graduate students

“We are training the next-generation of molecular engineers to think creatively and work across disciplines to engineer solutions to complex challenges impacting society.”

– Patrick Stayton, MoES Director

Institute Activities

- ▶ Weekly seminar series
- ▶ Faculty collaboration grant program
- ▶ Faculty startup partnerships and matching
- ▶ Communications support
- ▶ Meeting and conference event management
- ▶ Building renovation and modification support



Featured Research

There are many potential applications of molecular engineering, faculty and students at MoES conduct research in one of two focus areas: *Biotech and Cleantech.*



The research group of biochemistry professor David Baker is developing and applying methods for computationally designing new peptides, enzymes, nanomaterials, biosensors and protein-based therapeutics. A world leader in computational protein design, the Baker lab was the first to design a protein with a novel fold and enzymes with non-natural chemistries. In 2012, Baker launched the Institute for Protein Design with the aim of designing a new world of proteins to address 21st century challenges in medicine, energy, and technology.



The research of materials science & engineering professor Christine Luscombe focuses on the design, synthesis, and applications of functional macromolecules. Polymeric materials are a more lightweight, flexible, and cost-effective alternative to conventional materials such as silicon. Her research group aims to develop new methods for making semiconducting polymers and to create new polymers with improved light absorption, charge transport, and stability. Luscombe is also MoES’ Associate Director of Education.

