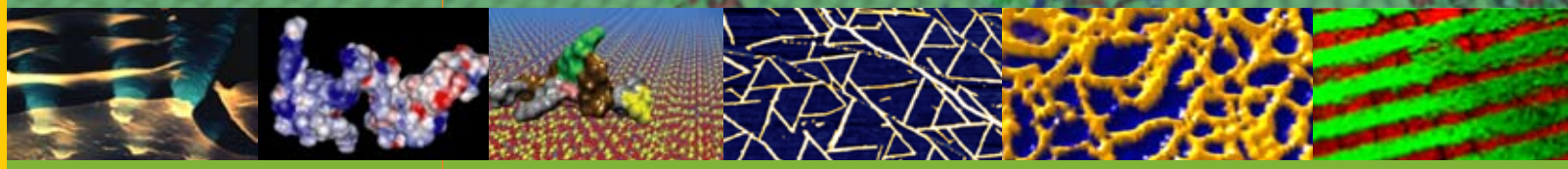
GENETICALLY ENGINEERED MATERIALS SCIENCE
AND ENGINEERING CENTER (GEMSEC)

Imitating Biology Molecule-by-Molecule to Design and Tailor the Next Generation of Engineered Materials for Functional Nanosystems



University of Washington

GEMSEC

GEMSEC's interdisciplinary team of scientists and engineers design and synthesize peptide-based molecular materials for technology and medicine.

Proteins are the major biomolecules performing a myriad of specific functions that make biology viable. Similarly, center developed GEPIs (genetically engineered peptides for inorganic materials) are the fundamental building blocks in Molecular Biomimetics. Adapting biology to practical engineering, GEMSEC researchers genetically design and construct peptides as molecular synthesizers, linkers, and assemblers to better control biology/materials interfaces. GEMSEC harnesses this fundamental knowledge to engineer novel materials and devices beyond what MSE can accomplish today.

GEMSEC's interdisciplinary scientists work at the confluence of physical sciences (chemistry and physics), biological sciences (molecular biology and genetics) and materials engineering (metals, ceramics, semiconductors, and polymers). Drawing on this wide expertise, GEMSEC is well equipped to discover the fundamentals of peptide-enabled material formation, controlled molecular self-assembly, and nanostructures for designed and addressable functions.

HIGHLIGHTS . . .

Molecular recognition, material selectivity, and self-assembly are the keys to the utility of engineered peptides.

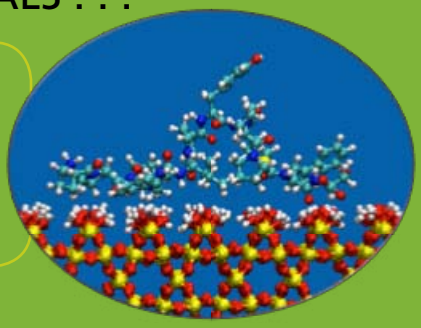
Center researchers are exploring and discovering genetically designed peptide based molecular materials through environmentally being processes.

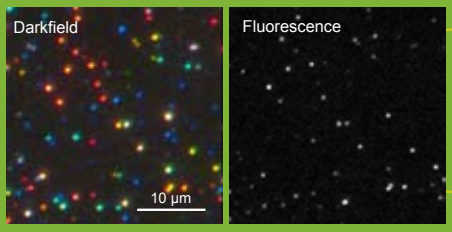
GEPIs link, erect, and assemble nano- and molecular materials to create tailored functionality.

DIRECTOR: Mehmet Sarikaya
http://depts.washington.edu/GEMSEC

RESEARCH FUNDAMENTALS . . .

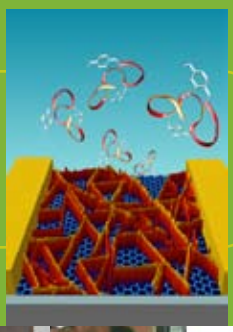
One unique aspect of GEMSEC research is the nanobiosynthesis of inorganics and their controlled assembly under ambient conditions in aqueous solutions.





Linking nanomaterials to create ordered hybrid functional assemblies.

Designing bio/nano interfaces enabling self-assembled functional nanosystems.

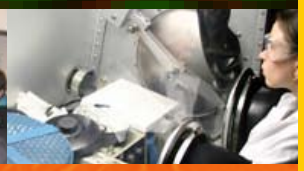


"Our ability to develop nano- and molecular materials through the controlled manipulation of peptides will allow genetic design of practical engineered systems that will revolutionize the way we perform materials science and engineering in this century."

Mehmet Sarikaya, Director
GEMSEC







GEMSEC OFFERS DIVERSE EDUCATION AND PARTNERSHIPS...

- Classes on the nano- and bio-interfaces for undergraduates and graduates
- **NANOVISION:** a K-12 visitation on microscopy, imaging, magnification, and resolution
- **Materials Summer Camp:** Workshop for High School Students
- **RET - Research Experience for Teachers:** Materials Camp for Teachers (in collaboration with ASM-International) and teachers' research towards developing teaching modules
- **REU - Research Experience for Undergraduates:** summer and full year, hands-on research experience at the cutting edge of science.
- **NEU-UNIQUE:** Nanoscience Education for Undergraduates—Using Nanoscience Instrumentation for Quality Undergraduate Education
- **GloBMi:** Global Biomimetics Materials (institute) network
- **SECF:** Shared Experimental and Computation Facilities, a member of MRSEC-MFN and NNIN
- Partnerships with Native American communities in Research and Education

OUTREACH

More information about the workshops, internships, partnerships, and educational opportunities are available at: http://depts.washington.edu/gemsec/education