

University of California, Irvine

THE DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
MSE 298 SEMINAR

FALL 2025: MSE IN THE SPOTLIGHT

**Professor
SungWoo Nam**
Mechanical and Aerospace
Engineering



RESEARCH TALK:
***STRETCHING POSSIBILITIES: STRAIN-TUNED VAN
DER WAALS MATERIALS***

SHORT CAREER TALK:
***INNOVATION AT THE INTERSECTIONS: MY CAREER
IN INTERDISCIPLINARY SCIENCE***

Abstract: Mechanical deformations such as buckling, wrinkling, and delamination are typically viewed as threats to mechanical integrity and are avoided in the traditional design of materials and structures. Our work challenges this conventional view by tailoring such mechanical instabilities to create strain-engineered materials. In this talk, I will present our research on strain-engineered van der Waals (vdW) materials and the emergent, reconfigurable material properties that arise from controlled mechanical deformation. First, I will introduce our methods for fabricating controlled mechanical deformations in vdW materials and demonstrate how strain engineering can modulate a wide range of properties, including exciton localization and drift. I will then discuss our work on interfacial control using vdW materials to manipulate fracture modes in thin films, enabling strain-resilient electrical functionality for flexible electronics. These mechanically-induced modulations at the atomic level open the door to unconventional and reconfigurable properties, with potential applications in next-generation deformable electronics and quantum devices.

Bio: SungWoo Nam is a Professor and Associate Chair in the Department of Mechanical and Aerospace Engineering at the University of California, Irvine. His research focuses on strain engineering of atomically-thin materials to uncover novel functionalities for electronic and quantum applications. Until 2021, he was an Associate Professor and the Anderson Faculty Scholar at the University of Illinois at Urbana-Champaign. He earned a bachelor's degree in Materials Science and Engineering from Seoul National University, and a master's degree in Physics and a doctorate in Applied Physics from Harvard University. His research has been recognized with several awards, including The TMS Early Career Faculty Fellow Award, NSF CAREER Award, AFOSR and ONR Young Investigator Program Awards, and the NASA Early Career Faculty Award.

DATE: Thursday, October 2, 2025

TIME: 2:00 - 3:20 PM

**LOCATION: McDonnell Douglas Engineering
Auditorium**