BIOENGINEERING SEMINAR

FALL 2021

Micro/Nano Mechanics and Photonics with Atomically-Thin 2D Materials for Biomedical Engineering

Abstract

Nanomaterials have shown potential for high-performance functional materials especially in emerging flexible and wearable biomedical and health applications. Structuring of nanomaterials, including atomically-thin two-dimensional (2D) materials (e.g. graphene) and combining 2D materials with conventional materials such as metals and polymers can enable new functionalities and high performance by engineering exceptional and outstanding mechanical, electrical, and optical properties. In my talk, I will discuss how engineering structures of 2D atomic-layered materials allows for the enhancement of material properties and creating of new functionalities. I will introduce a mechanical manufacturing approach, which allows large-scale, uniform nanostructures with 2D atomic layers and enables mechanical stretchability and strain-tunable sensing for flexible optoelectronic devices. I will also discuss how multi-dimensional hybrid nanomaterials combining three-dimensional graphene and metallic nanoparticles can be produced in large scale with low production cost by transient laser photothermal processing. I will highlight the potential of the multi-dimensional nanohybrid structured materials in biomedical health applications.

Biography

Pilgyu Kang is an Assistant Professor in the Department of Mechanical Engineering and Affiliate Faculty in Department of Bioengineering and Department of Electrical and Computer Engineering at George Mason University. Prior to joining GMU, he conducted postdoctoral research at University of Illinois at Urbana-Champaign. He obtained his Ph.D. in Mechanical Engineering in 2014 at Cornell University and earned a M.S. degree in Mechanical Engineering in 2009 from Carnegie Mellon University. He earned a B.S. degree in Mechanical Engineering with a minor in Electrical Engineering in 2007 at Seoul National University. His research at the GMU focuses on Micro/Nano Scale Mechanics and Photonics with Atomically-Thin 2D Materials. His research aims to create high performance materials with new functionalities in mechanical, optical, electronic properties by using a main approach of nanostructuring 2D materials into 3D structures. He explores various fields including Nanophotonics, Optofluidic, Optoelectronics, and Plasmonics for broad applications of Nano Bio Sensors. Dr. Kang has published many papers in high impact journals including Nature Electronics and Advanced Materials, and his work has been recognized through a number of journal covers and reception of awards.

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Thursday, September 23
12:00-1:00 pm

Join Zoom Meeting:
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