



Department of Biomedical Engineering

香港城市大學
City University of Hong Kong

Hosted by Prof. Yu SONG

Materials Design and Integration for Bioelectronic Medicine

Dr. Wubin Bai

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Date: 12 March 2025
Time: 2:00 pm - 3:00 pm
Venue: LT-13, 4/F
Yeung Kin Man Academic Building

Abstract

DNA and proteins naturally fold into intricate three-dimensional structures, enabling a wide range of essential biological functions. Mimicking these natural structuring principles in engineered materials offers immense potential, especially in medical technologies. Our lab leverages the distinctive characteristics of soft and nanomaterials to create advanced electronic systems with bioinspired architectures, capable of seamlessly integrating with living tissues, medical robotics, and other dynamic systems for applications in biosensing, drug delivery, and therapeutics. This presentation will explore key innovations including: i) 3D folding of monocrystalline silicon at microscales for high-precision strain sensing; ii) skin-like sensory robots for electronic implants; iii) automated, digital drug delivery systems; and iv) a wireless wearable system that leverages AI and near infrared light for continuously measuring deep-tissue mechanics. These efforts aim to enhance our understanding of the interface between heterogeneous materials, paving the way for unconventional integrations of bioelectronics to advance healthcare.

Biography

Wubin Bai is an assistant professor at the University of North Carolina at Chapel Hill. He obtained BS degree in physics from the University of Science and Technology of China in 2011. He received PhD degree from the Department of Materials Science and Engineering at Massachusetts Institute of Technology in 2016. From 2016 to 2020, he was a postdoctoral researcher in Professor John Rogers' lab at the Querrey Simpson Institute for Bioelectronics. His lab focuses research on the heterogeneous integration of soft materials and nanomaterials to design and develop devices for healthcare. His research has been recognized with Hettleman prizes, NeuroSpark award, Biotech TRG award, NC TraCS award, NSF CAREER award, Materials Today Rising Start award, and others.