UCONN
COLLEGE OF ENGINEERING
BIOMEDICAL ENGINEERING

UCONN
HEALTH

DEPARTMENT OF BIOMEDICAL ENGINEERING

# 2025 Fall Seminar Series

## Dr. Huibin (HB) Chang

**Associate Professor**
**Bioengineering Program**
**Department of Aerospace and Mechanical Engineering**
**University of Notre Dame**

**THURSDAY September 11, 2025**
**11am-12pm**
**WEBINAR**

## ABSTRACT:

***Toward Multi-Scale Structural and Functional Fibers: 3D Tissue Engineered Heart Models***

Helical alignment of micro/nanofibers is crucial for reproducing the complex 3D structures found in biological tissues such as heart musculature, but this has been challenging with existing technologies like 3D bioprinting and electrospinning. We developed additive textile manufacturing approaches to create large-scale 3D fiber scaffolds with controlled alignment and orientation. This system allows for high-throughput production of micro/nanofibers that conform to various 3D geometries with controlled alignment. Using these platforms, we engineered biohybrid ventricle scaffolds to examine the fundamental structure-function relationships of the heart's musculature, specifically the importance of its helical architecture. Our engineered ventricles, which recapitulate the helical alignment of the human left ventricle, demonstrate several key physiological achievements: reduced basal strain, uniform deformations, and the first in vitro demonstration of ventricle twist, a clinically relevant metric of cardiac health. Most importantly, we experimentally confirm a long-standing hypothesis that helical myofibril alignment is essential for achieving high ejection fractions, a finding previously difficult to test in animal models due to confounding factors. This work provides a powerful platform to study cardiac physiology and confirms the critical role of helical alignment in heart function.

## BIOGRAPHY

Huibin (H.B.) Chang is an Assistant Professor in the Bioengineering Program & Department of Aerospace and Mechanical Engineering at the University of Notre Dame. He received his Ph.D. from Georgia Institute of Technology in 2017, after which he completed postdoctoral research at Harvard/BWH/MIT from 2018-2024. He has published papers in high-impact journals, including Science, Nature Materials, Nature Food, Matter, and Carbon, etc. He has been named as 2022 MIT Technology Review 35 Innovators under 35 (Asia Pacific). At Notre Dame, his research group focuses on exploring cutting-edge manufacturing technology, biomaterials, and tissue engineering to engineer multi-scale and multi-functional fibers for personalized in vitro disease models, drug-screening, and drug delivery.

Join on-line:

For questions, please contact Visar Ajeti visar.ajeti@uconn.edu
Darcy Richard Darcy.Richard@uconn.edu