

## NANO-BME Seminar

**Time: 11:00AM Tuesday, Apr 9**

**Location: EP208 and <https://sdsmt.zoom.us/j/96294340132>**

### Developing Biomimetic Nanomaterials for Cellular Tissue Engineering

Faculty Candidate: Dr. Jue Hu, Ph.D., Assistant Research Scientist  
Iowa Institute of Oral Health Research. University of Iowa

**Abstract:** As defined by Dr. Langer and Vacanti, tissue engineering is “an interdisciplinary field which applies the principles of engineering and life sciences toward the development of biological substitutes that restore, maintain, or improve tissue function”. Typically, scaffolds, cells, and biologically active molecules are combined to form or repair functional tissues. My research focus on developing biomimetic scaffolds with nanomaterials for nerve/bone tissue engineering, and study on the drug delivery capacity of the functional scaffolds together with the stem cell differentiation. In this seminar, I overview my recent results on the study of Biomimetic Nanomaterials for Cellular Tissue Engineering. Three topics will be covered:

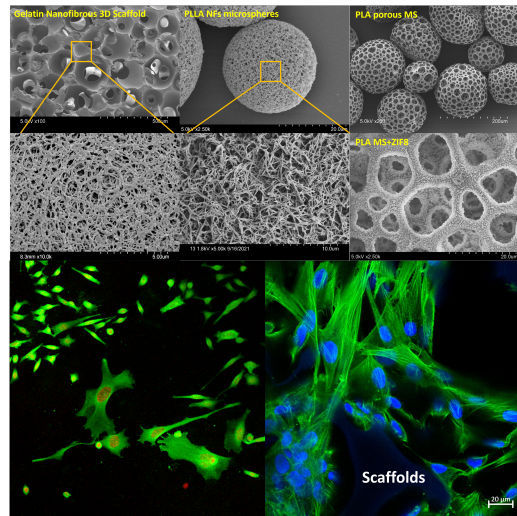
In the first part, the electrospun 2D nanofibrous scaffolds with different topography, drug loading, and outside electrical stimulation for nerve regeneration will be discussed.

In the second part, the focus will be on developing 3D nanofibrous and porous scaffolds for bone tissue engineering using thermally induced nanofiber self-agglomeration (TISA) and thermally induced phase separation & porogen-leaching (TIPS&P) techniques. Followed by the developing of injectable nanofibrous microspheres and injectable 3D hydrogel as cell carrier and drug delivery systems.

In the third part, I will discuss the development of nanoparticles-mediated drug/gene delivery systems with the combination of scaffolds.

These projects provide new scientific insights and set a solid foundation for my future work, which will be focus on stem cell behavior in the micro-environment with the aim of developing innovative and translational approach for tissue engineering.

**About the speaker:** Dr. Jue Hu has been developing innovative bio-inspired nanofibrous/porous scaffolds/hydrogel and drug/gene delivery technologies to promote stem cell differentiation and modulate inflammation at the University of Iowa since 2018. She received her doctoral degree in Textile Biomaterials & Technology from Donghua University, Shanghai, China in March 2017. She was a Joint-PhD student in the National University of Singapore, department of Engineering, Center for Nanoscience and Nanotechnology from Jan 2014 to Jan 2016. Before joining the University of Iowa, Dr. Hu also worked as a lecturer at Hunan University of Technology, Zhuzhou, Hunan, China. Dr. Hu was awarded the Excellent project award in Textile Academic and Creative Works Competition of 2011 and the Operative Dentistry Carl Svare Post-Doctoral Research Award of 2021. She has experience in nanomaterials, stem cells, drug delivery, 3D printing and 2D/3D scaffolds preparation.



Electron micrographs and fluorescence images of (cell-laden) nanofibrous scaffolds.

