

# Seminar Series



## Dr. Qiaobing Xu

Professor

Department of Biomedical  
Engineering

Tufts University

### Zoom link:

<https://bit.ly/3rArmiR>

### Password:

017873

## Synthetic Lipid Nanoparticle for Gene Therapy and Gene Editing

October 14 • 12:05–1:20 p.m.

### ABSTRACT

Recently, Dr. Qiaobing Xu and his team developed an effective strategy to synthesize a combinatorial library of biodegradable lipid nanoparticles using Michael addition. In contrast to many existing non-degradable cationic lipids, including lipofectamine, Dr. Xu's library of cationic lipid nanoparticles includes a disulfide bond in its hydrophobic portion, facilitating intracellular degradation of the nanoparticles and reducing toxicity. Dr. Xu and his lab showed that these bioreducible lipids efficiently deliver mRNA cargo into cells, facilitating the escape from endosomes in response to the reductive intracellular environment. The delivery of Cas9 mRNA complexed with bioreducible lipids enables gene editing with high efficiencies. In addition, Dr. Xu and his team demonstrated that these lipid nanoparticles are effective for delivering mRNA into hard-to-transfect cells, including stem cells, and lymphocytes.

### BIO

Dr. Qiaobing Xu is a professor in the Department of Biomedical Engineering at Tufts University. He also holds an adjunct position in the Department of Chemical and Biological Engineering and School of Medicine at Tufts University. He obtained his bachelor of science from Jilin University, Changchun, China, and his doctorate from Harvard University. He completed postdoctoral training at the Massachusetts Institute of Technology before joining Tufts University as an assistant professor in September 2010. He was promoted to full professor in 2021. His current research interests lie at the intersection of material science engineering, specifically micro/nanoscience, and biomedical application. His work involves using a combinatorial method to develop novel materials for the delivery of therapeutic biomacromolecules and using nanotechnology to develop novel biomaterials for tissue engineering. He received the Charlton Award from Tufts University School of Medicine in 2012 and was named the Pew Scholar for Biomedical Sciences from Pew Charitable Trusts in 2013. He received the National Science Foundation CAREER Award in 2015, and the Rising Star Award from the BMES/Cellular and Molecular Bioengineering Program in 2017. He was elected as a Fellow of AIMBE, class of 2020.