

BME Seminar

Wednesday, March 11, 2026

3:00 – 4:00 pm, MJIS 2001

Microsoft Teams meeting

Join: <https://teams.microsoft.com/join/29439842767101?p=6YaWmmFKW0hKsRNqo2>

Meeting ID: 294 398 427 671 01

Passcode: ox2ok3mp

“Precision Nanomaterials for Cancer Immunotherapy and Bioengineering”



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Abstract: Precision nanomaterials are transforming bioengineering by making therapeutic function programmable and measurable in vivo. In this seminar, I will present three complementary efforts that use molecularly defined design to program biological function and enable quantitative in vivo readouts. First, I will describe prodrug-tethered lipid nanoparticles (LNPs) that couple controlled intracellular drug release with cytokine mRNA delivery to amplify antitumor immunity while improving safety. Second, I will discuss lung-targeted intravenous mRNA vaccination that redirects antigen expression to the lung to promote local immune surveillance and durable tumor protection. Third, I will introduce precision chemical barcode system for nanoparticles encoding and quantification. Together, these studies position precision and encoded nanomaterials as a new operating paradigm for nanobiomaterials.

Bio: Qiangqiang Shi, is a postdoctoral researcher in Bioengineering at the University of Pennsylvania in Prof. Michael Mitchell's laboratory. His research centers on precision nanomaterials for drug and mRNA delivery, with an emphasis on cancer immunotherapy. He develops prodrug-tethered lipid nanoparticles (LNPs) for controlled immunomodulation, lung-targeted intravenous mRNA vaccine strategies to program local anti-tumor immunity. He also develops chemical barcode system that enables built, read, and encode information into nanoparticles. He has authored first/co-first-author papers in Nature Nanotechnology, Nature Chemistry, Nature Reviews Cancer, and PNAS and other leading journals.