UC San Diego
JACOBS SCHOOL OF ENGINEERING
Aiiso Yufeng Li Family Department of Chemical and Nano Engineering

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DEPARTMENT SEMINAR

Wednesday, February 19th, 2025
11:00 AM - 12:00 PM
FAH 4201

Dr. Jinjun Shi, PhD

"RNA Nanomedicine for Cancer Immunotherapy and Beyond"

Associate Professor
Brigham and Women's Hospital
Harvard University

Abstract: Synthetic RNAs have demonstrated enormous potential in biomedical applications, with their capability to regulate the expression of any genes of interest and to target 'undruggable' pathways. The success of RNA medicine is exemplified by recent clinical approval of multiple mRNA vaccines and siRNA therapies. In this seminar, I will present nanotechnology-mediated systemic delivery of synthetic RNAs for treatment of cancer and atherosclerosis. My laboratory has demonstrated the feasibility of applying mRNA nanoparticles to restore tumor suppressors, such as PTEN and p53, in human and murine cancer cells. The reactivation of PTEN/p53 could not only inhibit tumor growth, but also improve the tumor's sensitivity to other therapies such as immune checkpoint blockade. More recently, we have discovered that nanoparticle co-delivery of PTEN mRNA and immunostimulant could effectively and selectively target immunosuppressive cells in the tumor tissue. In addition to mRNA, we have also developed targeted nanoparticles to deliver siRNA to atherosclerotic macrophages for silencing plaque-destabilizing genes. Our studies suggest that synthetic RNA nanomedicine may provide a compelling strategy for treatment of cancer and atherosclerosis.

Bio: Dr. Shi is an Associate Professor at Harvard Medical School and a co-founding faculty member of the Center for Nanomedicine at Brigham and Women's Hospital. He has a broad interest in nanomedicine, biomaterials, RNA therapy, and immunotherapy for transformative biomedical applications. His research work has contributed to the formation of two biotech companies, Selecta Biosciences (now named Cartesian Therapeutics) and Seer, both of which are listed on Nasdaq. His laboratory is now focusing on i) novel nanotechnologies for durable RNA therapy; ii) organ-selective nanoparticle delivery; and iii) immuno-nanotherapeutics. He is an Elected Fellow (2021) of the American Institute of Medical and Biological Engineering (AIMBE) for outstanding contributions to development and clinical translation of immuno-nanotherapeutics and RNA nanomedicines. Since 2022, he has been recognized as a Clarivate Highly Cited Researcher. He received his B.S. from Tsinghua University and his Ph.D. in Chemistry from Texas A&M University.

Seminar Host: Liangfang Zhang