

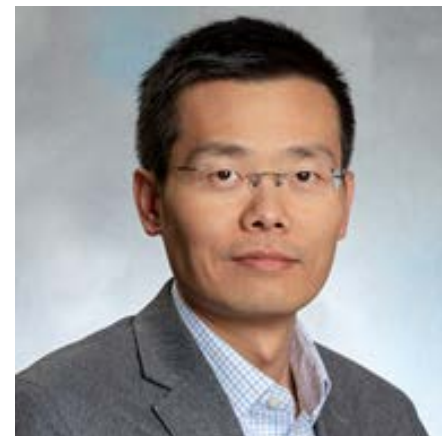
UNIVERSITY OF MIAMI

THE DR. JOHN T. MACDONALD FOUNDATION  
BIOMEDICAL NANOTECHNOLOGY INSTITUTE  
BioNIUM



# BioNIUM

## Lecture Series



**DR. JINJUN SHI PRESENTS:**

**RNA Nanomedicine:**

**An Emerging Therapy for Cancer and Atherosclerosis?**

**Wednesday, October 20, 2021 @ 3:30 PM**

**[CLICK HERE TO JOIN ZOOM MEETING](#)**

MEETING ID: 975 5650 1593

PASSCODE: 678804

## ABOUT THE LECTURE

Synthetic RNAs have demonstrated enormous potential in biomedical applications, with the capability to regulate the expression of individual genes and to target “undruggable” pathways. The success of RNA therapy is exemplified by the recent FDA approval of mRNA vaccines for COVID-19 and siRNA drugs for genetic disorders. In this lecture, I will present the use of nanoparticles for systemic delivery of synthetic RNAs to treat cancer and atherosclerosis. We 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 chemotherapy or immunotherapy. In addition, we developed targeted nanoparticles to deliver siRNA to lesional macrophages for atherosclerotic cardiovascular disease. By silencing calcium/calmodulin-dependent kinase-II $\gamma$  (CaMKII $\gamma$ ), a key mediator of impaired macrophage phagocytosis of apoptotic cells (efferocytosis) and inflammation resolution, we showed that targeted siCamk2g nanoparticles improved plaque stability by reducing necrotic core area and increasing fibrous cap thickness. Our studies suggest that synthetic RNA nanoparticle delivery may provide a novel strategy for effective treatment of cancer and atherosclerosis.

## ABOUT THE SPEAKER

Dr. Jinjun Shi is an Associate Professor at Harvard Medical School and a faculty member in the Center for Nanomedicine at Brigham and Women’s Hospital. His laboratory has a broad interest in nanotechnology, biomaterials, RNA therapy, and immunotherapy for transformative biomedical applications. Notably, the immuno-nanotherapeutic technology developed by him and colleagues has led to the clinical trials of synthetic nanoparticle vaccines by Selecta Biosciences. His laboratory research is currently focusing on i) RNAi delivery for gene silencing; ii) mRNA delivery for protein restoration; iii) nanotechnology-mediated immunotherapy; and iv) development of stimuli-responsive biomaterials. He is an elected Fellow of the American Institute of Medical and Biological Engineering (AIMBE).