Upcoming Seminar

UNT

Department of Materials Science and Engineering

2:30 pm Jan. 26, 2018 at Discovery Park B155

Precise Manipulation and Transfection of Single Cell on Nano-Electroporation Platform

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One of the cutting-edge multidisciplinary research themes in Biomedical Engineering is to design and manufacture advanced Biomedical Micro-/nano-devices for life science, ranging from *in vitro* cell biology toward *in vivo* medicine. In recent years, nanotechnologies and nanomaterials have facilitated the development of bio-chips and devices which have demonstrated unprecedented capabilities in single cell analysis and manipulation. In this talk, a novel nano-biotechnology, nano-electroporation (NEP), is introduced with emphasis on high-throughput, and precisely delivery of gene / drugs into living cells at single-cell resolution. Cleanroom micro-/nano-fabrication techniques are involved in fabrication of the nano-chip. Micro-manipulation techniques, including magnetic tweezers, di-electrophoresis (DEP) and microfluidics, are invented to precisely control and capture cells on the chip for localized gene transfection.

The *in vitro* applications of the NEP platform have been demonstrated in the studies of intracellular cancer biomarker detection in leukemic cells, cardiomyocytes, T lymphocytes and glioma stem cells. Our latest efforts have achieved *in vivo* cell reprogramming for on-body gene therapy and wound healing. The future research of this nano-technique for flexible wearable drug delivery platform with the aims to patient-specific gene therapy and regenerative medicine are discussed.

Bio: Dr. Lingqian Chang is currently an assistant professor of Biomedical Engineering at University of North Texas. He received his Ph.D. degree in Biomedical Engineering from The Ohio State University (OSU) in 2016. Before join faculty at UNT, he was a postdoctoral fellow in Department of Mechanical Engineering at Northwestern University. His research interests are in the fields of micro-/nano-fabrication, Micro-/nano-technology, BioMEMS, and Lab-on-Chip systems with their application in gene delivery and cancer detection. His current research focus includes flexible patchable biomedical nano-device for *in vivo* gene delivery, therapy and regenerative medicine; novel micro-/nano-fabrication technologies for biomedical applications, and high-throughput BioMEMS devices for intracellular interrogation of gene editing (CRISPR-Cas9). In these fields he has co-authored over 40 publications on peer-reviewed international journals, such as ***Nature Nanotechnology, Nano Letters, Small, Lab Chip*** (as 1st or co-1st author of most of them). He also serves associated editor of the journal *European Journal of Biomedical Research* and the editorial board of *Computer in Biology and Medicine*.