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Deformable Composites: from Photostimulation to Living Bioelectronics

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Room 1200 EECS

ME Seminar Link
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Abstract:
The field of electronic and photonic biointerfaces continues to evolve, with flexible and living composites playing a key role in advancing the development of multifunctional devices such as sensors and modulators. Our research focuses on creating non-genetic approaches for biological modulation and sensing across different length scales. This presentation will provide insights into some of our recent projects. This includes our work related to photostimulation within clinical environments. We have made new progress in the development of a nanoporous/non-porous heterojunction, exemplifying the level of precision and control achievable in bioelectronic therapies.

We have also developed a granular system aimed at focal adhesion in bioelectronics and other interfaces for regenerative medicine. Additionally, we have begun exploring the integration of living cells with wearable bioelectronic devices, a new direction within the sphere of living bioelectronics. Our primary goal is to transition these basic studies of modulation tools into applicable clinical practices, with the potential to influence therapeutic strategies and improve patient outcomes. As I conclude the presentation, I will highlight our future research directions. These are designed to further contribute to the extensive field of biological modulation and sensing, with a specific focus on applications that could have a significant impact in the clinical setting.

Bio:

Dr. Bozhi Tian received his Ph.D. degree in physical chemistry from Harvard University. He then pursued postdoctoral studies at the Massachusetts Institute of Technology in regenerative medicine and tissue engineering. His current research focuses on developing materials for bioelectronics and semiconductor-enabled approaches to understanding subcellular biophysics, as well as studying dynamics at soft-hard interfaces. Dr. Tian's accolades include the Raymond and Beverly Sackler International Prize in the Physical Sciences and the Presidential Early Career Awards for Scientists and Engineers (PECASE).