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Novel processing of biodegradable and biocompatible polymers at small scales for medical applications

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Biodegradable polymers have a significant impact to medical field. The polymers have been extensively used for medical sutures, tissue engineering scaffolds and drug carriers. In this talk, I will present two researches which aim to further fabricate and process the polymers at small scales, enabling their special functions for use in important medical devices. The first part of this talk will be focused on a novel manufacturing technology, which allows creating versatile 3D microstructures of biodegradable polymers for vaccine/drug delivery. The second part of this talk will be emphasized on a novel approach, which enables the polymers to be electromechanically-active for use in an implanted biodegradable force-sensor, which could measure tiny vital bio-physiological forces such as trans-diaphragmatic/trans-pulmonary pressures. The presented works, while significantly enhancing functionality and usefulness of the polymers, do not compromise their excellent biodegradability and biocompatibility for medical use. We anticipate many other applications in health monitoring, drug delivering, tissue engineering etc. will be generated from the presented technology and method.

Biography

Thanh Duc Nguyen has joined the Departments of Mechanical Engineering and Biomedical Engineering at UConn at the beginning of 2016. His research is highly interdisciplinary and at the interface of biomedicine, materials and nano/micro technology. He did his Post-doctoral Fellowship with Dr. Robert Langer at MIT. His Post-doctoral research involved developing a platform technology which can create 3-dimensional microstructures of biomaterials, such as biodegradable and FDA-approved polymers for applications in vaccine/drug delivery and medical implants. In 2013, he obtained his PhD from Princeton University in the Department of Mechanical and Aerospace Engineering. There, he worked with Dr. Michael McAlpine to develop the field of biointerfaced nanopiezoelectrics, which aims to create advanced electromechanical materials/devices at nanoscales that can interface with biological cells/tissues for applications in harvesting, sensing and engineering cellular mechanics. His work has been published in prestigious journals and highlighted in major media such as *The New York Times and Nature*.

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