UCLA Engineering
HENRY SAMUELI SCHOOL OF
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BIOENGINEERING

PRESENTS

Engineering Elastomeric Hydrogels for Biomedical Applications

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2101 ENGINEERING V

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ABSTRACT:

Tissue engineering is an interdisciplinary field aimed at maintaining, restoring and promoting the normal function of organs and tissues through the use of live cells, and by incorporating concepts from engineering, biological sciences, and medicine. One of the central themes in the field of tissue engineering is the development of tissue constructs that mimic the three dimensional (3D) architectures of the native tissues. To date, tissue engineering has been successfully implemented in the engineering of different tissues including bone, cartilage, and vascular systems. Despite the significant progress in this field, many challenges still remain, which hinder the development of fully functional tissue constructs. Micro- and nanoscale technologies have been shown to hold great potential to address the current challenges in tissue engineering. These technologies have benefited the fields of experimental biology and medicine through the design of complex biomaterials that can be used for cell-based studies. Our research is focused on merging micro/nanofabrication techniques with advanced protein-based biomaterials and nanomaterials for tissue engineering applications. Our group has been actively involved in engineering novel cell-laden elastomeric hydrogels with unique physical and biological properties by using recombinant proteins. We use these bioelastomers as 3D matrices for various soft tissue engineering applications. In addition, we modify these protein-based hydrogels to increase their adhesion to tissues and use them as sealants, hemostats, and bioadhesives for different surgical applications. Our work encompasses a wide range of scientific subjects from bioengineering, chemistry, and materials science to biology. In this presentation, I will outline our work in the development of microscale protein-based hydrogels to modulate cell-microenvironment interactions for tissue engineering applications. I will also highlight some of the clinical applications of our engineered hydrogel as tissue adhesives and surgical sealants.

BIOGRAPHY:

Nasim Annabi is an Assistant Professor *of Chemical and Biomolecular Engineering at UCLA.* Annabi's research focuses on the design and engineering of next-generation biomaterials for regenerative medicine. This includes understanding how cells and biomaterials interact and developing new materials for tissue engineering. She has received major grants for her research from the National Institutes of Health, the Department of Defense and the American Heart Association. She joins UCLA from the faculty of Northeastern University in July 2018. Prior to Northeastern, Dr. Annabi was an instructor in medicine at Harvard Medical School and Brigham and Women's Hospital in Boston. She was also a postdoctoral fellow at Harvard's Wyss Institute for Biologically Inspired Engineering. Dr. Annabi received her Ph.D. from the University of Sydney, Australia in 2010.

Dr. Annabi's contributions appear in 9 patents/disclosures, 6 book chapters, and > 100 peer-reviewed articles in highly regarded journals such Science Translational Medicine, Advanced Materials, Advanced Functional Materials, Nano Today, ACS Nano,

Biomaterials, Biotechnology, etc. As of Nov 2018, her work has been cited > 6015 times with an H-index of 41. Dr. Annabi's interdisciplinary research has been recognized by several national and international awards including the Australian Prestigious Endeavour Award, the National Health and Medical Research Council Early Career Award, and the Bright Futures Award at Harvard University.