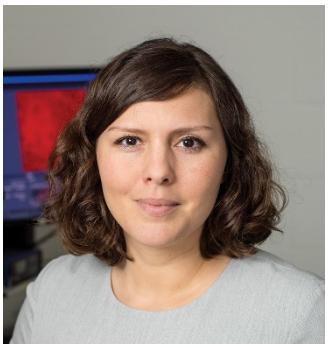
UC San Diego
JACOBS SCHOOL OF ENGINEERING
NanoEngineering

UCSD NANOENGINEERING/CHEMICAL ENGINEERING

Virtual SEMINAR SERIES

Wednesday, October 14, 2020
Seminar Presentation: 11:00am – 12:00pm PT
Zoom Seminar

"Engineered Disease Models with Aged Tissue Microenvironments"



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Chemical and Biomolecular Engineering Department
Bioengineering Graduate Program
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Abstract: The fact that the most significant life-threatening diseases of our times such as Cardiovascular Diseases or Cancer remains the number one killer for over a century suggests that, despite the advancements in science and medicine over the years, there is a huge gap in translating these scientific findings to clinical setting. One of the major reasons for this gap is pre-clinical research's heavy dependence on young animal models despite the fact that aging is the biggest risk factor for these diseases. For example, the average age for first heart attack is 65.3 years for males and 71.8 years for females, and most breast cancers develop in a postmenopausal, aged mammary gland tissue microenvironment at age of 62. Yet, due to the logistical limitations, current pre-clinical research predominately relies on experimental animals with a human-equivalent age of less than 35 years, which does not faithfully replicate the clinically prevailing aged tissue microenvironment. With increasing appreciation of the role of the tissue microenvironment in regulating disease progression and the response to therapeutics, there is an urgent need to develop, optimize and validate a novel 3D culture systems that fully recapitulates the aged tissue microenvironment in order to reproducibly model natural disease progression. In this talk I will present two engineered tissue models that we developed, an aged myocardial tissue model to study myocardial infarction (MI) and an aged breast tissue model to study breast cancer progression.

Educational Development and Training: Dr. Zorlutuna will also be discussing the topics of "Navigating the two-body problem in academic job search" and "Tenure-track with Toddlers".

Biosketch: Pinar Zorlutuna is the Sheehan Family Collegiate Chair and Associate Professor of Engineering in Aerospace and Mechanical Engineering Department, Chemical and Biomolecular Engineering Department, and in Bioengineering Graduate Program at the University of Notre Dame. Her research explores designing biomimetic environments for understanding and controlling cell behavior, and cell-cell and cell-environment interactions using tissue engineering, genetic engineering and micro- and nanofabrication approaches. Dr. Zorlutuna received her PhD in Biotechnology Program from a joint project between Middle East Technical University (Ankara, Turkey) and Interdisciplinary Research Center in Biomedical Materials, Queen Mary University of London (London, UK). Her PhD work focused on biomimetic tissue engineering towards fabricating a functional blood vessel tissue through 3D tubular co-culture of vascular cell types using nanopatterned scaffolds. In her first postdoctoral fellowship with Rashid Bashir at UIUC, she worked on utilization of stereolithography for engineering microfabricated 3D neuro-muscular tissue as a first step towards engineering cell-based soft robots or "Bio-bots". After that, she led Khademhosseini Lab's Tissue Engineering Subgroup at the joint Harvard-MIT Division of Health Sciences and Technology and Center for Biomedical Engineering at Harvard Medical School, working on various projects and supervising a group of about ten researchers of different educational levels and backgrounds. Her research has been published in high impact journals such as Advanced Materials, ACS Nano, Science Advances and Circulation Research. She received various awards including NSF CAREER Award and PECASE.