Microengineered Physiological Biomimicry: Human Organ-on-Chips

D. Dan Huh

Wilf Family Term Chair & Assistant Professor
Department of Bioengineering
University of Pennsylvania

Human organs are complex living systems in which specialized cellsand tissues are assembled in various proportions and patterns to carry out integrated functions essential to the survival of the entire organism. Lack of reliable model systems that recapitulate the complexity of living human organs poses major technical challenges in virtually all areas of life science and technology. This talk will present interdisciplinary research efforts focused on leveraging unique capabilities of microfluidics and microfabrication to develop microengineered biomimetic models that reconstitute complex structures, dynamic microenvironments, and physiological functionality of human organs. Specifically, I will talk about i) a bioinspired microsystem that mimics the structural and functional complexity of the alveolar-capillary interface in the living human lung, ii) a specialized *in vitro* human disease model that simulates pulmonary edema, and iii) a microengineered model of the ocular surface in the human eye.