

## Wallace H. Coulter Foundation Biomedical Engineering Seminar Series

**DR. JULIE PHILLIPPI** received her BS in Microbiology from the Pennsylvania State University and earned her PhD from Carnegie Mellon University. She joined the University of Pittsburgh faculty in 2007 and in 2019 was promoted to Associate Professor with Tenure in the Department of Cardiothoracic Surgery, School of Medicine, with a secondary appointment in the Department of Bioengineering. Dr. Phillippi is also the Director of Postdoctoral Research in the Department of Cardiothoracic Surgery. Dr. Phillippi is PI on an R01 award (2017-2022), a completed R56 award (2015-2016), and Co-I on an R01 award from NHLBI (2012-2018 and 2020-2024). Dr. Phillippi is a member of the American Heart Association and of the Executive Council for the International Society for Applied Cardiovascular Biology (ISACB). Dr. Phillippi is an Associate Editor with Science Advances, of the Science family of Journals with AAAS and a reviewer for the journals Stem Cells, Arteriosclerosis, Thrombosis and Vascular Biology, Acta Biomaterialia, Cardiovascular Research, Journal of Biomechanics, Journal of Clinical Investigation-Insight, and several others. She serves on the Executive Council for the ISACB and the Executive Committee for the McGowan Institute for Regenerative Medicine. Dr. Phillippi's research is focused on the role of perivascular progenitor cells and extracellular matrix biology in human aortic disease, microvascular remodeling, tissue-engineered disease models and new therapies for aortic disease.



### DR. JULIE PHILLIPPI

Professor of Cardiothoracic Surgery and Bioengineering

University of Pittsburgh

#### Extracellular Matrix Hydrogels for Microvascular Regeneration

**ABSTRACT:** The tri-layered anatomy of blood vessels (endothelium, smooth muscle and adventitia) underscores the importance of understanding the dynamic influence of each layer in cardiovascular disease. Foundational studies by Dr. Phillippi and colleagues uncovered medial smooth muscle cell responses to oxidative stress and a unique extracellular matrix fiber microarchitectural signature distinguishes the pathophysiology of bicuspid aortic valve-associated aortopathy from that of degenerative aneurysms of the human thoracic aorta. More recently, her laboratory has centered attention on the adventitia as an adaptive and dynamic player in human aortic disease and as a local source of progenitor cells. The vasa vasorum (Latin: the vessels of the vessels) is a network of microvessels infiltrating the adventitia of large blood

vessels to provide oxygen and nourishment. Dr. Phillippi's group identified microvascular remodeling of the vasa vasorum associated with evidence of chronic hypoxia in the medial layer of aneurysmal human aorta. In the setting of thoracic aortic disease, her lab's approach to characterize pericyte-mediated vessel homeostasis employs several tissue-engineered models of disease using human aortic specimens and primary cells from all three blood vessel cell layers and extracellular matrix-based hydrogels. It is anticipated that this work will lead to refinement of risk assessments toward improved clinical management of patients. The improved understanding of perivascular progenitor cells' governance of microvascular health could enable their regenerative potential to be harnessed for treatment of aortic disease in a minimally-invasive manner.



Through the generous support of the Wallace H. Coulter Foundation the Department of Biomedical Engineering facilitates weekly lectures each year during academic terms. Experts in all areas of Biomedical Engineering are invited to campus to provide a research seminar and to meet with faculty and students and to tour our academic and research facilities.

Friday, February ♥ 14, 2020  
9:00AM-10:00AM Room EC 2300