

**CONTROLLED DELIVERY OF REACTIVE SULFUR SPECIES FOR STIMULATING  
ANGIOGENESIS**  
**Urara Hasegawa**

Assistant Professor  
The Pennsylvania State University



**Abstract:** Hydrogen sulfide ( $H_2S$ ) and its oxidized metabolites, such as per/polysulfide species ( $H_2S_n$ ,  $RS_nH$ ,  $n \geq 2$ ), are categorized as reactive sulfur species (RSS) that have recently emerged as essential signal mediators along with reactive oxygen and nitrogen species. Recently, these sulfur species have been shown to play pivotal roles in the vascular system including induction of angiogenesis. Due to their inherent instability, there is a need to develop controlled RSS delivery systems in order to translate the knowledge of RSS biology into therapeutic applications. We have sought to develop polymeric micelle systems enabling generation of RSS in vascular endothelial cells in a controlled manner. In this talk, I will discuss the material design criteria and the impact of these nanostructures on controlling intracellular delivery of RSS. The effects of the RSS delivery systems on cellular function with an emphasis on stimulation of angiogenesis will also be presented.

**Bio:** Dr. Hasegawa is an assistant professor in the Department of Materials Science and Engineering at the Pennsylvania State University since 2020. She received her B.S. and M.Eng. in Applied Chemistry from Waseda University, Japan, and earned her Ph.D. in Biomedical Science from Tokyo Medical and Dental University, Japan. She worked as a postdoctoral fellow at École Polytechnique Fédérale de Lausanne (EPFL), Switzerland. She joined the Department of Applied Chemistry at Osaka University, Japan, as an assistant professor in 2011, and then moved to the Department of Chemical Engineering at Kansas State University in 2017. Her research focuses on the development of polymeric nanomaterials for controlled delivery of drugs and redox signaling molecules. Currently, her group is developing functional polymeric biomaterials by applying the principles of chemistry, nanotechnology, and biomedical science. Her work has been recognized with several awards including Osaka University Presidential Award for Encouragement in 2015, Warren and Gisela Kennedy Keystone Research Scholar in 2019 and NSF CAREER award in 2020 and Wilson Research Initiation Award in 2022.