JOHNS HOPKINS
BIOMEDICAL ENGINEERING

BME COVID-19 SEMINAR SERIES

Amanda Randles, Ph.D.
Assistant Professor
Department of Biomedical Engineering
Duke University

Date: Monday, March 1st, 2021
Time: 1:30 p.m.
Location: Virtual – Zoom

Faculty Host: Jamie Spangler

Massively Parallel Simulations of Hemodynamics in the Human Vasculature

Abstract: The recognition of the role hemodynamic forces have in the localization and development of disease has motivated large-scale efforts to enable patient-specific simulations. When combined with computational approaches that can extend the models to include physiologically accurate hematocrit levels in large regions of the circulatory system, these image-based models yield insight into the underlying mechanisms driving disease progression and inform surgical planning or the design of next generation drug delivery systems. Building a detailed, realistic model of human blood flow, however, is a formidable mathematical and computational challenge. The models must incorporate the motion of fluid, intricate geometry of the blood vessels, continual pulse-driven changes in flow and pressure, and the behavior of suspended bodies such as red blood cells. In this talk, I will discuss the development of HARVEY, a parallel fluid dynamics application designed to model hemodynamics in patient-specific geometries. I will further discuss the application of HARVEY to study a range of diseases.

Bio: Amanda Randles is the Alfred Winborne Mordecai and Victoria Stover Mordecai Assistant Professor of Biomedical Sciences at Duke University. Amongst other recognitions, she has received the ACM Grace Murray Hopper Award and the NIH Director's Early Independence Award. She was named to the World Economic Forum Young Scientist List and the MIT Technology Review World's Top 35 Innovators under the Age of 35 list, and is a Senior Member of the National Academy of Inventors. Amanda received her Ph.D. in Applied Physics from Harvard University and her Bachelor's degree in Computer Science and Physics from Duke University. She has contributed over 40 peer-reviewed papers, over 100 granted US patents, and has more than 100 pending patent applications.