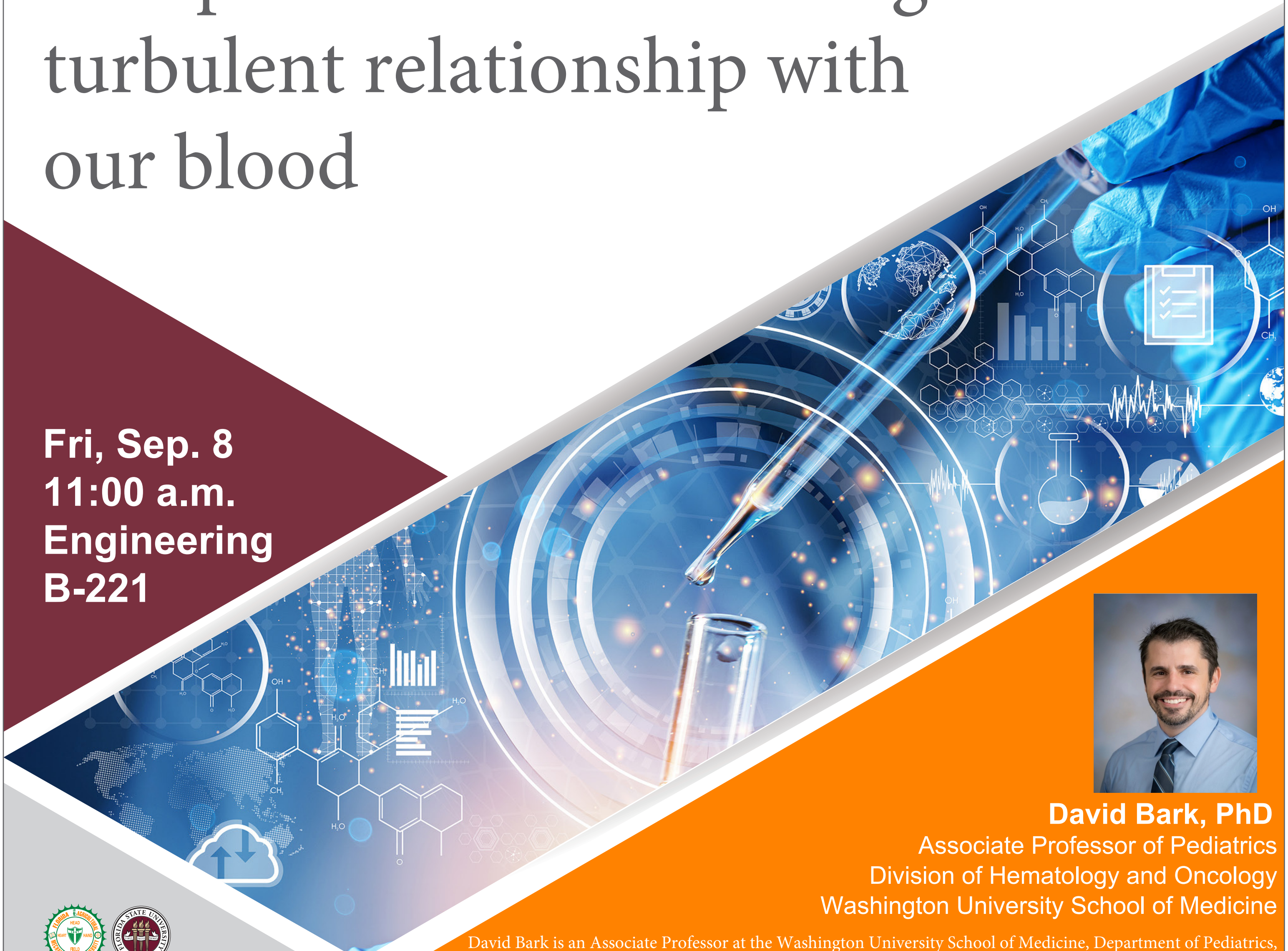
ENGINEERING SEMINAR ANNOUNCEMENT

Pumps and disease creating a turbulent relationship with our blood

Fri, Sep. 8
11:00 a.m.
Engineering B-221



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David Bark is an Associate Professor at the Washington University School of Medicine, Department of Pediatrics, Division of Hematology Oncology and Biomedical Engineering. He is the Chair of the Biorheology Scientific Standardization Committee of the International Society of Thrombosis and Haemostasis (ISTH). He completed his PhD in bioengineering and MS in mechanical engineering from the Georgia Institute of Technology, and completed his BS in mechanical engineering at the University of Illinois at Urbana/Champaign. This brought him to his postgraduate experiences, which included research fellow positions at the University of Canterbury in Christchurch, New Zealand where he developed computational models of blood flow, and the Australian Centre for Blood Diseases at Monash University in Melbourne, Australia where he delved deep into experimental platelet biology; and postdoctoral fellow in the Department of Mechanical Engineering at Colorado State University where he focused on heart valves. In 2017, Dr. Bark joined the Department of Mechanical Engineering at Colorado State University as an assistant professor. In 2020, he moved to his current position in Pediatric Hematology Oncology at the Washington University School of Medicine.

FAMU-FSU College of Engineering

This event sponsored by FAMU-FSU Department of Chemical & Biomedical Engineering

Mechanical circulatory support used to treat patients with heart failure often leads to two seemingly disparate events: bleeding and thrombotic (blood clot) complications. Similar complications can be seen in other blood contacting devices and in some disease, like an aortic stenosis. We recently found that turbulence, occurring in these environments, can profoundly affect blood components when compared to laminar flow environments. Turbulence does this by inducing both thrombotic and hemorrhagic changes in the blood environment. Here, we will discuss the flow environment in mechanical circulatory support, how we can reproduce it in benchtop experiments, and how these environments affect platelets, red blood cells, and plasma proteins. We further use an animal model to support these findings in a physiologic environment. Overall, this work may lead to guidance for how future mechanical circulatory support is designed and in how these devices are used with patients.