Joint Biomedical Engineering Seminar Series
MU ▪ MCW ▪ UWM

SEMINAR
Friday, January 19th, 2018
12:00 – 1:00 pm
HRC Auditorium

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"How can we use blood flow patterns to diagnose cardiovascular diseases?"

"The early detection of cardiovascular diseases, a leading cause of death worldwide, is an important task for doctors. State-of-the-art non-invasive medical imaging technologies can provide both anatomic and blood flow data. However, it is not straightforward to use these data in clinical practices since the links between blood flow patterns and pathological conditions are not well-established. In this talk, I present my recent works on using high-fidelity in-silico, in-vitro and in-vivo data to assist the diagnosing and treatment of cardiovascular diseases. Using high performance computing tools, I developed a computational framework for obtaining high resolution data of cardiovascular flows in patient-specific anatomies using imaged-guided data. I used the immersed boundary method in curvilinear grid formulation to efficiently deal with the complex anatomy. The advantage of this numerical method is that it allows the representation of the organ geometries, which are reconstructed from medical images, with accuracy and flexibility. I also designed the combination of immersed boundary method and finite-element method to compute the complex hemodynamics in the vicinity of implanted medical devices. Three particular problems will be discussed in this talk; i) blood flow dynamics of the heart; ii) heart valve dynamics and ii) brain aneurysms. This work demonstrates the feasibility to use high-performance computational tools with high-fidelity data for diagnosing cardiovascular diseases and virtual surgery. This work is supported by National Institute of Health, National Science Foundation, Minnesota Institute of Supercomputing, Institute for Advanced Computational Science at Stony Brook University and Argonne National Lab."

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Medical College of Wisconsin is located at 1101 N. 87th St., Milwaukee, WI 53226. Parking is available across the street in visitor parking. Refreshments will be served.