Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Quantification of Arterial Flow Using Planar Digital Subtraction Angiography Image Data with Applications to Hepatic Circulation BYRON PULLUTASIG, DEBANJAN MUKHERJEE, University of Colorado, Boulder — Digital subtraction angiography (DSA) is an imaging technique used to visualize blood flow in vessels using a contrast medium injected into the bloodstream. Spatiotemporal variations in image pixel intensities correspond to local flow and transport of the contrast medium in a vessel. DSA imaging is routinely used in a variety of procedures involving cerebral circulation, hepatic circulation, and applications in dialysis. Quantitative analysis of image pixel intensity data can provide valuable information on local flow, vascular network, and branching patterns. However, accounting for dynamic contrast agent movement, image noise due to breathing motion, and planar representation of 2D vasculature, can be challenging. In this presentation, we will describe a computational framework for quantification of flow and vasculature information from planar DSA image sequences. The framework is based on a combination of image processing operations and discretized matrix equations derived from pixel intensity values. We will illustrate the framework using example DSA sequences of the human hepatic circulation, and discuss applications of this technique in broader large artery hemodynamics modeling.

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Date submitted: 10 Aug 2020 Electronic form version 1.4