

Abstract Submitted
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Transient CFD Simulations of Dye Diffusions in A Square Tube Flow MARK JOHNSON, ZIFENG YANG, Wright State University — In using medical imaging techniques such as angiography, contrast agents are injected into the blood flow to provide contrast in the resulting images. Using these images to calculate flow field quantities is possible with the optical flow method (OFM). This method has high spatial resolution as it calculates velocity vectors at each pixel in the image. However, the accuracy of the velocity field result is questionable, especially for complex 3D flow configurations. The cause of these inaccurate measurements roots in direct projection of a 3D flow on to a 2D image. To atone for these 3D-2D projection errors, the known 3D flow field for 2D projections is required by using Computational Fluid Dynamic (CFD) software to simulate the transient flow in both the laminar and turbulent regime. These simulations are representative of a parallel experimental setup which will be used for comparisons. This is the first phase in which these simulations are used to generate 2D images in comparison with experimental results. Later, the generated 2D images and the 2D velocity fields coupled with the simulated 3D flow will be used to train a machine learning program, which will make it capable of using 2D angiography images to reveal 3D blood flow fields within the human vascular system.

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