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2019 MRV Challenge: Results and Comparisons MICHAEL BENSON, U.S. Military Academy, CHRISTOPHER ELKINS, ANDREW BANKO, Stanford University, SIMON SONG, Hanyang University, SVEN GRUNDMANN, MARTIN BRUSCHEWSKI, University of Rostock, DANIEL BORUP, Mayo Clinic
— This presentation is part of the 2019 Magnetic Resonance Velocimetry (MRV) Challenge and represents the combined results from all the participants of the challenge. Four research groups have made measurements in the same apparatus comprising a square cross section U-bend with a tight radius that will cause turbulent flow separation. An inlet boundary layer trip marks the common coordinate origin of the flow in the channel. The apparatus that was transferred between the research labs includes detailed flow conditioning to ensure that variations in supply and exit plumbing will not disrupt the test section flow. The test was conducted at a Reynolds Number of 15,000 based on the channel hydraulic diameter, and a tight radius U-Bend ensures a strongly three-dimensional flow field. This presentation will focus on the results from each team, which will be compared in the region near the boundary layer trip, at the entrance to and through the U-Bend, and through the exit passageway using velocity field contour plots, iso-surfaces, and quantities derived from the mean velocity components. Similarities and differences will be presented which can provide insight into the opportunities that state of the art MRV provides to researchers.

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