

Abstract Submitted
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Continuous wavelet analysis of stent-induced perturbations in a bent pipe model for curved arteries¹ KARTIK V. BULUSU, AUTUMN L. GLENN, The George Washington University, FANGJUN SHU, New Mexico State University, SHADMAN HUSSAIN, MICHAEL W. PLESNIAK, The George Washington University — Secondary flow vortical structures were observed in a 180 degree circular bend under physiological flow conditions with a stent model installed upstream of the bend. Phase-locked 2-D PIV measurements were made at various cross-sectional planes along the bend. Stent-induced perturbations led to a transient flow regime with a multiplicity of vortical patterns initiated during the deceleration phase of the systolic peak (starting at $t/T=0.21$). An exploratory investigation of vortical scale-count metrics from continuous wavelet transforms, was performed using a Ricker wavelet. The metrics highlight the evolution of a pair of ordered, coherent, high-circulation, counter-rotating vortical structures (at $t/T=0.21$) into multiple, disordered, low-circulation, coherent vortical structures (by $t/T=0.30$). The overarching goal of this study is to create a regime map of secondary flow morphologies based on the driving physiological waveform. An approach to develop a regime map using vortical scale-count metrics is outlined.

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