Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Computational fluid dynamics study of commercially available stents inside an idealised curved coronary artery WINSON XIAO CHEN, ANDREW OOI, NICHOLAS HUTCHINS, ERIC POON, VIKAS THONDAPU, University of Melbourne, Australia, PETER BARLIS, Northern Health, Australia
— Stent placement restores blood flow in diseased coronary arteries and is the standard treatment for obstructive coronary atherosclerosis. Analysis of the hemodynamic characteristics of stented arteries is essential for better understanding of the relationship between key fluid dynamic variables and stent designs. Previous computational studies have been limited to idealised stents in curved arterial segments or more realistic stents in straight segments. In clinical practice, however, it is often necessary to place stents in geometrically complex arterial curvatures. Thus, numerical simulations of the incompressible Navier–Stokes equations are carried out to investigate the effects of curvature on hemodynamics using detailed, commercially available coronary stents. The computational domain is a 3mm curved coronary artery model and simulations are conducted using a physiologically realistic inlet condition. The averaged flow rate is about 80 mL/min, similar to the normal human resting condition. The examination of hemodynamic parameters will assess the performance of several commercially available stents in curved arteries and identify regions that may be at risk for restenosis. It is anticipated that this information will lead to improvements in future stent design and deployment.

Winson Xiao Chen
University of Melbourne

Date submitted: 31 Jul 2015 Electronic form version 1.4