INVITATION TO THE SEMINAR

Optimization of LVAD implantation to reduce stroke risk and progress in modeling of the Hybrid Norwood operation for Hypolastic Left Heart Syndrome

Alain Kassab, Ph.D.

Mechanical, materials and aerospace engineering,
University of Central Florida, Orlando, Florida

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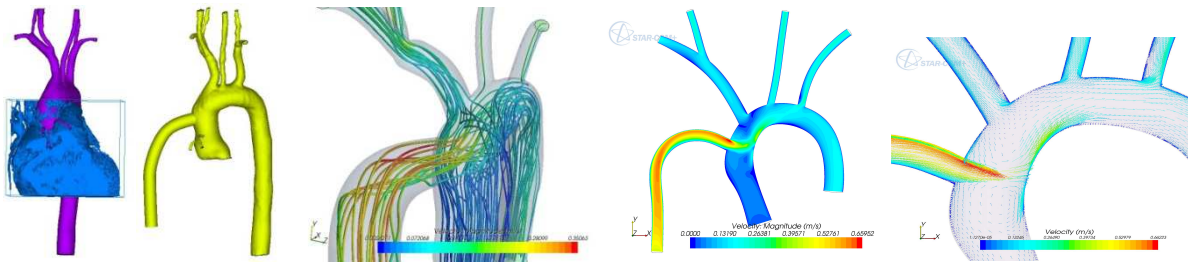
Abstract

Recent results are presented from collaborative research projects undertaken with the Congenital Heart Institute at the Arnold Palmer Hospital for Children in cardiovascular modeling related to congenital heart defects. In the first project, computational fluid dynamics (CFD) is utilized to understand hemodynamics associated with thrombi transport in patients treated with Left Ventricular Assist Devices (LVAD) as a bridge to cardiac transplantation. Current results suggest that thrombo-embolism in LVAD patients can be significantly reduced by proper adjustment of LVAD cannula and possible by-pass to the left carotid artery. The facilities of the computational mechanics lab (CML) provide the resources required for these studies. Also a bench-top experiment on the LVAD circulatory bed is underway to validate computational models as well as a mutliscale approach to provide boundary conditions to the CFD model. In another project, CFD is used to better understand the hemodynamics of neonates born with hypoplastic left heart syndrome (HLHS) who have undergone a variant of the Norwood three-stage operative procedure.



CT-rendered aortic arch with implanted LVAD cannula, thrombus pathlines, and flowfield.