Figure 5.1.1. Expanded graft-end configurations intended to reduce DAIH formation: (a) S-shaped connector suggested by Lei et al. (1996, 1997); (b) ‘new graft-end’ design suggested by Longest and Kleinstreuer (2000) for arteriovenous access; (c) Distaflo™ graft proposed by Harris and How (1999) and marketed by IMPRA-Bard.

Figure 5.2.1. Geometric surface models including the currently implemented Miller cuff as well as virtually prototyped anastomotic configurations.
Figure 5.2.2. Graft and artery configurations for the Miller cuff and prototype geometries. For Models A through C, graft and artery curvatures are intended to mitigate disturbed flow occurrence without reducing WSS.

Figure 5.2.3. Representative post-anastomotic input waveform for the femoral bypass.
Figure 5.3.1. Midplane velocity vectors, contours of velocity magnitude, and streamlines of secondary motion during accelerating flow (t1).
Figure 5.3.2. Midplane velocity vectors, contours of velocity magnitude, and streamlines of secondary motion during decelerating flow ($t_2$).
Figure 5.3.3a-b. Selected monocyte trajectories indicating transient vortical flow features for (a) the Miller Cuff, and (b) Model A.
Figure 5.3.3c-d. Selected monocyte trajectories indicating transient vortical flow features for (c) Model B, and (d) Model C.
Figure 5.3.4. Wall shear stress based hemodynamic parameters for the Miller cuff.

Figure 5.3.5. Wall shear stress based hemodynamic parameters for Model A.
Figure 5.3.6. Wall shear stress based hemodynamic parameters for Model B.

Figure 5.3.7. Wall shear stress based hemodynamic parameters for Model C.
Figure 5.3.9. NWRT contours based on platelet trajectories in Miller style and virtually prototyped models with and without platelet stimulation history (PSH) and surface reactivity conditions.
Figure 5.3.10. NWRT contours based on monocyte trajectories in Miller style and virtually prototyped models with a WSS-limiter condition of $\tau_{\text{limit}} = 14.0$ dyne/cm$^2$. 
Figure 5.3.11. Wall shear stress based hemodynamic parameters for Model B without proximal outflow.

Figure 5.3.12. Wall shear stress based hemodynamic parameters for Model C without proximal outflow.
Figure 5.3.13. NWRT contours based on platelet trajectories for Models B and C with and without PSH and SR conditions for the case of no proximal outflow.
Figure 5.4.1a. A potentially viable ETE anastomotic configuration intended to minimize DAIH and facilitate non-invasive procedures. The assembly consists of a custom tapered PTFE graft (G) partially inserted in the recipient artery (A), resulting in an overlap region (O). An internal rapamycin-eluting stent (S) and an external non-constrictive collar (C) provide compression to secure the anastomosis. Collar mounted teeth (T), as with the tie-band connector of Chang et al. (2000), are used to anchor the assembly. Alternatively, sutures, vascular adhesives, or stent compatible rivets could be used to prevent slippage. The length of the rapamycin-eluting stent should be sufficient to provide a non-reactive buffer zone in the immediate region of the ETE anastomosis as well as in a portion of the proximally tapered synthetic graft, where there is an increased risk of thrombosis.

Figure 5.4.1b. Technique for patient specific tailoring of commonly available grafts providing the necessary taper needed to alleviate graft-to-artery diameter mismatch in ETE applications. A narrow-V shaped section (V) is excised from the graft. Sealing of the graft (S), results in a tapered configuration. Alternatively, insertion of a properly sized mandrel and even heating of the PTFE will readily provide any taper necessary, without weakening the structural integrity of the graft.