

SPECIAL ISSUE for ASME Journal of Medical Devices

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TITLE: Cardiovascular Device Development and Safety Assessment using Computational and/or Experimental Approaches

Cardiovascular devices must typically interact with a complex physiologic environment that can severely challenge device performance and longevity. These challenges include blood damage (hemolysis and thrombosis), changing contact conditions during each heartbeat, high-cycle fatigue-to-fracture, and the need to accommodate the highly variable geometric, material, and hemodynamic environment encountered across the target population. The cardiovascular device industry increasingly relies on computer modeling as a controlled and repeatable methodology for assessing these device design-related factors. Additionally, clinicians are evaluating computer modeling as a pre-interventional planning tool that can confirm the need for treatment and optimize treatment outcomes.

This special issue, therefore, seeks original research that highlights the use of computer models in all stages of cardiovascular device development and assessment. Contributions are expected to utilize one or more of a wide range of approaches, including computational fluid dynamics (CFD), finite element analysis (FEA), high- and low-frequency electromagnetics, reduced-order and lumped parameter approaches, multi-scale analysis, anatomic models, and statistical shape analysis (PCA). Contributions must tie the work described to the design of a medical device, either by incorporating a simulated device as an example or by describing how the computational tool would be used in the design of a specific medical device. Potential topics include, but are not limited to:

- cardiovascular biomechanics in health and disease, including soft tissue modeling
- the impact of image acquisition and/or segmentation on model uncertainty
- shape variability of anatomic structures in the population
- physiological response(s) to an intervention, both locally (e.g. healing) and globally
- device-tissue interactions
- assessing and/or optimizing device performance
- device safety assessment (regulatory or non-regulatory)
- surgical procedure planning and improving diagnostics for clinical-decision making

Submissions that incorporate additional sources of evidence that help to establish model credibility will be prioritized. Academic and industry researchers, clinicians and industry practitioners are encouraged to contribute.

SUBMISSION GUIDELINES: Manuscripts can be submitted electronically to the ASME Journal site at <http://journaltool.asme.org>. Within the Paper Submittal page, select the Journal of Medical Devices. Next, select 'Cardiovascular Device Development and Safety Assessment using Computational and/or Experimental Approaches' within the Special Issue tab.

Submission Deadline: July 31, 2016

Final Review Deadline: August 31, 2016

Publication Date for Special Issue: November 30, 2016