# Postdoc Position with the SimVascular Open Source Project at UCSD

The Marsden lab at UCSD is seeking a postdoc to actively develop core computational methods and contribute significantly to the advancement of the software architecture for the open source code project SimVascular. Funded by the NSF and based on over a decade of active research and development, SimVascular is the state-of-the-art research tool for patient specific cardiovascular modeling. SimVascular uniquely offers an integrated pathway to go from medical image data to patient specific blood flow simulation results.

Our team includes faculty and graduate students at UCSD (Marsden lab), UC Berkeley (Shadden lab), and UCLA (Nathan Wilson, the original architect of SimVascular). A major goal of the project will be to integrate cutting-edge research developments into distributable software releases. The ideal candidate will have experience and interest in cardiovascular modeling as well as software development and open source.

Research activities may include:

- Design and integration of new user interface to accelerate patient specific model construction.
- Finite element flow solver development, including multiscale modeling, linear equation solvers, and numerical analysis.
- Identifying and replacing embedded commercial packages with open source alternatives.
- Assisting with open source management, responding to bug and feature requests and developing benchmarking, test suites, and documentation.
- Integration of 2D and 3D image segmentation methods for patient specific model construction.
- Development and integration of tools for multiscale modeling, flow analysis, optimization, and uncertainty quantification.
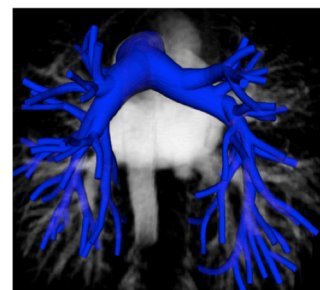
Skills needed:

- Significant programming experience, including Fortran, C++, Tcl/Tk, Python, and object-oriented programming. Additional experience with ITK/VTK is a plus.
- Interest in open source scientific software. History of open source contribution is a plus.
- Working knowledge of modern software development tools including bug tracking, source code revision control, and automated testing.
- Knowledge of multi-core system architecture and experience developing parallel applications for HPC.
- Track record of productivity in academic research related to biomedical computing and/or medical software applications.
- Excellent communication skills, collaborative spirit, ability to work independently, self-starter, and strong team player required.
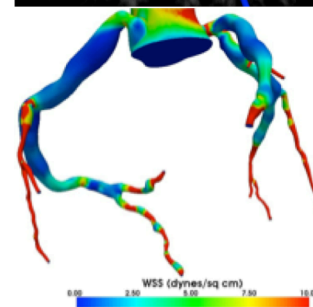
Educational requirements & Background:

- PhD in computational science, computer science, biomedical engineering, mechanical engineering or related field, with significant software development experience.
- Background in finite element modeling, patient specific model construction, image segmentation methods, graphical user interface design, and/or open source software is desirable.

Our team is at the cutting edge of cardiovascular model development, and part of a dynamic research environment involving close collaboration between engineers and clinical faculty. We are collaborating with leading researchers in machine learning, image segmentation, and visualization. This project provides a unique opportunity to have a leading role in a cutting-edge open source project in the medical software field that will integrate new research tools into a releasable product. We expect to build a dynamic and growing user base for the SimVascular project during the time period of the grant.

Interested candidates should send a cover letter, CV, and brief summary of research interests to: Alison Marsden, Mechanical Engineering Department, UCSD, amarsden@ucsd.edu