Resource Summary Report

Generated by RRID on May 17, 2025

SimVascular

RRID:SCR_002686
Type: Tool

Proper Citation

SimVascular (RRID:SCR_002686)

Resource Information

URL: https://simtk.org/home/simvascular

Proper Citation: SimVascular (RRID:SCR_002686)

Description: Open source software suite for cardiovascular simulation. It includes code for reading 3D images, segmenting structures, generating models and meshes, and modeling blood flow in deformable vessels. The suite also includes tools for physiologic boundary conditions, fluid structure interaction, and an accurate and efficient finite element Navier-Stokes solver. Commercial components have been used in the simulation process, and for these components, the project attempts to provide interfaces that allow substitution of open source components. The SimVascular project is derived from the ASPIRE2 software project and includes modified portions of PHASTA from RPI/SCOREC.

Synonyms: SimVascular: Cardiovascular Modeling and Simulation

Resource Type: software resource, software application, simulation software

Defining Citation: PMID:31446517

Keywords: simulation software, fluid dynamics, blood flow, cardiovascular, image-based geometric modeling, image segmentation, mesh generation, vascular, bio.tools

Funding:

Availability: Free, Freely available

Resource Name: SimVascular

Resource ID: SCR_002686

Alternate IDs: nif-0000-23311, BioTools:SimVascular, biotools:SimVascular

Alternate URLs: https://bio.tools/SimVascular, https://bio.tools/SimVascular, https://bio.tools/SimVascular

Record Creation Time: 20220129T080214+0000

Record Last Update: 20250513T060440+0000

Ratings and Alerts

No rating or validation information has been found for SimVascular.

No alerts have been found for SimVascular.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 53 mentions in open access literature.

Listed below are recent publications. The full list is available at RRID.

Garcha A, et al. (2025) Sensitivity of coronary hemodynamics to vascular structure variations in health and disease. Scientific reports, 15(1), 3325.

Laudenschlager S, et al. (2024) Estimation of pulmonary vascular resistance for Glenn physiology. PloS one, 19(7), e0307890.

Hu W, et al. (2024) Effects of pedicle subtraction osteotomy on aortic morphology and hemodynamics in ankylosing spondylitis with kyphosis: a finite element analysis study. Scientific reports, 14(1), 25456.

Martin T, et al. (2024) Computational hemodynamic pathophysiology of internal carotid artery blister aneurysms. Biomedical engineering online, 23(1), 118.

Bartolo MA, et al. (2024) Computational framework for the generation of one-dimensional vascular models accounting for uncertainty in networks extracted from medical images. ArXiv.

Wang Y, et al. (2024) Spatiotemporal analysis of the effects of exercise on the hemodynamics of the aorta in hypertensive rats using fluid-structure interaction simulation. Journal of translational internal medicine, 12(1), 64.

El Sayed R, et al. (2024) Subjects with carotid webs demonstrate pro-thrombotic hemodynamics compared to subjects with carotid atherosclerosis. Scientific reports, 14(1), 10092.

Wei Y, et al. (2024) The Association Between the Hemodynamics in Anomalous Origins of Coronary Arteries and Atherosclerosis: A Preliminary Case Study Based on Computational Fluid Dynamics. Bioengineering (Basel, Switzerland), 11(12).

Rezaeitaleshmahalleh M, et al. (2024) Developing a nearly automated open-source pipeline for conducting computational fluid dynamics simulations in anterior brain vasculature: a feasibility study. Scientific reports, 14(1), 30181.

van de Velde L, et al. (2024) Lesion Eccentricity Plays a Key Role in Determining the Pressure Gradient of Serial Stenotic Lesions: Results from a Computational Hemodynamics Study. Cardiovascular and interventional radiology, 47(5), 533.

Colebank MJ, et al. (2024) Efficient uncertainty quantification in a spatially multiscale model of pulmonary arterial and venous hemodynamics. Biomechanics and modeling in mechanobiology, 23(6), 1909.

van de Velde L, et al. (2023) Computational Fluid Dynamics for the Prediction of Endograft Thrombosis in the Superficial Femoral Artery. Journal of endovascular therapy : an official journal of the International Society of Endovascular Specialists, 30(4), 615.

Azarnoosh J, et al. (2023) Temporal evolution of mechanical stimuli from vascular remodeling in response to the severity and duration of aortic coarctation in a preclinical model. Scientific reports, 13(1), 8352.

Muskat JC, et al. (2023) Method for estimating pulsatile wall shear stress from one-dimensional velocity waveforms. Physiological reports, 11(7), e15628.

Komosa ER, et al. (2023) A novel perfusion bioreactor promotes the expansion of pluripotent stem cells in a 3D-bioprinted tissue chamber. Biofabrication, 16(1).

Nair PJ, et al. (2023) Non-invasive estimation of pressure drop across aortic coarctations: validation of 0D and 3D computational models with in vivo measurements. medRxiv : the preprint server for health sciences.

Yang W, et al. (2023) Passive performance evaluation and validation of a viscous impeller pump for subpulmonary fontan circulatory support. Scientific reports, 13(1), 12668.

Roopnarinesingh R, et al. (2023) Evidence and Mechanisms for Embolic Stroke in Contralateral Hemispheres From Carotid Artery Sources. Journal of the American Heart Association, 12(23), e030792.

Yao Z, et al. (2023) 3D-FVS: construction and application of three-dimensional fundus vascular structure model based on single image features. Eye (London, England), 37(12), 2505.

Yang W, et al. (2023) Passive Performance Evaluation and Validation of a Viscous Impeller Pump for Subpulmonary Fontan Circulatory Support. Research square.