

Mgr. Helena Švihlová, Ph.D.

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Education

- 2013 – 2017 Charles University, Faculty of Mathematics and Physics, doctoral studies in Mathematical and Computer Modelling, Thesis title: **Mathematical modelling in biomechanics - model analysis and computations**, supervisor Dr. Jaroslav Hron
- 2011 – 2013 Charles University, Faculty of Mathematics and Physics, master studies in Mathematical and Computer Modelling in Physics and Engineering, cum laude peregit, Master Thesis Title: **Application of finite element method to real problems in hemodynamics**, supervisor Dr. Jaroslav Hron

Work and teaching experience

- 2014 – 2016 **Teaching Assistant**, Charles University, Faculty of Mathematics and Physics, course title: Mathematical analysis I, II
- 2013 – 2015 **Junior Researcher**, International Clinical Research Center, St. Anne's University Hospital, Brno, computer simulations of the flow in cerebral arteries

Projects and research activities

- 2017 – **Correlation of the CFD parameters with the histological changes in the walls of aneurysm sacs**, grant of Czech Health Research Council of the Ministry of Health of the Czech Republic
follow-up to the previous project
- 2014 – 2017 **Imaging, quantification and modelling of hemodynamics in cerebral aneurysms**, grant of Ministry of Education, Youth and Sports of Czech Republic, cooperation with Neurosurgical Clinic of Jan Evangelista Purkyně University, Ústí nad Labem and Engineering Department in Mayo Clinic, Rochester, the United States
computation of the flow in patient-specific geometries for the cerebral vessel affected by an aneurysm
- 2013 **Student Research Activities (SVOČ)**, 2nd place in section *Mathematical models of dynamics*, title of the text (part of the master thesis): Preparing meshes from medical data for the flow computations using the finite element method

Research interests

computational fluid dynamics, biomechanics, computer simulations

List of publications

Publications in the peer-reviewed journals:

[1] H. Švihlová, J. Hron, J. Málek, K.R. Rajagopal, K. Rajagopal (2017): **Determination of pressure data from velocity data with a view towards its application in cardiovascular mechanics. Part 2: A study of aortic valve stenosis.** In: *International Journal of Engineering Science* 113,37-50, DOI: 10.1016/j.ijengsci.2017.01.001

[2] H. Švihlová, J. Hron, J. Málek, K.R. Rajagopal, K. Rajagopal (2016): **Determination of pressure data from velocity data with a view toward its application in cardiovascular mechanics. Part 1. Theoretical considerations.** In: *International Journal of Engineering Science* 105,108-127, DOI: 10.1016/j.ijengsci.2015.11.002

[3] A. Hejčl, H. Švihlová, A. Sejkorová, T. Radovnický, D. Adámek, J. Hron, D. Dragomir-Daescu, J. Málek, M. Sameš (2017): **Computational Fluid Dynamics of a Fatal Ruptured Anterior Communicating Artery Aneurysm.** In: *Journal of Neurological Surgery Part A: Central European Neurosurgery* 11, DOI: 10.1055/s-0037-1604286

[4] A. Sejkorová, K. D. Dennis, H. Švihlová, O. Petr, G. Lanzino, A. Hejčl, D. Dragomir-Daescu (2016): **Hemodynamic changes in a middle cerebral artery aneurysm at follow-up times before and after its rupture: a case report and a review of the literature.** In: *Neurosurgical Review* 40(2)329-338, DOI: 10.1007/s10143-016-0795-7

[5] P. Berg, C. Roloff, O. Beuing, S. Voss, S-I. Sugiyama, N. Aristokleous, A. S. Anayiotos, N. Ashton, A. Revell, N. W. Bressloff, A. G. Brown, B. Jae Chung, J. R. Cebal, G. Copelli, W. Fu, A. Qiao, A. J. Geers, S. Hodis, D. Dragomir-Daescu, E. Nordahl, Y. Bora Suzen, M. Owais Khan, K. Valen-Sendstad, K. Kono, P. G. Menon, P. G. Albal, O. Mierka, R. Münster, H. G. Morales, O. Bonnefous, J. Osman, L. Goubergrits, J. Pallares, S. Cito, A. Passalacqua, S. Piskin, K. Pekkan, S. Ramalho, N. Marques, S. Sanchi, K. R. Schumacher, J. Sturgeon, H. Švihlová, J. Hron, G. Usera, M. Mendina, J. Xiang, H. Meng, D. A. Steinman, G. Janiga (2015): **The Computational Fluid Dynamics Rupture Challenge 2013—Phase II: Variability of Hemodynamic Simulations in Two Intracranial Aneurysms.** In: *Journal of Biomechanical Engineering* 137(12):121008-121008-13, DOI: 10.1115/1.4031794

Other publications:

A. Hejčl, H. Švihlová, N. Poláková, T. Radovnický, J. Hron, M. Nováková, J. Málek, M. Sameš (2015): **Differences in computational fluid dynamics in unruptured brain aneurysms based on segmentation using CT and MR angiography.** In: *Medimond International Proceedings* 2015, 275–280