Dr.techn Alireza Jafarinia

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SCIENTIFIC CAREER

2022 - present **Graz University of Technology**

• Postdoctoral researcher at Graz Center of Computational Engineering

- Computational fluid dynamics (CFD) & multiphysics simulations using OpenFOAM, Python, openCFS, Coreform Cubit
- Validation of in-silico studies with experimental and medical data
- Development of digital twins
- Supervision of master and bachelor students
- Grant writing
- Project management

May 2023 **Imperial College London**

• Guest researcher (Lab of Prof. Xiao Yun Xu)

- Model development, implementation, and validation using OpenFOAM and Ansys CFX
- CFD simulations of patient-specific dissected aortas

2018 - 2022 **Graz University of Technology**

• Project assistant at Graz Center of Computational Engineering

- CFD simulation of non-Newtonian blood flow
- CFD simulation of biochemical reactions in the coagulation process
- Phenomenological modeling of thrombus formation and growth
- Validation of patient-specific CFD simulations with medical data
- Model development and implementation in OpenFOAM and ANSYS CFX
- Surrogate modeling, sensitivity analysis
- Supervision of master and bachelor students
- Grant writing

2012 - 2013 **Yazd University**

• Teaching assistant of the CFD course in Mechanical Engineering

- Teaching CFD programming in Fortran, defining assignments and supervision

2009 - 2010 **Persian Gulf University**

• Teaching assistant for Fluid Mechanics, CFD, and Statics courses

- Assignment supervision

PROFESSIONAL CAREER

2013 - 2017 **Mr CFD/Freelance**

• CFD Engineer

- Training and consultating for CFD simulations
- Turbomachinery, Heat exchangers
- Two-phase flow

2015 - 2017 **Shiraz Razi Institute**

• Teacher

- English & Mathematics (highschool)

2011-6 months **Petrochemical Industries Design and Engineering Company (PIDEC)**

• Rotary engineer (internship)

- Turbomachinery, Customer negotiation

EDUCATION

2018 - 2022 **Graz University of Technology**, Graz, Austria
Ph.D., Mechanical Engineering
Thesis: Thrombus formation and growth in type B aortic dissection

2017 - 2018 **University of Bergen**, Bergen, Norway
30 ECTS completed in the master program "Applied and computational engineering"
Thesis: No Thesis

2011 - 2013 **Yazd University**, Yazd, Iran
M.Sc., Mechanical Engineering - Energy Conversion,
Thesis: Numerical investigation of heat and fluid flow on collocated grids and comparison with staggered grids

2007 - 2011 **Persian Gulf University**, Bushehr, Iran
B.Sc., Mechanical Engineering – Heat Transfer and Fluid Mechanics
Thesis: CFD simulation combined convective and radiative heat transfer on irregular surfaces

SKILLS

Languages	English:	Full professional proficiency
	Deutsch:	Intermediate proficiency
	Farsi:	Native / Bilingual proficiency
Computer	Programming:	python, MATLAB, Fortran, C++
	CFD:	OpenFOAM, Ansys Fluent, CFX
	Meshing:	Gmesh, Ansys ICEM, Salume, Coreform Cubit
	Multiphysics:	COMSOL Multiphysics, openCFS
	Cad tools:	CATIA, SOLIDWORKS
	Postprocessing:	Tecplot, ParaView

INTERESTS

Research	CFD simulations, Reduced order modeling, Digital twin
Personal	Fitness training, Hiking, Swimming, Dancing

JOURNAL PUBLICATIONS

1. **A. Jafarinia**, G. M. Melito, T. S. Müller, M. Rolf-Pissarczyk, G. A. Holzapfel, G. Brenn, K. Ellermann, and T. Hochrainer. Morphological parameters affecting false lumen thrombosis following type B aortic dissection: a systematic study based on simulations of idealized models. Biomech. Model. Mechanobiol. 22:885–904, 2023. DOI: 10.1007/s10237-023-01687-5
2. V. Badeli, **A. Jafarinia**, G. M. Melito, T. S. Müller, A. Reinbacher-Köstinger, T. Hochrainer, G. Brenn, K. E., O. Biro, and M. Kaltenbacher. Monitoring of false lumen thrombosis in type B aortic dissection by impedance cardiography–A multiphysics simulation study. Int. J. Numer. Methods Biomed. Eng. 39:e3669, 2023.DOI: 10.1002/cnm.3669
3. **A. Jafarinia**, C. H. Armour, R. G. J. Gibbs, X. Y. Xu, and T. Hochrainer. Shear-driven modelling of thrombus formation in type B aortic dissection. Front Bioeng Biotechnol., 10:1033450, 2022. DOI: 10.3389/fbioe.2022.1033450
4. **A. Jafarinia**, T. S. Müller, U. Windberger, G. Brenn, and T. Hochrainer. Blood rheology influence on false lumen thrombosis in type B aortic dissection. J. Biosci. Bioeng., 7:13-24, 2020. DOI: 10.11159/jbeb.2020.002
5. G. M. Melito, **A. Jafarinia**, T. Hochrainer, and K. Ellermann. Sensitivity analysis of a phenomenological thrombosis model and growth rate characterisation. J. Biosci. Bioeng., 7:31-40, 2020. DOI: 10.11159/jbeb.2020.004

6. R. Amini, M. Amini, **A. Jafarinia**, and M. Kashfi. Numerical investigation on effects of using segmented and helical tube fins on thermal performance and efficiency of a shell and tube heat exchanger. Appl. Therm. Eng. 138: 750-760, 2018. DOI: 10.1016/j.applthermaleng.2018.03.004

7. **A. Jafarinia**, A. A. Dehghan, and M. R. Hadian. Investigation and comparison of different methods for solving fluid flow and heat transfer on collocated and staggered grids in a natural convection problem. Journal of Mechanical Engineering, University of Tabriz, 45:27-38, 2015. - in Persian, Link to journal.

CONFERENCE PROCEEDINGS

1. Schussnig, S. Dreymann, **A. Jafarinia**, T. Hochrainer, and T. P. Fries. A semi-implicit method for thrombus formation in haemodynamic fluid-structure interaction - Published in: Proceedings of the 8th European Congress on Computational Methods in Applied Sciences and Engineering, Eccomas Congress, Oslo, 2022. DOI: 10.23967/eccomas.2022.029

2. **A. Jafarinia**, T. S. Müller, U. Windberger, G. Brenn, and T. Hochrainer. A study on thrombus formation in case of type b aortic dissection and its hematocrit dependence. Published in: proceedings of the 6th World Congress on Electrical Engineering and Computer Systems and Science(EECSS'20) - ICBES'20, 2020. DOI: 10.11159/icbes20.111

3. G. M. Melito, **A. Jafarinia**, T. Hochrainer, K. Ellermann. Sensitivity analysis of a hemodynamic-based model for thrombus formation and growth - Published in: Proceedings of the 6th World Congress on Electrical Engineering and Computer Systems and Sciences (EECSS'20) - ICBES'20, 2020. DOI: 10.11159/icbes20.127

CONFERENCE CONTRIBUTIONS

1. **A. Jafarinia**, C. H. Armour, X. Y. Xu, and T. Hochrainer. Phenomenological prediction of false lumen thrombosis in type B dissection - presented in: 28th Congress of the European Society of Biomechanics (ESB),, Maastricht, the Netherlands, 2023.

2. **A. Jafarinia**, V. Badeli, G. M. Melito, A. Reinbacher-Köstinger, G. Brenn, M. Kaltenbacher, and T. Hochrainer. Anisotropic electrical conductivity of blood: a new model for numerical computations of impedance cardiography signals. ECCOMAS Young Investigators Conference (YIC), Porto, Portugal, 2023.

3. V. Badeli, **A. Jafarinia**, A. Reinbacher-Köstinger, T. Hochrainer, and M. Kaltenbacher. Multiphysical simulation of flow-related impedance changes in arteries. ECCOMAS Young Investigators Conference (YIC), Porto, Portugal, 2023.

4. **A. Jafarinia**, C. H. Armour, X. Y. Xu, and T. Hochrainer. Phenomenological modeling of thrombus formation: an application for aortic dissection - presented in: The 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS Congress), Oslo, Norway, 2022.

5. **A. Jafarinia**, G. M. Melito, T. S. Müller, M. Rolf-Pissarczyk, G. A. Holzapfel, G. Brenn, K. Ellermann, and T. Hochrainer. Dominant morphological parameters impacting the false lumen thrombosis in type B aortic dissection. Modelling the Cardiac Function: Theory, Numerical Methods, Clinical Applications (iHeart), Cetraro, Italy, 2022.

6. G. M. Melito, V. Badeli, **A. Jafarinia**, T. S. Müller, A. Reinbacher-Köstinger, T. Hochrainer, G. Brenn, O. Biro, M. Kaltenbacher, and K. Ellermann. Impact of false lumen thrombosis on blood flow dynamics and electrical conductivity in type B aortic dissection. Modelling the Cardiac Function: Theory, Numerical Methods, Clinical Applications (iHeart), Cetraro, Italy, 2022.

7. **A. Jafarinia**, V. Badeli, G. M. Melito, T. S. Müller, A. Reinbacher-Köstinger, T. Hochrainer, O. Biro, K. Ellermann, and G. Brenn. False lumen thrombosis in aortic dissection and its impact on blood conductivity variations - an application for impedance cardiography - presented in: VI ECCOMAS Young Investigators Conference (YIC), Valencia, Spain, Virtual Conference, 2021.

8. V. Badeli, **A. Jafarinia**, T. Müller, G. M. Melito, A. R. Köstinger, T. Hochrainer, G. Brenn, K. Ellermann, and O. Biro, and M. Kaltenbacher. Monitoring of false lumen thrombosis in type b aortic dissection by impedance cardiography - a multiphysical simulation. presented in: 23rd International Conference on the Computation of Electromagnetic Fields (COMPUMAG), 2021.

9. **A. Jafarinia**, T. Müller, U. Windberger, G. Brenn, and T. Hochrainer. A Study on Thrombus Formation in Case of Type B Aortic Dissection and Its Hematocrit Dependence - presented in: 6th World Congress on Electrical Engineering and Computer Systems and Sciences (EECSS'20) - ICBES'20, Prague, Czech Republic, Virtual Conference, 2020.

10. **A. Jafarinia**, T. Hochrainer. Numerical simulation of platelet deposition in the false lumen in case of aortic dissection - presented in: 25th Congress of the European Society of Biomechanics (ESB), Vienna, Austria 2019.