




Saeed Salehi

Contact Information

✉ saeed.salehi@chalmers.se chalmers.se/en/persons/saeedsa/
🔍 [Google Scholar](#)  [ORCID](#)  [Scopus](#)  [Researchgate](#)
☎ +46 72 018 87 28 🏠 Room 1329B, Hörsalsvägen 7A, SE-41296 Gothenburg, Sweden

Employment

- 2023 – **Researcher**, Permanently employed by Chalmers Industriteknik, working as an affiliated researcher in Chalmers University of Technology on the application of artificial intelligence in fluid dynamics for improving the lifetime of hydraulic turbines
- 2019 – 2023 **Postdoctoral researcher**, Chalmers University of Technology, Project: New operating procedures of hydropower for a sustainable energy system

Education

- PhD.** University of Tehran, Mechanical Engineering, Hydraulic Machinery
2012 – 2018 Thesis: Uncertainty quantification of turbulent flows in hydraulic machinery
Supervisors: Prof. M. Raisee, Prof. M. Cervantes, Prof. A. Nourbakhsh
- MSc.** University of Tehran, Mechanical Engineering, Energy Conversion
2010 – 2012 Thesis: Computation of steady and pulsating turbulent flow through a straight asymmetric diffuser with moderate adverse pressure gradient
Supervisors: Prof. M. Raisee, Prof. M. Cervantes
- BSc.** University of Tehran, Mechanical Engineering
2005 – 2009 Thesis: Large eddy simulation of stall development around airfoils

Supervision

I am supervising or have supervised the following students. Further details about their projects can be found in the pedagogical portfolio.

- **Jonathan Fahlbeck**, PhD student, Chalmers University of Technology, April 2020 –
Project title: Design, simulation, and optimization of low-head pump-turbines for pumped seawater electric energy storage
Role: Co-supervisor
- **Martina Nobilo**, PhD student, Chalmers University of Technology, Feb. 2023 –
Project title: CFD for hydropower lifetime analysis
Role: Co-supervisor
- **Mohammad Sheikholeslami**, PhD student, Chalmers University of Technology, Jan. 2023 –
Project title: Multi-Fidelity Physics-Informed Neural Network to solve partial differential equations
Role: Co-supervisor
- **Hari Abaram**, Master thesis student, Chalmers University of Technology, Jan. 2022 – Jun. 2022
Project title: Systematic evaluation of different approaches for modeling inhaled particle deposition in the lung
Role: Academic supervisor (the project had also a supervisor from industry)
- **Hari Abaram, Amith Basavapatna Shesh**, Project course in MSc program, Chalmers University of Technology, July. 2021 – Dec. 2021
Project title: Efficient Dynamic Mode Decomposition on Moving Mesh
Role: Main supervisor

Publications

Peer-reviewed journal papers

- [1] **Saeed Salehi** and Håkan Nilsson. “A semi-implicit slip algorithm for mesh deformation in complex geometries, implemented in OpenFOAM”. *Computer Physics Communications* 287 (2023), p. 108703.
- [2] **Saeed Salehi** and Håkan Nilsson. “Effects of uncertainties in positioning of PIV plane on validation of CFD results of a high-head Francis turbine model”. *Renewable Energy* 193 (2022), pp. 57–75.
- [3] Jonathan Fahlbeck, Håkan Nilsson, and **Saeed Salehi**. “Surrogate based optimisation of a pump mode startup sequence for a contra-rotating pump-turbine using a genetic algorithm and computational fluid dynamics”. *Journal of Energy Storage* 62 (2023), p. 106902.
- [4] **Saeed Salehi** and Håkan Nilsson. “Flow-induced pulsations in Francis turbines during startup - A consequence of an intermittent energy system”. *Renewable Energy* (2022).
- [5] Jonathan Fahlbeck, **Saeed Salehi**, and Håkan Nilsson. “A head loss pressure boundary condition for hydraulic systems”. *OpenFOAM Journal* 2 (2022), pp. 1–12.
- [6] **Saeed Salehi**, Håkan Nilsson, Eric Lillberg, and Nicolas Edh. “An in-depth numerical analysis of transient flow field in a Francis turbine during shutdown”. *Renewable Energy* 179 (2021), pp. 2322–2347.
- [7] **Saeed Salehi** and Håkan Nilsson. “OpenFOAM for Francis turbine transients”. *OpenFOAM Journal* 1 (2021), pp. 47–61.
- [8] Jonathan Fahlbeck, Håkan Nilsson, and **Saeed Salehi**. “Flow Characteristics of Preliminary Shutdown and Startup Sequences for a Model Counter-Rotating Pump-Turbine”. *Energies* 14.12 (2021).
- [9] Mohamad Sadeq Karimi, Mehrdad Raisee, **Saeed Salehi**, Patrick Hendrick, and Ahmad Nourbakhsh. “Robust optimization of the NASA C3X gas turbine vane under uncertain operational conditions”. *International Journal of Heat and Mass Transfer* 164 (2021), p. 120537.
- [10] Akbar Mohammadi-Ahmar, **Saeed Salehi**, and Mehrdad Raisee. “Uncertainty quantification of the turbulent flow field and heat transfer of film cooling (in Persian)”. *Journal of Solid and Fluid Mechanics* 10.2 (2020), pp. 177–192.
- [11] Mohamad Sadeq Karimi, **Saeed Salehi**, Mehrdad Raisee, Patrick Hendrick, and Ahmad Nourbakhsh. “Probabilistic CFD computations of gas turbine vane under uncertain operational conditions”. *Applied Thermal Engineering* 148 (2019), pp. 754–767.
- [12] **Saeed Salehi**, Mehrdad Raisee, Michel J. Cervantes, and Ahmad Nourbakhsh. “On the flow field and performance of a centrifugal pump under operational and geometrical uncertainties”. *Applied Mathematical Modelling* 61 (2018), pp. 540–560.
- [13] **Saeed Salehi**, Mehrdad Raisee, Michel J. Cervantes, and Ahmad Nourbakhsh. “An efficient multifidelity ℓ_1 -minimization method for sparse polynomial chaos”. *Computer Methods in Applied Mechanics and Engineering* 334 (2018), pp. 183–207.
- [14] Ali Salehpour, **Saeed Salehi**, Samaneh Salehpour, and Mehdi Ashjaee. “Thermal and hydrodynamic performances of MHD ferrofluid flow inside a porous channel”. *Experimental Thermal and Fluid Science* 90 (2018), pp. 1–13.
- [15] **Saeed Salehi**, Mehrdad Raisee, Michel J. Cervantes, and Ahmad Nourbakhsh. “Efficient uncertainty quantification of stochastic CFD problems using sparse polynomial chaos and compressed sensing”. *Computers & Fluids* 154 (2017), pp. 296–321.
- [16] **Saeed Salehi**, Mehrdad Raisee, Michel J. Cervantes, and Ahmad Nourbakhsh. “The Effects of Inflow Uncertainties on the Characteristics of Developing Turbulent Flow in Rectangular Pipe and Asymmetric Diffuser”. *Journal of Fluids Engineering* 139.4 (2017), p. 041402.
- [17] **Saeed Salehi**, Mehrdad Raisee, and Michel J. Cervantes. “Computation of Developing Turbulent Flow Through a Straight Asymmetric Diffuser With Moderate Adverse Pressure Gradient”. *Journal of Applied Fluid Mechanics* 10.4 (2017), pp. 1029–1043.
- [18] **Saeed Salehi** and Mehrdad Raisee. “Application of Gram-Schmidt orthogonalization method in uncertainty quantification of computational fluid dynamics problems with arbitrary probability distribution functions (In Persian)”. *Modares Mechanical Engineering* 15.12 (2015), pp. 1–8.

- [19] Behrouz Takabi and **Saeed Salehi**. “Augmentation of the Heat Transfer Performance of a Sinusoidal Corrugated Enclosure by Employing Hybrid Nanofluid”. *Advances in Mechanical Engineering* 6 (2014), p. 147059.

Book chapters

- [1] **Saeed Salehi**, Mehrdad Raisee, Michel Cervantes, and Ahmad Nourbakhsh. “Development of an Efficient Multifidelity Non-Intrusive Uncertainty Quantification Method”. *Evolutionary and Deterministic Methods for Design Optimization and Control With Applications to Industrial and Societal Problems*. Ed. by Esther Andrés-Pérez, Leo M. González, Jacques Periaux, Nicolas Gauger, Domenico Quagliarella, and Kyriakos Giannakoglou. Springer International Publishing, 2019.

Conference proceedings

- [1] Jonathan Fahlbeck, Håkan Nilsson, and **Saeed Salehi**. “Evaluation of startup time for a model contra-rotating pump-turbine in pump-mode”. Vol. 1079. 1. IOP Publishing, Sept. 2022, p. 012034.
- [2] **Saeed Salehi**, Håkan Nilsson, Eric Lillberg, and Nicolas Edh. “Development of a novel numerical framework in OpenFOAM to simulate Kaplan turbine transients”. Vol. 774. 1. IOP Publishing, June 2021, p. 012058.
- [3] **Saeed Salehi**, Håkan Nilsson, Eric Lillberg, and Nicolas Edh. “Numerical Simulation of Hydraulic Turbine During Transient Operation Using OpenFOAM”. Vol. 774. 1. IOP Publishing, June 2021, p. 012060.
- [4] Jonathan Fahlbeck, Håkan Nilsson, **Saeed Salehi**, Mehrdad Zangeneh, and Melvin Joseph. “Numerical analysis of an initial design of a counter-rotating pump-turbine”. Vol. 774. 1. IOP Publishing, June 2021, p. 012066.
- [5] Mohamad Sadeq Karimi, **Saeed Salehi**, Mehrdad Raisee, and Ahmad Nourbakhsh. “Conjugate Heat Transfer Simulation of a Cooled Turbine Vane under Uncertain Operational Condition”. *International Conference on Evolutionary and Deterministic Methods for Design Optimization and Control with Applications to Industrial and Societal Problems, Madrid, Spain*. 2017.
- [6] **Saeed Salehi**, Mehrdad Raisee, Michel Cervantes, and Ahmad Nourbakhsh. “Development of an Efficient Multifidelity Non-Intrusive Uncertainty Quantification Method”. *International Conference on Evolutionary and Deterministic Methods for Design Optimization and Control with Applications to Industrial and Societal Problems, Madrid, Spain*. 2017.
- [7] **Saeed Salehi**, Mehrdad Raisee, and Ahmad Nourbakhsh. “Effects of Geometrical and Operational Uncertainties on the Performance of Hydraulic Machinery”. *The 14th Asian International Conference on Fluid Machinery, Zhenjiang, China*. 2017.
- [8] Vahid Etemadeasl, **Saeed Salehi**, Mehrdad Raisee, and Ahmad Nourbakhsh. “Numerical Investigation of Turbulent Flow in Francis-99 Turbine Using Various Turbulence Models”. *The 14th Asian International Conference on Fluid Machinery, Zhenjiang, China*. 2017.
- [9] Ehsan Akbari, **Saeed Salehi**, and M. Karami. “Numerical and Experimental Investigation of the Effect of Heat Exchanger Shape on Performance of an Industrial Heater (In Persian)”. *21st Annual International Conference on Mechanical Engineering (ISME), Tehran, Iran*. 2013.
- [10] Behrouz Takabi, **Saeed Salehi**, and Mohammad Hassan Rahimyan. “Studying the effects of employing hybrid nanofluid on heat transfer performance of a wavy cavity”. *21st Annual International Conference on Mechanical Engineering (ISME), Tehran, Iran*. 2013.

Conference presentations

- [1] **Saeed Salehi** and Håkan Nilsson. “Implementation of deep reinforcement learning in OpenFOAM for active flow control”. 18th OpenFOAM Workshop (OFW18). 2023.
- [2] **Saeed Salehi**. “Deep reinforcement learning for active flow control”. Dutch OpenFOAM User Group Meeting, July. 2023.
- [3] **Saeed Salehi** and Håkan Nilsson. “Evolution of flow features during transient operation of a Kaplan turbine”. 17th OpenFOAM Workshop (OFW17). 2022.
- [4] **Saeed Salehi** and Håkan Nilsson. “Numerical Simulation of Hydraulic Turbine During Transient Operation Using OpenFOAM”. 15th OpenFOAM Workshop (OFW15). 2020.

Teaching Experiences

The following presents a summary of highlights of my teaching experience. For more details, please see my pedagogical portfolio.

- **Introduction to Turbomachinery**
Role: Main teacher and examiner
University: University of Science and Culture, Iran
Level: Bachelor
Year: 2018 – 2019
Credits: 7.5 ECTS
- **Intro. to fluid dynamics in water turbines**
Role: Main teacher and examiner
University: Chalmers University of Technology
Level: PhD
Year: 2022
Credits: 2.0 ECTS
- **CFD with OpenSource Software**
Role: Co-teacher/teaching assistant
University: Chalmers University of Technology
Level: PhD
Year: 2020 –
Credits: 7.5 ECTS
- **Basic Usage of OpenFOAM**
Role: Co-teacher/teaching assistant
University: Chalmers University of Technology
Level: PhD
Year: 2021 –
Credits: 2.0 ECTS
- **Turbomachinery Lab.**
Role: Teaching assistant
University: University of Tehran, Iran
Level: Bachelor
Year: 2015 – 2017
Credits: 2.5 ECTS
- **Turbulent flows**
Role: Teaching assistant
University: University of Tehran, Iran
Level: Master
Year: 2015 – 2017
Credits: 7.5 ECTS
- **Introduction to heat transfer I**
Role: Teaching assistant
University: University of Tehran, Iran
Level: Bachelor
Year: 2017
Credits: 7.5 ECTS
- **Introduction to fluid mechanics II**
Role: Teaching assistant
University: University of Tehran, Iran
Level: Bachelor
Year: 2013 – 2015
Credits: 7.5 ECTS

Pedagogical Training

In October 2023, I was awarded the “Diploma in Teaching and Learning in Higher Education” in recognition of the successful fulfillment of all program requirements including seven courses. The program is equivalent to 15 ECTS credits or 10 weeks of full-time study. Additionally, I completed the “Supervising Research Students” course (3.0 ECTS) which is not included in the teaching diploma program. The following presents a summary of my pedagogical training. For more details, please see my pedagogical portfolio.

- University teaching and learning (CLS925), 2.5 ECTS, 2021
- Diversity and inclusion for learning in higher education (CLS930), 2.0 ECTS, 2023
- Supervising writing processes (CLS910), 2.5 ECTS, 2023
- Theoretical perspectives on learning (CLS900), 2.5 ECTS, 2023
- Enhancing learning through writing (CLS941), 4.5 ECTS, 2023
- Minor independent study in teaching and learning in higher education. (CLS946), 0.5 ECTS, 2023
- Reflections on teaching and learning in higher education (CLS920), 0.5 ECTS, 2023
- Supervising research students (CLS905), 3.0 ECTS, 2022

Research Grants

- Artificial intelligence for enhanced hydraulic turbine lifetime
Funding agency: Swedish Hydropower Centre (SVC)
Time period: from 2023-01 to 2027-06 (four and half years)
Amount: 12 248 000 SEK (around 1 100 000 Euros)
Role: Co-PI
Description: This is the successful grant that I received for my current position as a researcher at Chalmers University of Technology. The grant also includes funding for a PhD student that we recently hired. I had the leading role in developing the grant application that concerned my own project and also a major role in defining the PhD project that I am co-supervising.

- Hydropower operation and lifetime analysis
Funding agency: Swedish Hydropower Centre (SVC)
Time period: from 2023-03 to 2027-08 (four and half years)
Amount: 5 035 000 SEK (around 450 000 Euros)
Role: Co-PI
Description: The funding for this successful grant application was used to hire a PhD student (Martina) whom I am co-supervising. I had a major role in developing the application as it can be considered a continuation of my postdoc project and the PhD started basically started where I left off.
- Multi-Fidelity Physics-Informed Neural Network to Solve Partial Differential Equations
Funding agency: Chalmers University of Technology
Time period: from 2023-01 to 2027-06 (four and half years)
Amount: Equal to a fully funded PhD student at Chalmers
Role: Co-PI
Description: This is another funding that we received for a cross-divisional PhD student in the Department of Mechanics and Maritime Sciences of Chalmers University of Technology. I played a pivotal role in formulating the concept and preparing the grant proposal application. Subsequently, the department approved our proposal, leading to the recruitment of a PhD student (Mohammad), whom I am co-supervising.

Applications for Computing Resources

I have been heavily involved in the development of the following successful applications for computing resources through the National Academic Infrastructure for Supercomputing in Sweden (NAISS, formerly called SNIC). I also had a contributing role in acquiring multiple storage allocations through the same resources which are not listed here for brevity.

- Large compute project
Time period: from 2023-01-01 to 2024-01-01
Role: Co-PI
Allocation: 500×1000 core-h/month
- Large compute project
Time period: from 2022-01-01 to 2023-01-01
Role: Co-PI
Allocation: 600×1000 core-h/month
- Large compute project
Time period: from 2021-07-01 to 2022-01-01
Role: Co-PI
Allocation: 500×1000 core-h/month

Reviewer

Reviewer for several journals including

- [Physics of Fluids](#) (*AIP*)
- [AIAA Journal](#) (*AIAA*)
- [Computers and Fluids](#) (*Elsevier*)
- [Biomechanics and Modeling in Mechanobiology](#) (*Springer*)
- [Applied Mathematical Modeling](#) (*Elsevier*)
- [Journal of Fluids Engineering](#) (*ASME*)
- [Fluids](#) (*MDPI*)
- [Energies](#) (*MDPI*)
- [Applied Fluid Mechanics](#) (*IUT*)

Invited Speaker

- Dutch OpenFOAM User group meetings July 2023
- Dutch OpenFOAM User group meetings, January 2023

Membership

- I am an active member of the [OpenFOAM Turbomachinery Technical Committee](#), which is a part of the [OpenFOAM Governance](#). We strive to further develop the modeling capabilities of OpenFOAM for Turbomachinery applications. My contribution to this committee is mainly focused on hydropower applications.

Other Experiences

- 2014 – 2018 | **Head of Research Team**
Efficient uncertainty quantification and robust optimization of complex fluid flows
Uncertainty quantification lab, University of Tehran
Under supervision of Prof. M. Raisee
Funded by University of Tehran
- 2015 – 2018 | **Head of Research Team**
Shape optimization of internal cooling passages of the MGT70 gas turbine blade
[MAPFAN](#) Research Institute, University of Tehran
Under supervision of Prof. M. Raisee
Funded by [MAPNA Co.](#)
- 2013 – 2014 | **Research Assistant of Project**
CFD simulation of free convection of hybrid nanofluid inside a sinusoidal corrugated cavity
Mechanical Engineering Department, University of Tehran
Under supervision of Prof. M. H. Rahimian
Funded by Delta Co.
- 2011 – 2012 | **Research Assistant of Project**
Lattice Boltzmann Simulation of non-Newtonian flow and heat transfer over a square obstacle in a straight channel
Mechanical Engineering Department, University of Tehran
Under supervision of Prof. M. H. Rahimian
Funded by University of Tehran
- 2010 – 2011 | **Research Assistant of Project**
Simulation, design and fabrication of artificial lung
Research Center for New Technologies in Life Science
Engineering, University of Tehran
Funded by University of Tehran
- 2010 – 2010 | **Research Assistant of Project**
Experimental study on the effects of cavitation in Francis turbine on the structural vibrations
Mechanical Engineering Department, University of Tehran
Under supervision of Prof. M. J. Mahjoob
Funded by University of Tehran
- 2009 – 2010 | **Research Assistant of Project**
Experimental investigation of Francis turbine operation and extraction of Hill chart
University of Tehran
Under supervision of Prof. S. Derakhshan
Funded by University of Tehran

Honors

- 2017 Awarded the membership and grant of the [Iran's National Elites Foundation](#)
- 2010 Top 1% of students among 10,000 participants of national high education university entrance exam (rank: 121), which led to a full scholarship to study my Master of Science at the University of Tehran
- 2005 Top 0.1% of students among 400,000 participants of national university entrance exam (rank: 212), which led to a full scholarship to study my Bachelor of Science at the University of Tehran

Computer Skills

CFD	OpenFOAM	● ● ● ● ●	Fluent	● ● ● ● ●
	CFX	● ● ● ● ●	Numeca	● ● ● ● ●
	TurboGrid	● ● ● ● ●	ICEM-CFD	● ● ● ● ●
	Ansys Mesh	● ● ● ● ●		
Programming	C++	● ● ● ● ●	Python	● ● ● ● ●
	MATLAB	● ● ● ● ●	Fortran	● ● ● ● ●
CAD	SolidWorks	● ● ● ● ●	AutoCAD	● ● ● ● ●
	SpaceClaim	● ● ● ● ●		
General	L ^A T _E X	● ● ● ● ●	MS Office	● ● ● ● ●
	Linux	● ● ● ● ●		

Languages

- English: Fluent
- Swedish: Intermediate (learning)
- Persian: Mother tongue
- Arabic: Basic

References

- **Prof. Håkan Nilsson**
Full Professor of Mechanical Engineering,
Division of Fluid Dynamics
Dept. of Mechanics and Maritime Sciences
Chalmers University of Technology, Sweden
Email: hakan.nilsson@chalmers.se
Website: <http://www.tfd.chalmers.se/~hani/>
Tel: +46 31 772 14 14
- **Prof. Mehrdad Raisee**
Full professor of Mechanical Engineering,
Mechanical Engineering Department,
University of Tehran, Iran
Email: mraisee@ut.ac.ir
Website: rtis2.ut.ac.ir/cv/mraisee/?lang=en-gb
Tel: +98 912 296 9732
- **Prof. Michel J. Cervantes**
Full Professor of Fluid Mechanics,
Fluid and Experimental Mechanics Division,
Dept. of Engineering Sciences and Mathematics,
Luleå University of Technology, Sweden
Email: michel.cervantes@ltu.se
Website: ltu.se/staff/c/cervante-1.9910?l=en
Tel: +46 (0) 920 493014