

# EBRAHIM GHAHRAMANI

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## Education

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**Ph.D.**, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden 2015-2020

*Supervisor:* Prof. Rickard Bensow

*Thesis:* “Development of LES methodology utilizing a sub-grid scale model for dynamic non-linear behaviour of the cloud cavitation”

**M.Sc.**, Mechanical Engineering, Shiraz University, Iran 2013

*Supervisors:* Assoc. Prof. Omid Abouali, Assoc. Prof. Homayoon Emdad

*Thesis:* “Analysis of micro and nano particle deposition in turbulent flow in a realistic model of human upper airway using RANS/stochastic and LES methods”

**B.Sc.**, Mechanical Engineering, Shiraz University, Iran 2010

*Thesis:* “Numerical prediction of the drag force on a blunt body using various turbulence models”

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## Research Experience

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### Academic Experience

Marie Curie Early Stage Researcher (ESR) in **CaFE Project** (<http://cafe-project.eu>) 2015-2018

- CaFE is a Marie Skłodowska-Curie Innovative Training Network; a joint research training and doctoral program, funded by the EU and implemented by a partnership of high profile universities, research institutions, and non-academic organizations that are located in 9 different countries, with the purpose of development and experimental validation of computational models for Cavitating Flows, surface Erosion damage and material loss.

Research Assistant, **Chalmers University of Technology**, Sweden 2015-present

- Developing a new hybrid mixture-bubble model for simulation of cavitating flows as an in-house code
- Improving the cavitation DBM model performance by proposing a novel localized form of the widely used Rayleigh-Plesset equation
- Improving the turbulence stochastic dispersion module in Lagrangian Particle tracking models of OpenFOAM
- Reviewing and supervising CFD program projects in OpenFOAM

Visiting PHD Student, **Technical University of Munich**, Germany June-July 2016

- A comparative study in the simulation of cavitating bubbles using 3 different numerical approaches: Thermodynamic equilibrium model, finite mass transfer (FMT) model and an (in-house self-developed) Lagrangian model
- Detecting some sources of issues with the thermodynamic equilibrium model and FMT model
- Provide suggestions to improve the FMT model performance

Advisor: Dr. Steffen Schmidt

Research Assistant, **Shiraz University**, Iran

2010-2015

- Implementing a new stochastic dispersion model in ANSYS FLUENT for Lagrangian tracking of aerosol particles
- Modelling particle deposition in the turbulent flows in human respiratory system using RANS-Stochastic and LES models
- Improving the ventilation system of Shiraz urban railway by suggestion a new location for the intake fans and decreasing the operational costs
- Fire simulation of Shiraz urban railway tunnels and estimating the system performance for design modifications

## Industrial Experience

Visiting PHD Student, **Andritz Hydro**, Switzerland

April-May 2018

- Experimental study of cavitating flow and erosion pattern in a converging-diverging nozzle
- Experimental and numerical study of cavitating flow and erosion pattern around surface mounted cylindrical bluff body
- Using a novel paint test in the erosion study to avoid unrealistic paint removal during the test
- Considerable decreasing of the experimental costs using the faster paint test approach

Advisor: Dr. Magdalena Neuhauser

Mechanical Engineer, **PIDEC**, Shiraz, Iran

Aug-Nov 2015

- Designing pressurized vessels for petrochemical industrial sites and powerplants

Research Assistant, **Fars Science & Technology Park**, Shiraz, Iran

Dec 2014- Aug 2015

Engineering Internship, **PIDEC**, Shiraz, Iran

Summer 2010

- Designing the pipeline systems of petrochemical industrial sites

## Academic Teaching Experience

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### Lecturer:

- Energy Management, Islamic Azad University of Arsanjan 2013-2014
- Application of Renewable Energies, Islamic Azad University of Arsanjan 2013-2014
- Fundamentals of Engineering Drawing, Islamic Azad University of Neyriz 2012-2013
- ANSYS FLUENT workshop, Shiraz University Summer 2012

## Teaching Assistant:

- CFD with OpenSource Software, Chalmers University of Technology Fall semester 2017, 2018
- Fluid Mechanics, Chalmers University of Technology Fall semester 2018
- Fluid Mechanics I, Shiraz University 2010 – 2012
- Fluid Mechanics II, Shiraz University 2010 – 2012

## Publication

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### Journal Papers

- [J5] **E. Ghahramani**, M. H. Arabnejad, R. E. Bensow, 2018, “A comparative study between numerical methods in simulation of cavitating bubbles”, *International Journal of Multiphase Flow*, <http://dx.doi.org/10.1016/j.ijmultiphaseflow.2018.10.010>.
- [J4] **E. Ghahramani**, M. H. Arabnejad, R. E. Bensow, 2018, “Realizability improvements to a hybrid mixture-bubble model for simulation of cavitating flows”, *Computers & Fluids*, <http://dx.doi.org/10.1016/j.compfluid.2018.06.025>.
- [J3] **E. Ghahramani**, O. Abouali, H. Emdad, G. Ahmadi, 2017, “Numerical Investigation of Turbulent Airflow and Microparticle Deposition in a Realistic Model of Human Upper Airway Using LES”, *Computers & Fluids*, <http://dx.doi.org/10.1016/j.compfluid.2017.08.003>.
- [J2] M. M. Tavakol, **E. Ghahramani**, O. Abouali, M. Yaghoubi, G. Ahmadi, 2017, “Deposition fraction of ellipsoidal fibers in a model of human nasal cavity for laminar and turbulent flows”, *Journal of Aerosol Science*, <https://doi.org/10.1016/j.jaerosci.2017.07.008>
- [J1] **E. Ghahramani**, O. Abouali, H. Emdad, G. Ahmadi, 2014, “Numerical analysis of stochastic dispersion of micro-particles in turbulent flows in a realistic model of human nasal/upper airway”, *Journal of Aerosol Science*, <http://dx.doi.org/10.1016/j.jaerosci.2013.09.004>.

### Conference Papers

- [C4] **E. Ghahramani**, R. E. Bensow, 2018, “Analysis of the Finite Mass Transfer Models in the Numerical Simulation of Bubbly Flows”, *The 10th International Symposium on Cavitation (CAV2018)*, May 14-16, Baltimore, Maryland, USA
- [C3] **E. Ghahramani**, M. H. Arabnejad, R. E. Bensow, 2017, “A hybrid model for simulation of cavitating flows”, *12th OpenFOAM® Workshop*, July 24-27, Exeter, UK
- [C2] **E. Ghahramani**, O. Abouali, H. Emdad, G. Ahmadi, 2014, “LES of turbulent airflow field and microparticle deposition in a realistic model of human upper airway”, *ASME Fluid Engineering Division Summer Meeting*, August 3-7, Chicago, Illinois, USA
- [C1] **E. Ghahramani**, O. Abouali, H. Emdad, G. Ahmadi, 2013, “Numerical analysis of micro-particle deposition in turbulent flows in a realistic model of human upper airway”, *21st Annual International Conference on Mechanical Engineering-ISME2013*, May 7-9, Tehran, Iran

## Poster paper

- [P2] **E. Ghahramani**, R. Bensow, 2017 “Simulation of small-scale cavity structures through coupling of the mixture model with the discrete bubble model”, *5th International Institute of Cavitation Research (IICR)*, Chania, Greece.
- [P1] **E. Ghahramani**, R. Bensow, 2016 “Modelling for Incompressible LES using a DNS-based sub-grid model for bubble cloud dynamics”, *4th International Institute of Cavitation Research (IICR)*, Chania, Greece.

## Skills and Abilities

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- **Programming:** Fortran, C++, MATLAB, Maple
- **CFD Solvers:** Open FOAM, ANSYS FLUENT M
- **PostProcessing:** Paraview, Tecplot, Gnuplot M
- **Design:** AutoCAD, Mimics, ANSYS ICEM, Gambit M
- **Hands-on skills:** Parallel programming
- **Languages:**
  - English: Full professional proficiency
  - Swedish: Limited working proficiency
  - Persian (Farsi): Native
  - French: Elementary proficiency

## Awards and Honors

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- Hugo Heyman Scholarship (6700 SEK) 2016
- Hugo Heyman Scholarship (19000 SEK) 2017
- M.Sc. in Mechanical Engineering , ranked 2nd (class 2013)
- B.Sc. in Mechanical Engineering , ranked 3rd (class 2010)
- Chosen as an exceptional talented student in Shiraz University and accepted for studying M.Sc. without national entrance exam

## Relevant Activities

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### Summer School

- Introduction to High Performance Computing, KTH University, Sweden Summer 2018

### Invited Speaker

- Coupling of VOF-Based Solver with LPT for Simulation of Cavitating Flows, Chalmers University of Technology January 2018

### Technical Reviewer

- International Journal of Mechanical Sciences

### Attended Seminars

- Simulation models for cavitating flows, Grenoble Institute of Technology, France 2017
- Experimental methods for cavitating flows, Grenoble Institute of Technology, France 2017

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- Surface erosion models, Grenoble Institute of Technology, France 2017
  - Material loss and fatigue due to cavitation attack, Grenoble Institute of Technology, France 2017
  - Diesel engine technology, MAICh Conference Centre, Chania, Greece 2017
  - Fuel injection systems technology, MAICh Conference Centre, Chania, Greece 2017
  - Cavitation in bioengineering field, MAICh Conference Centre, Chania, Greece 2017
  - Hydro turbine technology, AVL, Graz, Austria 2018
  - Thermodynamics of fuels and their properties, AVL, Graz, Austria 2018
  - Simulation models for cavitation and phase-change, AVL, Graz, Austria 2018
  - Computational methods for interface tracking cavitation and phase-change, AVL, Graz, Austria 2018
  - Main Engine Fuel Pumps for Aero Gas Turbine Engines, Wärtsilä, the Netherlands 2018
  - Propulsion Technology, Wärtsilä, the Netherlands 2018

## Memberships

- Member of PhD Student Council, Mechanics and Maritime Sciences Department, Chalmers University of Technology 2017-present
- Board member of Iranian Students Association at Chalmers (ISAC) 2018-present

## References

### Prof. Rickard Bensow

Mechanics and Maritime Sciences Department, Chalmers University of Technology, Göteborg, Sweden  
Email: [rickard.bensow@chalmers.se](mailto:rickard.bensow@chalmers.se)

### Associate Prof. Omid Abouali

School of Mechanical Engineering, Shiraz University, Shiraz, Iran  
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Homepage: <http://home.shirazu.ac.ir/~abouali/>

### Prof. Goodarz Ahmadi

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