Alireza Ghasemi

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Profile

Early Stage Researcher in the Magister ITN and Ph.D. candidate at University of Twente. Proficient in numerical analysis of turbulent reactive flows and spray flames. Interested in green technologies and combustion dynamics. Enthusiastic about ML applications in combustion modelling and control. Excellent communication and language skills with strong teamwork and project management competency.

Education

Ph.D. Candidate **May 2018 – Present**

University of Twente, Enschede, The Netherlands
Working thesis title: Large Eddy Simulation of Acoustically Forced Spray Flames
Focused on CFD simulations of turbulent spray flames and thermoacoustics

M.Sc. in Energy Engineering **Oct 2013 – Jul 2017**

Politecnico di Milano, Milan, Italy
Thesis title: Numerical Simulation of non-Reactive Evaporative Diesel Sprays using OpenFOAM
Graduated with 109 / 110

B.Sc. In Mechanical Engineering **Oct 2007 – Jul 2012**

University of Tehran, Tehran, Iran
Thesis title: Aerodynamic Design of High Speed Centrifugal Compressors and Simulation using CFX
Graduated with GPA 3.44 / 4.0

Experience

Early Stage Researcher in MAGISTER,
Marie Skłodowska-Curie Actions (MSCA) Innovative Training Networks (ITN) **May 2018 – Present**

University of Twente, Enschede, The Netherlands

- Design of a novel aero-engine representative airblast swirl burner
- LES and DES of turbulent liquid spray flames using flamelet libraries
- ML oriented post-processing of CFD results with POD and DMD
- Reduced order modelling of combustion dynamics
- Thermoacoustic response of turbulent spray flames and combustion instability

Researcher **Oct 2015 – Jul 2017**

Internal Combustion Engines department, Politecnico di Milano, Milan, Italy

- 5th Engine Combustion Network (ECN) contribution in Wayne State University in Detroit, USA
- Non-reactive evaporative diesel spray simulations using OpenFOAM

Internship **Jun 2011 – Sep 2011**

Moshanir Power Engineering Consultants, Tehran, Iran

- Studied gas transportation and distribution piping systems standards

Research Interests

Computational Fluid Dynamics and Heat Transfer (CFD, DES, LES and DNS) • Combustion and Turbulent Reactive Flows • Liquid Fuel Combustion • Hydrogen Combustion • Turbomachinery • Energy Conversion Systems • Renewable Energies • Machine Learning: POD/DMD and Deep Learning

Publications

- S. Gohari and **A. Ghasemi**, "Introducing New Compact Parameterization Method for an Automated Blade Shape Optimization" in 21st AIAA CFD Conference, 2013
- **A. Ghasemi** and J. B. W. Kok, "Numerical study of a swirl atomized spray response to acoustic perturbations" in 26th International Congress on Sound and Vibration, ICSV, 2019
- **A. Ghasemi** and J. B. W. Kok, "Numerical identification of Precessing Vortex Core in an airblast swirl burner using POD" in 27th International Congress on Sound and Vibration, ICSV, 2021
- **A. Ghasemi**, S. N. Arredondo, and J. B. W. Kok, "Numerical study of a novel double swirl burner, prone to thermoacoustic instabilities" in Symposium on Thermoacoustics in Combustion: Industry meets Academia, SoTiC, 2021

Honors and Rewards

- ESR fellow in Magister, Marie Skłodowska-Curie Actions (MSCA) ITN part of Horizon Europe
- Golden Scholarship from Politecnico di Milano for highest average among M.Sc. candidates
- Full scholarship from University of Tehran for ranking among top B.Sc. candidates nationwide

Language Proficiency

English: C2 • Nederlands: B2 • Italiano: B2 • Deutsch: A2/B1 • Arabic: A2 • Persian: Native

Training & Certificates

- Machine learning for fluid mechanics: analysis, modeling, control and closures
  Von Karman Institute, 2020
- Measurements of spray flames in aero combustors. Karlsruhe Institut für Technologie, 2020
- TensorFlow 2 for Deep Learning Specialization via Coarsera, University of Cambridge, 2019
- CFD for Dispersed Multiphase Flows, ERCOFTAC, 2018
- Machine learning workshop on combustion and acoustics in aero engine combustors
  University of Cambridge, 2018
- Thermo-acoustic and combustion dynamics in aero gas turbines workshop. University of Twente and University of Cambridge, 2018

Software Skills

Numerical analysis, Mesh generation, Visualization

- OpenFOAM • Ansys Fluent • Ansys CFX • Cantera • SU2 • XFoil • FreeFem++
- Pointwise • ICEM CFD • Ansys Meshing • Gambit • SnappyHexMesh • Salome • Gmsh
- Paraview • Ansys CFD-post • Python matplotlib • Tecplot • Origin • gnuplot

Machine Learning

- MATLAB deep learning toolbox • Python scikit-learn and TensorFlow using Keras APIs

Programming Languages

- Python • C++ • MATLAB scripting • Unix Shell scripting • Fortran • R • JavaScript

And more...

- SOLIDWORKS and CAD software • Blender • Mathematica • LaTeX and MS Office Suite

Hobbies

I enjoy going running and swimming to stay fit. I mostly read books on science and philosophy. I like to create digital art and I play the violin.