Hadi Zanganeh Kia

Computational Fluid Dynamics Modeler

Education

2022–present	**PhD**, *University of Houston*, Houston, GPA:3.95.
	Atmospheric sciences
2016–2019	**Master**, *University of Tehran*, Tehran, GPA:3.77.
	Mechanical Engineering, Energy Conversion
2011–2015	**Bachelor**, *K.N.Toosi university of technology*, Tehran, GPA: 3.24.
	Mechanical engineering

Current PhD Project

Title	*Simulation of urban micro-climate using CFD*
Supervisor	Dr. Yunsoo Choi (ychoi6@uh.edu)
Description	My research focuses on using computational fluid dynamics (CFD) to simulate and study the impact of wind, cloud, and heat in urban micro-climates. I aim to understand and analyze the distribution of urban heat islands, outdoor ventilation, and precipitation in congested urban areas by employing high-resolution modeling techniques. This research contributes to the development of effective strategies for urban planning and addressing the challenges posed by urban environments.

Master Thesis

Title	*CFD Simulation of Piston-Effect in Urban Metro Tunnels*
Supervisors	Dr. Vahid Esfahanian, Dr. Alireza Riasi
Description	In my master's thesis, I investigated the Piston-Effect phenomenon in urban metro tunnels, where trains create air displacement akin to a piston pushing smoke in a cylinder. I conducted simulations to analyze this transient process using dynamic mesh techniques and Ansys Fluent, a commercial CFD software. This research aims to improve the safety and efficiency of urban metro systems.

Bachelor Thesis

Title	*Construction and Testing of a Sub-Scale Savonius Wind Turbine*
Supervisor	Dr. Ali Ashrafizadeh (ashrafizadeh@kntu.ac.ir)
Description	My bachelor thesis involved constructing and testing a sub-scale Savonius vertical axis wind turbine. I set up the experimental apparatus and performed final testing, focusing on extracting Torque-Rpm and Power-Rpm curves. The study aimed to investigate the performance characteristics of the Savonius wind turbine design.

Job Experience

2018–2021 **MATLAB Tutor**, *Iran University of Science and Technology*, Tehran.
Instructed students in mathematical techniques, programming skills, Simulink, and visualizations using MATLAB.

2017–2018 **Research Assistant**, *VFERI (Vehicle, Fuel and Environment Research Institute)*, Tehran.
Conducted a study on metro development worldwide, and simulation of metro movements.

Languages

Persian **Fluent**

English **Fluent**
- IELTS: L:7.5, R:6.5, W:6, S:6.5 Overall: 6.5

French **Beginner**

Computer skills

Programming MATLAB, C++, FORTRAN, Python, Shell scripting

Typesetting LATEX, Microsoft Office

Simulation WRF, OpenFOAM, Ansys Fluent

CAD/Meshing SolidWorks, ICEM (Ansys), Ansys Meshing

Interests

Research CFD, Model development, Data science

Research Computational fluid mechanics (including complex and moving geometries, micro-climate, wind engineering, and heat transfer)

Experimental Projects Fluid mechanics experiments, especially related to wind turbines and renewable energy systems

Programming Discretization of PDEs using Python, C++, MATLAB, etc.

Simulation Software Utilizing various software packages for simulating complex geometries

Researches and Projects

- Micro-climate modeling using RANS and LES in OpenFOAM open-source code
- Code scripts for evaluating meteorological and air pollution variables in Python using pandas
- Large-Eddy simulation in WRF software for evaluating cloud properties
- CFD simulation of oil whirling and whipping to predict safe rotor rotational speed
- Experimental setup for simulating a turbine using porous disks (actuator disk theory)
- Designing HAWT (Horizontal Axis Wind Turbine) using Blade Element Momentum Theory (MATLAB)

- Designing VAWT (Vertical Axis Wind Turbine) using double Actuator Disc Theory (MATLAB)
- Modeling and analyzing a Horizontal Axis Wind Turbine in Ansys Fluent (2D sliding mesh)
- Design and modeling of a Francis Hydro-turbine in SolidWorks
- Participation in CFD1 course at the University of Tehran, involving more than 3 CFD codes
- Member of Robotics Group at K.N. Toosi University, participating in line follower projects
- Modeling and analysis of a 9-floor steel structure building in ETABS software

Publications

- Ranjbar, M., Nasrazadani, S., Zanganeh Kia, H., Gharali, K. (2019). Reaching the betz limit experimentally and numerically. Energy Equipment and Systems, 7(3), 271-278. doi: 10.22059/ees.2019.36563
- Ranjbar, MH, Zanganeh Kia, H, Nasrazadani, SA, Gharali, K, Nathwani, J. Experimental and numerical investigations of actuator disks for wind turbines. Energy Sci Eng. 2020; 8: 2371– 2386. https://doi.org/10.1002/ese3.670
- Kia, Hadi Zanganeh, Yunsoo Choi, Delaney Nelson, Jincheol Park, and Arman Pouyaei. "Large eddy simulation of sneeze plumes and particles in a poorly ventilated outdoor air condition: A case study of the University of Houston main campus." Science of The Total Environment (2023): 164694.

References

Dr.Yunsoo Choi, *University of Houston*, Houston, .
Atmospheric sciences, ychoi6@uh.edu

Prof.Vahid Esfahanian, *University of Tehran*, Tehran, .
Energy Conversion, evahid@ut.ac.ir and evahid.com

Dr.Kobra Gharali, *University of Tehran*, Tehran, .
Energy Conversion, kgharali@ut.ac.ir

Dr.Honghai Zhang, *University of Houston*, Houston, .
Atmospheric sciences, hzhang83@central.uh.edu

Honors and Awards

- Recipient of the Best First Year PhD Student Award from the Department of Earth and Atmospheric Sciences
- Recipient of the Earth and Atmospheric Sciences Research Grant for Graduate Students
- Ranked 320th among over 100,000 participants in the university entrance exam (Konkur)
- Received a fully funded scholarship for the bachelor's degree at K.N. Toosi University of Technology
- English Teaching Assistant for 5 semesters at K.N. Toosi University of Technology