

EDUCATION

University of Tehran

M.S. in Biomechanical Engineering

GPA: 19.05/20.00 (4.0/4.0)

Tehran, Iran

Sep. 2020 - Present

University of Tehran

B.S. in Mechanical Engineering

GPA: 17.76/20.00 (3.82/4.00), Last 2year GPA: 18.51/20.00 (4.0/4.0)

Tehran, Iran

Sep. 2020

RESEARCH INTERESTS

- Computational Fluid Dynamics
- Complex Fluids
- Transport Phenomena in Biological Systems
- Microfluidics
- Targeted Drug Delivery
- Heat Transfer
- Deep Learning, Neural Networks, and Optimization

PUBLICATIONS

- Hanie Rezaei, **Mehryar Jannesari Ghomsheh**, Farshad Kowsary, Pouria Ahmadi, "Performance assessment of a range-extended electric vehicle under real driving conditions using novel PCM-based HVAC system," [Sustainable Energy Technologies and Assessments](#), 47(101527), 2021.
- **Mehryar Jannesari Ghomsheh**, Azadeh Jafari, "Inertial lift forces on a particle in a straight microchannel of Newtonian, Power-law, and Carreau-Yasuda fluids: a simulation study toward optimized particle separation," *Phys. Fluids (to be submitted)*.
- **Mehryar Jannesari Ghomsheh**, Azadeh Jafari, "A novel passive geometry for inertial focusing of different-sized particles," *Sci. Rep. (to be submitted)*.

RESEARCH EXPERIENCES

M.S. Thesis: Investigation of hydrodynamic interactions between micro-swimmers in the gastric mucus for improvement on targeted drug delivery using machine learning

Aug. 2021 - Present

Advisor: Dr. A. Jafari

University of Tehran

- Researched Brinkman model to simulate the gastric mucus environment
- Scrutinized the H. pylori bacteria locomotion in the gastric mucus

Graduate Research Assistant

Jan. 2021 - Present

Computational Non-Newtonian Fluid Mechanics Lab, Head: Dr. A. Jafari

University of Tehran

- Developed a framework for coupling of MATLAB and COMSOL software to carry out 3D DNS of particle lateral movement in straight microchannels
- Detected the particle trajectory in a square-wave microchannel for different Reynolds numbers by post-processing the experimental results and comparing with the obtained numerical results
- Generated a particle tracing module for the application of targeted drug delivery in cardiovascular disease
- Analyzed the blood rheology by viscoelastic, shear-thinning, and thixotropic models
- Examined a micro-swimmer trajectory in high Reynolds number flows through FSI simulation with Arbitrary Lagrangian-Eulerian (ALE) method

B.S. Thesis: Modeling and optimization of a phase change material heat exchanger used in electric vehicle air conditioning system

Jan. 2020 – Sep. 2020

Advisor: Prof. F. Kowsary

University of Tehran

- Observed the thermal performance of PCM heat exchanger in real driving conditions and different outside temperatures
- Designed an optimal PCM heat exchanger
- Integrated the optimal PCM heat exchanger into the EV model to extend its mileage

SELECTED PROJECTS

- Inertial Lift Forces on a Particle in Newtonian Fluid and Xanthan Gum Solutions** *Mar. 2021 – July 2021*
Instructor: Dr. A. Jafari
- Calculated position-dependent inertial lift forces for a single particle in the Poiseuille flow of Newtonian fluids and Xanthan gum solutions to detect the equilibrium positions for two different Reynolds numbers
 - Assessed the validity of Power-law model for Xanthan gum solutions based on the obtained shear-rate profiles
- Stability Analysis of a Laminar Wall Jet in a Decelerating External Flow** *Mar. 2021 – July 2021*
Instructor: Prof. K. Sadeghy
- Devised a golden-section optimization algorithm to optimize the pressure gradient parameter
 - Carried out temporal stability analysis of the wall jet using spectral methods based on similarity profiles of velocity
- A Novel Bubble-driven Micromixer/Micropump Based on Thermal-inkjet Technology** *Oct. 2020 – Mar. 2021*
Instructor: Dr. V. Bazargan
- Designed an extensible square-wave microchannel toward reaching an optimal design
 - Coupled Level Set and Volume-Of-Fluid (CLSVOF) method for bubble-fluid and fluid-fluid interface tracking
- Analysis of the Flow through a Converging-Diverging Duct (Stenosis)** *Sep. 2020 – Oct. 2020*
Instructor: Dr. V. Bazargan
- Obtained different velocity profiles based on stenosis shape
 - Calculated the pressure drop as a function of stenosis height and length for different Re numbers
- Two-dimensional Incompressible Laminar Navier-Stokes and Energy Equations in C++** *Oct. 2019 – Jan. 2020*
Instructor: Dr. A. Jalali
- Developed a SIMPLE algorithm with finite-volume discretization to solve the NS equations and verified the results by solving the same problem with the equations of stream function and vorticity
 - Programmed explicit and implicit Euler time advance schemes for the energy equation to compare their stability

TEACHING EXPERIENCES

(All in School of Mechanical Engineering, University of Tehran)

Responsibilities: assigning and grading homework, quizzes, and projects and lecturing additional course materials

- Teaching Assistant, Fluid Mechanics II, Instructor: Dr. A. Jafari** *Sep. 2021 – Present*
- Teaching Assistant, Optimization of Mechanical Systems, Instructor: Prof. F. Kowsary** *Sep. 2020 – Jan. 2021*
- Teaching Assistant, Heat Transfer I, Instructor: Prof. F. Kowsary** *Sep. 2020 – Jan. 2021*
- Teaching Assistant, Fluid Mechanics II, Instructor: Dr. H. Rezvantaleb** *Sep. 2019 – Jan. 2020*

SELECTED COURSES

Graduate Level

- Non-Newtonian Fluid Mechanics (19.75/20.00), Instructor: Dr. A. Jafari
- Advanced Fluid Mechanics (19.75/20.00), Instructor: Prof. K. Sadeghy
- Fluid Mechanics in Biological Systems (19.0/20.0), Instructor: Dr. V. Bazargan
- Advanced Mathematics (17.1/20.0), Instructor: Dr. H. M. Darian
- Physiology (20.0/20.0), Instructor: Dr. B. Seifi

Undergraduate Level

- Computational Fluid Dynamics (19.5/20.0), Instructor: Dr. A. Jalali
- Optimization of Mechanical Systems (20.0/20.0), Instructor: Prof. F. Kowsary
- Heat Transfer I (17.0/20.0), Instructor: Prof. F. Kowsary

CERTIFICATIONS

- Deep Learning and Neural Networks with Keras** *Apr. 2021*
IBM, Coursera
- Machine Learning** *Mar. 2021*
Stanford Online, Coursera

TECHNICAL SKILLS

Engineering	ANSYS Workbench, COMSOL Multiphysics, SolidWorks
Programming	MATLAB, Python, C/C++, HTML/CSS
Operating Systems	Windows, Linux
Other	Microsoft Office, L ^A T _E X, Adobe Premiere Pro

HONORS AND AWARDS

Ranked Among Top 10% of the Entry School of Mechanical Engineering, University of Tehran, Tehran, Iran	July 2020
Full Scholarship, M.S. Program, Exceptional Talents School of Mechanical Engineering, University of Tehran, Tehran, Iran	July 2020
Full Scholarship, B.S. Program, Iranian University Entrance Exam School of Mechanical Engineering, University of Tehran, Tehran, Iran	Aug. 2016
306th Place among 162,879 Participants, Iranian University Entrance Exam (Konkur)	2016

LANGUAGE

English: Professional Working Proficiency <ul style="list-style-type: none">TOEFL iBT: 103 (Reading: 29/30, Listening: 26/30, Speaking: 23/30, Writing: 25/30) Persian: Native	Oct. 2020
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REFERENCES

Dr. A. Jafari Assistant Professor of Mechanical Engineering, University of Tehran <ul style="list-style-type: none">Ph.D. Graduated from EPFL azadeh.jafari@ut.ac.ir	Prof. F. Kowsary Professor of Mechanical Engineering, University of Tehran <ul style="list-style-type: none">Ph.D. Graduated from Virginia Polytechnic Institute and State University fkowsari@ut.ac.ir
Dr. V. Bazargan Assistant Professor of Mechanical Engineering, University of Tehran <ul style="list-style-type: none">Ph.D. Graduated from University of British Columbia vbazargan@ut.ac.ir	