

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

- Fluid Mechanics
- Complex Fluids
- Transport Phenomena in Biological Systems
- Microfluidics and Lab-on-a-Chip Systems
- 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, Denis Funfschilling, "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*, Nov. 2021 (*under review*).

In Preparation:

- **Mehryar Jannesari Ghomsheh**, Azadeh Jafari, Denis Funfschilling, "A novel passive geometry for inertial focusing of different-sized particles," *Sci. Rep.*

RESEARCH EXPERIENCES

M.S. Thesis: Hydrodynamic interactions between micro-swimmers in complex media for improvement on targeted drug delivery

Advisor: Dr. A. Jafari

Aug. 2021 - Present

University of Tehran

- Studied the gastric mucus environment
- Examined the locomotion of a self-propelled micro-swimmer in the gastric mucus

Graduate Research Assistant

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

Jan. 2021 - Present

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 them 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 in electric vehicle air conditioning system

Advisor: Prof. F. Kowsary

Jan. 2020 – Sep. 2020

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 Instructor: Dr. A. Jafari <ul style="list-style-type: none">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 numbersAssessed the validity of Power-law model for Xanthan gum solutions based on the obtained shear-rate profiles	<i>Mar. 2021 – July 2021</i>
Stability Analysis of a Laminar Wall Jet in a Decelerating External Flow Instructor: Prof. K. Sadeghy <ul style="list-style-type: none">Devised a golden-section optimization algorithm to optimize the pressure gradient parameterCarried out temporal stability analysis of the wall jet using spectral methods based on similarity profiles of velocity	<i>Mar. 2021 – July 2021</i>
A Novel Bubble-driven Micromixer/Micropump Based on Thermal-inkjet Technology Instructor: Dr. V. Bazargan <ul style="list-style-type: none">Designed an extensible square-wave microchannel toward reaching an optimal designImplemented a Coupled Level Set and Volume-Of-Fluid (CLSVOF) method for bubble-fluid and fluid-fluid interface tracking	<i>Oct. 2020 – Mar. 2021</i>
Analysis of the Flow through a Converging-Diverging Duct (Stenosis) Instructor: Dr. V. Bazargan <ul style="list-style-type: none">Obtained different velocity profiles based on stenosis shapeCalculated the pressure drop as a function of stenosis height and length for different Re numbers	<i>Sep. 2020 – Oct. 2020</i>
Two-dimensional Incompressible Laminar Navier-Stokes and Energy Equations in C++ Instructor: Dr. A. Jalali <ul style="list-style-type: none">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 vorticityProgrammed explicit and implicit Euler time advance schemes for the energy equation to compare their stability	<i>Oct. 2019 – Jan. 2020</i>

TEACHING EXPERIENCES

Teaching Assistant Responsibilities: assigning and grading homework, quizzes, and projects and lecturing additional course materials <ul style="list-style-type: none">Advanced Fluid Mechanics, Instructor: Dr. A. JalaliFluid Mechanics II, Instructor: Dr. A. JafariOptimization of Mechanical Systems, Instructor: Prof. F. KowsaryHeat Transfer I, Instructor: Prof. F. KowsaryFluid Mechanics II, Instructor: Dr. H. Rezvantalab	<i>School of Mechanical Engineering, University of Tehran</i> <i>Sep. 2021 – Present</i> <i>Sep. 2021 – Present</i> <i>Sep. 2020 – Jan. 2021</i> <i>Sep. 2020 – Jan. 2021</i> <i>Sep. 2019 – Jan. 2020</i>
Private Tutor <ul style="list-style-type: none">Mathematics Teacher (The outcome was two gold medals, two silver medals, and one bronze medal in International Mathematics Competition (IMC))	<i>Math Home, Tehran, Iran</i> <i>Mar. 2019 – Apr. 2019</i>

SELECTED COURSES

Graduate Level <ul style="list-style-type: none">Non-Newtonian Fluid Mechanics (19.75/20.00), Instructor: Dr. A. JafariAdvanced Fluid Mechanics (19.75/20.00), Instructor: Prof. K. SadeghyFluid Mechanics in Biological Systems (19.0/20.0), Instructor: Dr. V. BazarganAdvanced Mathematics (17.1/20.0), Instructor: Dr. H. M. DarianPhysiology (20.0/20.0), Instructor: Dr. B. Seifi
Undergraduate Level <ul style="list-style-type: none">Computational Fluid Dynamics (19.5/20.0), Instructor: Dr. A. JalaliOptimization of Mechanical Systems (20.0/20.0), Instructor: Prof. F. KowsaryHeat Transfer I (17.0/20.0), Instructor: Prof. F. Kowsary

CERTIFICATIONS

Deep Learning and Neural Networks with Keras

IBM, Coursera

Apr. 2021

Machine Learning

Stanford Online, Coursera

Mar. 2021

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 2% of the Entry (Graduate)

School of Mechanical Engineering, University of Tehran, Tehran, Iran

July 2021

Ranked Among Top 10% of the Entry (Undergraduate)

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

- TOEFL iBT: 103 (Reading: 29/30, Listening: 26/30, Speaking: 23/30, Writing: 25/30)
- GRE General: 315 (Verbal: 150/170, Quantitative: 165/170)

Oct. 2020

Nov. 2021

Persian: Native

REFERENCES

Dr. A. Jafari

Assistant Professor of Mechanical Engineering,
University of Tehran

- Ph.D. Graduated from EPFL

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Dr. V. Bazargan

Assistant Professor of Mechanical Engineering,
University of Tehran

- Ph.D. Graduated from University of British Columbia

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Prof. F. Kowsary

Professor of Mechanical Engineering, University of Tehran

- Ph.D. Graduated from Virginia Polytechnic Institute and State University

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Dr. A. Jalali

Assistant Professor of Mechanical Engineering, University of Tehran

- Ph.D. Graduated from University British Columbia

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