

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

- Thermal-Fluid Science
- Computational Fluid Dynamics
- Non-Newtonian Fluid Mechanics
- Transport Phenomena in Biological Systems
- Targeted Drug Delivery
- Microfluidics
- Deep Learning and Neural Networks

RESEARCH EXPERIENCES

M.S. Thesis: The investigation of hydrodynamic interactions between swimming microorganism in the gastric mucus for improvement on drug delivery

Advisor: Dr. A. Jafari

- Researched Brinkman and Bi-viscous models to model the gastric mucus
- Scrutinized the H. pylori bacteria locomotion in the gastric mucus

Aug. 2021 - Present

University of Tehran

Graduate Research Assistant

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

- 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 by post-processing the experimental results and comparing with the obtained numerical results
- Explored the dynamics of different micro-swimmers for the application of targeted drug delivery
- Examined a micro-swimmer trajectory in high Reynolds number flows through FSI simulation with Arbitrary Lagrangian-Eulerian (ALE) method

Jan. 2021 - Present

University of Tehran

B.S. Thesis: modeling and optimization of a condenser with phase change material used in electric vehicle heat pump cycle

Advisor: Prof. F. Kowsary

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

Jan. 2021 - Present

University of Tehran

ACADEMIC PROJECTS

Inertial Lift on a Spherical Particle in Newtonian and Power-law Fluids

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
- Assessed the validity of Power-law model for Xanthan gum solutions based on shear-rate profiles

Mar. 2021 – July 2021

Stability Analysis of a Laminar Wall Jet in a Decelerating External Flow

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 method

Mar. 2021 – July 2021

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 design Coupled Level Set and Volume-Of-Fluid (CLSVOF) method for bubble-fluid interface tracking 	Oct. 2020 – Mar. 2021
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 size Calculated the pressure drop as a function of stenosis height and length for different Re numbers 	Oct. 2020 – Nov. 2020
Two-dimensional Incompressible Laminar Navier-Stokes 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 Formulated the equations of stream function and vorticity to compare with the SIMPLE algorithm 	Nov. 2019 – Jan. 2020
A Two-dimensional Inverse Heat Conduction Problem to Estimate the Surface Heat Flux Instructor: Prof. F. Kowsary <ul style="list-style-type: none"> Developed a framework for coupling of MATLAB and ANSYS Fluent software to solve and optimize the temperature profile Generated genetic and conjugate gradient optimization algorithms 	Oct. 2019 – Dec. 2019
Two-dimensional Incompressible Laminar Energy Equation in C++ Instructor: Dr. A. Jalali <ul style="list-style-type: none"> Programmed explicit and implicit time advance schemes to compare the stability Applied approximate factorization to solve the linear system of implicit discretization 	Oct. 2019 – Dec. 2019
Implementation of Elliptic Equations' Solving Methods in C++ Instructor: Dr. A. Jalali <ul style="list-style-type: none"> Second-order finite difference discretization of Poisson's and Laplace's equations Implementation of Gauss-Seidel, P-SOR, and L-SOR algorithms 	Sep. 2019 – Nov. 2019

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](#).
- "Inertial lift on a particle in a straight microchannel of Newtonian, Power-law, and Carreau-Yasuda fluids: a simulation study toward optimized particle separation (*to be submitted*)"

TEACHING EXPERIENCES

Teaching Assistant, Fluid Mechanics II School of Mechanical Engineering, University of Tehran <ul style="list-style-type: none"> Assigning and grading homework and quizzes 	Sep. 2021 – Present
Teaching Assistant, Optimization of Mechanical Systems School of Mechanical Engineering, University of Tehran <ul style="list-style-type: none"> Assigned and graded homework and projects, lectured additional course materials 	Sep. 2020 – Jan. 2021
Teaching Assistant, Heat Transfer I School of Mechanical Engineering, University of Tehran <ul style="list-style-type: none"> Assigned and graded homework and projects 	Sep. 2020 – Jan. 2021
Teaching Assistant, Fluid Mechanics II School of Mechanical Engineering, University of Tehran <ul style="list-style-type: none"> Assigned and graded homework and quizzes, held weekly office hours for a class of 30 students 	Sep. 2019 – Jan. 2020

Math Home, Tehran, Iran

- Tutored 10 high school students attending International Mathematics Competition (IMC)

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

TECHNICAL SKILLS

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

HONORS AND AWARDS

Deep Learning and Neural Networks with Keras, Certification IBM, Coursera	<i>Apr. 2021</i>
Machine Learning, Certification Stanford Online, Coursera	<i>Mar. 2021</i>
Full Scholarship for M.S. Program School of Mechanical Engineering, University of Tehran, Tehran, Iran	<i>July 2020</i>
Ranked Among Top 10% of the Entry School of Mechanical Engineering, University of Tehran, Tehran, Iran	<i>July 2020</i>
Full Scholarship for B.S. Program School of Mechanical Engineering, University of Tehran, Tehran, Iran	<i>Aug. 2016</i>
488th Place among 162,879 Participants, Iranian University Entrance Exam (Konkur)	<i>2016</i>

LANGUAGE

English: Professional Working Proficiency • TOEFL iBT: 103 (Reading: 29/30, Listening: 26/30, Speaking: 23/30, Writing: 25/30)	<i>Oct. 2020</i>
Persian: Native	

REFERENCES*

Dr. A. Jafari Assistant Professor of Mechanical Engineering, University of Tehran • PHD Graduated from EPFL azadeh.jafari@ut.ac.ir	Prof. F. Kowsary Professor of Mechanical Engineering, University of Tehran • PHD Graduated from Virginia Polytechnic Institute fkowsari@ut.ac.ir
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*Others available upon request