

## 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
- Complex Fluids
- 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 targeted drug delivery

Advisor: Dr. A. Jafari

Aug. 2021 - Present  
University of Tehran

- Researched Brinkman and Bi-viscous models to simulate the gastric mucus environment
- Scrutinized the H. pylori bacteria locomotion 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 with the obtained numerical results
- Generated a particle tracing module for the application of targeted drug delivery in cardiovascular disease
- 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 condenser with phase change material used in electric vehicle heat pump cycle

Advisor: Prof. F. Kowsary

Jan. 2020 – Sep. 2020  
University of Tehran

- 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

## SELECTED PROJECTS

### Inertial Lift Forces on a Particle in Newtonian Fluid and Xanthan Gum Solutions

Instructor: Dr. A. Jafari

Mar. 2021 – July 2021

- 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

Instructor: Prof. K. Sadeghy

Mar. 2021 – July 2021

- 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

## 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

## PUBLICATIONS

- “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 (*to be submitted*), under supervision of Dr. A. Jafari”
- 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.

## 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

## TECHNICAL SKILLS

<b>Engineering</b>	ANSYS Workbench, COMSOL Multiphysics, SolidWorks
<b>Programming</b>	MATLAB, Python, C/C++, HTML/CSS (beginner level)
<b>Operating Systems</b>	Windows, Linux (beginner level)
<b>Other</b>	Microsoft Office, $\text{\LaTeX}$

## HONORS AND AWARDS

### Deep Learning and Neural Networks with Keras, Certification

Apr. 2021

IBM, Coursera

### Machine Learning, Certification

Mar. 2021

Stanford Online, Coursera

### Full Scholarship, M.S. Program, Exceptional Talents

July 2020

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

**Ranked Among Top 10% of the Entry**

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

**488<sup>th</sup> 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)

Oct. 2020

**Persian: Native**

## REFERENCES\*

---

**Dr. A. Jafari**

Assistant Professor of Mechanical Engineering,  
University of Tehran

- PHD Graduated from EPFL

[azadeh.jafari@ut.ac.ir](mailto:azadeh.jafari@ut.ac.ir)

**Prof. F. Kowsary**

Professor of Mechanical Engineering, University of Tehran

- PHD Graduated from Virginia Polytechnic Institute and State University

[fkowsari@ut.ac.ir](mailto:fkowsari@ut.ac.ir)

\*Others available upon request