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**EDUCATION**

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**University of Tehran***Tehran, Iran*

M.S. in Biomechanical Engineering

GPA: 19.05/20 (4/4)

*Sep. 2020 - Present***University of Tehran***Tehran, Iran*

B.S. in Mechanical Engineering

GPA: 17.76/20 (3.82/4), Last 2year GPA: 18.51/20 (4/4)

*Sep. 2020*

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**RESEARCH INTERESTS**

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

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**RESEARCH EXPERIENCES**

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**M.S. Thesis: The investigation of hydrodynamic interactions between swimming microorganism in the gastric mucus for improvement on drug delivery***Aug. 2021 - Present*

Advisor: Dr. A. Jafari

*University of Tehran*

- Researched Brinkman and Bi-viscous models to model the gastric mucus
- 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 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

**B.S. Thesis: modeling and optimization of a condenser with phase change material used in electric vehicle heat pump cycle***Jan. 2021 - Present*

Advisor: Prof. F. Kowsary

*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

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**ACADEMIC PROJECTS**

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**Inertial Lift on a Spherical Particle in Newtonian and Power-law Fluids***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
- Assessed the validity of Power-law model for Xanthan gum solutions based on 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 method

**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 interface tracking

**Analysis of the Flow through a Converging-Diverging Duct (Stenosis)**

*Oct. 2020 – Nov. 2020*

Instructor: Dr. V. Bazargan

- Obtained different velocity profiles based on stenosis size
- Calculated the pressure drop as a function of stenosis height and length for different Re numbers

**Two-dimensional Incompressible Laminar Navier-Stokes Equations in C++**

*Nov. 2019 – Jan. 2020*

Instructor: Dr. A. Jalali

- 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

**A Two-dimensional Inverse Heat Conduction Problem to Estimate the Surface Heat Flux**

*Oct. 2019 – Dec. 2019*

Instructor: Prof. F. Kowsary

- 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

**Two-dimensional Incompressible Laminar Energy Equation in C++**

*Oct. 2019 – Dec. 2019*

Instructor: Dr. A. Jalali

- Programmed explicit and implicit time advance schemes to compare the stability
- Applied approximate factorization to solve the linear system of implicit discretization

**Implementation of Elliptic Equations' Solving Methods in C++**

*Sep. 2019 – Nov. 2019*

Instructor: Dr. A. Jalali

- Second-order finite difference discretization of Poisson's and Laplace's equations
- Implementation of Gauss-Seidel, P-SOR, and L-SOR algorithms

## 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**

*Sep. 2021 – Present*

School of Mechanical Engineering, University of Tehran

- Assigning and grading homework and quizzes

**Teaching Assistant, Optimization of Mechanical Systems**

*Sep. 2020 – Jan. 2021*

School of Mechanical Engineering, University of Tehran

- Assigned and graded homework and projects, lectured additional course materials

**Teaching Assistant, Heat Transfer I**

*Sep. 2020 – Jan. 2021*

School of Mechanical Engineering, University of Tehran

- Assigned and graded homework and projects

#### **Teaching Assistant, Fluid Mechanics II**

*Sep. 2019 – Jan. 2020*

School of Mechanical Engineering, University of Tehran

- Assigned and graded homework and quizzes, held weekly office hours for a class of 30 students

#### **Private Tutor, Mathematics**

*Mar. 2019 – Apr. 2019*

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

#### **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**

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

### **LANGUAGE**

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

### **REFERENCES\***

<b>Dr. A. Jafari</b> Assistant Professor of Mechanical Engineering, University of Tehran	<b>Prof. F. Kowsary</b> Professor of Mechanical Engineering, University of Tehran
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- PHD Graduated from EPFL

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\*Others available upon request

- PHD Graduated from Virginia Polytechnic Institute

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