Mehryar Jannesari Ghomsheh

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EDUCATION

University of Tehran — *Tehran, Iran*
M.S. in Biomechanical Engineering — *Sep. 2020 - Present*
GPA: 19.05/20.00 (4.0/4.0)

University of Tehran — *Tehran, Iran*
B.S. in Mechanical Engineering — *Sep. 2020*
GPA: 17.76/20.00 (3.82/4.00), Last 2year GPA: 18.51/20.00 (4.0/4.0)

RESEARCH INTERESTS

- Thermal-Fluid Science
- Computational Fluid Dynamics
- Complex Fluids
- Transport Phenomena in Biological Systems
- Targeted Drug Delivery
- Microfluidics
- Deep Learning and Neural Networks
- Energy Conversion and Storage

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 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"

RESEARCH EXPERIENCES

M.S. Thesis: The investigation of hydrodynamic interactions between swimming microorganisms in the gastric mucus for improvement on targeted drug delivery — *Aug. 2021 - Present*
Advisor: Dr. A. Jafari — *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 — *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
- 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. 2020 – Sep. 2020*
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

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

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. Rezvantalab *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

Engineering	ANSYS Workbench, COMSOL Multiphysics, SolidWorks
Programming	MATLAB, Python, C/C++, HTML/CSS
Operating Systems	Windows, Linux
Other	Microsoft Office, LaTeX

CERTIFICATIONS

Deep Learning and Neural Networks with Keras *Apr. 2021*
IBM, Coursera

Machine Learning *Mar. 2021*
Stanford Online, Coursera

HONORS AND AWARDS

Ranked Among Top 10% of the Entry *July 2020*
School of Mechanical Engineering, University of Tehran, Tehran, Iran

Full Scholarship, M.S. Program, Exceptional Talents *July 2020*
School of Mechanical Engineering, University of Tehran, Tehran, Iran

Full Scholarship, B.S. Program, Iranian University Entrance Exam *Aug. 2016*
School of Mechanical Engineering, University of Tehran, Tehran, Iran

488th 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

- Ph.D. Graduated from EPFL

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Prof. F. Kowsary
Professor of Mechanical Engineering, University of Tehran

- 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

- Ph.D. Graduated from University of British Columbia

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