Mehryar Jannesari Ghomsheh

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| [mehryar.jannesari@ut.ac.ir](mailto:mehryar.jannesari@ut.ac.ir) | [LinkedIn](http://www.linkedin.com/in/mehryar-jannesari) | +98 937 697 9095 |

# education

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| University of Tehran | Tehran, Iran |
| M.S. in Biomechanical Engineering  GPA: 19.05/20 (4.0/4.0) | Sep. 2020 - Present |
| University of Tehran | Tehran, Iran |
| 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) | Sep. 2020 |

# 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 |

# research Experiences

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| Graduate Research Assistant | Jan. 2021 - Present |
| Computational Non-Newtonian Fluid Mechanics Lab, Advisor: Prof. 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 * Calculated the total inertial lift forces exerted on a particle in a straight microchannel * 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 | |

# Academic projects

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|  | Aug. 2021 – Present |
| Advisor: Prof. A. Jafari | M.S. Thesis |
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| Inertial Lift on a Spherical Particle in Newtonian and Power-law Fluids | Mar. 2021 – July 2021 |
| Instructor: Prof. A. Jafari | Course Project |
| * 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 | Course Project |
| * 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: Prof. V. Bazargan | Course Project |
| * 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 | |
| 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 | B.S. Thesis |
| * 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 | |
| Two-dimensional Incompressible Laminar Navier-Stokes Equations in C++ | Nov. 2019 – Jan. 2020 |
| Instructor: Prof. A. Jalali | Course Project |
| * 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 | Course Project |
| * 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++ | Sep. 2019 – Nov. 2019 |
| Instructor: Prof. A. Jalali | Course Project |
| * Programmed explicit and implicit time advance schemes to compare the stability * Applied approximate factorization to solve the linear system of implicit discretization | |

# publications

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| 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](https://www.sciencedirect.com/science/article/abs/pii/S2213138821005385). |

# Teaching experiences

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| Teaching Assistant, Fluid Mechanics II | Sep. 2021 – Present |
| School of Mechanical Engineering, University of Tehran |  |
| * Grading assigned homework and quizzes | |
| Teaching Assistant, Optimization of Mechanical Systems | Sep. 2020 – Jan. 2021 |
| School of Mechanical Engineering, University of Tehran |  |
| * Graded assigned homework and projects, lectured additional course materials | |
| Teaching Assistant, Heat Transfer I | Sep. 2020 – Jan. 2021 |
| School of Mechanical Engineering, University of Tehran |  |
| * Graded assigned homework and projects | |
| Teaching Assistant, Fluid Mechanics II | Sep. 2019 – Jan. 2020 |
| School of Mechanical Engineering, University of Tehran |  |
| * Graded assigned 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

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| Graduate Level |
| * Non-Newtonian Fluid Mechanics (19.75/20.00), Instructor: Prof. A. Jafari |
| * Advanced Fluid Mechanics (19.75/20.00), Instructor: Prof. K. Sadeghy |
| * Fluid Mechanics in Biological Systems (19.0/20.0), Instructor: Prof. V. Bazargan |
| Undergraduate Level |
| * Computational Fluid Dynamics (19.5/20.0), Instructor: Prof. A. Jalali |
| * Optimization of Mechanical Systems (20.0/20.0), Instructor: Prof. F. Kowsary |

# technical skills

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| Engineering | Programming |
| * ANSYS Workbench | * MATLAB |
| * COMSOL Multiphysics | * Python |
| * SolidWorks | * C++ |
| Operating Systems | Other |
| * Windows | * Microsoft Office |
| * Linux (beginner level) | * LATEX |

# honors and awards

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

# language

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

# References\*

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| Prof. A. Jafari | Prof. F. Kowsary |
| Assistant Professor of Mechanical Engineering, University of Tehran | Professor of Mechanical Engineering, University of Tehran |
| * PHD Graduated from EPFL | * PHD Graduated from Virginia Tech |
| [azadeh.jafari@ut.ac.ir](mailto:azadeh.jafari@ut.ac.ir) | [fkowsari@ut.ac.ir](mailto:fkowsari@ut.ac.ir) |

\*Others available upon request