

# FATEME MIRZAABOLHASSANI

## Computer Science

✉ Mail    📞 +98 9120224129    📍 Tehran, Iran    🌐 Github    in Fateme Abolhassani    📁 Portfolio

## FIELDS OF INTEREST

- Single-cell RNA-seq analysis in cancer research
- Molecular dynamics of drug-DNA-protein interactions
- Machine learning and deep learning
- Bioinformatics and Computational biology
- Gene regulatory network inference

## EDUCATION

### Master of Computer Science

📅 Oct. 2020 – Sept. 2023

- GPA: 17.80/20 with total 32 passed credits

📍 Sharif University, Tehran, Iran

- Class Rank: Third

### Bachelor of Computer Science

📅 Sept. 2016 – Sept. 2020

- GPA: 19.44/20 with total 136 passed credits

📍 Alzahra University, Tehran, Iran

- Class Rank: First

### Mathematic and Physics high school diploma

📅 Sept. 2012 – Aug. 2016

- GPA: 18.98/20

📍 Farzanegan High School, Tehran, Iran

## SKILLS

**Programming & Scripting:** Python, R, Bash, Git/GitHub.

**Single-cell & Bioinformatics tools:** Seurat, Monocle3, SoupX, Harmony, pySCENIC, CellOracle, TradeSeq, SCPA, InferCNV, CopyKAT.

**Molecular modeling & MD:** GROMACS, Amber, trajectory analysis.

**Machine learning & Statistics:** Machine learning pipelines, statistical testing (Wilcoxon, differential tests), scikit-learn.

**Visualization & Integration:** Cytoscape, ggplot2, matplotlib, data visualization, figure preparation for publications.

**HPC & Reproducibility:** High-performance computing workflows, containerization (conda, docker), pipeline development.

## PROJECTS

### Molecular Dynamics Simulation of Doxorubicin Binding to DNA and Topoisomerase II

📅 Jun. 2025 – present

- Collaborating with biologists and computational physicists to validate computational predictions.
- Assistant Supervisors: Dr. Arash Boochani and Dr. Fatemeh Zare-Mirakabad

### Integrative Single-Cell Transcriptomics to Identify Regulatory Drivers in the Dedifferentiation of Thyroid Cancer

📅 Sep. 2024 – present

- Role: **Lead author for bioinformatics analyses** (co-first contribution; overall second author).
- Identified candidate transcription factors and genes driving transitions from **Normal** → **PTC** → **ATC**, with results currently under experimental validation in collaboration with biologists.
- Assistant Supervisors: Dr. Kaveh Kavousi and Dr. Vahid Haghpanah

## Identification of driver genes in Glioblastoma based on single-cell gene expression data utilizing the concept of pseudotime and phylogenetic analysis

📅 Oct. 2022 – present

- Complete manuscript and awaiting review from supervisor.
- Developed an approach integrating gene expression and mutation data to identify key driver genes in GBM.
- Work formed the basis of my Master's thesis, with an additional year of post-defense analysis.
- Presented at the **Iran Conference on Bioinformatics**.
- Thesis Supervisor: Dr. Mohammad Hadi Foroughmand Araabi
- Article Supervisors: Dr. Kaveh Kavousi and Dr. Fatemeh Zare-Mirakabad

## Implementation of RNA Secondary Structure Prediction

📅 Feb. 2024 – May 2024

- Implemented methods from: "RNA Secondary Structure Prediction Using Stochastic Context-Free Grammars and Evolutionary History."
- Supervised a B.Sc. student.
- Assistant Supervisor: Dr. Fatemeh Zare-Mirakabad

## Implementation of an article which is titled 'Approximation algorithms for color spanning diameter'

📅 Oct. 2019 – June 2020

- Reference Article: Spanning Colored Points with Intervals
- Assistant Supervisors: Dr. Payam Khanteimouri and Dr. Mohammad Reza Kazemi

## PRESENTATIONS

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### Identification of Driver Genes in Glioblastoma Using Single-Cell Gene Expression, Pseudotime, and Phylogenetic Analysis

- Poster presentation: Feb. 2025, Iran Conference on Bioinformatics, Zanjan, Iran. 📄[Abstract \(P.140\)](#) 📄[Poster](#)
- Oral presentation: Apr. 2025, Computational Biology Research Center, Amirkabir University, Tehran, Iran.

## WORK EXPERIENCE

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### Research Center Memberships

📅 2022 – present

- Member, Computational Biology Research Center (CBRC), Amirkabir University
- Member, Complex Biological Systems and Bioinformatics (CBB), Tehran University

### Workshop Instructor

📅 Sep. 2024

📍 Institute Pasteur, Tehran, Iran

- Conducted training on Next-Generation Sequencing techniques.

### Teaching Assistant

📅 2018 – 2023

📍 Sharif University, Alzahra University

- Foundations of Computation Theory (Dr. Fatemeh Zare-Mirakabad, Fall 2023)
- Database (Dr. Kamyar Izadi, Fall 2019)
- Foundations of Computation Theory (Dr. Payam Khanteimouri, Spring 2019)
- Data Structures and Algorithms (Dr. Marzieh Eskandari, Fall 2018)

### Volunteer Instructor

📅 Spring 2018

📍 Marziehyazdi Elementary School, Tehran, Iran

- Taught Algorithms and ICDL to elementary school students.

## HONORS🏆

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- M.Sc. Fellowship Award at Amirkabir University of Technology, Tehran University, and Sharif University as an exceptionally talented student (exempt from entrance exam).
- Ranked first in my B.Sc. class for three consecutive years.
- Received governmental fellowships for outstanding Bachelor performance.
- Admitted to NODET (National Organization for Development of Exceptional Talent) via competitive entrance exam for high school.

## LEADERSHIP & EXTRACURRICULARS

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### Coach, ICPC Iranian Regional Programming Contest, 2025

- Mentored and guided a competitive programming team, coordinating strategy, training, and problem-solving.

### Co-founder, Computer Science Journal Club

📅 Winter 2018 – Summer 2020

## LANGUAGES

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### English

- IELTS: 7 (2022 – 2024)

## REFERENCES

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### Dr. Kaveh Kavousi

Associate Professor, Dept. of Bioinformatics, Institute of Biochemistry & Biophysics, University of Tehran  
[kkavousi@ut.ac.ir](mailto:kkavousi@ut.ac.ir)

### Dr. Fatemeh Zare-Mirakabad

Assistant Professor, Dept. of Mathematics & Computer Science, Amirkabir University of Technology  
[f.zare@aut.ac.ir](mailto:f.zare@aut.ac.ir)

### Dr. Vahid Haghpanah

Associate Professor of Molecular Medicine, Endocrinology and Metabolism Research Center, Clinical Sciences Institute, Tehran University of Medical Sciences  
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### Dr. Marzieh Eskandari

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