

# MAHDI AFSHARI

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## EDUCATION

**Massachusetts Institute of Technology (MIT)** • Cambridge, MA Sep 2023 – May 2027  
*Candidate for Bachelor of Science • Computer Science • Minor in Physics • GPA: 4.7/5.0*  
Related Coursework: *Machine Learning • Computer Systems Engineering • Software Construction • Algorithms and Data Structures*

**National Organization for Development of Exceptional Talents** • Tehran, Iran Sep 2019 – Jun 2022  
*High School Diploma • Natural Sciences • GPA: 4.0/4.0*

## RESEARCH

**Inferring Dynamics of Memory Encoding and Recall with Sequential Sampling Models** Jun – Dec 2024  
*Mehrdad Jazayeri Lab – McGovern Institute, MIT*

- Designed and evaluated Drift Diffusion Models (DDMs) and their variants to capture behavioral patterns in short- and long-term memory tasks using data from human and non-human primates.
- Integrated Gaussian Process (GP) regression into the modeling pipeline to estimate time-varying latent parameters, enabling non-parametric inference of cognitive dynamics and uncertainty quantification across trials.
- Applied probabilistic modeling techniques to analyze response distributions, jointly fitting reaction times and accuracy under varying memory loads and delays.
- Built a modular, reusable codebase for simulation, model fitting, and evaluation, facilitating flexible task manipulations and future extensions in sequential sampling models.

**Hierarchical Modeling of Protein Structure for Predicting Function** Jan – May 2024  
*Manolis Kellis Lab – CSAIL, MIT*

- Developed a novel approach to predict protein function from secondary structure as part of a team.
- Implemented a feedback loop to improve predictions by iteratively refining protein structure and function predictions.
- Personalized the ESMFold model for specific use in our pipeline, contributing to better accuracy in prediction outcomes.

**Screening of Short Antimicrobial Peptides (sAMP) by Natural Language Models.** Nov – Dec 2022  
*Independent Research*

- As a team of two, worked on a new approach to combat antibiotic-resistant strains using Short Anti-Microbial Peptides (sAMP), leveraging an LSTM deep neural network trained on encoded amino acids by their biochemical properties.
- Used this model to further screen other unfamiliar peptides. generating potential new drug candidates.

## EXPERIENCES

**Lab Assistant for Computation Structures – MIT** Feb 2025 – Present

- Lead weekly lab and office hours to support students in digital logic design, Verilog programming, and system debugging.
- Provided guidance on complex design projects, including pipelined processors and memory hierarchies, reinforcing core computational architecture concepts.

**International Students Association – MIT** Feb 2024 – Present

- Serving as Co-President since Sep 2024
- Executive Committee Member and Class Representative
- Initiated a new constitution, large events planning framework and launched faculty and founder networking series, expanding professional development and mentorship opportunities for international students.
- Designed and implemented a centralized coordination system for international and cultural student organizations, promoting sustainable collaboration and deeper cross-cultural engagement across campus.

**AIM Labs (AI@MIT) – MIT** Oct – Dec 2023

- Developed a web-based AI music assistant in a selected collaborative team of five.
- Processed large music databases, optimized the model based on a Siamese Neural Network architecture on the data.
- Achieved a significant improvement in our music recommendation accuracy, validated through user testing.

**International Biology Olympiad Peer Mentor and Student Advisor – Iran** Jan 2020 – Mar 2023

- Mentored over 40 students, for the international representative team, national medalists, and Olympiad students.
- Taught biology and neuroscience classes in exceptional high schools, junior highs and private tutoring institutes.

## AWARDS

• 33 <sup>rd</sup> International Biology Olympiad, Gold Medal	2022
• 23 <sup>rd</sup> National Biology Olympiad, Gold Medal	2020
• 5 <sup>th</sup> & 6 <sup>th</sup> National Stem Cell and Regenerative Medicine Olympiad, Top 40 and Gold Medal	2020, 2021
• 5 <sup>th</sup> & 7 <sup>th</sup> National Brain Bee Neuroscience Competition, Bronze and Silver Medal	2019, 2021

## TECHNICAL SKILLS

• **Programming:** Python, ML, C, Assembly, Bluespec SystemVerilog