

Sina Barazandeh

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Google Scholar
Research Group: [Lugoteam](#)

Research focus: Agentic scientific discovery and autonomous laboratories, including lab automation with the [Model Hardware Standard \(MHS\)](#), using generative and foundation models, reinforcement learning, and ML systems. Applications include computational biology, protein engineering, biological sequence design, and biomarker discovery.

Seeking: Summer 2027 research and applied science internships developing ML methods and systems for science.

Research Experience

2024–Present	Graduate Research Assistant, Carnegie Mellon University, School of Computer Science Advisor: Dr. Jose Lugo-Martinez - Led CMU's MHS deployment, featured in Anthropic's research-preview announcement; built instrument drivers and orchestration enabling an agent to coordinate a liquid handler, plate reader, robotic arm, and cameras within device-declared safety bounds - Developing simpCL and evaluation methods for agent planning and fault recovery in programmable cloud laboratories - Developing reinforcement-learning methods for biomarker discovery and evolution-informed protein representations
2021–2024	Research Assistant, Bilkent University, Department of Computer Engineering (CicekLab) Advisor: Dr. A. Ercument Cicek Developed GANs and LLMs for biological sequence generation and optimization
2019–2020	Undergraduate Research Assistant, Shiraz University, Department of Computer Engineering Advisor: Dr. Reza Boostani Project: EEG to MEG signal translation using LSTM neural networks

Education

2024–Present	Ph.D. Computational Biology (<i>expected May 2029</i>), School of Computer Science, Carnegie Mellon University, Pittsburgh, PA Advisor: Dr. Jose Lugo-Martinez Relevant Coursework: Machine Learning (10-701), LLM Systems (11-868), Introduction to Computational Structural Biology
2021–2024	M.Sc. Computer Engineering, Bilkent University, Ankara, Turkey Thesis: Generative Models for Generating and Optimizing Biological Sequences Advisor: Dr. A. Ercument Cicek GPA: 3.9/4.0
2016–2021	B.Sc. Computer Engineering, Shiraz University, Shiraz, Iran Thesis: Implementing Recommendation Systems Using Neural Network-Based Matrix Factorization Advisor: Dr. Reza Boostani GPA: 3.5/4.0 (16.63/20)

Selected Research Projects

- 2026 **Safe Closed-Loop Agentic Dose-Response Experiments Using the Model Hardware Standard (MHS)**
Closed-loop experiments ran about $3\times$ faster than the prior workflow; instrument integration took approximately eight hours
- 2026 **simPCL: An Open-Framework Simulator and Benchmark Generator for Programmable Cloud Laboratories**
Simulator and benchmark generator for planning, fault recovery, and closed-loop decisions in programmable cloud laboratories
- 2026 **Agentic Orchestration and Fault Recovery**
Methods for detecting protocol deviations, selecting safe recovery actions, and resuming long-horizon laboratory workflows
- 2025 **Reinforcement Learning for Senescence Biomarker Discovery**
Manuscript in preparation
- 2025 **Evolution-Informed Structural Subgraph Protein Representations**
Manuscript in preparation

Publications

- 2026 Furkan Ozden, **Sina Barazandeh**, Dogus Akboga, Sobhan Shukueian Tabrizi, Urartu Ozgur Safak Seker, and A. Ercument Cicek. [RNAGEN: A generative adversarial network-based model to generate synthetic RNA sequences to target proteins](#). *ChemBioChem* 27, no. 13 (2026): e202500445.
- 2025 Sobhan Shukueian Tabrizi, **Sina Barazandeh**, Helyasadat Hashemi Aghdam, and A. Ercument Cicek. [RNAtranslator: Modeling protein-conditional RNA design as sequence-to-sequence natural language translation](#). *PLOS Computational Biology* 21, no. 10 (2025): e1013541.
- 2025 **Sina Barazandeh**, Furkan Ozden, Ahmet Hincer, Urartu Ozgur Safak Seker, and A. Ercument Cicek. [UTRGAN: Learning to generate 5' UTR sequences for optimized translation efficiency and gene expression](#). *Bioinformatics Advances* 5, no. 1 (2025): vbaf134.
- 2018 Ehsan Asali, Farzin Negahbani, Saeed Tafazzol, Mohammad Sadegh Maghareh, Shahryar Bahmeie, **Sina Barazandeh**, Shokoofeh Mirian, and Mahta Moshkelgosha. Namira Soccer 2D Simulation Team Description Paper 2018. *RoboCup 2018*, Montreal, Canada.

Manuscript in Preparation

- 2026 **Sina Barazandeh**, Gün Kaynar, Arth Banka, Joshua Kangas, Carl Kingsford, and Jose Lugo-Martinez. **simPCL: An Open-Framework Simulator and Benchmark Generator for Programmable Cloud Laboratories**.

Technical Skills

Machine Learning: PyTorch, Keras, scikit-learn, Strands Agents SDK; reinforcement learning, generative modeling; CUDA, multi-GPU and PyTorch distributed training

Scientific Models: ESM-2, ProtT5, DNABERT, AlphaFold, Boltz, RoseTTAFold

Bioinformatics: BLAST, HMMER, Clustal, PyMOL, Galaxy, Biopython, Bioconductor; PDB, UniProt, NCBI, BioMart

Programming & Systems: Python, R, Java, C/C++, JavaScript; SLURM, HPC clusters, Git, Docker, Singularity, CI/CD

Selected Presentations

2026	AI Scientist Summer Workshop, Microsoft Research, Cambridge, MA Contributed Talk: <i>Agentic Fault Recovery for Autonomous Orchestration of Programmable Cloud Laboratories</i>
2026	SciFM: Foundation Models and Agentic AI for Science, Chicago, IL Poster Presentation: simpCL
2023	RECOMB, Istanbul, Turkey Poster Presentation: UTRGAN
2023	RECOMB-SEQ, Istanbul, Turkey Poster Presentation: Using Minimizer Interarrival Distances for Read-Until Human Read Detection from Blood Samples Sequenced by Oxford Nanopore
2023	HIBIT, Ankara, Turkey Oral Presentation: RNAGEN (Second Best Presentation Award)

Awards & Honors

2021–2024	Comprehensive Graduate Scholarship, Bilkent University
2021	Best Start-Up in Southern Iran Award (GhasedakApp)
2021	Ranked 1st in Hardware Engineering, Top 10% of Class of 2020
2018	8th Place (out of 32 teams), RoboCup Soccer 2D Simulation League, Montreal, Canada
2016–2021	Full National Scholarship for Undergraduate CS Program, Shiraz University, Iran

Teaching Experience

2026	Teaching Assistant: Machine Learning for Scientists, Carnegie Mellon University; Instructor: Dr. Martin Zhang
2025	Teaching Assistant: Computational Medicine, Carnegie Mellon University; Instructor: Dr. Wei Wu
2023	Teaching Assistant: Programming and Algorithms, Bilkent University; Instructor: Dr. Ugur Dogrusoz
2022	Teaching Assistant: Artificial Intelligence, Bilkent University; Instructor: Dr. Özgür S. Ögüz
2021	Teaching Assistant: Introduction to Machine Learning, Bilkent University; Instructors: Dr. A. Ercument Cicek and Dr. Aysegul Dundar

Academic Service

2022–2026	Peer Reviewer – Multiple manuscripts for <i>Bioinformatics</i> and <i>Bioinformatics Advances</i>
2022–2025	Subreviewer – ISMB (2025); RECOMB (2022, 2024); ISCB and RECOMB-SEQ (2023); ISBRA and ACM-BCB (2022)

Selected Course Research Projects

2026	FlashAttention and PagedAttention in MiniTorch; Instructor: Lei Li
2025	Investigating ProtT5 and ESM Embeddings Disentanglement on Multi-Chain Proteins; Instructor: David Ryan Koes
2024	VAE Disentanglement Analysis on Noisy Data Using Residual Connections; Instructors: Maria Florina Balcan and Geoffrey J Gordon

Additional Experience

Co-Founder and Backend Developer, Ghasedak Institution, Shiraz, Iran	2019–2022
Vice-President, Interdisciplinary Robotics Association, Shiraz University	2019–2021

References

Dr. Jose Lugo-Martinez
Assistant Professor; Co-Director, M.S. in Automated Science, Carnegie Mellon University
jlugomar@cs.cmu.edu

Dr. Carl Kingsford
Herbert A. Simon Professor of Computer Science; Co-Director, Joint CMU–Pitt Ph.D. Program in Computational Biology
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Dr. Joshua Kangas
Associate Teaching Professor and Co-Director, M.S. in Automated Science, Carnegie Mellon University
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Dr. A. Ercument Cicek
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