

EUXHEN HASANAJ

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Research Expertise: Machine Learning & Biotechnology: senescence/aging • oncology • drug discovery • graph learning • generative models • biological foundation models • multimodal learning • perturbation studies

PROFESSIONAL EXPERIENCE

GenBio AI

Research Scientist

Palo Alto, CA

Dec. 2024 – Present

- Leading the Science Team driving scientific applications of GenBio AI's Virtual Cell engine, overseeing research direction, translational strategy, and external partnerships.
- Directing the development of the sequence layer of the Virtual Cell engine, including cell-type-specific sequence signatures and mechanistic interpretation of genetic variants.

Carnegie Mellon University

Ph.D. Student

Pittsburgh, PA

Aug. 2021 – Dec. 2024

- Conducted research on machine learning methods for genomics and systems biology, focusing on modeling gene regulation, molecular interactions, and cellular dynamics.
- Designed novel deep-learning architectures for inferring time-resolved gene regulatory networks from dynamic transcriptomic datasets.
- Collaborated with wet-lab teams to develop an AI framework that identifies senescent (aged) cells in single-cell transcriptomic data, yielding SenSet—a 106-gene human lung senescence signature.

Sanofi

Computational and Systems Biology Intern

Cambridge, MA

May 2023 – Aug. 2023

- Developed TRUFFLE, a novel algorithm for integrating patient time-series clinical transcriptomics, uncovering new disease subtypes across psoriasis, COVID-19, and Crohn's datasets; accepted at ISMB 2024.
- Validated TRUFFLE on three large-scale clinical trial datasets, outperforming existing methods in reconstructing patient trajectories and identifying treatment-response patterns.
- Packaged, documented, and open-sourced the TRUFFLE software on GitHub, enabling reproducible analysis across Sanofi's R&D projects during a 10-week internship.

Genesis Therapeutics

Machine Learning Research Intern

Burlingame, CA

May 2022 – Aug. 2022

- Pioneered transformer-based generative chemistry as part of Genesis' GEMS platform, training GPT models on SMILES to design highly novel and diverse small-molecule libraries.
- Engineered end-to-end SMILES data pipelines and quantitative novelty/diversity metrics, demonstrating a significant expansion of accessible chemical space over legacy methods.

Ritech Solutions

Machine Learning Engineer

Tirana, Albania

Jan. 2021 – Aug. 2021

- Developed and deployed production-grade monocular depth estimation and image classification models for container logistics, outperforming legacy systems by double digits.
- Engineered a comprehensive image-quality assessment and evaluation pipeline, reducing error rates of downstream vision models.

Centroida

Machine Learning Engineer

Sofia, Bulgaria

Nov. 2017 – Aug. 2018

- Engineered a real-time face-tracking and identification system for ID-card verification.
- Developed efficient custom CUDA kernels in C++ to extend TensorRT functionality.

EDUCATION

Carnegie Mellon University

Pittsburgh, PA

Ph.D. in Machine Learning | Advisors: Ziv Bar-Joseph, Barnabás Póczos

Aug. 2021 – Dec. 2024

- Dissertation: “Machine Learning Strategies for Biomarker Discovery: A Senescence Case Study”
- Key coursework: Advanced Deep Learning, Advanced Machine Learning Theory, Computational Genomics
- Teaching Assistant for: Convex Optimization; Machine Learning with Large Datasets (>200 students)

Carnegie Mellon University

Pittsburgh, PA

M.S. in Machine Learning

Aug. 2019 – Dec. 2020

- Project: Built Cellar, an interactive software for single-cell data integration and cell-type annotation.

American University in Bulgaria

Blagoevgrad, Bulgaria

B.A. in Computer Science, B.A. in Mathematics

Sep. 2015 – May 2019

- Graduated salutatorian with Outstanding Achievement Awards in both Computer Science and Mathematics.
- Named to the Dean’s List and President’s List for academic excellence each semester.
- Founded and led the AUBG Math Club, Polygon, organizing problem-solving workshops and guest lectures.
- Competed in regional and international programming and math competitions; coached a computational mathematics team.

University of Iowa

Iowa City, IA

ISEP Study Abroad | GPA: 4.07

Spring 2018

- Completed courses on Matrix Theory; Numerical Analysis; Algorithms; Operating Systems

SELECTED PUBLICATIONS [GOOGLE SCHOLAR

Foundation Models Improve Perturbation Response Prediction

Elijah Cole, ..., Euxhen Hasanaj, et al.

Preprint, Feb 2026

SenSet, a novel human lung senescence cell gene signature, identifies cell-specific senescence

Euxhen Hasanaj, Delphine Beaulieu, Cankun Wang, et al.

EMBO Journal, Feb 2026

Multimodal Benchmarking of Foundation Model Representations for Cellular Perturbation Response Prediction

Euxhen Hasanaj, Elijah Cole, Shahin Mohammadi, et al.

ICML 2025 FM4LS Workshop, Jul. 2025

Recovering time-varying networks from single-cell data

Euxhen Hasanaj, Barnabás Póczos, Ziv Bar-Joseph

Intelligent Systems for Molecular Biology (ISMB), Jul. 2025

scDOT: optimal transport for mapping senescent cells in spatial transcriptomics

Nam D. Nguyen, ..., Euxhen Hasanaj, et al.

Genome Biology, Nov. 2024

Integrating patients in time series clinical transcriptomics data

Euxhen Hasanaj, Sachin Mathur, Ziv Bar-Joseph

Intelligent Systems for Molecular Biology (ISMB), Jul. 2024

AutoML Decathlon: Diverse Tasks, Modern Methods, and Efficiency at Scale

Nicholas Roberts, ..., Euxhen Hasanaj, et al. *Proceedings of the NeurIPS 2022 Competitions Track, PMLR, Dec. 2022*

NIH SenNet Consortium to map senescent cells throughout the human lifespan to understand physiological health

SenNet Consortium

Nature Aging, Dec. 2022

Multiset multicover methods for discriminative marker selection

Euxhen Hasanaj, Amir Alavi, Anupam Gupta, Barnabás Póczos, Ziv Bar-Joseph

Cell Reports Methods, Oct. 2022

Interactive single-cell data analysis using Cellar

Euxhen Hasanaj, Jingtao Wang, Arjun Sarathi, Jun Ding, Ziv Bar-Joseph

Nature Communications, Apr. 2022

HONORS & AWARDS

COMPETITIONS

- 2022 **4th place**, NeurIPS AutoML Decathlon Competition
- 2019 **Silver Medal**, International Mathematics Competition for University Students (IMC)
- 2018 **Silver Medal**, Computational Mathematics Competition, Bulgaria
- 2018 **Honorable Mention**, International Mathematics Competition for University Students (IMC)
- 2017 **Bronze Medal** (team), ACM, Southeastern Europe Regional Programming Contest, Romania
- 2017 **2nd Place** (team), National Programming Contest, Bulgaria
- 2016 **Honorable Mention** (team), ACM, Southeastern Europe Regional Programming Contest, Romania
- 2015 **Honorable Mention**, International Mathematical Olympiad (IMO), Thailand
- 2015 **2nd Place**, National Mathematical Olympiad, Albania
- 2015 **3rd Place**, National Chemistry Olympiad, Albania

ACADEMIA

- 2019 **Salutatorian – Class of 2019**, American University in Bulgaria
- 2019 **Outstanding Achievement in Computer Science**, American University in Bulgaria
- 2019 **Outstanding Achievement in Mathematics**, American University in Bulgaria
- 2015-19 **AADF Scholar**, Albanian-American Development Foundation

PROFESSIONAL MEMBERSHIPS

NIH CELLULAR SENESCENCE NETWORK (SENNET) CONSORTIUM

Member – Consortium Organization and Data Coordinating Center (CODCC) Sep. 2022 – Dec. 2024

- Developed methods to discover senescence biomarkers as a member of the Biomarker Working Group.

NIH HUMAN BIOMOLECULAR ATLAS PROGRAM (HUBMAP) CONSORTIUM

Member – Platform Development and Data Analysis Team Aug. 2019 – Dec. 2020

- Developed software tools to enable large-scale collaborations, integration, and comparisons across many different single-cell omics platforms and modalities.

MATHEMATICS CLUB (POLYGON)

American University in Bulgaria

Founder/President

Sep. 2017 – May 2019

- Organized several events including talks by students and professors, mathematics competitions, and social events between math students and professors.