Euxhen Hasanaj

LinkedIn | Personal Website | GitHub

Research Interests: Drug Discovery, Graph Learning, Multimodal Learning, LLMs, Computational Genomics, Computer Vision, Generative Models for Biology & Chemistry, Protein Folding, Machine Learning for Sciences

Education

Carnegie Mellon University — Pittsburgh, PA
Doctor of Philosophy in Machine Learning | GPA: 4.00 — *Aug. 2021 – Expected Sep. 2024*
Master of Science in Machine Learning | GPA: 4.15 — *Aug. 2019 – Dec. 2020*

American University in Bulgaria — Blagoevgrad, Bulgaria
Bachelor of Arts in Computer Science (Honors) | GPA: 4.00 — *Sep. 2015 – May 2019*
Bachelor of Arts in Mathematics (Honors) | GPA: 4.00 — *Sep. 2015 – May 2019*

University of Iowa – Exchange Student (ISEP) | GPA: 4.07 — *Spring 2018*

Professional Experience

Sanofi — Cambridge, MA
Artificial Intelligence Intern — *May 2023 – Aug. 2023*
- Developed optimal transport algorithms for disease subtype identification from clinical data, applied to psoriasis, COVID-19, and Crohn's disease.
- Published findings at a major conference (ISMB 2024).

Genesis Therapeutics — Burlingame, CA
Machine Learning Intern — *May 2022 – Aug. 2022*
- Researched and trained generative language models for de novo drug design.
- Focused on optimizing the novelty and diversity of generated molecules using SMILES strings.

Ritech Solutions — Tirane, Albania
Machine Learning Engineer — *Jan. 2021 – Aug. 2021*
- Developed novel computer vision models for monocular depth estimation and image classification.
- Implemented and optimized algorithms for real-time performance.

Centroida — Sofia, Bulgaria
Machine Learning Engineer — *Nov. 2017 – Aug. 2018*
- Investigated and developed deep learning methods for real-time face detection and tracking.

Academic Research Experience

Research Assistant — Pittsburgh, PA
Carnegie Mellon University | *Advisors: Ziv Bar-Joseph, Barnabás Póczos* — *Dec. 2019 – Present*
- Developed biomarker discovery methods tailored to various learning paradigms, focusing on human aging and cellular senescence.
- Used a positive-unlabeled learning approach to detect rare aging cell populations that led to a list of genes potentially enriched in aged (senescent) cells.
- Developed a transformer-based neural network for temporal graph structure learning. The method provided insights into the evolution of gene networks with advancing age.
- Derived optimization targets and developed solutions for biomarker discovery in these settings: 1) known phenotypes (supervised), 2) endotypes in time series data, and 3) completely unsupervised omics datasets.

Laboratory Intern — Pittsburgh, PA
University of Pittsburgh Medical Center (UPMC) | *Supervisor: Oliver Eickelberg* — *Nov. 2022 – Present*
- Conducted experiments on cell cultures and induced DNA damage to assess the causal effects of marker genes on aging.

Selected Publications [Google Scholar]

Integrating patients in time series clinical transcriptomics data [ISMB] [code]
Euxhen Hasanaj, Sachin Mathur, Ziv Bar-Joseph *Intelligent Systems for Molecular Biology (ISMB), Jul. 2024*

Multiset multicover methods for discriminative marker selection [CR Methods] [code]
Euxhen Hasanaj, Amir Alavi, Anupam Gupta, Barnabás Póczos, Ziv Bar-Joseph *Cell Reports Methods, Oct. 2022*

Interactive single-cell data analysis using Cellar [NatureComm] [GUI] [code]
Euxhen Hasanaj, Jingtao Wang, Arjun Sarathi, Jun Ding, Ziv Bar-Joseph *Nature Communications, Apr. 2022*

Awards

2022 4^{th} **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

Teaching Assistant

Carnegie Mellon University

Machine Learning with Large Datasets (*Spring 2023*), Convex Optimization (*Fall 2022*)

American University in Bulgaria

Abstract Algebra (*Fall 2018*), Math. Statistics (*Fall 2018*), Calculus I (*Spring 2017*), Linear Algebra (*Fall 2017*)

Leadership and Professional Affiliations

NIH Cellular Senescence Network (SenNet) Consortium

Member - Consortium Organization and Data Coordinating Center (CODCC) *Sep. 2022 – Present*

- Helping harmonize and integrate efforts from all SenNet sites to create atlases of senescent cells.
- Developing 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.

Skills

Programming Languages: Python, C++, R, Bash
Libraries: Pytorch, Tensorflow, Scikit-learn, OpenCV, OpenMM, RDKit, Scanpy
Other: Linux, Docker, AWS, Spark, Azure, Git
Languages: Albanian (native), English (fluent), Italian (intermediate), French (beginner)