

Bianca M. Nemes

nbianca@engineering.upenn.edu | +1 914-383-6570 | Philadelphia, PA | EU Citizen (Romania)

EDUCATION

University of Pennsylvania, School of Engineering and Applied Science

Philadelphia, PA

B.S.E. in Artificial Intelligence

Aug 2024 – May 2028

Coursework: Data Structures, Algorithms, Programming Languages, Discrete Mathematics, Linear Algebra, Statistics, Game Theory, Data, Decisions & Models (Optimization), Applied Dynamical Systems

Awards: Fulbright Scholar; Gold Award, International Research Project Olympiad; Gold Award, Taiwan International Science Fair; Regeneron ISEF Mention; Swiss International Talent Forum Alumna

EXPERIENCE

Human-Computer Interaction Lab, University of Pennsylvania

Philadelphia, PA

Research Assistant – Mathematical Concept Graphs for LLM Reasoning

Jan 2026 – Present

- Built a Python concept-graph system modeling theorem dependencies across algebra and algebraic-geometry papers, with JSON-backed storage for nodes, edges, and metadata.
- Engineered a two-tier data collection pipeline combining LLM-curated theorem relationships (Perplexity API) with breadth-first search over citation networks (Semantic Scholar API).
- Compared three prompting strategies (no-context, keyword-clustered, graph-context) via the OpenAI API.

University of Pennsylvania, Department of Computer and Information Science

Philadelphia, PA

Teaching Assistant & Course Development Assistant – Discrete Mathematics

Summer 2025 – Present

- Taught recitations and office hours for undergraduate and graduate courses covering logic, proofs, probability, graph theory, and combinatorics.
- Designed Master's-level problem sets and course materials, translating abstract concepts into clear, testable learning objectives.
- Coordinated with a 20+ member course staff on grading, regrade disputes, and lab supervision; revised course policies to address AI coding agents.

National Institute of Physical Chemistry

Bucharest, Romania

Junior Researcher

May 2022 – Apr 2023

- Conducted research on stochastic sensors for early cancer detection, applying statistical modeling and computational analysis in MATLAB to experimental data.
- Co-developed the MATLAB implementation (credited for software) of a novel 8-criterion morphometric algorithm that stratifies breast cancer patients into low, intermediate, and high risk of bone metastasis.
- Co-authored the resulting [peer-reviewed article in Diagnostics](#) (2023); in a preliminary 41-patient study, every patient with bone metastases met at least 6 of 8 criteria, while 94% of patients without met 5 or fewer.

PROJECTS

AI Chess Engine | Python

- Built a playable chess game in Python with an AI opponent that chooses its moves using minimax search over a heuristic board evaluation function.

Paint Application | OCaml

- Implemented a drawing program in OCaml supporting lines, shapes, freehand drawing, color selection, and undo, built on an event-driven GUI.

Snake | Java

- Developed a customizable Snake game in Java with an object-oriented game-state model, collision detection, and keyboard controls; added persistent high scores via file I/O and an extensive JUnit test suite.

Intelligent Wound Dressing (Patent Pending)

Jun 2021 – Jun 2024

- Led a student team from ideation to patent filing on an intelligent dressing for burn injuries; wrote the research grant proposal and won a research grant from the Romanian Ministry of Research.

TECHNICAL SKILLS

Languages: Python, Java, OCaml, SQL, MATLAB, Lean

ML/AI: PyTorch, Transformers, GNNs, CNNs, OpenAI & Perplexity APIs, prompt design and evaluation

Tools & Data: Git, NumPy, Pandas, REST APIs

Interests: AI safety, algorithmic trading, market microstructure, ML for financial markets, formal verification, AI ethics