Pedram B. Bayat

+1 (650) 208-4914 | pbayat@seas.upenn.edu | linkedin.com/in/pedrambayat | pedrambayat.github.io

Education

University of Pennsylvania, School of Engineering and Applied Science — Philadelphia, PA

B.S. in Bioengineering, Intended M.S.E. in Systems Engineering — *May 2027*

- Coursework: Machine Learning, Big Data Analytics, Probability, Discrete Mathematics, Linear Algebra, Differential Equations, Programming Languages, Signal Processing, Human Physiology, Biomechanics, Organic Chemistry

Professional Experience

Research Assistant, Ruella Lab — March 2024 – Present

Perelman School of Medicine at the University of Pennsylvania — *Philadelphia, PA*

- Develop CAR-T cell therapies against relapsed & refractory B cell malignancies to reduce immunosuppression.
- Implement and fine-tune protein design machine learning models for CAR construct optimization.
- Co-authored publication in review at Science Translational Medicine and abstracts at ICLR 2025 and ASH 2025.

Biochemical and Cellular Pharmacology Intern — June - August 2025

Genentech — *South San Francisco, CA*

- Develop and optimize functional and binding assays for novel, cell-based therapies.

Machine Learning Research Intern, Goodarzi Lab — May – September 2024

Arc Institute — *Palo Alto, CA*

- Analyzed single-cell RNA sequencing data to investigate the impact of hypoxia environments on cancer cells.
- Implemented graph-based dimensionality reduction (UMAP, PCA) and pathway enrichment analysis (GSEA).

Student Researcher, Kornberg Lab — June – August 2023

Stanford University School of Medicine — *Stanford, CA*

- Purified eukaryotic topoisomerase IIα to discover structure of C-terminus and investigate small molecule binding.
- Delivered presentation summarizing small molecule discovery and use of the protein as a tumor growth inhibitor.

Projects

Single Cell Assist | *Python, Agentic AI, Microsoft AutoGen* — January 2025

- Developed agentic large language model to automate cell type prediction in single-cell RNA sequencing analysis.
- Awarded 1st prize at 2025 Immune Health Hackathon and contributed to workshop paper at ICLR MLGenX2025.

Music Genre Classification | *PyTorch, scikit-learn, Pandas, NumPy* — April 2025

- Developed a multi-class classification model to predict genres of Spotify songs based on their audio features.
- Conducted EDA, feature engineering, and implemented Random Forest, XGBoost, and neural network models.

Low-Cost Absorbance Spectrophotometer | *C++, Solidworks, CircuitLab, Laser Cutting* — April 2025

- Designed, built, and validated a spectrophotometer to determine biomarker concentration in blood samples.
- Successfully prototyped a spectrophotometer, with expected values falling within predicted confidence intervals.

2048 Game | *Java Swing, GUI Development* — December 2024

- Designed and programmed 2048 game implementation using Java Swing with interactive user interface.
- Implemented core game logic, user event handling, and user data storage.

Leadership Experience

Big Data Analytics (CIS 5450) Teaching Assistant — August 2025 - Present

University of Pennsylvania Department of Computer and Information Science — *Philadelphia, PA*

- Curate homework assignments, host office hours, write lecture notes, and grade exams for 300 student course.

Technical Skills

Languages: Python, Java, SQL, R, C++ (Arduino), MATLAB, OCaml, HTML/CSS.
Frameworks & Tools: PyTorch, scikit-learn, XGBoost, Scanpy, DESeq2, AnnData, OpenCV, Github, Hugging Face.
Data Science: Apache Spark, Microsoft Azure, Pandas, NumPy, Matplotlib, SciPy.
Laboratory: Functional Assays, Viral Vector Production, Flow Cytometry, PCR, Protein Purification, Cell Culture.