Pedram B. Bayat

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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

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

Low-Cost Absorbance Spectrophotometer | *C++, Solidworks, CircuitLab, Laser Cutting* April 2024

- 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.

Leadership Experience

Big Data Analytics (CIS 5450) Teaching Assistant August 2025 - Present
University of Pennsylvania Department of Computer and Information Science *Philadelphia, CA*

- 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