Felix Z. Song
Email: felixzsong@gmail.com | **Phone:** (617)-678-3930 | **Address:** 78 Ridge Ave, Newton, MA

EDUCATION

Tufts University *Sept 2021-May 2025*
BS in Physics, Minor in Computer Science and Mathematics | GPA: 3.82
Honor: *Summa Cum Laude*
Core Modules: *Physics: Relativistic E&M, Quantum Theory I, Nuclear/Particle Physics, Thermal Physics; Math: Mathematical Data Analysis, Numerical Linear Algebra; CS: Data Structures, Programming Languages, Computation Theory, Web Programming.*
Senior Thesis: Unfolding High Energy Particle Collisions *Sept 2024 – May 2025*
Supervised by Prof. Pierre-Hugues Beauchemin

- Simulating proton-proton collisions and writing detailed thesis on insights gained from data analysis of experimental results
- Building a Generative AI (cDDPM) method, matrix SVD systems, and bin-by-bin ratios to reconstruct theoretical from experimental measurements and comparing quality of each methodologies loss function on university computing cluster

PROFESSIONAL AND RESEARCH EXPERIENCE

Trainee *May 2025-July 2025*
Genomes2People - Supervised by Dr. Robert Green

- Engaged in foundational training in genomics, including reading of peer-reviewed literature, coursework, and online modules
- Completed data curation and management for research database and improved quality of RShiny Genomic database app

Structuring and Analyzing Medical Datasets using ML and Iterative Approximation *Feb 2025 – May 2025*
Tufts University - Supervised by Prof. Seulip Lee

- Collected patient characteristic data and applied linear regression and random forest ML models to predict future health
- Implemented Jacobi and Gauss Seidel methods to accelerate computations during iterative approximations
- Developed a UI for patients to enter information and receive personalized recommendations to improve health

Research Assistant: Non-Invasive Method for Identification of Axonal Beading *Jan 2023 – Present*
Massachusetts General Hospital

- Developed novel data visualization methods to map structure of axons with beading using experimental data and to simulate single water particle diffusion within axon structure to remap structural characteristics
- Built model to track diffusion in axon to diagnose structural beading, which can imply early-stage neurodegenerative diseases

Research Assistant: Differential Growth of Colloidal Crystals and Particle Diffusion *Jun 2023 – Sept 2024*
Harvard University School of Engineering and Applied Sciences - Supervised by Prof. David Weitz and Prof. Frans Spaepen

- Built orientation varied colloidal crystal structures using dyed silica particles and refractive index matching
- Imaged crystal bulks using confocal microscopy techniques, focused on the interface between the two orientations
- Created python software for particle tracking and crystal identification utilizing ImageJ to analyze the differential growths between two orientation varied colloidal crystal structures and colloidal diffusion across the crystal bulk

Effectiveness of Nystrom approximations on Spectral Clustering *Oct 2023 – Dec 2023*
Tufts University

- Applied spectral clustering using k means to a large form public data set, identified Laplacian matrix and eigenvalues
- Employed Nyström Approximation to reduced computation complexity and analyzed loss function using silhouette scores
- Performed a PCA to reduce high dimensionality of data and implemented a k-NN on data to assign new data points to cluster

Research Assistant: Novel Technique for Crystal Identification using Voronoi Structure *Jan 2023 –Aug 2023*
Harvard University School of Engineering and Applied Sciences - Supervised by Prof. David Weitz and Prof. Frans Spaepen

- Generated Monte Carlo simulations of nucleating, melting, and dynamic colloidal crystal structures
- Created a software in python which utilizes characteristics of the Voronoi cell found in the simulation data to identify crystal structures, focused on identifying small crystal structures in phase transitions and cluster indexing

AWARDS AND PRESENTATION

- National Science Foundation-REU Fellow *Summer 2022, 2023*
- Presented at 97th New England Complex Fluids Conference *Dec 1st, 2023*

VOLUNTEER AND LEADERSHIP EXPERIENCE

President of OmniTempo.org - Music Development Organization for Seniors *2019-Present*

- Launched non-profit organization to manage jazz education and performances at local senior homes and led fundraising efforts

Program Manager at OptiNeeds.org - Prescription Eyewear for Special Needs Athletes *2017-Present*

- Managed service at several regional Special Olympic events

Co-Founder and Project Manager of TaskBird – Task Management Website *2023-Present*

- Created a task management website that utilizes the google calendar API, SQL databases and priority-based scheduling

ADDITIONAL SKILLS

- Coding: Python, R, MATLAB, HTML, CSS, JavaScript, C++, Swift
- Technical Frameworks: Scikit-learn, PyTorch, Pandas, Linux, Ovito, Odyssey, SQL, MongoDB
- Data Science, Data Visualization, Machine Learning Models, Statistics, Data Management and Databases, Writing Skills