

# QIFEI CUI

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## Education

### University of Pennsylvania

Jun 2026

Candidate of Master of Science in Engineering in Systems Engineering

Philadelphia, PA

GPA: 4.00/4.00

### University of California - Santa Barbara

Dec 2023

Dual Bachelor of Science in Applied Mathematics and Statistics & Data Science

Santa Barbara, CA

GPA: 3.75/4.00

## Skills

**Programming Languages:** Python (Proficient), C++ (Familiar), Matlab, SQL, R

**Machine Learning & Vision:** PyTorch, TensorFlow, OpenCV, Scikit-learn, NumPy, Pandas

**Developer Tools & Platforms:** GitHub, VS Code, Jupyter Notebook, Docker, Anaconda, AWS

**Relevant Concepts & Coursework:** Deep Learning Principles, NeRF, GNNs, Sensor Fusion (EKF), Kinematic

Modeling, Convex Optimization, Advanced Linear Systems, Probabilistic Methods (Bayes/Stochastic Process), ODE/PDE

## Experience

### Hybrid Visual-Physical Humanoid Arm Control Strategy

Mar 2025 – Present

Supervised by Professor Pratik Chaudhari

Philadelphia, PA

- Architected a multi-stage humanoid control pipeline, initiating with visual pose estimation and critically incorporating an advanced 3D human pose refinement module (HPSTM) that leverages a Transformer-based temporal encoder and explicit manifold constraints (via a differentiable Forward Kinematics decoder) to ensure kinematically valid inputs for high-precision physical arm control.
- Implemented a manifold-constrained pose representation within HPSTM, predicting joint rotations (quaternions) and bone lengths, and developed a capability to estimate pose covariance, laying groundwork for robust state estimation and fusion with physical arm models (e.g., via EKF).
- Spearheading the development of a comprehensive experimental validation framework using datasets like AMASS, defining key performance indicators (MPJPE, temporal smoothness, bone length consistency) and robustness tests against diverse noise profiles (Gaussian, temporal, outlier) to benchmark the pose refinement and control system.

### Adversarial Learning for Brain Tumor Segmentation (GANet-Seg)

Sep 2024 – Dec 2024

Supervised by Professor Pratik Chaudhari

Philadelphia, PA

- Designed GANet-Seg, a novel hybrid framework combining GAN-based anomaly detection with U-Net segmentation. Outperformed state-of-the-art models on the BraTS dataset, achieving 88.84% Dice coefficient for the tumor core (+6.77%), 81.92% lesion-wise Dice (+3.89%), and 13.95 mm HD95 error (-5.73 mm) compared to existing baselines like nnU-Net and Swin-UNETR.
- The model used only 300 training objects to reach a Dice coefficient of 88.84%, closed to the performance of most recent SoTA baseline model nnUNet's 91.42% trained with 2000 objects reported in recent paper (2024).
- Proposed the methodology, designed the experimental validation process, and implemented the code-base for the study.

### Graph-Based Embedding Sequential Recommendation System

Aug 2023 – Jun 2024

Supervised by Professor Haowen

Remote

- Pioneered an approach to the cold start problem in sequential recommendation systems by incorporating 20-dimensional embedding for both users and items. Conducted experiments on selected testing sets from IMDb1M, focusing on the 30% of users with a watching history of less than 50 titles.
- Enhancing the base BERT4Rec model with dynamic graph layers to improve recommendation accuracy by 4.21% and adaptability in user-item interactions with an increase in Recall@10 of 5.38%.

### Alphabet Inc.

Mar 2023 – June 2023

Intern Data Analyst

Hybrid, CA

- Implemented efficient pipelines for preprocessing large datasets with 1m lines and ensured data integrity. Developed a double-tower recommendation model adapted from recent Recommendation System research papers with Recall@10 of 78.2%. Built real-world simulation with a node.js based App interface that generate movie suggestions with detailed information for registered user.
- Engineered new embeddings by analyzing user-item interaction data based on statistical distributions. Applied different levels to varying lengths of watching history, resulting in a 2.3% increase in benchmark accuracy. Achieved an accuracy of 79.3% on Recall10, demonstrating effective learning and robust generalization.

## Hobbies and Interest

Expertise Pastry Chief, Well-trained Cook, Amateur Frisbee Player, LGBT+ Community Volunteer