# Yiqi Jiang

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## EDUCATION

**Stanford University,** Electrical Engineering Ph.D. Program **Sept. 2022 - Expected Jun. 2027**
GPA: 4.0

**Cornell University,** College of Engineering, Ithaca, NY **Aug. 2018 - May 2022**
Bachelor of Science, Electrical and Computer Engineering
Bachelor of Science, Computer Science
Minor, Applied Mathematics
GPA: 4.142; Dean's List: all semesters
Merrill Presidential Scholar

## PUBLICATION

Sun J., **Jiang Y.**, Qiu J., Nobel P., Kochenderfer M., Schwager M., Conformal Prediction for Uncertainty-Aware Planning with Diffusion Dynamic Model, In *Advances in Neural Information Processing Systems*. 2023.

Akengin H.*, Aslihak M.*, **Jiang Y.***, Miranda C., Pozo M., Hernandez O., Inan H., Dinc F., Schnitzer M., ActSort: An Active-learning Accelerated Cell Sorting Algorithm for Large-Scale Calcium Imaging, In *Advances in Neural Information Processing Systems Workshop on Adaptive Experimental Design and Active Learning in the Real World*. 2023.

## RESEARCH EXPERIENCE

**Linderman's Lab**, Stanford University, *Research Assistant* **Apr. 2024 - Present**
**Advisor: Dr. Scott Linderman**

- Leveraged variational auto-encoder (VAE) including linear / nonlinear encoder and linear / nonlinear decoder to study the geometry of large-scale neuronal populations.
- Analyzed the dimensionality using power law.
- Implementing structured VAE which combines probabilistic graphical model priors on latent variables and deep neural networks to link latent variables to observed large-scale neural activity data.

**Schnitzer's Lab**, Stanford University, *Research Assistant* **Mar. 2023 - Present**
**Advisor: Dr. Mark Schnitzer**

- Developed active-learning accelerated cell sorting algorithms for large-scale calcium imaging pipeline using confidence-based active learning and discriminative active learning.
- Designed and implemented feature engineering on raw calcium movie to obtain the feature set for single cell.
- Surpassed human-level performance in both recall and precision labeling only < 5% cells, while current machine learning method requires 80% of annotated cells to achieve the same performance.
- Outperformed human annotators in multiple datasets across mice with < 2% of the human-annotated cells.
- Accelerated the software speed with parallel computing and GPU available in MATLAB.

- Researched on latent variable extraction capability in four brain regions - motor cortex, dorsolateral striatum, cerebellum, and retrosplenial cortex - using PCA, partial least squares (PLS), latent factor analysis via dynamical system (LFADS), linear dynamical system (LDS), and recurrent switching linear dynamical system (rSLDS).
- Built and tested off-line and on-line decoder for brain-machine interface (BMI) using linear regression, partial least squares regression, deep neural networks, and hierarchical decoders.
- Achieved > 80% hit rate for real-time BMI.

**Pilanci's Lab**, Stanford University, *Research Assistant* **Jan. 2023 - Mar. 2023**
**Advisor: Dr. Mert Pilanci**

- Reformulated the learnable network in the epistemic neural networks as a convex formula and observed faster convergence in training on neural networks that can quantify the epistemic uncertainty of the model.
- Deducted Baysian linear regression on two-layer ReLU Neural Network by lifting the input data to a high dimensional space so that the activation function is transformed from a non-convex function to a convex function.

**Multi-Robot Systems Lab**, Stanford University, *Research Assistant* **Sept. -Dec. 2022**
**Advisor: Dr. Mac Schwager**

- Incorporated ORB-SLAM3 and DROID-SLAM for a single drone to estimate the localization while navigating.

- Calibrated the ground truth position and SLAM estimated position in nerfstudio.
- Implemented RGB-D NeRF training based on nerfstudio.

**Independent Research,** *Researcher* **Aug. - Oct. 2021**

- Learned an optimal policy from imperfect demonstrations using confidence-based IL methods, namely two-step importance weighting (2IWIL), with meta-learned confidence scores as the weights for the data.
- Collected various performance policies, learned with the trust region policy optimization (TRPO) method in the Mujoco Swimmer3 environment, to obtain imperfect demonstrations from simulated trajectories.
- Built a meta-learning model to predict the confidence scores of unknown trajectories, given a small number of labeled data sampled from different source domains, namely different labeling strategies.
- Conducted meta-learning on multiple confidence score Neural Networks for different labeling criteria.

**NICS-EFC Lab,** Tsinghua University, *Undergraduate Research Assistant* **Feb. 2021-Aug. 2021**
**Advisor: Dr. Yu Wang**

- Examined the Hanabi environment and aimed to increase training speed via multi-cores parallel computing.
- Wrote test cases for the iGibson environment, quadrotor robot, and room exploration tasks.
- Implemented an interface between the ORB-SLAM3 written in C++ and the robot provided in the iGibson environment written in Python to estimate the global map and the agent position based on RGB-D observations
- Built Neural SLAM for the quadrotor robot to achieve higher performance in obtaining an agent's position.

**Electrical and Computer Engineering Department**, Cornell University, *Undergraduate Researcher.* **Jun.-Aug.2019**
**Advisor: Dr. Peter Doerschuk**

- College of Engineering-wide project. Funded through the Engineering Learning Initiative (ELI) program. Granted $3900 funding for the independent research projects.
- Derived a statistical model for 3-D convex regular polyhedron cages and the corresponding 2-D projection model.
- Employed direct maximization likelihood algorithms and EM algorithms to estimate the unknown parameters, the polyhedron cages' edge length and the probability distributions among the classes.
- Simulated the cryo-electron microscopy images of silica-cages using a Gaussian mixture model.
- Compiled a 10-page academic paper, *Detecting and Characterizing Nano-particle Cage Structures in Cryo-Electron Microscopy Image,* and presented the results to 20+ audience of students and faculties.
- Achieved 97% accuracy on edge length prediction and 94% accuracy on classification problems.

## ENGINEERING EXPERIENCE

**Autonomous Mobile Robot Navigation** **Jan.-May. 2022**

- Employed particle filter and EKF based on beacon data and depth data to estimate current location in a given map and utilized grid-point roadmap to navigate the robot to waypoints.
- Developed a re-localization algorithm when the robot's location estimation had low confidence.
- Implemented an unknown obstacle detection algorithm through which the robot was able to detect obstacles that were not originally provided in the map, and the robot was able to re-planned the navigation route.
- Successfully navigated to all the waypoints and reconstructed the map

## TEACHING EXPERIENCE

**CS 4789 Introduction to Reinforcement Learning,** *Teaching Assistant* **Spring 2022**

- TA nomination

**ECE 4670 Digital Communication System Design,** *Teaching Assistant* **Spring 2022**

- TA nomination

**ECE 4110 Random Signals in Communications and Signal Processing,** *Teaching Assistant* **Fall 2021**
**CS 1110 Introduction to Computing using Python,** *Teaching Assistant* **Fall 2019**
**Associate of Computer Science Undergraduate,** *Mentor* **Fall 2021**
**Women In Computing at Cornell,** *Mentor* **Spring 2021**

## SPECIALIZED SKILLS

**Programming Language:** Python, MATLAB, Java, Arduino, AMPL, OCaml, ARM Cortex-M, UNIX Shell Script
**Frameworks and Tools:** Pytorch, Jupyter Notebook, Git

## EXTRACURRICULAR ACTIVITIES

**Badminton:** First Class National Athlete, 2021-2022 YONEX Eastern Collegiate Team Championship Division 1A
**Symphony Orchestra:** First chair of clarinet