Jeff Winchell
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EDUCATION

Drexel University, Philadelphia, PA
Bachelor of Science, Computer Science; GPA: 3.21 June 2021
Bachelor of Arts, Mathematics; GPA: 3.21 June 2021

HONORS AND GRANTS

Dean's List (Fall 2019, Winter 2019, Fall 2020)
NSF REU Grant (Summer 2017)

RESEARCH EXPERIENCE

The New York Stem Cell Foundation Research Institute
Associate Data Scientist (Jan 2022 - Present)
Assistant Data Scientist (Apr 2022 - Dec 2022)
Data Science Intern (Nov 2021 - Apr 2022)
Advisors: Dr. Bianca Migliori, Dr. Daniel Paull
- Designed, tested, and deployed deep learning network for focus-level analysis of microscopy images of live/dead stem cell assays with >98% classification accuracy
- Designed a Mask R-CNN-based tool for instance segmentation of DAPI-stained nuclei of diverse cell types to improve quality of single-cell phenotypic screens with ~0.8 mIoU and <5% missed cells
- Combined existing in-house cell-level inception feature extraction pipeline with custom thresholding of cell-painted stem cell assays to characterize and cluster GFP-tagged cells
- Segmented, classified, and clustered Parkinson's-affected neural cells based on calcium activation signals and morphology in calcium imaging videos

Drexel University, Department of Computer Science
Research Assistant (Sept 2020 - May 2021)
Advisor: Dr. Edward Kim
- Improved sparse coding feature extraction performance for natural videos using temporally smooth representations leading to ~45% greater sparsity and ~17% greater reconstruction fidelity
- Extended the functionality of sparse coding model to use patch-based dictionary learning with RGB input with 95% reconstruction accuracy and 50% sparsity
- Reviewed and discussed academic literature relating to sparse coding, representation learning, and causal inference

Drexel University, Department of Mathematics
Research Assistant (June 2019 - Feb 2020)
Advisor: Dr. Hugo Woerdeman
- Explored minimal rank properties of matrices and their corresponding augmentations via their Kronecker products with identity matrices of progressively higher dimensions
- Experimented with partial matrix patterns, their minimal rank completions, and the minimal rank completions of their sub-patterns

Drexel University, College of Engineering
Research Assistant (Sept 2017 - Mar 2018)
Advisors: Dr. Dmitri Vainchtein, Dr. Gary Friedman
- Applied to classical computer vision/image processing techniques to identify and track magnetic sensor in simulated brain tissue from live video
- Explored feasibility of real-time X-ray-based control system for moving magnetic sensor into various regions of the brain.

PRESENTATIONS:

NYSCF Conference, New York, NY, October 2022. Winchell, J. "Deep learning tools for high-quality data production and analysis in large high-content imaging screens" (poster).

Drexel CCI Senior Project Session, Philadelphia, PA. May 2021. Winchell, J. "Temporal Smoothing in Sparse Coding" (video presentation).

MEMBERSHIP:

SPARSE (SPiking And Recurrent Software) Coding Lab, Research Assistant (Sept 2020 - May 2021)
Drexel Society of Artificial Intelligence, Secretary/Member (Jan 2021 - May 2021)
Upsilon Pi Epsilon Drexel Chapter, Vice President (Winter 2018)
Drexel Math and Computer Science Club, Vice President (Winter 2018)
Drexel University Symphony Orchestra, Principal Oboist (Summer 2017)

TECHNICAL SKILLS:

Languages: Python, MATLAB, C++
Libraries: Tensorflow, PyTorch, Jupyter, OpenCV, pandas, matplotlib, scikit-learn, pillow
Machine learning: GANs, CNNs, sparse coding, transformers, weight-space analysis
Software: Anaconda, VS Code, ImageJ, Microsoft SQL Server, LaTeX