Christopher Langfield

New York, NY

https://chris-langfield.github.io/

EDUCATION

UNIVERSITY OF ROCHESTER Rochester, NY
BS, Applied Mathematics May 2018
Dean's Scholarship all years
GPA: 3.82 / 4.0

EXPERIENCE

RESEARCH SOFTWARE ENGINEER May 2023 - present
Columbia University – International Brain Laboratory New York, NY

- Ran data processing from scratch on 321 electrophysiological recordings from IBL and two external datasets, showed IBL's data to be of similar quality on a range of metrics, and created text and figures for paper under review.
- Created a database of more than 150 million multichannel neural waveforms extracted from voltage recordings of 600,000 neurons in 699 mice.
- Maintains, supports, and expands signal processing, visualization, and data stewardship tools in IBL's open-source codebase.

RESEARCH SOFTWARE ENGINEER Aug 2021 – Feb 2023
Princeton University – Program in Applied & Computational Mathematics Princeton, NJ

- Developer for ASPIRE, an open-source cryo-electron microscopy Python package.
- Worked with postdocs and graduate students to integrate a novel technique for fast expansion of 2D images in truncated Fourier-Bessel basis.
- Implemented efficient loading of cropped individual molecular projections from cryo-EM micrograph images.

RESEARCH DATA ANALYST Oct 2018 – Aug 2021
Columbia University Irving Medical Center New York, NY

- Managed pipeline for ongoing fMRI studies with >500 human subjects from scanner acquisition to server storage and analysis.
- Coded in-scanner neuropsychological tasks and data processing scripts.
- Performed analysis and created visualizations for scientific publications.
- Created an AWS system for remotely administering behavioral tasks, neuropsychological batteries, and forms to subjects via browser during COVID-19.

UNDERGRADUATE RESEARCHER May – Aug 2016

University of Rochester Medical Center Rochester, NY

- Ran large-scale biochemical simulations on an HPC cluster.
- Used molecular dynamics software to understand biological membranes.
- Project title: "Coarse-grained simulation of lipid bilayer interactions with cylinders of various eccentricities."

RESEARCH ASSISTANT Feb – Dec 2015

University of Rochester – Human Language Processing Lab Rochester, NY

- Created text stimuli adhering to specific grammatical structures for use in computational linguistics experiments.
- Spliced audio files of human speech from experiments for analysis.

TEACHING

University of Rochester – Teaching Assistant (2016 – 2018)

- *Multidimensional Calculus (MTH 164)* • Undergraduate
- *Linear Algebra & Differential Equations (MTH 165)* • Undergraduate

AWARDS

- University of Rochester *Discover* Undergraduate Research Grant Summer 2016

SCHOLARSHIP

Publications

Journal publications

- T. S. Eich, **C. Langfield**, J. Sakhardande, Y. Gazes, C. Habeck, and Y. Stern, 'Older adults compensate for switch, but not mixing costs, relative to younger adults on an intrinsically cued task switching experiment', *Front. Aging Neurosci.*, vol. 15, p. 1152582, Apr. 2023.
- P. Sunderaraman, Y. Gazes, G. Ortiz, **C. Langfield**, A. Mensing, S. Chapman , J. Joyce, A. Brickman, Y. Stern, S. Cosentino, 'Financial decision-making and self-awareness for financial decision-making is associated with white matter integrity in older adults', *Hum. Brain Mapp.*, vol. 43, no. 5, pp. 1630–1639, Apr. 2022.
- Y. Gazes, R. Li, A. Mensing, R. Babukutty, D. Noofoory, G. Nazario, **C. Langfield**, J. Sakhardande, S. Lee, 'White matter fiber density for vocabulary better maintained than fluid abilities in aging', *Alzheimers. Dement.*, vol. 17, no. S4, Dec. 2021.

Conference publications

- **C. Langfield**, J. Carmichael, G. Wright, J. Anden, and A. Singer, 'Representing steerable bases for cryo-EM in ASPIRE', in *2022 IEEE 18th International Conference on e-Science (e-Science)*, Salt Lake City, UT, USA, 2022.

Presentations

- *'Reproducibility of in-vivo electrophysiological measurements in mice'*, IBL Annual Meeting – May 2024
- *'Exploring compression, denoising, and fingerprinting of ephys waveforms with Singular Spectrum Analysis',* Pre-Cosyne BrainHack, – Feb 2024
- *'Steerable Bases in ASPIRE: Object-oriented Representation of Mathematical Structures'*, Princeton RSE Group – Oct 2022
- *'ASPIRE – A Python Package for Single Particle Reconstruction'*, Flatiron Institute, EM Interest Group Presentation, – Sep 2022
- *'Preprocessing Cryo-EM Data in ASPIRE'*, Princeton RSE Group – Feb 2022

PROFESSIONAL DEVELOPMENT

- Hackathon project: *Creating an Interactive Pyodide Webapp for Visualizing abSENSE Genetic Data* (with the Princeton RSE group), Sep 2022
- Hackathon project: *GPUizing an ASPIRE viewing direction estimation algorithm in CuPy* (Princeton/NVIDIA GPU Hackathon), Jun 2022
- Hackathon project: *Implementing Automated 3D Cell Tracking and Segmentation for the Devenport Lab* (with the Princeton RSE group), Nov 2021

SKILLS

Proficiencies: Scientific computing in Python, scientific visualization, data analysis, high performance computing, image & signal processing, open-source software

ERRATA

- Classical piano training, Eastman School of Music, 2014-2018
- NYS certified Emergency Medical Technician, since 2018