

# Christopher Langfield

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

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## 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

- Performs data analysis, visualizations, and writing for IBL platform papers.
- Creates novel methods and tools for processing neural and behavioral data from mice.
- Maintains, supports, and expands IBL's open-source scientific software codebase.

### RESEARCH SOFTWARE ENGINEER

Aug 2021 – Feb 2023

*Princeton University – Program in Applied & Computational Mathematics*

Princeton, NJ

- Scientific developer for ASPIRE, an open-source cryo-EM Python package.
- Worked directly with PIs, postdocs, and graduate students to build software interfaces for cutting-edge cryo-electron microscopy reconstruction algorithms
- Implemented support for inter-operability with other open-source projects and new dataset formats.

### RESEARCH ASSISTANT

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 *et al.*, '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 *et al.*, '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