

General Information

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Education

2017–2022 **PhD**, ANC, Informatics Forum, University of Edinburgh, UK, [Scalable software and models for large-scale extracellular recordings](#), supervised by Dr. Matthias Hennig.
2013–2017 **BA Logic, Information, and Computation**, University of Pennsylvania, Philadelphia, Minor in Mathematics and Computer Science, *summa cum laude*.

Publications

- [Targeted Neural Dynamical Modeling](#). **Cole Hurwitz**, Akash Srivastava, Kai Xu, Justin Jude, Matthew Perich, Lee Miller, Matthias Hennig *Advances in Neural Information Processing Systems 34 (NeurIPS)*. 2021
- [Building population models for large-scale neural recordings: opportunities and pitfalls](#). **Cole Hurwitz**, Nina Kudryashova, Arno Onken, Matthias H. Hennig. *Current Opinion in Neurobiology 70, Pages 64-73*. 2021
- [SpikeInterface, a unified framework for spike sorting](#). Alessio Buccino*, **Cole Hurwitz***, Jeremy Magland, Samuel Garcia, Joshua Siegle, Roger Hurwitz, and Matthias Hennig. * - Equal Contribution, *eLife*. 2020
- [SpikeForest, reproducible web-facing ground-truth validation of automated neural spike sorters](#). Jeremy Magland, James Jun, Elizabeth Lovero, Alexander J Morley, **Cole Hurwitz**, Alessio Buccino, Samuel Garcia, Alex Barnett. *eLife*. 2020
- [Scalable Spike Source Localization in Extracellular Recordings using Amortized Variational Inference](#). **Cole Hurwitz**, Kai Xu, Akash Srivastava, Alessio Buccino, and Matthias Hennig. *Advances in Neural Information Processing Systems 32 (NeurIPS)*. 2019
- [Scaling Spike Detection and Sorting for Next Generation Electrophysiology](#). Matthias Hennig, **Cole Hurwitz**, and Martino Sorbaro. In press. *In Vitro Neuronal Networks - From Culturing Methods to Neuro-Technological Applications*. 2019

Preprints

- [Reproducibility of in-vivo electrophysiological measurements in mice](#). International Brain Laboratory, ..., **Cole Hurwitz**, *bioRxiv.com*. 2022
- [Spike sorting pipeline for the International Brain Laboratory](#). International Brain Laboratory, ..., **Cole Hurwitz**, *figshare.com*. 2022

- [not-so-BigGAN: Generating High-Fidelity Images on Small Compute with Wavelet-based Super-Resolution](#). Seungwook Han*, Akash Srivastava*, **Cole Hurwitz***, Prasanna Sattigeri, David D. Cox. * - Equal Contribution. *arXiv*. 2020
- [Improving the Reconstruction of Disentangled Representation Learners via Multi-Stage Modelling](#). Akash Srivastava*, Yamini Bansal*, Yukun Ding*, **Cole Hurwitz***, Kai Xu, Bernhard Egger, Prasanna Sattigeri, Josh Tenenbaum, David D. Cox, Dan Gutfreund. * - Equal Contribution. *arXiv*. 2020

In Preparation

- **Lightning Pose: a suite of semi-supervised learning algorithms deployed on the cloud for better, faster, and easier pose estimation**. Dan Biderman*, Matthew R Whiteway*, **Cole Hurwitz**, Nicholas Greenspan, Robert S Lee, Ankit Vishnubhotla, Michael Schartner, Julia M Huntenburg, Richard Warren, Federico Pedraja, Dillon Noone, The International Brain Laboratory, John P Cunningham, Nathaniel Sawtell, Liam Paninski. * - Equal Contribution.
- **Density-based neural decoding of electrophysiological data**. Yizi Zhang*, Tianxiao He*, Julien Boussard, **Cole Hurwitz**, Erdem Varol, Charlie Windolf, Olivier Winter, Matt Whiteway, The International Brain Laboratory, Liam Paninski. * - Equal Contribution.
- **Drift-robust spike sorting of high-density recordings using denoising, spike localization, and registration**. Charlie Windolf*, Julien Boussard*, **Cole Hurwitz***, Hyun Dong Lee, Liam Paninski. * - Equal Contribution.

Software

- [TNDM](#): Targeted Neural Dynamical modeling.
- [SpikeInterface](#): A unified framework for spike sorting.
- [HS2](#): A spike sorting algorithm for dense multielectrode arrays. Real-time speeds for datasets from >4000 electrodes.

Work Experience

- 2022–present **Postdoctoral Researcher**, Columbia University.
Currently performing research and supervising students to develop state-of-the-art pose estimation, spike sorting, and neural decoding algorithms.
- 2021 **Research Intern**, FRL Research.
Performed research into processing algorithms for EMG-based brain computer interfaces. Improved performance and benchmarking of spike decomposition algorithms for EMG.
- 2020 **Research Intern**, MIT-IBM AI Lab.
Performed research into disentangled representation learning, wavelet-based deep generative modelling, and inverse rendering.
- 2019–2020 **Research Assistant**, University of Edinburgh, Scotland.
Performed research into deep generative modeling as applied to neural data analysis and built general-purpose software for spike sorting.
- 2016–2016 **Teaching Assistant**, University of Pennsylvania, Philadelphia.
Taught recitations and graded assignments/tests for an introductory calculus course.
- 2014–2016 **Athlete Tutor**, University of Pennsylvania, Philadelphia.
Tutored student-athletes in introductory calculus and physics.

Experience

- 2019 **Summer course**, *MLSS 2019: London*, UCL, Covers topics ranging from optimization and Bayesian inference to deep learning, reinforcement learning and Gaussian processes.
- 2019 **Workshop Organizer**, University of Edinburgh, Edinburgh.
Workshop: "Spike Sorting and Reproducibility for Next Generation Electrophysiology".
- 2018 **Summer course**, *OCNC: OIST Computational Neuroscience Course*, OIST, Covers methods, neurons, networks, and behavior. Two week project on deep spiking neural networks.

Awards and Honors

- PhD NeurIPS travel award (£1400)
- PhD OCNC travel award (£500)
- BA Thouron Award – Two year UK postgraduate study fellowship
- BA Phi Beta Kappa
- BA CSCAA Scholar All-American
- BA 2016 USA Swimming Olympic Trials Qualifier
- BA 2013-2017 Ivy League Championship Swimming Finalist

Programming Languages and Tools

- Languages Python
- Tools pytorch, tensorflow, scikit-learn, SciPy, SpikeInterface