Cole Hurwitz

General Information

Affiliation	*Institute for Adaptive and Neural Computation, Informatics, University of Edinburgh.*
Supervisors	Dr. Matthias Hennig (principal) and Dr. Arno Onken.
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Education

2017–Present **PhD**, ANC, Informatics Forum, University of Edinburgh, UK, Scalable Modelling and Analysis for Extracellular Electrophysiology.

2013–2017 **BA Logic, Information, and Computation**, University of Pennsylvania, Philadelphia, Minor in Mathematics and Computer Science, *summa cum laude*.

Publications

- 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

- Building population models for large-scale neural recordings: opportunities and pitfalls. **Cole Hurwitz**, Nina Kudryashova, Arno Onken, Matthias H. Hennig. *arXiv* 2021
- 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

Software

- SpikeInterface: A unified framework for spike sorting. Author.
- HS2: A spike sorting algorithm for dense multielectrode arrays. Real-time speeds for datasets from >4000 electrodes. Developer.

Work Experience

2020 **Internship**, 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, scikit-learn, SciPy, SpikeInterface

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