

Asa Barth-Maron (He/Him)

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Summary

Researcher with expertise applying machine learning to drug discovery. Strong interdisciplinary background, with domain knowledge in cellular biology, biochemistry, and deep learning.

Education

Harvard University

Boston, MA

Ph.D. in Neuroscience, Distinction in Computational Neuroscience

February, 2022

- NIH Kirschstein-NRSA Fellow
- Relevant Courses: Probability Theory, Machine Learning, Statistical Machine Learning

Lehigh University

Bethlehem, PA

B.S. in Neuroscience

January, 2013

Key Skills

Technical: Python, PyTorch, MLflow, Scikit-learn, SciPy/NumPy/Pandas, statsmodels, RDKit, CellProfiler, MATLAB, R, AWS (EC2, FSx, S3), LSF, Slurm.

Quantitative: Deep Learning, Digital Signal Processing, Statistical Analysis, Representation Learning

Scientific: Experimental Design, Interdisciplinary Communication, Microscopy, Neurophysiology.

Professional Experience

Data Scientist II, Neumora Therapeutics

2022 – 2024

- Developed single-cell segmentation and feature extraction pipelines. Responsible for all microscopy data pipelines and analyses. Interfaced closely with lab scientists.
- Implemented VAEs to generate insights from unbiased cellular morphology datasets.
- Conducted experiments for molecular property prediction using latest state-of-the-art graph neural networks and molecular representation learning.
- Worked as an integral part of core pipeline programs and cross-functional project teams.
- Served as a translator between data science and biology.

Graduate Researcher. Harvard Medical School, Department of Neurobiology

2015 – 2022

- Research on how network architectures enable distinct computations during sensory encoding.
- Discovered neuron populations that implement different forms of normalization.
- Developed dynamical systems and population activity decoding models.
- Hired, trained, and mentored over 20 research assistants. Managed teams of 3-5.

Graduate Researcher. Harvard Medical School, Department of Neurobiology

2015

- Developed biologically realistic CNNs to model mid-size visual feature detection in primate visual cortex area V4. NVIDIA hardware grant recipient.

Research Assistant. Harvard Medical School, Department of Neurobiology

2012 - 2014

- Characterized the biochemistry of a signaling protein involved in synapse development.

Additional Experience

Teaching Fellow, Intro. to Computational Neuroscience 2021

- Topics included deep learning, reinforcement learning, recurrent neural networks, neural encoding and decoding, generalized linear models, and dynamical systems analysis.

Teaching Fellow, Boot Camp in Quantitative Methods 2015, 2019

- Taught programming fundamentals and data analysis methods in MATLAB.

EEG Motor Imagery, personal project

- Implemented the Filter Bank Common Spatial Pattern (FBCSP) algorithm from scratch to classify imagined movements.

Distributed high-performance computing 2014 - 2022

- Ran large-scale models and analyses on the LSF-managed cluster at Harvard Medical School.

Large-Scale Connectomics Project Management 2015 - 2018

- Managed DVID backend server and NeuTu clients for large-scale reconstruction effort.

Publications & Presentations

Publications

- **Barth-Maron A.**, D'Alessandro I., Wilson R.I. (2023). *Interactions between specialized gain control mechanisms in olfactory processing*. **Current Biology** 33 (23), 5109-5120. e7
- **Barth-Maron A.** (2022). Interneuron diversity in the Drosophila antennal lobe promotes computational flexibility and adaptive coding properties. **Harvard University**, 2022. 29209804.
- Schlegel, P., Bates, A.S., Stürner, T., Jagannathan, S.R., Drummond, N., Hsu, J., Serratos Capdevila, L., Javier, A., Marin, E.C., **Barth-Maron, A.**, et al. (2021). *Information flow, cell types and stereotypy in a full olfactory connectome*. **eLife** 10, e66018.
- Guo W., Clause A.R., **Barth-Maron A.**, Polley D.B. (2018) *A Corticothalamic Circuit for Dynamic Switching between Feature Detection and Discrimination*. **Neuron**, Volume 95, Issue 1, 180-194.e5
- Veeramah K.R., Johnstone L., Karafet T.M., Wolfe D., Sprissler R., Salogiannis J., **Barth-Maron A.**, Greenberg M.E., Pazzi M., Restifo L.L., Talwar D., Erickson R.P., Hammer M.F. (2013) *Exome sequencing reveals new causal mutations in children with epileptic encephalopathies*. **Epilepsia** 54(7): 1270-1281.

Conferences & Seminars

- **Barth-Maron A.**, Horne J.A., Katz W.T., Plaza S.M., Scheffer L.K., D'Alessandro I., Meinertzhagen I.A., Lee W.A., Wilson R.I. (2019) *What is the role of interneuron diversity in the Drosophila antennal lobe?* Neurobiology of Drosophila, Cold Spring Harbor. (poster)
- **Barth-Maron A.**, Horne J.A., Katz W.T., Plaza S.M., Scheffer L.K., D'Alessandro I., Meinertzhagen I.A., Lee W.A., Wilson R.I. (2018) *What is the role of interneuron diversity in the Drosophila antennal lobe?* Harvard Medical School, Department of Neurobiology Seminar Series. (talk)
- Guo W., Clause A.R., **Barth-Maron A.**, Shinn-Cunningham B.G., Polley D.B. (2015) *Layer 6 corticothalamic neurons modulate the Gain and Selectivity of columnar sound processing*. Society for Neuroscience, Annual Meeting Abstract 596.13/J26. (poster)