Asa Barth-Maron (He/Him)

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Summary

I am a Data Scientist at Neumora Therapeutics, with interdisciplinary expertise in machine learning, biochemistry, drug development, and neuroscience. I am interested in developing and applying methods for learning representations and generating insight from biological data for drug discovery.

Key Skills

Technical: Python, PyTorch, MLflow, Scikit-learn, SciPy/NumPy/Pandas, RDKit, CellProfiler, MATLAB, R, AWS, 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 – Present

- Developed single-cell segmentation and feature extraction pipelines. Sole person 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 (ongoing).

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, 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.

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

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., Serratosa 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 Friday 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)