

Asa Barth-Maron

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asabarthmaron.github.io

Education

Harvard University

Boston, MA

Ph.D. in Neuroscience, Distinction in Computational Neuroscience

Expected Feb. 2022

- **F31 Ruth L. Kirschstein Predoctoral Individual National Research Service Award (NRSA)**
National Institutes of Health. 2017 - 2020
- **Relevant Courses:** Linear Algebra & Differential Equations, Intro. to Probability Theory, Machine Learning, Statistical Machine Learning, Teaching Fellow for Intro. to Computational Neuroscience.

Lehigh University

Bethlehem, PA

BS, Behavioral Neuroscience, *magna cum laude*

2013

- **Relevant Coursework:** Fundamentals of Programming.

Research Experience

Harvard Medical School Department of Neurobiology

Boston, MA

Graduate Researcher. Advisor: Dr. Rachel I. Wilson

2015 – Present

- Research focuses on how network architecture supports distinct computations during sensory encoding.
- Discovered subpopulations of inhibitory neurons that enable different forms of normalization depending on input statistics.
- Combined circuit mapping (connectomics), *in vivo* physiology/optogenetics, and dynamical systems modeling.
- Hired, trained, mentored over 20 research assistants, and coordinated work for teams of 3-5.

Harvard Medical School Department of Neurobiology

Boston, MA

Graduate Researcher. Advisor: Dr. Till S. Hartmann

Summer 2015

- Developed data-driven, biologically realistic, convolution network for V4 mid-size visual feature detection.

Harvard Medical School Department of Neurobiology

Boston, MA

Research Assistant. Advisor: Dr. Michael E. Greenberg

2012 - 2014

- Investigated the role of a molecular signaling molecule (Ephexin5) in hippocampal synapse development.

Lehigh University Department of Biology

Bethlehem, PA

Undergraduate Research Assistant. Advisor: Dr. Jennifer Swann,

2010 – 2012

- Investigated the role of an intercellular signaling molecule in a mammalian mating behavior circuit.

Technical Skills & Experience

Programming Languages: Python, MATLAB, and R.

- GitHub: <https://github.com/AsaBarthMaron>

Teaching Fellow, Intro. to Computational Neuroscience

Fall 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

Summer 2015 & 2019

- Taught programming fundamentals and data analysis methods in MATLAB.

Distributed high-performance computing

2014 - Present

- 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.

Program in Neuroscience Computational Systems Club

2015 - 2017

- Participant and rotating lecturer.

Publications & Presentations

Papers

- **Barth-Maroon 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. "Heterogenous populations of interneurons support distinct computations and provide flexible coding across shifts in input statistics" *In preparation*.
- Schlegel, P., Bates, A.S., Stürner, T., Jagannathan, S.R., Drummond, N., Hsu, J., Serratosa Capdevila, L., Javier, A., Marin, E.C., **Barth-Maroon, A.**, et al. (2021). Information flow, cell types and stereotypy in a full olfactory connectome. **eLife** 10, e66018.
- Guo W., Clause A.R., **Barth-Maroon 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-Maroon 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-Maroon 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-Maroon 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-Maroon 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)