# Asa Barth-Maron

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## 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**                            2014 – Present
- Investigated the computations performed by specific inhibitory neurons during sensory processing in a region of the *Drosophila* brain (antennal lobe).
- Used large-scale connectomics data to identify network architecture.
- Developed data-driven dynamical systems model to aid network explainability.
- Used *in vivo* whole-cell electrophysiological recordings and optogenetics to causally test inhibitory interneuron roles, and compared to model predictions.
- 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 2014
- 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.
- Independently designed and executed biochemistry experiments in acute hippocampal slices, cell culture, and cell-free assays.

**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 (magnocellular medial preoptic nucleus).

## Technical Skills & Experience

**Programming Languages:** Proficient in Python, MATLAB, and R.
- GitHub: https://github.com/AsaBarthMaron

**Teaching Fellow**, Intro. to Computational Neuroscience      Fall 2021
- Taught programming fundamentals and data analysis methods in MATLAB.

**Teaching Fellow**, Boot Camp in Quantitative Methods    August 2015 & 2019
- Taught programming fundamentals and data analysis methods in MATLAB.

**Distributed high-performance computing**       2014 - Present
- 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-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. "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-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)