THOMAS L. ATHEY

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CURRENT EMPLOYMENT

MIT, Electrical Engineering and Computer Science, Postdoctoral researcher 2024-present
Advisor: Nir Shavit

EDUCATION

Ph.D. Biomedical Engineering, Johns Hopkins University 2024
Advisors: Michael Miller and Joshua Vogelstein

M.S.E. Applied Mathematics and Statistics, Johns Hopkins University 2021
Focus Area: Statistics and Statistical Learning

B.S. Biomedical Engineering, Johns Hopkins University 2018
Minor: Computational Medicine

ACADEMIC HONORS

Fellowships and Scholarships

- MIT-Novo Nordisk Artificial Intelligence Postdoctoral Fellow Program, 2024
- William and Mary Drescher Endowment Fund for Graduate Medical Research Award, Johns Hopkins Medicine, 2019.
- Vredenburg Scholarship, Johns Hopkins Whiting School of Engineering, 2016.

Prizes and Awards

- Trainee Travel Award, 2020 Brain Initiative Investigators Meeting

Honors

- Tau Beta Pi 2016-present.
- Richard J. Johns Award, Johns Hopkins Whiting School of Engineering, 2018.
- Outstanding Research Presentation 2nd place at BMES Mid-Atlantic Undergraduate Research Day Competition (2018).
- Linda Trinh Memorial Award, Johns Hopkins Whiting School of Engineering (2017).

PUBLICATIONS

2023

- Thomas L. Athey, Daniel J. Tward, Ulrich Mueller, Laurent Younes, Joshua T. Vogelstein, and Michael I. Miller. Preserving Derivative Information while Transforming Neuronal Curves. *Neuroinformatics*, November 2023
- Thomas L. Athey, Matthew A. Wright, Marija Pavlovic, Vikram Chandrashekhar, Karl Deisseroth, Michael I. Miller, and Joshua T. Vogelstein. BrainLine: An Open Pipeline for Connectivity Analysis of Heterogeneous Whole-Brain Fluorescence Volumes. *Neuroinformatics*, 21(4):637–639, October 2023

- Michael Hawrylycz, Maryann E. Martone, Giorgio A. Ascoli, Jan G. Bjaalie, Hong-Wei Dong, Satrajit S. Ghosh, Jesse Gillis, Ronna Hertzano, David R. Haynor, Patrick R. Hof, Yongsoo Kim, Ed Lein, Yufeng Liu, Jeremy A. Miller, Partha P. Mitra, Eran Mukamel, Lydia Ng, David Osumi-Sutherland, Hanchuan Peng, Patrick L. Ray, Raymond Sanchez, Aviv Regev, Alex Ropelewski, Richard H. Scheuermann, Shawn Zheng Kai Tan, Carol L. Thompson, Timothy Tickle, Hagen Tilgner, Merina Varghese, Brock Wester, Owen White, Hongkui Zeng, Brian Aevermann, David Allemang, Seth Ament, Thomas L. Athey, Cody Baker, Katherine S. Baker, Pamela M. Baker, Anita Bandrowski, Samik Banerjee, Prajal Bishwakarma, Ambrose Carr, Min Chen, Roni Choudhury, Jonah Cool, Heather Creasy, Florence D'Orazi, Kylee Degatano, Benjamin Dichter, Song-Lin Ding, Tim Dolbeare, Joseph R. Ecker, Rongxin Fang, Jean-Christophe Fillion-Robin, Timothy P. Fliss, James Gee, Tom Gillespie, Nathan Gouwens, Guo-Qiang Zhang, Yaroslav O. Halchenko, Nomi L. Harris, Brian R. Herb, Houri Hintiryan, Gregory Hood, Sam Horvath, Bingxing Huo, Dorota Jarecka, Shengdian Jiang, Farzaneh Khajouei, Elizabeth A. Kiernan, Huseyin Kir, Lauren Kruse, Changkyu Lee, Boudewijn Lelieveldt, Yang Li, Hanqing Liu, Lijuan Liu, Anup Markuhar, James Mathews, Kaylee L. Mathews, Chris Mezias, Michael I. Miller, Tyler Mollenkopf, Shoaib Mufti, Christopher J. Mungall, Joshua Orvis, Maja A. Puchades, Lei Qu, Joseph P. Receveur, Bing Ren, Nathan Sjoquist, Brian Staats, Daniel Tward, Cindy T. J. van Velthoven, Quanxin Wang, Fangming Xie, Hua Xu, Zizhen Yao, Zhixi Yun, Yun Renee Zhang, W. Jim Zheng, and Brian Zingg. A guide to the BRAIN Initiative Cell Census Network data ecosystem. *PLOS Biology*, 21(6):e3002133, June 2023. Publisher: Public Library of Science

2022

- Thomas L. Athey, Daniel J. Tward, Ulrich Mueller, Joshua T. Vogelstein, and Michael I. Miller. Hidden Markov modeling for maximum probability neuron reconstruction. *Communications Biology*, 5(1):1–11, April 2022. Number: 1 Publisher: Nature Publishing Group
- Jean-Baptiste Poline, David N. Kennedy, Friedrich T. Sommer, Giorgio A. Ascoli, David C. Van Essen, Adam R. Ferguson, Jeffrey S. Grethe, Michael J. Hawrylycz, Paul M. Thompson, Russell A. Poldrack, Satrajit S. Ghosh, David B. Keator, Thomas L. Athey, Joshua T. Vogelstein, Helen S. Mayberg, and Maryann E. Martone. Is Neuroscience FAIR? A Call for Collaborative Standardisation of Neuroscience Data. *Neuroinformatics*, 20(2):507–512, April 2022

2021

- Thomas L. Athey, Jacopo Teneggi, Joshua T. Vogelstein, Daniel J. Tward, Ulrich Mueller, and Michael I. Miller. Fitting Splines to Axonal Arbors Quantifies Relationship Between Branch Order and Geometry. *Frontiers in Neuroinformatics*, 15, 2021
- Thomas L. Athey, Can Ceritoglu, Daniel J. Tward, Kwame S. Kutten, J. Raymond DePaulo, Kara Glazer, Fernando S. Goes, John R. Kelsoe, Francis Mondimore, Caroline M. Nievergelt, Kelly Rootes-Murdy, Peter P. Zandi, J. Tilak Ratnanather, and Pamela B. Mahon. A 7 Tesla Amygdalar-Hippocampal Shape Analysis of Lithium Response in Bipolar Disorder. *Frontiers in Psychiatry*, 12, 2021

2020

- Alexandra J. Berges, Megan Callanan, Valerie Zawicki, Richard Shi, Thomas Athey, Vinay Ayyappan, Schuyler Metzger, Alanna Farrell, Amir Manbachi, Susan Harvey, and Nicholas J. Durr. A Novel Intermediate Attachment to Reduce Contamination in Reusable Core Needle Biopsy Devices. *Journal of Medical Devices*, 14(011107), February 2020

2019

- S. Michaela Rikard, Thomas L. Athey, Anders R. Nelson, Steven L. M. Christiansen, Jia-Jye Lee, Jeffrey W. Holmes, Shayn M. Peirce, and Jeffrey J. Saucerman. Multiscale Coupling of an Agent-Based Model of Tissue Fibrosis and a Logic-Based Model of Intracellular Signaling. *Frontiers in Physiology*, 10, 2019

PRE-PRINTS

- Yaron Meirovitch, Core Francisco Park, Lu Mi, Pavel Potocek, Shashata Sawmya, Yicong Li, Ishaan Chandok, Thomas L. Athey, Yuelong Wu, Daniel Berger, Richard Schalek, Hanspeter Pfister, Remco Schoenmakers, Maurice Peemen, Jeff W. Lichtman, Aravinthan D.T. Samuel, and Nir Shavit. SmartEM: machine-learning guided electron microscopy. *In review*, May 2024

- Richard J. Chen, Taylor L. Bobrow, Thomas Athey, Faisal Mahmood, and Nicholas J. Durr. SLAM Endoscopy enhanced by adversarial depth prediction, June 2019. arXiv:1907.00283 [cs, eess]
- Thomas L. Athey, Tingshan Liu, Benjamin D. Pedigo, and Joshua T. Vogelstein. AutoGMM: Automatic and Hierarchical Gaussian Mixture Modeling in Python, August 2021. arXiv:1909.02688 [cs, stat]

CONFERENCE POSTERS

- Athey T.L., Vogelstein J. T., Miller M. I., *Preserving Derivative Information while Transforming Neuronal Curves.* Brain Initiative Investigators Meeting, (2023).
- Athey T.L., Vogelstein J. T., Miller M. I., *Nyquist Sampling Rate for Projection Neuron Reconstruction.* Society for Neuroscience (SfN), (2022).
- Athey T.L., Miller, M. I., *A Graphical User Interface for Semi-Automated Tracing of Neuronal Processes.* Northeast Bioengineering Conference (NEBEC), (2022).
- Kodibagkar A. P., Athey T. L., Le M., Vogelstein J. T. Predicting Axon Collaterals using Branch Angles. Brain Initiative Investigators Meeting (2021).
- Athey T. L. *Automated Neuron Tracing of Sparse Fluorescently Labeled Neurons.* Neuromatch 3.0 (2020). (Talk)
- Athey T. L., Sulam, J., Vogelstein J. T., Mueller U., Miller M. I. *Low-level Neuron Segmentation in Sub-micron Resolution Images of the Complete Mouse Brain.* Brain Initiative Investigators Meeting (2020).
- Athey T. L., Vogelstein J. T., Mueller U., Miller M. I. *Investigating Neuron Trajectories with Splines.* Brain Initiative Investigators Meeting (2020).
- Athey T. L., Rootes-Murdy K., Glazer K., Goes F., Mondimore F., Zandi P., Ratnanather T., Mahon P. A Pilot 7T Subcortical Shape Analysis of Lithium Response in Bipolar Disorder. Society of Biological Psychiatry (SOBP) Annual Meeting (2018).
- Athey T. L., Lee J. J., Saucerman J. J., Holmes, J. W. Coupling of Agent Based and Network Models of Cardiac Fibrosis. NSF REU Symposium (2017), and Biomedical Engineering Society (BMES) Annual Meeting (2017).
- Athey T. L., Clerfond G., Corcoran D., Hennigan B., Carrick D., Mangion K., Rocchiccioli P., Lindsay M., Eteiba H., Berry C., McEntegart M., Radjenovic A. Semi-quantitative Analysis of Cardiac Perfusion Images in The Glasgow MRI Rotational Atherectomy Study (GlaMoRoS). Society for Cardiac Magnetic Resonance (SCMR) Conference (2017).

TALKS

- *BrainLine: An Open Pipeline for Connectivity Analysis of Whole-Brain Fluorescence Volumes.* NeuroNex 2 Workshop, Texas Advanced Computing Center (2023).
- *Morphological Analysis of Bipolar Disorder with 7T MRI.* BMES Mid-Atlantic Undergraduate Research Day Competition (2018).
- *Cortical Thickness and Connectivity, Some Nuts and Bolts.* Institute of Computational Medicine Retreat, Johns Hopkins University (2016).

TEACHING EXPERIENCE

Johns Hopkins Teaching Academy Certificate 2024

Teaching Assistant

- Introduction to Computational Medicine, Department of Biomedical Engineering, Johns Hopkins University, 2019.

Guest Lecturer

- Linear Signals and Systems, Department of Biomedical Engineering, Johns Hopkins University, 2020 and 2023.

- Introduction to Computational Medicine: Imaging, Department of Biomedical Engineering, Johns Hopkins University, 2020.
- Neuro Data Design, Department of Biomedical Engineering, Johns Hopkins University, 2020.

ADVISING

Diversity and Academic Advancement Summer Institute (DAASI)

- Meikah Robinson (Summer/Fall 2022).

Masters Students

- Shreya Singh (Spring 2021).

Undergraduate Students

- Sejal Srivastava (Summer 2021).
- Dominique Allen (Summer 2021).
- Alisha Kodibagkar (Summer 2020).
- Shunan Wu (Summer 2019).
- Shiyu Sun (Summer 2019).

High School Students

- MyCo Le (Spring 2021).
- Sander Schulhoff (Summer 2019).

LABORATORY EXPERIENCES

- Neurodata Lab: PhD Rotation - Spring 2019
  - Automatic model selection for high dimensional clustering.
  - Advisor: Dr. Joshua Vogelstein.
- Computational Biophotonics Lab: PhD Rotation - Fall 2018
  - Applying monocular SLAM to endoscopy video.
  - Advisor: Dr. Nicholas Durr.
- JHU Vision Lab: PhD Rotation - Summer 2018
  - Using convolutional neural networks to classify histopathological images.
  - Advisor: Dr. Rene Vidal.
- Center for Imaging Science: Spring 2016 and September 2017-May 2018
  - Using Large Deformation Diffeomorphic Metric Mapping (LDDMM) shape analysis pipeline to associations of hippocampus and amygdala anatomy with bipolar disorder.
  - Advisor: Dr. Tilak Ratnanather.
- Multi-Scale Systems Bioengineering REU: University of Virginia Cardiac Biomechanics Lab - Summer 2017
  - Advisor: Dr. Jeffrey Holmes.
- Glasgow Cardiovascular Research Center (University of Glasgow): Summer 2016
  - Advisor: Dr. Aleksandra Radjenovic.

OTHER EXPERIENCES

- Introduction to I-Corps @ JHU: short version of the NSF's rigorous market assessment and validation program. Participated with BME design team (2017).