

# THOMAS L. ATHEY

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## EDUCATION

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**PhD Biomedical Engineering**, Johns Hopkins University Expected November 2023

Advisors: Michael Miller and Joshua Vogelstein

GPA: 4.00

**M.S.E. Applied Mathematics and Statistics**, Johns Hopkins University 2021

Focus Area: Statistics and Statistical Learning

GPA: 4.00

**B.S. Biomedical Engineering**, Johns Hopkins University 2018

GPA: 3.99, GPA within major: 4.00

Minor: Computational Medicine

## ACADEMIC HONORS

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### Prizes and Awards

- Trainee Travel Award, 2020 Brain Initiative Investigators Meeting

### Fellowships and Scholarships

- William and Mary Drescher Endowment Fund for Graduate Medical Research Award, Johns Hopkins Medicine, 2019.
- Vredenburg Scholarship, Johns Hopkins Whiting School of Engineering, 2016.

### 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

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### 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. *bioRxiv*, 2023.02.28.530429, 2023 *In Press*

### 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, 2022
- 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, et al. Is neuroscience fair? a call for collaborative standardisation of neuroscience data. *Neuroinformatics*, pages 1–6, 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*, page 38, 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, et al. A 7 tesla amygdalar-hippocampal shape analysis of lithium response in bipolar disorder. *Frontiers in Psychiatry*, 12:614010, 2021

## 2020

- Alexandra J Berges, Megan Callanan, Valerie Zawicki, Richard Shi, Thomas Athey, Vinay Ayyappan, Schuyler Metzger, Alanna Farrell, Amir Manbachi, Susan Harvey, et al. A novel intermediate attachment to reduce contamination in reusable core needle biopsy devices. *Journal of Medical Devices*, 14(1), 2020

## 2019

- S Michaela Rikard, Thomas L Athey, Anders R Nelson, Steven LM 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*, 10:1481, 2019

## PRE-PRINTS

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- Thomas L. Athey, Daniel J. Tward, Ulrich Mueller, Laurent Younes, Joshua T. Vogelstein, and Michael I. Miller. Preserving Derivative Information while Transforming Neuronal Curves. *In Review*, 2023. arXiv:2303.09649 [cs, math, q-bio]
- BICCN Data Ecosystem Collaboration. The BRAIN Initiative Cell Census Network Data Ecosystem: A User's Guide. *In Review*, 2022. bioRxiv:2022.10.26.513573
- Richard J Chen, Taylor L Bobrow, Thomas Athey, Faisal Mahmood, and Nicholas J Durr. Slam endoscopy enhanced by adversarial depth prediction. *arXiv*, 1907.00283, 2019
- Thomas L Athey and Joshua T Vogelstein. Autogmm: Automatic gaussian mixture modeling in python. *arXiv*, 1909.02688, 2019

## CONFERENCE POSTERS

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- 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

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- *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

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### Johns Hopkins Teaching Academy Certificate

Expected 2023

#### Teaching Assistant

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

#### Guest Lecturer

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

## ADVISING

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### Diversity and Academic Advancement Summer Institute (DAASI)

- Student TBD (Summer 2023)
- 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

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- 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**

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