EricBridgeford

Neurostatistician

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languages

English, basic French

programming

Python, R, UNIX
Java, Matlab, SQL
C++, C, solidity, fabric
Javascript, CSS & HTML

tools

Rmarkdown, FSL, Git
jupyter, Docker, AWS,
Android, Django,
tidyverse

education

now — **Ph.D.** in the Department of Biostatistics — Johns Hopkins University, Baltimore, MD
Principal Investigators: Joshua Vogelstein, Brian Caffo, Carey Priebe
Current work includes efforts to quantify and mitigate batch effects in fMRI/dMRI statistical connectomics, hyper-parallelizable framework for dMRI and fMRI processing, multiscale graph inference, supervised embeddings for dimensionality reduction, multiscale efforts for consistent independence testing, graph inference

2013 – 2017 — **B.S.** in Biomedical Engineering and Computer Science
minor in Mathematics — Johns Hopkins University, Baltimore, MD
Thesis work supervised by Dr. Joshua T. Vogelstein on project entitled:
Functional Neurodata Graphs Service: a One-Click Pipeline for the Reliable Estimation of Functional Connectomes.
Coursework Includes: High Dimensional Approximation, Statistical Learning and Signal Processing, Machine Learning, Probability and Statistics, Algorithms, Discrete Mathematics, Automata and Computation Theory, Systems Bioengineering, Statistical Mechanics and Thermodynamics, Object Oriented Software Engineering, Data Structures

2009 – 2013 — **High School** La Salle College High School — Wyndmoor, PA

experience

Academic Experience

Positions

10/17 – now — **Center for Imaging Science, Johns Hopkins University** — Baltimore, MD
Graduate Research Assistant under Joshua T. Vogelstein and Brian Caffo
Statistical work focusing on quantifying batch-effects and maximizing predictive inferences from graphs with applications to fMRI and dMRI connectomes.

08/14 – 05/17 — **Center for Imaging Science, Johns Hopkins University** — Baltimore, MD
Undergraduate Researcher under Joshua T. Vogelstein
Design and implementation of an open-source, cloud-deployable fMRI and DWI pipeline for robust one-click analysis.

05/14 – 02/16 — **Complex Systems Group, University of Pennsylvania** — Philadelphia, PA
Undergraduate Researcher under Danielle S. Bassett
Assisted in the development of novel network theory statistic and code package to compare the small worldness of weighted, real world networks.

Teaching

08/17 – 05/18 — **Biomedical Engineering Department, Johns Hopkins University** — Baltimore, MD
Teaching Assistant for 580.437/697 Neuro Data Design 1 under Dr. Joshua Vogelstein.

01/17 – 05/17 **Computer Science Department, Johns Hopkins University** Baltimore, MD
Course Assistant for 600.475 Introduction to Machine Learning under Dr. Raman Arora.

Professional Experience

09/18 – now **Delphi Consulting** Baltimore, MD
Co-Founder, Chief Technical Consultant
The Delphi Team provides blockchain consulting to new technical startups. As the Chief Technical Consultant, my role focuses on the development of blockchain implementations that can efficiently and scalably augment existing business workflows.

01/18 – 09/18 **Atana** Baltimore, MD
Vice President of Engineering
At Atana, we are building a platform to facilitate frictionless information exchange between data providers and consumers in life sciences and healthcare. As the Vice President of Engineering, I am responsible for contributing technological vision, coauthoring technical documents and patents, and managing the software and data analytics teams. We have currently raised $500,000 dollars through pre-seed funding.

Organizations and Volunteer Work

03/08 – 05/17 **Special Olympics Male Gymnastics Coach, Hatboro YMCA** Hatboro, PA
Volunteer work mentoring & coaching special needs gymnasts. Head male gymnastics coach from 03/11 – 05/14.

04/14 – 05/17 **Sigma Chi Fraternity, $\mathrm{K\Upsilon}$ Chapter** JHU, Baltimore, MD
Chapter Risk manager from 09/14 – 05/15.

awards

02/18 **b0x Sponsor Prize** ETHDenver, Denver, CO
developed Delphi, a framework for a decentralized oracle service between Hyperledger Fabric private networks and the Ethereum public network.

09/17 **JP Morgan and Booz Allen Hamilton Sponsor Prizes** JHU Hophacks, Baltimore, MD
developed Illuminate, an application that empowers verifiable, frictionless donations for worldwide disaster relief by leveraging the Ethereum public network at Hop Hacks.

05/17 **CS Departmental Honors with Thesis** JHU, Baltimore, MD
awarded for maintaining a cumulative GPA of 3.5 or higher within courses specific to the computer science department and acceptance of senior research thesis.

05/17 **BME Departmental Honors** JHU, Baltimore, MD
awarded for maintaining a cumulative GPA of 3.5 or higher within courses specific to the Biomedical Engineering department.

05/17 **General Honors** JHU, Baltimore, MD
awarded for maintaining cumulative GPA of 3.5 or higher.

09/14 – 05/17 **Martha A. Laverty Scholar** JHU, Baltimore, MD
Grant awarded for merit achievement.

05/15 – 05/17 **Dean's List** JHU, Baltimore, MD
Awarded for maintaining a GPA above a 3.5/4.0.

09/15 **Pennapps Everyblock Sponsor Prize** UPenn, Philadelphia, PA
Awarded for development of Strollsafe, an application that enables users to seamlessly view crime risk for a given area while maneuvering Philadelphia at University of Pennsylvania's PennApps.

05/13 **National Merit Finalist** LSCHS, Wyndmoor, PA
Awarded to the top 15,000 high school students nationally on basis of PSAT scores and academic achievement while a student La Salle College High School.

interests

professional: omics statistics, machine learning, graph classification, mixed-effects modeling, pipeline engineering, cloud computing, data analysis, neuroscience, reproducibility, timeseries analysis, semi-parametric modeling, blockchain.
personal: guitar, cooking, hiking, biking, scale model warships, rock climbing.

publications

Under Review

1. Optimal Experimental Design for Big Data: Applications in Brain Imaging

   Eric W Bridgeford, Shangsi Wang, Zhi Yang, Zeyi Wang, Ting Xu, Cameron Craddock, Gregory Kiar, William Gray Roncal, Carey E Priebe, Brian Caffo, Michael Milham, Xi-Nian Zuo, Consortium Reliability & Reproducibility, Joshua T Vogelstein

   Submitted to Nature Methods (2019).

2. A High-Throughput Pipeline Identifies Robust Connectomes But Troublesome Variability

   Gregory Kiar†, **Eric W Bridgeford**†, Will Gray Roncal†, Consortium Reliability Reproducibility (CoRR), Vikram Chandrashakar, Disa Mhembere, Sephira Ryman, Xi-Nian Zuo, Daniel S Marguiles, R Cameron Craddock, Carey E Priebe, Rex Jung, Vince D Calhoun, Brian Caffo, Randal Burns, Michael P Milham, Joshua T Vogelstein

   Under Revision (2018).

3. Geometric Dimensionality Reduction for Subsequent Classification

   Joshua T. Vogelstein†, **Eric W. Bridgeford**†, Minh Tang, Da Zheng, Randal Burns, Mauro Maggioni

   Under Revision (Sept. 2018).

Articles in Peer-Reviewed Journals

1. GraSPy: Graph Statistics in Python

   Jaewon Chung, Benjamin Pedigo, **Eric W Bridgeford**, Bijan Varjavand, Hayden Helm, Joshua T Vogelstein

   Journal of Machine Learning Research (Sept. 2019).

2. On a 'Two Truths' Phenomenon in Spectral Graph Clustering

   Carey E. Priebe, Youngser Park, Joshua T. Vogelstein, John M. Conroy, Vince Lyzinski, Minh Tang, Avanti Athreya, Joshua Cape, **Eric W. Bridgeford**

   Proceedings of the National Academy of Sciences (PNAS) (Mar. 2019).

3. Connectal Coding: Discovering the Structures Linking Cognitive Phenotypes to Individual Histories

   Joshua T Vogelstein, **Eric W. Bridgeford**, Benjamin D Pedigo, Jaewon Chung, Keith Levin, Brett Mensh, Carey E Priebe

   In Press at Current Opinions in Neurobiology (June 2019).

† *co-first author*

4. Discovering and Deciphering Relationships Across Disparate Data Modalities

   Joshua T. Vogelstein, **Eric W Bridgeford**, Qing Wang, Carey E. Priebe, Mauro Maggioni, Cencheng Shen

   eLife Sciences (Sept. 2018).

5. A community-developed open-source computational ecosystem for big neuro data

   Joshua T. Vogelstein, Eric Perlman, Benjamin Falk, Alex Baden, William Gray Roncal, Vikram Chandrashekhar, Forrest Collman, Sharmishtaa Seshamani, Jesse L. Patsolic, Kunal Lillaney, Michael Kazhdan, Robert Hider, Derek Pryor, Jordan Matelsky, Timothy Gion, Priya Manavalan, Brock Wester, Mark Chevillet, Eric T. Trautman, Khaled Khairy, **Eric W. Bridgeford**, Dean M. Kleissas, Daniel J. Tward, Ailey K. Crow, Brian Hsueh, Matthew A. Wright, Michael I. Miller, Stephen J. Smith, R. Jacob Vogelstein, Karl Deisseroth, Randal Burns

   Nature Methods 15.11 (Nov. 2018) pp. 846–847. Nature Publishing Group.

6. Vertex nomination: The canonical sampling and the extended spectral nomination schemes

   Jordan Yoder, Li Chen, Henry Pao, **Eric W Bridgeford**, Keith Levin, Donniell Fishkind, Carey E Priebe, Vince Lyzinski

   CSDA (2018).

7. Small-World Propensity in Weighted, Real-World NetWorks

   Sarah F Muldoon, **Eric W Bridgeford**, Danielle S Bassett

   Nature, Scientific Reports (Feb. 2016).

Conference Posters

1. A Principled Approach to Statistical Connectomics and Mega-Analysis

   Gregory Kiar, William R Gray Roncal, Disa Mhembere, **Eric W Bridgeford**, Shan gsi Wang, Carey Priebe, Randal Burns, Joshua T Vogelstein

   Organization for Human Brain Mapping (OHBM) (June 2018).

2. MRImages to Graphs: A One Click Community Pipeline for MR Connectome Analysis

   Eric W Bridgeford, Gregory Kiar, Will Gray Roncal, Disa Mehembre, Randal Burns, Joshua T Vogelstein

   Institute for Computational Medicine Poster Session (2015).

3. Community Connectomics via Cloud Computing Utilizing m2g - a Reference Pipeline

   Gregory Kiar, et al.

   Organization for Human Brain Mapping (OHBM) (2015).

4. Quantifying Small Worldness in Weighted Brain Networks: Small-World Propensity

   Sarah Muldoon, **Eric W Bridgeford**, Danielle Bassett

   Society for Neuroscience (SfN) (Oct. 2015).

5. The Open Connectome Project & NeuroData: Enabling Data Driven Neuroscience at Scale

   Joshua T. Vogelstein, et al.

   Society for Neuroscience (SfN) (Oct. 2015).

Talks

1. Neurodata MRI Graphs Pipeline (NDMG)

   Organization of Human Brain Mapping (2018).

2. A Principled Approach to Statistical Connectomics and Mega-Analysis

   Organization of Human Brain Mapping (2018).

3. From the Functional Brain to the Connectome: An Introduction to Neuroscience Research in the 21st Century

   JHU Splash (2016).

Software Packages

1. GraSPy: Graph Statistics in Python

   Jaewon Chung, Benjamin D Pedigo, **Eric W Bridgeford**, Bijan K Varjavand, Hayden Helm, Joshua T Vogelstein

   Pypi (May 2018).

2. Multiscale Graph Correlation

   Eric W Bridgeford, Censheng Shen, Shangsi Wang, Joshua Vogelstein

   CRAN Package (May 2018).

3. Linear Optimal Low-Rank Projection

   Eric W Bridgeford, Minh Tang, Jason Yim, Joshua T Vogelstein

   CRAN Package (May 2018).

4. Statistical Learning Benchmarks

   Eric W. Bridgeford, Joshua Vogelstein

   R package (2018).

5. Graphstats

   Eric W. Bridgeford, Joshua Vogelstein

   R package (2017).

6. Neurodata MRI Graphs

   Gregory Kiar†, **Eric Bridgeford**†, Will Gray Roncal, Vikram Chandrashekhar, Disa Mhembere, Joshua Vogelstein

   python package (2017).