

Joshua Vogelstein, Ph.D.

Personal Information

Primary Appointment

- 02/22 – **Associate Professor** Department of Biomedical Engineering, JHU.
 08/14 – 02/22 **Assistant Professor** Department of Biomedical Engineering, JHU.

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 Department of Biomedical Engineering
 Johns Hopkins University
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Joint Appointments

- 09/19 – **Joint Appointment** Department of Biostatistics, JHU, Baltimore, MD, USA.
 08/15 – **Joint Appointment** Department of Applied Mathematics and Statistics, JHU.
 08/14 – **Joint Appointment** Department of Neuroscience, JHU.
 08/14 – **Joint Appointment** Department of Computer Science, JHU.

Institutional and Center Appointments

- 08/15 – **Steering Committee** Kavli Neuroscience Discovery Institute (KNDI).
 08/14 – **Core Faculty** Institute for Computational Medicine, JHU.
 08/14 – **Core Faculty** Center for Imaging Science, JHU.
 08/14 – **Assistant Research Faculty** Human Language Technology Center of Excellence, JHU.
 10/12 – **Affiliated Faculty** Institute for Data Intensive Engineering and Sciences, JHU.

Education

- 2003 – 2009 **Ph.D in Neuroscience** Johns Hopkins School of Medicine
 Advisor: Eric Young
Thesis: OOPSI: a family of optical spike inference algorithms for inferring neural connectivity from population calcium imaging
 2009 – 2009 **M.S. in Applied Mathematics & Statistics** Johns Hopkins University
 1998 – 2002 **B.A. in Biomedical Engineering** Washington University, St. Louis

Training

- 2022 Foundations in Somatic Abolitionism for White Bodies (14 Hours)
 2022 Sacred Sons Leadership Training Level 1
 2022 Creatorhood Initiate Training - Phase 1
 2021 JHU SafeZone training

Academic Experience

- 08/18 – **Director of Biomedical Data Science Focus Area** Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, USA.
 05/16 – **Visiting Scientist** Howard Hughes Medical Institute, Janelia Research Campus, Ashburn, VA, USA
 10/12 – 08/14 **Endeavor Scientist** Child Mind Institute, New York, NY, USA
 08/12 – 08/14 **Affiliated Faculty** Kenan Institute for Ethics, Duke University, Durham, NC, USA
 08/12 – 08/14 **Adjunct Faculty** Department of Computer Science, JHU, Baltimore, MD, USA
 12/09 – 01/11 **Post-Doctoral Fellow** Department of Applied Mathematics and Statistics, Supervised by Carey E.Priebe, JHU, Baltimore, MD, USA
Research Statistics of populations of networks
 06/01 – 09/01 **Research Assistant** Prof. Randy O'Reilly, Dept. of Psychology, University of Colorado, Denver, CO, USA
 06/00 – 09/00 **Clinical Engineer** Johns Hopkins Hospital, JHU, Baltimore, MD, USA

06/99 – 08/99 **Research Assistant under Dr. Jeffrey Williams** Dept. of Neurosurgery, Johns Hopkins Hospital, Baltimore, MD, USA

06/98 – 08/98 **Research Assistant under Professor Kathy Cho** Dept. of Pathology, Johns Hopkins School of Medicine, Baltimore, MD, USA

Published Peer-Reviewed Research Articles

Note: CV author in bold; Trainees are underlined,

(108 papers; top 10 cited 3,922 times; H-index 36; 12 first, 13 last, 48 middle authorships) as of 2023/10/12

- [108] S. Cencheng, S. Wang, A. Badea, C. E. Priebe, and **J. T. Vogelstein**. "Discovering the signal subgraph: An iterative screening approach on graphs" *Pattern Recognition Letters*, 2024. [\[URL\]](#)
- [107] S. Cencheng, C. Jaewon, M. Ronak, X. Ting, and **J. T. Vogelstein**. "Independence Testing for Temporal Data" *Transactions on Machine Learning Research*, 2024. [\[URL\]](#)
- [106] X. Li, N. Bianchini Esper, L. Ai, S. Giavasis, H. Jin, E. Feczko, T. Xu, J. Clucas, A. Franco, A. Sólón Heinsfeld, A. Adebimpe, **J. T. Vogelstein**, C. Yan, O. Esteban, R. A. Poldrack, C. Craddock, D. Fair, T. Satterthwaite, G. Kiar, and M. P. Milham. "Moving Beyond Processing and Analysis-Related Variation in Neuroscience" *Nature Human Behaviour*, 2024. [\[DOI\]](#)
- [105] H. S. Helm, A. De Silva, **J. T. and Vogelstein**, C. E. Priebe, and W. Yang. "Approximately Optimal Domain Adaptation with Fisher's Linear Discriminant" *Mathmatics*, 2024. [\[URL\]](#)
- [104] Z. Wang, E. Bridgeford, S. Wang, **J. T. Vogelstein**, and . B. Caffo. "Statistical Analysis of Data Repeatability Measures" *International Statistical Review*, 2024. [\[URL\]](#)
- [103] T. Zuzul, E. C. Pahnke, J. Larson, P. Bourke, N. Caurvina, N. P. Shah, F. Amini, J. Weston, Y. Park, **J. Vogelstein**, C. White, and C. E. Priebe. "Dynamic Silos: Increased Modularity and Decreased Stability in Intraorganizational Communication Networks During the COVID-19 Pandemic" *Management Science*, 2024. [\[URL\]](#)
- [102] R. Xiong, A. Koenecke, M. Powell, Z. Shen, **J. T. Vogelstein**, and S. Athey. "Federated Causal Inference in Heterogeneous Observational Data" *Statistics in Medicine*, 2023. [\[DOI\]](#)
- [101] Benjamin D Pedigo, Mike Powell, Eric W Bridgeford, Michael Winding, Carey E Priebe, and **Joshua T Vogelstein**. "Generative network modeling reveals quantitative definitions of bilateral symmetry exhibited by a whole insect brain connectome" *eLife Sciences Publications, Ltd*, 2023. [\[URL\]](#)
- [100] Michael Winding, Benjamin D Pedigo, Christopher L Barnes, Heather G Patsolic, Youngser Park, Tom Kazimiers, Akira Fushiki, Ingrid V Andrade, Avinash Khandelwal, Javier Valdes-Aleman, Feng Li, Nadine Randel, Elizabeth Barsotti, Ana Correia, Richard D Fetter, Volker Hartenstein, Carey E Priebe, **Joshua T Vogelstein**, Albert Cardona, and Marta Zlatic. "The connectome of an insect brain" *science*, 2023. [\[URL\]](#)
- [99] B. D. Pedigo, M. Winding, C. E. Priebe, and **J. T. Vogelstein**. "Bisected graph matching improves automated pairing of bilaterally homologous neurons from connectomes" *Network Neuroscience*, 2022. [\[URL\]](#)
- [98] T. L. Athey, D. J. Tward, U. Mueller, **Vogelstein Joshua T**, and M. I. Miller. "Hidden Markov modeling for maximum probability neuron reconstruction" *Communications Biology*, 2022. [\[DOI\]](#)
- [97] D. Kudithipudi, M. Aguilar-Simon, J. Babb, M. Bazhenov, D. Blackiston, J. Bongard, A. P. Brna, S. Chakravarthi Raja, N. Cheney, J. Clune, A. Daram, S. Fusi, P. Helfer, L. Kay, N. Ketz, Z. Kira, S. Kolouri, J. L. Krichmar, S. Kriegman, M. Levin, S. Madireddy, S. Manicka, A. Marjaninejad, B. McNaughton, R. Miiikulainen, Z. Navratilova, T. Pandit, A. Parker, P. K. Pilly, S. Risi, T. J. Sejnowski, A. Soltoggio, N. Soures, A. S. Tolia, D. Urbina-Meléndez, F. J. Valero-Cuevas, G. M. van de Ven, **J. T. Vogelstein**, F. Wang, R. Weiss, A. Yanguas-Gil, X. Zou, and H. Siegelmann. "Biological underpinnings for lifelong learning machines" *Nature Machine Intelligence*, (3)4:196-210, 2022. [\[DOI\]](#)
- [96] S. Li, T. Jun, J. Tyler, E. Schadt, Y. Kao, Z. Wang, M. F. Konig, C. Bettgowda, **J. T. Vogelstein**, N. Papadopoulos, R. E. Parsons, R. Chen, E. E. Schadt, L. Li, and W. K. Oh. "Inpatient Administration of Alpha-1-Adrenergic Receptor Blocking Agents Reduces Mortality in Male COVID-19 Patients" *Front. Med.*, 2022. [\[URL\]](#)
- [95] J. Poline, D. N. Kennedy, F. T. Sommer, G. A. Ascoli, D. C. Van Essen, A. R. Ferguson, J. S. Grethe, M. J. Hawrylycz, P. M. Thompson, R. A. Poldrack, S. S. Ghosh, D. B. Keator, T. L. Athey, **J. T. Vogelstein**, H. S.

- Mayberg, and M. E. Martone. "Is Neuroscience FAIR? A Call for Collaborative Standardisation of Neuroscience Data" *Neuroinformatics*, 2022. [\[URL\]](#)
- [94] **J. T. Vogelstein**, T. Verstynen, K. P. Kording, L. Isik, J. W. Krakauer, R. Etienne-Cummings, E. L. Ogburn, C. E. Priebe, R. Burns, K. Kutten, J. J. Knierim, J. B. Potash, T. Hartung, L. Smirnova, P. Worley, A. Savonenko, I. Phillips, M. I. Miller, R. Vidal, J. Sulam, A. Charles, N. J. Cowan, M. Bichuch, A. Venkataraman, C. Li, N. Thakor, J. M. Kebschull, M. Albert, J. Xu, M. H. Shuler, B. Caffo, T. Ratnanather, [A. Geisa](#), [S. Roh](#), [E. Yezerets](#), [M. Madhyastha](#), [J. I. How](#), [T. M. Tomita](#), [J. Dey](#), [N. Huang](#), [J. M. Shin](#), [K. A. Kinfu](#), P. Chaudhari, B. Baker, A. Schapiro, D. Jayaraman, E. Eaton, M. Platt, L. Ungar, L. Wehbe, A. Kepecs, A. Christensen, O. Osuagwu, B. Brunton, B. Mensh, A. R. Muotri, G. Silva, F. Puppato, F. Engert, E. Hillman, J. Brown, C. White, and W. Yang. "Prospective Learning: Back to the Future" *arXiv [cs.LG]*, 2022. [\[URL\]](#)
- [93] [J. Chung](#), [B. Varjavand](#), [J. Arroyo-Reli3n](#), [A. Alyakin](#), J. Agterberg, M. Tang, C. E. Priebe, and **J. T. Vogelstein**. "Valid two-sample graph testing via optimal transport Procrustes and multiscale graph correlation with applications in connectomics" *Stat*, (1)11:e429, 2022.
- [92] T. Hartung, L. Smirnova, I. E. M. Pantoja, A. Akwaboah, D. A. E. Din, C. Berlinicke, J. L. Boyd, B. S. Caffo, B. Cappiello, T. Cohen-Karni, L. Curley, R. Etienne-Cummings, R. Dastgheyb, D. H. Gracias, F. Gilbert, C. W. Habela, F. Han, T. Harris, K. Herrmann, E. J. Hill, Q. Huang, R. E. Jabbour, E. C. Johnson, B. J. Kagan, C. Krall, A. Levchenko, P. Locke, A. Maertens, M. Metea, A. R. Muotri, R. Parri, B. L. Paulhamus, J. D. Plotkin, P. Roach, J. C. Romero, J. C. Schwamborn, F. Sille, A. Szalay, K. Tsaioun, D. Tornero, **J. T. Vogelstein**, K. Wahlin, and D. J. Zack. "The Baltimore Declaration toward the exploration of organoid intelligence" *Frontiers in Science*, 2022.
- [91] M. Powell, C. Clark, A. Alyakin, **J. T. Vogelstein**, and B. Hart. "Exploration of Residual Confounding in Analyses of Associations of Metformin Use and Outcomes in Adults With Type 2 Diabetes" *JAMA Network Open*, (1)5:e2241505–e2241505, 2022. [\[URL\]](#)
- [90] [V. Chandrashekar](#), D. J. Tward, D. Crowley, A. K. Crow, M. A. Wright, B. Y. Hsueh, F. Gore, T. A. Machado, A. Branch, J. S. Rosenblum, K. Deisseroth, and **J. T. Vogelstein**. "CloudReg: automatic terabyte-scale cross-modal brain volume registration" *Nature Methods*, 2021. [\[DOI\]](#)
- [89] [M. Powell](#), A. Koenecke, J. Byrd, A. Nishimura, M. Konig, R. Xiong, S. Mahmood, V. B. Mucaj, L. Rose, S. Tamang, A. Sacarny, B. Caffo, S. Athey, E. Stuart, and **J. Vogelstein**. "Ten Rules for Conducting Retrospective Pharmacoepidemiological Analyses: Example COVID-19 Study" *Frontiers in Pharmacology*, 2021. [\[DOI\]](#)
- [88] [T. L. Athey](#), [J. Teneggi](#), **J. T. Vogelstein**, D. Tward, U. Mueller, and M. I. Miller. "Fitting Splines to Axonal Arbors Quantifies Relationship between Branch Order and Geometry" *Frontiers in Neuroinformatics*, 2021. [\[URL\]](#)
- [87] A. Koenecke, [M. Powell](#), R. Xiong, Z. Shen, N. Fischer, S. Huq, A. M. Khalafallah, M. Trevisan, P. Sparen, J. J. Carrero, A. Nishimura, B. Caffo, E. A. Stuart, R. Bai, V. Staedtke, D. L. Thomas, N. Papadopoulos, K. W. Kinzler, B. Vogelstein, S. Zhou, C. Bettgowda, M. F. Konig, B. Mensh, **J. T. Vogelstein**, and S. Athey. ""Alpha-1 adrenergic receptor antagonists to prevent hyperinflammation and death from lower respiratory tract infection",journal=Elife" *None*, 2021. [\[DOI\]](#)
- [86] [C. Shen](#), [S. Panda](#), and **J. T. Vogelstein**. "The Chi-Square Test of Distance Correlation" *Journal of Computational and Graphical Statistics*, (ja)0:1–21, 2021. [\[DOI\]](#)
- [85] [Ronan Perry](#), Gavin Mischler, Richard Guo, Theodore Lee, Alexander Chang, Arman Koul, Cameron Franz, Hugo Richard, Iain Carmichael, Pierre Ablin, Alexandre Gramfort, and **Joshua T. Vogelstein**. "mvlearn: Multiview Machine Learning in Python" *Journal of Machine Learning Research*, (109)22:1-7, 2021. [\[URL\]](#)
- [84] **J. T. Vogelstein**, E. W. Bridgford, M. Tang, D. Zheng, C. Douville, R. Burns, and M. Maggioni. "Supervised dimensionality reduction for big data" *Nature Communications*, (2872)12:1-9, 2021. [\[DOI\]](#)
- [83] S. Li, T. Jun, Z. Wang, Y. Kao, E. Schadt, M. F. B. Konig, J. T. Vogelstein, **N. Papadopoulos**, R. E. Parsons, and others. "COVID-19 outcomes among hospitalized men with or without exposure to alpha-1-adrenergic receptor blocking agents" *Frontiers in Medicine*, 2021. [\[URL\]](#)
- [82] [S. Wang](#), [J. Arroyo](#), **J. T. Vogelstein**, and C. E. Priebe. "Joint Embedding of Graphs" *Transactions on Pattern Analysis and Machine Intelligence*, 2021. [\[URL\]](#)
- [81] L. Rose, L. Graham, A. Koenecke, [M. Powell](#), R. Xiong, Z. Shen, B. Mench, K. W. Kinzler, C. Bettgowda, B. Vogelstein, and others. "The association between Alpha-1 adrenergic receptor antagonists and in-hospital mortality from COVID-19" *Frontiers in Medicine*, 2021. [\[DOI\]](#)

- [80] M. P. Milham, **J. T. Vogelstein**, and T. Xu. "Removing the Reliability Bottleneck in Functional Magnetic Resonance Imaging Research to Achieve Clinical Utility" *JAMA Psychiatry*, 2021. [\[DOI\]](#)
- [79] [J. Arroyo](#), A. Athreya, J. Cape, G. Chen, C. E. Priebe, and **J. T. Vogelstein**. "Inference for Multiple Heterogenous Networks with a Common Invariant Subspace" *Journal of Machine Learning Research*, (142)22:1-49, 2021. [\[URL\]](#)
- [78] [E. W. Bridgeford](#), S. Wang, Z. Wang, T. Xu, C. Craddock, [J. Dey](#), G. Kiar, W. Gray-Roncal, C. Colantuoni, C. Douville, and others. "Eliminating accidental deviations to minimize generalization error and maximize replicability: Applications in connectomics and genomics" *PLoS computational biology*, (9)17:e1009279, 2021. [\[URL\]](#)
- [77] [R. M. Lawrence](#), [E. W. Bridgeford](#), P. E. Myers, G. C. Arvapalli, S. C. Ramachandran, D. A. Pisner, P. F. Frank, A. D. Lemmer, A. Nikolaidis, and **J. T. Vogelstein**. "Standardizing human brain parcellations" *Scientific data*, (1)8:1-9, 2021. [\[URL\]](#)
- [76] S. Hong, T. Xu, A. Nikolaidis, J. Smallwood, D. S. Margulies, B. Bernhardt, **J. T. Vogelstein**, and M. P. Milham. "Toward a connectivity gradient-based framework for reproducible biomarker discovery" *NeuroImage*, 2020. [\[DOI\]](#)
- [75] Ting Xu, Karl-Heinz Nenning, Ernst Schwartz, Seok-Jun Hong, **Joshua T. Vogelstein**, Alexandros Goulas, Damien A. Fair, Charles E. Schroeder, Daniel S. Margulies, Jonny Smallwood, Michael P. Milham, and Georg Langs. "Cross-species functional alignment reveals evolutionary hierarchy within the connectome" *NeuroImage*, 2020. [\[DOI\]](#)
- [74] J. W. Chow, A. Korchmaros, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Impact of concatenating fMRI data on reliability for functional connectomics" *Neuroimage*, 2020. [\[DOI\]](#)
- [73] Karl-Heinz Nenning, Ting Xu, Ernst Schwartz, [Jesus Arroyo](#), Adelheid Woehrer, Alexandre R. Franco, **Joshua T. Vogelstein**, Daniel S. Margulies, Hesheng Liu, Jonathan Smallwood, Michael P. Milham, and Georg Langs. "Joint embedding: A scalable alignment to compare individuals in a connectivity space" *NeuroImage*, 2020. [\[DOI\]](#)
- [72] N. Wang, R. J. Anderson, D. G. Ashbrook, [V. Gopalakrishnan](#), Y. Park, C. E. Priebe, Y. Qi, **J. T. Vogelstein**, R. W. Williams, and A. G. Johnson. "Variability and heritability of mouse brain structure: Microscopic MRI atlases and connectomes for diverse strains" *NeuroImage (Cover Story)*, 2020. [\[DOI\]](#)
- [71] M. A. Haendel, C. G. Chute, T. D. Bennett, D. A. Eichmann, J. Guinney, W. A. Kibbe, P. R. O. Payne, E. R. Pfaff, P. N. Robinson, J. H. Saltz, H. Spratt, C. Suver, J. Wilbanks, A. B. Wilcox, A. E. Williams, C. Wu, C. Blacketer, R. L. Bradford, J. J. Cimino, M. Clark, E. W. Colmenares, P. A. Francis, D. Gabriel, A. Graves, R. Hemadri, S. S. Hong, G. Hripscak, D. Jiao, J. G. Klann, K. Kostka, A. M. Lee, H. P. Lehmann, L. Lingrey, R. T. Miller, M. Morris, S. N. Murphy, K. Natarajan, M. B. Palchuk, U. Sheikh, H. Solbrig, S. Visweswaran, A. Walden, K. M. Walters, G. M. Weber, X. T. Zhang, R. L. Zhu, B. Amor, A. T. Girvin, A. Manna, N. Qureshi, M. G. Kurilla, S. G. Michael, L. M. Portilla, J. L. Rutter, C. P. Austin, and K. R. Gersing. "The National COVID Cohort Collaborative (N3C): Rationale, design, infrastructure, and deployment" *Journal of the American Medical Informatics Association*, 2020. [\[DOI\]](#)
- [70] [C. Shen](#) and **J. T. Vogelstein**. "The exact equivalence of distance and kernel methods in hypothesis testing" *AStA Advances in Statistical Analysis*, 2020. [\[DOI\]](#)
- [69] M. Madhyastha, G. Li, V. Strnadov-Neeley, J. Browne, **J. T. Vogelstein**, R. Burns, and C. E. Priebe. "Geodesic Forests" *Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2020. [\[DOI\]](#)
- [68] M. Schulz, B. T. Yeo, **J. T. Vogelstein**, J. Mourao-Miranda, J. N. Kather, K. Kording, B. Richards, and D. Bzdok. "Different scalling of linear models and deep learning in UKBiobank brain images versus machine-learning datasets" *Nat Commun*, 2020. [\[DOI\]](#)
- [67] M. Schulz, B. T. Yeo, **J. T. Vogelstein**, J. Mourao-Miranada, J. N. Kather, K. Kording, B. Richards, and D. Bzdok. "Different scaling of linear models and deep learning in UKBiobank brain images versus machine-learning datasets" *Nat Commun*, 2020. [\[DOI\]](#)
- [66] [Z. Wang](#), H. Sair, C. Crainiceanu, M. Lindquist, B. A. Landman, S. Resnick, **J. T. Vogelstein**, and B. S. Caffo. "On statistical tests of functional connectome fingerprinting" *The Canadian Journal of Statistics*, 2020. [\[DOI\]](#)

- [65] A. S. Charles, [B. Falk](#), N. Turner, T. D. Pereira, D. Tward, [B. D. Pedigo](#), [J. Chung](#), R. Burns, S. S. Ghosh, J. M. Kebschull, W. Silversmith, and **J. T. Vogelstein**. "Toward Community-Driven Big Open Brain Science: Open Big Data and Tools for Structure, Function, and Genetics" *Annual Review of Neuroscience*, (1)43:441-464, 2020. [\[DOI\]](#)
- [64] Maximilian F. Konig, [Mike Powell](#), Verena Staedtke, Ren-Yuan Bai, David L. Thomas, Nicole Fischer, Sakibul Huq, Adham M. Khalafallah, Allison Koenecke, Ruoxuan Xiong, Brett Mensh, Nickolas Papadopoulos, Kenneth W. Kinzler, Bert Vogelstein, **Joshua T. Vogelstein**, Susan Athey, Shibin Zhou, and Chetan Bettegowda. "Preventing cytokine storm syndrome in COVID-19 using alpha-1 adrenergic receptor antagonists" *The Journal of Clinical Investigation*, (7)130:3345-3347, 2020. [\[DOI\]](#)
- [63] K. Mehta, R. F. Goldin, D. Marchette, **J. T. Vogelstein**, C. E. Priebe, and G. A. Ascoli. "Neuronal Classification from Network Connectivity via Adjacency Spectral Embedding" *bioRxiv*, 2020. [\[DOI\]](#)
- [62] G. Franca, M. Rizzo, and **J. T. Vogelstein**. "Kernel k-Groups via Hartigan's Method" *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2020. [\[DOI\]](#)
- [61] [T. M. Tomita](#), [J. Browne](#), C. Shen, [J. Chung](#), J. L. Patsolic, B. Falk, J. Yim, C. E. Priebe, R. Burns, M. Maggioni, and **J. T. Vogelstein**. "Sparse Projection Oblique Randomer Forests" *Journal of Machine Learning Research*, 2020. [\[URL\]](#)
- [60] S. Hong, **J. T. Vogelstein**, A. Gozzi, B. C. Bernhardt, B. T. Yeo, M. P. Milham, and A. D. Martino. "Toward Neurosubtypes in Autism" *Biological Psychiatry*, (1)88:111 - 128, 2020. [\[DOI\]](#)
- [59] A. Nikolaidis, A. S. Heinsfeld, T. Xu, P. Bellec, **J. T. Vogelstein**, and M. Milham. "Bagging Improves Reproducibility of Functional Parcellation of the Human Brain" *NeuroImage*, 2020. [\[URL\]](#)
- [58] [E. W. Bridgeford](#), [S. Wang](#), Z. Yang, Z. Wang, . Xu, C. Craddock, [G. Kiar](#), W. Gray-Roncal, C. E. Priebe, B. Caffo, M. Milham, X. Zuo, (CoRR), and **J. T. Vogelstein**. "Optimal Experimental Design for Big Data: Applications in Brain Imaging" *bioRxiv*, 2019. [\[URL\]](#)
- [57] [Y. Lee](#), [C. Shen](#), C. E. Priebe, and **J. T. Vogelstein**. "Network dependence testing via diffusion maps and distance-based correlations" *Biometrika*, 2019. [\[DOI\]](#)
- [56] [R. Perry](#), [T. M. Tomita](#), J. Patsolic, B. Falk, and **J. T. Vogelstein**. "Manifold Forests: Closing the Gap on Neural Networks" *arXiv*, 2019. [\[URL\]](#)
- [55] [J. Chung](#), [B. D. Pedigo](#), [E. W. Bridgeford](#), [B. K. Varjavand](#), and **J. T. Vogelstein**. "GraSPy: Graph Statistics in Python" *Journal of Machine Learning Research*, (158)20:1-7, 2019. [\[URL\]](#)
- [54] **J. T. Vogelstein**, [E. W. Bridgeford](#), [B. D. Pedigo](#), [J. Chung](#), K. Levin, B. Mensh, and C. E. Priebe. "Connectal Coding: Discovering the Structures Linking Cognitive Phenotypes to Individual Histories" *Current Opinion in Neurobiology*, 2019. [\[DOI\]](#)
- [53] C. E. Priebe, Y. Park, **J. T. Vogelstein**, J. M. Conroy, V. Lyzinski, M. Tang, A. Athreya, J. Cape, and [E. Bridgeford](#). "On a two-truths phenomenon in spectral graph clustering" *Proceedings of the National Academy of Sciences of the United States of America*, (13)116:5995-6000, 2019. [\[DOI\]](#)
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- [51] H. Patsolic, S. Adali, **J. T. Vogelstein**, Y. . P. Park, G. Li, and V. Lyzinski. "Seeded Graph Matching Via Joint Optimization of Fidelity and Commensurability" *arXiv*, 2019. [\[URL\]](#)
- [50] **J. T. Vogelstein**, [E. W. Bridgeford](#), Q. Wang, C. E. Priebe, M. Maggioni, and [C. Shen](#). "Discovering and deciphering relationships across disparate data modalities" *eLife*, 2019. [\[DOI\]](#)
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- [48] **J. T. Vogelstein**, [E. Bridgeford](#), M. Tang, D. Zheng, R. Burns, and M. Maggioni. "Geometric Dimensionality Reduction for Subsequent Classification" *arXiv*, 2018. [\[URL\]](#)
- [47] [C. Shen](#), C. E. Priebe, and **J. T. Vogelstein**. "From Distance Correlation to Multiscale Graph Correlation" *Journal of the American Statistical Association*, 2018. [\[URL\]](#)
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Funding

External Research Support: Current

2022-2027 **NIH**, The Heart and the Mind: An Integrative Approach to Brain-Body Interactions in the Zebrafish 2U19NS104653
 PI: F. Engert
 Role on Project: Co-Investigator

Term: 01-Sep-2022 to 31-Aug-2024

Funding to lab, entire period: \$412,500 (total)

Funding to lab, current year:

Johns Hopkins University will be responsible for developing all algorithms and software in support of the Atlas project, as well as running the Data Core. This will include writing software to store, manage, and visualize the data, as well as algorithms for scalable analysis and support of modeling.

2020-2024 **NSF**, Neural Net Learning for Graph NSF 2113099

PI: C. Shen

Role on Project: Co-Investigator

Term: 01-Sep-2021 to 31-Aug-2024

Funding to lab, entire period: \$73,597 (total)

Funding to lab, current year:

Goal of this project is methodological development, theoretical investigation, and simulation and real data experimentation toward the end goal of principled understanding and advancement of the mathematics and science of graph neural network

2021-2024 **NIH**, An Alignment Framework for Mapping Brain Dynamics and Substrates of Human Cognition Across Species 1RF1MH128696

PI: T. Xu

Role on Project: Co-Investigator

Term: 01-Sep-2021 to 31-Aug-2024

Funding to lab, entire period: \$270,189 (total)

Funding to lab, current year:

We will continue collecting, organizing, and analyzing another cohort of the NKI-Rockland Sample.

2021-2027 **NIH**, The NKI Rockland Sample II: An Open Resource of Multimodal Brain, Physiology & Behavior Data from a Community Lifespan Sample 2U19NS104653

PI: M. Milham

Role on Project: Co-Investigator

Term: 01-Jul-2022 to 30-Apr-2026

Funding to lab, entire period: \$3,831,854 (total)

Funding to lab, current year:

The major goal is to establish multimodal MRI and electrophysiology lifespan sample to open and prospectively share with the larger scientific community.

2020-2025 **NSF**, Collaborative Research: Transferable, Hierarchical, Expensive, Optimal, Robust, Interpretable Networks NSF 20-540

PI: R. Vidal

Role on Project: Co-Investigator

Term: 01-Sep-2020 to 31-Aug-2025

Funding to lab, entire period: \$1,650,000 (direct)

Funding to lab, current year: \$660,000 (direct)

The goal of this project is to develop a mathematical, statistical and computational frame- work that helps explain the success of current network architectures, understand its pitfalls, and guide the design of novel architectures with guaranteed confidence, robustness, inter- pretability, optimality, and transferability

2020 -- **Microsoft**, Federated Causal Inference for Multi-site Real-World Evidence & Clinical Trial Analysis Studies in Pandemic Preparedness

PI: M. Powell

Role on Project: Co-Investigator

Term: 01-Aug-2020 to current

Funding to lab, entire period: N/A

Funding to lab, current year: N/A

This project will conduct federated retrospective analyses designed to assess the benefit of off-label drug use by pooling multiple disparate databases, to help prioritize and guide subsequent initiation and recruitment

of randomized clinical trials. This will include evaluating the impact of the target drugs on patient outcomes from diseases similar to COVID-19, such as pneumonia or acute respiratory distress, generating artificial datasets using generative adversarial networks to assess performance of methods when 'ground truth' is known, applying the best methods to analyze the effect of the target drugs on the outcomes of COVID-19 patients across hospital systems, and using the results to evaluate the potential of these drugs and suggest guidelines for clinical trials.

2020-2023 **NIH**, Graspy: A python package for rigorous statistical analysis of populations of attributed connectomes NIH MH-19-147

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 01-Jul-2020 to 30-Jun-2023

Funding to lab, entire period: \$861,240 (direct) \$1,416,279 (total)

Funding to lab, current year: \$283,301 (direct) \$471,082 (total)

The goal of this project is to establish a state-of-the-art toolbox for analysis of connectomes, spanning taxa, scale, and complexity. We will develop and extend implementations to enable neurobiologists to (1) estimate latent structure from attributed connectomes, (2) identify meaningful clusters among populations of connectomes, and (3) detect relationships between connectomes and multivariate phenotypes

2020-2025 **NSF**, NeuroNex2: Enabling Identification and Impact of Synaptic Weight in Functional Networks NSF 2014862

PI: K. Harris

Role on Project: Co-Investigator

Term: 01-Apr-2020 to 31-Mar-2025

Funding to lab, entire period: \$609,294 (direct) \$997,719 (total)

Funding to lab, current year: \$121,587 (direct) \$199,543 (total)

The goal is to develop the requisite technology to understand the impact of synaptic weight on functional networks

2020-2025 **NSF**, CAREER: Foundational Statistical Theory and Methods for Analysis of Populations of Attributed Connectomes NSF 17-537

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 01-Jan-2020 to 31-Dec-2025

Funding to lab, entire period: \$630,230 (total) \$384,873 (direct)

Funding to lab, current year: \$126,046 (total) \$76,975 (direct)

The goal is to establish foundational theory and methods for analyzing populations of attributed connectomes

2019-2023 **NIH**, Brain Networks in Mouse Models of Aging NIH RO1AG066184-01

PI: A. Badea

Role on Project: Co-Investigator

Term: 01-Dec-2019 to 30-Nov-2023

Funding to lab, entire period: N/A

Funding to lab, current year: \$205,998

The goal of this grant is to generate connectomes and RNA-seq transcriptomes to characterize and differentiate APOE mice as a model of aging

2019 -- **Microsoft**, Microsoft Research Award

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: Unrestricted Gift

Funding to lab, entire period: \$50,000 (total)

Funding to lab, current year: N/A

Research and development of neuroscience and connectomes around neuronal circuit and system modeling, application of time-series-of-graphs and dynamics to neuronal signaling analysis and connectomes, and in

the abstractions of matter, math, machines that point toward complex systems composed of low-level components

External Research Support: Completed

- 2020-2022 **NSF**, AI Institute: Planning: BI4ALL: Understanding Biological NSF 20-503
 PI: K. Kording
 Role on Project: Co-Investigator
 Term: 01-Oct-2020 to 31-Jul-2022
 Funding to lab, entire period: N/A
 Funding to lab, current year: \ \$79,629 (direct)
 The goal of this project is to plan an AI institution via several meetings and workshops
- 2019-2022 **NIH**, Accessible technologies for high-throughput, whole-brain reconstructions of molecularly characterized mammalian neurons NIH RFA-MH-19-148
 PI: M. Muller
 Role on Project: Co-Investigator
 Term: 01-Sep-2019 to 31-Aug-2022
 Funding to lab, entire period: \ \$1,180,445 (total) \ \$753,974 (direct)
 Funding to lab, current year: \ \$383,482 (total) \ \$251,325 (direct)
 The overall goal of the proposal is to develop technologies for the brain wide reconstruction of axonal arbors of molecularly defined neurons. The proposal aims at overcoming barriers in neuronal labeling, imaging and computation to achieve this goal, and to develop a technology platform that can be scaled to all neurons of the brain
- 2019-2020 **NIH**, Reproducible imaging-based brain growth charts for psychiatry NIH R01MH120482-01
 PI: T. Satterthwaite
 Role on Project: Co-Investigator
 Term: 01-Aug-2019 to 31-May-2020
 Funding to lab, entire period: \ \$362,861 (total) \ \$231,276 (direct)
 Funding to lab, current year: N/A
 Aggregate, harmonize, and analyze existing large-scale pediatric neuroimaging datasets to identify normative and clinical brain growth curves
- 2018 -- 2021 **NSF**, SemiSynBio: Collaborative Research: YeastOns: Neural Networks Implemented in Communication Yeast Cells NSF 1807369
 PI: E. Schulman
 Role on Project: Co-Investigator
 Term: 16-Jul-2018 to 30-Jun-2021
 Funding to lab, entire period: \ \$263,942 (total) \ \$172,971 (direct)
 Funding to lab, current year: \ \$87,980 (total) \ \$57,657 (direct)
 Provide neuroscience and machine learning expertise to guide the design of the computational learning capabilities of the system
- 2018 -- 2020 **Schmidt Science Foundation**, Connectome Coding at the Synaptic Scale Nascent Innovation Grant 128503
 PI: J. Vogelstein
 Role on Project: Principal Investigator
 Term: 01-Jan-2018 to 31-Dec-2020
 Funding to lab, entire period: \ \$250,000 (total)
 Funding to lab, current year: N/A
 Study learning and plasticity at an unprecedented scale, revealing the dynamics of large populations of synapses comprising an entire local cortical circuit. No previously conducted experiment could answer the questions about the dynamics of large populations of synapses, which is crucial to understanding the learning process
- 2017 -- 2021 **DARPA**, Continual Learning Across Synapses, Circuits, and Brain Areas FA8650-18-2-7834

- PI: A. Tolias
 Role on Project: Co-Investigator
 Term: 01-Nov-2017 to 30-Oct-2021
 Funding to lab, entire period: \\$796,715 (total) \\$486,666 (direct)
 Funding to lab, current year: \\$199,179 (total) \\$121,667 (direct)
 Develop the pre-processing analysis pipeline for the imaging data collected in this project
- 2017 -- 2021 **DARPA**, Lifelong Learning Forests FA8650-18-2-7834
 PI: J. Vogelstein
 Role on Project: Principal Investigator
 Term: 01-Nov-2017 to 31-Oct-2021
 Funding to lab, entire period: \\$1,839,308 (total) \\$1,123,474 (direct)
 Funding to lab, current year: \\$199,179 (total) \\$121,667 (direct)
 Lifelong Learning Forests (L2Fs) will learn continuously, selectively adapting to new environments and circumstances utilizing top-down feedback to impact low-level processing, with provable statistical guarantees, while maintaining computational tractability at scale
- 2017 -- 2022 **NIH**, Sensorimotor processing, decision making, and internal states: towards a realistic multiscale circuit model of the larval zebrafish brain NIH 1U19NS104653-01
 PI: F. Engert
 Role on Project: Co-Investigator
 Term: 01-Sep-2017 to 31-Aug-2022
 Funding to lab, entire period: \\$1,050,000 (total) \\$655,206 (direct) (JHU sub-award)
 Funding to lab, current year: \\$210,000 (total) \\$131,041 (direct)
 Generate a realistic multiscale circuit model of the larval zebrafish's brain – the multiscale virtual fish (MSVF). The model will span spatial ranges from the nanoscale at the synaptic level, to local microcircuits to inter-area connectivity - and its ultimate purpose is to explain and simulate the quantitative and qualitative nature of behavioral output across various timescales
- 2017 -- 2020 **NSF**, NeuroNex Innovation Award: Towards Automatic Analysis of Multi-Terabyte Cleared Brains NSF 1707298
 PI: J. Vogelstein
 Role on Project: Principal Investigator
 Term: 01-Sep-2017 to 31-Aug-2020 (No Cost Extension)
 Funding to lab, entire period: \\$959,999 (total) \\$588,758 (direct)
 Funding to lab, current year: \\$320,000 (total) \\$196,252 (direct)
 We propose to lower the barrier to connecting data to analyses and models by providing a coherent cloud computational ecosystem that minimizes current bottlenecks in the scientific process
- 2017 -- 2020 **NIH**, CRCNS US-German Res Prop: functional computational anatomy of the auditory cortex NIH 1R01DC016784-01
 PI: J. MRatnanather
 Role on Project: Co-Investigator
 Term: 01-Jul-2017 to 30-Jun-2020
 Funding to lab, entire period: \\$747,143 (total) \\$458,519 (direct)
 Funding to lab, current year: N/A
 Create a robust computational framework for analyzing the cortical ribbon in a specific region: the auditory cortex
- 2017 -- 2020 **NSF**, Multiscale Generalized Correlation: A Unified Distance-Based Correlation Measure for Dependence Discovery NSF 1921310
 PI: S. Cencheng
 Role on Project: Co-Investigator
 Term: 01-May-2017 to 30-Apr-2020
 Funding to lab, entire period: \\$200,000 (total) \\$124,189 (direct)
 Funding to lab, current year: N/A

Establish a unified methodology framework for statistical testing in high-dimensional, noisy, big data, through theoretical advancements, comprehensive simulations, and real data experiments

2017 -- 2019 **NSF, NeuroNex Technology Hub: Towards the International Brain Station for Accelerating and Democratizing Neuroscience Data Analysis and Modeling** NSF 16-569

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 2017 to 2019

Funding to lab, entire period: \ \$246,773

Funding to lab, current year: N/A

We propose to lower the barrier to connecting data to analyses and models by providing a coherent cloud computational ecosystem that minimizes current bottlenecks in the scientific process

2017 -- 2018 **The Kavli Foundation, The International Brain Station** 90071826

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 2017 to 2018

Funding to lab, entire period: \ \$50,000 (total) \ \$50,000 (direct)

Funding to lab, current year: N/A

Take the first few steps towards building the international brain station

2017 -- 2018 **NSF, Brain Comp Infra: EAGER: BrainLab CI: Collaborative, Community Experiments** ACI-1649880

PI: B. Miller

Role on Project: Co-Investigator

Term: 2017 to 2018

Funding to lab, entire period: \ \$294,599 (total) \ \$180,736 (direct)

Funding to lab, current year: N/A

The BrainLab CI prototype system will deploy an experimental-management infrastructure that allows users to construct community-wide experiments that implement data and metadata controls on the inclusion and exclusion of data

2017 -- 2018 **DARPA, The Brain Ark** 90076467

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 2017 to 2018

Funding to lab, entire period: \ \$92,376 (total) \ \$56,499.08 (direct)

Funding to lab, current year: N/A

Characterize the statistical properties of the individual graphs, to identify circuit motifs, both that specialize in a species specific fashion, and that are preserved across species. As a test, will compare the connectomes of sea lions and coyotes

2016 -- 2020 **DARPA, D3M: What Would Tukey Do?** FA8750-17-2-0112

PI: C. Priebe

Role on Project: Co-Investigator

Term: 01-Oct-2016 to 30-Sep-2020

Funding to lab, entire period: \ \$4,406,360 (total) \ \$2,746,050 (direct)

Funding to lab, current year: N/A

Develop theory and methods for generating a discoverable archive of data modeling primitives and for automatically selecting model primitives and for composing selected primitives into complex modeling pipelines based on user-specified data and outcome(s) of interest

2016 -- 2019 **NSF, A Scientific Planning Workshop for Coordinating Brain Research Around the Globe** NIH RFA-MH-19-148

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 2016 to 2019

Funding to lab, entire period: \ \$97,950 (total) \ \$97,950 (direct)

Funding to lab, current year:

This travel grant is for the expressed purposes of gathering researchers from around the globe to discuss the new way to further brain research during part one of a two day conference

2016 -- 2019 **NSF**, A Scientific Planning Workshop for Coordinating Brain Research Around the Globe NSF 1637376

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 2016 to 2019

Funding to lab, entire period: \\$16,327 (total) \\$14,491 (direct)

Funding to lab, current year: N/A

This travel grant is for the expressed purposes of gathering researchers from around the globe to further discuss advancements in brain research during the second part of a two day conference

2015 -- 2018 **DARPA**, From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from N66001-15-C-40401

PI: J. Vogelstein

Role on Project: Principal Investigator

Term: 01-Sep-2019 to 31-Aug-2022

Funding to lab, entire period: \\$2,103,091.60 (total) \\$1,298,204 (direct)

Funding to lab, current year: N/A

Multiple, large, multifarious brain imaging datasets are rapidly becoming standards in neuroscience. Yet, we lack the tools to analyze individual datasets, much less populations thereof. Therefore, we will develop theory and methods to analyze and otherwise make such data available

2014 -- 2016 **DARPA**, Scalable Grain Graph Analyses Using Big-Memory, High-IPS Compute Architectures N66001-14-1-4028

PI: R. Burns

Role on Project: Co-Investigator

Term: 2014 to 2016

Funding to lab, entire period: \\$39,882 (total) \\$28,272 (direct)

Funding to lab, current year: N/A

Build software infrastructure to enable analytics on billion node, terabyte sized networks using commodity hardware

2014 -- 2019 **NIH**, Synaptomes of Mouse and Man NIH R01NS092474

PI: S. Smith

Role on Project: Co-Investigator

Term: 2014 to 2019

Funding to lab, entire period: \\$756,417 (total) \\$491,341 (direct)

Funding to lab, current year: N/A

The major goals of this project are to discover the synaptic diversity and complexity in mammalian brains, specifically comparing and contrasting humans with mice, the leading experimental animal

2012 -- 2015 **National Institute of Biomedical Imaging and Bioengineering**, CRCNS: Data Sharing: The EM open Connectome Project RO1EB16411

PI: R. Burns

Role on Project: Co-Investigator

Term: 2012 to 2015

Funding to lab, entire period: \\$70,823 (total) \\$46,517 (direct)

Funding to lab, current year: N/A

Develop cyberinfrastructure to support management, visualization, storage, and analysis of large-scale electron microscopy data

Invited Talks

- [50] **J. T. Vogelstein**. "Surprise! IID++ Out of Distribution & Prospective Learning" *Simons Foundation, New York, NY*, 2023.

- [49] **B. D. Pedigo.** "Hypothesis testing for connectome comparisons: a statistical analysis of bilateral symmetry in an insect brain connectome" *Drexel University, Philadelphia, PA*, 2022.
- [48] **Ali Geisa.** "[Towards a theory of out-of-distribution learning](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [47] **E. Bridgeford.** "[Eliminating Accidental Deviations in Human Connectomics](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [46] **L. Chung.** "[Heritability of Human Structural Connectomes](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [45] **L. Dey.** "[Omnidirectional Lifelong Learning via Ensembling Representations](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [44] **J. T. Vogelstein.** "[FIRM Guiding Principles for scientific software development and stewardship](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [43] **J. T. Vogelstein.** "[Jovo++](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [42] **J. T. Vogelstein.** "[Reality Transurfing: Chapter 1](#)" *JHU BME, Baltimore, MD, USA*, 2021.
- [41] **J. T. Vogelstein.** "[Lifelong Learning: Theory and Practice](#)" *Darpa L2M PI Meeting*, 2021.
- [40] **J. T. Vogelstein.** "[Lifelong Learning and Beyond](#)" *Darpa L2M PI Meeting*, 2021.
- [39] **J. T. Vogelstein.** "[Lifelong Learning: Theory and Context](#)" *Darpa L2M PI Meeting*, 2021.
- [38] **J. T. Vogelstein.** "[Lifelong Learning: Theory and Practice and Coresets](#)" *Darpa L2M PI Meeting*, 2021.
- [37] **J. T. Vogelstein.** "Lifelong Learning" *North Carolina State University, Raleigh, NC, USA*, 2020.
- [36] **J. T. Vogelstein.** "Lifelong Learning" *Morgan State University, Baltimore, MD, USA*, 2020.
- [35] **J. T. Vogelstein.** "[Lifelong Learning: Moving Beyond Avoiding Catastrophic Forgetting](#)" *Johns Hopkins Mathematical Institute for Data Science, Baltimore, MD, USA*, 2020.
- [34] **J. T. Vogelstein.** "[Open Access to the Brain: a Computer "Connectome" Links Brain Images in Fine Detail](#)" *JHM Boot Camp, Baltimore, MD, USA*, 2019.
- [33] **J. T. Vogelstein.** "[Big Biomedical Data Science](#)" *Sol Goldman International Conference, Baltimore, MD, USA*, 2019.
- [32] **J. T. Vogelstein.** "[Journey to Here](#)" *JHU BMES talks, Baltimore, MD, USA*, 2019.
- [31] **J. T. Vogelstein.** "[NeuroData \(Science\)](#)" *Kavli, Baltimore, MD, USA*, 2019.
- [30] **J. T. Vogelstein.** "[NeuroData Tools](#)" *NeuroData Hackashop, Baltimore, MD, USA*, 2019.
- [29] **J. T. Vogelstein.** "[Biomedical Big Data and Data Science](#)" *JHU BME, Baltimore, MD, USA*, 2019.
- [28] **J. T. Vogelstein.** "[Data Intensive Brain Science](#)" *Kavli Neuroscience Discovery Institute, Baltimore, MD, USA*, 2018.
- [27] **J. T. Vogelstein.** "[Using Big Data Science to Understand What Goes On in our Heads](#)" *SOHOP Faculty Spotlight, Baltimore, MD, USA*, 2018.
- [26] **J. T. Vogelstein.** "[Engineering the Future of Medicine: Data Intensive Biomedical Science](#)" *Johns Hopkins University Biomedical Engineering, Baltimore, MD, USA*, 2018.
- [25] **J. T. Vogelstein.** "[Data Coordination and Data Resources for the BRAIN Initiative](#)" *4th Annual BRAIN Initiative Investigators Meeting, Rockville, MD, USA*, 2018.
- [24] **J. T. Vogelstein.** "[The International Brain Station \(TIBS\)](#)" *JHU BME and Tsinghua University, Baltimore, MD, USA*, 2017.
- [23] **J. T. Vogelstein.** "[Using Big Data Science to Understand What Goes on in Our Heads](#)" *SOHOP Faculty Spotlight, Baltimore, MD, USA*, 2017.
- [22] **J. T. Vogelstein.** "[Challenges and Opportunities in Big Data for Neuroscientists](#)" *Society for Neuroscience: DC Metro Area Chapter Keynote Address, Washington, DC, USA*, 2017.
- [21] **J. T. Vogelstein.** "[Opportunities and Challenges in Big Data Neuroscience](#)" *Society for Neuroscience, Washington D.C., USA*, 2017.
- [20] **J. T. Vogelstein.** "[NeuroStorm](#)" *Global Brain Workshop 2 JHU, Baltimore, MD, USA*, 2017.
- [19] **J. T. Vogelstein.** "[The International Brain Station \(TIBS\)](#)" *United Nations Global Brain Workshop Meeting, Baltimore, MD, USA*, 2016.

- [18] **J. T. Vogelstein.** "[Using Big Data Science to Understand What Goes on in Our Heads](#)" *SOHOP Faculty Spotlight, Baltimore, MD, USA, 2016.*
- [17] **J. T. Vogelstein.** "[The International Brain Station \(TIBS\)](#)" *Kavli Foundation, Baltimore, MD, USA, 2016.*
- [16] **J. T. Vogelstein.** "[NeuroData 2016](#)" *NeuroData Lab Retreat, 2016.*
- [15] **J. T. Vogelstein.** "[Global Brain Workshop 2016](#)" *Global Brain Workshop NSF+JHU at Kavli, Baltimore, MD, USA, 2016.*
- [14] **J. T. Vogelstein.** "[Global Brain Workshop 2016](#)" *Kavli Neuroscience Discovery Institute & Center for Imaging Science, Baltimore, MD, USA, 2016.*
- [13] **J. T. Vogelstein.** "[Learning a Data-Driven Nosology:Progress, Challenges & Opportunities](#)" *Kavli Neuroscience Discovery Institute & Center for Imaging Science, Baltimore, MD, USA, 2016.*
- [12] **J. T. Vogelstein.** "[NeuroData:Enabling Terascale Neuroscience](#)" *Kavli Neuroscience Discovery Institute & Center for Imaging Science, Baltimore, MD, USA, 2016.*
- [11] **J. T. Vogelstein.** "[NeuroData:Enabling Terascale Neuroscience](#)" *JHU Kavli Neuroscience Discovery Institute, Baltimore, MD, USA, 2016.*
- [10] **J. T. Vogelstein, M. I. Miller, and R. Hunganir.** "[Global Brain Workshop 2016](#)" *Kavli Neuroscience Discovery Institute & Center for Imaging Science @ JHU, Baltimore, MD, USA, 2016.*
- [9] **J. T. Vogelstein.** "[Special Symposium: Neuroscience in the 21st Century](#)" *Kavli, Baltimore, MD, USA, 2015.*
- [8] **J. T. Vogelstein.** "[Open Connectome Project: Lowering the Barrier to Entry of Big Data Neuroscience](#)" *Institute for Computational Medicine at Johns Hopkins University, Baltimore, MD, USA, 2015.*
- [7] **J. T. Vogelstein.** "[Open Source Platform for Heterogenous Brain Data](#)" *figshare, 2015.*
- [6] **J. T. Vogelstein.** "[Big \(Neuro\) Statistics](#)" *Kavli Salon, Chicago, IL, USA, 2014.*
- [5] **J. T. Vogelstein.** "[Open-Science Platform for Heterogeneous Brain Data: Opportunities and Challenges](#)" *Kavli, Baltimore, MD, USA, 2014.*
- [4] **J. T. Vogelstein.** "[Big \(Neuro\) Statistics](#)" *Kavli Salon, Baltimore, MD, USA, 2014.*
- [3] **J. T. Vogelstein.** "Decision Theoretic Approach to Statistical Inference" *Guest Lecture in Current Topics in Machine Learning, Johns Hopkins University, Baltimore, MD, USA, 2012.*
- [2] **J. T. Vogelstein.** "Once we get connectomes, what the $\% \backslash \# *$ are we going to do with them?" *Institute of Neuroinformatics, Boston, MA, USA, 2011.*
- [1] **J. T. Vogelstein.** "[Inferring spike times given typical time-series fluorescence observations](#)" *Department of Applied Mathematics and Statistics, Johns Hopkins University, Baltimore, MD, USA, 2008.*

Other Talks

- [78] **J. T. Vogelstein.** "[Probably Approximately Correct in the Future](#)" *Banff International Research Station for Mathematical Innovation and Discovery, Oaxaca, Mexico, 2024.*
- [77] **Qingyang Wang.** "Why do networks need negative weights?" *None, 2022.*
- [76] **E. Bridgeford.** "[Simulating a Realization of a Stochastic Block Model](#)" *ABCD-ReproNim Program, 2022.*
- [75] **E. Bridgeford.** "[Community Detection and Model Selection in SBMs](#)" *ABCD-ReproNim Program, 2022.*
- [74] **S. Panda, C. Shen, and J. T. Vogelstein.** "Nonparametric MANOVA via Independence Testing" *Global Young Scientists Summit, 2022.*
- [73] **B. D. Pedigo, M. Winding, M. Zlatic, A. Cardona, C. E. Priebe, and J. T. Vogelstein.** "[Maggot brain, mirror image? A statistical analysis of bilateral symmetry in an insect brain connectome](#)" *Neuromatch 4.0, 2021.*
- [72] **B. D. Pedigo and J. T. Vogelstein.** "graspologic: A python package for rigorous statistical analysis of populations of attributed connectomes" *BRAIN Informatics Webinar, 2021.*
- [71] **S. Panda, C. Shen, and J. T. Vogelstein.** "[Nonparametric MANOVA via Independence Testing](#)" *BRAIN Initiative Meeting, 2021.*
- [70] **B. D. Pedigo.** "[Network data science for bilateral brains: Applications in the larval Drosophila connectome](#)" *NIH & DOE Brain Connectivity Workshop Series, 2021.*

- [69] **J. T. Vogelstein.** "[OOD DARPA Presentation](#)" *DARPA*, 2021.
- [68] **J. T. Vogelstein.** "[Lifelong Learning and Beyond](#)" *DARPA L2M*, 2021.
- [67] **J. Vogelstein.** "[The role of the connectome in achieving artificial general intelligence](#)" *Yale School of Medicine, Whistler Scientific Workshop, Whistler, BC, Canada*, 2020.
- [66] **J. Vogelstein.** "[Lifelong Learning via Ensembling General Representations](#)" *None*, 2020.
- [65] H. Helm, R. Mehta, C. E. Priebe, R. Arora, and **J. T. Vogelstein.** "[A Theory and Practice of Lifelong Learnable Forest](#)" *Kavli Neural Systems Institute, Rockefeller University, New York City, NY, USA*, 2020.
- [64] **J. T. Vogelstein.** "[Lifelong Learning](#)" *Columbia University, New York City, NY, USA*, 2020.
- [63] **J. T. Vogelstein.** "[Ailey in an Hour: \(A "Soup-to-Nuts" Pipeline for Analysis of Whole Cleared Brain Data\)](#)" *NeuroNex, Cornell University, Ithaca, NY, USA*, 2019.
- [62] **J. T. Vogelstein**, H. Helm, R. Mehta, C. E. Priebe, and R. Arora. "[A Theory and Practice of the Lifelong Learnable](#)" *L2M*, 2019.
- [61] **J. T. Vogelstein** and R. Burns. "[Data Science Core](#)" *Harvard University, Carmridge, MA, USA*, 2019.
- [60] J. Chung. "[Statistical Methods for Population of Connectomes](#)" *Organization of Human Brain Mapping, Rome, Italy*, 2019.
- [59] J. Browne. "[Forest Packing: Fast Parallel, Decision Forests](#)" *SIAM International Conference on Data Mining, Calgary, Alberta, Canada*, 2019.
- [58] D. Tward. "[Brain mapping tools for neuroscience research](#)" *NeuroNex, Cornell University, Ithaca, NY, USA*, 2019.
- [57] **J. T. Vogelstein.** "[Big Data and the Life Sciences](#)" *Sloan Foundation, New York City, NY, USA*, 2019.
- [56] **J. T. Vogelstein.** "[Statistical Foundations For Connectomics](#)" *Max Planck / HHMI Connectomics Meeting, Berlin, Germany*, 2019.
- [55] **J. T. Vogelstein.** "[Connectal Coding](#)" *Dipy Workshop, Bloomington, Indiana, USA*, 2019.
- [54] **J. T. Vogelstein.** "[Lifelong Learning Forests](#)" *L2M*, 2019.
- [53] **J. T. Vogelstein.** "[Connectome Coding](#)" *Society for Neuroscience, San Diego, CA, USA*, 2018.
- [52] **J. T. Vogelstein.** "[NeuroData: A Community-developed open-source computational ecosystem for big neuro data](#)" *NeuroNex, Cornell University, Ithaca, NY, USA*, 2018.
- [51] **J. T. Vogelstein.** "[A Community-Developed Open-Source Computational Ecosystem for Big Neuro Data](#)" *Princeton University, Princeton, NJ, USA*, 2018.
- [50] **J. T. Vogelstein.** "[Multiscale Graph Correlation: A Knowledge Representation System for Discovering Latent Geometric Structure](#)" *DARPA SIMPLEX PI Review Meeting, New York City, NY, USA*, 2018.
- [49] E. W. Bridgeford. "[A High-Throughput Pipeline Identifies Robust Connectomes but Troublesome Variability](#)" *Organization of Human Brain Mapping, Suntec, Singapore*, 2018.
- [48] E. Perlman. "[NeuroData: Embracing Open Source for Big Data Neuroscience](#)" *NSF NeuroNex Workshop on Super 3DEM, Austin, TX, USA*, 2018.
- [47] **J. T. Vogelstein** and V. Chandrashekar. "[NeuroNex + Stanford](#)" *NeuroNex-Stanford, Stanford, CA, USA*, 2018.
- [46] G. Kiar. "Connectome Coding: what is it, how do we do it, and why do we care?" *Data science in Neuroscience Symposium, Suntec, Singapore*, 2018.
- [45] **J. T. Vogelstein.** "[Lifelong Learning Forests](#)" *Darpa L2M PI Meeting, Arlington, VA, USA*, 2018.
- [44] **J. T. Vogelstein.** "[Discovering Relationships and their Geometry Across Disparate Data Modalities](#)" *Yale University, New Haven, CT, USA*, 2018.
- [43] **J. T. Vogelstein.** "[Connectome Coding](#)" *Schmidt Sciences*, 2017.
- [42] **J. T. Vogelstein.** "[Discovering Relationships and their Geometry Across Disparate Data Modalities](#)" *Stanford University, Stanford, CA, US*, 2017.
- [41] D. Mhembere. "[knor: a NUMA-Optimized In-Memory, Distributed and Semi-External-Memory k-means library](#)" *HPDC, Washington DC, USA*, 2017.
- [40] G. Kiar. "Science in the Cloud (SIC): A use-case in MRI Connectomics" *Open Science Special Interest Group, Oxford University, Oxford, England*, 2017.

- [39] [Y. Lee](#). "[Network Dependence Testing via Diffusion Maps and Distance-Based Correlations](#)" *Joint Statistical Meetings, Baltimore, MD, USA*, 2017.
- [38] [T. M. Tomita](#). "ROFLMAO: Robust Oblique Forests with Linear Matrix Operations" *SIAM International Conference on Data Mining, Houston, TX, USA*, 2017. [[DOI](#)]
- [37] **J. T. Vogelstein**. "NeuroData: Enabling Terascale Neuroscience for Everyone" *3rd Annual BRAIN Initiative Investigators Meeting, Bethesda, MD, USA*, 2016.
- [36] [C. Shen](#). "Multiscale Generalized Correlation" *Joint Statistical Meeting, Chicago, IL, USA*, 2016.
- [35] **J. T. Vogelstein**. "[NeuroData: Enabling Terascale Neuroscience for Everyone](#)" *Keystone Symposia: State of the Brain, Alpbach, Austria*, 2016.
- [34] [C. Shen](#). "Local Distance Correlation for Testing Independence" *Temple University, Philadelphia, PA, USA*, 2015.
- [33] **J. T. Vogelstein**. "[Law of Large Graphs](#)" *DARPA Graphs, Columbia University, New York City, NY, USA*, 2015.
- [32] **J. T. Vogelstein**. "[Research Computing Support for Neuroscience and Other Life Sciences](#)" *CASC, Aachen, Germany*, 2015.
- [31] **J. T. Vogelstein**. "[From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from Heterogeneous Data](#)" *SIMPLEX Kickoff, New York City, NY, USA*, 2015.
- [30] **J. T. Vogelstein**. "[From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from Heterogeneous Data: Part 1](#)" *DARPA SIMPLEX PI Meeting, New York City, NY, USA*, 2015.
- [29] **J. T. Vogelstein**. "[From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from Heterogeneous Data: Part 2](#)" *DARPA SIMPLEX PI Meeting, New York City, NY, USA*, 2015.
- [28] **J. T. Vogelstein**. "[Opportunities and Challenges in Big Data Neuroscience](#)" *DoE*, 2015.
- [27] **J. T. Vogelstein** and L. Paninski. "[Spike inference from calcium imaging using sequential Monte Carlo methods](#)" *AMSI Program on Sequential Monte Carlo*, 2015.
- [26] **J. T. Vogelstein**. "[big time \(series data in neuroscience\)](#)" *figshare*, 2015.
- [25] **J. T. Vogelstein**. "[Top Challenges of Big Data Neuroscience](#)" *BRAIN Initiative Workshop, Bethesda, MD, USA*, 2014.
- [24] **J. T. Vogelstein**. "[Big Statistics for Brain Sciences](#)" *Baylor College of Medicine, Department of Neuroscience, Houston, TX, USA*, 2014.
- [23] **J. T. Vogelstein**. "[Beyond Little Neuroscience](#)" *Beyond Optogenetics workshop at Cosyne, Salt Lake City, UT, USA*, 2013.
- [22] **J. T. Vogelstein**. "Statistical Inference on Graphs" *University of Michigan, Ann Arbor, Michigan*, 2013.
- [21] **J. T. Vogelstein**. "Statistical Inference on Graphs" *Scientific Computing Institute, University of Utah, Salt Lake City, UT, USA*, 2013.
- [20] **J. T. Vogelstein**. "[Open Problems in Neuropsychiatry](#)" *Data Seminar, Duke University, Durham, NC, USA*, 2013.
- [19] **J. T. Vogelstein**. "[Statistical Models and Inference for big Brain-Graphs](#)" *NIPS Workshop on Acquiring and analyzing the activity of large neural ensembles, Lake Tahoe, NV, USA*, 2013.
- [18] **J. T. Vogelstein**. "[BIG NEURO](#)" *Theory and Neurobiology, Duke University, Durham, NC, USA*, 2012.
- [17] **J. T. Vogelstein**. "Open Connectome Project" *Academic Medical Center, Amsterdam, Netherlands*, 2012.
- [16] **J. T. Vogelstein**. "[Are mental properties supervenient on brain properties](#)" *None*, 2011.
- [15] **J. T. Vogelstein**. "What can Translational neuroimaging Research do for Clinical Practice" *Child Mind Institute, New York City, NY, USA*, 2011.
- [14] **J. T. Vogelstein**. "[Statistical Connectomics](#)" *Harvard University Connectomics Labs, Cambridge, MA, USA*, 2011.
- [13] **J. T. Vogelstein**. "Once we get connectomes, what the $\% \#$ are we going to do with them?" *Krasnow Institute for Advanced Study at George Mason Univeristy, Fairfax, VA, USA*, 2011.
- [12] **J. T. Vogelstein**. "[Consistent Connectome Classification](#)" *Math/Bio Seminar, Duke University, Durham, NC, USA*, 2011.

- [11] **J. T. Vogelstein.** "[Connectome Classification: Statistical Graph Theoretic Methods for Analysis of MR-Connectome Data](#)" *Organization for Human Brain Mapping, Quebec City, Canada, 2011.*
- [10] **J. T. Vogelstein.** "[Consistent Graph Classification](#)" *Guest Lecture in Deisseroth Lab, Stanford University, Stanford, CA, USA, 2011.*
- [9] **J. T. Vogelstein.** "[Neurocognitive Graph Theory](#)" *National Security Agency, 2009.*
- [8] **J. T. Vogelstein.** "[OOPSI: A Family of Optimal Optical Spike Inference Algorithms for Inferring Neural Connectivity from Population Calcium Imaging](#)" *Dissertation Defense, Johns Hopkins University, Baltimore, MD, USA, 2009.*
- [7] **J. T. Vogelstein.** "Sequential Monte Carlo in Neuroscience" *SAMSI Program on Sequential Monte Carlo, Tracking Working Group, 2009.*
- [6] **J. T. Vogelstein.** "[Towards Inference and Analysis of Neural Circuits Inferred from Population Calcium Imaging](#)" *Guest Lecture in Schnitzer Lab, Stanford University, Stanford, CA, USA, 2009.*
- [5] **J. T. Vogelstein.** "[Towards Inferring Neural Circuits from Calcium Imaging](#)" *Guest Lecture in Yuste Lab, Columbia University, New York City, NY, USA, 2009.*
- [4] **J. T. Vogelstein.** "Inferring Spike Trains Given Calcium-Sensitive Fluorescence Observations" *Statistical Analysis of Neural Data, Pittsburgh, PA, USA, 2008.*
- [3] **J. T. Vogelstein.** "[Inferring spike trains from Calcium Imaging](#)" *Redwood Center for Theoretical Neuroscience, University of California, Berkeley, CA, USA, 2008.*
- [2] **J. T. Vogelstein.** "[Inferring spike trains from Calcium Imaging](#)" *Cambridge University, Gatsby Unit, and University College London, Cambridge, England, 2008.*
- [1] **J. T. Vogelstein.** "Model based optimal inference of spike times and calcium dynamics govern noisy and intermittent calcium-fluorescence observations" *Neurotheory Center of Columbia University, New York City, NY, USA, 2007.*

Abstracts/Poster Presentations

- [70] **L. A. De Silva** and **J. T. Vogelstein.** "Kernel density networks" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.*
- [69] **J. Dey, W. LeVine, L. A. De Silva, A. Geisa,** and **J. T. Vogelstein.** "Out-of-distribution Detection Using Kernel Density Polytopes" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.* [[URL](#)]
- [68] **J. J. How, G. Schuhknecht, M. B. Ahrens, F. Engert,** and **J. T. Vogelstein.** "Transfer learning in larval zebrafish (*Danio rerio*)" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.* [[URL](#)]
- [67] **B. D. Pedigo, M. Powell, E. W. Bridgeford,** M. Winding, C. E. Priebe, and **J. T. Vogelstein.** "Generative network modeling reveals a first quantitative definition of bilateral symmetry exhibited by a whole insect brain connectome" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.* [[URL](#)]
- [66] **J. M. Shin,** L. Isik, and **J. T. Vogelstein.** "Measure of human-likeness in tree-based ensemble model and artificial neural networks" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.* [[URL](#)]
- [65] **H. Xu** and **J. T. Vogelstein.** "Simplest streaming trees" *From Neuroscience to Artificially Intelligent Systems (NAISys), Cold Spring Harbor Laboratory, NY, USA, 2022.*
- [64] **E. W. Bridgeford, M. Powell, A. Alyakin,** B. Caffo, and **J. T. Vogelstein.** "Batch Effects are Causal Effects: Applications in Human Functional Connectomes" *Neuromatch 3, 2020.*
- [63] **I. Chung, I. Dey, G. Kiar,** C. E. Priebe, and **J. T. Vogelstein.** "Human Structural Connectomes are Heritable" *Neuromatch 3, 2020.*
- [62] **V. Gopalakrishnan, I. Chung, E. Bridgeford, I. Arroyo, B. D. Pedigo,** C. E. Priebe, and **J. T. Vogelstein.** "Statistical Methods for Multiscale Comparative Connectomics" *Neuromatch 3, 2020.*

- [61] [B. D. Pedigo](#), M. Winding, T. Orujlu, M. Zlatic, Cardona, Albert, C. E. Priebe, and **J. T. Vogelstein**. "A quantitative comparison of a complete connectome to artificial intelligence architectures" *NAISys, Cold Spring Harbor, NY, USA*, 2020.
- [60] [B. D. Pedigo](#), M. Winding, [A. Saad-Eldin](#), T. Liu, A. Cardona, M. Zlatic, C. E. Priebe, and **J. T. Vogelstein**. "Statistical tools for nanoscale connectomics: clustering neurons in Drosophila larva brain and other applications" *Neuromatch 3*, 2020.
- [59] [R. Perry](#), J. Zorn, S. Czajko, D. S. Margulies, and **J. T. Vogelstein**. "Permutation-corrected independence testing for high-dimensional fMRI data" *Neuromatch 3*, 2020.
- [58] [A. Saad-Eldin](#), [B. D. Pedigo](#), [Y. Park](#), C. E. Priebe, and **J. T. Vogelstein**. "NeuroGraphMatch" *Neuromatch 3*, 2020.
- [57] **J. T. Vogelstein**, [H. Helm](#), [B. D. Pedigo](#), [R. Mehta](#), C. E. Priebe, and C. White. "A Biological Implementation of Lifelong Learning in the Pursuit of Artificial General Intelligence" *NAISys, Cold Spring Harbor, NY, USA*, 2020.
- [56] J. Cho, A. Korchmaros, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Developing a gradient flow framework to guide the optimization of reliability for the study of individual differences" *OHBM and Resting State, Fairmont, Dallas, TX, USA*, 2020.
- [55] J. Cho, A. Korchmaros, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Impact of Concatenating fMRI Data on reliability for Functional Connectomics" *OHBM and Resting State, Fairmont, Dallas, TX, USA*, 2020.
- [54] J. Hecheng, J. S. Ramirez, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Assessing functional connectivity beyond Pearson's correlation" *Fairmont, Dallas, TX, USA*, 2020.
- [53] X. Li, J. Cho, M. P. Milham, and T. Xu. "Improving brain-behavior prediction using individual-specific components from connectivity-based shared response model" *Resting State, Fairmont, Dallas, TX, USA*, 2020.
- [52] [E. Bridgeford](#) and **J. T. Vogelstein**. "Optimal Experimental Design for Big Data: Applications in Brain Imaging" *OHBM*, 2020.
- [51] J. Cho, A. Korchmaros, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Impact of Concatenating fMRI Data on reliability for Functional Connectomics" *OHBM and Resting State, Fairmont, Dallas, TX, USA*, 2020.
- [50] J. Cho, A. Korchmaros, **J. T. Vogelstein**, M. P. Milham, and T. Xu. "Developing a gradient flow framework to guide the optimization of reliability for the study of individual differences" *OHBM and Resting State, Fairmont, Dallas, TX, USA*, 2020.
- [49] [R. Perry](#) and **J. T. Vogelstein**. "Identifying Differences Between Expert and Novice Meditator Brain Scans via Multiview Embedding" *OHBM*, 2020.
- [48] B. Falk and **J. T. Vogelstein**. "NeuroData's Open Data Cloud Ecosystem" *Harvard University, Cambridge, MA, USA*, 2019. [[URL](#)]
- [47] [J. Chung](#), [B. D. Pedigo](#), C. E. Priebe, and **J. T. Vogelstein**. "Clustering Multi-Modal Connectomes" *OHBM, Rome Italy*, 2019. [[URL](#)]
- [46] [J. Chung](#), [B. D. Pedigo](#), C. E. Priebe, and **J. T. Vogelstein**. "Human Structural Connectomes are Heritable" *OHBM, Rome Italy*, 2019. [[URL](#)]
- [45] [I. Browne](#), [D. Mhembere](#), [T. M. Tomita](#), **J. T. Vogelstein**, and R. Burns. "Forest Packing: Fast Parallel Decision Forests" *SIAM International Conference on Data Mining, Calgary, Alberta, Canada*, 2019. [[URL](#)]
- [44] [B. D. Pedigo](#), [J. Chung](#), [E. W. Bridgeford](#), [B. Varjavand](#), C. E. Priebe, and **J. T. Vogelstein**. "GraSPy: an Open Source Python Package for Statistical Connectomics" *Max Planck /HHMI Connectomics Meeting Berlin, Germany*, 2019. [[URL](#)]
- [43] [A. Baden](#), E. Perlman, F. Collman, S. Smith, **J. T. Vogelstein**, and R. Burns. "Processing and Analyzing Terascale Conjugate Array Tomography Data" *Berlin, Germany*, 2017. [[URL](#)]
- [42] P. Perlman and E. Eric. "NEURODATA: ENABLING BIG DATA NEUROSCIENCE" *Kavli, Baltimore, MD, USA*, 2017. [[URL](#)]
- [41] S. J. Smith, R. Burns, M. Chevillet, E. Lein, G. Sapiro, W. Seeley, J. Trimmer, **J. T. Vogelstein**, and R. Weinberg. "The Open Synaptome Project: Toward a Microscopy-Based Platform for Single-synapse Analysis of Diverse Populations of CNS Synapses" *Society for Neuroscience, Chicago, IL, USA*, 2015. [[URL](#)]

- [40] **V. Vogelstein** and J. T. "Open Connectome Project NeuroData: Enabling Data-Driven Neuroscience at Scale" *Society for Neuroscience, Chicago, IL, USA, 2015.* [\[URL\]](#)
- [39] **S. Chen**, **J. T. Vogelstein**, S. Lee, M. Lindquist, and B. Caffo. "High Dimensional State Space Model with L-1 and L-2 Penalties" *ENAR 2015, Miami, FL, USA, 2015.* [\[URL\]](#)
- [38] **S. Chen**, K. Liu, Y. Yuguang, L. Seonjoo, M. Lindquist, B. Caffo, and **J. T. Vogelstein**. "A Sparse High Dimensional State-Space Model with an Application to Neuroimaging Data" *Figshare, 2015.* [\[URL\]](#)
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- [34] **J. T. Vogelstein** and C. E. Priebe. "Nonparametric Two-Sample Testing on Graph-Valued Data." *Duke Workshop on Sensing and Analysis of HighDimensional Data, Durham, NC, USA, 2013.*
- [33] D. Koutra, Y. Gong, S. Ryman, R. Jung, **J. T. Vogelstein**, and C. Faloutsos. "Are All Brains Wired Equally?" *Proceedings of the 19th Annual Meeting of the Organization for Human Brain Mapping (OHBM), Seattle, WA, USA, (4.2)1:3, 2013.* [\[URL\]](#)
- [32] **M. Mhembe**, **D. A. Burns**, R. A. Vogelstein, J. T. A. Vogelstein, R. J. A. Sussman, D. A. Priebe, C. A. Jung, R. Rex, A. Ryman, and S. Sefhira. "Multivariate Invariants from Massive Brain-Graphs" *OHBM, Seattle, WA, USA, 2013.* [\[URL\]](#)
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- [30] **G. Roncal**, W. A. Kleissas, D. M. A. Burck, J. M. A. Manavalan, **P. A. Vogelstein**, J. T. A. Perlman, E. A. Burns, R. A. Vogelstein, and R. Jacob. "Towards a Fully Automatic Pipeline for Connectome Estimation from High-Resolution EM Data" *OHBM, Seattle, WA, USA, 2013.* [\[URL\]](#)
- [29] D. L. Sussman, **D. Mhembe**, S. Ryman, R. Jung, R. J. Vogelstein, R. Burns, **J. T. Vogelstein**, and C. E. Priebe. "Massive Diffusion MRI Graph Structure Preserves Spatial Information" *OHBM, Seattle, WA, USA, 2013.* [\[URL\]](#)
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- [25] **J. T. Vogelstein** and others. "Anomaly Screening and Clustering of Multi-Object Movies via Multiscale Structure Learning" *DARPA XDATA Colloquium, 2013.*
- [24] **V. Vogelstein**, J. A. Sikka, S. A. Cheung, B. A. Khanuja, R. A. Li, Q. A. Y. C, .. A. Priebe, C. A. Calhoun, V. A. Vogelstein, R. J. A. Milham, M. A. Burns, and R. R.. "BRAINSTORM towards clinically and scientifically useful neuroimaging analytics" *Neuroinformatics, Munich, Germany, 2012.* [\[URL\]](#)
- [23] **V. Vogelstein**, J. T. A. Bock, **D. A. Gray**, W. A. Sussman, D. A. Burns, R. A. Kleissas, D. A. Marchette, D. A. Fishkind, D. E. A. Tang, M. A. Hager, G. A. Vogelstein, and R. J. A. P. C. E.. "Statistical Connectomics" *Janelia Farm conference, Statistical Inference and Neuroscience, Loudoun County, VA, USA, 2012.* [\[URL\]](#)

- [22] **G. Gray**, W. R. A. Kleissas, D. M. A. Burck, **J. M. A. Vogelstein**, J. T. A. Perlman, E. A. Burlina, P. M. A. Burns, and R. A. V. R. Jacob. "Towards a Fully Automatic Pipeline for Connectome Estimation from High-Resolution EM Data" *Cold Spring Harbor Laboratory, Neuronal Circuits, Cold Spring Harbor, NY, USA*, 2012. [\[URL\]](#)
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- [20] **J. T. Vogelstein**, D. E. Fishkind, D. L. Sussman, and C. E. Priebe. "Large graph classification: theory and statistical connectomics applications" *IMA conference on Large Graphs, University of Minnesota, Minneapolis, MN, USA*, 2011. [\[URL\]](#)
- [19] **J. T. Vogelstein**, **W. Gray**, J. G. Martin, G. C. Coppersmith, M. Dredze, J. Bogovic, J. L. Prince, S. M. Resnick, C. E. Priebe, and R. J. Vogelstein. "Connectome Classification using statistical graph theory and machine learning" *Society for Neuroscience, Washington DC, USA*, 2011. [\[URL\]](#)
- [18] **J. T. Vogelstein**, D. L. Sussman, M. Tang, D. E. Fishkind, and C. E. Priebe. "Dot product embedding in large (errorfully observed) graphs with applications in statistical connectomics" *IMA conference on Large Graphs, University of Minnesota, Minneapolis, MN, USA*, 2011.
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- [16] **J. T. Vogelstein**, **W. R. Gray**, R. J. Vogelstein, J. Bogovic, S. Resnick, J. Prince, and C. E. Priebe. "Connectome Classification: Statistical Graph Theoretic Methods for Analysis of MR-Connectome Data" *Organization for Human Brain Mapping, Quebec City, Canada*, 2011. [\[URL\]](#)
- [15] **W. R. Gray**, **J. T. Vogelstein**, J. Bogovic, A. Carass, J. L. Prince, B. Landman, D. Pham, L. Ferrucci, S. M. Resnick, C. E. Priebe, and R. J. Vogelstein. "Graph-Theoretical Methods for Statistical Inference on MR Connectome Data" *DARPA Neural Engineering, Science and Technology Forum, San Diego, CA, USA*, 2010. [\[URL\]](#)
- [14] **J. T. Vogelstein**, C. E. Priebe, R. Burns, R. J. Vogelstein, and J. Lichtman. "Measuring and reconstructing the brain at the synaptic scale: towards a biofidelic human brain in silico" *DARPA Neural Engineering, Science and Technology Forum, San Diego, CA, USA*, 2010. [\[URL\]](#)
- [13] **J. T. Vogelstein**, J. Bogovic, A. Carass, **W. Gray**, J. Prince, B. Landman, D. Pham, L. Ferrucci, S. Resnick, C. E. Priebe, and R. Vogelstein. "Graph-Theoretical Methods for Statistical Inference on MR Connectome Data" *Organization for Human Brain Mapping, Barcelona, Spain*, 2010. [\[URL\]](#)
- [12] **J. T. Vogelstein**, R. Vogelstein, and C. E. Priebe. "A Neurocognitive Graph-Theoretical Approach to Understanding the Relationship Between Minds and Brains" *CSHL conference on Neural Circuits, Cold Shore Harbor, NY, USA*, 2010. [\[URL\]](#)
- [11] **J. T. Vogelstein**, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. "Towards Confirming Neural Circuit Inference from Population Calcium Imaging" *COSYNE, Salt Lake City, UT, USA*, 2010. [\[URL\]](#)
- [10] **J. T. Vogelstein**, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. "Towards Inferring Neural Circuit Inference from Population Calcium Imaging" *COSYNE, Salt Lake City, UT, USA*, 2010. [\[URL\]](#)
- [9] **J. T. Vogelstein**, Y. Mishchchenko, A. M. Packer, T. A. Machado, R. Yuste, and L. Paninski. "Towards Confirming Neural Circuits from Population Calcium Imaging" *NIPS Workshop on Connectivity Inference in Neuroimaging, Whistler, BC, Canada*, 2009. [\[URL\]](#)
- [8] **J. T. Vogelstein**, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. "Towards Inferring Neural Circuit Inference from Population Calcium Imaging" *COSYNE, Salt Lake City, UT, USA*, 2009. [\[URL\]](#)
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- [6] **J. T. Vogelstein**, B. Babadi, and L. Paninski. "Model-Based Optimal Inference of Spike-Times and Calcium Dynamics given Noisy and Intermittent Calcium-Fluorescence Imaging" *COSYNE, Salt Lake City, UT, USA*, 2008. [\[URL\]](#)
- [5] **J. T. Vogelstein** and L. Paninski. "Inferring Spike Trains, Learning Tuning Curves, and Estimating Connectivity from Calcium Imaging" *Integrative Approaches to Brain Complexity*, 2008. [\[URL\]](#)

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- [3] **J. T. Vogelstein**, K. Zhang, B. Jedynek, and L. Paninski. "Maximum Likelihood Inference of Neural Dynamics under Noisy and Intermittent Observations using Sequential Monte Carlo EM Algorithms" *COSYNE, Salt Lake City, UT, USA*, 2007. [\[URL\]](#)
- [2] **J. T. Vogelstein** and K. Zhang. "A novel theory for simultaneous representation of multiple dynamic states in hippocampus" *Society for Neuroscience, San Diego, CA, USA*, 2004.
- [1] **J. T. Vogelstein**, L. Snyder, M. Warchol, and D. Angelaki. "Up-down asymmetry in memory guided saccadic eye movements are independent of head orientation in space" *Society for Neuroscience, Orlando, FL, USA*, 2002.

Educational Activities

Teaching Experience - Ongoing Courses

- Fall '23 Philosophy of Life - A Data Science Perspective EN.580.419, Course Director, JHU, enrollment 10.
- Spring '22 NeuroData Design II EN.580.438/638, Course Director, JHU, enrollment 20. [\[URL\]](#)
- Fall '21 NeuroData Design I EN.580.437/697, Course Director, JHU, enrollment 27. [\[URL\]](#)
- Spring '21 NeuroData Design II EN.580.438/638, Course Director, JHU, enrollment 30. [\[URL\]](#)
- Fall '20 NeuroData Design I EN.580.237/437/697, Course Director, JHU, enrollment 38. [\[URL\]](#)
- Spring '20 NeuroData Design II EN.580.438/638, Course Director, JHU, enrollment 32. [\[URL\]](#)
- Fall '19 NeuroData Design I EN.580.237/437/637, Course Director, JHU, enrollment 46. [\[URL\]](#)
- Spring '19 NeuroData Design II EN.580.438/638, Course Director, JHU, enrollment 18. [\[URL\]](#)
- Fall '18 NeuroData Design I EN.580.237/437/637, Course Director, JHU, enrollment 22. [\[URL\]](#)
- Spring '17 NeuroData Design II EN.580.238/438/638, Course Director, JHU, enrollment 14. [\[URL\]](#)
- Winter '17 BME Research Intersession EN.580.574, Course Director, JHU, enrollment 6. [\[URL\]](#)
- Fall '17 NeuroData Design I EN.580.247/437/637, Course Director, JHU, enrollment 15. [\[URL\]](#)
- Spring '16 The Art of Data Science EN.580.468, Course Director, JHU, enrollment 24. [\[URL\]](#)
- Fall '16 NeuroData Design I EN.580.437, Course Director, JHU, enrollment 16. [\[URL\]](#)
- Spring '15 Statistical Connectomics EN.580.694, Course Director, JHU, enrollment 26. [\[URL\]](#)

Teaching Experience - One-Time

- Spring '19 Systems Bioengineering II EN.580.422, Guest Lecturer, JHU, 2 Lectures.
- Spring '19 Computational Neuroscience AS.080.321, Guest Lecturer, JHU, 2 Lectures.
- Spring '18 Systems Bioengineering II EN.580.422, Guest Lecturer, JHU, 2 Lectures.
- Spring '18 Computational Neuroscience AS.080.321, Guest Lecturer, JHU, 2 Lectures.
- Spring '17 Systems Bioengineering II EN.580.422, Guest Lecturer, JHU, 2 Lectures.
- Spring '16 Systems Bioengineering II EN.580.422, Guest Lecturer, JHU, 2 Lectures.
- Winter '16 Introduction to Connectomics EN.600.221, Guest Lecturer, JHU, 1 Lecture.
- Fall '16 BME Modeling and Design EN.580.111, Guest Lecturer, JHU, 1 Lecture.
- Fall '15 Introduction to Computational Medicine Course Co-Director, JHU.

Educational Workshops

- Summer '19 DiPy Workshop 1 day lecture on statistical connectomics, Bloomington, Indiana [\[URL\]](#)
- Fall '18 Society for Neuroscience Annual Meeting 1 day lecture on statistical connectomics, Educational Workshop, San Diego, CA [\[URL\]](#)
- Fall '17 Society for Neuroscience Annual Meeting 1 day lecture on statistical connectomics, Educational Workshop, San Diego, CA [\[URL\]](#)
- Summer '16 CRCNS Course on Mining and Modeling of Neuroscience Data 2 day lecture on statistical connectomics, Redwood Center for Theoretical Neuroscience, University of California, Berkeley [\[URL\]](#)

Mentorship

Research Track Faculty Mentorship

- 07/19 – 08/20 **Ronak Mehta MSE** Research Assistant BME, JHU
Finalizing three manuscripts on (1) uncertainty forests, (2) time-series dependence quantification, and (3) lifelong learning forests
- 03/19 – 05/20 **Anton Alyakin BSE** Assistant Research Engineer BME, JHU
Worked on various problems in statistical graph inference
- 02/19 – 12/19 **Hayden Helm MSE** Assistant Research Faculty BME, JHU
Lead research efforts developing theory and methods for lifelong learning
- 08/16 – 08/18 **Eric Perlman Ph.D.** Assistant Research Faculty BME, JHU
Lead Scientist in developing storage, transfer, and visualization solutions for large data in our cloud infrastructure
- 03/16 – 06/20 **Jesse Patsolic MA** Assistant Research Faculty BME, JHU
Lead developer converting our extensions to decision forests to be merged into sklearn

Staff Research Scientists

- 10/23 – **Itsuki Ogihara BME** Research Assistant MS, JHU
- 09/20 – 04/23 **Jong Shin MSE** Software Engineer BME, JHU
Currently investigating the effect of inductive bias innately coinciding with various machine learning models
- 03/20 – 08/22 **Ali Geisa MS** Research Assistant BME, JHU
Researching progressive and lifelong learning theory
- 06/19 – 08/20 **Devin Crowley BS** Research Assistant BME, JHU
Lead developer of our scalable Python implementation of LDDMM
- 06/18 – 12/19 **Benjamin Falk Ph.D.** Research Engineer BME, JHU
Lead software engineer, oversees all development projects, solely responsible for all cloud infrastructure

Postdoctoral Fellows

- 09/22 – 12/22 **Adam Li Ph.D.** Postdoctoral Fellow BME, JHU
- 11/20 – **Javier Josue How Ph.D.** Postdoctoral Fellow Neurosciences, UCSD
Javier studies how larval zebrafish learn how to perform a task under one situation, and use this knowledge to learn another task more quickly. He hopes to use this understanding of biological transfer learning to improve machine learning, which tends to be unable to complete this feat.
- 07/19 – 08/21 **Austin Grave Ph.D.** Post-doctoral Fellow Kavli NDI, JHU
Co-Advised by Prof. Richard Hugarir, Department of Neuroscience. Working on understanding whole brain synaptic plasticity using genetic engineering and light microscopy imaging
- 07/19 – 08/21 **Celine Drieu Ph.D.** Post-doctoral Fellow Kavli NDI, JHU
Co-Advised by Assistant Prof. Kuchibhotla, Department of Psychological and Brain Sciences. Working on understanding learning and memory using two-photon calcium imaging
- 08/18 – 08/20 **Jesús Arroyo Ph.D.** Post-doctoral Fellow CIS, JHU
Worked on graph matching and joint graph embedding
- 07/18 – 07/20 **Audrey Branch Ph.D.** Post-doctoral Fellow Kavli NDI, JHU
Co-Advised by Prof Michela Gallagher, extending brain clearing experimental technology from mice to rats. Currently with a manuscript on biorxiv
- 09/16 – 08/18 **Cencheng Shen Ph.D.** Post-doctoral Fellow CIS, JHU
Developed Multiscale Graph Correlation, which is currently the premiere hypothesis testing framework, and about to be integrated into SciPy, by far the world's leading scientific computing package. Currently an Assistant Professor in Department of Statistics at University of Delaware, and still an active collaborator and grantee
- 06/16 – 07/17 **Guilherme Franca Ph.D.** Post-doctoral Fellow CIS, JHU

Worked on non-parametric clustering, with an article about to be accepted in PAMI, the leading machine learning journal. Currently a postdoc for Rene Vidal

05/16 – 06/17 **Leo Duan Ph.D.** Post-doctoral Fellow CIS, JHU

Went on to do a second postdoc with Leo Dunson (who I did my second postdoc with). Currently an Assistant Professor at University of Florida

08/14 – 05/22 **Tyler Tomita MSE** Postdoctoral Fellow BME, JHU

Developed Sparse Projection Oblique Randomer Forest in his dissertation, currently the best performing machine learning algorithm on a standard suite of over 100 benchmark problems. Currently a postdoc with Assistant Prof. Chris Honey of Psychology and Brain Sciences

Ph.D. Students

8/23 - 12/23 **Skyler Thomas BS, BSA** PhD Student (Rotation) BME, JHU

Skyler is a rotation student in the lab. He is interested in applied mathematics and machine learning. He is currently working on prospective learning theory. He is currently a Ph.D. student in BME at JHU.

05/23 – **Yuxin Bai MSE** PhD Student BME, JHU

05/22 – 05/23 **Jeremy Welland Ph.D.** PhD Student (Rotation) BME, JHU

02/22 – **Alice Qingyang Wang Bsc** PhD candidate Neuroscience, JHU

01/22 – 01/23 **Noga Mudrik Ph.D.** PhD Student (Rotation) BME, JHU

08/21 – **Ashwin De Silva BS** PhD Student BME, University of Moratuwa
Statistical Machine Learning

01/21 – **Haoyin Xu MSE** PhD Student BME, JHU

A Research Assistant who was also a Master's student in the NeuroData lab, maintainer of proglearn, working on streaming trees and forests

08/20 – 08/22 **Kaleab A. Kinfu MSE** PhD Student BME, JHU

Kaleab studied double descent phenomena in decision forests and deep learning methods and developed 'Partition and Decode' – a framework that formalizes an implicit internal representation of several modern machine learning methods. He is currently a Ph.D. student in CS at JHU.

05/20 – **Tingshan Liu B.A.** PhD Student Math Neuro, Smith College

Implementing and applying clustering algorithms to the connectomes of insect nervous systems.

08/19 – 12/23 **Eric Bridgeford BSE** PhD Student Department of Biostatistics, JHU

Dissertation will focus on statistics of human connectomes and mitigating batch effects. Already first author on several manuscripts under review, and spearheads collaboration with Prof Brian Caffo at Biostatistics

08/19 – 04/22 **Mike Powell MSE** PhD Candidate BME, Johns Hopkins University

Mike has studied drug-repurposing options for potential COVID-19 treatments, proposed methodological improvements and best practices for drug-repurposing studies, and developed a taxonomy for describing and quantifying feature importance in machine learning models.

07/19 – 06/24 **Jayanta Dey MSE** PhD Student BME, JHU

Currently working on lifelong learning that aims at training a machine learning model on multiple tasks and transferring knowledge among tasks

06/19 – **Sambit Panda MSE** PhD Student BME, JHU

A Ph.D. student who was also a Master's student in the NeuroData lab. Currently, the maintainer of the `hyppo` package, and works on creating more powerful and efficient multivariate hypothesis tests.

05/19 – **Jaewon Chung MSE** PhD Student BME, JHU

Data science for macroscale connectomes. Co-creator and maintainer of `graspologic`, a Python package for network statistics.

01/19 – 01/24 **Thomas Athey BS** PhD Candidate BME, JHU

Tommy analyzes terabyte-scale full brain images from light microscopy with a focus on neuromorphology. His expertise is in statistics and computer vision.

08/18 – 05/23 **Ben Pedigo BS** PhD Candidate BME, JHU

Data science for nanoscale connectomes. Co-creator and maintainer of `graspologic`, a Python package for network statistics.

08/18 – 06/2022 **Meghana Madyastha BSE** PhD Co-advisee CS, JHU

Dissertation will focus on computational aspects of acceleration learning and inference using decision forests

08/16 – 12/21 **Vikram Chandrashekhar BSE** PhD advisee BME, JHU

Dissertation has focused on extending LDDMM to whole cleared brain datasets, spearheads collaboration with Prof. Karl Deisseroth's lab at Stanford, one of the world's leading neuroscientists

Visiting Doctoral Student

03/19 – 09/19 **Derek Pisner MSE** PhD advisee JHU/UT, Austin

Worked on the ndmg pipeline, developing direct streamline normalization for structural connectome generation

M.S. Students

6/23 – **Ziyan Li MSE** MS student BME, JHU

05/21 – 05/23 **Yuxin Bai MSE** MS Student BME, JHU

05/20 – 12/21 **Ali Saad-Eldin BSE** MS advisee BME, JHU

Working on implementing and improving combinatorial optimization algorithms, specifically the Quadratic Assignment Problem

02/20 – 12/20 **Will LeVine** MS advisee BME, JHU

Exploring different sub-algorithms within progressive learning to alleviate harmful effects that result from training on unhelpful data

01/20 – 08/22 **Shreya Singh BS** Graduate Researcher BME, JHU

brainlit' package, aws and azure data management

07/19 – 04/22 **Ross Lawrence BSE** MS advisee BME, JHU

Lead m2g developer, maintainer of neuroparc, MRI connectome repositories

06/19 – 12/20 **Bijan Varjavand BSE** MS advisee BME, JHU

Submitted manuscript to PAMI on advancing statistics on populations of networks

06/19 – 05/21 **Vivek Gopalakrishnan MSE** Combined BS/MSE Student BME, JHU

Vivek developed multiscale hypothesis tests for multi-subject connectomics datasets, and is currently a PhD student in Medical Engineering and Medical Physics at the Harvard-MIT Program in Health Sciences and Technology.

01/19 – 06/21 **Ronan Perry MSE** MSE/BS Student BME, JHU

Ronan studied random forest methods for structured data and improved prediction calibration, developed nonparametric hypothesis testing tools, and explored novel complexity measures of neural networks. He is currently a Fulbright Germany scholar with Bernhard Scholkopf.

10/18 – 04/22 **Alex Loftus BSE** MS advisee BME, JHU

graph stats book, 'graspologic' package, ndmg development

06/18 – 06/19 **Drishti Mannan BSE** MS advisee BME, JHU

Preparing manuscript introducing novel specification for large attributed networks

08/14 – 06/17 **Greg Kiar BSE** MSE advisee BME, JHU

Developer of m2g, the only existing "soup to nuts" pipeline for both functional and diffusion pipelines, co-first author of manuscript under review. Currently a PhD student at McGill University

Undergraduate Students

6/23 – **Anvii Mishra BS** Undergraduate BME, JHU

10/22 -- **Hope Ugwuoke BS** Undergraduate BME, JHU

- 06/22 – 12/22 **Audrey Herskovits BS** Undergraduate (Visiting) BME, JHU
- 06/22 – 02/23 **Sejal Srivastava BS** Undergraduate BME, JHU
- 09/21 -- **Kareef Ullah** Undergraduate Researcher BME, JHU
Assisted with fixing issues in graspologic and hyppo
- 08/20 – 05/21 **Alisha Kodibagkar** Undergraduate Researcher BME, JHU
Assisting in the integration of brainlit packages with Azure services
- 05/20 – 06/2022 **Diane Lee** Undergraduate Researcher BME, JHU
Assisting in the maintenance of graspologic
- 06/21 – 08/21 **Dominique Allen** Undergraduate Researcher BME, JHU
Assisted Thomas Athey in his work with statistics and computer vision
- 06/19 – 12/19 **Richard Guo** Undergraduate Researcher BME, JHU
Developed uncertainty forests, an approach for estimated posterior class probabilities, conditional entropy, and mutual information for high-dimensional data common in brain science applications
- 06/15 – 08/16 **Albert Lee BSE** Undergraduate BME, JHU
Developed big data visualization tools
- 06/15 – 12/15 **Ron Boger BSE** Undergraduate Researcher BME, JHU
Worked at a computational medicine start-up in Silicon Valley, worked on high-dimensional low-sample size theory
- 05/15 – 05/16 **Jordan Matelsky BSE** BME, JHU
Currently a data scientist at APL, developed a number of simple WebApps in support of big data management
- 02/15 – 05/16 **Ivan Kuznetsov BSE** BME, JHU
Currently an MD, PhD Candidate at the UPenn, winner of Soros Fellowship, worked on analysis of data from Dr. Daniel Amen, developed matrix exploratory data analysis package.

Highschool Student

Thesis Committee Service (BME unless noted otherwise)

- 2019 **Browne, James** Computer Science JHU Ph.D. Student, Graduated 2019
- 2019 **Mhembere, Disa** Computer Science JHU Ph.D. Student, Graduated 2019
- 2018 **Kutten, Kwame** JHU Ph.D. Student, Graduated 2018
- 2018 **Wang, Shangsi** Applied Mathematics and Statistics JHU Ph.D. Student, Graduated 2018
- 2018 **Tang, Runze** Applied Mathematics and Statistics JHU Ph.D. Student, Graduated 2018
- 2018 **Lee, Youjin** Biostatistics JHU Ph.D. Student, Graduated 2018
- 2017 **Zheng, D** Computer Science JHU Ph.D. Student, Graduated 2017
- 2017 **Binkiewicz, Norbert** Statistics University of Wisconsin Ph.D. Student, Graduated 2017
- 2016 **Gray-Roncal, Will** Computer Science JHU Ph.D. Student, Graduated 2016

Service

Grant Review Service

- 2015 **NSF Review Panel** Review for NSF BIG DATA Program

University Service

- Winter '19 **Track Organizer** AI in Healthcare: From Bench to Bedside
Organizer for Breakout Topic Sessions on artificial intelligence
- 08/15 – 07/18 **Co-Developer** Computational Medicine Minor, JHU, Baltimore, MD, USA
<http://icm.jhu.edu/academics/undergraduate-minor/>
- 2015 – 2017 **Co-Founder and Faculty Advisor** MedHacks

<http://medhacks.org/> Medhacks is one of the first and largest hackathons dedicated specifically to hacking on medical advances, started entirely by BME undergrads at JHU

08/14 – 08/18 **Director of Undergraduate Studies** Institute for Computational Medicine, JHU, Baltimore, MD, USA

<http://icm.jhu.edu/academics/undergraduate-minor/>

Department Service

2019 **Member** Search Committee, BME, Neuroengineering, 2019

2019 **Member** Search Committee, BME, Data Science, 2019

2018 **Member** Search Committee, BME, Neuroengineering, 2018

Service in Scientific Community

2023 – **Member** National Advisory Mental Health Council Workgroup on High-Dimensional Datasets

2019 – **Mentor** Black in AI

2017 – **Scientific Advisory Board** NSF NeuroNex

Enhanced resolution for 3DEM analysis of synapses across brain regions and taxa. Provided scientific, computational, and statistical guidance to a flagship NSF funded BRAIN Initiative program

2017 – **Chair of Committee of Data Cores** U19 Data Cores

The U19 program is NIH's flagship BRAIN Initiative program, with five original awardees, each with a dedicated Data Core and designated PI. I was elected the chair of the committee of Data Core PIs

2017 **Consultant for Nature Publishing Group** The journal Nature

The journal Nature, flagship journal of Nature Publishing Group, decided to create a "Code and Software Submission Checklist". They consulted me on their first draft, and I helped re-write it.

2011 – Open Connectome Project

The co-founder of the "Open Connectome Project" (OCP), for several years, I was the only neuroscientist that could easily store, manage, and analyze very big datasets, spanning first tens of terabytes, and then hundreds. For that reason, I was an essential co-author on a number of big data papers. Specifically, though I sometimes contributed relatively little to the scientific ideas, I often was required to complete, visualize, and/or share the data. Perhaps more importantly, both funding agencies and journals began mandating that these large datasets be publicly shared, and OCP was literally the only option. This is despite often not having funding, nor being a co-author, on the manuscripts

2010 – AWS Open Neuro Data Registry

Our lab co-founded the <https://registry.opendata.aws/open-neurodata/> Registry of Open Data on Amazon Web Services (AWS). The implication of this is that now, pending a few minor considerations, any neuroscientist that collects large image data can deposit it online for free. This means that neither they nor we must request funding to store the data. Our lab maintains this repository, but only by virtue of ensuring instructions for uploading, visualizing, and downloading are up to date, and acting as a gatekeeper to ensure only appropriate data are deposited there

Journal Service: Editorial Board

2019 – **Associate Editor**

Journal of the American Statistical Association

2018 – **Editor**

Neurons, Behavior, Data analysis, and Theory

2016 **Guest Associate Editor**

PLoS Computational Biology

Journal Service: Conference and Journal Reviewer

Neural Information Processing Systems (NeurIPS)

International Conference on Learning Representations (ICLR)

International Conference on Machine Learning (ICML)

Annals of Applied Statistics (AOAS)
Bioinformatics
International Conference on Learning Representations (ICLR)
Network Science
Current Opinion in Neurobiology
Biophysical Journal
IEEE International Conference on eScience
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
IEEE Global Conference on Signal and Information Processing (GlobalSIP)
IEEE Signal Processing Letters
IEEE Transactions on Signal Processing
Frontiers in Brain Imaging Methods
Journal of Machine Learning Research (JMLR)
Journal of Neurophysiology
Journal of the Royal Statistical Society B (JRSSB)
Nature Communications
Nature Methods
Nature Reviews Neuroscience
Neural Computation
Neural Information Processing Systems (Neurips)
NeuroImage
Neuroinformatics
PLoS One
PLoS Computational Biology

Conferences and Hackathon Organizer

- Summer '20 **Co-Chair** SciPy mini-symposium: Biology and Bioinformatics
 Winter '19 **Organizer** Decision Forest Hackathon
 Summer '19 **Organizer** NeuroData Workshop
<https://neurodata.devpost.com/> Hackathon to train brain scientists in machine learning for big data (50 participants from around the country)
 March '19 **Organizer** Neuro Reproducibility Hackathon
<https://brainx3.io/> Hackathon to train brain scientists in best practices in reproducible science, co-organized with two startups: Vathes, LLC and Gigantum (50 participants)
 Spring '18 **Organizer** NeuroData Hackathon
 Fall '17 **Organizer** NeuroData Mini-Hackathon
 Summer '17 **Organizer** NeuroStorm
<https://brainx2.io/> Workshop to bring together thought leaders from academia, national labs, industry, and non-profits around the world to take next steps towards accelerating brain science discovery in the cloud (50 participants and 5 observers from funding institutions)
 2016 **Organizer** Global Brain Workshop
<http://brainx.io/> First ever international Brain Initiative workshop, bringing together leaders from around the world, covered by Nature and Science (75 participants)
 2016 **Co-Organizer** Brains and Bits: Neuroscience Meets Machine Learning, NIPS Workshop
http://www.stat.ucla.edu/~akfletcher/brainsbits_overview.html
 Winter '15 **Organizer** Hack@NeuroData
<http://hack.neurodata.io/>
 2015 **Co-Organizer** BigNeuro2015: Making Sense of Big Neural Data, NIPS Workshop
<http://neurodata.io/bigneuro2015>
 2012 **Co-Organizer** Scaling up EM Connectomics Conference

<https://openwiki.janelia.org/wiki/download/attachments/8687459/final+agenda+EM+Connectomics+100512.pdf>
 The world's first connectomics workshop, now run annually alternating between Janelia Research and Max Plank locations (80 participants)

Awards and Recognition

Individual

2002 Dean's List Washington University

Shared

2019 Kavli NDI Distinguished Postdoctoral Fellow Celine Drieu, PhD
 2019 Kavli NDI Distinguished Postdoctoral Fellow Austin Graves, PhD
 2019 Kavli NDI Distinguished Postdoctoral Fellow Audrey Branch, PhD
 2019 Winner of Pistrutto Fellowship. Vivek Gopalakrishnan
 2017 Best Presentation Award HPDC Mhembere et al.
 2017 Nonparametric Statistics of the American Statistical Association Student Paper Award Lee et al.
 2014 F1000 Prime Recommended Vogelstein et al.
 2013 Spotlight Neural Information Processing Systems (NIPS)
 2011 Trainee Abstract Award Organization for Human Brain Mapping
 2008 Spotlight Computational and Systems Neuroscience (CoSyNe)

Other Media

- [31] NPR "*Why scientists just mapped every synapse in a fly brain*" NPR [\[URL\]](#)
- [30] Science Friday "*The First Fully Mapped Animal Brain Is The Larva Of A Fruit Fly*" WNYC Studio [\[URL\]](#)
- [29] Hamblin, James "*Why Some People Get Sicker Than Others: COVID-19 is proving to be a disease of the immune system.*" The Atlantic [\[URL\]](#)
- [28] Ladapo, Joseph A. "*Too Much Caution Is Killing Covid Patients*" The Wall Street Journal [\[URL\]](#)
- [27] Mandavilli, Apoorva "*Coronavirus Can Set Off a 'Cytokine Storm.' These Drugs May Calm It*" The New York Times [\[URL\]](#)
- [26] Mone, Amy and Mehl, Valerie "*Researchers Urge Clinical Trial of Blood Pressure Drug to Prevent Lethal Complication of Covid-19*" Johns Hopkins Medicine [\[URL\]](#)
- [25] Rosen, Meghan "*Preventing 'Cytokine Storm' May Ease Severe COVID-19 Symptoms*" Howard Hughes Medical Institute [\[URL\]](#)
- [24] Salzberg, Steven "*Prazosin Might Be A Treatment for COVID-19. More Data Is Urgently Needed*" Forbes [\[URL\]](#)
- [23] Johns Hopkins Medicine "*BME Pioneers: Joshua Vogelstein*" BME Pioneers [\[URL\]](#)
- [22] Johns Hopkins Medicine "*Technology Connecting the Brain to the Human Experience*" Tomorrows Discoveries [\[URL\]](#)
- [21] Perkel, Jeffrey M. "*Web service makes big data available to neuroscientists*" Nature [\[URL\]](#)
- [20] Emerging Technology from the arXiv "*Three Grand Challenges for Brain Science That Can Be Solved in 10 Years*" MIT Technology Review [\[URL\]](#)
- [19] Patel, Prachi "*Johns Hopkins researchers want to use big data to chart the brain*" Johns Hopkins University [\[URL\]](#)
- [18] Reardon, Sara "*Worldwide brain-mapping project sparks excitement --- and concern*" Nature [\[URL\]](#)
- [17] Underwood, Emily "*International brain projects proposed*" Science [\[URL\]](#)
- [16] {National Institutes of Health} "*International Brain Projects Considered*" BRAIN initiative [\[URL\]](#)
- [15] {Office of the Spokesperson} "*International Brain Initiative Launch and VIP Dialog: Towards an International Brain Station*" US Department of State [\[URL\]](#)
- [14] {The Kavli Foundation} "*International Brain Initiative*" Kavli [\[URL\]](#)
- [13] Dale Keiger "*The Open Connectome Project takes a close look at the brain*" Johns Hopkins Magazine [\[URL\]](#)
- [12] Begley, Sharon "*Fly brain 'atlas' opens door to linking human neurons to actions*" Reuters [\[URL\]](#)
- [11] Gatlin, Latarsha "*Johns Hopkins mathematician receives grant to support study of brain's circuitry*" Johns Hopkins University [\[URL\]](#)

- [10] O'Leary, Timothy and Marder, Eve "*Mapping Neural Activation onto Behavior in an Entire Animal*" Science [URL]
- [9] Sanders, Laura "*Ten thousand neurons linked to behaviors in fly*" ScienceNews [URL]
- [8] Son, Donghee and Lee, Jongha "*Research Highlights*" Nature [URL]
- [7] Yandell, Kate "*Linking Neurons to Behaviors*" TheScientist [URL]
- [6] Yirka, Bob "*Researchers create a reference atlas for neural circuits in fruit fly larvae*" MedicalXpress [URL]
- [5] Begg, Colin B. and Pike, Malcolm C. "*Comment on "The Predictive Capacity of Personal Genome Sequencing"*" Science [URL]
- [4] Thomas, Ben "*"Open Access to the Brain" – Podcast 1: Joshua Vogelstein*" The Connectome Podcast [URL]
- [3] Topol, Eric J. "*Comment on "The Predictive Capacity of Personal Genome Sequencing"*" Science [URL]
- [2] Birch, Kristi "*Mapping the Mind*" Johns Hopkins Engineering [URL]
- [1] Vogelstein, Joshua T. "*Q&A: What is the Open Connectome Project?*" BMC Nature [URL]

Professional/Social Media Presence

[@neuro_data](#) Twitter account with a approximately 7,000 followers, over 250K impressions in December 2019, and approximately 100 new followers, and upwards of 100 new tweets, per month, and 25 link clicks per day. Follower demographics include <50% high school graduates, 46% female

[Bits and Brains](#) Professional blog regarding all things academic, neurological, and statistical, with approximately 30 blog posts, approximately one new post per month (9,000 page views, 3,200 unique users) Most Popular Post: [10 Simple Rules to Write a Paper from Start to Finish](#)

[medium.com/@progl](#) My Medium account where I post articles on both personal and professional topics

Translation / Technology Transfer Activities

Open Datasets

2019 – [Templier et al. \(2019\) \[URL\]](#)

The non-destructive collection of ultrathin sections onto silicon wafers for post-embedding staining and volumetric correlative light and electron microscopy using MagC. MagC allows the correlative visualization of neuroanatomical tracers within their ultrastructural volumetric electron microscopy context

0 citations, 119 unique visitors

2018 – [Bloss et al. \(2018\) \[URL\]](#)

Images of CA1 pyramidal neurons for analysis involving feature-selective firing as a result of dendritic integration of inputs from multiple brain regions. Show that single presynaptic axons form multiple, spatially clustered inputs onto the distal, but not proximal, dendrites of CA1 pyramidal neurons

20 citations, 530 unique visitors

2018 – [Branch \(2018\) \[URL\]](#)

Adult generated neurons in aging M. musculus imaged using array tomography, multi-spectral light microscopy, and electron microscopy

2 citations, 223 unique visitors

2017 – [Allen Atlas \[URL\]](#)

Anatomical reference atlases that illustrate the adult mouse brain in coronal and sagittal planes. They are the spatial framework for datasets such as in situ hybridization, cell projection maps, and in vitro cell characterization. <http://atlas.brain-map.org/>

142 citations, 1058 unique visitors

2017 – [Hildebrand et al. \(2017\) \[URL\]](#)

A multi-resolution serial-section electron microscopy data set containing the anterior quarter of a 5.5 days post fertilization larval zebrafish, including its complete brain acquired by Hildebrand and colleagues. Electron micrographs and reconstructions are available for view in CATMAID

70 citations, 1,014 unique visitors

2017 – [Tobin et al. \(2017\) \[URL\]](#)

Wiring variations that enable and constrain neural computation in a sensory microcircuit

28 citations, 43 unique visitors

2016 – Bloss et al. (2016) [[URL](#)]

Images of molecularly defined inhibitory interneurons and CA1 pyramidal cell dendrites collected using correlative light-electron microscopy and large-volume array tomography

41 citations, 701 unique visitors

2016 – Dyer et al. (2016) [[URL](#)]

Mesoscale (1 cubic micron resolution) resolution images generated with the use of synchrotron X-ray microtomography (microCT) from millimeter-scale volumes of mouse brain. X-ray tomography promises rapid quantification of large brain volumes

21 citations, 216 unique visitors

2016 – Lee et al. (2016) [[URL](#)]

Electron microscopy data collected at $4 \times 4 \times 40$ nm per voxel from the visual cortex in Mouse V1 used in a study of an excitatory network

132 citations, 725 unique visitors

2016 – Wanner et al. (2016) [[URL](#)]

Serial block face scanning EM (SBEM) and conductive sample embedding image stack from an olfactory bulb (OB) of a zebrafish larva at a voxel resolution of $9.25 \times 9.25 \times 25$ nm³

12 citations, 328 unique visitors

2015 – Amunts et al. (2015) [[URL](#)]

BigBrain is an ultrahigh-resolution three-dimensional model of a full human brain at 20 micrometer resolution, enabling an unprecedented look into the human brain at micro- and macro-scopic scale

262 citations, 1,041 unique visitors

2015 – Bhatla et al. (2015) [[URL](#)]

Nikhil Bhatla and Rita Droste in Bob Horvitz's Lab reconstruction of the anterior half of the *C. elegans* feeding organ, the pharynx. Volumes for three adult hermaphrodite worms include volumetric tracing of all neurons, selected cell types, 12 neuron synapses. 50 nm thick sections with an image resolution of 2 nm per pixel

16 citations, 467 unique visitors

2015 – Collman et al. (2015) [[URL](#)]

Mouse cortex collected using conjugate array tomography (AT), a volumetric imaging method that integrates immunofluorescence and EM imaging modalities in voxel-conjugate fashion

69 citations, 382 unique visitors

2015 – Deisseroth et al. (2015) [[URL](#)]

Twelve CLARITY mouse brains (5 wild type controls and 7 behaviorally challenged) were prepared by Li Ye, and imaged using CLARITY-Optimized Light-sheet Microscopy (COLM) (whole brain COLM imaging and data stitching performed by R. Tomer, in preparation)

5 citations, 208 unique visitors

2015 – Harris et al. (2015) [[URL](#)]

Three volumes of hippocampal CA1 neuropil in adult rat imaged by the laboratory of Kristen M Harris, PhD, at an XY resolution of ~2 nm on serial sections of ~50-60 nm thickness

9 citations, 463 unique visitors

2015 – Kasthuri et al. (2015) [[URL](#)]

Saturated reconstruction of a sub-volume of mouse neocortex collected using automated technologies in which all cellular objects (axons, dendrites, and glia) and many sub-cellular components are rendered and itemized in a database. Provides access to the complexity of the neocortex and enables further data-driven inquiries

323 citations, 1,299 unique visitors

- 2015 – Micheva et al. (2015) [[URL](#)]
Multi-channel array tomography data of the barrel cortex of an adult mouse (C57BL/6J)
57 citations, 190 unique visitors
- 2015 – Ohyama et al. (2015) [[URL](#)]
The side view of the approximately 7,000 neurons reconstructed so far, either in full or partially, of the approximately 12,000 neurons of the central nervous system of Drosophila larva. The 0111-8 data set was originally sectioned and imaged by Richard D. Fetter and his two tech assistants
136 citations, 299 unique visitors
- 2015 – Randlett et al. (2015) [[URL](#)]
Zebrafish brain atlas with surface mesh of different regions intended for the analysis of whole-brain activity mapping
124 citations, 498 unique visitors
- 2014 – Weiler (2014) [[URL](#)]
Images of whisker-associated barrel columns of mouse somatosensory cortex stained with antibodies against selected antigens (DAPI, YFP), and indirect immunofluorescence. Images collected by the lab of Stephen J Smith
6 citations, 123 unique visitors
- 2013 – Bumbarger et al. (2013) [[URL](#)]
Serial, thin section data generated by Dan Bumbarger in Ralf Sommer's lab in order to compare the pharyngeal connectomes of the pharyngeal nervous system between Caenorhabditis elegans and Pristionchus pacificus. In P. pacificus they found clearly homologous neurons for all of the 20 pharyngeal neurons in C. elegans, and massive rewiring of synaptic connectivity between the two species
67 citations, 22 unique visitors
- 2013 – Takemura et al. (2013) [[URL](#)]
The right part of the brain of a wild-type Oregon R female fly that was serially sectioned into 40-nm slices. A total of 1,769 sections, traversing the medulla and downstream neuropils, were imaged at a magnification of 35,000X
323 citations, 144 unique visitors
- 2011 – Bock et al. (2011) [[URL](#)]
Volume of mouse primary visual cortical data, spanning layers 1, 2/3, and upper layer 4 collected as electron microscope (EM) data and two-photon microscopy data collected by Davi Bock, Ph.D. and Wei-Chung Allen Lee, Ph.D.. Images have a resolution of 4x4x45 cubic nanometers
430 citations, 511 unique visitors

Open-Source Software: Active

- 2021 – scikit-tree [[URL](#)]
Scikit-tree is a package for modern tree-based algorithms for supervised and unsupervised learning problems. It extends the robust API of scikit-learn for tree algorithms that achieve strong performance in benchmark tasks.
38 stars, 7 forks
- 2020 – hypo ((HYP)hthesis Testing in PythOn) [[URL](#)]
An open-source software package for multivariate hypothesis testing. It intends to be a comprehensive multivariate hypothesis testing package that runs on all major versions of operating systems. It also includes novel tests not found in other packages.
201 stars, 82 forks
- 2020 – brainlit [[URL](#)]
This repository is a container of methods that Neurodata uses to expose their open-source code while it is in the process of being merged with larger scientific libraries such as scipy, scikit-image, or scikit-learn.

23 stars, 17 forks

2019 – [graspologic \(Graph Statistics\) \[URL\]](#)

Co-developed with Microsoft Research: Utilities and algorithms designed for processing and analysis of graphs with specialized graph statistical algorithms

134 stars, 56 forks, 2,516 downloads/month

2019 – [neuroparc \[URL\]](#)

This repository contains a number of useful parcellations, templates, masks, and transforms to (and from) MNI152NLin6 space. The files are named according to the BIDs specification

26 stars, 4 forks

2018 – [m2g \(MR graph analysis\) \[URL\]](#)

A Python pipeline which uses diffusion MRI data from individuals to generate connectomes reliably and scalably

35 stars, 26 forks, 218 downloads/month, 7,900 docker pulls

Open-source Software: Contributed

2019 [cloud-volume \[URL\]](#)

Added support for additional file types

2019 – [C-PAC \[URL\]](#)

Added streamlined reproducible pipeline

2019 – [scipy \[URL\]](#)

Added `mgc`, a state of the art method for hypothesis testing we developed in the lab

2018 – 2019 [neuroglancer \[URL\]](#)

Added multispectral support to enable light microscopy data use

2018 – [igraph \[URL\]](#)

Added spectral clustering functionality

2017 – 2018 [render \[URL\]](#)

Added cloud support

2017 [boss \[URL\]](#)

Developed core functionality

Open-source Software: Archived

2020 – 2022 [ProgLearn \(Progressive Learning\) \[URL\]](#)

A Python package for exploring and using progressive learning algorithms

22 stars, 29 forks, 37 downloads/month

2019 – 2020 [ARDENT \(Affine and Regularized Deformative Numeric Transform\) \[URL\]](#)

A Python package for performing automated image registration using LDDMM

10 stars, 5 forks

2019 – 2021 [reg \(Image registration\) \[URL\]](#)

A Python package which performs non-linear affine and deformable image registration

6 stars, 4 forks, 61 downloads/month

2019 – 2019 [https://neurodata.io/forests/ \[URL\]](https://neurodata.io/forests/)

SPORF is an improved random forest algorithm that achieves better accuracy and scaling than previous implementations on a standard suite of > 100 benchmark problems

54 stars, 35 forks, 73 downloads/month, 36 docker pulls

2019 – 2020 [Uncertainty-Forest \[URL\]](#)

A Python package containing estimation procedures for posterior distributions, conditional entropy, and mutual information between random variables X and Y

- 2 stars, 1 fork**
- 2018 – 2021 LOL (Supervised dimensionality reduction) [URL]
 Linear Optimal Low-rank (LOL) projection for improved classification performance in high-dimensional classification tasks
8 stars, 6 forks, 60 downloads/month
- 2018 – 2021 MGC (Non-parametric hypothesis testing) [URL]
 Multiscale Graph Correlation (MGC) is a framework for universally consistent testing high-dimensional and non-Euclidean data
28 stars, 11 forks, 120 downloads/month, 266 docker pulls
- 2018 – 2019 ndcloud (NeuroData Cloud) [URL]
 The deployment of tools which support the Open Connectome Project
- 2016 – 2019 Non-Parametric-Clustering [URL]
 A program which uses non-parametric-clustering to minimize or maximize a given criterion function
3 stars, 2 forks
- 2017 – 2019 ndex [URL]
 Python 3 command-line program to exchange (download/upload) image data with NeuroData's cloud deployment of APL's BOSS spatial database
3 stars, 0 forks, 89 downloads/month
- 2017 – 2019 knor (Clustering) [URL]
 Python version of knor, a highly optimized and fast library for computing k-means in parallel with accelerations for Non-Uniform Memory Access (NUMA) architectures
1 stars, 3 forks, 115 downloads/month
- 2017 – 2019 SynapseAnalysis (Synapse Detection) [URL]
 A framework to evaluate synaptic antibodies for array tomography applications
2 stars, 0 forks
- 2017 – 2018 MEDA (Matrix Exploratory Data Analysis) [URL]
 A python package for matrix exploratory data analysis
0 stars, 3 forks, 56 downloads/month, 21 docker pulls
- 2017 – 2018 ndwebtools [URL]
 ndwebtools (ndweb) is a Django application to provide a user-friendly interface for interacting with NeuroData resources and data
0 stars, 1 forks
- 2015 – 2018 ndviz [URL]
 Web visualization and analysis tools for neuroimaging datasets, powered by Neuroglancer
8 stars, 4 forks, 48 docker pulls
- 2015 – 2016 DMG [URL]
 An implementation of a distributed multigrid Poisson solver for image stitching, smoothing, and sharpening
19 stars, 6 forks
- 2015 VESICLE (EM Synapse Detection) [URL]
 Reference synapse detection program for processing serial electron microscopy data
3 stars, 3 forks
- 2015 CAJAL [URL]
 A MATLAB API that provides a simple to use interface with Open Connectome Project servers and provides RAMON Objects, unit tests, configuration scripts, and utilities
6 stars, 5 forks
- 2012 – 2017 FlashGraph (Scalable Analytics) [URL]

General-purpose graph analysis framework that exposes vertex-centric programming interface for users to express varieties of graph algorithms

220 stars, 42 forks

2012 – 2017 FlashX (Scalable machine learning) [URL]

A matrix computation engine that provides a small set of generalized matrix operations on sparse matrices and dense matrices to express varieties of data mining and machine learning algorithms

220 stars, 42 forks

2011 – 2016 oopsi (Calcium Spike Sorting) [URL]

Model-based spike train inference from calcium imaging

20 stars, 9 forks

2011 – 2017 ndstore [URL]

Scalable database cluster for the spatial analysis and annotation of high-throughput brain imaging data

37 stars, 13 forks

Consultancy

2017 **Consultant** Greenspring Associates [URL]

2016 **Consultant** Scanadu

Advisory Board Appointments

2018 – **Advisory Board** Mind-X [URL]

A neurotechnology company combining brain-computer interfaces and artificial intelligence to make the world's information available with the speed and ease of a single thought. Incubated at Camden Partners Nexus, completed an initial round of funding for an undisclosed amount. 15 employees.

2017 – **Advisory Board** PivotalPath [URL]

PivotalPath is a leading hedge fund research and intelligence organization built by a team of experienced alternative investment professionals and fintech developers. Raised undisclosed amount of funding, 11 employees.

Startups

2017 **Chief Intelligence Officer** sensie [URL]

Sensie is a startup devoted to unblocking intelligence to optimize our collective wellness.

21 employees.

2017 **Co-Founder** gigantum [URL]

The future of data science is open, decentralized and user friendly. That is why we created a platform that enables anybody to create and share totally reproducible computational work with the world. Completed initial round of seed funding for undisclosed amount from <https://www.digital-science.com/>>Digital Science, which also funds figshare, readcube, altmetric, overleaf, and more. Gigantum was acquired by nVidia in early 2022.

15 employees.

2016 **Co-Founder** d8alab [URL]

Our services include evaluating model performance, building prototype R/Shiny web applications and basic data cleaning., Provides data science consulting for a variety of companies, specifically biomedical data science

4 employees.

2016 **Co-Founder** global domain partners

Global Domain Partners is a quantitative hedge fund that was acquired by Mosaic Investment Partners in 2012

6 employees.

