

# Joshua T. Vogelstein

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## Current Experience

### Academic Positions

- 08/14 – now **Assistant Professor**, Department of Biomedical Engineering, Johns Hopkins University.
- 08/14 – now **Core Faculty**, Institute for Computational Medicine & Center for Imaging Science, Johns Hopkins University.
- 05/16 – now **Visiting Scientist**, Howard Hughes Medical Institute, Janelia Research Campus.
- 10/15 – now **Steering Committee Member & Associate Member**, Kavli Neuroscience Discovery Institute.
- 08/15 – now **Joint Appointment**, Department of Applied Mathematics and Statistics.
- 08/14 – now **Joint Appointment**, Department of Neuroscience.
- 08/14 – now **Joint Appointment**, Department of Computer Science.
- 08/14 – now **Assistant Research Faculty**, Human Language Technology Center of Excellence.
- 10/12 – now **Affiliated Faculty**, Institute for Data Intensive Engineering and Sciences, Johns Hopkins University.

### Academic Activities

- 01/11 – now **Co-Founder & Co-Director**, [NeuroData](#) (formerly Open Connectome Project).
- 08/14 – now **Director of Undergraduate Studies**, Institute for Computational Medicine.

### Commercial Experience

- 01/17 – now **Co-Founder**, [gigantum](#).
- 01/17 – now **Advisory Board**, [PivotalPath](#).
- 01/16 – now **Co-Founder**, [d8alab](#).

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## Previous Experience

- 05/15 – now **Co-Founder and Faculty Advisor**, [MedHacks](#).
- 10/12 – 08/14 **Endeavor Scientist**, Child Mind Institute.
- 08/12 – 08/14 **Senior Research Scientist**, Dept's of Statistical Sciences & Mathematics & Neurobiology.
- 08/12 – 08/14 **Affiliated Faculty**, Kenan Institute for Ethics.  
Duke University
- 08/12 – 08/14 **Adjunct Faculty**, Department of Computer Science.
- 01/11 – 08/12 **Assistant Research Professor**, Department of Applied Mathematics and Statistics.
- 12/09 – 01/11 **Post-Doctoral Fellow**, Department of Applied Mathematics and Statistics, Supervised by Carey E. Priebe.  
Johns Hopkins University
- 07/04 – 07/12 **Chief Data Scientist**, Global Domain Partners, LLC.
- 06/01 – 09/01 **Research Assistant**, Prof. Randy O'Reilly, Dept. of Psychology.  
University of Colorado
- 06/00 – 09/00 **Clinical Engineer**, Johns Hopkins Hospital.
- 06/99 – 08/99 **Research Assistant under Dr. Jeffrey Williams**, Dept. of Neurosurgery, Johns Hopkins Hospital.
- 06/98 – 08/98 **Research Assistant under Professor Kathy Cho**, Dept. of Pathology, Johns Hopkins School of Medicine.

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## Education

- 2003 – 2009 **Ph.D in Neuroscience**,  
*Johns Hopkins School of Medicine, Supervised by Eric Young,*  
Dissertation: 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.*
- 06/08 – 07/08 **Molecular Biology Summer Workshop**, *Smith College, Mass, USA.*
- 07/08 – 07/08 **Advanced Techniques in Molecular Neuroscience**, *Cold Spring Harbor, New York, USA.*
- 06/05 – 07/05 **Imaging Structure and Function of the Nervous System (audited)**, *Cold Spring Harbor, New York, USA.*
- 06/04 – 07/04 **Advanced Course in Computational Neuroscience**, *Obidos, Portugal.*

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## Awards & Honors

- 2017 **Best Presentation Award HPDC**, *Mhembere et al. (2017).*
- 2017 **Nonparametric Statistics of the American Statistical Association Student Paper Award**,  
*Lee et al. (2017).*
- 2014 **F1000 Prime Recommended**, *Vogelstein et al. (2014).*
- 2013 **Spotlight**, *Neural Information Processing Systems (NIPS).*
- 2011 **Trainee Abstract Award**, *Organization for Human Brain Mapping.*
- 2008 **Spotlight**, *Computational and Systems Neuroscience (CoSyNe).*

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## Pre-Prints

- 1 S. Wang, C. Shen, A. Badea, C. E. Priebe, and J. T. Vogelstein. [Signal Subgraph Estimation Via Vertex Screening](#). *arXiv:1801.07683*, 2018.
- 2 J. T. Vogelstein, M. Tang, E. W. Bridgeford, D. Zheng, R. Burns, and M. Maggioni. [Linear Optimal Low Rank Projection for High-Dimensional Multi-class Data](#). *arXiv:1709.01233*, 2017.
- 3 C. Shen, M. Tang, E. W. Bridgeford, C. E. Priebe, M. Maggioni, and J. T. Vogelstein. [Discovering Relationships Across Disparate Data Modalities](#). *arXiv:1609.05148*, 2016.
- 4 R. Tang, M. Tang, J. T. Vogelstein, and C. E. Priebe. [Robust Estimation from Multiple Graphs under Gross Error Contamination](#). *arXiv:1707.03487*, 2017.
- 5 Y. Lee, C. Shen, and J. T. Vogelstein. [Network Dependence Testing via Diffusion Maps and Distance-Based Correlations](#). *arXiv:1703.10136*, 2017.
- 6 C. E. Priebe, Y. Park, M. Tang, A. Athreya, V. Lyzinsky, J. T. Vogelstein, Y. Qin, B. Cocanougher, K. Eichler, M. Zlatic, and A. Cardona. [Semiparametric spectral modeling of the \*Drosophila\* connectome](#). *arXiv:1705.03297*, 2017.
- 7 R. Tang, M. Ketcha, A. Badea, E. D. Calabrese, D. S. Margulies, J. T. Vogelstein, C. E. Priebe, and D. L. Sussman. [Connectome Smoothing via Low-rank Approximations](#). *arXiv:1609.01672*, 2016.
- 8 T. Tomita, J. Browne, C. Shen, P. C. E., R. Burns, M. Maggioni, and J. T. Vogelstein. [Randomer Forests](#). *arXiv:1506.03410*, 2016.
- 9 D. Zheng, R. Burns, J. T. Vogelstein, C. E. Priebe, and A. S. Szalay. [An SSD-based eigensolver for spectral analysis on billion-node graphs](#). *arXiv:1602.01421*, 2016.

- 10 D. Zheng, D. Mhembere, V. Lyzinski, J. Vogelstein, C. E. Priebe, and R. Burns. Semi-External memory sparse matrix multiplication for Billion-Node graphs. *IEEE Trans. Parallel Distrib. Syst.*, PP(99):1–1, 2016.
- 11 D. Zheng, D. Mhembere, J. T. Vogelstein, C. E. Priebe, and R. Burns. [FlashMatrix: Parallel, Scalable Data Analysis with Generalized Matrix Operations using Commodity SSDs](#). *arXiv:1604.06414*, 2016.
- 12 V. Lyzinski, S. Adali, J. T. Vogelstein, Y. Park, and C. E. Priebe. [Seeded Graph Matching Via Joint Optimization of Fidelity and Commensurability](#). *arXiv:1401.3813*, 2014.
- 13 A. Banerjee, J. Vogelstein, and D. Dunson. [Parallel inversion of huge covariance matrices](#). *arXiv:1312.1869*, 1312.1869:17, 2013.
- 14 M. Kazhdan, R. Burns, B. Kasthuri, J. Lichtman, J. Vogelstein, and J. Vogelstein. [Gradient-Domain Processing for Large EM Image Stacks](#). *arXiv:1310.0041*, 1310.0041, 2013.

## Peer-Reviewed Journal Publications

- 1 D. Durante, D. B. Dunson, and J. T. Vogelstein. [Rejoinder: Nonparametric Bayes Modeling of Populations of Networks](#). *Journal of the American Statistical Association*, 112(520):1547–1552, 2017.
- 2 J. D. Cohen, L. Li, Y. Wang, C. Thoburn, B. Afsari, L. Danilova, C. Douville, A. A. Javed, F. Wong, A. Mattox, R. H. Hruban, C. L. Wolfgang, M. G. Goggins, M. D. Molin, T.-L. Wang, R. Roden, A. P. Klein, J. Ptak, L. Dobbryn, J. Schaefer, N. Silliman, M. Popoli, J. T. Vogelstein, J. D. Browne, R. E. Schoen, R. E. Brand, J. Tie, P. Gibbs, H.-L. Wong, A. S. Mansfield, J. Jen, S. M. Hanash, M. Falconi, P. J. Allen, S. Zhou, C. Bettgowda, L. Diaz, C. Tomasetti, K. W. Kinzler, B. Vogelstein, A. M. Lennon, and N. Papadopoulos. [Detection and localization of surgically resectable cancers with a multi-analyte blood test](#). *Science*, page eaar3247, January 2018.
- 3 S. Wang, J. T. Vogelstein, and C. E. Priebe. [Joint Embedding of Graphs](#). *arXiv:1703.03862*, 2017.
- 4 E. L. Dyer, W. Gray Roncal, J. A. Prasad, H. L. Fernandes, D. Gürsoy, V. De Andrade, K. Fezzaa, X. Xiao, J. T. Vogelstein, C. Jacobsen, K. P. Körding, and N. Kasthuri. [Quantifying mesoscale neuroanatomy using X-ray microtomography](#). *eNeuro*, 4(5), September 2017.
- 5 A. K. Simhal, C. Aguerrebere, F. Collman, J. T. Vogelstein, K. D. Micheva, R. J. Weinberg, S. J. Smith, and G. Sapiro. [Probabilistic fluorescence-based synapse detection](#). *PLOS Computational Biology*, 13(4):1–24, 04 2017.
- 6 C. Shen, J. T. Vogelstein, and C. E. Priebe. [Manifold matching using shortest-path distance and joint neighborhood selection](#). *Pattern Recognition Letters*, 92:41 – 48, 2017.
- 7 G. Kiar, K. J. Gorgolewski, D. Kleissas, W. Gray Roncal, B. Litt, B. Wandell, R. A. Poldrack, M. Wiener, R. Vogelstein, R. Burns, and J. T. Vogelstein. [Science In the Cloud \(SIC\): A use case in MRI Connectomics](#). *GigaScience*, gix013, mar 2017.
- 8 D. G. C. Hildebrand, R. M. Torres, W. Choi, T. M. Quan, A. W. Wetzel, G. S. Plummer, R. Portugues, I. H. Bianco, S. Saalfeld, A. Baden, L. Kunal, R. Burns, J. T. Vogelstein, W.-K. Jeong, J. W. Lichtman, and F. Engert. [Whole-brain serial-section electron microscopy in larval zebrafish](#). *Nature*, 2017.
- 9 S. Chen, K. Liu, Y. Yang, Y. Xu, S. Lee, M. Lindquist, B. S. Caffo, and J. T. Vogelstein. [An M-Estimator for Reduced-Rank High-Dimensional Linear Dynamical System Identification](#). *Pattern Recognition Letters*, 86:76 – 81, 2017.
- 10 N. Binkiewicz, J. T. Vogelstein, and K. Rohe. [Covariate Assisted Spectral Clustering](#). *Biometrika*, 2017.

- 11 D. Durante, D. B. Dunson, and J. T. Vogelstein. [Nonparametric Bayes Modeling of Populations of Networks](#). *Journal of the American Statistical Association*, 0(ja):0–0, 2016.
- 12 L. Chen, C. Shen, J. T. Vogelstein, and C. E. Priebe. [Robust Vertex Classification](#). *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(3):578–590, 2016.
- 13 R. D. Airan, J. T. Vogelstein, J. J. Pillai, B. Caffo, J. J. Pekar, and H. I. Sair. [Factors affecting characterization and localization of interindividual differences in functional connectivity using MRI](#). *Human Brain Mapping*, 37(5):1986–1997, 2016.
- 14 L. Chen, J. T. Vogelstein, V. Lyzinski, and C. E. Priebe. [A Joint Graph Inference Case Study: the C. Elegans Chemical and Electrical Connectomes](#). *Worm*, 5(2):e1142041, 2016.
- 15 K. M. Harris, J. Spacek, M. E. Bell, P. H. Parker, L. F. Lindsey, A. D. Baden, J. T. Vogelstein, and R. Burns. [A resource from 3D electron microscopy of hippocampal neuropil for user training and tool development](#). *Scientific Data*, 2:150046, 2015.
- 16 D. Koutra, N. Shah, J. T. Vogelstein, B. Gallagher, and C. Faloutsos. [DeltaCon: Principled Massive-Graph Similarity Function with Attribution](#). *ACM Transactions on Knowledge Discovery from Data*, 10(3):28:1–28:43, February 2016.
- 17 W. G. Roncal, D. M. Kleissas, J. T. Vogelstein, P. Manavalan, R. Burns, R. J. Vogelstein, C. E. Priebe, M. A. Chevillet, and G. D. Hager. [An Automated Images-to-Graphs Pipeline for High Resolution Connectomics](#). *Frontiers in Neuroinformatics*, 9, 2015.
- 18 N. Kasthuri, K. J. Hayworth, D. R. Berger, R. L. Schalek, J. A. Conchello, S. Knowles-Barley, D. Lee, Vazquez-Reina, V. Kaynig, T. R. Jones, M. Roberts, J. L. Morgan, J. C. Tapia, H. S. Seung, W. G. Roncal, J. T. Vogelstein, R. Burns, D. L. Sussman, C. E. Priebe, H. Pfister, and J. W. Lichtman. [Saturated Reconstruction of a Small Volume of Neocortex](#). *Cell*, 162:648–661, 2015.
- 19 J. T. Vogelstein, J. M. Conroy, V. Lyzinski, L. J. Podrazik, S. G. Kratzer, E. T. Harley, D. E. Fishkind, R. J. Vogelstein, and C. E. Priebe. [Fast Approximate Quadratic Programming for Graph Matching](#). *PLoS One*, 10:e0121002, 2015.
- 20 J. T. Vogelstein and C. E. Priebe. [Shuffled Graph Classification: Theory and Connectome Applications](#). *Journal of Classification*, 32:3–20, 2015.
- 21 V. Lyzinski, D. L. Sussman, D. E. Fishkind, H. Pao, L. Chen, J. T. Vogelstein, Y. Park, and C. E. Priebe. [Spectral clustering for divide-and-conquer graph matching](#). *Parallel Computing*, 47:70–87, 2015.
- 22 V. Lyzinski, D. E. Fishkind, M. Fiori, J. T. Vogelstein, C. E. Priebe, and G. Sapiro. [Graph Matching: Relax at Your Own Risk](#). *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(1):60–73, Jan 2016.
- 23 N. C. Weiler, F. Collman, J. T. Vogelstein, R. Burns, and S. J. Smith. [Synaptic molecular imaging in spared and deprived columns of mouse barrel cortex with array tomography](#). *Scientific Data*, 1:140046, 2014.
- 24 E. M. Sweeney, J. T. Vogelstein, J. L. Cuzzocreo, P. A. Calabresi, D. S. Reich, C. M. Crainiceanu, and R. T. Shinohara. [A Comparison of Supervised Machine Learning Algorithms and Feature Vectors for MS Lesion Segmentation Using Multimodal Structural MRI](#). *PLoS ONE*, 9:e95753, 2014.
- 25 J. T. Vogelstein, Y. Park, T. Ohyama, R. A. Kerr, J. W. Truman, C. E. Priebe, and M. Zlatić. [Discovery of brainwide neural-behavioral maps via multiscale unsupervised structure learning](#). *Science*, 344(6182):386–92, 2014.
- 26 D. E. Carlson, J. T. Vogelstein, Q. Wu, W. Lian, M. Zhou, C. R. Stoetznner, D. Kipke, D. Weber, D. B. Dunson, and L. Carin. [Multichannel Electrophysiological Spike Sorting via Joint Dictionary](#)

- [Learning & Mixture Modeling](#). *IEEE Transactions on Biomedical Engineering*, 61(1):41–54, 2014.
- 27 J. T. Vogelstein, W. R. Gray, R. J. Vogelstein, and C. E. Priebe. [Graph classification using signal-subgraphs: applications in statistical connectomics](#). *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 35(7):1539–51, 2013.
- 28 R. C. Craddock, S. Jbabdi, C.-G. Yan, J. T. Vogelstein, F. X. Castellanos, A. Di Martino, C. Kelly, K. Heberlein, S. Colcombe, and M. P. Milham. [Imaging human connectomes at the macroscale](#). *Nature Methods*, 10(6):524–39, 2013.
- 29 C. E. Priebe, J. Vogelstein, and D. Bock. [Optimizing the Quantity/Quality Trade-Off in Connectome Inference](#). *Communications in Statistics - Theory and Methods*, 42(19):3455–3462, 2013.
- 30 D. Dai, H. He, J. T. Vogelstein, and Z. Hou. [Accurate prediction of AD patients using cortical thickness networks](#). *Machine Vision and Applications*, 24(7):1445–1457, 2012.
- 31 D. E. Fishkind, D. L. Sussman, M. Tang, J. T. Vogelstein, and C. E. Priebe. [Consistent Adjacency-Spectral Partitioning for the Stochastic Block Model When the Model Parameters Are Unknown](#). *SIAM Journal on Matrix Analysis and Applications*, 34(1):23–39, 2013.
- 32 N. J. Roberts, J. T. Vogelstein, G. Parmigiani, K. W. Kinzler, B. Vogelstein, and V. E. Velculescu. [The predictive capacity of personal genome sequencing](#). *Science Translational Medicine*, 4(133):133ra58, 2012.
- 33 W. R. Gray, J. A. Bogovic, J. T. Vogelstein, B. A. Landman, J. L. Prince, and R. J. Vogelstein. [Magnetic resonance connectome automated pipeline: an overview](#). *IEEE Pulse*, 3(2):42–8, 2012.
- 34 J. T. Vogelstein, R. J. Vogelstein, and C. E. Priebe. [Are mental properties supervenient on brain properties?](#) *Scientific Reports*, 1:100, 2011.
- 35 S. B. Hofer, H. Ko, B. Pichler, J. Vogelstein, H. Ros, H. Zeng, E. Lein, N. A. Lesica, and T. D. Mrsic-Flogel. [Differential connectivity and response dynamics of excitatory and inhibitory neurons in visual cortex](#). *Nature Neuroscience*, 14(8):1045–52, 2011.
- 36 Y. Mishchenko, J. T. Vogelstein, and L. Paninski. [A Bayesian approach for inferring neuronal connectivity from calcium fluorescent imaging data](#). *The Annals of Applied Statistics*, 5(2B):1229–1261, 2011.
- 37 J. T. Vogelstein, A. M. Packer, T. A. Machado, T. Sippy, B. Babadi, R. Yuste, and L. Paninski. [Fast nonnegative deconvolution for spike train inference from population calcium imaging](#). *Journal of Neurophysiology*, 104(6):3691–704, 2010.
- 38 L. Paninski, Y. Ahmadian, D. G. Ferreira, S. Koyama, K. R. Rad, M. Vidne, J. Vogelstein, and W. Wu. [A new look at State-Space Models for Neural Data](#). *Journal of Computational Neuroscience*, 29(1-2):107–26, 2010.
- 39 J. T. Vogelstein, B. O. Watson, A. M. Packer, R. Yuste, B. Jodynak, and L. Paninski. [Spike inference from calcium imaging using sequential Monte Carlo methods](#). *Biophysical Journal*, 97(2):636–55, 2009.
- 40 R. J. Vogelstein, U. Mallik, J. T. Vogelstein, and G. Cauwenberghs. [Dynamically reconfigurable silicon array of spiking neurons with conductance-based synapses](#). *IEEE Transactions on Neural Networks*, 18(1):253–65, 2007.
- 41 J. T. Vogelstein, D. Angelaki, and L. Snyder. [Accuracy of saccades to remembered targets as a function of body orientation in space](#). *Journal of Neurophysiology*, 90(1):521–4, 2003.
- 42 D. L. Greenspan, D. C. Connolly, R. Wu, R. Y. Lei, J. T. Vogelstein, Y. T. Kim, J. E. Mok, N. Muñoz, F. X. Bosch, K. Shah, and K. R. Cho. [Loss of FHIT expression in cervical carcinoma cell lines and primary tumors](#). *Cancer research*, 57(21):4692–8, 1997.



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## Peer-Reviewed Conference Proceedings

- 1 D. Zheng, D. Mhembere, J. T. Vogelstein, C. E. Priebe, and R. Burns. [FlashR: Parallelize and Scale R for Machine Learning Using SSDs](#). *SIGPLAN Not.*, 53(1):183–194, February 2018.
- 2 K. S. Kutten, N. Charon, M. I. Miller, T. Ratnanather, K. Deisseroth, L. Ye, and J. T. Vogelstein. [A Diffeomorphic Approach to Multimodal Registration with Mutual Information: Applications to CLARITY Mouse Brain Images](#). *MICCAI*, 2017.
- 3 D. Mhembere, C. E. Da Zheng, J. T. Vogelstein, and R. Burns. [knor: A NUMA-optimized In-memory, Distributed and Semi-external-memory k-means Library](#). *High Performance Distributed Computing 2017*, 2017.
- 4 T. M. Tomita, M. Maggioni, and J. T. Vogelstein. [ROFLMAO: Robust Oblique Forests with Linear Matrix Operations](#). In *Proceedings of the 2017 SIAM International Conference on Data Mining*. SIAM, 2017.
- 5 K. S. Kutten, J. T. Vogelstein, N. Charon, L. Ye, K. Deisseroth, and M. I. Miller. [Deformably Registering and Annotating Whole CLARITY Brains to an Atlas via Masked LDDMM](#). *SPIE Europe*, 2016.
- 6 W. Gray Roncal, M. Pekala, V. Kaynig-fittkau, D. M. Kleissas, J. T. Vogelstein, H. Pfister, R. Burns, R. J. Vogelstein, M. A. Chevillet, and G. D. Hager. [VESICLE : Volumetric Evaluation of Synaptic Interfaces using Computer vision at Large Scale](#). In *26th British Machine Vision Conference (BMVC)*, pages 1–9, 2015.
- 7 D. Zheng, D. Mhembere, R. Burns, J. T. Vogelstein, C. E. Priebe, and A. S. Szalay. [FlashGraph: Processing Billion-Node Graphs on an Array of Commodity SSDs](#). In *USENIX Conference on File and Storage Technologies*, 2015.
- 8 F. Petralia, J. T. Vogelstein, and D. Dunson. [Multiscale Dictionary Learning for Estimating Conditional Distributions](#). *Advances in Neural Information Processing Systems (NIPS)*, pages 1797–1805, 2013.
- 9 D. Carlson, V. Rao, J. T. Vogelstein, and L. Carin. [Real-Time Inference for a Gamma Process Model of Neural Spiking](#). *Advances in Neural Information Processing Systems (NIPS)*, pages 2805–2813, 2013.
- 10 M. Fiori, P. Sprechmann, J. T. Vogelstein, P. Muse, and G. Sapiro. [Robust Multimodal Graph Matching: Sparse Coding Meets Graph Matching](#). *Advances in Neural Information Processing Systems (NIPS)*, pages 127–135, 2013. (spotlight).
- 11 D. Koutra, J. T. Vogelstein, and C. Faloutsos. [DeltaCon: A Principled Massive-Graph Similarity Function](#). *Proceedings of the 2013 SIAM International Conference on Data Mining*, pages 162–170, 2013.
- 12 W. G. Roncal, Z. H. Koterba, D. Mhembere, D. M. Kleissas, J. T. Vogelstein, R. Burns, A. R. Bowles, D. K. Donavos, S. Ryman, R. E. Jung, L. Wu, V. Calhoun, and R. J. Vogelstein. [MI-GRAINE: MRI Graph Reliability Analysis and Inference for Connectomics](#). *IEE GlobalSIP*, 2013.
- 13 D. Mhembere, W. G. Roncal, D. Sussman, C. E. Priebe, R. Jung, S. Ryman, R. J. Vogelstein, J. T. Vogelstein, and R. Burns. [Computing Scalable Multivariate Global Invariants of Large \(Brain-\) Graphs](#). *IEE GlobalSIP*, 2013.
- 14 V. Kulkarni, J. Sastry, J. T. Vogelstein, and L. Akoglu. [Sex Differences in the Human Connectome](#). In *International Conference on Brain and Health Informatics*, 2013. Lecture Notes in Computer Science, Volume 8211.
- 15 R. Burns, W. G. Roncal, D. Kleissas, K. Lillaney, P. Manavalan, E. Perlman, D. R. Berger, D. D. Bock, K. Chung, L. Grosenick, N. Kasthuri, N. C. Weiler, K. Deisseroth, M. Kazhdan,

- J. Lichtman, R. C. Reid, S. J. Smith, A. S. Szalay, J. T. Vogelstein, and R. J. Vogelstein. [The Open Connectome Project Data Cluster: Scalable Analysis and Vision for High-Throughput Neuroscience](#). *Proceedings of the 25th International Conference on Scientific and Statistical Database Management (SSDBM)*. Article No. 27, 2013.
- 16 B. Cornelis, Y. Yang, J. T. Vogelstein, A. Doms, I. Daubechies, and D. Dunson. [Bayesian crack detection in ultra high resolution multimodal images of paintings](#). *DSP 2013 Special Session on Tensor Factorization and its Applications*, 2013.
- 17 Q. J. Huys, J. Vogelstein, and P. Dayan. [Psychiatry: Insights into depression through normative decision-making models](#). *Advances in Neural Information Processing Systems (NIPS)*, pages 729–736, 2008.

## Other Publications

- 1 Neuro Cloud Consortium et al. [To the Cloud! A Grassroots Proposal to Accelerate Brain Science Discovery](#). *Neuron*, 92(3):622–627, 2016.
- 2 J. T. Vogelstein et al. [Grand Challenges for Global Brain Sciences](#), 2016.
- 3 P. Golland, J. Galland, G. Hager, H. Pfister, P. Christos, S. Schaal, and J. T. Vogelstein. [A New Age of Computing and the Brain](#). In *CCC Brain Workshop*, 2015.
- 4 R. Burns, J. T. Vogelstein, and A. S. Szalay. [From cosmos to connectomes: the evolution of data-intensive science](#). *Neuron*, 83(6):1249–52, 2014.
- 5 R. Yuste, J. MacLean, J. Vogelstein, and L. Paninski. [Imaging action potentials with calcium indicators](#). *Cold Spring Harbor Protocols*, 2011(8):985–9, 2011.
- 6 J. T. Vogelstein. [Q&A: What is the Open Connectome Project?](#) *Neural Systems & Circuits*, 1:16, 2011.
- 7 J. T. Vogelstein, R. J. Vogelstein, and B. Vogelstein. [Testing the effects of genetic variations using MINIME technology](#). *Science*, 286:2300–2301, 1999.

## Unpublished Work – Pre-prints Available upon Request

- 1 Robust Bayesian Inference via Lq-Likelihood. Joint work with D.B. Dunson, Carey E. Priebe, Y. Qin.
- 2 Neuronal Classification from Network Connectivity. Joint work with R. Goldin, D. Marchette, P. Salomonsky, Carey E. Priebe, G. Ascoli.
- 3 Class Morphing. Joint work with D. Marchette, Carey E. Priebe.
- 4 Optimal Spike Inference from in vivo 2-Photon Calcium Imaging. Joint work with D. Greenberg, J. Kerr.
- 5 Extracting Proximity for Brain Graph Voxel Classification. Joint work with N. Sismanis, D.L. Sussman, X. Sun, N. Pitsianis.
- 6 A Six Degree-Of-Freedom Two-Photon Microscope for Functional Imaging in Awake Behaving Primates. Joint work with C.E. Connor et al.
- 7 A Spiking Model of Ventral Cochlear Nucleus in Response to Complex Stimuli, 2004. Joint work with E. Young.
- 8 A Hardware Emulator of Awake Behaving Macaque Primary Motor Cortex, 2003. Joint work with D. Moran.

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## Invited Talks

- 1 *Challenges and Opportunities in Big Data for Neuroscientists*, Society for Neuroscience: DC Metro Area Chapter Keynote Address, 2017.
- 2 [\*NeuroData: Enabling Terascale Neuroscience for Everyone\*](#), Keystone Symposia: State of the Brain, 2016.
- 3 Using big data science to understand what goes on in our heads. SOHOP Faculty Spotlight, 2017.
- 4 Using big data science to understand what goes on in our heads. SOHOP Faculty Spotlight, 2016.
- 5 [\*From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from Heterogeneous Data: Part 1\*](#). DARPA SIMPLEX PI Meeting, 2015.
- 6 [\*Special Symposium: Neuroscience in the 21st Century\*](#), Kavli, 2015.
- 7 [\*Open Connectome Project: Lowering the Barrier to Entry of Big Data Neuroscience\*](#), Institute for Computational Medicine at Johns Hopkins University, 2015.
- 8 [\*Law of Large Graphs\*](#), DARPA Graphs, 2015.
- 9 [\*From RAGs to Riches: Utilizing Richly Attributed Graphs to Reason from Heterogeneous Data\*](#), SIMPLEX Kickoff, 2015.
- 10 [\*Opportunities and Challenges in Big Data Neuroscience\*](#), DoE, 2015.
- 11 [\*Open-Science Platform for Heterogeneous Brain Data: Opportunities and Challenges\*](#), Kavli, 2014.
- 12 [\*Top Challenges of Big Data Neuroscience\*](#), BRAIN Initiative Workshop, Dec 2014.
- 13 [\*Big Statistics for Brain Sciences\*](#), Baylor College of Medicine, Department of Neuroscience, May 2014.
- 14 [\*Big \(Neuro\) Statistics\*](#), Kavli Salon, 2014. Big Data: Practice Across Disciplines.
- 15 [\*Statistical Models and Inference for big Brain-Graphs\*](#), NIPS Workshop on Acquiring and analyzing the activity of large neural ensembles, 2013.
- 16 [\*Beyond Little Neuroscience\*](#), Beyond Optogenetics workshop at Cosyne, 2013.
- 17 [\*Statistical Inference on Graphs\*](#), University of Michigan, 2013.
- 18 [\*Statistical Inference on Graphs\*](#), Scientific Computing Institute, University of Utah, 2013.
- 19 [\*Open Problems in Neuropsychiatry\*](#), Data Seminar, Duke University, 2013.
- 20 [\*BIG NEURO\*](#), Theory and Neurobiology, Duke University, 2012.
- 21 [\*Open Connectome Project\*](#), Academic Medical Center, Amsterdam, 2012.
- 22 [\*Connectome Classification: Statistical Graph Theoretic Methods for Analysis of MR-Connectome Data\*](#), Organization for Human Brain Mapping, 2011.
- 23 [\*Decision Theoretic Approach to Statistical Inference\*](#), guest Lecture in Current Topics in Machine Learning, Johns Hopkins University, 2012.
- 24 NIPS workshop on Philosophy and Machine Learning. [\*Are mental properties supervenient on brain properties\*](#), 2011.
- 25 [\*Once we get connectomes, what the %#\\* are we going to do with them?\*](#), Krasnow Institute for Advanced Study at George Mason University, 2011.



- 26 *What can Translational neuroimaging Research do for Clinical Practice*, Child Mind Institute, 2011.
- 27 [Consistent Graph Classification](#), Guest Lecture in Deisseroth Lab, Stanford University, 2011.
- 28 *Once we get connectomes, what the %\* are we going to do with them?*, Institute of Neuroinformatics, 2011.
- 29 [Consistent Connectome Classification](#), Math/Bio Seminar, Duke University, 2011.
- 30 [Statistical Connectomics](#), Harvard University Connectomics Labs, 2011.
- 31 [Towards Inference and Analysis of Neural Circuits Inferred from Population Calcium Imaging](#), Guest Lecture in Schnitzer Lab, 2009.
- 32 [Towards Inferring Neural Circuits from Calcium Imaging](#), Guest Lecture in Yuste Lab, 2009.
- 33 [Neurocognitive Graph Theory](#), national Security Agency, 2009.
- 34 *Sequential Monte Carlo in Neuroscience*, SAMSI Program on Sequential Monte Carlo, Tracking Working Group, 2009.
- 35 [OOPSI: A Family of Optimal Optical Spike Inference Algorithms for Inferring Neural Connectivity from Population Calcium Imaging](#), Dissertation Defense, 2009.
- 36 *Inferring Spike Trains Given Calcium-Sensitive Fluorescence Observations*, Statistical Analysis of Neural Data, 2008.
- 37 [Inferring spike times given typical time-series fluorescence observations](#), Department of Applied Mathematics and Statistics, Johns Hopkins University, 2008.
- 38 [Inferring spike trains from Calcium Imaging](#), Redwood Center for Theoretical Neuroscience, University of California, Berkeley, 2008.
- 39 [Inferring spike trains from Calcium Imaging](#), Cambridge University, Gatsby Unit, and University College London, 2008.
- 40 *Model based optimal inference of spike times and calcium dynamics given noisy and intermittent calcium-fluorescence observations*, Neurotheory Center of Columbia University, 2007.

## Poster Presentations

- 1 J. T. Vogelstein. [NeuroData: Enabling Terascale Neuroscience for Everyone](#). In *Janelia: High-Resolution Circuit Reconstruction*, 2016.
- 2 S. Chen, J. T. Vogelstein, S. Lee, M. Lindquist, and B. Caffo. [High Dimensional State Space Model with L-1 and L-2 Penalties](#). In *ENAR 2015*.
- 3 J. T. Vogelstein and C. E. Priebe. Nonparametric Two-Sample Testing on Graph-Valued Data. In *Duke Workshop on Sensing and Analysis of HighDimensional Data*, 2013.
- 4 Y. Qin et al. [Robust Clustering of Adjacency Spectral Embeddings of Brain Graph Data via Lq-Likelihood](#). In *OHBM*, 2013.
- 5 D. Koutra et al. [Are All Brains Wired Equally?](#) In *OHBM*, 2013.
- 6 D. Sussman et al. [Massive Diffusion MRI Graph Structure Preserves Spatial Information](#). In *OHBM*, 2013.
- 7 D. Mhembere et al. [Multivariate Invariants from Massive Brain-Graphs](#). In *OHBM*, 2013.
- 8 W. R. Gray et al. [Towards a Fully Automatic Pipeline for Connectome Estimation from High-Resolution EM Data](#). In *OHBM*, 2013.

- 9 C. Craddock et al. Towards Automated Analysis of Connectomes: The Configurable Pipeline for the Analysis of Connectomes. In *OHBM*, 2013.
- 10 N. Sismanis et al. [Feature Clustering from a Brain Graph for Voxel-to-Region Classification](#). In *5th Panhellenic Conference on Biomedical Technology*, 2013.
- 11 J. T. Vogelstein et al. Anomaly Screening and Clustering of Multi-Object Movies via Multiscale Structure Learning. In *DARPA XDATA Colloquium*, 2013.
- 12 E. A. Pnevmatikakis et al. [Rank-penalized nonnegative spatiotemporal deconvolution and demixing of calcium imaging data](#). In *COSYNE*, 2013.
- 13 R. D. Airan, J. T. Vogelstein, et al. [Reproducible differentiation of individual of individual subjects with minimal acquisition time via resting state fMRI](#). In *Proc ISMRM*, page 1932, 2013.
- 14 W. R. Gray et al. [Towards a Fully Automatic Pipeline for Connectome Estimation from High-Resolution EM Data](#). In *Cold Spring Harbor Laboratory, Neuronal Circuits*, 2012.
- 15 J. T. Vogelstein et al. [Statistical Connectomics](#). In *Janelia Farm conference, Statistical Inference and Neuroscience*, 2012.
- 16 J. T. Vogelstein et al. [BRAINSTORM towards clinically and scientifically useful neuroimaging analytics](#). In *Neuroinformatics*, 2012.
- 17 J. T. Vogelstein, D. E. Fishkind, D. L. Sussman, and C. E. Priebe. [Large graph classification: theory and statistical connectomics applications](#). In *IMA conference on Large Graphs*, 2011.
- 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. In *IMA conference on Large Graphs*, 2011.
- 19 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](#). In *Organization for Human Brain Mapping*, 2011.
- 20 J. T. Vogelstein, E. Perlman, D. Bock, W. C. Lee, M. Chang, B. Kasthuri, M. Kazhdan, C. Reid, J. Lichtman, R. Burns, and R. J. Vogelstein. [Open Connectome Project: collectively reverse engineering the brain one synapse at a time](#). *Neuroinformatics*, 2011.
- 21 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](#). In *Society for Neuroscience*, 2011.
- 22 W. R. Gray, J. A. Bogovic, J. T. Vogelstein, C. Ye, B. A. Landman, J. L. Prince, and R. J. Vogelstein. [Magnetic resonance connectome automated pipeline and repeatability analysis](#). In *Society for Neuroscience*, 2011.
- 23 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](#). In *DARPA Neural Engineering, Science and Technology Forum*, 2010.
- 24 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](#). In *DARPA Neural Engineering, Science and Technology Forum*, 2010.
- 25 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](#). In *Organization for Human Brain Mapping*, 2010.

- 26 J. T. Vogelstein, R. Vogelstein, and C. E. Priebe. [A Neurocognitive Graph-Theoretical Approach to Understanding the Relationship Between Minds and Brains](#). In *CSHL conference on Neural Circuits*, 2010.
- 27 J. T. Vogelstein, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. [Towards Confirming Neural Circuit Inference from Population Calcium Imaging](#). In *COSYNE*, 2010.
- 28 J. T. Vogelstein, Y. Mishchenko, A. M. Packer, T. A. Machado, R. Yuste, and L. Paninski. [Towards Confirming Neural Circuits from Population Calcium Imaging](#). In *NIPS Workshop on Workshop on Connectivity Inference in Neuroimaging*, 2009.
- 29 J. T. Vogelstein, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. [Towards Inferring Neural Circuit Inference from Population Calcium Imaging](#). In *COSYNE*, 2010.
- 30 J. T. Vogelstein, Y. Mishchenko, A. M. Packer, T. A. Machado, R. Yuste, and L. Paninski. [Towards Confirming Neural Circuits from Population Calcium Imaging](#). In *Society for Neuroscience*, 2009.
- 31 J. T. Vogelstein, Y. Mishchenki, A. Packer, T. Machado, R. Yuste, and L. Paninski. [Towards Inferring Neural Circuit Inference from Population Calcium Imaging](#). In *COSYNE*, 2009.
- 32 J. T. Vogelstein, B. Babadi, B. Watson, R. Yuste, and L. Paninski. [From Calcium Sensitive Fluorescence Movies to Spike Trains](#). In *Society for Neuroscience*, 2008.
- 33 J. T. Vogelstein and L. Paninski. In *Statistical and Applied Mathematical Sciences Institute (SAMSI) Program on Sequential Monte Carlo Methods*.
- 34 B. Vogelstein, Joshua T Babadi and L. Paninski. [Model-Based Optimal Inference of Spike-Times and Calcium Dynamics given Noisy and Intermittent Calcium-Fluorescence Imaging](#). In *COSYNE*, 2008.
- 35 J. T. Vogelstein and L. Paninski. [Inferring Spike Trains, Learning Tuning Curves, and Estimating Connectivity from Calcium Imaging](#). In *Integrative Approaches to Brain Complexity*, 2008.
- 36 J. T. Vogelstein, B. Jedynek, K. Zhang, and L. Paninski. [Inferring Spike Trains, Neural Filters, and Network Circuits from in vivo Calcium Imaging](#). In *Society for Neuroscience*, 2007.
- 37 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](#). In *COSYNE*, 2007.
- 38 J. T. Vogelstein and K. Zhang. A novel theory for simultaneous representation of multiple dynamic states in hippocampus. In *Society for Neuroscience*, 2004.
- 39 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. In *Society for Neuroscience*, 2002.

## Press

- 1 D. Son and J. Lee. [Research Highlights](#), 2014.
- 2 S. Begley. [Fly brain ‘atlas’ opens door to linking human neurons to actions](#), 2014.
- 3 L. Sanders. [Ten thousand neurons linked to behaviors in fly](#), 2014.
- 4 K. Yandell. [Linking Neurons to Behaviors](#), 2014.
- 5 B. Yirka. [Researchers create a reference atlas for neural circuits in fruit fly larvae](#), 2014.

- 6 T. O’Leary and E. Marder. [Mapping Neural Activation onto Behavior in an Entire Animal](#), 2014.
- 7 L. Gatlin. [Johns Hopkins mathematician receives grant to support study of brain’s circuitry](#), 2014.
- 8 S. Reardon. Worldwide brain-mapping project sparks excitement — and concern. <http://www.nature.com/news/worldwide-brain-mapping-project-sparks-excitement-and-concern-1.20658>, 2016.
- 9 The Kavli Foundation. International brain initiative. <http://www.kavlifoundation.org/international-brain-initiative>, 2016.
- 10 Office of the Spokesperson. International brain initiative launch and vip dialog: Towards an international brain station. <https://2009-2017.state.gov/r/pa/prs/ps/2016/09/262200.htm>, 2016.
- 11 M. T. Review. Three grand challenges for brain science that can be solved in 10 years. <https://www.technologyreview.com/s/602274/three-grand-challenges-for-brain-science-that-can-be-solved-in-10-years/>, 2016.
- 12 National Institutes of Health. International brain projects considered. <http://www.braininitiative.org/2016/04/22/international-brain-projects-considered/>, 2016.
- 13 E. Underwood. International brain projects proposed. <http://science.sciencemag.org/content/352/6283/277>, 2016.
- 14 D. Keiger. The open connectome project takes a close look at the brain. [Johns Hopkins Magazine](#), 2015.
- 15 C. B. Begg and M. C. Pike. Comment on “The Predictive Capacity of Personal Genome Sequencing”. <http://stm.sciencemag.org/content/4/135/135le3.full>, 2012.
- 16 E. J. Topol. Comment on “The Predictive Capacity of Personal Genome Sequencing”. <http://stm.sciencemag.org/content/4/135/135le5.full>, 2012.

## Teaching

- Fall 2016 **NeuroData Design**, EN.580.437, Johns Hopkins University.
- Spring 2016 **Upward Spiral of Science**, EN.580.468, Johns Hopkins University.
- Winter 2015 **Statistical Connectomics**, Neuroimaging Specialization, Coursera.
- Spring 2015 **Statistical Connectomics**, Johns Hopkins University.
- Fall 2015 **Introduction to Computational Medicine**, Co-Teaching, Johns Hopkins University.

## Advising

### Current Advisees

- 09/16 – now **Cencheng Shen**, Assistant Research Faculty, Center for Imaging Science, The Johns Hopkins University.
- 02/16 – now **Jesse Leigh Patsolic**, Assistant Research Engineer, Center for Imaging Science, The Johns Hopkins University.
- 08/14 – now **Tyler Tomita**, PhD candidate, BME.
- 08/14 – now **Eric Bridgeford**, BS candidate, BME.

### Past Advisees

- 08/14 – 06/17 **Greg Kiar**, Neuro-Cartographer, Center for Imaging Science, The Johns Hopkins University.
- 05/16 – 06/17 **Leo Duan**, Post-doctoral Fellow, Center for Imaging Science, The Johns Hopkins University.

06/16 – 07/17 **Guilherme Franca**, *Post-doctoral Fellow*, Center for Imaging Science, The Johns Hopkins University.

08/15 – 08/16 **Albert Lee**, *BS candidate*, BME.

06/15 – 12/15 **Ron Boger**, *BS candidate*, BME.

05/15 – 05/16 **Jordan Matelsky**, *BS, CS and Neuroscience*.

02/15 – 05/16 **Ivan Kuznetsov**, *BS*, BME.

08/14 – 05/16 **Greg Kiar**, *MS*, BME.

## Conference and Journal Activities

### Reviewer

**Annals of Applied Statistics (AOAS).**

**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.**

**NeuroImage.**

**Neuroinformatics.**

**PLoS One.**

**PLoS Computational Biology.**

### Events

Spring 2016 **Organizer**, *Global Brain Workshop*, <http://brainx.io>.

Fall 2015 **Co-Organizer**, *BigNeuro2015: Making Sense of Big Neural Data*, *NIPS Workshop*, <http://neurodata.io/bigneuro2015>.

Winter 2015 **Organizer**, *Hack@NeuroData*, <http://hack.neurodata.io/>.

Fall 2015 **Faculty Supervisor**, *MedHacks*, <http://medhacks.org/>.

Fall 2012 **Co-Organizer**, *Scaling up EM Connectomics Conference*, <https://openwiki.janelia.org/wiki/download/attachments/8687459/final+agenda+EM+Connectomics+100512.pdf>.

## Funding

### Link to Current & Pending

### Past Funding

5/14 – 2/16 **Scalable Brain Graph Analyses Using Big-Memory, High-IOPS Compute Architectures**, *DARPA (GRAPHS)*, Burns (PI), DARPA-BAA-13-15.

3/13 – 1/16 **Computational infrastructure for massive neuroscience image stacks**, *NIH/NSF (BIG-DATA)*, Mitra (PI), 1R01DA036400.

- 2/13 – 9/15 **Endeavor Scientists Training Fellowship**, Child Mind Institute, Vogelstein (PI).
- 9/12 – 8/15 **Data Sharing: The EM Open Connectome Project**, NIH/NIBIB (CRCNS), Burns (PI), 1R01EB016411.
- 1/14 – 12/14 **Data Readiness Level**, *Laboratory for Analytic Sciences*, Harer (PI).
- 1/12 – 10/13 **Graph-Based Scalable Analytics for Big Data**, DARPA (XDATA), Andrews (PI), FA8750-12-C-0239.
- 12/09 – 1/13 **National Center for Applied Neuroscience Project**, NSF, RJ Vogelstein (PI).

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## Languages

- Proficient **English, Hebrew, Love, MATLAB, LaTeX.**
- Inproficient **R, Python, HTML, CSS.**