KELLY L. GEYER

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EDUCATION

Ph.D. Statistics — *Expected 2022*
Boston University — *Boston, MA*
Research: Bayesian modeling of multimodal mutational signatures

M.A. Statistics — *Dec. 2019*
Rice University — *Houston, TX*
Project: Regularized Tensor Decompositions for Interpreting ECoG Data

B.S. Statistics & B.S. Mathematics — *May 2012*
Virginia Tech — *Blacksburg, VA*
Concentration in applied computational mathematics

EXPERIENCE

Research Fellow — **Boston University**
Boston, MA — *Jan. 2020 – Present*
- Analysis of multimodal genomic data using Bayesian topic modeling.
- Bayesian model development and testing with Stan & pyMC3.

Research Assistant — **Rice University**
Houston, TX — *Aug. 2016 – Aug. 2019*
- Project I: Regularized tensor decomposition for interpretation of ECoG data
  - Design methodology for associating regions of brain with audio-visual stimuli.
- Project II: Implicit regularization and solution uniqueness in over-parameterized matrix sensing
  - Seek to the improve understanding of implicit regularization in neural networks.
- Project III: Bayesian variable selection in Dirichlet-multinomial models for topic models
  - Application to structured topic models for analysis of deceptive news articles.
  - Supporting tasks: web scraping, text processing, database, and entity disambiguation.

Assistant Staff — **MIT Lincoln Laboratory**
Lexington, MA — *Sep. 2012 – July 2016*
- Social network exploration of multimodal social media data.
- Feature engineering of unstructured data, and natural language processing.
- Created software for researchers to easily create and analyze social media networks.
- Assisted with the development & testing of coherent change detection algorithms for satellite imagery.

Associate Engineer I — **Lakota Technical Solutions, Inc.**
Columbia, MD — *May 2012 – Aug. 2012*
- Implemented image processing pipelines in C++

Associate Statistical Collaborator — **Laboratory for Interdisciplinary Statistical Analysis & StatCom**
Blacksburg, VA — *March 2010 – May 2012*
- Analyze, interpret, and explain statistical results for researchers at Virginia Tech.

Undergraduate Scholar — **Biocomplexity Institute of Virginia Tech**

Blacksburg, VA *Feb. 2011 – May 2012*

- Statistical analysis of associations between microsatellites and types of cancer.

Undergraduate Research **National Institute for Mathematical and Biological Synthesis**

Knoxville, TN *Summer 2010*

- Performed longitudinal study of insect biodiversity in the Great Smoky Mountains National Park.

TEACHING ASSISTANT EXPERIENCE

Statistics I	Undergrad. level	Boston University	Fall 2019
Statistical Inference	Graduate level	Rice University	Spring 2018
Statistical Computing & Graphics in R	Graduate level	Rice University	Fall 2017
Probability & Statistics	Undergrad. level	Rice University	Fa. 2016; Sp. 2017

LEADERSHIP

Organizational Service

Meeting Coordinator	Campbell Lab, BU Dept. of Medicine	2021+
Graduate student representative	Dept. of Mathematics & Statistics, BU	2020 +
Organizer of admitted Ph.D. student visit	Dept. of Statistics, Rice University	Spring 2020
College campus recruiting	MIT Lincoln Laboratory	2014-2016

Supervision of Undergraduate Student Projects

Directed Reading Program: Variational Inference	Boston University	Fall 2021
Directed Reading Program: Bayesian Statistics	Boston University	2020-2021
Network models of deceptive news	Rice University	Summer 2018
Classification of deceptive news	Rice University	Summer 2017

Supervision of Graduate Student Projects

Classification for targeted sampling & community detection with Twitter data	MIT Lincoln Laboratory	Summer 2016
Clique detection within Twitter networks	MIT Lincoln Laboratory	Summer 2015

PUBLICATIONS

1. Siahkamari, A., Acar, D., Liao, C., **Geyer, K.,** Saligrama, V., & Kulisa, B. (2021). Faster Convex Lipschitz Regression via 2-block ADMM. *Submitted.*
2. **Geyer, K.,** Campbell, F., Chang, A., Magnotti, J., Beauchamp, M., & Allen, G. (2020). Interpretable Visualization and Higher-order Dimension Reduction for ECoG Data. *Workshop Proceedings of IEEE Big Data Conference*.
3. **Geyer, K.,** Kyrillidis, A. & Kalev, A. (2020). Implicit regularization and solution uniqueness in over-parameterized matrix sensing. *Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics, PMLR 108:930-940.*
4. Dagli, C., Campbell, W., Li, L., Williams, J., **Geyer, K.,** Vidaver, G., Acevedo-Aviles, J., Wolf, E., Taylor, J., & Campbell, J. (2016). LLTools: Machine Learning for Human Language Processing. *NIPS Machine Learning Systems Worship*.
5. Campbell, W., Lin, L., Dagli, C., Acevedo-Aviles, J., **Geyer, K.,** Campbell, J., and Priebe, C. (2016). Cross-Domain Entity Resolution in Social Media. *In the 4th International Workshop on Natural Language Processing for Social Media.*
6. Greenfield, K., Caceres, R., Coury, M., **Geyer, K.,** Gwon, Y., Matterer, J., Mensch A., Sahin C., & Simek, O. (2016). A Reverse Approach to Named Entity Extraction and Linking in Microposts. In *#Microposts @ WWW (pp. 67-69)*.
7. **Geyer, K.,** Greenfield, K., Mensch, A., & Simek, O. (2016). Named Entity Recognition in 140 Characters or Less. In *#Microposts @ WWW (pp. 78-79)*.
8. Nayar, H., Miller, B. A., **Geyer, K.,** Caceres, R. S., Smith, S. T., & Nadakuditi, R. (2015). Improved hidden clique detection by optimal linear fusion of multiple adjacency matrices. In *Signals,*

Systems and Computers, 2015 49th Asilomar Conference on Signals, Systems & Computers (pp. 1520-1524). IEEE.

9. Shah, D., Anderson, C., Breimyer, P., Foster, S., **Geyer, K.,** Griffith, J., Heier, A., Majumdar, A., Simek, O., Stanisha, N., & Waugh, F. (2015). Application of graph methods for leveraging open source data during disaster response. In *Global Humanitarian Technology Conference (GHTC), 2015 IEEE (pp. 259-266). IEEE.*
10. Anderson, C., Breimyer, P., Foster, S., **Geyer, K.,** Griffith, J. D., Heier, A., Majumdar A., Simek O., Shah D., Stanisha N.,& Waugh, F. (2015). A network science approach to open source data fusion and analytics for disaster response. In *Information Fusion (Fusion), 2015 18th International Conference on (pp. 207-214). IEEE.*
11. Cha, M., Myra Nam, & **Kelly Geyer**. (2014). Joint SAR image compression and coherent change detection. In *Geoscience and Remote Sensing Symposium (IGARSS), 2014 IEEE International (pp. 13-16). IEEE.*

SOFTWARE DEVELOPMENT

1. **Rho-PCA** (2020). Tensor decomposition of ECoG data. https://github.com/DataSlingers/rho-PCA.
2. **LiLAC** (2016). Multilingual author classification. https://github.com/mitll/LiLAC.
3. **TweetE** (2015). Sampling Twitter networks based on profiles & tweets. https://github.com/mitll/TweetE.

PROFESSIONAL COMPENTENCIES

Select Graduate Coursework	Statistical Inference, Machine Learning, Bayesian Statistics, Deep Learning, Optimization Theory, Online Learning, Time Series Analysis
Programming (Proficient)	Python, R, Matlab
Specialized Libraries	Stan, TensorFlow, pyTorch, pyMC3, NLTK, Tensor Toolbox
Operating Systems	Linux, MacOS, Windows
Other Frameworks	Docker, PostgreSQL, Git, grid/cluster computing, LaTex
Programming (Introductory)	C++, Java, SAS

PRESENTATIONS

Joint estimation of signatures across mutation modalties using Multi-Modal NMF
Computational Biomedicine Seminar, BU Dept. of Medicine — Dec. 2021
Computational Biomedicine Seminar, BU Dept. of Medicine — June 2021

Creating beautiful and informative graphs using R/ggplot
Computational Biomedicine Retreat, BU Dept. of Medicine — April 2021

Interpretable visualization and higher-order dimension reduction for ECoG data
IEEE International Workshop on Big Data Reduction — Dec. 2020

Implicit Regularization and solution uniqueness in over-parameterized matrix sensing
AISTATS — Aug. 2020

Joint SAR image compression and coherent change detection
IEEE IGARSS — July, 2014

Biodiversity in the Great Smoky Mountains National Park: Past and Present Metrics
Undergraduate Research Conference at the Interface of Biology and Mathematics — Nov. 2010

AWARDS

Travel Grant, Graduate Student Organization, Boston University	2021
Travel Award, Dept. of Mathematics & Statistics, Boston University	2020 x 2
Undergraduate Research Award, Dept. of Statistics, Virginia Tech	2012
Johns Hopkins Applied Physics Laboratory Scholarship	2008-2012
Marion & Charlotte Eckert Statistics Scholarship, Virginia Tech	2008