# KELLY L. GEYER

111 Cummington Mall #140C | Boston, MA 02215| klgeyer@bu.edu | https://kgeyer.github.io |

## EDUCATION

**Ph.D. Statistics** — *Expected 2022*
*Boston University* — *Boston, MA*
**Research focus:** High dimensional statistics and Bayesian topic models for single cell analysis

**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** — **Campbell Lab, Boston Univ.**
*Boston, MA* — *Jan. 2020 – Present*
- Analysis of single cell sequencing 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 multimodality 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**
*Columbia, MD* — *May 2012 – Aug. 2012*
- Implemented image processing pipelines in C++

**Associate Statistical Collaborator** — **Laboratory for Interdisciplinary Statistical Analysis**
*Blacksburg, VA* — *March 2010 – May 2012*
- Analyze, interpret, and explain data 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 | Undergraduate 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 | Undergraduate level | Rice University | Fall 2016 & Sp. 2017 |

## LEADERSHIP

### Organizational Service

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| Graduate Student Representative | Dept. of Mathematics & Statistics, Boston University | 2020+ |
| Organizer of Admitted Ph.D. Student Visit | Dept. of Statistics, Rice University | Sp. 2020 |
| College Campus Recruiting | MIT Lincoln Laboratory | 2014-2016 |

### Project Supervision

***Supervision of Undergraduate Student Projects***

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

***Supervision of Graduate Student Projects***

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| Content-based 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. **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*.
2. **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.*
3. 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*.
4. 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.*
5. 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)*.
6. **Geyer, K.,** Greenfield, K., Mensch, A., & Simek, O. (2016). Named Entity Recognition in 140 Characters or Less. In *#Microposts @ WWW (pp. 78-79)*.
7. 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.*
8. 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.*
9. 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.*
10. 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

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| **Relevant Coursework** | Statistical Inference, Machine learning, Bayesian statistics, Deep learning, Optimization theory, Online learning |
| **Programming (Proficient)** | Python, R, Matlab |
| **Specialized Libraries** | Stan, TensorFlow, pyTorch, pyMC3, NLTK, Tensor Toolbox |
| **Operating Systems** | Linux, MacOS, Windows |
| **Office & Collaboration** | Slack, Latex, Google Docs, Microsoft Office |
| **Other Frameworks** | PostgreSQL, Git, grid/cluster computing |
| **Exposure (Introductory)** | C++, Java, SAS |

## HONORS

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| **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 |