ELIZABETH SPENCER

162 Allston St., Apt. 2 ◇ Boston, MA 02134
(443) · 798 · 1830 ◇ erss@bu.edu

EDUCATION

Boston University Aug 2015 – Present
Ph.D. Program in Neuroscience, Computational Specialization

University of Maryland, College Park (Honors Program) Aug 2011 – May 2015
B.S. in Mathematics (GPA: 3.74) & B.A. in French Language and Literature (GPA: 4.0)

RESEARCH EXPERIENCE

Neural Dynamics and Data Analysis Lab Aug 2015 – Dec 2015, Aug 2016 – Present
Boston University, Boston, Massachusetts

Studying childhood epilepsy using brain functional network models.

Studied methods of data assimilation by incorporating simulated data of a neuronal firing pattern using the unscented Kalman filter combined with the FitzHugh-Nagumo mathematical model in order to untangle specific parameter configurations supporting observed activity.

Laboratory of Neural Circuit Formation Jan 2016 – Aug 2016
Boston University, Boston, Massachusetts

· Analyzed calcium-imaging data recorded from the premotor cortex of zebra finch during birdsong to study sensory-motor learning in songbirds.

Institute for Pure and Applied Mathematics (IPAM) Jun 2014 – Aug 2014
University of California, Los Angeles, California

Studied methods of computing the channel capacity of satellite communication systems, particularly the Mobile User Objective System, focusing on the mathematical modeling of the channel and development of numerical methods for computing the channel capacity.

Center for Harmonic Analysis Aug 2013 – Dec 2013
University of Maryland, College Park, Maryland

Mapped the molecular content of the human retina, such as macular pigments and fluorescent photochemicals that accumulate in humans retinas, while studying modern mathematical techniques used in medical imaging.

Center for Nonlinear Analysis May 2013 – Jul 2013
Carnegie Mellon University, Pittsburgh, Pennsylvania

Created and evaluated models used to predict galaxy redshifts using different statistical regression techniques, including general additive models, linear models, and smoothing splines.

AWARDS

Third Place Henry I. Russek Student Achievement Award in Graduate Medical Sciences April 2019
First Place Computational Neuroscience Poster in neuroscience recruitment fair Feb 2018, March 2020
National Science Foundation Graduate Research Fellow Awardee April 2017

– "A Dynamic Approach to Resolving the Brain," proposal to analyze how dynamic functional networks fluctuate along their anatomical white matter pathways.

PEER-REVIEWED ACTIVITIES

JOURNAL ARTICLES

E. Spencer*, L.-E. Martinet, E.N. Eskandar, C.J. Chu, E.D. Kolaczyk, S.S. Cash, U.T. Eden, M.A. Kramer, *A procedure to increase the power of Granger-causal analysis through temporal smoothing*, Journal of Neuroscience Methods, 2018 Oct 1;308:48-61.

PRESENTATIONS

"Brain Networks in Epilepsy"
Math Department Community Seminar, BU, Boston, MA April 2019

"Procedure to increase the power of Granger-causal analysis through temporal smoothing"
Cognitive Rhythms Collaborative, MIT, Boston, MA April 2018

"National Science Foundation Graduate Research Fellowship Session"
American Mathematical Society Professional Development Series, BU Chapter, Boston, MA Sept 2017

POSTERS

"Characterizing the relationship between sleep spindles and neurocognitive deficits in epileptic encephalopathy"
Society for Neuroscience Annual Meeting, Chicago, IL — Oct 2019

"Characterizing the relationship between functional connectivity and neurocognitive deficits in benign epilepsy with centrotemporal spikes"
Statistical Analysis of Neuronal Data, Pittsburgh, PA — May 2019
Society for Neuroscience Annual Meeting, San Diego, CA — Nov 2018

"Network inference for dynamic modeling of epileptic seizures"
Society for Neuroscience Annual Meeting, Washington, D.C. — Nov 2017

"Calculating Channel Capacity of Satellite Communications"
Joint Mathematics Meetings, San Antonio, TX — Jan 2015

"Developing Regression Models to Predict Galaxy Redshifts"
Joint Mathematics Meetings, Baltimore, MD — Jan 2014

"Applied Harmonic Analysis for Retinal Imaging – Dimensionality Reduction and Classification"
Biosciences Research and Technology Review Day, University of Maryland, College Park, MD — Nov 2013

CONFERENCES AND WORKSHOPS

Summer Workshop on the Dynamic Brain
Allen Institute for Brain Science, Friday Harbor, WA — Aug 23 - Sept 8, 2019

Ninth International Workshop: Statistical Analysis of Network Data, travel and registration award
University of Pittsburgh, Pittsburgh PA — May 2019

The MIT IMPACT program
Selected for semester long mentorship program to refine research focus to optimize impact, develop communication skills and engage in professional development with faculty from institutions and companies in the Boston area
Massachusetts Institute for Technology, Boston MA — Feb - May 2019

Data Institute Annual Conference, travel and registration award
Conference and workshops for data scientists in networks and machine learning
University of San Francisco, San Francisco, CA — March 2019

Society for Neuroscience Annual Meeting
Washington, D.C. — Nov 2018

Society for Neuroscience Annual Meeting
San Diego, CA — Nov 2017

Workshop in Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap
Workshop at the Mathematical Biosciences Institute, The Ohio State University — Oct 17 - 21 2016

Summer School in Computational Sensory-Motor Neuroscience
Workshop at University of Minnesota, Minneapolis, MN — July 31 - Aug 14, 2016

Course in Mining and Modeling of Neuroscience Data
Workshop at the Redwood Center for Theoretical Neuroscience, UC Berkeley, CA — July 11 - 22, 2016

PROFESSIONAL ACTIVITIES AND SERVICE

Organizer of the NeuroArts Forum: lecture series bringing neuroscientists and artists from different communities to facilitate cross talk between the arts and sciences. — October 2019

Directed Reading Program, undergraduate mentoring program to guide reading through a mathematics text book, work on a related project and prepare presentation

- Studying Dr. Kolaczyk's *Statistical Analysis of Network Data: Methods and Models* — Jan – May 2019
- Studied Drs. Kolaczyk and Csardi's *Statistical Analysis of Network Data With R* — Sep – Dec 2018

Graduate Women In Science and Engineering mentorship program
Mentored undergraduate studying neuroscience over weekly meetings — Sep - Dec 2018

Neuroscience Graduate Student Organization Outreach Committee — Jan 2016 – Present

- Prepared and organized activities for BU booth at Boston's Museum of Science for Brain Awareness Week — Jan - March 2016, 2017, 2018, 2019

- Volunteer for SET (Science, Engineering, Technology) in the city - Day of Career Exploration for High School Girls — April 7, 2018
- Helped design four after school neuroscience club meetings at William H. Lincoln Elementary School — Jan – March 2017

West End House Elementary Girls Science Club, volunteer — Sep 2017 – Mar 2018
Computational Neuroscience Student Organization, Treasurer — Aug 2015 – July 2019

RELEVANT COURSEWORK

Neuroscience Coursework

- *Completed at Boston University*: Principles of Neuroscience I: Molecules to Systems, Frontiers of Neuroscience I, Neural Systems: Functional Circuit Analysis, Neural Systems: Cognition and Behavior, Frontiers of Neuroscience II

Mathematics Coursework

- *Completed at Boston University*: Accelerated Introduction to Statistical Methods for Quantitative Research,Statistical Analysis of Network Data, Point Processes, Introduction to Modeling and Data Analysis in Neuroscience, Bioinformatics, Dynamical Systems, Statistics Seminar: Statistical Modeling and Inference for Network Data, Bayesian Statistics
- *Completed at University of Maryland*: Calculus III, Introduction to Linear Algebra, Principles of Micro-Economics, Differential Equations, Introduction to Analysis, Advanced Calculus I, Advanced Calculus II, Introduction to Probability Theory, Research Interaction Teams on Sparse Methods in Biological Data, Linear Algebra, Introduction to Numerical Analysis I
- *Completed at Carnegie Mellon University*: Wavelets and Fractals, Symbolic Programming Methods

Physics Coursework

- *Completed at University of Maryland*: Introductory Physics: Mechanics and Relativity, Introductory Physics: Fields, Introductory Physics: Waves, Quantum Mechanics I, Quantum Mechanics II, Intermediate Theoretical Methods

SKILLS

Computer Proficiencies	MATLAB, R, Python, Java
Spoken Languages	Proficient in French