ELIZABETH SPENCER

Phone: (443) 798-1830
erss@bu.edu
GitHub: https://github.com/erss
Website: https://erss.github.io/

EDUCATION

Boston University, Graduate Program for Neuroscience (computational specialty) 2015 - Present
Advisors: Mark Kramer, Ph.D., Uri Eden, Ph.D., Catherine Chu, MD.

University of Maryland, College Park (Honors Program) 2011 - 2015
BS: Mathematics (GPA 3.74) & **BA:** French Language and Literature (GPA 4.0)
Minor in Physics

RESEARCH GRANTS

National Science Foundation Graduate Research Fellow (NSF GRFP) Apr 2017
Proposal to analyze how dynamic functional networks fluctuate along their anatomical white matter pathways, "A Dynamic Approach to Resolving the Brain."

RESEARCH EXPERIENCE

Dissertation, Boston University (BU), Boston, MA 2015 - Present
Advisors: Mark Kramer, Ph.D. & Uri Eden, Ph.D. - Neural Dynamics & Data Analysis Lab (BU)
Catherine Chu, M.D. - Chu Lab at Massachusetts General Hospital (MGH)
"Development of biomarkers and statistical models to characterize disease with applications in childhood epilepsy and Angelman syndrome."

Industry Research Internship Summer 2020
Biogen Inc & Massachusetts General Hospital, Boston MA
- Developed approach to use a clinical biomarker, delta power, to measure treatment response in Angelman syndrome.

Research in Industrial Projects for Students Summer 2014
Institute for Pure and Applied Mathematics, University of California, Los Angeles, CA
The Aerospace Corporation, El Segundo, CA
- Studied methods for computing the channel capacity of satellite communication systems.

Undergraduate research assistant Fall 2013
Center for Harmonic Analysis, University of Maryland (UMD), College Park, MD
Advisor: Wojciech Czaja, Ph.D.
- Studied wavelet transforms with applications in medical imaging.

Summer Undergraduate Applied Mathematics Institute Summer 2013
Center for Nonlinear Analysis**,** Carnegie Mellon University, Pittsburgh, PA

- Studied statistical regression techniques, including general additive models, linear models, and smoothing splines, to build models to predict galaxy redshifts.

PEER-REVIEWED PUBLICATIONS

SPENCER, E., SHI, W., OSTROWSKI, L., KOMOROWSKI, R., KRAMER, M., & CHU, C. (2021). *Treatment-induced deviations of delta power from natural history model correlate with UBE3A expression in Angelman syndrome*, in progress.

SPENCER, E., STOYELL, S., CHINAPPEN, D., OSTROWSKI, L., MORGAN, A., EMERTON, B., JING, J., WESTOVER, M., EDEN, U., STICKGOLD, R., MANOACH, D., KRAMER, M. A., & CHU C. (2021). *Sleep spindle deficits reduced in frontotemporal regions of cortex predict neurocognitive deficits in epileptic encephalopathy*, in progress.

OSTROWSKI, L., **SPENCER, E.**, BIRD, L., THIBERT, R., KOMOROWSKI, R., KRAMER, M., CHU, C. (2021). *Delta power is a robust biomarker of cognitive function in Angelman* Syndrome, under review.

KRAMER, M. A., STOYELL, S., CHINAPPEN, D., OSTROWSKI, L., **SPENCER, E.**, MORGAN, A., EMERTON, B., JING, J., WESTOVER, M., EDEN, U., STICKGOLD, R., MANOACH, D., & CHU C. J. (2021). *Focal sleep spindle deficits reveal focal thalamocortical dysfunction and predict cognitive deficits in childhood epilepsy with centrotemporal spikes.* The Journal of Neuroscience, JN-RM-2009-20.

MARTINET, L.-E., KRAMER, M. A., VILES, W., PERKINS, L. N., **SPENCER, E.**, CHU, C. J., CASH, S. S., & KOLACZYK, E. D. (2020). *Robust dynamic community detection with applications to human brain functional networks*. Nature Communications, 11(1), 2785.

SPENCER, E., MARTINET, L. E., ESKANDAR, E. N., CHU, C. J., KOLACZYK, E. D., CASH, S. S., EDEN, U. T., & KRAMER, M. A. (2018). *A procedure to increase the power of Granger-causal analysis through temporal smoothing*. Journal of Neuroscience Methods, 308(July), 48–61.

PRESENTATIONS AND POSTERS

Presentations

Brain Networks in Epilepsy
Math Department Community Seminar, BU, Boston, MA — Apr 2019

Procedure to increase the power of Granger-causal analysis through temporal smoothing
Cognitive Rhythms Collaborative, MIT, Cambridge, MA — Apr 2018

NSF Graduate Research Fellowship Session
American Mathematical Society Professional Development Series, BU, 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 Nov 2017

Developing Regression Models to Predict Galaxy Redshifts
Joint Mathematics Meetings, Baltimore, MD Jan 2015

Applied Harmonic Analysis for Retinal Imaging – Dimensionality Reduction and Classification
Biosciences Research and Technology Review, UMD, College Park, MD Nov 2013

PROFESSIONAL TRAINING

Summer Workshop on the Dynamic Brain Aug - Sept 2019
Allen Institute for Brain Science & University of Washington, Friday Harbor, WA
Two-week course featuring lectures on computational modeling applied to visual system neuroscience, Python bootcamp and group project using the Allen Institute's open datasets (project: *Characterization of Oscillations in Visual Cortex*).

The MIT IMPACT program Spring 2019
Massachusetts Institute of Technology, Cambridge, MA
Semester long mentorship program to refine research focus to optimize scientific impact, develop communication skills and engage in professional development with faculty from institutions and companies in the Boston area.

Summer School in Computational Sensory-Motor Neuroscience Aug - Sept 2016
University of Minnesota, Minneapolis, MN
Two-week course featuring lectures on modeling applied to sensory and movement science and a group project (project: *Modeling the Relationship Between Reward and Sensory Feedback in Sensorimotor Adaptation*).

Course in Mining and Modeling of Neuroscience Data July - Aug 2016
Redwood Center for Theoretical Neuroscience, University of California, Berkeley, CA
Two-week course featuring computational and statistical modeling techniques for analyzing big data.

HONORS AND AWARDS

First Place Computational Neuroscience Poster Feb 2018, Mar 2020
Poster session for all students in the BU Graduate Program for Neuroscience (judged by faculty).

Third Place Henry I. Russek Student Achievement Award Apr 2019
Departmental award for excellence in the BU Graduate Medical Sciences.

PROFESSIONAL ACTIVITIES AND SERVICE

NeuroArts Forum: Co-Organizer Oct 2019

Lecture series brining neuroscientists and artists from different communities to facilitate crosstalk between the arts and sciences.

Directed Reading Program: Mentor Fall 2018 & Spring 2019
Semester-long mentoring of a BU undergraduate student in a private reading course, and completion of a related research project and presentation. Topics:

- Dr. Kolaczyk's *Statistical Analysis of Network Data: Methods and Models*.
- Drs. Kolaczyk and Csardi's *Statistical Analysis of Network Data with R.*

Graduate Women in Science and Engineering Undergraduate Mentorship Program Fall 2018
Semester long mentorship program of BU undergraduate interested in pursuing graduate school.

Neuroscience Graduate Student Organization Outreach Committee 2016 – 2019

- Prepared and organized activities for BU booth at Boston's Museum of Science annual Brain Awareness Week (Winter 2016 – 19).
- Volunteer for SET (Science, Engineering, Technology) in the city – Day of Career Exploration for High School Girls (April 2018).
- Helped design four-part after school neuroscience club series at William H. Lincoln Elementary School (Fall 2017).

West End House Elementary Girls Science Club, volunteer Fall 2017 – Spring 2018
Computational Neuroscience Student Organization, Treasurer 2016

SKILLS

Computer Proficiencies: MATLAB (expert); R (advanced); and Python (intermediate).
Languages: English and French.