

Emily T. Winn-Nuñez

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RESEARCH INTERESTS

Statistics of shapes, topological data; nonparametric models for big data; applications to data science, machine learning

EDUCATION

Brown University

PhD in Applied Mathematics

MS in Applied Mathematics

Providence, RI

Expected May 2024

May 2019

College of the Holy Cross

AB in Mathematics with High Honors, Magna Cum Laude

Worcester, MA

May 2017

St. Edmund Hall, University of Oxford

Visiting Students Programme

Oxford, England, UK

2015-2016

WORK EXPERIENCE

PhD Data Science Intern

Worked on Facebook Home Ecosystems Team

Meta

Summer 2022

PUBLICATIONS

(# denotes corresponding author)

- E.T. Winn-Nuñez, M. Griffin, # L. Crawford. A Simple Approach for Local and Global Variance Importance in Nonlinear Regression Models. *Under Revision at Computational Data Science and Statistics*. March 2023. doi: <https://doi.org/10.48550/arXiv.2302.02024>. Preprint on arXiv.
- E.T. Winn, M. Vazquez, P. Loliencar, K. Taipale, X. Wang, # G. Heo (2021). A survey of statistical learning techniques as applied to inexpensive pediatric Obstructive Sleep Apnea data. In: Demir, I., Lou, Y., Wang, X., Welker, K. (eds) *Advances in Data Science*. Association for Women in Mathematics Series, vol 26. Springer, Cham. https://doi.org/10.1007/978-3-030-79891-8_12
- K. Lin, J. Rutter, A. Xie, E.T. Winn, B. Pardieu, R. Del Bello, R. Itzykson, Y-R Ahn, Z. Dai, R. Sobhan, G. Anderson, K. Singleton, A. Decker, P. Winter, J. Locasale, L. Crawford, # A. Puissant, # K. Wood. Using antagonistic pleiotropy to design a chemotherapy induced evolutionary trap. *Nature Genetics*, v. 52, 408-417, Apr. 2020.

RESEARCH AND TEACHING EXPERIENCE

NSF Graduate Research Fellow

Division of Applied Mathematics

Brown University

June 2019 - Present

- Upgrade algorithm for ranking variable importance to account for additive effects in addition to marginal effects; apply to genetic data
- Develop method for sampling shapes and manifolds from a distribution
- Program methods in Python and R
- Work to become thesis under Dr. Lorin Crawford

Course Co-Instructor

Division of Applied Mathematics

Brown University

Summer 2020

- Curated first online iteration of Statistical Inference I with colleague Patrick Liscio
- Designed homework assignments, reading quizzes, lecture videos, extra practice problems, and exams
- Managed two undergraduate teaching assistants

Teaching Assistant*Division of Applied Mathematics***Brown University***Sept. 2018 - May 2019*

- o Created answer keys, graded homework assignments, and conducted office hours for undergraduate students
- o Supervised undergraduate teaching assistants and helped with their grading and preparation for office hours
- o Worked under Dr. Matt Harrison (Information Theory) and Dr. Anastasios Matzavinos (Operations Research Methods)

Research Assistant*Division of Applied Mathematics***Brown University***May 2018 - May 2019*

- o Built algorithm for comparing network differences at the local, neighborhood, and global levels under Dr. Lorin Crawford and applied to cancer tissue data
- o Examined limit cycles in chip firing models under Dr. Caroline Klivans
- o Studied graph motifs and k -winner-take-all networks in neural networks under Dr. Elie Bienenstock
- o Programmed in MATLAB, R

Research Assistant*Department of Mathematics and Computer Science***College of the Holy Cross***June 2016 - May 2017*

- o Built topological models of force networks in granular materials under Dr. David Damiano
- o Simulated data for analysis in MATLAB and C++

Teaching Assistant*Department of Mathematics and Computer Science***College of the Holy Cross***Sept. 2016 - May 2017*

- o Created answer keys, graded homework assignments, and conducted office hours for undergraduate students
- o Worked under Dr. Steven Levandoski (Principles of Analysis) and Dr. Daniel Franz (Linear Algebra)

Research Assistant*NSF REU Program in Mathematics***Sam Houston State University***Summer 2016*

- o Collaborated in group of seven undergraduate and graduate students on studying properties of twisted torus links under Dr. Brandy Doleshal and Dr. Taylor Martin
- o Generated data in Python program to create a new thesis, which was proved with help of teammates

PROJECTS

Database for Math Graduate Program GRE Requirements, Qualifying Exam Practices*July 2020 - Present*

- o Gather data about GRE requirements for admission to more than 200 mathematics PhD programs in the US and Canada into one publicly available spreadsheet (available at <https://etwinn.github.io/gre-database/>)
- o Secure funding from Transforming Post-Secondary Education (TPSE) Math to continue work
- o Curate public database about qualifying exam practices in more than 100 mathematics PhD programs via an online survey (available at <https://etwinn.github.io/gre-database/>)

LEADERSHIP AND SERVICE

Brown Undergrad-Grad Mentoring Program*Division of Applied Mathematics***Brown University***2017 - 2020*

Mentored three undergraduate students, providing advice on courses, research, and summer opportunities

Graduate President; Treasurer of AWM Student Chapter*Division of Applied Mathematics***Brown University***2019 - 2020*

Facilitated weekly meetings, monthly events, and support for undergraduate and graduate women in math

Faculty Graduate Liaison*Division of Applied Mathematics***Brown University***2018 - 2019*

Collected all proposed budgets for department graduate student organizations and activities to be presented to the faculty each semester; advocated on behalf of graduate students and suggest departmental reforms to department leaders

Lead Retreat Coordinator*Division of Applied Mathematics***Brown University***2018*

Planned logistics and activities for graduate student fall retreat, including travel, accommodation, food, and research

CODING LANGUAGES

SQL, \LaTeX , MATLAB, Python, R, some C++, familiarity with TensorFlow