

Emily T. Winn-Nuñez

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🌐 etwinn

RESEARCH INTERESTS

Developing computationally efficient, interpretable methods in machine learning. Specialties include nonparametric, nonlinear models and methods for shape data.

EDUCATION

Brown University

PhD. in Applied Mathematics

Advisor: Dr. Lorin Crawford

Providence, RI

Expected May 2024

Brown University

M.S. in Applied Mathematics

Providence, RI

May 2019

College of the Holy Cross

A.B. in Mathematics with High Honors, Magna Cum Laude

Advisor: Dr. David Damiano

Thesis: Topological Modeling of Force Networks in Granular Materials

Worcester, MA

May 2017

St. Edmund Hall, University of Oxford

Visiting Students Programme

Oxford, England, UK

2015-2016

PREPRINTS

- # 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>

PUBLICATIONS

(# denotes corresponding author)

- # 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. doi: <https://doi.org/10.1038/s41588-020-0590-9>.
- M. Berry, V. Diaz, B. Doleshal, T. Martin, # E.T. Winn, and M. Zhou. The component number of a twisted torus link. *Minnesota Journal of Undergraduate Mathematics*, [S.l.], v. 2, n. 1, Apr. 2017. ISSN 2378-5810.

WORK EXPERIENCE

NSF Graduate Research Fellow

Division of Applied Mathematics

Brown University

June 2019 - Present

- Upgraded algorithm for ranking variable importance to account for additive effects in addition to marginal effects; applied to genetic data
- Developed and implemented method for sampling shapes from a distribution and generating new shapes to fit in with given shape data set. Built corresponding R package.

PhD Data Science Intern

Meta

Facebook Home Ecosystems Team

Summer 2022

Created and implemented new algorithm and defined new metric. Recommended strategy changes based on metric's analysis of millions of global Facebook users and overall company goals.

Research Assistant

Brown University

Division of Applied Mathematics

May 2018 - May 2019

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

Research Assistant

College of the Holy Cross

Department of Mathematics and Computer Science

June 2016 - May 2017

Honors thesis in topological models of force networks in granular materials under Dr. David Damiano

Research Assistant

Sam Houston State University

NSF REU Program in Mathematics

Summer 2016

Collaborated with seven undergraduate and graduate students to study properties of twisted torus links under Dr. Brandy Doleshal and Dr. Taylor Martin

RESEARCH PRESENTATIONS

**Denotes event cancelled due to COVID-19 pandemic*

Invited Talks

- Session for Bayesian Computing, Computation for Streaming, Shapes, and Selection, Joint Statistical Meetings, Toronto, ON, August 2023
- Conference on Education, American Mathematical Society, Washington, D.C., September 2022
- AWM Graduate Student Seminar, University of Pittsburgh, Online, April 2022
- Special Session on the Mathematics of Data Science, AMS Spring Eastern Sectional Meetings, Online, March 2022
- Graduate Student Applied Mathematics Seminar, Brown University, Providence, RI, March 2022
- Measuring Graduate Student Success, Virtual Graduate Students Achieving Inclusion Now (GAIN) Conference, Online, October 2021
- Minisymposium on Women in Data Science, Virtual SIAM Conference on Mathematics of Data Science, Online, June 2020
- *Special Session on Mathematics of Data Science, AMS Spring Eastern Sectional Meetings, Medford, MA, 2020
- Models, Inference, and Algorithms Seminar Series, Broad Institute, Cambridge, MA, 2019

Contributed Talks

- Graduate Student Applied Mathematics Seminar, Brown University, Providence, RI, 2019
- AMS Contributed Paper Session on Undergrad. Research, Joint Mathematics Meetings, Atlanta, GA, 2017
- Special Session on Undergrad. Research, AMS Sectional Meetings, Bowdoin College, Brunswick, ME, 2016
- Women in Mathematics in New England (WiMiN), Smith College, Northampton, MA, 2015

Posters

- *Poster Session, SIAM Conference on the Mathematics of Data Science, Cincinnati, OH, 2020
- AWM Graduate Student Poster Session, Joint Mathematics Meetings, Denver, CO, 2020
- MAA Undergraduate Student Poster Session, Joint Mathematics Meetings, Atlanta, GA, 2017
- College of the Holy Cross Summer Research Symposium, Worcester, MA, 2016
- College of the Holy Cross Summer Research Symposium, Worcester, MA, 2015

FELLOWSHIPS AND GRANTS

NSF Graduate Research Fellowship

Fellowship award for outstanding graduate students in science

National Science Foundation

2019 - Present

Patrick L. McCarthy '63 Alumni Scholarship

Scholarship award for legacy students with high grade point average

Holy Cross Alumni Association

2016 - 2017

AWARDS AND HONORS

AWM Workshop Graduate Poster Award

Awarded to recognize best posters in Graduate Women Poster Session

Joint Mathematics Meetings

January 2020

Gertrude McBrien Prize in Mathematics

Awarded to an outstanding mathematics major

College of the Holy Cross

May 2017

Alpha Sigma Nu

National Jesuit Honor Society, recognizes scholarship and service

College of the Holy Cross

Inducted 2016

Pi Mu Epsilon

Mathematical Honors Society

College of the Holy Cross

Inducted 2016

TRAVEL GRANTS

JSM Student Travel Award

Awarded to travel to 2023 Joint Statistics Meetings in Toronto, ON

ASA

August 2023

SIAM Student Travel Award

Awarded to travel to 2020 SIAM Conference on the Math of Data Science in Cincinnati, OH

SIAM

May 2020

AWM Travel Grant (from AWM NSF Workshop Grant)

Awarded to travel to 2020 Joint Mathematics Meetings in Denver, CO

Assoc. for Women in Mathematics

January 2020

MAA Student Travel Grant

Awarded to travel to 2017 Joint Mathematics Meetings in Atlanta, GA

Mathematical Association of America

January 2017

CURATED DATABASES

Database for Math Graduate Program GRE Requirements

2020-2022

- o Gathered data about GRE requirements for admission to more than 200 mathematics PhD programs in the US and Canada into one publicly available resource, funded by Transforming Post-Secondary Education (TPSE) Math

Database for Math Graduate Program Qualifying Exam Practices

April 2021

- o Collected data for public database about qualifying exam practices in mathematics PhD programs via an online survey, which has had more than 100 response so far

TEACHING AND MENTORING EXPERIENCE

Teaching Experience

Co-instructor

Statistical Inference I (APMA 1650)

Brown University

Summer 2020

Teaching Assistant

Operations Research Methods (APMA 1200) with Dr. Anasatios Matzavinos

Brown University

Spring 2019

Teaching Assistant

Information Theory (APMA 1710) with Dr. Matthew Harrison

Brown University

Fall 2018

Teaching Assistant <i>Linear Algebra (MATH 244) with Dr. Daniel Franz</i>	College of the Holy Cross <i>Spring 2017</i>
Teaching Assistant <i>Principles of Analysis (MATH 242) with Dr. Stephen Levandoski</i>	College of the Holy Cross <i>Fall 2016</i>

Pedagogy Training

Sheridan Teaching Seminar - Reflective Teaching (Certificate I) <i>The Harriet W. Sheridan Center for Teaching and Learning</i> Course to “develop and refine fundamental teaching and assessment strategies and communication skills based on how students learn.”	Brown University <i>Fall 2019</i>
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Mentoring Experience

Brown Undergrad-Grad Mentoring Program <i>Division of Applied Mathematics</i> Mentored three students, providing advice on courses, research, and summer opportunities	Brown University <i>2017 - 2020</i>
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SERVICE AND ACTIVITIES

Paper Submission Reviewer <i>Workshop on Geometric and Topological Representation Learning</i> Reviewed three papers submitted to the workshop	ICLR <i>2022</i>
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Member of Review Committee <i>Workshop for Topological Data Analysis and Beyond</i> Reviewed three papers submitted to the workshop	NeurIPS 2020 <i>Fall 2020</i>
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Treasurer of AWM Student Chapter <i>Division of Applied Mathematics</i> Submitting semester budgets and ensured correct documentation and reimbursement of event expenses.	Brown University <i>Fall 2020</i>
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Graduate President of AWM Student Chapter <i>Division of Applied Mathematics</i> Directed and organized weekly meetings and monthly events, including speakers, panels, and support for undergraduate and graduate women in applied math and math	Brown University <i>2019 - 2020</i>
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Faculty Graduate Liaison <i>Division of Applied Mathematics</i> o Organized all proposed budgets for department graduate student organizations and activities each semester o Served as contact between faculty and graduate students and advocate for student well-being	Brown University <i>2018 - 2019</i>
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Lead Retreat Coordinator <i>Division of Applied Mathematics</i> Planned logistics and activities for graduate student fall retreat, including accommodation, food, budgeting, transportation, and research activities	Brown University <i>2018</i>
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CODING LANGUAGES

SQL, \LaTeX , MATLAB, Python, Pytorch, R, some C++

PROFESSIONAL AFFILIATIONS

- American Statistical Association (ASA)
- American Mathematical Society (AMS)
- Association for Women in Mathematics (AWM)
- Society for Industrial and Applied Mathematics (SIAM)
- The Rose Whelan Society