Oliver A. Orejola

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Research Interests, Technical Skills

High-dimensional Probability & Statistics, Time Series Analysis, Random Matrix Theory, Deep Learning
R, R-markdown, python, jupyter notebooks, TensorFlow, MatLab, Excel, GitHub, LaTeX

Education

Tulane University, New Orleans, LA   *Expected:* Aug. 2023
Ph.D. Mathematics Advisor: Gustavo Didier Ph.D.
University of Colorado Boulder, Boulder, CO   May 2016
B.A. Physics
B.A. Mathematics, *Magna Cum Laude*, Advisor: Elizabeth Gillaspy Ph.D.

Research Experience

Tulane University, New Orleans, LA   Aug. 2019 - Present
Graduate Student Researcher
Investigated high dimensional time series and random matrix empirical eigenvalue distributions
Implemented contemporary Machine Learning techniques (DNNs, spectral clustering, etc.)
Constructed a statistical test for unimodality of asymptotic eigenvalue distributions
Developed and proved completeness of games in which coalitions can engage in concealed operations
Colorado School of Mines, Golden, CO   May 2016 - Aug. 2016
REMRSEC REU, *Summer Researcher*
Simulated Adiabatic Quantum computation for the Knapsack Problem
University of Colorado Boulder, Boulder, CO   Aug. 2015 - May 2016

Honors Thesis Research, *Undergraduate Student Researcher*
Proved Cohomologous 2-cocycles defined on a k-graph are also Homotopic
University of Colorado Boulder, Boulder, CO   May 2015 - Aug. 2015

Summer REU, *Summer Researcher*
Collaborated in a study of 2-cocycles paired with a k-graph and the relationship
with their respective C*-algebras

Teaching and Professional Experience

Tulane University, New Orleans, LA
Instructor, Statistics for Scientists   Aug. 2021 - Dec. 2021
Taught introductory probability and statistics concepts to a non-math undergraduate audience
Implemented modern classroom technology to improve student engagement in the zoom/COVID era
Teaching Assistant,   Aug. 2018 - Present
Calculus I - II, Statistics for Scientists, Introduction to Statistics, Mathematical Statistics,
Intro to Applied Math, Experimental Mathematics, and Intro to Probability and Statistics
Summer Teaching Assistant, Explorations in Experimental Math   June 2022
Assisted advanced high school students in developing their critical thinking and mathematical writing skills
Graduate Tutor   Aug. 2019 - Present
Facilitated supplementary learning for undergraduate students in a variety of math classes
Willis Towers Watson, Denver, CO

Benefits Analyst   Oct. 2016 - July 2018
Reviewed bank check ledger and automated pension calculations
Streamlined manual pension calculations for deployment

PhET Interactive Simulations, Boulder, CO

Quality Assurance Consultant   Oct. 2013 - Feb. 2016

Tested simulations for physical correctness, usability, and user accessibility on different platforms

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Awards

Academic Awards

Magna Cum Laude Mathematics Honors Thesis, UC Boulder   May 2016

Dean's List, UC Boulder   Aug. 2013 - May 2016

Research Awards

Summer Research Funding, Tulane University   May 2019, May 2020, May 2021 & May 2022

Outstanding Presentation Award, Mathematical Association of America (MAA) MathFest   Aug. 2015

Professional and Academic Conference Endowment (PACE) Award, UC Boulder   Aug. 2015

Talks/ Posters/ Presentations

Graduate Student Colloquium, Tulane University

On the Empirical Spectral Distribution for Random Matrices with Independent Rows   Oct. 2021

A simple proof of Bell's Inequalities   Nov. 2019

REMRSEC REU Poster, Colorado School of Mines

Simulation and Analysis of the Knapsack Problem in Adiabatic Quantum Computation   Aug. 2016

Thesis Defense, UC Boulder

Cohomologous 2-cocycles are Homotopic 2-cocycles: k-graphs and C^*-algebras   April 2016

MAA Mathfest Presentation, Washington D.C

C^*-algebras from k-Graphs and 2-Cocycles   Aug. 2015

Papers

"On the empirical spectral distribution of large wavelet random matrices for mixed-Gaussian fractional measurements" with Didier, G., Wendt, H. and Abry, P. (in preparation) (2023)

"Hurst multimodality detection based on large wavelet random matrices" with Didier, G., Wendt, H. and Abry, P. (2022) *30th European Signal Processing Conference (EUSIPCO)*

"The Logic of Clandestine Operations" with Naumov, P. (in preparation) (2022).

"Cohomologous 2-cocycles are Homotopic 2-cocycles: k-graphs and C^*-algebras" (2016).
Undergraduate Honors Theses. 1076. https://scholar.colorado.edu/honr_theses/1076

Service & Leadership

SIAM Tulane Student Chapter *Vice President*   Aug. 2020 - June 2022

Graduate Studies Student Association *Mathematics Department Representative*   Aug. 2018 - Dec. 2021

References Available Upon Request