ISAAC DOBES

idobes@berry.edu

EDUCATION

PhD North Carolina State University, Mathematics — May 2025
Dissertation: "Local Unitary Invariants of Multipartite Quantum States and Cayley's First Hyperdeterminant"
Committee: Naihuan Jing (chair), Kailash Misra, Negash Medhin, Jiajia Li

MS North Carolina State, Mathematics — December 2023
Advisor: Naihuan Jing

BS University of Pittsburgh, Mathematics — May 2019
Graduated Magna Cum Laude

HONORS AND AWARDS

NSF Louis Stokes Bridge to the Doctorate Fellowship 2019

TEACHING EXPERIENCE

Berry College, Mt. Berry GA — August 2025 to Present
Visiting Assistant Professor, Math Department

- Professor of Record for the following courses
  - MAT 111: Elementary Statistics
  - MAT 202: Calculus 2

North Carolina State University, Raleigh NC — August 2021 to May 2025
Teaching Assistant, Math Department

- Lead instructor for the following courses:
  - MA 114: Introduction to Finite Mathematics with Applications
  - MA 131: Calculus for Life and Management Sciences A
  - MA 141: Calculus 1
  - MA 242: Calculus 3
- Recitation Leader for the following courses:
  - MA 241: Calculus 2
  - MA 242: Calculus 3

Research Experience

From August 2021 to April 2025, I was a graduate student researcher at North Carolina State University, advised by Dr. Naihuan Jing. My dissertation was on classifying entangled multipartite quantum states and on generalizing the concurrence/n-tangle (two well-known entanglement measures) by means of Cayley's first hyperdeterminant using elementary combinatorics and multilinear/hypermatrix algebra.

Publications

I. Dobes and N. Jing, "Cayley's First Hyperdeterminant is an Entanglement Measure." Submitted to International Journal of Quantum Information in May 2025. Preprint available here: https://arxiv.org/pdf/2504.15511

I. Dobes and N. Jing, "Local Unitary Equivalence of Tripartite Quantum States in Terms of Trace Identities." Quantum Information Processing, Vol. 24 No. 158, 2025. DOI: https://doi.org/10.1007/s11128-025-04784-9

I. Dobes and N. Jing, "Qubits as Hypermatrices and Entanglement," Physica Scripta, Vol. 99n No. 5, 2024. DOI: 10.1088/1402-4896/ad3989

Professional Affiliations

Internship Network in the Mathematical Sciences (INMAS) Participant 2023-2024

AMS Member 2019

Math Alliance Scholar 2018

Other Experience

During the summer of 2024, I interned at Huntington Ingalls Industries, a government contractor for the DOD and DHS. There I built an R shiny web app which computes minimum sample size thresholds for both normal and nonparametric tolerance intervals. This app was built to aide in the test planning phase of experiments to be conducted by the DOD. Alongside developing the app, I co-authored a best practices paper on machine learning model retraining and detecting/measuring model drift, and additionally I shadowed professional statisticians. I attended their consulting meetings with DOD testers, and after a few weeks of learning and observation, I developed my own experimental designs for a previous DOD test. Afterwards I processed and analyzed real-world data obtained from said test, and then presented my findings to the team of statisticians.

COMPUTER SKILLS

Proficient in LaTeX, R and Shiny; experience with Python 3, Git/Github, and Microsoft Office Products (Word, PowerPoint, Excel, etc.)

LANGUAGES

English: Native Language