BRYSON G. KAGY

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EXPERIENCE

Texas State University *2025-Present*
Lecturer

EDUCATION

North Carolina State University *2019-2025*
PhD Advisor: Seth Sullivant
Thesis: Algebraic and Combinatorial Problems in Mathematical Phylogenetics
Master's in Mathematics *2021*

Georgia Institute of Technology *2015-2019*
B.S. Mathematics with Pure Mathematics concentration, May 2019
B.S. Physics, May 2019
Science and Math Research Training (SMaRT) Program

RESEARCH INTERESTS

algebraic statistics, phylogenetics, algebraic combinatorics, phylogenetic networks, coalescent theory, applied algebraic geometry, polyhedral geometry, graphical models, graph theory.

PUBLICATIONS

Identifiability of Large Phylogenetic Mixtures for Many Phylogenetic Model Structures 2025

with Seth Sullivant. Arxiv.org/abs/2508.05832. Submitted to Bulletin of Mathematical Biology.

Methodological considerations for semialgebraic hypothesis testing with incomplete U-statistics 2025

with David Barnhill, Marina Garrote-Lopez, Elizabeth Gross, Max Hill, John Rhodes, Joy Zhang. Arxiv.org/abs/2507.13531. Submitted to J. of the Royal Statistical Society Series B.

The poset of maximal tubings of the cycle graph is a lattice 2025

with Ben Adenbaum, Emily Barnard, Max Hlavacek, Nathan Lesnevich, George Nasr, Katie Waddle. Arxiv.org/abs/2510.09429. Submitted to Forum of Mathematics SIGMA.

Equidistant Circular Split Networks 2024

with Seth Sullivant. Arxiv.org/abs/2402.11032. SIAM Journal on Applied Algebra and Geometry Vol. 9, Iss. 1 2025.

New directions in algebraic statistics: Three challenges from 2023 2024

with Yulia Alexandr, Miles Bakenhus, Mark Curiel, Sameer K. Deshpande, Elizabeth Gross, Yuqi Gu, Max Hill, Joseph Johnson, Vishesh Karwa, Jiayi Li, Hanbaek Lyu, Sonja Petrović, Jose Israel Rodriguez. Arxiv.org/abs/2402.13961. Algebraic Statistics Vol. 15, No. 2, 2024.

ML Threshold of Colored Gaussian Graphical Models 2026

with Danai Deligeorgaki, Roser Homs Pons, Joseph Johnson, Aida Maraj,Pratik Misra,Teresa Yu. In preparation.

Using Quintets for identifiability under the Coalescent Model 2026

with Joe Cummings, Maize Curiel, Bryan Currie, Udani Ranasinghe, John Rhodes. In preparation.

Real Secant Lines to Pairs of Twisted Cubic Curves 2026

with Saima Aslam, Matthew Faust, Jonathan d. Hauenstein, Jordy Lopez Garcia, Margaret Regan, Charles w. Wampler, and Albert Zhang. In preparation.

GRANTS

2026 Proposal selected for a Collaborate@ICERM meeting one week of support (travel, accommodation, meals) for the project Identifiability of Species Relationships from Quintet Concordance Factors with Joe Cummings, Maize Curiel, Bryan Currie, Udani Ranasinghe, John Rhodes.
2025 Proposal selected for an Interdisciplinary Research Cluster at IMSI Two weeks of support (travel, accommodation, meals) for the project Correlated Equilibrium Polytopes of Zero-Sum Games with Danai Deligeorgaki, Max Hill, and Stefana Sorea.

AWARDS AND HONORS

2024-2025 North Carolina State University Franke-Norris-Griggs Award for Excellence in Teaching
Summer 2025 IMSI Interdisciplinary Research Cluster Organizer
Fall 2024 ICERM semester program participant
Summer 2024 AMS MRC on Algebraic Combinatorics participant
Fall 2023 IMSI long program participant
2023 North Carolina State University Preparing the Professoriate participant
Spring 2019 North Carolina State University Provost Fellowship
2017-2018 Georgia Institute of Technology School of Mathematics Outstanding Math Major Award

TEACHING EXPERIENCES

Texas State University Fall 2025-Present

- **As Primary Instructor**:
- Fall 2025 MA 1329. Mathematics for Business and Economics II.
- Fall 2025 MA 2473. Integral Calculus with Multivariables and Series.

North Carolina State University Summer 2020-Spring 2025

- **As Primary Instructor**:
- Spring 2025 MA 241- Calculus 2
- Fall 2024 MA 405- Introduction to Linear Algebra and Matrices
- Spring 2024 MA 103- Intro to Contemporary Math, As part of Preparing the Professoriate
- Fall 2023 MA 103- Intro to Contemporary Math
- Spring 2023 MA 103- Intro to Contemporary Math
- Fall 2022 MA 103- Intro to Contemporary Math
- Summer 2022 MA 241- Calculus 2
- Spring 2022 MA 241- Calculus 2
- Fall 2021 MA 111- Precalculus
- **As Recitation Leader**:
- Summer 2021 MA 141- Calculus 1
- Spring 2021 MA 241- Calculus 2
- Fall 2020 MA 241- Calculus 2

North Carolina Governor's Honors School Instructor Summer 2023-Summer 2024

- 4 week summer program for gifted high schoolers from across the state
- Designed and gave my own course on graph theory and combinatorics. Gave an introductory exposure to proofs as well Advised multiple groups on their final cornerstone math research projects.

Georgia Institute of Technology Fall 2016-Fall 2018

- **As Recitation Leader**:
- Fall 2018 Math 1552- Calculus 2
- Spring 2018 Math 1552- Calculus 2
- Fall 2017 Math 1552- Calculus 2
- Spring 2017 Math 1552- Calculus 2
- Fall 2016 Math 1551- Calculus 1

PRESENTATIONS AND TALKS

2025 SIAM Conference on Applied Algebraic Geometry minisymposium on phylogenetic networks "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2025 Spring Southeastern AMS Sectional Meeting "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2025 Joint Mathematics Meeting AMS Special Session on MRC Algebraic Combinatorics: "Inversion sets of the Poset of the Cyclohedron"
2024 UNCW Combinatorics and Probability Seminar: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 Brown University graduate student seminar: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 ICERM semester program: Theory, Methods, and Applications of Quantitative Phylogenomics: "U-Statistics applied to Phylogenetics"
2024 ICERM Theory, Methods, and Applications of Quantitative Phylogenomics graduate students seminar: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 Graduate Students Combinatorics Conference: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 Graduate Recruitment Weekend: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 Joint Mathematics Meeting AMS Special Session on Algebraic Approaches to Mathematical Biology: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
Fall 2023 IMSI long program - Algebraic Statistics and Our Changing World: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2019 National Conference on Undergraduate Research: "Fair Division for Drawing Legislative Districts"
2018 SIAM LA-TX conference: "Fair Division for Drawing Legislative Districts"

POSTERS

2024 ICERM: From Phylogenetics to Phylogenomics: Mathematical and Statistical Challenges in the Era of Big Data: "Distinguishability of Species Relationships from Quintet Concordance Factors"
2024 ICERM: Current Methods and Open Problems in Mathematical and Statistical Phylogenetics: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 International Symposium on Symbolic and Algebraic Computation: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"
2024 Graduate Student Meeting in Applied Algebra and Combinatorics: "A Description of the Polyhedral Geometry of Equidistant Phylogenetic Networks"

2019 Joint Mathematics Meeting: "Fair Division for Drawing Legislative Districts"
2018 Joint Mathematics Meeting: "One-Bit Johnson-Lindenstrauss Lemma"
2017 Young Mathematicians Conference: "One-Bit Johnson-Lindenstrauss Lemma"

WORKSHOPS AND CONFERENCES ATTENDED

Summer 2025 IMSI New Directions in Algebraic Statistics workshop
Summer 2025 AMS MRC on Real Numerical Algebraic Geometry
Fall 2024 ICERM semester program- "Theory, Methods, and Applications of Quantitative Phylogenomics"
Summer 2024 University of Hawaii Algebraic Methods in Phylogenetics Workshop
Summer 2024 AMS MRC on Algebraic Combinatorics
Fall 2023 IMSI long program - "Algebraic Statistics and Our Changing World"
Summer 2022 Joint MSRI-BIRS Graduate Summer School - "Sums of Squares Method in Geometry, Combinatorics and Optimization"

TECHNICAL STRENGTHS

Computer Languages Java, LaTeX, Macaulay2, Polymake, Maple, Python

OUTREACH

Math Doesn't Bug Me Fall 2019

Volunteer

Emory Math Circle Summer 2019

Teaching Assistant

Mathapalooza Exhibit Fall 2018-Spring 2019

Organizer

Seven Bridges of Königsberg Show Fall 2018

Organizer