ALEYAH DAWKINS

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EDUCATION EXPERIENCE

NSF MPS-Ascend Postdoctoral Research Fellow, Carnegie Mellon University　　　　August 2024–Present
Scientific Mentor: Michael Young

Ph.D. in Mathematics, George Mason University (GMU)　　　　August 2019–May 2024
Advisors: Geir Agnarsson and Rachel Kirsch

B.S. in Mathematics, James Madison University (JMU)　　　　August 2012–May 2016

INDUSTRY EXPERIENCE

Los Alamos National Laboratory, Los Alamos, New Mexico　　　　August 2023–August 2024
Guest Student

U.S. Census Bureau, Suitland, Maryland　　　　December 2016–August 2019
Statistician

RESEARCH INTERESTS

Combinatorics extremal graph theory, graph labeling, Ramsey theory,

PUBLICATIONS AND PREPRINTS

1. A. Cao, A. Dawkins, J. Hutchins, and O. Luce *Radio gracefulness of Moore graphs and beyond* arXiv:2510.00228, Submitted, 2025.

2. M. Bayer, S. Borgwardt, T. Chambers, S. Daugherty, A. Dawkins, D. Deligeorgaki, H. Liao, T. McAllister, A. Morrison, G. Nelson, and A. Vindas-Meléndez *Combinatorics of generalized parking-function polytopes*, Discrete & Computational Geometry, 2025. [arXiv:2403.07387]

3. A. Dawkins, V. Gupta, M. Kempton, W. Linz, J. Quail, H. Richman, Z. Stier. *A Ricci flow on graphs from effective resistance*, Journal of Combinatorics, 2025. [arXiv:2403.01151]

4. A. Dawkins, V. Gupta, M. Kempton, W. Linz, J. Quail, H. Richman, Z. Stier. *Node resistance curvature in Cartesian graph products*, Journal of Combinatorics, 2025. [arXiv:2403.01037]

5. K. Isham, L. Monroe, K. Lakhotia, A. Dawkins, D. Hwang, and .A. Kubicek, *Edge-Disjoint Spanning Trees on Star-Product Networks*, 2025 IEEE International Parallel and Distributed Processing Symposium (IPDPS). [arXiv:2403.12231]

6. G. Agnarsson, E. Alhajjar, and A. Dawkins. *On locally finite ordered rooted trees and their rooted subtrees*, Discrete Applied Mathematics, 2025. [arXiv:2312.11379]

7. A. Dawkins, J. Elder, P. E. Harris, K. Harry, D. Smith, and B. E. Tenner. *On the Lucky and Displacement Statistics of Stirling Permutations*, Journal of Integer Sequences, 2024. [arXiv:2403.03280]

8. A. Dawkins and R. Kirsch. *Hamiltonicity and related properties in K_{r+1}-free graphs* arXiv:2310.11452, Submitted, 2023.

RESEARCH EXPERIENCE

Graduate Research Assistant Los Alamos National Laboratory
Advisor: Dr. Laura Monroe June 2023–August 2023

Topic: *Constructing edge-disjoint spanning trees in post-exascale networks*

Graduate Research Assistant George Mason University
Advisor: Dr. Rachel Kirsch August 2022–May 2023

Title: *Edge conditions for Hamiltonicity and related properties in K_{r+1}-free graphs*

Graduate Research Assistant George Mason University
Industrial Immersion Program (IIP) June 2022–August 2022

Advisors: Dr. Geir Agnarsson (GMU Math) and Dr. Elie Alhajjar (West Point Math)
Title: *On locally finite ordered rooted trees and their rooted subtrees*

Graduate Assistant Mentor George Mason University
Mason Experimental Geometry Lab (MEGL) January 2022–May 2022

Advisor: Dr. Ben Schweinhart and Dr. Erika Roldan
Title: *Random 3D Polyforms*

Graduate Research Assistant George Mason University
Industrial Immersion Program (IIP) May 2021–August 2021

Advisors: Dr. Maria Emelianenko (GMU Math), Dr. Ming Tian (GMU Physics), and Dr. Fred Wieland (Mosaic ATM)
Title: *Quantum algorithms for Unmanned Air Vehicles (UAV) trajectory optimization*

Graduate Research Assistant George Mason University
NSF Improving Undergraduate STEM Education (IUSE) project August 2020–May 2021

Advisors: Dr. Robert Sachs and Dr. Jill Nelson

MENTORING

Undergraduate Research Advisor Carnegie Mellon University

Summer Undergraduate Applied Mathematics Institute Summer 2025
Title: *Radio Labelings and the Moore bound*

Graduate Assistant Mentor George Mason University
Mason Experimental Geometry Lab (MEGL) January 2020–May 2020

Advisor: Dr. Neil Epstein
Title: *Content formulas in algebras derived from Grassmanians*

TEACHING EXPERIENCE

Tartans Scholar Tutor Carnegie Mellon University

Various classes: Calculus, Linear Algebra Fall 2024 - Spring 2025

Instructor of Summer Academy Carnegie Mellon University

Introduction to Graph Theory (26 high school students) Summer 2024
Exploring the Worlds of Geometry (10 high school students) Summer 2024

Instructor of Record George Mason University

MATH 114 - Analytic Geometry and Calculus II Summer 2022
MATH 114 - Analytic Geometry and Calculus II (2 courses) Summer 2021
MATH 114 - Analytic Geometry and Calculus II Summer 2020
MATH 108 - Introductory Calculus with Business Applications Summer 2020

Graduate Learning Assistant (GLA)	George Mason University
PhD Launchpad Program	Summer 2022

Graduate Teaching Assistant (GTA)	George Mason University
Math Tutoring Center	January 2022–May 2022
MATH 113 - Analytic Geometry and Calculus I	August 2021–December 2021
MATH 114 - Analytic Geometry and Calculus II	January 2021–May 2021
MATH 114 - Analytic Geometry and Calculus II	August 2020–December 2020
MATH 113 - Analytic Geometry and Calculus I	January 2020–May 2020
MATH 113 - Analytic Geometry and Calculus I	August 2019–December 2019

AWARDS AND ACHIEVEMENTS

- Dean's Graduate Award for Excellence in Research, GMU, 2023-24 ($1250)

- Doctoral Research Scholars Assistantship, Office of Provost, GMU, 2023-24 ($22,000 stipend)

- Graduate Research Excellence Award, Department of Mathematics, GMU, 2023 ($1000)

- Dean's Award for Excellence in Service, GMU, 2022 ($1250)
    - for contributions to improve Mason Experimental Geometry Lab outreach to the community

- TC Lim Award for Excellence in Teaching, Department of Mathematics, GMU, 2022 ($1000)

- TC Lim Award for Excellence in Teaching, Department of Mathematics, GMU, 2021 ($1000)

- Outstanding Mathematical Research, Department of Mathematics, JMU, 2016

PRESENTATIONS

Invited Talks

- Graduate Student and Postdoc Seminars, Carnegie Mellon University, November 2025

- Kansas Women in Math Symposium, *Graph homomorphisms and radio graceful graphs*, April 2025

- Iowa State Discrete Math Seminar, *Radio Graceful Labelings of Graphs*, March 2025

- OURFA^{2}M^2, Crash Course on *Drawing Connections Through Graphs*, February 2025

- JMM special session on Graphs, Hypergraphs, and Extremal Combinatorics, *Hamiltonicity and related properties in K_{r+1}-free graphs*, January 2025

- University of Massachusetts - Amherst Discrete Math Seminar, *Hamiltonicity and related properties in K_{r+1}-free graphs*, May 2024

- AMS Spring Eastern Sectional Meeting special session on Fresh Researchers in Algebra, Combinatorics, and Topology (FRACTals), *Edge conditions for Hamiltonicity in K_{r+1}-free graphs*, April 2024

- JMM special session on Applications of Extremal Graph Theory to Network Design, *Constructing Spanning Trees in Post-Exascale Networks*, January 2024

- JMM special session on Extremal and Probabilistic Combinatorics, *Hamiltonicity and related properties in K_{r+1}-free graphs*, January 2024

- AMS Fall Southeastern Sectional Meeting special session on Extremal and Probabilistic Combinatorics, *Post-Exascale Network Design*, October 2023

- Graduate Online Combinatorics Colloquium (GOCC), *Hamiltonicity and related properties in K_{r+1}-free graphs*, September 2023

- AMS Spring Southeastern Sectional Meeting special session on Recent trends in Structural and Extremal Graph Theory, *Edge conditions for Hamiltonicity and related properties in K_{r+1}-free graphs*, March 2023

Contributed Talks and Posters

- NAM MATHfest, *Hamiltonicity and related properties in K_{r+1}-free graphs*, September 2023
- ACORN Workshop Poster Session, *Edge conditions for Hamiltonicity and related properties in K_{r+1}-free graphs*, March 2023
- Howard Mathematics Graduate Student Seminar, *Edge conditions for Hamiltonicity in K_{r+1}-free graphs*, February 2023
- XVIII Escuela de Verano en Matemáticas Discretas, *Edge conditions for Hamiltonicity in K_{r+1}-free graphs*, January 2023
- IIP Summer Symposium, *Cyber security models and attacks*, August 2022
- BRIDGES Workshop, *Cheeger constant of Cartesian products of Cayley graphs arising from generalized dihedral groups*, June 2022
- JMM, *Cheeger constant of Cartesian products of Cayley graphs arising from generalized dihedral groups*, April 2022
- IIP Summer Symposium, *Quantum algorithms for Unmanned Air Vehicles (UAV) trajectory optimization*, August 2021
- MEGL Symposium, *Content formulas in algebras derived from Grassmanians* (jointly with undergraduate students), May 2020

ORGANIZING

- AMS Fall Eastern Sectional Meeting 2025, Co-organizer for special session on "Combinatorics and Graph Theory: The Audience Counts"
- AMS Fall Western Sectional Meeting 2024, Co-organizer for special session on "Gender Equity in the Mathematical Sciences (GEMS) of Combinatorics"
- JMM 2024, Co-organizer for *AMS Special Session on Ricci Curvatures of Graphs and Applications to Data Science*

CONFERENCES AND WORKSHOPS

- BIRS Bridging Theoretical Discrete Math Advancements with Open Source Resource Development 2026
- NAM MATHfest 2025
- PIMS-BIRS-UBCO GEMS of Optimization 2025
- AIM workshop on Graph Theory: structural properties, labelings, and connections to applications 2024
- Early Career Researchers in Combinatorics (ECRiC24) 2024 (hosted by International Centre for Mathematical Sciences)
- Graduate Research Workshop in Combinatorics (GRWC) 2023
- AMS Mathematics Research Communities (MRC) conference 2023: Ricci Curvatures of Graphs and Applications to Data Science
- Extremal Graphs arising from Designs and Configurations (hosted by Banff International Reserach Station)
- GEMS of Combinatorics 2023 (hosted by AIM)
- CIME: Mentoring for Equity 2023 (hosted by MSRI/SLMath)
- Modern Math Workshop 2022 (organized by MSRI/SLMath)
- MSRI - Random Graphs 2022 Summer Graduate School
- Building Relationships for an Inclusive and Diverse Group of Emerging Students (BRIDGES) Workshop 2022 (University of Utah)

PROFESSIONAL SERVICE AND OUTREACH

- Pittsburgh Community Science Workshop
    - Volunteer: Fall 2024, Spring 2025
- Panel on "Graduate School", MATHfest 2023
- Student Research Talks (StReeTs) Seminar (GMU)
    - Co-organizer: Fall 2021, Spring 2022, Fall 2022, Spring 2023
- Society for Industrial and Applied Mathematics (GMU Chapter)
    - Vice President: 2021-2023
- Mason Experimental Geometry Lab
    - Lab Co-manager: Fall 2021, Spring 2022
    - Graduate Outreach Assistant: Fall 2021, Spring 2022
    - Graduate Assistant Mentor: Spring 2020, Spring 2022
- Graduate and Professional Student Association (GAPSA) (GMU)
    - Mathematics Representative: 2021-2022
- Mathematics Outreach
    - Volunteer at East-John Youth Center: Summer 2021