Jonathan M. Mousley

Mathematics PhD Student
Duke University
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EDUCATION	**Duke University**, PhD of Mathematics *Aug 2022 - May 2027 (Expected)*

- NSF Graduate Research Fellow

Utah State University, Bachelor of Science in Mathematics *Aug 2018 - May 2022*
- Summa Cum Laude
- Minor in Mechanical Engineering
- Academic Senator for College of Science *(April 2021 - Present)*

RESEARCH EXPERIENCE

Undergraduate Research Fellow, Utah State University   *Aug 2019 - May 2022*
- Researching labeling of directed graphs among other topics in graph theory
- Studying directed graphs that have labeling property called $(2,3)$-Cordial
- Mentors: Dr. David E Brown, Dr. LeRoy B. Beasley

Summer Geometry Institute Fellow, Massachusetts Institute of Technology
Jul 2021 - Aug 2021
- Project I: Developed algorithms to construct conforming piecewise linear vector fields on triangle meshes (Mentor: Dr. Amir Vaxman, Utrecht University)
- Project II: Developed algorithms to robustly fit arbitrarily oriented ellipsoids to data sets and wrote scripts to animate moon orbit from moon-centric and earth-centric reference frames (Mentor: Dr. Noah Snavley, Cornell University)
- Project III: Developed algorithms to solve Anisotropic Schrodinger Bridge Optimal Transport problem and wrote scripts to animate the problem (Mentor: Dr. Justin Solomon, Massachusetts Institute of Technology)

Mathematics Research Assistant, University of Michigan - Dearborn *May 2021 - Aug 2021*
- Developed computational approach to phase retrieval with applications to ptychographic imaging
- Performed complexity analysis on algorithms, followed by numerical experiments both verifying complexity and determining noise robustness
- Mentors: Dr. Yulia Hristova, Dr. Aditya Viswanathan

HONORS AND AWARDS

Outstanding Mathematics Undergraduate Award, *April 2022*
David G. Sant Scholarship, *Aug 2021*
2021 Barry Goldwater Scholarship Nominee, *Jan 2021*
Mary Ann McDonald Ebbeler Scholarship, *Aug 2020*
Rocky Mountain Power Scholarship, *Aug 2020*
Mechanical Engineering Student of the Year, Honorable Mention, *Feb 2020*
Thomas M. Farley Chemistry Award, *Spring 2019*
Dean's List Student, *Fall 2018 - Present*
SAME Lt. Col. G. Roger Sunada Scholarship, *Feb 2019*
National Merit Scholarship, *Fall 2018 - Present*
Utah State University Full-Ride Scholarship, *Fall 2018 - Present*

PUBLICATIONS   Beasley, LeRoy, Jonathan Mousley, Manuel Santana, and David Brown. "Cordiality of Digraphs." *Journal of Algebra Combinatorics Discrete Structures and Applications* 10 (2023), 1-13. arXiv:2110.08706.

Mousley, Jonathan, LeRoy Beasley, Manuel Santana, and David Brown. "(2,3)-Cordial Oriented Hypercubes." Accepted as conference proceedings at *2021 Southeastern International Conference on Combinatorics, Graph Theory, and Computing.* 2021 Mar 11. Boca Raton, FL. arXiv:2012.11091.

Santana, Manuel, LeRoy Beasley., Jonathan Mousley, and David Brown. "(2,3)-Cordial Trees and Paths." Accepted as conference proceedings at *2021 Southeastern International Conference on Combinatorics, Graph Theory, and Computing.* 2021 Mar 11. Boca Raton, FL. arXiv:2012.10591.

PRESENTATIONS   Mousley, J., Baker N., Flynn J.D. 2021. *Phase Retrieval from Local Measurements via Lifting and Eigenvector-based Angular Synchronization.* AMS Contributed Paper Session on Numerical Methods I. Joint Mathematics Meetings 2022; 2022 Apr 6 - 9; Seattle, WA.

Mousley, J., Flynn J.D. 2021. *Phase Retrieval from Local Measurements via Lifting and Eigenvector-based Angular Synchronization.* Young Mathematicians Conference 2021; 2021 Aug 20 - 22; Columbus, OH.

Mousley, J. 2021. *(2,3)-Cordial Oriented Hypercubes.* Graph labeling session presented at: Southeastern International Conference on Combinatorics, Graph Theory, and Computing; 2021 Mar 11; Boca Raton, FL.

Mousley, J., Santana M. 2020. *(2,3)-Cordial Digraphs.* Poster session presented at: Utah State University Fall Undergraduate Research Symposium; 2020 Dec 10; Logan, UT.

Mousley, J., Santana M. 2020. *(2,3)-Cordial Digraphs.* Poster session presented at: Utah Conference on Undergraduate Research; 2021 Feb 19; Provo, UT.

TEACHING   **Teaching Assistant (MATH 111L: Laboratory Calculus I)**, Duke University
Aug 2022 - December 2022

Recitation Instructor (MATH 2250: Linear Algebra and Differential Equations), Utah State University
Aug 2019 - May 2022
- Taught classrooms of approximately 25 students twice a week
- Responsible for preparing instruction materials, holding office hours, writing exams, and developing curriculum
- Converted entire course curriculum to online format as necessitated by COVID-19 during summer 2020 alongside professor

Recitation Instructor (MATH 2210: Multivariable Calculus), Utah State University
Aug 2021 - Dec 2021
- Taught classrooms of approximately 25 students twice a week
- Responsible for preparing instruction materials, holding office hours, writing exams, and developing curriculum

OUTREACH

Senator for College of Science, Utah State University, College of Science
Apr 2021 - Apr 2022
- Championed initiatives relating to peer mentorship, expanding visibility of undergraduate research opportunities on campus, and student advocacy
- Held several committee assignments on campus including the University Student Fee Board and Academic Opportunity Fund Allocation Committee

Member of Science Council, Utah State University, College of Science
Aug 2020 - Apr 2022
- Member of professional development committee: design and facilitate programs that prepare College of Science students for professional success after university
- Supervisor of College of Science Student Mentorship Program

SOFTWARE SKILLS

Java
C/C++
MATLAB (including *gptoolbox*)
SOLIDWORKS Associate Certification
STK Level I Certification
LaTeX