Jodin Morey

MoreyJ@LeMoyne.edu | 651-705-6346 | MathTalker.org | ORCID: 0000-0001-5578-7881

Areas of Interest

I am passionate about mathematics education, particularly in developing effective curriculum and pedagogy that increase accessibility, ensuring that students with weak mathematical backgrounds or initial disinterest find motivation to explore mathematical content in my courses. As an applied mathemetician, my research interests lie in mathematical physics and dynamical systems, especially black hole quasinormal modes and orbital mechanics.

Education

- **Ph.D. in Mathematics**, *University of MN*; Minneapolis, MN. Spring 2022
  Advisor: Prof. Richard Moeckel.
  Dissertation: *Relative Equilibria for Orbiting Dumbbells in a Planar System*
- **MS in Mathematics**, *University of MN*; Minneapolis, MN Spring 2020
- **Minnesota Teaching License**, Mathematics (grades 5 – 12) June 2015
- **BS in Mathematics Teaching**, *Metropolitan State University*; St. Paul, MN. Spring 2015
  Summa Cum Laude
- **BFA in Music**, *University of MN*; Morris, MN Spring 1998

Teaching Experience

- Assistant Professor, *Le Moyne College*; Syracuse, NY. **Introduction to probability theory** (MTH 311), **differential eqs** (303), **intro stats** (110) 2024-2026
- Director of IMA-MathCEP Modeling Summer Camp for middle and highschool students featuring student research, University of MN 2023 & 2024
- MathCEP Assistant Professor (postdoc), UMTYMP, *University of MN*. 2022-2024
  Taught 6 distinct courses while supervising instructors. **Differential equations**, **logic**, **proof writing** (MATH 1473); **linear algebra** (2471); **math modeling of bio systems** (with RStudio) (2241); **applied linear algebra** (4242); **calculus I** (1471); **multivariable calculus** (2473). Led enrichment activities for middle schoolers, supervised group work in **calculus II** (1472), directed two math modeling camps, and mentored young researchers
- Lecturer (teacher of record), *University of MN*; Minneapolis, MN Fall 2021
  Linear algebra and diff eqs (2243), with 4 sections. Supervised 2 TAs
- TA Instructor, *University of MN*. **Calculus I/II**, **linear algebra and diff eqs**. 2016 – 2021
  Average student rating for 26 sections was 5.4 out of 6.
- 5-12 Teaching Experience 2012 – 2016
  Student teaching, substitute teaching, volunteer tutoring.

Service to the Department and Profession

- Faculty search committee member 2023-2025
- Member of committees to determine the intro stats textbook (MTH-110), to measure the learning outcomes in MTH-110, the required coursework for Adolescent Education Majors w/a Concentration in Math, and the Student Research Committee 2025
- Manuscript reviewer for *Minnesota Journal of Undergraduate Mathematics* March 2024
- Developed a *Mathematics Comprehension Strategy Log* with strategies to narrow the achievement gap Spring 2014
- Conducted an interview and provided feedback for potential faculty hire November 2021
  University of Minnesota Mathematics Department, Faculty Search Committee
- Served as invited panelist for Women in Mathematics' "Oral Exam Panel" Fall 2020

Mentorship and Outreach

- Mentored math students/professors with disabilities in use of assistive technology — 2006-2025
- Research Mentor for Le Moyne undergrad on two-body problem. — 2025
  Student gave campus-wide math talk
- Published *Back to the Books: Navigating Grad School as a Mature Student.* — June 2024
  MAA's Math Values Blog
- Research Mentor for PSEO/UMTYMP students on two-body problem. — 2023-2024
  They gave talks at MAA regional conf. (St. Thomas) and Pi Mu Epsilon (St. Benedict/St. John's), and published their research (Rose-Hullman)
- Mentored an undergraduate as part of a Directed Reading Program. — Fall 2021
  Text: *Analysis I*, by Terence Tao

Seminar and Talks

- Nevada State University Math Colloquium, hosted by the Math & Data Sci Club — October 2025
  Title: *Orbiting Satellites: Achieving Stability*
- MathFest (MAA) Talk at *Engaging All Students in Meaningful Mathematics and Accessibility by Design*. Title: Voice Recognition & Mathematics. Reclaiming a Lost Technology — August 2024
- JMM Talk at the AMS Special Session on Hamiltonian Systems and Celestial Mechanics. Title: *Approximating the Full Two-Body Problem* — January 2024
- University of St. Thomas, Macalester College, and Metro State University — Spring 2023
  Title: *Orbiting Satellites: Achieving Stability*
- MAA Spring 2022 Meeting, Metropolitan State University; Saint Paul, MN — April 2022
  Title: *Relative Equilibria of Dumbbells Orbiting in a Planar Newtonian Gravitational System*
- Brazilian Orbital Dynamics Colloquium, — December 2021
  Federal University of Pernambuco; Recife, Brazil.
  Title: *Relative Equilibria of Dumbbells Orbiting in a Planar Newtonian Gravitational System*.
- Masters Oral Exam, University of MN; Minneapolis, MN — April 2020
  Title: *Relative Equilibria of Dumbbells Orbiting in a Planar Newtonian Gravitational System*
- Dynamical Systems Seminar, University of MN; Minneapolis, MN — April 2020
  Title: *Relative Equilibria of Dumbbells Orbiting in a Planar Newtonian Gravitational System*
- Joint Mathematics Meetings, Contributed Paper; San Antonio, TX — January 2015
  Title: *Undergraduate Sustainability Experiences in the Mathematics Classroom*

Peer Reviewed Publications

- S. Shen, G. Li, R. Daghigh, **J. Morey**, M. Green, W. Qian, R. Yue. *Asymptotic quasinormal modes, echoes, and black hole spectral instability: a brief review.* — 2026
  Invited Review, *Int. J. Mod. Phys. D.* DOI: 10.1142/S0218271826300016
- S. Shen, G. Li, R. Daghigh, **J. Morey**, M. Green, Q. Pan, C. Shao, W. Qian. — 2026
  On the instability of the fundamental mode of Regge-Wheeler potential.
  Eur. Phys. J. C. Preprint: arxiv.org/abs/2602.05194
- S. Shen, G. Li, X. Kuang, W. Qian, R. Daghigh, **J. Morey**, M. Green, R. Yue. — 2026
  On Hyperboloidal Foliation in the Study of Black Hole Quasinormal Modes.
  Eur. Phys. J. C. DOI: 10.1140/epjc/s10052-026-15283-1
- S. Shen, G. Li, R. Daghigh, **J. Morey**, M. Green. *Spectral instability in modified Pöschl-Teller effective potential triggered by deterministic and random perturbations.* — 2025
  Universe. DOI: 10.3390/universe12010005
- G. Li, W. Qian, Q. Pan, R. Daghigh, **J. Morey**, R. Yue. *Regge poles, grey body, factors and absorption cross sections for black hole metrics w/discontinuity*. — 2025
  Phys. Rev. D. DOI: 10.1103/sqxy-f841

- R. Daghigh, M. Green, **J. Morey**. *Calculating quasinormal modes of extremal and non-extremal Reissner-Nordstrom black holes with the continued fraction method.* Phys. Rev. D. DOI: 10.1103/PhysRevD.109.104076 — 2024
- R. Daghigh, M. Green, **J. Morey**. *Calculating quasinormal modes of Schwarzschild anti-de Sitter black holes using the continued fraction method.* Phys. Rev. D. DOI: 10.1103/PhysRevD.107.024023 — 2023
- R. Daghigh, M. Green, **J. Morey**, Gabor Kunstatter. *Scalar Perturbations of a Single-Horizon Regular Black Hole.* Phys. Rev. D. DOI: 10.1103/PhysRevD.102.104040 — 2020
- R. Daghigh, M. Green, **J. Morey**. *Significance of Black Hole Quasinormal Modes: A Closer Look.* Phys. Rev. D. DOI: 10.1103/PhysRevD.101.104009 — 2020

Submitted/In-Preperation Manuscripts

- G. Li, **J. Morey**, W. Qian, R. Daghigh, M. Green, K. Lin, R. Yue. *Continued fraction method for high overtone QNMs in effective potentials w/discontinuity.* Phys. Rev. D. Preprint: arxiv.org/abs/2602.06536 — Submitted
- R. Daghigh, M. Green, G. Li, **J. Morey**, W. Qian, Stefan J. Randow. *Sensitivity of black hole spectral instability against perturbations of the effective potential* — In Preparation

Dissertation / Thesis

J. Morey. *Relative Equilibria for Orbiting Dumbbells in a Planar System.* Ph.D. dissertation, University of Minnesota. arxiv.org/abs/2307.01935 — 2022

Grants, Honors, and Awards

- Acquired internal funding ($15,000) at Metro State University for advanced research computer to conduct parallel processing of quasi-normal modes of black holes — June 2023
- Awarded "Outstanding Teaching and Dedication to Helping Students Learn." Eleven recognitions from University of MN, Center for Educational Innovation — 2016 – 2022
- Awarded AMS travel grant to attend the Joint Mathematics Meetings — November 2021
- Awarded NSF summer funding through advisor's research grant — 2019 – 2020
- Earned Outstanding Student Award, Metropolitan State University, College of Arts and Sciences. Awarded to only one graduating senior — Spring 2015
- Awarded Academic Achievement Scholarship, Metropolitan State University — May 2013

Professional Activities

- Attended Intl. Conference on General Relativity and Gravitation; Glasgow, Scotland — July 2025
- Developed Math & Music curriculum for a summer program — 2024
- Became an MAA Project NExT Fellow (Green Cohort) — 2023-2024
- Participated in GAIN conference. Topic: advocacy for *students with disability* — October 2021
- Developed College Algebra/Precalculus curriculum featuring environmental sustainability — 2014

Technical Projects/Early Career Highlights

- Built web application “RadioChimp.” A service to send audio e-mail messages, podcast radio shows, or embed audio messages into webpages — 2008 – 2013
- Built website with MP3 automation for a nonprofit's “Sunday Talks” — 2008 – 2012
- Developed the first web-based reservation system in Minnesota for a limousine company (which I founded and co-owned). Developed computerized dispatching of trips to driver's cell phones

---

Skills

- Curriculum Development
- ALEKS, Canvas, Moodle
- R/RStudio, Python, Mathematica, Perl, PHP, SQL, JavaScript, RSS, HTML, LaTeX