

Curriculum Vitae

for Katrina Morgan

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APPOINTMENTS

NSF Postdoctoral Research Fellow October 2020 - present
Northwestern University, Evanston, IL

NSF RTG Postdoctoral Fellow January 2020 - September 2020
Northwestern University, Evanston, IL

Gamelin Postdoctoral Fellow Fall 2019
Mathematical Sciences Research Institute, Berkeley, CA
· **Scientific Program:** Microlocal Analysis

EDUCATION

Ph.D., Pure Mathematics August 2014 - August 2019
University of North Carolina at Chapel Hill, Chapel Hill, NC
· **Advisor:** Dr. Jason Metcalfe
· **Thesis:** *Wave decay in the asymptotically flat stationary setting*

Non-Degree Seeking Post-Baccalaureate, Mathematics Spring 2012 - Spring 2013
Rice University, Houston, TX

B.A., Cognitive Sciences August 2005 - May 2009
Rice University, Houston, TX

RESEARCH GRANTS

NSF Postdoctoral Fellowship October 2020 - August 2023

Dissertation Completion Fellowship AY 2018-2019
UNC Chapel Hill Graduate School

Kenan Graduate Fellowship AY 2018-2019
UNC Chapel Hill College of Arts and Sciences
· One of 10 students selected for inaugural cohort in recognition for excellence in research and teaching.

Kenneth Gaines Smith Summer Research Fellowship Summer 2016
UNC Chapel Hill Graduate School

GRANTS AND AWARDS FOR DIVERSITY INITIATIVES

Tensor Grant Program:**SUMMA Grant****Program for Women and Mathematics***Mathematical Association of America*

- Granted funds to create and organize the *Girls Talk Math* summer day camp, which has run since 2016. The 2020 funds have been deferred until summer 2022.

April 2019 - present
 March 2016 - May 2019
AMOUNT: \$22,900

Boka W. Hadzija Award for Distinguished University Service*UNC Chapel Hill Office of the Chancellor*

April 2019

University Award for the Advancement of Women*UNC Chapel Hill Office of the Chancellor*

February 2018

NSF INCLUDES WATCH:US Mini-Grant,*Administered by the University of Nebraska - Lincoln*

- Granted funds to create and organize the *Association for Women in Mathematics Triangle Conference*.

PERIOD: AY 2017-2018
AMOUNT: \$2,100

Student Chapter Award for Community Outreach*Association for Women in Mathematics*

- Winner of inaugural award in recognition for *Girls Talk Math*.

July 2017

RESEARCH

RESEARCH INTERESTS

Partial differential equations, spectral theory, microlocal analysis, global analysis, non-linear waves, mathematical relativity

TECHNICAL PAPERS

[1] **K. Morgan** & J. Wunsch. *Wave propagation on rotating cosmic string spacetimes*. In preparation. Preprint available upon request.

[2] **K. Morgan** & J. Wunsch. *Mode solutions to the wave equation on a rotating cosmic string background*. Proceedings of the AMS. To appear. ([arXiv: 2112.07705](https://arxiv.org/abs/2112.07705))

[3] **K. Morgan** & J. Wunsch. *Generalized Price's law on fractional-order asymptotically flat stationary spacetimes*. Mathematical Research Letters. To appear. ([arXiv: 2105.02305](https://arxiv.org/abs/2105.02305))

[4] **K. Morgan**. *The effect of metric behavior at spatial infinity on pointwise wave decay in the asymptotically flat stationary setting*. American Journal of Mathematics. To appear. ([arXiv: 2006.11324](https://arxiv.org/abs/2006.11324))

[5] J. Metcalfe & **K. Morgan**. *Global existence for systems of quasilinear wave equations in $(1+4)$ -dimensions*. 2020. Journal of Differential Equations. (<https://doi.org/10.1016/j.jde2019.09.012>).

[6] **K. Morgan**. *Wave decay in the asymptotically flat stationary setting*. 2019. Available from ProQuest Dissertations & Theses Global. (2296357806).

PRESENTATIONS AND POSTERS

INVITED TALKS

PDE Mini-School <i>University of North Carolina at Chapel Hill</i>	March 2023
Ghent Methusalem Junior Seminar <i>Ghent Analysis & PDE Center, Belgium (to be delivered remotely)</i>	November 2022
Nonlinear Dispersive PDEs Workshop <i>Texas A&M</i>	October 2022
Undergraduate Seminar <i>Oberlin College</i>	October 2022
Harmonic Analysis and Linear and Nonlinear Waves Conference <i>University of Washington</i>	August 2022
Workshop on Microlocal Analysis and PDEs <i>University College London</i>	July 2022
Analysis Seminar <i>University of New Mexico</i>	May 2022
Partial Differential Equations Seminar <i>Vanderbilt University</i>	October 2021
International Congress on Mathematical Physics Young Researchers Symposium <i>Geneva, Switzerland (delivered remotely)</i>	July 2021
Analysis and PDE Seminar <i>University of Kentucky</i>	May 2021
Canadian Mathematical Society Summer Meeting <i>Ottawa, Canada</i> · Canceled due to COVID	June 2020
Microlocal Analysis Seminar <i>Mathematical Sciences Research Institute</i>	October 2019
Harmonic Analysis and Differential Equations Seminar <i>University of California - Berkeley</i>	October 2019
Analysis and Partial Differential Equations Seminar <i>University of Kentucky</i>	March 2019
Spectral and Scattering Theory Seminar <i>Purdue University</i>	October 2018

AMSI-ANU Workshop on Microlocal Analysis March 2018
South Durras, Australia

SELECTED OTHER TALKS

AWM Special Session on Recent Developments in the Analysis of Local and Nonlocal PDEs January 2023
Joint Mathematics Meetings, Boston, MA

"Analysis and Geometry of Nonlinear Evolution Equations" Session January 2019
Joint Mathematics Meetings, Baltimore, MD

Texas Analysis and Mathematical Physics Symposium October 2018
Baylor University

"Great Talks: Coached Presentations by Graduate Students" Session August 2018
MathFest, Denver, CO [[View Talk Slides](#)]

Resonances: Geometric Scattering and Dynamics March 2017
Centre International de Rencontres Mathématiques, Marseilles, France

POSTERS

Summer School in Semiclassical Analysis August 2019
Northwestern University [[View Poster](#)]

Texas Analysis and Mathematical Physics Symposium October 2018
Baylor University

PosterFest: Scholarship by Early Career Mathematicians August 2018
MathFest, Denver, CO

Association for Women in Mathematics Poster Competition January 2018
Joint Mathematics Meetings, San Diego, CA

EXPOSITORY PUBLICATIONS

[1] **K. Morgan.** *Which Sounds Better, Analogue or Digital Music?.* Scientific American Observations Blog. 11 Oct 2017. [[View Article](#)]

- Discussed Fourier Transform and Shannon Sampling Theorem.

TEACHING AND MENTORING

* indicates graduate courses/instruction

INSTRUCTOR OF RECORD

Northwestern University

MATH 230-2 Multivariable Integral Calculus Spring 2023

MATH 240 Linear Algebra Spring 2022

MATH 300 Foundations of Higher Mathematics Fall 2021

MATH 230-2 Multivariable Integral Calculus	Spring 2020
MATH 228-1 Multivariable Differential Calculus for Engineering	Winter 2020

UNC Chapel Hill

MATH 383 First Course in Differential Equations	Spring 2018
MATH 233 Calculus of Functions of Several Variables	Summer 2017
MATH 116 Intuitive Calculus	Fall 2016
MATH 130 Precalculus	Fall 2015

GRADUATE TEACHING ASSISTANT

UNC Chapel Hill Graded homework and answered questions on material. Additional responsibilities as specified.

*MATH 653 Introductory Analysis · Held two office hours per week.	Fall 2017
MATH 533 Elementary Theory of Numbers	Fall 2015
MATH 521 Advanced Calculus · Substitute instructor for two lectures.	Summer 2015
MATH 547 Linear Algebra with Applications	Summer 2015
MATH 523 Complex Analysis	Spring 2015
MATH 534 Elements of Modern Algebra	Spring 2015
MATH 381 Discrete Mathematics	Fall 2014

OTHER INSTRUCTION

*Semiclassical Analysis Course TA <i>Summer Northwestern Analysis Program</i>	August 2019
*Analysis Boot Camp · Planned and taught five 3-hour review sessions for incoming graduate students.	August 2016/2017/2018
*Analysis Comprehensive Exam Review · Planned and taught nine 2-hour review sessions.	Summer 2016

UNDERGRADUATE MENTORING

Causeway Postbaccalaureate Certificate Program <i>Northwestern University</i> · Mentor to students in the bridge program	August 2021 - present
Directed Reading Program <i>UNC Chapel Hill</i> · Developed and directed project on Differential Geometry.	September 2018 - May 2019

Undergraduate Research November 2017 - May 2019
UNC Chapel Hill

- Assisted Dr. Jason Metcalfe in directing undergraduate student research project.

AWM Chapter Mentoring Network February 2017 - May 2019
UNC Chapel Hill

- Mentor to two undergraduates in the AWM Student Chapter.

TEACHING AND MENTORING SKILLS DEVELOPMENT

Mentoring Up and Down Workshops November 2020
Northwestern University Office of Postdoctoral Affairs

Creating and Implementing a Course Workshop August 2017
UNC Chapel Hill Graduate School

Integrating Active Learning Techniques Workshop August 2017
UNC Chapel Hill Graduate School

MATH 920 Teaching Assistants Teaching Seminar Fall 2014
UNC Chapel Hill Mathematics Department

OUTREACH AND DIVERSITY

PROGRAM DEVELOPMENT

[†] indicates programs co-founded with Dr. Francesca Bernardi.

Girls Talk Math[†] March 2016 - Present
UNC Chapel Hill [[Visit Camp Website](#)]

FOUNDER AND DIRECTOR

- Created 2-week summer day camp for high school girls.
- Hosted 26 campers in 2016; 35 in 2017; and 39 in 2018.
- Oversaw inquiry-based learning curriculum development.
- Program expanded to the University of Maryland in 2018 and Worcester Polytechnic Institute in 2022.

Association for Women in Mathematics Mentor Network Spring 2021
Northwestern University

UNC Chapel Hill[†] January 2017 - May 2019

FOUNDER AND ORGANIZER

- Paired undergraduates with student mentors.

Association for Women in Mathematics Triangle Conference[†] February 2017
UNC Chapel Hill [[Visit Conference Website](#)]

FOUNDER AND ORGANIZER

- Hosted 74 participants from 12 institutions.

PUBLICATIONS

- TITLE: *Girls Talk Math: Using Mathematics Communication to Build Community* 2020
 PUBLISHER: Mathematical Association of America Focus
 AUTHORS: F. Bernardi & K. Morgan
- TITLE: *Girls Talk Math: Not Your Ordinary Math Camp* 2018
 PUBLISHER: American Mathematical Society Inclusion/Exclusion Blog
 AUTHORS: F. Bernardi & K. Morgan
- TITLE: *Girls Talk Math: Engaging Girls Through Math Media* 2017
 PUBLISHER: Association for Women in Mathematics Newsletter
 AUTHORS: F. Bernardi & K. Morgan

PRESENTATIONS, POSTERS, AND PANELS

- AMS Special Session on Mathematical Outreach** January 2021
Joint Mathematics Meetings, Zoom
 TITLE: *Merging Mathematics and Media to Increase Representation and Build Community.*
- MAA Contributed Paper Session on Promoting Women in Math** January 2021
Joint Mathematics Meetings, Zoom
 TITLE: *Addressing Barriers Through Outreach at the Girls Talk Math camp.*
- MAA General Session on Outreach** January 2019
Joint Mathematics Meetings, Baltimore, MD
 TITLE: *Promoting diversity through outreach at the Girls Talk Math camp*
- "Advancing Women in Mathematics" Session** August 2018
MathFest, Denver, CO
 TITLE: *Mentoring, Outreach, and Professional Development: Activities of the UNC AWM Chapter*
- Supporting Underrepresented Students in STEM Panel** January 2018
North Carolina School of Science and Math, Durham, NC
 · Invited to be a panelist at event for high school educators.
- MAA Session on Inquiry-Based Teaching and Learning** January 2018
Joint Mathematics Meetings, San Diego, CA
 TITLE: *Inquiry-Based Learning Problem Sets at Girls Talk Math: Increasing Confidence and Strengthening Interest Among Underrepresented Groups*
- MAA Mathematical Outreach Poster Session** January 2017/2018/2019/2021
Joint Mathematics Meetings, GA/CA/MD
 · Invited by MAA Tensor Grant officials.

OUTREACH ACTIVITIES

Berkeley Math Circle <i>University of Berkeley</i> INSTRUCTOR TOPIC TITLE: <i>To Infinity and Beyond</i>	November 2019
Scientific Research and Education Network Event <i>Raleigh, NC</i> CURRICULUIM WRITER	September 2017
Science Expo <i>UNC Chapel Hill</i> ORGANIZER AND VOLUNTEER	April 2015-2018
Julia Robinson Math Festival <i>UNC Chapel Hill</i> VOLUNTEER	April 2017/2018

OUTREACH SKILLS DEVELOPMENT

Morehead Planetarium IMPACTS Program <i>Chapel Hill, NC</i> <ul style="list-style-type: none"> · One of 15 out of over 100 applicants selected for program. · Developed and implemented non-Euclidean geometry and knot theory activities for middle and high school students. 	AY 2018-2019
ComSciCon Triangle: Science Communication Conference <i>Research Triangle Park, NC</i>	March 2017

ACADEMIC SERVICE

CONFERENCES AND SEMINARS ORGANIZED

Amateur Microlocal Zoom Seminar <i>Zoom</i> <ul style="list-style-type: none"> · Informal seminar for graduate students, postdocs, and early career faculty from around the world. 	January - May 2020
Association for Women in Mathematics Triangle Conference <i>UNC Chapel Hill</i>	February 2018 [Visit Conference Website]
Graduate Mathematics Association Visions Seminar <i>UNC Chapel Hill</i>	AY 2016 - 2017
Triangle Area Graduate Mathematics Conference <i>UNC Chapel Hill</i>	December 2016
"Harmonic Analysis and Dispersive PDE" Session <i>AMS Sectional Meeting, North Carolina State University</i>	November 2016

Joint Student Math Colloquium
Duke University & UNC Chapel Hill

Fall 2015

LEADERSHIP

Directed Reading Program
UNC Chapel Hill

June 2018 - May 2019

ORGANIZING COMMITTEE MEMBER

- Organized first run of the program at UNC.

Association for Women in Mathematics Student Chapter
UNC Chapel Hill

August 2015 - May 2019

PRESIDENT/TREASURER

Graduate Mathematics Association
UNC Chapel Hill

AY 2017-2018

PRESIDENT