

University of North Carolina at Chapel Hill
 Department of Physics and Astronomy
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Education

University of North Carolina at Chapel Hill

Ph.D., Physics (Advisor: Dr. Charles R. Evans) Expected: 10 May 2020

Thesis: Numerical and analytical models of extreme-mass-ratio orbits in Kerr spacetime

M.S., Physics (Advisor: Dr. Charles R. Evans) Conferred: 14 May 2017

Project: The scalar self-force for generic extreme-mass-ratio orbits in a Kerr spacetime

Vassar College

B.A., Physics and Astronomy, Mathematics Minor Conferred: 31 May 2015

Thesis: Constraining maverick dark matter through direct detection experiments

Research Appointments

- Graduate Student, **UNC at Chapel Hill** 2015-Present
Supervisor: Dr. Charles R. Evans Chapel Hill, NC
- Research Assistant, **UNC at Chapel Hill** Summer 2015
Supervisor: Dr. Sheila J. Kannappan Chapel Hill, NC
- Research Assistant, **NASA Goddard Space Flight Center** Summer 2014
Supervisors: Dr. John Baker & Dr. Bernard Kelly Greenbelt, MD
- Research Assistant, **Vassar Acoustics Laboratory** Summer 2013
Supervisors: Dr. Kimberly A. Riegel & Dr. David T. Bradley Poughkeepsie, NY
- Research Assistant, **Vassar Class of 1951 Observatory** Fall 2011
Supervisor: Dr. Fred Chromey Poughkeepsie, NY

Peer-Reviewed Publications

1. *Repeated faint quasinormal bursts in extreme-mass-ratio inspiral waveforms: Evidence from frequency-domain scalar self-force calculations on generic Kerr orbits*
Z. Nasipak, T. Osburn, and C. R. Evans
[Phys. Rev. D **100**, 064008 \(2019\)](#), [arXiv:1905.13237](#)
2. *The Baryonic Collapse Efficiency of Galaxy Groups in the RESOLVE and ECO Surveys*
 K. D. Eckert, S. J. Kannappan, C. del P. Lagos, A. D. Baker, A. A. Berlind, D. V. Stark,
 A. J. Moffett, **Z. Nasipak**, and M. A. Norris
[Astrophys. J **849**, 1 \(2017\)](#), [arXiv:1709.07462](#)
3. *Effect of measurement conditions on sound scattered from a pyramid diffuser in a free field*
 K. A. Riegel, D. T. Bradley, M. Morgan, **Z. Nasipak**, and I. Kowalok
[Proc. Mtgs. Acoust **22**, 015003 \(2014\)](#); published in 2016
4. *Numerical prediction of sound scattering from surfaces with fractal geometry: A preliminary investigation*
 D. Bradley, E. O. Snow, K. A. Riegel, **Z. D. Nasipak**, and A. S. Terenzi
[Proc. Mtgs. Acoust **12**, 015010 \(2011\)](#); published in 2014

Additional Papers and Publications

- *Scalar self-force along $r\theta$ -resonances in the Kerr spacetime*
Z. Nasipak and C. R. Evans
[In preparation](#)
- *KerrGeodesics Mathematica package*
N. Warburton, M. van de Meent, Z. Nasipak, T. Osburn, and C. R. Evans
bhptoolkit.org/KerrGeodesics/

Contributed Talks

- **22nd Capra Meeting on Radiation Reaction** June 2019
Quasinormal bursts and the resonant self-force Rio de Janeiro, Brazil
- **21st Capra Meeting on Radiation Reaction** June 2018
Scalar self-force for generic bound orbits on a Kerr background Potsdam, Germany
- **American Physical Society April Meeting** Jan 2017
Calculating the scalar self-force for generic orbits in Kerr Cleveland, OH
- **20th Capra Meeting on Radiation Reaction** June 2017
Scalar self-force for generic, bound orbits on Kerr Chapel Hill, NC
- **American Physical Society April Meeting** Jan 2017
Scalar self-force for generic bound orbits on Kerr Washington, D.C.

Teaching Experience

Teaching Assistant, University of North Carolina at Chapel Hill

- *PHYS 721: Graduate Quantum Mechanics* Fall 2019
- *PHYS 701: Graduate Classical Mechanics* Fall 2019
- *PHYS 724: Graduate Statistical Mechanics* Spring 2018
- *PHYS 118: Introductory Physics: Mechanics & Special Relativity* Fall 2015

Physics & Astronomy Tutor

- Private tutor 2016-19
- Academic Support Program for Student Athletes 2016-18

Mentoring and Leadership Roles

2017-2018: I co-mentored a local high school student Karna Morey in his research on time-domain self-force calculations in the context of black hole perturbation theory. Karna presented his work at an internationally attended conference. He has started his undergraduate degree at MIT (US) and I continue to co-supervise his work on time-domain self-force calculations.

2017-2018: I served as **President of the Physics and Astronomy Graduate Student Association**. Responsibilities included mediating dialogue between the Department chair and graduate students, writing and managing the over \$2000 Graduate Student Association budget, and organizing departmental events and meetings.

2016-2017: I was a **Graduate Representative for Physics and Astronomy Graduate Recruiting** at UNC. I co-organized the departmental visitation weekend for accepted students. I also assisted recruiting efforts at external events, such as the APS Conference for Undergraduate Women in Physics at Virginia Tech (US).

2016-2017: I served as a **Senior Graduate Student Pre-Candidacy Mentoring Team Leader**, co-leading a group of 8 senior graduate students as we prepared new doctoral students for their written qualifying exams. Responsibilities included organizing, scheduling, and leading review lectures and problem-solving sessions.

Science Outreach

Invited Talks

- Astronomy on Tap Triangle 07 May 2019
Talk title: Gravitational Waves & the New Era of Astronomy Durham, NC
- Teen Cosmos Collective at Museum of Life and Science 07 Nov 2018
Talk title: Black Holes & Seeing the Hidden Universe Durham, NC
- Teen Science Cafe at Morehead Planetarium and Science Center 11 May 2018
Talk title: Black Holes and Gravitational Waves Chapel Hill, NC

Volunteer Activities

- UNC Science Expo 06 April 2019
Performed public physics demos at UNC Chapel Hill, NC
- North Carolina Astronomy Days Jan 2018, 2019
Performed public astronomy demos at NC Museum of Natural Sciences Raleigh, NC
- Letters to a Pre-Scientist 2016-Present
Served as science pen pal to middle school students USA

Awards & Fellowships

- **NC Space Grant Graduate Research Fellowship** 2017, 18
NASA/North Carolina Space Grant Consortium
- **Doctoral Merit Assistantship** 2016
University of North Carolina at Chapel Hill
- **Shearin Fellowship** 2015
Department of Physics and Astronomy, UNC at Chapel Hill
- **Lucy Kellogg English Prize** 2015
Department of Physics and Astronomy, Vassar College
- **Robert Bradford Newman Student Award Recipient** 2013-14
Newmand Fund
- **Tananbaum Fellowship** 2013-14
Vassar College
- **Frances D. Fergusson Scholarship** 2012-15
Vassar College

Professional Memberships

- American Physical Society
- Sigma Xi, the Scientific Honor Society
- Phi Beta Kappa (Honor) Society

Additional Skills & Experience

Referee Experience

- Referee for the Physical Review
I have refereed an article that was accepted to Physical Review Research

Conference Organization

- Local organizing committee member, 20th Capra Meeting, Chapel Hill, NC, 2017
I designed the conference website, managed conference communications, scheduled the presentation venue, co-organized the presentation schedule, helped book dining venues and secure hotel blocks, and provided on-site technical support.

Computational Skills

- Highly proficient in Mathematica
- Proficient in Python
- Working knowledge of GNU Bash, C, and MATLAB
- Extensive experience executing programs on high performance computing clusters, primarily on UNC's *Longleaf* (6000+ cores) and *Dogwood* (11000+ cores) clusters
- Highly proficient in L^AT_EX typesetting with experience in Beamer
- Proficient in Microsoft PowerPoint, Microsoft Word, Apple Keynote, and Apple Pages for designing written and visual presentations