

Oak Ridge Associated Universities
NASA Goddard Space Flight Center
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Academic Employment

- **NASA Postdoctoral Fellow**, Supervisor: John G. Baker 01/2021 - present
USRA/ORAU appointment at NASA Goddard Space Flight Center Greenbelt, MD
- **Postdoctoral Fellow**, Supervisor: Brendan Hasset 09/2020 - 12/2020
Institute for Computational & Experimental Research in Mathematics Providence, RI

Education

- **University of North Carolina at Chapel Hill**
Ph.D., Physics (Advisor: Charles R. Evans) Conferred: 04 August 2020
Thesis: Numerical and analytical models of extreme-mass-ratio orbits in Kerr spacetime
M.S., Physics (Advisor: 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

Peer-Reviewed Publications

1. *Adiabatic evolution due to the conservative scalar self-force during orbital resonances*
Z. Nasipak
Phys. Rev. D **106**, 064042 (2022), arXiv:2105.15188
2. *Resonant self-force effects in extreme-mass-ratio binaries: A scalar model*
Z. Nasipak and C. R. Evans
Phys. Rev. D **104**, 084011 (2021), arXiv:2105.15188
3. *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
4. *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
5. *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
6. *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

- *Self-Force Regularisation Parameters Package*
A. Heffernan, Data curator: **Z. Nasipak**
[Zenodo:6282572](https://zenodo.org/record/6282572)
- *Advancing the Landscape of Multimessenger Science in the Next Decade*
K. Engel, T. Lewis, et al.
[arXiv:2203.10074](https://arxiv.org/abs/2203.10074)
- *KerrGeodesics Mathematica package*
N. Warburton, M. van de Meent, **Z. Nasipak**, T. Osburn, C. R. Evans, Leo Stein, & Phillip Lynch
bhptoolkit.org/KerrGeodesics

Invited Talks

- **Astrophysical and Cosmological Relativity Seminar** Feb 2022
Max Planck Institute for Gravitational Physics, AEI (virtual) Potsdam, Germany
The effect of resonances on extreme-mass-ratio inspirals
- **Self-Force Group Meeting** July 2021
Southampton Theory Astrophysics & Gravity Research Centre (virtual) Southampton, UK
Orbital $r\theta$ -resonances in EMRIs
- **Science & Exploration Directorate Director's Seminar** March 2021
NASA Goddard Space Flight Center (virtual) Greenbelt, Maryland, USA
Orbital resonances in extreme-mass-ratio black hole binaries

Contributed Talks

- **25th Capra Meeting on Radiation Reaction** June 2022
Post-1/2 adiabatic corrections from the conservative self-force during $r\theta$ -resonances Dublin, Ireland
- **American Physical Society April Meeting** Apr 2022
Dissipation due to the (not-so) conservative self-force for resonant extreme-mass-ratio inspirals New York, NY, USA
- **LISA Community Call** Nov 2021
Orbital resonances in extreme-mass-ratio inspirals (virtual)
- **24th Capra Meeting on Radiation Reaction** June 2021
Transient resonances in EMRIs: A scalar model (virtual) Waterloo, Ontario, Canada
- **23rd Capra Meeting on Radiation Reaction** June 2020
Calculating the scalar self-force during $r\theta$ -resonances (virtual) Austin, TX, USA
- **American Physical Society April Meeting** April 2020
Calculating the scalar self-force during $r\theta$ -resonances (virtual) Washington, D.C., USA
- **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** April 2018
Calculating the scalar self-force for generic orbits in Kerr Columbus, OH, USA
- **20th Capra Meeting on Radiation Reaction** June 2017
Scalar self-force for generic, bound orbits on Kerr Chapel Hill, NC, USA
- **American Physical Society April Meeting** Jan 2017
Scalar self-force for generic bound orbits on Kerr Washington, D.C., USA

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

2019-present: Assistant mentor to PhD student

2017-2018: Assistant mentor to high school student, now at MIT

2017-2018: President of the Physics and Astronomy Graduate Student Association

2016-2017: Graduate Representative for Physics and Astronomy Graduate Recruiting

2016-2017: Senior Graduate Student Pre-Candidacy Mentoring Team Leader

Science Outreach

Invited Talks

- STEM Speaker Series at Friends School of Baltimore 28 Sep 2022
Talk title: Dead stars, black holes, and gravitational waves Baltimore, MD
- 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

- **NASA Postdoctoral Fellowship** 2020 - present
Universities Space Research Association
- **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

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

Conference Organization

- Discussion session co-chair, 25th Capra Meeting, Dublin, Ireland, 2022
- Session chair, 24th Capra Meeting, (virtual) Waterloo, Ontario, Canada, 2021
- Local organizing committee member, 20th Capra Meeting, Chapel Hill, NC, 2017

Computational Skills

- Highly proficient in Mathematica
- Proficient in Python, C/C++
- Working knowledge of GNU Bash 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 \LaTeX typesetting with experience in Beamer
- Proficient in Microsoft PowerPoint, Microsoft Word, Apple Keynote, and Apple Pages for designing written and visual presentations