Justin L. Ripley

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Academic Employment

Research Associate, DAMTP, University of Cambridge **October 2020-present**

Research and Teaching Assistant, Princeton University **September 2014-July 2020**

Education

PhD, Physics, Princeton University **September 2014-July 2020**

Advisor: Frans Pretorius

B.A., Physics, Columbia University **September 2010-May 2014**

Minor in Mathematics

Departmental honors in Physics, *summa cum laude*, Phi Beta Kappa

Awards/Grants

Hartle award, ISGRG (GR 22/Amaldi 13 conference) **December 2019**

Erwin H. Leiwant Scholarship, Columbia University **September 2013-May 2014**

John Jay Scholar, Columbia University **September 2010-May 2014**

Professional Activities

Seminar organizer Friday GR seminar, DAMTP, University of Cambridge **October 2020-present**

Committee member Climate and Inclusion, Department of Physics, Princeton University **September 2019-May 2020**

Referee Physical Review D, Physical Review Letters

Computational Experience

I have programming experience with C/C++, Fortran (77/90), Python, Mathematica. My Github account: JLRipley314, list some of the computational projects I have worked on/am working on.

Teaching

Assistant Instructor, Princeton University

EGR/PHY 191, An integrated introduction to engineering, math, physics	**Fall 2019**
PHY 103/105, General Physics I Lab	**Fall 2018**
PHY 304, Advanced Electromagnetism	**Spring 2018**
AST 203, The Universe	**Spring 2017,2018**
PHY 523, General Relativity	**Fall 2017**
AST 204, Topics in Modern Astronomy	**Spring 2016**
PHY 301, Thermal Physics	**Fall 2015, Spring 2016**

Teaching Assistant, Columbia University

Math V2000, Introduction to higher mathematics	**Spring 2014**

Outreach

Princeton Citizen Scientists

The Princeton Citizen Scientists (PCS) is a graduate student led group at Princeton University that is dedicated to science policy and outreach at the local, state, and federal level.

President **June 2018–July 2019**
Co-organizer for science advocacy trip to Washington, D.C (article) **December 2018**
Co-organizer for science "teach-in" event at Princeton Public Library (article) **October 2017**

Open Labs

Open Labs is a graduate student group at Princeton University that organizes "science cafes" where local high and middle school students hear talks given by graduate students about their research.

Treasurer and presenter **May 2018–February 2019**

Department of Physics, Princeton University

I participated in several science outreach events organized through the Department of Physics at Princeton University throughout my time as a graduate student. Events where I helped plan/organize some of programming are listed below.

Trenton science summer camp (helped plan and run several lessons over 2 weeks) **July 2018**

Interviews on "These Vibes are Too Cosmic"

These Vibes are Too Cosmic is a radio program run through Princeton University.

Interview on exotic compact objects **January 2019**
Interview on antigravity **March 2016**

Invited Talks/Seminars

11. Sapienza University of Rome, Rome, IT (virtual) **May 2021**
    Computing the second order gravitational perturbation of Kerr black holes
10. University of Oxford, Oxford, UK (virtual) **February 2021**
    The classical evolution of binary black hole systems in scalar-tensor theories
9. University of Virginia, Charlottesville, VA (virtual) **February 2021**
    The classical evolution of binary black hole systems in scalar-tensor theories
8. Kyoto University, Kyoto, JP (virtual) **February 2021**
    The classical evolution of binary black hole systems in scalar-tensor theories
7. University of Southampton, Southampton, UK (virtual) **January 2021**
    The classical evolution of binary black hole systems in scalar-tensor theories
6. University of Cambridge, Cambridge, UK (virtual) **November 2020**
    Computing the second order gravitational perturbation of Kerr black holes
5. Johns Hopkins University, Baltimore, MD (virtual) **November 2020**
    Numerical computation of second order vacuum perturbations of Kerr black holes
4. Princeton University, Princeton, NJ (virtual) **October 2020**
    Classical modifications to Einstein's General Relativity around black holes
3. Perimeter Institute, Waterloo, ON (virtual) **April 2020**
    Exploring the nonlinear dynamics of Einstein dilaton Gauss-Bonnet gravity
2. University of Illinois, Urbana-Champaign, IL **January 2020**
    Testing General Relativity and the nonlinear dynamics of modified gravity theories
1. Black Hole Initiative, Harvard University, Cambridge, MA **December 2019**
    Nonlinear dynamics of Horndeski theories in spherical collapse

Contributed Talks/Seminars (selected)

7. APS April Meeting, Sacramento, CA (virtual) **April 2021**
    Application of the modified generalized harmonic formulation to scalar-tensor gravity theories

6. BritGrav21, UCD, Dublin, Ireland (virtual) **April 2021**
Computing the second order vacuum perturbation of Kerr black holes

5. APS April Meeting, Washington, DC (virtual) **April 2020**
Second order perturbation of a Kerr black hole

4. Massachusetts Institute of Technology, Cambridge, MA **December 2019**
Second order vacuum perturbation of a Kerr black hole

3. GR 22/Amaldi 13, Valencia, Spain **July 2019**
Nonlinear dynamics of Horndeski theories in spherical collapse

2. APS April Meeting, Denver, CO **April 2019**
Hyperbolicity in gravitational collapse in a modified gravity theory

1. Numerical Relativity beyond General Relativity, Benasque, Spain **June 2018**
Gravitational collapse in a modified gravity theory

Refereed Publications

Link to all papers, including preprints: InSpire Hep

12. **Justin L. Ripley**, *A symmetric hyperbolic formulation of the vacuum Einstein equations in affine-null coordinates.* Journal of Mathematical Physics 62, 062501 (2021). arXiv:2104.09972

11. **Justin L. Ripley**, Nicholas Loutrel, Elena Giorgi, and Frans Pretorius *Numerical computation of second-order vacuum perturbations of Kerr black holes.* Phys. Rev. D 103 (10), 104018 (2021). arXiv:2010.00162

10. Nicholas Loutrel, **Justin L. Ripley**, Elena Giorgi, and Frans Pretorius *Second Order Perturbations of Kerr Black Holes: Reconstruction of the Metric.* Phys. Rev. D 103, 104017 (2021). arXiv:2008.11770

9. William E. East, **Justin L. Ripley** *Evolution of Einstein-scalar-Gauss-Bonnet gravity using a modified harmonic formulation.* Phys.Rev.D 103 4, 044040 (2021). arXiv:2011.03547

8. **Justin L. Ripley**, Frans Pretorius *Dynamics of a $\mathbb{Z}_2$ symmetric EdGB gravity in spherical symmetry.* Class. Quant. Grav. 37 (15), 155003 (2020). arXiv:2005.05417

7. **Justin L. Ripley**, Frans Pretorius *Scalarized black hole dynamics in Einstein-dilaton-Gauss-Bonnet gravity.* Phys. Rev. D 101 (4), 044015 (2019). arXiv:1911.11027

6. **Justin L. Ripley**, *Excision and avoiding the use of boundary conditions in numerical relativity.* Class. Quantum Grav. 36 (23) 237001 (2019). arXiv:1908.04234

5. **Justin L. Ripley**, Frans Pretorius, *Gravitational collapse in Einstein dilaton Gauss-Bonnet gravity* Class. Quantum Grav. 36 (13) 134001 (2019). arXiv:1903.07543

4. **Justin L. Ripley**, Frans Pretorius, *Hyperbolicity in Spherical Collapse of a Horndeski Theory.* Phys. Rev. D 99 (8), 084014 (2019). arXiv:1902.01468

3. **Justin L. Ripley**, Kent Yagi, *Black hole perturbation under a 2+2 decomposition in the action.* Phys. Rev. D 97 (2), 024009 (2017). arXiv:1705.03068

2. Anna Ijjas, **Justin L. Ripley**, Paul J. Steinhardt, *NEC violation in mimetic cosmology revisited.* Phys.Lett. B760 132-138 (2016). arXiv:1604.08586

1. **Justin L. Ripley**, Brian D. Metzger, Almudena Arcones, and Gabriel Martnez-Pinedo, *X-ray Decay Lines from Heavy Nuclei in Supernova Remnants as a Probe of the r-Process Origin and the Birth Periods of Magnetars.* Mon. Not. Roy. Astron. Soc. 438 (4), 3243-3254 (2013). arXiv:1310.2950