CURRICULUM VITAE: Bernard Joseph Kelly

EDUCATION

Ph.D. 2004: The Pennsylvania State University (Physics)
Advisor: Dr Pablo Laguna
Thesis: "The Next Generation of Binary Black Hole Head-On Collisions, and their Aftermath"
M. Sc. 1996: University College Dublin, Ireland (Mathematical Physics)
B.S.C. 1995: University College Dublin, Ireland (Experimental and Mathematical Physics)

Experience in Higher Education

Oct 2015 - present Assistant Research Scientist, UMBC, Center for Space Science, working at NASA/GSFC Code 663
Oct 2017 – present Physics of the Cosmos Support Scientist, working at NASA/GSFC Code 663
Sep 2009 – Oct 2015 CRESST UMBC Research Associate, working at NASA/GSFC Code 663
Jun 2001 -- Aug 2001 The Pennsylvania State University; Course Lecturer, Physics
Aug 1998 -- May 2000 The Pennsylvania State University; Teaching Assistant, Physics
Sep 1995 -- Jun 1996 University College Dublin, Ireland; Course Tutor, Mechanics/Mathematical Physics

Experience in Other than Higher Education

Sep 2006 – Aug 2009 NASA/GSFC, Code 660; NPP Postdoctoral Fellow with the Numerical Relativity group
Sep 2004 – Aug 2006 University of Texas at Brownsville; Postdoctoral Researcher with the Numerical Relativity group
Sep 2000 – Jul 2004 The Pennsylvania State University; Research Assistant with the Numerical Relativity group

Honors Received

2002 David C. Duncan Graduate Fellowship in Physics
1996 U.C.D. Travelling Studentship Prize in Mathematical Science
1995 U.C.D. Conway Medal, for third-year results in undergraduate Mathematical Physics
1995 U.C.D. Scholarship for third-year results in undergraduate Joint Honours Mathematical Physics and Experimental Physics
1994 U.C.D. Fr. Ciaran Ryan Prize for second-year results in undergraduate Mathematical Physics

PUBLICATIONS, PRESENTATIONS, CREATIVE ACHIEVEMENTS

Peer-Reviewed Publications:

1. O. Porth, K. Chatterjee, R. Narayan, et al. "The Event Horizon General Relativistic Magnetohydrodynamic Code Comparison Project". Astrophys. J. Supp. Ser. 243, 26 (2019)
2. J. D. Schnittman, T. Dal Canton, J. Camp, D. Tsang, and B. J. Kelly "Electromagnetic Chirps from Neutron Star-Black Hole Mergers". Astrophys. J. 853, 123 (2018)

3. B. J. Kelly, J. G. Baker, Z. B. Etienne, B. Giacomazzo, and J. Schnittman “Prompt Electromagnetic Transients from Binary Black Hole Mergers”. Phys. Rev. D 96, 123003 (2017)
4. Z. B. Etienne, J. G. Baker, V. Paschalidis, B. J. Kelly, and S. L. Shapiro "Improved moving puncture gauge conditions for compact binary evolutions". Phys. Rev. D 90, 064032 (2014)
5. T. B. Littenberg, J. G. Baker, A. Buonanno , and B. J. Kelly "Systematic biases in parameter estimation of binary black-hole mergers". Phys. Rev. D 87, 104003 (2013)
6. B. J. Kelly and J. G. Baker "Decoding mode mixing in black-hole merger ringdown". Phys. Rev. D 87, 084004 (2013)
7. B. J. Kelly, J. G. Baker, W. D. Boggs, S. T. McWilliams, and J. M. Centrella “Mergers of black-hole binaries with aligned spins: Waveform characteristics”. Phys. Rev. D 84, 084009 (2011)
8. B. C. Mundim, B. J. Kelly, H.Nakano, Y. Zlochower,and M. Campanelli “Hybrid black-hole binary initial data”. Class. Quantum Grav. 28, 134003 (2011).
9. J. M. Centrella, J. G. Baker, B. J. Kelly, and J. R. van Meter “Merging Black Holes”. Invited review article. Contemp. Phys. 52, 1-14 (2011).
10. J. M. Centrella, J. G. Baker, B. J. Kelly, and J. R. van Meter “Black-hole binaries, gravitational waves, and numerical relativity”. Invited review article. Rev. Mod. Phys. 82, 3069-3119 (2010).
11. J. M. Centrella, J. G. Baker, B. J. Kelly, and J. R. van Meter “The Final Merger of Black-Hole Binaries”. Invited review article. Annu. Rev. Nucl. Part. Sci. 60, 75-100 (2010).
12. J. R. van Meter, M. C. Miller, J. G. Baker, W. D. Boggs, and B. J. Kelly “Test of a General Formula for Black Hole Gravitational Wave Kicks”. Astrophys. J. 719, 1427 (2010).
13. S. T. McWilliams, B. J. Kelly, and J. G. Baker “Observing mergers of non-spinning black-hole binaries”. Phys. Rev. D 82, 024014 (2010).
14. B. J. Kelly, W. Tichy, Y. Zlochower, M. Campanelli, and B. F. Whiting “Post-Newtonian Initial Data with Waves: Progress in Evolution”. Class. Quantum Grav. 27, 114005 (2010).
15. S. T. McWilliams, J. I. Thorpe, J. G. Baker, and B. J. Kelly “Impact of mergers on LISA parameter estimation for nonspinning black hole binaries”. Phys. Rev. D 81, 064014 (2010).
16. J. R. van Meter, J. Wise, M. C. Miller, C. Reynolds, J. M. Centrella, J. G. Baker, W. D. Boggs, B. J. Kelly, and S. T. McWilliams “Modeling flows around merging black hole binaries”. Astrophys. J. 711, L89 (2010).
17. B. J. Kelly, J. G. Baker, W. D. Boggs, J. M. Centrella, J. R. van Meter, and Sean T. McWilliams “Gravitational radiation characteristics of nonspinning black-hole binaries”. J. Phys. Conf. Ser. 154, 012050 (2009).
18. J. I. Thorpe, S. T. McWilliams, B. J. Kelly, R. P. Fahey, K. Arnaud, and J. G. Baker “LISA parameter estimation using numerical merger waveforms”. Class. Quantum Grav. 26, 094026 (2009).
19. M. D. Hannam, S. Husa, J. G. Baker, et al. “Samurai project: Verifying the consistency of black-hole-binary waveforms for gravitational-wave detection”. Phys. Rev. D 79, 084025 (2009).
20. B. Aylott et al. “Testing gravitational-wave searches with numerical relativity waveforms: results from the first Numerical INJection Analysis (NINJA) project”. Class. Quantum Grav. 26, 165008 (2009).
21. J. G. Baker, W. D. Boggs, J. Centrella, B. J. Kelly, S. T. McWilliams and J. R. van Meter “Mergers of nonspinning black-hole binaries: Gravitational radiation characteristics”. Phys. Rev. D 78, 044046 (2008).
22. J. G. Baker, W. D. Boggs, J. Centrella, B. J. Kelly, S. T. McWilliams, M. C. Miller and J. R. van Meter “Modeling kicks from the merger of generic black-hole binaries”. Astrophys. J. 682, L29 (2008).

23. J. Schnittman, A. Buonanno, J. R. van Meter, J. G. Baker, W. D. Boggs, J. Centrella, B. J. Kelly and S. T. McWilliams "Anatomy of the binary black hole recoil: A multipolar analysis". Phys. Rev. D 77, 044031 (2008).
24. Y. Pan, A. Buonanno, J. G. Baker, J. Centrella, B. J. Kelly, S. T. McWilliams, F. Pretorius and J. R. van Meter "Data-analysis driven comparison of analytic and numerical coalescing binary waveforms: Nonspinning case". Phys. Rev. D 77, 024014 (2008).
25. A. Buonanno, Y. Pan, J. G. Baker, J. Centrella, B. J. Kelly, S. T. McWilliams and J. R. van Meter "Approaching faithful templates for non-spinning binary black holes using the effective-one-body approach". Phys. Rev. D 76, 104049 (2007).
26. D.-I. Choi, B. J. Kelly, W. D. Boggs, J. G. Baker, J. Centrella and J. R. van Meter "Recoiling from a kick in the head-on collision of spinning black holes". Phys. Rev. D 76, 104026 (2007).
27. J. G. Baker, J. R. van Meter, S. T. McWilliams, J. Centrella and B. J. Kelly; "Consistency of post-Newtonian waveforms with numerical relativity". Phys. Rev. Lett. 99, 181101 (2007).
28. B. J. Kelly, W. Tichy, M. Campanelli and B. F. Whiting "Black hole puncture initial data with realistic gravitational wave content". Phys. Rev. D 75, 024008 (2007).
29. J. G. Baker, W. D. Boggs, J. Centrella, B. J. Kelly, S. T. McWilliams, M. C. Miller and J. R. van Meter "Modeling kicks from the merger of non-precessing black-hole binaries". Astrophys. J. 668, 1140 (2007).
30. J. G. Baker, S. T. McWilliams, J. R. van Meter, J. Centrella, D.-I. Choi, M. Koppitz and B. J. Kelly "Binary black hole late inspiral: Simulations for gravitational wave observations". Phys. Rev. D 75, 124024 (2007).
31. M. Campanelli, B. J. Kelly and C. O. Lousto "The Lazarus Project. II. Space-like extraction with the Quasi-Kinnersley tetrad". Phys. Rev. D 73, 064005 (2006).
32. U. Sperhake, B. Kelly, P. Laguna, K. L. Smith and E. Schnetter "Black hole head-on collisions and gravitational waves with fixed mesh-refinement and dynamic singularity excision". Phys. Rev. D 71, 124042 (2005).
33. U. Sperhake, K. L. Smith, B. Kelly, P. Laguna and D. Shoemaker "Impact of densitized lapse slicings on evolutions of a wobbling black hole". Phys. Rev. D 69, 024012 (2004).
34. O. Dreyer, B. Kelly, B. Krishnan, L. S. Finn, D. Garrison and R. Lopez-Aleman "Black-hole spectroscopy: testing general relativity through gravitational-wave observations'". Class. Quantum Grav. 21, 787 (2004).
35. B. Kelly, P. Laguna, K. Lockitch, J. Pullin, E. Schnetter, D. Shoemaker and M. Tiglio "Cure for unstable numerical evolutions of single black holes: Adjusting the standard ADM equations in the spherically symmetric case". Phys. Rev. D 64, 084013 (2001).

Contributed Oral Presentations:

1. "Magnetic-Field and Matter Distribution Dependence of EM Emission during Supermassive Binary Black Hole Mergers"; APS April Meeting, Denver, CO -- April 2019
2. "Prompt Electromagnetic Transients from Binary Black Hole Mergers"; APS April Meeting, Columbus, OH -- April 2018
3. "Distinguishing transients from merger characteristics in EM signals from black hole binary mergers"; APS April Meeting, Washington, DC -- April 2017
4. "Robust GRMHD Evolutions of Merging Black-Hole Binaries in Magnetized Plasma"; APS April Meeting, Salt Lake City, UT -- April 2016
5. "Curvature-Based Method for Measuring Numerical Black-Hole Spins"; APS April Meeting, Baltimore, MD -- April 2015
6. "Applying IRS Multi-Mode Templates to Parameter Estimation"; APS April Meeting, Savannah, GA -- April 2014
7. "Developments in IRS Multi-Mode Waveforms"; APS April Meeting, Denver, CO -- April

2013

8. "Accounting for Ringdown Mode-Mixing in Black-Hole Merger Waveforms"; APS April Meeting, Atlanta, GA -- March 2012
9. “Modelling Multiple Waveform Modes of Spinning Black-Hole Mergers”; APS April Meeting, Washington D.C. -- February 2010
10. “PN Initial Data with Waves: Progress in Evolution”; NRDA Workshop, Potsdam -- July 2009
11. “Gravitational Radiation Characteristics of Nonspinning Black-Hole Binaries”; 7th International LISA Symposium, Barcelona -- June 2008
12. “PN Initial Data with Waves: Progress in Evolution”; Post Newton 2008, Jena -- June 2008
13. “Black-Hole Spins and Kicks in Numerical Relativity”; BritGrav 8, York -- March 2008
14. “Post-Newtonian Initial Data with Waves for Numerical Relativity”; General Relativity & Gravitation 18, Sydney -- July 2007
15. “Advances in Black-Hole Mergers: Spins and Unequal Masses”; General Relativity & Gravitation 18, Sydney -- July 2007
16. “Advances in Black-Hole Mergers: Spins and Unequal Masses”; American Physical Society April Meeting, Jacksonville -- April 2007
17. “Progress in Post-Newtonian Data for Numerical Relativity”; American Physical Society April Meeting, Dallas -- April 2006
18. “Lazarus2: Applying the quasi-Kinnersley Frame in the Lazarus Project”; American Physical Society April Meeting, Dallas -- April 2006
19. “Progress in Post-Newtonian Data for Numerical Relativity”; Second Gulf Coast Meeting, Florida Atlantic University -- March 2006
20. “Applying the Quasi-Kinnersley Frame to Numerical Evolutions”; American Physical Society April Meeting -- April 2005
21. “Applying the Quasi-Kinnersley Frame to Numerical Evolutions”; First Gulf Coast Meeting, Brownsville -- February 2005
22. “Black Hole Head-On Collisions Revisited”; General Relativity & Gravitation 17, Dublin -- July 2004
23. “Black Hole Head-On Collisions Revisited”; Apples with Apples Meeting, Mexico City -- December 2003
24. “Head-On Binary Black-Hole Collisions in BSSN”; American Physical Society April Meeting, Philadelphia -- April 2003
25. “Almost Constraint-Satisfying Initial Data for Binary Black-Hole Systems”; American Physical Society April Meeting, Albuquerque -- April 2002
26. “Testing General Relativity: Black Hole Spectroscopy”; American Physical Society April Meeting, Washington, D.C. -- April 2001

Invited Oral Presentations:

1. “Simultaneous Gravitational and Electromagnetic Signatures of Merging Astrophysical Black Holes”; Public Physics Lecture at the University of Houston Clear Lake -- March 2017
2. "Black Holes and Gravitational-Wave Astronomy"; Physics Colloquium at Binghamton University -- October 2011
3. “Black Holes and Gravitational-Wave Astronomy”; Talk given at meeting of Astronomy Club of Greenbelt -- February 2011
4. “Gravitational-Wave Astronomy”; Physics Colloquium, University of Maryland, Baltimore County -- September 2010
5. “Black-Hole Binaries via Numerical Relativity”; Dept. of Mathematics Seminar, Dublin City University -- March 2008

6. “Post-Newtonian Initial Data with Waves for Numerical Relativity”; CGWP Seminar, Penn State University -- February 2007
7. “Post-Newtonian Initial Data with Waves for Numerical Relativity”; Physics Gravity Theory Seminar, University of Maryland -- February 2007
8. “From Big Bang to Earth (from pre-hydrogen to heavy elements)”; Astrobiology Seminar, University of Houston Downtown -- March 2006
9. “Lazarus2: Applying the quasi-Kinnersley Frame in the Lazarus Project”; Sources and Simulations Seminar, Penn State University --- September 2005

SERVICE TO DEPARTMENT, UNIVERSITY, COMMUNITY, & PROFESSION

Teaching (Penn State University)

• Course Lecturer, Phys 265 (modern algebra-based physics) June 2001 – August 2001
• Teaching Assistant, Phys 201, 202, 204, 211 August 1998 – May 2000

Community/Profession

Professional Societies

- Member of the American Physical Society (1999 – present);
- Member of the International Society on General Relativity and Gravitation (2007 – present);
- Member of the Institute of Physics (2008 – present);
- Member of the American Astronomical Society (2009 – present)

Refereeing

- Referee for Physical Review D, Physical Review Letters, Classical and Quantum Gravity
- 2016 Reviewer of the Year, Classical and Quantum Gravity
- Member of Classical and Quantum Gravity Advisory Panel (Jan 2018 - Jan 2020)

Outreach & Public Engagement

- Volunteer for NASA Astrophysics Sciences Division's "Ask an Astrophysicist" (2012 - present)
- Participant in NASA Public Engagement Events, including Earth Day @ Union Station, NASA Science Live telecast, Black Hole Q&A virtual events via Reddit, YouTube, Facebook, Twitter, and Instagram