

## William E. East

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CONTACT INFORMATION Perimeter Institute for Theoretical Physics  
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Waterloo, Ontario, Canada, N2L 2Y5

RESEARCH INTERESTS Strong-field gravity including compact object mergers, gravitational wave modeling, electromagnetic counterparts to gravitational wave sources, early universe cosmology, black hole dynamics, and applications of relativistic plasma physics to high-energy astrophysics.

EDUCATION **Princeton University**, Princeton, NJ USA

Ph.D., Physics, September 2013

- Adviser: Professor Frans Pretorius
- Thesis: Numerical Hydrodynamics in Strong-Field General Relativity

M.A., Physics, January 2010

**Stanford University**, Stanford, CA USA

B.S., Mathematics and Physics, June 2008

- with Honors in Physics
- Conferred with Distinction

EMPLOYMENT **Perimeter Institute for Theoretical Physics**, Waterloo, ON, Canada

*Senior Faculty (tenured)* **October 2023 to present**

*Junior Faculty (tenure track)* **January 2018 to September 2023**

*Director's Fellow* **September 2016 to December 2017**

**Physics and Astronomy Department, University of Waterloo**, Waterloo, ON, Canada

*Adjunct Faculty* **January 2018 to present**

**Kavli Institute for Particle Astrophysics and Cosmology, Stanford University**, Menlo Park, CA

*Postdoctoral Fellow* **September 2013 to August 2016**

FUNDING

- **Digital Research Alliance of Canada** PI on project entitled "Gravitational wave probes of new physics." Received 1337 core years supercomputer time, equivalent to \$154,710 CAD (April 2022-Mar. 2024).

- **Arthur B. McDonald Canadian Astroparticle Physics Research Institute** PI on HQP Pooled Resources grant. Awarded \$48,000 CAD (Sep. 2021-Aug. 2023).
- **NSERC Discovery Grant with Launch Supplement** PI on grant entitled “Uncovering the dynamics of black holes and neutron stars for gravitational wave and multimessenger astronomy.” Awarded \$177,500 CAD (Apr. 2019-Mar. 2024).
- **Compute Canada** Co-PI on project entitled “Gravitational waves, multimessenger astronomy, and new vistas through gravity.” Received 1106 core years supercomputer time, equivalent to \$137,179 CAD (Apr. 2019-Mar. 2022).
- **XSEDE PHY100053** Co-PI on project entitled “Compact Object Binary Mergers: Simulations in Full General Relativity.” Received computational resources valued at \$710,762 USD (Apr. 2015-Mar. 2022).
- **NASA** Einstein Postdoctoral Fellowship (*declined*), 2016
- **XSEDE AST150038** Co-PI on project entitled “Astrophysical Plasma in the Relativistic Regime.” Received computational resources valued at \$65,003 USD (Oct. 2015- Sep. 2016).
- **USA National Science Foundation** Graduate Research Fellowship, 2008-2011

#### AWARDS AND PRIZES

- The Jürgen Ehlers Thesis Prize for an Outstanding Ph.D. Thesis in Mathematical and Numerical Relativity, The International Society on General Relativity and Gravitation, 2016
- Nicholas Metropolis Award for Outstanding Doctoral Thesis Work in Computational Physics, American Physical Society, 2015
- Ray Grimm Memorial Prize in Computational Physics, Princeton University, 2013
- Deans’ Award for Academic Accomplishment, Stanford University, 2008
- President’s Award for Academic Excellence, Stanford University, 2005

#### STUDENT SUPERVISION

##### Ph.D. supervisor:

- Ifigeneia Giannakoudi, Univ. of Waterloo **Sep. 2023 to present**
- Taillte May, Univ. of Waterloo **Sep. 2021 to present**
- Nils Siemonsen, Univ. of Waterloo **Jan. 2020 to July 2023**

Currently postdoctoral fellow, Princeton University, Gravity Initiative.

- Maxence Corman, Univ. of Waterloo **Sep. 2019 to July 2023**

Currently postdoctoral fellow, Max Planck Institute for Gravitational Physics.

##### Master’s supervisor:

- Ifigeneia Giannakoudi, Master’s student Univ. of Waterloo **Nov. 2022 to June 2023**

Thesis (PSI Essay) supervisor.

- Tim Whittaker, Master’s student Univ. of Waterloo **Sep. 2019 to Sep. 2021**  
Currently Ph.D. student in Earth and Atmospheric Sciences at l’Université du Québec à Montréal.
- Taillte May, Master’s student Univ. of Waterloo **Nov. 2020 to June 2021**  
Thesis (PSI Essay) supervisor. Currently Ph.D. student at Univ. of Waterloo.
- Nils Siemonsen, Master’s student ETH Zurich **Mar. 2019 to Oct. 2019**  
Master thesis (external) supervisor. Currently Ph.D. student at Univ. of Waterloo.

**Undergraduate supervisor:**

- Tim Whittaker, undergrad. student Univ. of Waterloo **May 2018 to Aug. 2019**  
Co-supervisor of undergraduate research thesis on applications of machine learning to neutron star merger gravitational waveforms. Currently Ph.D. student in Earth and Atmospheric Sciences at l’Université du Québec à Montréal.

TEACHING  
EXPERIENCE

**Perimeter Scholars International Master’s Program, Waterloo, ON Canada**

*Lecturer* **Winter 2019, Winter 2022, Winter 2023**

- Designed curriculum and primary lecturer for Strong Field Gravity course.

**Atlantic General Relativity 2022, Memorial University, Canada**

*Lecturer* **May 16-17, 2022**

- Presented online mini-course aimed at beginning graduate students entitled “How to extract energy from a black hole.”

**Physics and Astronomy, University of Waterloo, Waterloo, ON Canada**

*Guest Lecturer* **March 2020**

- Taught module on numerical hydrodynamics for Computational Physics course (PHYS 776).

**Department of Physics, Stanford University, Stanford, CA USA**

*Guest Lecturer* **Fall 2014 and Fall 2015**

- Guest lecturer for Prof. Tom Abel’s Computational Physics class.

**Prison Teaching Initiative, Princeton, NJ USA**

*Instructor* **September 2012 to May 2013**

- Lectured, ran worksheet sessions, and graded for environmental science and introductory algebra courses taught in NJ correctional facilities for college credit.

**Department of Physics, Princeton University, Princeton, NJ USA**

*Assistant in Instruction*

**September 2009 to January 2013**

- Laboratory instructor for Seminar in Computational Physics (Fall 2011 and Fall 2012), review session leader and grader for Quantum Mechanics (Spring 2011), grader for Introduction to Relativity (Fall 2011), and grader for Future Physics (Fall 2009).

ACADEMIC  
SERVICE

**Referee**

Referee for the following funding agencies/grants:

- Canada NSERC Discovery Grant
- European Research Council Consolidator Grant
- USA NSF Review Panel

Referee for the following journals:

**2014 to present**

- Astrophysical Journal Letters, Classical and Quantum Gravity, Computer Physics Communications, Journal of Cosmology and Astroparticle Physics, Nature Communications, Physical Review D, Physical Review Letters, Physics Letters B

**Conference/Colloquium Organizer**

*24th International Conference of General Relativity and Gravitation Scientific Organizing Committee*

*LISA Canada 2022*

**Online workshop, August 24-25, 2022**

*Gravitational Waves Beyond the Boxes II*

**Perimeter Institute, April 4-8, 2022**

*LISA Canada 2021*

**Online workshop, April 27-29, 2021**

*Strong Gravity Seminar* **Perimeter Institute, September 2018 to June 2020**

*Gravitational Waves Outside the Boxes Workshop*

**Perimeter Institute,**

**October 23-25 2019**

*Searching for New Particles with Black Hole Superradiance*

**Perimeter**

**Institute, May 9-11 2018**

*Lights, Sound, Action in Strong Field Gravity Workshop*

**Perimeter**

**Institute, November 6-7 2017**

*Midwest Relativity Meeting*

**Perimeter Institute, October 13-15 2016**

*Stanford KIPAC Astrophysics Colloquium*

**March 2015 to June 2016**

**Committee/Platform Memberships**

*Women in Physics*

**Perimeter Institute, 2022 to current**

*Perimeter Scholars International Admissions* **2022 to current**

*Advisory Committee to the Faculty Chair* **Perimeter Institute, 2022 to current**

*Ph.D. Admissions* **Perimeter Institute, 2018 to 2019**

*Postdoctoral Recruitment* **Perimeter Institute, 2018 to 2019**

OTHER  
RESEARCH  
EXPERIENCE

**Department of Physics, Stanford University, Stanford, CA USA**

*Research Assistant* **April 2006 to June 2008**

- Theoretical modeling of particle acceleration and thermalization in solar flares and clusters of galaxies with Professor V. Petrosian.

**Ginzton Laboratories, Stanford University, Stanford, CA USA**

*Research Assistant* **April 2005 to June 2006**

- Designed and programmed control system software and built and calibrated electronics for the Advanced LIGO seismic isolation system.

PUBLICATIONS

**Submitted**

- [1] W. E. East, and N. Siemonsen, “Instability and backreaction of spin-2 fields around black holes”, (2023), arXiv:2309.05096 [gr-qc].
- [2] N. Siemonsen, and W. E. East, “Generic initial data for binary boson stars”, (2023), arXiv:2306.17265 [gr-qc].

**Published**

- [4] D. Jones, L. Sun, N. Siemonsen, W. E. East, S. M. Scott, and K. Wette, “Methods and prospects for gravitational-wave searches targeting ultra-light vector-boson clouds around known black holes”, *Phys. Rev. D* **108**, 064001 (2023), arXiv:2305.00401 [gr-qc].
- [5] N. Siemonsen, and W. E. East, “Binary boson stars: Merger dynamics and formation of rotating remnant stars”, *Phys. Rev. D* **107**, 124018 (2023), arXiv:2302.06627 [gr-qc].
- [6] N. Siemonsen, C. Mondino, D. Egana-Ugrinovic, J. Huang, M. Baryakhtar, and W. E. East, “Dark photon superradiance: Electrodynamics and multi-messenger signals”, *Phys. Rev. D* **107**, 075025 (2023), arXiv:2212.09772 [astro-ph.HE].
- [3] M. Corman, and W. E. East, “Starting inflation from inhomogeneous initial conditions with momentum”, *JCAP* **10**, 046 (2023), arXiv:2212.04479 [gr-qc].

- [7] N. Siemonsen, T. May, and W. E. East, “Modeling the black hole superradiance gravitational waveform”, *Phys. Rev. D* **107**, 104003 (2023), arXiv:2211.03845 [gr-qc].
- [8] M. Corman, J. L. Ripley, and W. E. East, “Nonlinear studies of binary black hole mergers in Einstein-scalar-Gauss-Bonnet gravity”, *Phys. Rev. D* **107**, 024014 (2023), arXiv:2210.09235 [gr-qc].
- [9] W. E. East, and F. Pretorius, “Binary neutron star mergers in Einstein-scalar-Gauss-Bonnet gravity”, *Phys. Rev. D* **106**, 104055 (2022), arXiv:2208.09488 [gr-qc].
- [10] W. E. East, and J. Huang, “Dark photon vortex formation and dynamics”, *JHEP* **12**, 089 (2022), arXiv:2206.12432 [hep-ph].
- [11] M. Corman, W. E. East, and J. L. Ripley, “Evolution of black holes through a nonsingular cosmological bounce”, *JCAP* **09**, 063 (2022), arXiv:2206.08466 [gr-qc].
- [12] W. E. East, “Vortex String Formation in Black Hole Superradiance of a Dark Photon with the Higgs Mechanism”, *Phys. Rev. Lett.* **129**, 141103 (2022), arXiv:2205.03417 [hep-ph].
- [13] T. Whittaker, W. E. East, S. R. Green, L. Lehner, and H. Yang, “Using machine learning to parametrize postmerger signals from binary neutron stars”, *Phys. Rev. D* **105**, 124021 (2022), arXiv:2201.06461 [gr-qc].
- [14] L. Sberna, P. Bosch, W. E. East, S. R. Green, and L. Lehner, “Nonlinear effects in the black hole ringdown: Absorption-induced mode excitation”, *Phys. Rev. D* **105**, 064046 (2022), arXiv:2112.11168 [gr-qc].
- [15] W. E. East, and J. L. Ripley, “Dynamics of Spontaneous Black Hole Scalarization and Mergers in Einstein-Scalar-Gauss-Bonnet Gravity”, *Phys. Rev. Lett.* **127**, 101102 (2021), arXiv:2105.08571 [gr-qc].
- [16] M. Corman, W. E. East, and M. C. Johnson, “Nonlinear dynamics of flux compactification”, *JHEP* **09**, 021 (2021), arXiv:2105.06434 [hep-th].
- [17] W. E. East, L. Lehner, S. L. Liebling, and C. Palenzuela, “Multimes-senger Signals from Black Hole–Neutron Star Mergers without Significant Tidal Disruption”, *Astrophys. J. Lett.* **912**, L18 (2021), arXiv:2101.12214 [astro-ph.HE].
- [18] N. Siemonsen, and W. E. East, “Stability of rotating scalar boson stars with nonlinear interactions”, *Phys. Rev. D* **103**, 044022 (2021), arXiv:2011.08247 [gr-qc].
- [19] L. Tsukada, R. Brito, W. E. East, and N. Siemonsen, “Modeling and searching for a stochastic gravitational-wave background from ultralight vector bosons”, *Phys. Rev. D* **103**, 083005 (2021), arXiv:2011.06995 [astro-ph.HE].
- [20] T. Zhang, J. Smetana, Y. Chen, J. Bentley, D. Martynov, H. Miao, W. E. East, and H. Yang, “Toward observing neutron star collapse with gravitational wave detectors”, *Phys. Rev. D* **103**, 044063 (2021), arXiv:2011.06705 [gr-qc].

- [21] W. E. East, and J. L. Ripley, “Evolution of Einstein-scalar-Gauss-Bonnet gravity using a modified harmonic formulation”, *Phys. Rev. D* **103**, 044040 (2021), arXiv:2011.03547 [gr-qc].
- [22] N. Siemonsen, and W. E. East, “Gravitational wave signatures of ultralight vector bosons from black hole superradiance”, *Phys. Rev. D* **101**, 024019 (2020), arXiv:1910.09476 [gr-qc].
- [23] W. E. East, and L. Lehner, “Fate of a neutron star with an endoparasitic black hole and implications for dark matter”, *Phys. Rev. D* **100**, 124026 (2019), arXiv:1909.07968 [gr-qc].
- [24] W. E. East, R. Wojtak, and F. Pretorius, “Einstein-Vlasov Calculations of Structure Formation”, *Phys. Rev. D* **100**, 103533 (2019), arXiv:1908.05683 [astro-ph.CO].
- [25] W. E. East, V. Paschalidis, F. Pretorius, and A. Tsokaros, “Binary neutron star mergers: Effects of spin and post-merger dynamics”, *Phys. Rev. D* **100**, 124042 (2019), arXiv:1906.05288 [astro-ph.HE].
- [26] W. E. East, “Cosmic Censorship Upheld in Spheroidal Collapse of Collisionless Matter”, *Phys. Rev. Lett.* **122**, 231103 (2019), arXiv:1901.04498 [gr-qc].
- [27] D. Martynov, et al., “Exploring the sensitivity of gravitational wave detectors to neutron star physics”, *Phys. Rev. D* **99**, 102004 (2019), arXiv:1901.03885 [astro-ph.IM].
- [28] F. Pretorius, and W. E. East, “Black Hole Formation from the Collision of Plane-Fronted Gravitational Waves”, *Phys. Rev. D* **98**, 084053 (2018), arXiv:1807.11562 [gr-qc].
- [29] W. E. East, “Massive Boson Superradiant Instability of Black Holes: Non-linear Growth, Saturation, and Gravitational Radiation”, *Phys. Rev. Lett.* **121**, 131104 (2018), arXiv:1807.00043 [gr-qc].
- [30] H. Yang, W. E. East, V. Paschalidis, F. Pretorius, and R. F. P. Mendes, “Evolution of Highly Eccentric Binary Neutron Stars Including Tidal Effects”, *Phys. Rev. D* **98**, 044007 (2018), arXiv:1806.00158 [gr-qc].
- [31] W. E. East, and H. Yang, “Magnetosphere of a spinning black hole and the role of the current sheet”, *Phys. Rev. D* **98**, 023008 (2018), arXiv:1805.05952 [astro-ph.HE].
- [32] W. E. East, R. Wojtak, and T. Abel, “Comparing Fully General Relativistic and Newtonian Calculations of Structure Formation”, *Phys. Rev. D* **97**, 043509 (2018), arXiv:1711.06681 [astro-ph.CO].
- [33] H. Yang, W. E. East, and L. Lehner, “Can we distinguish low mass black holes in neutron star binaries?”, *Astrophys. J.* **856**, [Erratum: *Astrophys. J.* **870**, 139 (2019)], 110 (2018), arXiv:1710.05891 [gr-qc].
- [34] W. E. East, “Superradiant instability of massive vector fields around spinning black holes in the relativistic regime”, *Phys. Rev. D* **96**, 024004 (2017), arXiv:1705.01544 [gr-qc].

- [35] W. E. East, and F. Pretorius, “Superradiant Instability and Backreaction of Massive Vector Fields around Kerr Black Holes”, *Phys. Rev. Lett.* **119**, 041101 (2017), arXiv:1704.04791 [gr-qc].
- [36] W. E. East, V. Paschalidis, and F. Pretorius, “Equation of state effects and one-arm spiral instability in hypermassive neutron stars formed in eccentric neutron star mergers”, *Class. Quant. Grav.* **33**, 244004 (2016), arXiv:1609.00725 [astro-ph.HE].
- [37] W. E. East, J. Kearney, B. Shakya, H. Yoo, and K. M. Zurek, “Spacetime Dynamics of a Higgs Vacuum Instability During Inflation”, *Phys. Rev. D* **95**, 023526 (2017), arXiv:1607.00381 [hep-ph].
- [38] Y. Yuan, K. Nalewajko, J. Zrake, W. E. East, and R. D. Blandford, “Kinetic study of radiation-reaction-limited particle acceleration during the relaxation of unstable force-free equilibria”, *Astrophys. J.* **828**, 92 (2016), arXiv:1604.03179 [astro-ph.HE].
- [39] K. Nalewajko, J. Zrake, Y. Yuan, W. E. East, and R. D. Blandford, “Kinetic simulations of the lowest-order unstable mode of relativistic magnetostatic equilibria”, *Astrophys. J.* **826**, 115 (2016), arXiv:1603.04850 [astro-ph.HE].
- [40] W. E. East, M. Kleban, A. Linde, and L. Senatore, “Beginning inflation in an inhomogeneous universe”, *JCAP* **09**, 010 (2016), arXiv:1511.05143 [hep-th].
- [41] W. E. East, V. Paschalidis, F. Pretorius, and S. L. Shapiro, “Relativistic Simulations of Eccentric Binary Neutron Star Mergers: One-arm Spiral Instability and Effects of Neutron Star Spin”, *Phys. Rev. D* **93**, 024011 (2016), arXiv:1511.01093 [astro-ph.HE].
- [42] V. Paschalidis, W. E. East, F. Pretorius, and S. L. Shapiro, “One-arm Spiral Instability in Hypermassive Neutron Stars Formed by Dynamical-Capture Binary Neutron Star Mergers”, *Phys. Rev. D* **92**, 121502 (2015), arXiv:1510.03432 [astro-ph.HE].
- [43] J. Zrake, and W. E. East, “Freely decaying turbulence in force-free electrodynamics”, *Astrophys. J.* **817**, 89 (2016), arXiv:1509.00461 [astro-ph.HE].
- [44] W. E. East, V. Paschalidis, and F. Pretorius, “Eccentric mergers of black holes with spinning neutron stars”, *Astrophys. J. Lett.* **807**, L3 (2015), arXiv:1503.07171 [astro-ph.HE].
- [45] W. E. East, J. Zrake, Y. Yuan, and R. D. Blandford, “Spontaneous decay of periodic magnetostatic equilibria”, *Phys. Rev. Lett.* **115**, 095002 (2015), arXiv:1503.04793 [astro-ph.HE].
- [46] W. E. East, “Gravitational waves from the collision of tidally disrupted stars with massive black holes”, *Astrophys. J.* **795**, 135 (2014), arXiv:1408.1695 [gr-qc].
- [47] W. E. East, F. M. Ramazanoğlu, and F. Pretorius, “Black Hole Superradiance in Dynamical Spacetime”, *Phys. Rev. D* **89**, 061503 (2014), arXiv:1312.4529 [gr-qc].



- [48] W. E. East, and F. Pretorius, “Simulating extreme-mass-ratio systems in full general relativity”, *Phys. Rev. D* **87**, 101502 (2013), arXiv:1303.1540 [gr-qc].
- [49] W. E. East, S. T. McWilliams, J. Levin, and F. Pretorius, “Observing complete gravitational wave signals from dynamical capture binaries”, *Phys. Rev. D* **87**, 043004 (2013), arXiv:1212.0837 [gr-qc].
- [50] W. E. East, and F. Pretorius, “Ultrarelativistic black hole formation”, *Phys. Rev. Lett.* **110**, 101101 (2013), arXiv:1210.0443 [gr-qc].
- [51] W. E. East, F. M. Ramazanoglu, and F. Pretorius, “Conformal Thin-Sandwich Solver for Generic Initial Data”, *Phys. Rev. D* **86**, 104053 (2012), arXiv:1208.3473 [gr-qc].
- [52] W. E. East, and F. Pretorius, “Dynamical Capture Binary Neutron Star Mergers”, *Astrophys. J. Lett.* **760**, L4 (2012), arXiv:1208.5279 [astro-ph.HE].
- [53] W. E. East, F. Pretorius, and B. C. Stephens, “Hydrodynamics in full general relativity with conservative AMR”, *Phys. Rev. D* **85**, 124010 (2012), arXiv:1112.3094 [gr-qc].
- [54] W. E. East, F. Pretorius, and B. C. Stephens, “Eccentric black hole-neutron star mergers: effects of black hole spin and equation of state”, *Phys. Rev. D* **85**, 124009 (2012), arXiv:1111.3055 [astro-ph.HE].
- [55] B. C. Stephens, W. E. East, and F. Pretorius, “Eccentric Black Hole-Neutron Star Mergers”, *Astrophys. J. Lett.* **737**, L5 (2011), arXiv:1105.3175 [astro-ph.HE].
- [56] V. Petrosian, and W. E. East, “Heating and Acceleration of Intracluster Medium Electrons by Turbulence”, *Astrophys. J.* **682**, 175 (2008), arXiv:0802.0900 [astro-ph].

## White Papers

- [57] M. Baryakhtar, et al., “Dark Matter In Extreme Astrophysical Environments”, in 2022 Snowmass Summer Study (Mar. 2022), arXiv:2203.07984 [hep-ph].
- [58] V. Kalogera, et al., “The Next Generation Global Gravitational Wave Observatory: The Science Book”, (2021), arXiv:2111.06990 [gr-qc].
- [59] E. Barausse, et al., “Prospects for Fundamental Physics with LISA”, *Gen. Rel. Grav.* **52**, 81 (2020), arXiv:2001.09793 [gr-qc].
- [60] B. S. Sathyaprakash, et al., “Extreme Gravity and Fundamental Physics”, (2019), arXiv:1903.09221 [astro-ph.HE].

INVITED  
PRESENTATIONS

1. “Strong Gravity Probes of the Dark Side” Amaldi15, July 19, 2023, invited plenary talk.

2. “Vortex Formation in Dark Photons” Ending Inflation and the Hot Big Bang, Simons Center for Geometry and Physics, June 5, 2023, invited workshop talk.
3. “Portents of New Physics from Extreme Gravity” Perimeter Institute Colloquium, May 31, 2023, invited colloquium.
4. “Black hole and neutron star mergers beyond Einstein” Computational Relativistic Astrophysics seminar, Max Planck Institute for Gravitational Physics, Dec. 6, 2022, invited seminar.
5. “Dark matter” Physics and Astrophysics at the eXtreme 2022, MIT, Aug. 2, 2022, invited panelist.
6. “Predicting Strong Gravity Signatures of New Physics” New Frontiers in Strong Gravity, Centro de Ciencias de Benasque, July 12, 2022, invited conference talk.
7. “Progress in Numerical Relativity” 23rd International Conference of General Relativity and Gravitation, July 7, 2022, invited plenary session.
8. “Predicting New Physics for Gravitational Wave Observations” Storming the Gravitational Wave Frontier, KITP UC Santa Barbara, April 20, 2022, invited conference talk.
9. “Cosmic Censorship, Black Holes, and Backreaction: Adventures in the Collapse of Collisionless Matter” Mathematical Perspectives of Gravitation beyond the Vacuum Regime Workshop, Erwin Schrödinger International Institute, Feb. 11, 2022, invited workshop talk.
10. “Compact Object Mergers Beyond Einstein” Spanish-Portuguese Relativity Meeting, Sep. 14, 2021, invited conference talk.
11. “Evolving Gravity Beyond Einstein” Canadian Mathematical Society Summer Meeting, June 7, 2021, invited conference talk.
12. “Evolving Binary Black Hole Spacetimes Beyond Einstein” Sapienza University Gravity Seminar, March 24, 2021, invited seminar.
13. “Evolving Binary Black Hole Spacetimes Beyond Einstein” SISSA/IFPU webinar, Feb. 19, 2021, invited seminar.
14. “Strong Field Dynamics of Bosonic Fields: Looking for New Particles and Modified Gravity” Mathematical and Computational Approaches for the Einstein Field Equations with Matter Field Workshop, ICERM Brown University, Oct. 26, 2020, invited workshop talk.
15. “Fundamental Physics with Gravitational Waves: Probing the Dark Side” Isaacson Award Session: Challenges in Gravitational Wave Research, APS April Meeting, April 21, 2020, invited conference talk.
16. “New Perspectives from Gravity’s Extremes” Perimeter Institute Colloquium, Feb. 26, 2020, invited colloquium.

17. “Uncovering the Dark Side with Gravitational Waves” University of Alberta Physics Colloquium, Jan. 31, 2020, invited colloquium.
18. “Cosmic Censorship, Backreaction, and Black Holes: Some Adventures in the Collapse of Collisionless Matter ” Theoretical Physics Institute Seminar, University of Alberta, Jan. 30, 2020, invited seminar.
19. “Hydrodynamics on Dynamical Spacetime” Hydrodynamics Across the Scales Workshop, University of Chicago, April 28, 2019, invited workshop talk.
20. “Black Hole Superradiance” University of Toronto Analysis & Applied Math Seminar, March 29, 2019, invited seminar.
21. “The Post-merger Dynamics of Compact Objects” Computational Challenges in Gravitational Wave Astronomy Workshop, Institute for Pure & Applied Mathematics UCLA, Jan. 30, 2019, invited workshop talk.
22. “Uncovering the Dynamics of Spacetime” University of Guelph Physics Colloquium, Nov. 20, 2018, invited colloquium.
23. “Liberating Energy from Black Holes: Jets, Bombs, and Gravitational Waves” Canadian Institute for Theoretical Astrophysics Seminar, July 5, 2018, invited seminar.
24. “Hitting the High Notes: The High Frequency Dynamics of Neutron Star Mergers” Path to Kilohertz Conference, Perimeter Institute, June 11, 2018, invited conference talk.
25. “Superradiance in the Nonlinear Regime” Numerical Relativity Beyond General Relativity, Centro de Ciencias de Benasque Pedro Pascual, June 6, 2018, invited conference talk.
26. “Black Hole Superradiance” Astrophysics Seminar, Los Alamos National Lab, April 5, 2018, invited seminar.
27. “Gravitational Waves: A New Window into the Universe” Centre for the Universe Launch, Perimeter Institute, Nov. 20, 2017, invited public talk.
28. “Uncovering the Dynamics of Spacetime” University of Mississippi Physics Colloquium, Nov. 14, 2017, invited colloquium.
29. “The Potential Impact of Neutron Star Spin or Orbital Eccentricity” Lights, Sound, Action in Strong Field Gravity Workshop, Perimeter Institute, Nov. 6, 2017, invited workshop talk.
30. “Uncovering the Dynamics of Spacetime” Perimeter Institute Colloquium, Oct. 25, 2017, invited colloquium.
31. “Strong Gravity, Black Holes, and the Fate of the Early Universe” Bangs, Bounces, Black Holes, and Bubbles: Where General Relativity Meets Cosmology Workshop, Princeton Center for Theoretical Science, May 11, 2017, invited workshop talk.

32. “Rotating Neutron Stars: A Tale of Two Instabilities” University of New Hampshire Physics Seminar, Feb. 3, 2017, invited seminar.
33. “Discovering the Dynamics of Spacetime” University of New Hampshire Physics Colloquium, Feb. 2, 2017, invited colloquium.
34. “Cosmic Inflation, Black Holes, and the Fate of the Early Universe” University of Arizona Theoretical Astrophysics Program Colloquium, Nov. 21, 2016, invited colloquium.
35. “Cosmic Inflation, Black Holes, and the Fate of the Early Universe” University of Waterloo Astrophysics Seminar, Nov. 16, 2016, invited seminar.
36. “One-arm Spiral Instability in Hypermassive Neutron Stars from Binary Mergers” CITA-PI Day, University of Toronto, Sep. 16, 2016, invited workshop talk.
37. “Spacetime Dynamics of the Higgs Instability and the Fate of the Early Universe” Cosmological Frontiers in Fundamental Physics, Perimeter Institute, June 16, 2016, invited conference talk.
38. “Gravitational Waves: Ripples in the Fabric of Spacetime” Science of SLAC, April 22, 2016, invited public talk.
39. “Compact Object Mergers with Spinning Neutron Stars” Perimeter Institute Strong gravity seminar, Dec. 3, 2015, invited seminar.
40. “Compact Object Mergers with Spinning Neutron Stars” Caltech Theoretical Astrophysics and Relativity Seminar, Nov. 13, 2015, invited seminar.
41. “Taking Numerical Relativity to the Extreme” Perturbation Methods in General Relativity, The Fields Institute, May 26, 2015, invited workshop talk.
42. “Numerical Hydrodynamics at Gravity’s Extremes” Invited Session: How Advanced Computational Resources Enhance Our Understanding of Physics, APS April Meeting, April 12, 2015, invited conference talk.
43. “Dynamical Capture Compact Binary Mergers” Friday Astrophysics Seminar, UC Santa Cruz, Feb. 28th, 2014, invited seminar.
44. “Dynamical Capture Compact Binary Mergers” UIUC Theoretical Astrophysics and GR seminar, Dec. 12, 2012, invited seminar.
45. “Dynamical Capture Compact Binary Mergers” Perimeter Institute Strong Gravity Seminar, Nov. 22, 2012, invited seminar.
46. “Dynamical Capture Compact Binary Mergers” Harvard CFA, Nov. 9, 2012, invited seminar.
47. “Dynamical Capture Compact Binary Mergers” Caltech TAPIR seminar, Oct. 26, 2012, invited seminar.
48. “Dynamical Capture Compact Binary Mergers” Cornell Astrophysics lunch seminar, Oct. 24, 2012, invited seminar.

INTERVIEWS AND  
MEDIA  
RELATIONS

- New Scientist “The hunt for black holes older than the universe itself” by Bernard Carr; March 2023 (work featured)
- Physical Review Letters Cover Sep. 2022 (work featured)
- HPCwire “Readers Choice Top HPC-Enabled Scientific Achievement” 2019 (work featured)
- The Globe and Mail “Waterloo meeting offers fresh spin on black holes – and potential new clues to the cosmos” May 2018 (interviewed)
- Astronomy “The next astronomical revolution” Jan. 2018 (interviewed)
- Physics World “Spinning black holes could grow long hair” July 2017 (work featured)
- Physics “Viewpoint: Spinning Black Holes May Grow Hair” July 2017 (work featured)
- AAS Nova “Spin Complicates Eccentric BH-NS Mergers” July 2015 (work featured)
- Physics “Synopsis: Black Holes Emerge from Collisions” Mar. 2013 (work featured)
- Science “Particle Collisions Could Create Twin Black Holes” Mar. 2013 (work featured)