CURRICULUM VITAE SCOTT E. FIELD

Department of Mathematics
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HIGHER EDUCATION

Graduate:

Brown University, Providence RI

Physics M.Sc., 2010.
Physics Ph.D, 2011. Advisor: Professor Jan S. Hesthaven, Division of Applied Mathematics.
Dissertation: *Applications of Discontinuous Galerkin Methods to Computational Relativity.*

Undergraduate:

University of Rochester, Rochester NY

Mathematics B.S., 2006.
Physics B.S., 2006. Advisor: Professor Arie Bodek, Department of Physics.

TEACHING & OTHER EXPERIENCE

1. Assistant Professor, Department of Mathematics, University of Massachusetts Dartmouth (9/2016 -)
2. Co-director, Data Science, University of Massachusetts Dartmouth (10/2017 -)
3. Adjunct Professor, Mechanical Engineering, University of Massachusetts Dartmouth (7/2017 - 7/2018)
4. Visiting Scientist, Cornell Center for Astrophysics (9/2016 - 8/2017)
5. Research Associate, Department of Astronomy, Cornell University (9/2014 - 9/2016)
6. Lecturer, Department of Physics, Cornell University (1/2015 - 5/2015)
7. Postdoctoral Researcher, Department of Physics, University of Maryland (8/2011 - 8/2014)
8. NASA Goddard-UMD Joint Space-Science Institute Prize Postdoctoral Fellow (8/2011 - 8/2014)
9. Maryland Center for Fundamental Physics, University of Maryland (8/2011 - 8/2014)

Courses taught at UMass Dartmouth:

1. Complex Analysis, MTH 421 & MTH 499. (Fall 2017)
2. High Performance Scientific Computing, EAS 520, DSC 520, & MTH 499. (Fall 2016, Fall 2017)
3. Introduction to Scientific Computation, MTH 280. (Spring 2017, Spring 2018)

ACADEMIC AND PROFESSIONAL HONORS

1. Gravitational Wave International Committee, 2011 Thesis Prize Honorable Mention (2/2012)
2. NASA Goddard-UMD Joint Space-Science Institute Prize Postdoctoral Fellowship (8/2011)
3. Brown University, Anthony Houghton award for excellence in theoretical physics (5/2011)
4. Brown University, Full member of Sigma Xi research honor society (5/2011)
5. University of Rochester, Stoddard Prize for outstanding senior thesis (2006)
6. University of Rochester, Highest Distinction in Physics (2006)
7. University of Rochester, High Distinction in Mathematics (2006)
8. University of Rochester, Undergraduate Physics Teaching Award (2006)
9. Fermilab National Laboratory, Research Experience for Undergraduates (Summer 2003)
10. University of Rochester, Take Five Scholar (2005 - 2006)
11. University of Rochester, Rush Rhees Academic Scholar (2001 - 2005)

SCHOLARSHIP AND PROFESSIONAL ACTIVITIES

Research Interests:

- Bayesian inference for large datasets, surrogate and reduced order modeling, gravitational wave parameter estimation
- Scientific computing, high performance computing, object and task-based parallel programing
- Discontinuous Galerkin methods for hyperbolic PDEs, computational general relativity and fluid dynamics, near-field to far-field methods

Peer-Reviewed Journal Publications:

1. Harbir Antil, Dangxing Chen, Scott E. Field. "A Note on QR-Based Model Reduction: Algorithm, Software, and Gravitational Wave Applications," accepted to IEEE's Computing in Science & Engineering, (2018).

2. Jeroen Meidam, Ka Wa Tsang, Janna Goldstein, Michalis Agathos, Archisman Ghosh, Carl-Johan Haster, Vivien Raymond, Anuradha Samajdar, Patricia Schmidt, Rory Smith, Kent Blackburn, Walter Del Pozzo, Scott E. Field, Tjonnie Li, Michael Purrer, Chris Van Den Broeck, John Veitch, Salvatore Vitale. "Parameterized tests of the strong-field dynamics of general relativity using gravitational wave signals from coalescing binary black holes: Fast likelihood calculations and sensitivity of the method", Phys. Rev. D 97, 044033 (2018).
3. Jonathan Blackman, Scott E. Field, Mark A. Scheel, Chad R. Galley, Christian D. Ott, Michael Boyle, Lawrence E. Kidder, Harald P. Pfeiffer, Bela Szilagyi. "A Numerical Relativity Waveform Surrogate Model for Generically Precessing Binary Black Hole Mergers," Physical Review D 96, (2017).
4. Jonathan Blackman, Scott E. Field, Mark A. Scheel, Chad R. Galley, Daniel A. Hemberger, Patricia Schmidt, and Rory Smith. "A Surrogate Model of Gravitational Waveforms from Numerical Relativity Simulations of Precessing Binary Black Hole Mergers." Physical Review D 95, 104023 (2017).
5. Richard O'Shaughnessy, Jonathan Blackman, and Scott E. Field. "An architecture for efficient multimodal gravitational wave parameter estimation with linear surrogate models," Classical and Quantum Gravity Volume 34, Number 14, June 2017.
6. Lawrence Kidder, Scott Field, Francois Foucart, Erik Schnetter, Saul Teukolsky, Andy Bohn, Nils Deppe, Peter Diener, Francois Hebert, Jonas Lippuner, Jonah Miller, Christian Ott, Mark Scheel, Trevor Vincent. "SpECTRE: A task-based discontinuous Galerkin code for relativistic astrophysics," Journal of Computational Physics, Volume 335, 15 April 2017, Pages 84-114.
7. Rory Smith, Scott Field, Kent Blackburn, Carl-Johan Haster, Michael Purrer, Vivien Raymond and Patricia Schmidt. "Fast and Accurate Inference on Gravitational Waves from Precessing Compact Binaries" Physical Review D 94, 044031 (2016).
8. Jonathan Blackman, Scott Field, Chad Galley, Béla Szilágyi, Mark Scheel, Manuel Tiglio, Daniel Hemberger. "Fast and accurate prediction of numerical relativity waveforms from binary black hole mergers using surrogate models" Physical Review Letters, Volume 115, Issue 12, September 2015.
9. Scott Field and Stephen Lau. "Fast recovery of far-field time-domain signals from near-field data" Journal of Scientific Computing, Volume 64, Issue 3, September 2015.
10. Scott Field and Paul Huwe. "Modern Gravitational Lens Cosmology for Introductory Physics and Astronomy Students" Phys. Teach. 53, 266 April 2015.
11. Priscilla Canizares, Scott Field, Jonathan Gair, Vivien Raymond, Rory Smith and Manuel Tiglio. "Accelerated gravitational-wave parameter estimation with reduced order modeling" Physical Review Letters 114, 071104, February 2015.
12. Scott Field, Chad Galley, Jan Hesthaven, Jason Kaye, and Manuel Tiglio. "Fast prediction and evaluation of gravitational waveforms using surrogate models" Physical Review X 4, 031006 (2014).
13. Priscilla Canizares, Scott Field, Jonathan Gair, and Manuel Tiglio. "Gravitational wave parameter estimation with compressed likelihood evaluations" Physical Review D, Volume 87, Issue 12, June 2013.
14. Harbir Antil, Scott Field, Frank Herrmann, Ricardo Nochetto, and Manuel Tiglio. "Two-step greedy algorithm for reduced order quadratures" Journal of Scientific Computing, May 2013.

15. Alex Benedict, Scott Field, and Stephen Lau. "Fast evaluation of asymptotic waveforms from gravitational perturbations" Classical and Quantum Gravity Volume 30, Number 5, 055015, February 2013
16. Scott Field, Chad Galley, and Evan Ochsner. "Towards beating the curse of dimensionality for gravitational waves using Reduced Basis" Phyical Review D, Volume 86, Issue 8 October 2012
17. J. David Brown, Peter Diener, Scott Field, Jan Hesthaven, Frank Herrmann, Abdul Mroué, Olivier Sarbach, Erik Schnetter, Manuel Tiglio, and Michael Wagman. "Numerical simulations with a first order BSSN formulation of Einstein's field equations" Physical Review D, Volume 85, Issue 8 April 2012
18. Sarah Caudill, Scott Field, Chad Galley, Frank Herrmann, and Manuel Tiglio. "Reduced basis representations of multi-mode black hole ringdown gravitational waves" Classical and Quantum Gravity Volume 29, Number 9, 095016, April 2012. **One of the journal's highlights from 2011-2012.**
19. Scott Field, Chad Galley, Frank Herrmann, Jan Hesthaven, Evan Ochsner, and Manuel Tiglio. "Reduced basis catalogs for gravitational wave templates" Physical Review Letters, Volume 106, Issue 22, June 2011
20. Scott Field, Jan Hesthaven, Stephen Lau, and Abdul Mroue. "Discontinuous Galerkin method for the spherically reduced BSSN system with second-order operators" Physical Review D, Volume 82, Issue 10, November 2010
21. Scott Field, Jan Hesthaven, and Stephen Lau. "Persistent junk solutions in time-domain modeling of extreme mass ratio binaries" Physical Review D, Volume 81, Issue 12, June 2010
22. Scott Field, Jan Hesthaven, and Stephen Lau. "Discontinuous Galerkin method for computing gravitational waveforms from extreme mass ratio binaries" Classical and Quantum Gravity Volume 26, Number 16, 21, August 2009

Conference Proceedings:

1. M. Purrer, R. Smith, S. Field, P. Canizares, V. Raymond, J. Gair, M. Hannam. "Accelerating Parameter Estimation of Gravitational Waves from Black Hole Binaries with Reduced Order Quadratures", Proceedings of the 14^{th} Marcel Grossmann meeting, 2015.

Other publications:

1. Christian D. Ott, Mark Scheel, Peter Diener, Philipp Mosta, Luke Roberts, David Radice, Sherwood Richers, Roland Haas, Erik Schnetter, Lawrence Kidder, Saul Teukolsky, Scott Field, and Francois Foucart. "Magnetars, black hole collisions for LIGO, and a next generation numerical relativity code." Blue Waters 2016 Annual report. `https://bluewaters.ncsa.illinois.edu/portal_data_src/BW_AR_16_linked.pdf` (2016)

PhD dissertation:

1. Applications of Discontinuous Galerkin Methods to Computational General Relativity, `https://repository.library.brown.edu/studio/item/bdr:11327/` (5/2011)

Undergraduate honors thesis:

1. Search for Ξ_b and Σ_b with the CDF II Detector at Fermilab, `http://hdl.handle.net/1802/2878` (5/2006)

Internal collaboration notes:

1. Search for $\Theta^0_{cs} \to D_s P$ state in CDF. CDF Note Number: CDF/ANAL/BOTTOM/CDFR/7638 (2005)
2. Search for Penta Quark in the channel of $\Phi P \pi$. CDF Note Number: CDF/ANAL/BOTTOM/CDFR/7144 (2005)

Public Software Packages:

1. Radiation boundary condition and asymptotic waveform evaluation (near-field to far-field) numerical tables for time-domain simulation of wave propagation problems on curved spacetimes `http://www.dam.brown.edu/people/sfield/KernelsRWZ/`
2. Surrogates provide a fast and accurate evaluation mechanism for gravitational waveforms which would otherwise be found through solving differential equations. The GWSurrogate software package contains surrogate data, and an easy-to-use evaluation interface: `https://pypi.python.org/pypi/gwsurrogate/`. Additional surrogate data is found on `https://www.black-holes.org/surrogates/`.
3. Greedycpp is a fast, scalable and easy-to-use parallelization of the greedy algorithm for building application-specific basis, empirical interpolants, and reduced-order quadrature (ROQ) rules `https://bitbucket.org/sfield83/greedycpp`.
4. I have made modest contributions to the publicly available LIGO Analysis Library (LAL) Suite, `https://github.com/lscsoft/lalsuite`, most notably the reduced-order quadrature pipeline for fast parameter estimation studies.

GRANTS RECEIVED

1. Office of Naval Research, Defense University Research Instrumentation Program, "A Heterogeneous Terascale Computing Cluster for the Development of GPU Optimized High-order Numerical Methods", Sigal Gottlieb (PI), Co-Pis: Vanni Bucci, Yanlai Chen, Geoffrey Cowles, Bo Dong, Scott Field, Alfa Heryudono, Gaurav Khanna, Maricris Mayes, Mehdi Raessi, Amit Tandon, Mazdak Tootkaboni. $643,899 (2018 2019).
2. CAS Event Fund. "Events: AfterMath Symposium and @Math", Gary Davis, Scott Field, Sigal Gottlieb, Alfa Heryudono, Saeja Kim, and Donghui Yan. $1,600 (2017).
3. SIAM Student Chapter funding. Yanlai Chen, Bo Dong, Scott Field, Alfa Heryudono, and Jiahua Jiang. $500 (2017-2018)
4. National Institute of Aerospace grant "High-order Compact Discontinuous Galerkin for Unstructured Grids", Scott Field (PI). $26,560 (2017 2018).

5. Provost's Departmental Seminar Series Funding, "Computational Science Seminar Series" Bo Dong and Scott Field. $1,000 (2017-2018).
6. NSF XSEDE supercomputer allocation grant TG-ASC160058, "Renewal: Stampede 2 for Students enrolled in High Performance Scientific Computing taught at the University of Massachusetts Dartmouth", Scott Field (PI). 2,340 node-hours (1 node-hour $\approx$ 16 single-core computing hours) (2017-2018)
7. 2017 Data Science Interface Grant, "Dataflow Notebooks: Improving Reproducibility in Notebook Environments", David Koop (PI), Scott Field (co-PI). $8,000 (2017-2018).
8. NSF XSEDE supercomputer allocation grant TG-ASC160058, "Stampede for Students enrolled in High Performance Scientific Computing taught at the University of Massachusetts Dartmouth", Scott Field (PI). 81,000 supercomputing units (1 SU $\approx$ one computing hour) (2016-2017)
9. SIAM Student Chapter funding. Yanlai Chen, Bo Dong, Scott Field, Alfa Heryudono, and Jiahua Jiang. $500 (2016-2017)
10. NSF Physics at the Information Frontier research grant PHY-1316424 "Reduced order modeling for gravitational waves", Scott Field (co-PI), Chad Galley (co-PI), Manuel Tiglio (PI). $375,000 (2013-2016)
11. NSF research grant PHY-1208861, "Reduced Basis for Gravitational Waves: Select, Solve, Represent, Predict", Scott Field (co-PI), Chad Galley (co-PI), Frank Herrmann (co-PI), Evan Ochsner (co-PI), Manuel Tiglio (PI). $150,000 (2012-2015)
12. Libraries Open Access Grant, University of Maryland (4/2014)
13. Research travel grant, Institute of Astronomy, Cambridge University (6/2013)
14. NSF XSEDE supercomputer allocation grant TG-PHY090080, "Binary Black Hole Parameter Space Studies", Scott Field (co-PI), Frank Herrmann (co-PI), Manuel Tiglio (PI). 2,700,000 supercomputing units (1 SU $\approx$ one computing hour) (2012-2013)
15. Brown University, Research Travel Grant "Reduced basis methods for problems in General Relativity" (4/2010 and 10/2010)

SEMINARS, COLLOQUIUM, AND CONFERENCE PRESENTATIONS

1. Black Holes and Computational Waves, keynote talk at HPCDay, Northeastern (5/2018). Keynote, regional conference.
2. GWSurrogate: An easy-to-use interface to gravitational wave surrogate models, April APS meeting, Columbus, OH (4/2018). Contributed, national conference.
3. GWSurrogate: An easy-to-use interface to gravitational wave surrogate models, 20th Eastern Gravity Meeting, Penn State (6/2017). Contributed, national/regional conference.
4. Fast recovery of far-field time-domain signals from near-field data, Applied and Computational Math Seminar, George Mason University (5/2017). Invited, seminar.
5. Fast recovery of far-field time-domain signals from near-field data, numerical analysis seminar, Worcester Polytechnic Institute (4/2017). Invited, seminar.
6. A Task-based Discontinuous Galerkin Code for Relativistic Astrophysics, Center for Computational Relativity and Gravitation, RIT (11/2016). Invited, seminar.

7. A Task-based Discontinuous Galerkin Code for Solving Multiphysics Problems in General Relativity, 21st International Conference on General Relativity and Gravitation, Columbia University (7/2016). Contributed, international conference.
8. A Task-based Discontinuous Galerkin Code for Solving Multiphysics Problems in General Relativity, 19th Eastern Gravity Meeting, University of New Hampshire (5/2016). Contributed, national/regional conference.
9. SpECTRE: A new code, SXS Presentations, (3/2016). Invited, web-based seminar attended by members of Cornell, Caltech, CITA, Cal State Fullerton, and AEI.
10. Efficient numerical methods for gravitational wave data science, scientific computing seminar, U. Mass Dartmouth (3/2016). Invited, seminar.
11. Efficient computational approaches to gravitational wave data science, astronomy seminar, Brown University (3/2016). Invited, seminar.
12. Nonspinning numerical relativity waveform surrogates, 18th Eastern gravity meeting, RIT (5/2015). Contributed, national/regional conference.
13. Nonspinning numerical relativity waveform surrogates: assessing the model, April APS meeting, Baltimore, MD (4/2015). Contributed, national conference.
14. A Discontinuous Galerkin Method for the Spherically Reduced Einstein Field Equations with Second-Order Operators, SIAM conference on Computational Science and Engineering, Salt Lake City, UT (3/2015). Invited, international conference.
15. Fast and exact evaluation of asymptotic waveforms from gravitational perturbations, theoretical astrophysics seminar, Cornell University (9/2014). Invited, seminar.
16. Surrogate gravitational waveform models, 17th Eastern Gravity Meeting, West Virginia University (5/2014). Contributed, national/regional conference.
17. Surrogate models for effective one body gravitational waveforms, April APS meeting, Savannah, GA (4/2014). Contributed, national conference.
18. Matrix completion and the Netflix challenge, TAPIR lunch seminar, California Institute of Technology (3/2014). Invited, brown-bag lunch talk.
19. Surrogate gravitational waveform models, gravitational theory seminar, U. of Maryland (1/2014). Invited, seminar.
20. Surrogate gravitational waveform models, theoretical astrophysics seminar, Cornell University (11/2013). Invited, seminar.
21. Surrogate and reduced order modeling for gravitational waves, 6^{th} Numerical Relativity - Data Analysis meeting, Mallorca, Spain (9/2013). Contributed, international meeting.
22. Gravitational Wave Parameter Estimation with Compressed Likelihood Evaluations, Applied Mathematics Modeling and Computer Science special session on Applied Analysis & Inverse Problems, Waterloo, Ontario, Canada (8/2013). Contributed, international conference.
23. Fast recovery of far-field time-domain signals from near-field data, Applied Mathematics Modeling and Computer Science special session on Recent Progress in Hyperbolic Problems, Waterloo, Ontario, Canada (8/2013). Invited, international conference.
24. Surrogate gravitational wave models, TAPIR lunch seminar, California Institute of Technology (6/2013). Invited, brown-bag lunch talk.
25. Gravitational wave parameter estimation with compressed likelihood evaluations, Reduced Order Modeling in General Relativity, Caltech (6/2013). Contributed, poster

session.

26. Fast evaluation of asymptotic waveforms from gravitational perturbations, TAPIR seminar, California Institute of Technology (5/2013). Invited, seminar.
27. Application-specific quadrature for fast evaluation of parameterized inner products with noisy data, mathematics colloquium, University of New Mexico (4/2013). Invited, colloquium.
28. Fast recovery of far-field signals from gravitational perturbations, computational science seminar, U. Mass Dartmouth (4/2013). Invited, seminar.
29. Fast evaluation of asymptotic waveforms from gravitational perturbations, gravitational theory seminar, U. of Maryland (3/2013). Contributed, seminar.
30. A Generalized Discontinuous Galerkin Scheme for Accurate Modeling of Binary Black Holes, applied and computational math seminar, George Mason University (2/2013). Invited, seminar.
31. Fast waveform extraction from gravitational perturbations, 15^{th} Capra Meeting on Radiation Reaction, U. of Maryland (6/2012). Contributed, international conference.
32. Numerical simulations with a first order BSSN formulation of Einstein's field equations, April APS meeting, Atlanta, GA (3/2012). Contributed, national conference.
33. Reduced basis representations of multi-mode black hole ringdown gravitational waves, April APS meeting, Atlanta, GA (3/2012). Contributed, national conference.
34. A reduced basis representation for chirp and ringdown gravitational wave templates, Joint Space-Science Institute mini-symposium, U. of Maryland (9/2011). Invited, regional meeting.
35. High-order accurate modeling of extreme mass ratio binaries and static junk solutions, U. of Massachusetts Dartmouth (6/2011). Invited, seminar.
36. Greedy algorithm for building a reduced basis of gravitational wave templates, 14th Eastern gravity meeting, Princeton (6/2011). Contributed, regional/national meeting.
37. A Discontinuous Galerkin Method for BSSN-Type Systems, Advances and Challenges in Computational General Relativity, Brown University (5/2011). Contributed, international conference.
38. Applications of Discontinuous Galerkin Methods to Computational General Relativity, dissertation defense, Brown University (4/2011). Dissertation defense talk.
39. Greedy algorithm for building a reduced basis of gravitational wave templates, astrophysics journal club, Brown University (2/2011). Contributed, seminar.
40. Greedy construction of an efficient and accurate gravitational waveform template bank for LIGO, astronomy seminar, CITA (1/2011). Invited, seminar.
41. Persistent junk solutions in time–domain modeling of extreme mass ratio binaries, 14^{th} Capra Meeting on Radiation Reaction, University of Guelph (6/2010). Contributed, international conference.
42. High-order accurate modeling of extreme mass ratio binaries and static junk solutions, gravitational theory seminar, U. of Maryland (4/2010). Invited, seminar.
43. Issues with Trivial Initial Data in Extreme Mass Ratio Binary Modeling, physics coffee hour presentation, Brown University (12/2009). Contributed, brown-bag lunch.
44. Discontinuous Galerkin as a Hybrid of Methods: Applications to Hydrodynamics, Cornell University (8/2009). Invited, seminar.

45. Modeling Extreme Mass Ratio Binaries, 13$^{\text{th}}$ Capra Meeting on Radiation Reaction, Indiana University (5/2009). Contributed, international conference.
46. Extreme Mass Ratio Binaries and Incorporation of Self-Force, astrophysics journal club, Brown University (5/2009). Invited, seminar.
47. Modeling Extreme Mass Ratio Binaries with a Discontinuous Galerkin Method, Preliminary exam talk (12/2008). Preliminary defense talk.
48. Introduction to Discontinuous Galerkin methods and Application to Extreme Mass Ratio Binaries, Cornell numerical relativity group (6/2008). Contributed, local group presentation.
49. Search for Ξ_b and Σ_b with the CDF II Detector at Fermilab, New York undergraduate research conference (5/2006). Contributed, regional meeting.
50. Search for Strange-Charmed Pentaquark States in the 1.96 TeV ppbar collision, APS meeting, Tampa, Florida (4/2005). Contributed, national conference.

OTHER PROFESSIONAL ACTIVITIES

Mentoring:

1. Research project advisor for the following University of Massachusetts Dartmouth undergraduate students: David Manning (Summer 2017), Matthew Wise (Senior project, 2017. Poster presentations at on-campus Sigma Xi and HPCDay events), Dwyer Deighan (2017 -), Derek Marshall (honors thesis advisor, "Utilizing Transcription Factors and Feature Reduction Methods to Determine Drug Response in Cancer Cells"), and Kimberly Matsuda (2017 -).
2. Research project advisor for the following University of Massachusetts Dartmouth masters students: Dominic Gastald (2017. Poster presentation at on-campus Sigma Xi event), Aakash Kardam (2017 -), Devin Viegas (2017 - 2018. "Simulating Orbital Resonance With a Python-based N-body Code"), Feroz Shaik (2018 -).
3. Research project advisor for the following University of Massachusetts Dartmouth PhD students: Ed McClain (2017 -).
4. Participation in University of Maryland's new mentoring program aimed to engage freshman in meaningful semester-long research. Responsibilities include designing a research project, supervising student research and developing student research skills. Two students were supervised throughout the spring semester. (1/2013 - 5/2013)
5. Jason Kaye's undergraduate applied math research project "The Interpolation of Gravitational Waveforms" for which he was awarded the "Provost's prize" in recognition of outstanding honors thesis. Additionally, as part of this project Jason was awarded a summer grant through Brown's "Undergraduate Teaching and Research Awards" program. (5/2011 - 5/2012)
6. Michael Wagman's undergraduate physics research project "Simulating Turduckened Black Holes with a Discontinuous Galerkin Scheme" for which he was awarded the "Mildred Widgoff Prize for Excellence in Thesis Preparation." Additionally, as part of this project Mike was awarded a summer grant through Brown's "Undergraduate Teaching and Research Awards" program. (10/2010 - 5/2012)

Selected summer school, workshop, and conference participation:

1. "Black Hole Initiative Conference," Harvard University (5/2017).
2. "Conference on Computational Science and Engineering," SIAM (2/2013).
3. "Chirps, Mergers and Explosions," summer program held at Kavli Institute for Theoretical Physics (8/2012)ted
4. "Near Field Cosmology as a Probe of Early Universe, Dark Matter and Gravity," Joint Space-Science Institute (11/2011)
5. "International conference on advances in scientific computing," Brown University (12/2009)
6. "Prospects in theoretical physics summer school: Computational Astrophysics," Princeton University (7/2009)

Professional Service:

1. Co-principle organizer of "ROM for Gravitational waves", a weeklong international workshop held at the Albert Einstein Institute of gravitational physics in Golm, Germany (6/2018).
2. Chair of the April APS session "Gravitational Waveforms and Perturbation Theory" (4/2015)
3. Organizing committee member for Reduced Order Modeling in General Relativity, a two day workshop at California Institute of Technology (6/2013). Workshop website `http://www.tapir.caltech.edu/~rom-gr/`
4. Local Organizing Committee for Capra Meeting on Radiation Reaction, a weeklong workshop at The Center for Scientific Computation and Mathematical Modeling (CSCAMM) University of Maryland (6/2012). Workshop website `http://www2.cscamm.umd.edu/programs/capra12/`
5. Principle workshop organizer for Advances and Challenges in Computational General Relativity, a three day workshop at Brown University attended by over 80 researchers (5/2011). A workshop website is maintained `http://www.dam.brown.edu/ACCGR/`
6. Referee for Applied Mathematics and Computation (1), Journal of Scientific Computing (3), Open Numerical Methods Journal (1), Physical Review Letters (3), Classical and Quantum Gravity (2), Physical Review D (6), Journal of Computational Physics (3), the Physics Teacher (1), LIGO Scientific Collaboration Papers (2)
7. Review editorial board member of Frontiers' Astronomy and Space Sciences Journal (2015 -)

Long-term Visits:

1. Perimeter institute (2/23/2015 - 2/27/2015)
2. Theoretical Astrophysics Including Relativity, Caltech (2/2014 - 3/2014)
3. Institute of Astronomy, Cambridge University (9/2013 - 10/2013)
4. Theoretical Astrophysics Including Relativity, Caltech (4/2013 - 6/2013)

Academic Outreach:

1. Science fair judge at Portsmouth High School (1/2018).

2. Collaboration with Howard University, a top-rated Historically Black College or University, to facilitate summer research experiences for under-represented groups. NSF grant 1208861 (co-PI) provides summer support for one student (Summer 2012)
3. Public outreach program showcasing current research efforts, Ladd Observatory (11/2009)
4. Math and Science Partnership (MSP) program providing outreach (e.g., assisting with science fairs and student projects) to high-need Rhode Island schools (2008)
5. Revised and rewrote many of the labs currently being used at Brown University in courses 1560 and 2010, `http://www.brown.edu/academics/physics/courses/courses` (2007-2008)
6. Developed the sonoluminescence lab at the University of Rochester, `http://www.pas.rochester.edu/~advlab/11-Sonolum/sono1.pdf` (2005)

Additional Experience:

1. Algorithm development consultant for Moodzic iPhone app. Software organizes a music library according to listener's "moods." (11/2011 - 5/2012)
2. Research assistant, Italian Red Cross Internship. Assisted with an ongoing study charting the lasting effects of the Chernobyl accident by testing soil and water samples at sites around Rome. (2/2004-7/2004)
3. Research assistant, Institute for Brain and Neural Systems, Brown University. Assisted in writing an algorithm which performs cursive handwriting recognition and a context-based object feature tracking algorithm. Both projects used C++. (Summers of 2002 and 2003)

UNIVERSITY SERVICE

Service to the Department:

1. Co-organizer of mathematics/CSCVR seminar series (2017 -)
2. Data custodian of the Department's University channel through the Tightrope program (2017 -)
3. Department's representative on the Biomedical Engineering and Biotechnology (BMEBT) graduate committee (2016 -)
4. Department representative on the data science program steering committee (2016 -)
5. Data science program faculty member (2016 -)
6. Faculty advisor to the U. Mass Dartmouth student chapter of the Society for Industrial and Applied Mathematics (SIAM) (2016 -)

Service to the University:

1. Dissertation committee member for the following students: Jason Galary (Mechanical Engineering Ph.D., 2017-), Tiffany Ferreira (EAS Ph.D., 2017 -)
2. Center for Scientific Computing and Visualization Research (CSCVR) faculty member (2016 -)

3. Maintains the CSCVR website `http://cscvr1.umassd.edu/index.html` (2016 -)
4. Created and manages the CSCVR email lists (2016 -)
5. Data custodian of the CSCVR's University channel through the Tightrope program (2016 -)
6. Assisted with HPCDay activities including the education round-table and student poster judge (5/2016)

OTHER TEACHING EXPERIENCES

Instructor:

1. Cornell University, Computational Physics (Spring 2015)

   Cross-listed physics and astronomy course for both senior undergraduate and graduate students. Introduction to numerical routines, algorithms and scientific computing tools. Course topics included solving linear systems of equations, matrix decompositions, interpolation and extrapolation, integration, nonlinear equations, optimization problems, fast Fourier transforms, modeling data, eigenvalue problems, ordinary and partial differential equations. Responsibilities included development of course curriculum, preparing and giving lectures, preparing homeworks, student evaluations, office hours and maintaining a course website.
2. Brown University, Theory of Relativity (Summer 2011, 2012, 2013, 2014)

   An intensive 30 hour course introducing senior high school and college-bound students to Einstein's theories of special and general relativity. A variety of tools were employed such as demonstrations, labs, online material and discussions drawn from current research. Responsibilities included development of course curriculum, preparing and giving lectures, preparing and grading exams/homeworks/labs, student evaluations, office hours and maintaining a course website.

Teaching Assistant:

1. Brown University, Everyday Mechanics and Special Relativity: From Earthly Speed to the Speed of Light! (7/2014)

   Science program for senior middle school students. Supported experiments, assisted in course design, lectures.

2. Brown University, Techniques in Experimental Physics (9/2006 - 12/2007)

   Graduate course developing essential research skills. Supported experiments, held office hours, revised lab manuals.

3. Brown University, Basic Physics 3 (6/2007 - 8/2007)

   Non-calculus based introduction to electricity, magnetism, and some modern physics. Corrected homeworks, proctored exams, led recitations and held office hours.

4. University of Rochester, Honors Waves and Modern Physics (1/2006 - 5/2006)

   Calculus based introduction to quantum theory. Corrected homeworks, proctored exams, led recitations and held office hours.

5. University of Rochester, Honors Intro Classical Mechanics (9/2005 - 12/2005)

   Calculus based introduction to classical mechanics. Supported computational problem-solving, corrected homeworks, proctored exams, led recitations and held office hours.

6. University of Rochester, Experiments in Electricity, Magnetism and Modern Physics (9/2003 - 5/2005)

   Led bi-weekly three-hour laboratory sessions and graded reports.

PROFESSIONAL MEMBERSHIPS

1. American Physical Society (APS)
2. American Mathematical Society (AMS)
3. Society for Industrial and Applied Mathematics (SIAM)
4. Sigma Xi scientific research society

COURSE WORK

Undergraduate:

- Physics: Mechanics (Honors), Electricity and Magnetism (Honors), 20th Century Modern Physics (Honors), Electricity and Magnetism I-II, Statistical Mechanics, Classical Mechanics I, Quantum Mechanics of Physical systems, Advanced Experimental Techniques, Quantum Mechanics, 20th Century Particle Physics, Quantum Mechanics I.
- Mathematics: Calculus I-IV (Honors), Probability, Algebra (Honors), Differential Geometry I-II, Functions of a Real Variable (Honors), History of Mathematics, Fourier Series and Boundary Problems, Complex Analysis with Applications.

Graduate:

- Physics: Classical Mechanics, Electricity and Magnetism, Quantum Mechanics I-II, Advanced Quantum Mechanics, Statistical Mechanics, Quantum Theory of Fields I-II, Solid State Physics, General Relativity + Cosmology.
- Applied Mathematics: Boundary Conditions for Hyperbolic Systems, Numerical Solution of PDEs I-II, Conservation Laws, Initial Value Problems ODE/PDE and Related Issues, High Performance Discontinuous Galerkin.
- Mathematics: Differential Geometry, Algebraic Geometry, Partial Differential Equations I-II.