

Geoffrey Lovelace

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Curriculum Vitae revised March 2, 2020

Personal Data, Education, and Appointments

Personal Data

Born April 1980, Huntingdon Valley, Pennsylvania
Married Elizabeth Wendel, August 2015; child William born April 2017

Education

Ph.D. in Physics <i>California Institute of Technology</i>	Oct. 2002 – Jun. 2007
B.S. in Physics <i>University of Oklahoma</i>	Aug. 1998 – May 2002

Employment

Associate Professor of Physics <i>Department of Physics</i> <i>California State University, Fullerton</i>	Aug. 2017 – present
Assistant Professor of Physics <i>Department of Physics</i> <i>California State University, Fullerton</i>	Aug. 2012 – Aug. 2017
Research Associate <i>Department of Astronomy</i> <i>Cornell University</i>	Sep. 2007 – Aug. 2012
Postdoctoral Scholar <i>Department of Physics</i> <i>California Institute of Technology</i>	Jul. 2007 – Aug. 2007

Visiting Appointments

Visiting Associate in Physics <i>Department of Physics</i> <i>California Institute of Technology</i>	Aug. 2012 – July 2013
Visitor in Theoretical Astrophysics <i>Division of Physics, Mathematics, and Astronomy</i> <i>California Institute of Technology</i>	Aug. 2018 – Aug. 2019

Research

Extramural Grants

7 extramural proposals funded (\$1,929,771), including 6 as PI (\$992,403), since Fall 2012.

1. PI for CSUF, National Science Foundation, PHY — Gravitational Experiments, “Collaborative Research: The Next Generation of Gravitational Wave Detectors” 2018
\$211,283 to CSUF, funded 2018–2021
2. Co-PI for CSUF, National Science Foundation, PHY — Gravitational Experiments, “Collaborative Research: The Next Generation of Gravitational Wave Detectors” 2017
\$206,227 to CSUF, declined
3. PI for CSUF, National Science Foundation, PHY — LIGO Research Support, “Collaborative Research: LSC Center for Coatings Research” 2016
\$136,819 to CSUF, funded 2017–2020, collaborative proposal spanning 10 institutions, led by Stanford
4. PI, National Science Foundation, PHY — Integrative Activities in Physics, “CAREER: Computational gravitational-wave science and education in the era of first observations” 2016
\$400,070, funded 2017–2022
5. PI, National Science Foundation, PHY — Gravitational Theory, “RUI: Computational gravitational-wave research for the era of first observations” 2015
\$135,000 over three years, funded 2016–2019
6. Co-PI, National Science Foundation, AST — PAARE, “Catching a new wave: the CSUF-Syracuse partnership for inclusion of underrepresented groups in gravitational-wave astronomy” 2015
\$937,368 over five years to CSUF, \$1,320,966 total budget, funded 2016–2021
7. PI, National Science Foundation, PHY — Integrative Activities in Physics, “CAREER: Computational gravitational-wave science and education for the era of first observations” 2015
\$420,190 over five years, declined
8. PI, National Science Foundation, MRI, “MRI: Acquisition of a high-performance computer cluster for gravitational-wave astronomy with Advanced LIGO” 2014
\$119,791 over three years, funded 2014–2017
9. Co-PI, National Science Foundation, AST - PAARE, “Catching the new wave: the CSUF-Syracuse partnership for advancing minority participation in gravitational-wave astronomy” 2013
\$977,931 over five years to CSUF, \$1,476,553 total budget, declined

10. PI, Research Corporation for Science Advancement, Multi Investigator 2013 Cottrell College Science Award, "Developing a numerical injection analysis pipeline for gravitational waves from merging black holes and neutron stars" 2013
\$75,000 over two years, funded 2014–2017
11. PI, National Science Foundation, PHY - Gravitational Theory, "RUI: 2012 Numerical Simulations of Merging Black Holes and Neutron Stars" 2012
\$125,723 over three years, funded 2013–2016

Intramural Grants

- PI, Course Redesign with Technology: Sustaining Success, "Early intervention in introductory mechanics" 2015
\$8,824 (\$1,960 + \$6,864 teaching release), funded 2015–2016
- PI, Junior/Senior Faculty Grant for Research, Scholarship, and Creative Activity, "Modeling thermal noise for gravitational-wave antennas" 2015
\$6,312 teaching release, declined
- PI, Junior/Senior Faculty Grant for Research, Scholarship, and Creative Activity, "Simulating merging black holes on a computer cluster" 2013
\$1986 + \$4747 for teaching release, funded 2013-2014

External Computer Time Grants

- Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" 2018
7.1 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration
- Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" 2018
Declined
- Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" 2016
6.41 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration
- Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" 2015
6.23 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration

Co-PI, Extreme Science and Engineering Discovery Environment, 2014
 “Gravitational Waves from Compact Binaries:
 Computational Contributions to LIGO”
*6.15 million CPU-hours computer time awarded
 to the Simulating eXtreme Spacetimes Collaboration*

Co-PI, Extreme Science and Engineering Discovery Environment, 2013 2013
 “Gravitational Waves from Compact Binaries:
 Computational Contributions to LIGO”
*3.2 million CPU-hours computer time awarded
 to the Simulating eXtreme Spacetimes Collaboration*

Selected Peer-Reviewed Publications

*Publications selected from the complete list of publications below. Note: California State University, Fullerton Student Co-Authors in **Bold-Italics**.*

1. Michael Boyle, Daniel Hemberger, Dante A.B. Iozzo, **Geoffrey Lovelace**, Serguei Ossokine, Harald P. Pfeiffer, Mark A. Scheel, Leo C. Stein, Charles J. Woodford, Aaron B. Zimmerman, *Nousha Afshari*, Kevin Barkett, Jonathan Blackman, Katerina Chatziioannou, Tony Chu, *Nicholas Demos*, Nils Deppe, Scott E. Field, Nils L. Fischer, *Evan Foley*, Heather Fong, *Alyssa Garcia*, Matthew Giesler, Francois Hebert, Ian Hinder, *Reza Katebi*, *Haroon Khan*, Lawrence E. Kidder, Prayush Kumar, *Kevin Kuper*, Halston Lim, Maria Okounkova, *Teresita Ramirez*, *Samuel Rodriguez*, Hannes R. Rüter, Patricia Schmidt, Bela Szilagy, Saul A. Teukolsky, Vijay Varma, and Marissa Walker. “The SXS Collaboration catalog of binary black hole simulations.” *Class. Quantum Grav.* **36**, 195006 (2019).
2. Katerina Chatziioannou, **Geoffrey Lovelace**, Michael Boyle, Matthew Giesler, Daniel A. Hemberger, *Reza Katebi*, Lawrence E. Kidder, Harald P. Pfeiffer, Mark A. Scheel, and Béla Szilágyi. “Measuring the properties of nearly extremal black holes with gravitational waves.” *Phys. Rev. D* **98**, 044028 (2018). <https://doi.org/10.1103/PhysRevLett.121.231103>
3. **Geoffrey Lovelace**, *Nicholas Demos*, and *Haroon Khan*. “Numerically modeling Brownian thermal noise in amorphous and crystalline thin coatings.” *Class. Quantum Grav.* **35**, 025017 (2017).
4. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. “GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral.” *Phys. Rev. Lett.* **119**, 161101 (2017).
5. **Geoffrey Lovelace**, Carlos O. Lousto, James Healy, Mark A. Scheel, *Alyssa Garcia*, Richard O’Shaughnessy, Michael Boyle, Manuela Campanelli, Daniel A. Hemberger, Lawrence E. Kidder, Harald P. Pfeiffer, Béla Szilágyi, Saul A. Teukolsky, and Yosef Zlochower. “Modeling the source of GW150914 with targeted numerical-relativity simulations.” *Class. Quantum Grav.* **33**, 244002 (2016).
6. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. “GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence.” *Phys. Rev. Lett.* **116**, 241103 (2016).

7. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "Observation of Gravitational Waves from a Binary Black Hole Merger." *Phys. Rev. Lett.* **116**, 061102 (2016).
8. Prayush Kumar, Kevin Barkett, Swetha Bhagwat, *Nousha Afshari*, Duncan A. Brown, **Geoffrey Lovelace**, Mark A. Scheel, and Béla Szilágyi. "Accuracy and precision of gravitational-wave models of inspiraling neutron star-black hole binaries with spin: Comparison with matter-free numerical relativity in the low-frequency regime." *Phys. Rev. D* **92**, 102001 (2015).
9. Mark A. Scheel, Matthew Giesler, Daniel A. Hemberger, **Geoffrey Lovelace**, *Kevin Kuper*, Michael Boyle, Béla Szilágyi, and Lawrence E. Kidder. "Improved methods for simulating nearly extremal binary black holes." *Class. Quantum Grav.* **32**, 105009 (2015).
10. Geoffrey Lovelace, Mark A. Scheel, Robert Owen, Matthew Giesler, *Reza Katebi*, Béla Szilágyi, Tony Chu, *Nicholas Demos*, Daniel A. Hemberger, Lawrence E. Kidder, Harald P. Pfeiffer, *Nousha Afshari*. "Nearly extremal apparent horizons in simulations of merging black holes." *Class. Quantum Grav.* **32**, 065007 (2015). *IOPselect article. Selected for CQG+ Author Insight.*
11. Andrea Taracchini, Alessandra Buonanno, Yi Pan, Tanja Hinderer, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, **Geoffrey Lovelace**, Abdul H. Mroué, Harald P. Pfeiffer, Mark A. Scheel, Béla Szilágyi, Nicholas W. Taylor, and Anil Zenginoglu. "Effective-one-body model for black-hole binaries with generic mass ratios and spins." *Phys. Rev. D* **89**, 061502 (2014).
12. Abdul H. Mroué, Mark A. Scheel, Béla Szilágyi, Harald P. Pfeiffer, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, Geoffrey Lovelace, Serguei Ossokine, Nicholas W. Taylor, Anil Zenginoglu, Luisa T. Buchman, Tony Chu, *Evan Foley*, *Matthew Giesler*, Robert Owen, Saul A. Teukolsky. "A catalog of 174 high-quality binary black-hole simulations for gravitational-wave astronomy." *Phys. Rev. Lett.* **111**, 241104 (2013).
13. **Geoffrey Lovelace**, Matthew D. Duez, Francois Foucart, Lawrence E. Kidder, Harald P. Pfeiffer, Mark A. Scheel, and Béla Szilágyi. "Massive disk formation in the tidal disruption of a neutron star by a nearly extremal black hole." *Class. Quantum Grav.* **30**, 135004 (2013). *Class. Quantum Grav. 2013-2014 Highlight article.*

Undergraduate and Graduate Research Students Advised

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|---|----------------|
| 1. <i>Samuel Rodriguez</i>
<i>Pursuing M.S. in physics at California State University, Fullerton</i> | B.S., May 2019 |
| 2. <i>Nicholas Demos</i>
<i>Pursing Ph.D. in physics at Massachusetts Institute of Technology</i> | B.S., May 2017 |
| 3. <i>John Derby</i> | M.S., May 2017 |
| 4. <i>Alyssa Garcia</i>
<i>Pursing Ph.D. in physics at Brandeis University,</i>
<i>NSF Graduate Research Fellow</i> | B.S., May 2017 |

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5. **Haroon Khan** B.S., May 2017
Employed at NASA Kennedy Space Center
 6. **Nousha Afshari** B.S., May 2016
Employed as an Advanced Sterilization Products Engineering Technician with Johnson & Johnson, beginning medical-physics M.S. program at McGill University in fall 2017.
 7. **Kevin Kuper** B.S., May 2015
Pursuing Ph.D. in optics at University of Arizona
 8. **Evan Foley** M.S., May 2014
Employed at DnB Engineering, Fullerton, California
 9. **Reza Katebi** M.S., May 2014
Pursuing Ph.D. in physics, Ohio University
 10. **Matthew Giesler** B.S., May 2013
Pursuing Ph.D. in physics, California Institute of Technology

Selected Invited Presentations

Significant invited presentations selected from 45 total invited presentations.

1. "Numerical relativity for next-generation gravitational-wave observatories" May 2019
Presentation and discussion on invited panel, Physics and Astrophysics at the eXtreme (PAX) workshop, Cascina, Italy
2. "Numerical relativity in the era of gravitational-wave observations" Jan. 2019
High energy and Gravity Seminar, University of California, Santa Barbara Santa Barbara, California
3. "Numerically modeling Brownian thermal noise in crystalline coatings." Jun. 2018
Workshop on AlGaAs thermal noise at American University Washington, D.C.
4. "Numerical relativity in the era of gravitational-wave observations." Mar. 2018
Center for Astrophysics and Space Sciences Seminar, University of California, San Diego, San Diego, California
5. "The first observations of gravitational waves from merging black holes" Mar. 2017
Physics and Astronomy Colloquium, Swarthmore College, Swarthmore, Pennsylvania
6. "Using supercomputers to simulate merging black holes in the era of gravitational-wave astronomy" Mar. 2017
Osher Lifelong Learning Institute Eclectics Seminar, Fullerton, California

7. "Doing science in the 21st century: colliding black holes and gravitational-wave astronomy" Feb. 2017
Keynote presentation, Better Together: CSU Fullerton EdTalk South—Next Generation Science Standards, Discovery Cube Orange County, Santa Ana, CA
8. "Simulations of binary-black-hole mergers" Jan. 2017
American Physical Society April Meeting, Washington, D.C.
9. "The discovery of gravitational waves from merging black holes" Oct. 2016
Scientific Symposium, Society for Advancement of Chicanos/Hispanics and Native Americans in Science
10. "The first observations of gravitational waves from merging black holes" Sep. 2016
Physics and Astronomy Colloquium, University of Oklahoma, Norman, Oklahoma
11. "Observation of gravitational waves from merging black holes" Jul. 2016
Orange County Astronomers General Meeting, Orange, California
12. "Modeling merging black holes with numerical relativity in the era of first gravitational-wave observations" May 2016
Center for Astrophysics & Space Sciences Astrophysics Seminar, University of California, San Diego, San Diego, California
13. "Simulating colliding black holes and mirror thermal noise for gravitational-wave astronomy" Sep. 2015
Physics Colloquium, California State University, Northridge, California
14. "Numerical simulations of merging black holes and neutron stars for gravitational-wave astronomy" Oct. 2014
Physics Colloquium, Washington State University
15. "Numerical simulations of merging black holes for gravitational-wave astronomy" Apr. 2014
American Physical Society April Meeting, Savannah, Georgia

Selected Contributed Presentations

1. "Can LIGO measure the spins of nearly extremal, merging binary black holes?" Apr. 2018
*American Physical Society April Meeting
Columbus, Ohio*
2. "Time series projections" Oct. 2017
*Interactive tutorial on projecting theoretical gravitational waveforms onto gravitational-wave detector data in the time domain
LIGO-Virgo Waveform Research and Development Team
Face-to-face Meeting, Berlin, Germany*

3. "Numerically modeling Brownian thermal noise in amorphous and crystalline thin coatings" Jul. 2017
12th Eduardo Amaldi Conference on Gravitational Waves
Pasadena, California
4. "Simulations of binary-black-hole mergers" Feb. 2017
The Dawning Era of Gravitational-Wave Astrophysics, Aspen Center for Physics
Winter Conference, Aspen, Colorado
5. "The Discovery of Gravitational Waves from Merging Black Holes" Oct. 2016
Outreach talks to science classes at Dock Mennonite Academy
Grades 9-12 Campus, Lansdale, PA
6. "Modeling merging black holes with numerical relativity Jul. 2016
in the era of first gravitational-wave observations"
21st International Conference on General Relativity
and Gravitation, Columbia University, New York, New York
7. "Modeling merging, rapidly rotating black holes with numerical relativity Apr. 2016
for the era of first gravitational-wave observations"
American Physical Society April Meeting, Salt Lake City, Utah
8. "Modeling crystalline Brownian coating noise Jul. 2015
with high performance computing"
LIGO monthly coatings teleconference
9. "Nearly extremal apparent horizons in simulations of Jun. 2015
merging black holes"
International Conference on Black Holes, Fields Institute, Toronto, Ontario
10. "Nearly extremal apparent horizons in simulations of merging Apr. 2015
black holes"
American Physical Society April Meeting, Baltimore, Maryland
11. "Collisions in Warped Space and Time" Oct. 2014
Outreach talk to physics classes at Grand Terrace High School,
Grand Terrace, California
12. "Results from numerical simulations of binaries containing Sep. 2013
nearly extremal black holes"
2013 Numerical Relativity and Data Analysis Meeting, Mallorca, Spain
13. "Nearly extremal black-hole spin in numerical Jul. 2013
simulations of compact binaries"
20th International Conference on General Relativity and Gravitation and
10th Amaldi Conference on Gravitational Waves, Warsaw, Poland
14. "The tidal disruption of a neutron star by a nearly extremal black hole" Mar. 2013
29th Annual Pacific Coast Gravity Meeting, Davis, California

15. "Supercomputer simulations of colliding black holes and neutron stars" Jun. 2012
*Introductory talk to summer research undergraduates,
University of Oklahoma, Norman, Oklahoma*

Selected Student Presentations

Significant student presentations selected from 21 total student presentations.

1. **John Derby**, "Testing the spin limit for merging black holes" Mar. 2017
33rd Annual Pacific Coast Gravity Meeting
2. **Nicholas Demos**, "Modeling Thermal Noise From Crystalline Coatings For Gravitational-Wave Detectors" Jan. 2017
American Physical Society April Meeting, Washington, D.C.
3. **Alyssa Garcia**, "Comparing Numerical Waveforms for Gravitational-Wave Astronomy" Apr. 2016
32nd Pacific Coast Gravity Meeting, Fullerton, California
4. **John Derby**, "Testing the Spin Limit for Merging Black Holes" Apr. 2016
32nd Pacific Coast Gravity Meeting, Fullerton, California
5. **Nicholas Demos**, "Modeling Thermal Noise from Crystalline Coatings for Gravitational-Wave Detectors" Apr. 2016
32nd Pacific Coast Gravity Meeting, Fullerton, California
6. **Alyssa Garcia**, "The Importance of Undergraduate Research" Nov. 2015
*California State University, Fullerton Philanthropic Foundation
Board of Governors Meeting, Santa Ana, California*
7. **Nicholas Demos**, "The Importance of Undergraduate Research" Nov. 2015
*California State University, Fullerton Philanthropic Foundation
Board of Governors Meeting, Santa Ana, California*
8. **Haroon Khan**, "Visualizing the Gravitational Lensing and Vortex and Tendex Lines of Colliding Black Holes" Nov. 2015
*Southern California Conference for Undergraduate Research,
Harvey Mudd College, Claremont, California*
9. **Evan Foley**, "Neutron star-black hole simulations with very fast black hole spins" Mar. 2014
31st Pacific Coast Gravity Meeting, University of California, San Diego, California
10. **Reza Katebi**, "Simulations of merging, spinning black holes: How fast do the resulting holes initially spin?" Mar. 2014
*31st Pacific Coast Gravity Meeting, University of California San Diego,
San Diego, California*

Selected Student Poster Presentations

Significant student poster presentations selected from 34 total student poster presentations.

1. **Samuel Rodriguez**, "Visualizing the Curvature of Spacetime: Vortex and Tendex Lines of a Head-On Merging Binary Black Hole Systems" Nov. 2017
Southern California Conference for Undergraduate Research, Pomona, California
2. **Denyz Melchor and Jennifer Sanchez**, "Simulating Black Hole-Neutron Star Mergers" Nov. 2017
Southern California Conference for Undergraduate Research, Pomona, California
3. **Haroon Khan**, "Visualizing the gravitational lensing and vortex and tendex lines of colliding black holes" Jan. 2017
American Physical Society April Meeting, Washington, D.C.
4. **Alyssa Garcia**, "Modeling the source of GW150914 with targeted numerical-relativity simulations" Nov. 2016
LIGO Virgo Collaboration Meeting, University of Glasgow, Glasgow, Scotland
5. **Samuel Rodriguez**, "Visualizing the Curvature of spacetime: Vortex and Tendex Lines Of A Head-On Merging Binary Black Hole System" Aug. 2016
STEM² Summer Research Symposium 2016, California State University, Fullerton, Fullerton, California
6. **Haroon Khan**, "Visualizing the gravitational lensing and vortex and tendex lines of colliding black holes" Apr. 2016
American Physical Society April Meeting, Salt Lake City, Utah
7. **Alyssa Garcia**, "Making and Testing Hybrid Gravitational Waves from Colliding Black Holes and Neutron Stars" Apr. 2016
American Physical Society April Meeting, Salt Lake City, Utah
8. **Nicholas Demos**, "Modeling Thermal Noise from Crystalline Coatings for Gravitational-Wave Detectors" Apr. 2016
American Physical Society April Meeting, Salt Lake City, Utah
9. **Nousha Afshari**, "Accuracy Of Binary Black Hole Waveform Models For Advanced LIGO " Apr. 2016
American Physical Society April Meeting, Salt Lake City, Utah
10. **Alyssa Garcia**, "Making and testing models of gravitational waves from colliding black holes" Jan. 2016
11th Annual Conference for Undergraduate Women in Physics, San Diego, California

11. **Haroon Khan**, “Simulating Colliding Black Holes for Gravitational-Wave Astronomy” Apr. 2015
Posters on the Hill, Washington, DC
One of 60 students selected from 500+ applicants to present and advocate for undergraduate research to members of the U.S. Congress by the Council on Undergraduate Research
12. **Haroon Khan**, “Comparing initial data for rapidly rotating, merging black holes” Apr. 2015
American Physical Society April Meeting, Baltimore, Maryland
13. **Nicholas Demos**, “Testing improved length and accuracy of numerical simulations of merging black holes” Apr. 2015
American Physical Society April Meeting, Baltimore, Maryland
14. **Haroon Khan**, “Simulating Colliding Black Holes for Gravitational-Wave Astronomy” Mar. 2015
Institution for Engineering and Technology’s Southern California Present Around the World competition, Los Angeles, California, awarded second place

Teaching

Supervision

- Supervision of 12 undergraduate and 3 graduate students for research projects in computational gravitational-wave physics Aug. 2012 – present
California State University, Fullerton
- Co-supervision of 4 undergraduate students and 1 graduate student for computational relativity research projects Jun. 2008 – Jul. 2012
Cornell University

Courses Taught

- PHYS 225: Fundamental Physics: Mechanics — *flipped classroom redesign* Spring 2018
 ASTR 444: Applications of Gravitation — *new course pilot*
 PHYS 499: Independent Study
 PHYS 599: Independent Graduate Research
- PHYS 520: Analytical Mechanics Fall 2017
 PHYS 499: Independent Study
- PHYS 225: Fundamental Physics: Mechanics — *flipped classroom redesign* Spring 2017
 PHYS 300: Survey of Mathematical Physics
 PHYS 499: Independent Study
 PHYS 597: Master’s Project
 PHYS 599: Independent Graduate Research

PHYS 520: Analytical Mechanics	Fall 2016
PHYS 499: Independent Study	
PHYS 597: Master's Project	
PHYS 599: Independent Graduate Research	
PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i>	Spring 2016
ASTR 444: Applications of Gravitation — <i>new course pilot</i>	
PHYS 499: Independent Study	
PHYS 597: Master's Project	
PHYS 599: Independent Graduate Research	
PHYS 499: Undergraduate Independent Study	Fall 2015
PHYS 520: Analytical Mechanics	
PHYS 599: Independent Graduate Research	
PHYS 211: Elementary Physics	Spring 2015
PHYS 211L: Elementary Physics Laboratory	
PHYS 499: Undergraduate Independent Study	
PHYS 499: Undergraduate Independent Study	Fall 2014
PHYS 520: Analytical Mechanics	
PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i>	Spring 2014
PHYS 499: Undergraduate Independent Study	
PHYS 597: Master's Project	
PHYS 599: Independent Graduate Research	
PHYS 499: Undergraduate Independent Study	Fall 2013
PHYS 520: Analytical Mechanics	
PHYS 597: Master's Project	
PHYS 599: Independent Graduate Research	
PHYS 211: Elementary Physics	Spring 2013
PHYS 499: Undergraduate Independent Study	
PHYS 597: Master's Project	
PHYS 599: Independent Graduate Research	
PHYS 211: Elementary Physics	Fall 2012
PHYS 499: Undergraduate Independent Study	
PHYS 599: Independent Graduate Research	

Professional Development

Discussion Leader at Gordon Research Conference discussing "Relativity and Gravitation: Contemporary Research and Teaching of Einstein's Physics"	Jun. 2016
<i>Salve Regina University, Newport, Rhode Island</i>	

Participant in “Proven Course Redesign” eAcademy on research-based, “flipped classroom” pedagogy
California State Polytechnic University, Pomona Jul. 2013

Designed and presented online lecture introducing aspects of object-oriented programming and the Spectral Einstein Code
Cornell University, Ithaca, New York Jun. 2011

Service

Professional Leadership

Secretary and Treasurer, American Physical Society
Division of Gravitation Jan. 2017 – present

Senior member, Gravitational-Wave Physics and Astronomy Center (GWPAC) at California State University, Fullerton Aug. 2012 – present

Member, Executive Committee of
the Simulating eXtreme Spacetimes (SXS) collaboration Nov. 2009 – present

Professional Membership

Active member, LIGO Scientific Collaboration May 2014 – present

Active member, Simulating eXtreme Spacetimes (SXS) Collaboration Sep. 2007 – present

Active member, American Physical Society, Division of Gravitation Feb. 2006 – present

Conferences Organized

Organize and host 32nd annual Pacific Coast Gravity Meeting Apr. 2016

Organize and host Theoretical Astrophysics
in Southern California conference Nov. 2015

Co-organize and host Numerical and Analytical Relativity and
Data Analysis (NARDA) 2014 meeting Aug. 2014

Peer-Review Service

Member, Classical and Quantum Gravity Advisory Panel Dec. 2016 – present

National Science Foundation Review Panelist Feb. 2015

Referee, Gravitational Physics Program,
National Science Foundation Jan. 2014 – present

Reviewer, NASA Postdoctoral Program May 2013

Reviewer, NSF Physics at the Information Frontier program Feb. 2013

Referee for journal Classical and Quantum Gravity, Mar. 2008 – present
IOP publishing

Department, College, and University Committee Service

Member, Center for Computational and Applied Mathematics Aug. 2017 – present
Computing Committee

Discuss NSF CAREER proposal writing with CSUF professors, April 2017
hosted by the Office of Research Development

Curriculum Committee Chair, Department of Physics, CSUF Aug. 2015 – present

Member, search committee for high-performance computing Aug. 2016 – Oct. 2017
system administrator

Lab Development Committee, Department of Physics, Aug. 2015 – Aug. 2016
California State University, Fullerton

Curriculum Committee, College of Natural Sciences Sep. 2014 – present
and Mathematics,
California State University, Fullerton

Safety Committee, College of Natural Sciences and Mathematics, Aug. 2013 – Sep. 2014
California State University, Fullerton

Outreach, Advocacy, and Fundraising

Outreach seminar at Citrus College, recruiting for a Apr. 2018
1-week CSUF summer workshop on high-performance computing

Q&A with Joshua Smith at Fullerton Community Center, May 2017
hosted by Parents' Voice and the Lions Club

Supervision of high school volunteer intern for Jun. 2016 – Aug. 2016
a computational research project

Presenter at CSUF fundraising dinner event, Apr. 2016
"Gravitational Waves: Examining the Universe
in a Whole New Way"

Discuss gravitational-wave research with CSU Chancellor, Feb. 2016
CSUF President, GWPAC student researchers and professors

Co-lead CSUF press conference announcing the Feb. 2016
discovery of gravitational waves from merging black holes

Contribute to CSUF media relations outreach Feb. 2016
for gravitational-wave discovery
<http://news.fullerton.edu/gravitational-waves/>

Present, with undergraduate researchers Nick Demos and Alyssa Garcia and Profs. Josh Smith and Josh Der, to California State University, Fullerton Philanthropic Foundation Board of Directors	Nov. 2015
Attend Posters on the Hill with student Haroon Khan to advocate for undergraduate STEM research to members of Congress and their staff in Washington, D.C.	Apr. 2015
Supervision of high school volunteer intern for a computational research project	Jun. 2013 – Aug. 2013
Participant in Discover STEM event, Cyprus College	Apr. 2013
Participant in Welcome to Fullerton Day, California State University, Fullerton	Apr. 2013
Interview with local middle school student	Jan. 2013
Participant in GWPAC opening celebration, California State University, Fullerton	Sep. 2012

Other Professional Service

Participate in CSU Webinar on grant writing	Feb. 2017
System administrator for high-performance computing cluster, Orange-county Relativity Cluster for Astronomy (ORCA)	Oct. 2014 – present
Building marshal, McCarthy Hall, CSUF	Sep. 2013 – Aug. 2015
Assist in McCarthy Hall evacuation planning, California State University, Fullerton	Oct. 2012 – Sept. 2014
Assistant faculty marshal, College of Natural Sciences and Mathematics commencement, CSUF	May 2013

Awards and Other Accomplishments

Awards

Outstanding Untenured Faculty Member, \$2,500, annual award given by the California State University, Fullerton College of Natural Sciences and Mathematics	May 2017
Titan on the Rise: Early Career Investigator Award \$750, award given by the California State University, Fullerton Office of Research Development	May 2017

Special Breakthrough Prize in Fundamental Physics co-recipient
\$1,976, portion of \$2 million shared among 1,012 contributors
to the LIGO experiment “for the observation of gravitational waves,
opening new horizons in astronomy and physics.” May 2016

Woodward Faculty Research Award
\$2,000, annual award given by the California State University, Fullerton
Department of Physics May 2015

Selected Student Awards

Nicholas Demos and Alyssa Garcia
Outstanding Student Scholarly and Creative Activities Award
for an undergraduate in the College of Natural Sciences and Mathematics,
given by the California State University, Fullerton Office of Research
and Sponsored Programs April 2017

Haroon Khan
Outstanding Student Scholarly and Creative Activities Award
for an undergraduate in the College of Engineering and Computer Science,
given by the California State University, Fullerton Office of Research
and Sponsored Programs April 2017

Other Accomplishments

Visualization of GW170814 created by CSUF undergraduate Nicholas Demos,
Peter Holderness at Caltech, and the SXS Collaboration featured in
the New York Times Jan. 2017
Second figure in <https://nyti.ms/2ss9syS>

Scientific results from and outreach concerning the discovery of
gravitational waves from merging black holes featured in local, national,
and international media Feb. 2016
(e.g. visualization starting at 00:53 in <https://youtu.be/z7pKXVkcDzs>)

Article selected for cover of Phys. Rev. Lett. vol. 116, no. 6
Contributed to creating cover image Feb. 2016

Article selected for cover of Phys. Rev. Lett. vol. 106, no. 15 Apr. 2011

Research on visualizing curved spacetime featured in news media
(e.g. <http://www.universetoday.com/84807/a-new-way-to-visualize-warped-space-and-time/>) Apr. 2011

Complete Lists of Publications and Presentations

Peer-Reviewed Publications

California State University, Fullerton Student Co-Authors in **Bold-Italics**

1. Michael Boyle, Daniel Hemberger, Dante A.B. Iozzo, **Geoffrey Lovelace**, Serguei Ossokine, Harald P. Pfeiffer, Mark A. Scheel, Leo C. Stein, Charles J. Woodford, Aaron B. Zimmerman, *Nousha Afshari*, Kevin Barkett, Jonathan Blackman, Katerina Chatziioannou, Tony Chu, *Nicholas Demos*, Nils Deppe, Scott E. Field, Nils L. Fischer, *Evan Foley*, Heather Fong, *Alyssa Garcia*, Matthew Giesler, Francois Hebert, Ian Hinder, *Reza Katebi*, *Haroon Khan*, Lawrence E. Kidder, Prayush Kumar, *Kevin Kuper*, Halston Lim, Maria Okounkova, *Teresita Ramirez*, *Samuel Rodriguez*, Hannes R. Rüter, Patricia Schmidt, Bela Szilágyi, Saul A. Teukolsky, Vijay Varma, and Marissa Walker. "The SXS Collaboration catalog of binary black hole simulations." *Class. Quantum Grav.* **36**, 195006 (2019). <https://doi.org/10.1088/1361-6382/ab34e2>
2. Katerina Chatziioannou, Geoffrey Lovelace, Michael Boyle, Matthew Giesler, Daniel A. Hemberger, *Reza Katebi*, Lawrence E. Kidder, Harald P. Pfeiffer, Mark A. Scheel, and Béla Szilágyi. "Measuring the properties of nearly extremal black holes with gravitational waves." *Phys. Rev. D* **98**, 044028 (2018). <https://doi.org/10.1103/PhysRevLett.121.231103>
3. "Assessing the Energetics of Spinning Binary Black Hole Systems." Serguei Ossokine, Tim Dietrich, *Evan Foley*, *Reza Katebi*, and **Geoffrey Lovelace**. *Phys. Rev. D* **98**, 104057 (2018). <https://doi.org/10.1103/PhysRevD.98.104057>
4. Chaitanya Afle, Anuradha Gupta, Bhooshan Gadre, Prayush Kumar, *Nick Demos*, **Geoffrey Lovelace**, Han Gil Choi, Hyung Mok Lee, Sanjit Mitra, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, Harald P. Pfeiffer, Mark A. Scheel, and Béla Szilágyi. "Detection and characterization of spin-orbit resonances in the advanced gravitational wave detectors era." *Phys. Rev. D* **98**, 083014 (2018). <https://dx.doi.org/10.1103/PhysRevD.98.083014>
5. **Geoffrey Lovelace**, *Nicholas Demos*, and *Haroon Khan*. "Numerically modeling Brownian thermal noise in amorphous and crystalline thin coatings." *Class. Quantum Grav.* **35**, 025017 (2017). <http://doi.org/10.1088/1361-6382/aa9ccc>.
6. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral." *Phys. Rev. Lett.* **119**, 161101 (2017). <https://doi.org/10.1103/PhysRevLett.119.161101>
7. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "GW170814: A three-detector observation of gravitational waves from a binary black hole coalescence." *Phys. Rev. Lett.* **119**, 141101 (2017). <https://doi.org/10.1103/PhysRevLett.119.141101>

8. Jacob Lange, Richard O'Shaughnessy, Michael Boyle, Juan Calderón Bustillo, Manuela Campanelli, Tony Chu, James A Clark, *Nicholas Demos*, Heather Fong, James Healy, Daniel Hemberger, Ian Hinder, Karan Jani, Bhavesh Khamesra, Lawrence E Kidder, Prayush Kumar, Pablo Laguna, Carlos O Lousto, **Geoffrey Lovelace**, Serguei Ossokine, Harald Pfeiffer, Mark A Scheel, Deirdre Shoemaker, Bela Szilagyi, Saul Teukolsky, Yosef Zlochower. "A Parameter Estimation Method that Directly Compares Gravitational Wave Observations to Numerical Relativity." *Phys. Rev. D* **96**, 104041 (2017), <http://doi.org/10.1103/PhysRevD.96.104041>.
9. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "GW170104: Observation of a 50-Solar-Mass Binary Black Hole Coalescence at Redshift 0.2." *Phys. Rev. Lett.* **118**, 221101 (2017). <https://doi.org/10.1103/PhysRevLett.118.221101>
10. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "Effects of waveform model systematics on the interpretation of GW150914." *Class. Quantum Grav.* **34**, 104002 (2017). <https://doi.org/10.1088/1361-6382/aa6854>
11. Alejandro Bohé, Lijing Shao, Andrea Taracchini, Alessandra Buonanno, Stanislav Babak, Ian W. Harry, Ian Hinder, Serguei Ossokine, Michael Pürrer, Vivien Raymond, Tony Chu, Heather Fong, Prayush Kumar, Harald P. Pfeiffer, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, **Geoffrey Lovelace**, Mark A. Scheel, and Béla Szilágyi. "An improved effective-one-body model of spinning, nonprecessing binary black holes for the era of gravitational-wave astrophysics with advanced detectors." *Phys. Rev. D* **95**, 044028 (2017). <https://doi.org/10.1103/PhysRevD.95.044028>
12. **Geoffrey Lovelace**, Carlos O. Lousto, James Healy, Mark A. Scheel, *Alyssa Garcia*, Richard O'Shaughnessy, Michael Boyle, Manuela Campanelli, Daniel A. Hemberger, Lawrence E. Kidder, Harald P. Pfeiffer, Béla Szilágyi, Saul A. Teukolsky, and Yosef Zlochower. "Modeling the source of GW150914 with targeted numerical-relativity simulations." *Class. Quantum Grav.* **33**, 244002 (2016). <https://doi.org/10.1088/0264-9381/33/24/244002>
13. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence." *Phys. Rev. Lett.* **116**, 241103 (2016). <https://doi.org/10.1103/PhysRevLett.116.241103>
14. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "Directly comparing GW150914 with numerical solutions of Einstein's equations for binary black hole coalescence." *Phys. Rev. D* **94**, 064035 (2016). <https://doi.org/10.1103/PhysRevD.94.064035>
15. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "An improved analysis of GW150914 using a fully spin-precessing waveform model." *Phys. Rev. X* **6**, 041014 (2016). <https://doi.org/10.1103/PhysRevX.6.041014>
16. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. "Tests of general relativity with GW150914." *Phys. Rev. Lett.* **116**, 221101 (2016). <https://doi.org/10.1103/PhysRevLett.116.241101>

17. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. “Properties of the Binary Black Hole Merger GW150914.” *Phys. Rev. Lett.* **116**, 241102 (2016). <https://doi.org/10.1103/PhysRevLett.116.241102>
18. B. P. Abbott et al., for the LIGO Scientific Collaboration and the Virgo Collaboration. “Observation of Gravitational Waves from a Binary Black Hole Merger.” *Phys. Rev. Lett.* **116**, 061102 (2016). <https://doi.org/10.1103/PhysRevLett.116.061102>
19. Prayush Kumar, Kevin Barkett, Swetha Bhagwat, *Nousha Afshari*, Duncan A. Brown, **Geoffrey Lovelace**, Mark A. Scheel, and Béla Szilágyi. “Accuracy and precision of gravitational-wave models of inspiraling neutron star-black hole binaries with spin: Comparison with matter-free numerical relativity in the low-frequency regime.” *Phys. Rev. D* **92**, 102001 (2015). <https://doi.org/10.1103/PhysRevD.92.102001>
20. Mark A. Scheel, Matthew Giesler, Daniel A. Hemberger, **Geoffrey Lovelace**, *Kevin Kuper*, Michael Boyle, Béla Szilágyi, and Lawrence E. Kidder. “Improved methods for simulating nearly extremal binary black holes.” *Class. Quantum Grav.* **32**, 105009 (2015). <https://doi.org/10.1088/0264-9381/32/10/105009>
21. **Geoffrey Lovelace**, Mark A. Scheel, Robert Owen, Matthew Giesler, *Reza Katebi*, Béla Szilágyi, Tony Chu, *Nicholas Demos*, Daniel A. Hemberger, Lawrence E. Kidder, Harald P. Pfeiffer, *Nousha Afshari*. “Nearly extremal apparent horizons in simulations of merging black holes.” *Class. Quantum Grav.* **32**, 065007 (2015). *IOPselect article. Selected for CQG+ Author Insight.* <https://doi.org/10.1088/0264-9381/32/6/065007>
22. The LIGO Scientific Collaboration, the Virgo Collaboration, and the NINJA-2 Collaboration: J. Aasi et al. “The NINJA-2 project: Detecting and characterizing gravitational waveforms modelled using numerical binary black hole simulations.” *Class. Quantum Grav.* **31**, 115004 (2014). <https://doi.org/10.1088/0264-9381/31/11/115004>
23. Andrea Taracchini, Alessandra Buonanno, Yi Pan, Tanja Hinderer, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, **Geoffrey Lovelace**, Abdul H. Mroué, Harald P. Pfeiffer, Mark A. Scheel, Béla Szilágyi, Nicholas W. Taylor, and Anıl Zenginoglu. “Effective-one-body model for black-hole binaries with generic mass ratios and spins.” *Phys. Rev. D* **89**, 061502 (2014). <https://doi.org/10.1103/PhysRevD.89.061502>
24. Ian Hinder et al, “Error-analysis and comparison to analytical models of numerical waveforms produced by the NRAR Collaboration.” *Class. Quantum Grav.* **31**, 025012 (2014). <https://doi.org/10.1088/0264-9381/31/2/025012>
25. Abdul H. Mroué, Mark A. Scheel, Béla Szilágyi, Harald P. Pfeiffer, Michael Boyle, Daniel A. Hemberger, Lawrence E. Kidder, **Geoffrey Lovelace**, Serguei Ossokine, Nicholas W. Taylor, Anıl Zenginoglu, Luisa T. Buchman, Tony Chu, *Evan Foley*, *Matthew Giesler*, Robert Owen, Saul A. Teukolsky. “A catalog of 174 high-quality binary black-hole simulations for gravitational-wave astronomy.” *Phys. Rev. Lett.* **111**, 241104 (2013). <https://doi.org/10.1103/PhysRevLett.111.241104>

26. Alexandre Le Tiec, Alessandra Buonanno, Abdul H. Mroué, Harald P. Pfeiffer, Daniel A. Hemberger, **Geoffrey Lovelace**, Lawrence E. Kidder, Mark A. Scheel, Béla Szilágyi, Nicholas W. Taylor, and Saul A. Teukolsky. “Periastron Advance in Spinning Black Hole Binaries: Gravitational Self-Force from Numerical Relativity.” *Phys. Rev. D* **88**, 124027 (2013).
27. Tanja Hinderer, Alessandra Buonanno, Abdul H. Mroué, Daniel A. Hemberger, **Geoffrey Lovelace**, Harald P. Pfeiffer, Lawrence E. Kidder, Mark A. Scheel, Béla Szilágyi, Nicholas W. Taylor, and Saul A. Teukolsky. “Periastron advance in spinning black hole binaries: comparing effective-one-body and numerical relativity.” *Phys. Rev. D* **88**, 084005 (2013). <https://doi.org/10.1103/PhysRevD.88.124027>
28. Daniel Hemberger, **Geoffrey Lovelace**, Thomas J. Loredo, Lawrence E. Kidder, Mark A. Scheel, Béla Szilágyi, Nicholas W. Taylor, and Saul A. Teukolsky. “Final spin and radiated energy in numerical simulations of binary black holes with equal masses and equal, aligned or anti-aligned spins.” *Phys. Rev. D* **88**, 064014 (2013). <https://doi.org/10.1103/PhysRevD.88.064014>
29. **Geoffrey Lovelace**, Matthew D. Duez, Francois Foucart, Lawrence E. Kidder, Harald P. Pfeiffer, Mark A. Scheel, and Béla Szilágyi. “Massive disk formation in the tidal disruption of a neutron star by a nearly extremal black hole.” *Class. Quantum Grav.* **30**, 135004 (2013). *Class. Quantum Grav.* 2013-2014 Highlight article. <https://doi.org/10.1088/0264-9381/30/13/135004>
30. Daniel A. Hemberger, Mark A. Scheel, Lawrence E. Kidder, Béla Szilágyi, **Geoffrey Lovelace**, Nicholas W. Taylor, and Saul A. Teukolsky. “Dynamical excision boundaries in spectral evolutions of binary black hole spacetimes.” *Class. Quantum Grav.* **30**, 115001 (2013). <https://doi.org/10.1088/0264-9381/30/11/115001>
31. David A. Nichols, Aaron Zimmerman, Yanbei Chen, **Geoffrey Lovelace**, Keith D. Matthews, Robert Owen, Fan Zhang, and Kip S. Thorne. “Visualizing Spacetime Curvature via Frame-Drag Vortexes and Tidal Tendexes III. Quasinormal Pulsations of Schwarzschild and Kerr Black Holes.” *Phys. Rev. D* **86**, 104028 (2012). <https://doi.org/10.1103/PhysRevD.86.104028>
32. Fan Zhang, Aaron Zimmerman, David A. Nichols, Yanbei Chen, **Geoffrey Lovelace**, Keith D. Matthews, Robert Owen, and Kip S. Thorne. “Visualizing Spacetime Curvature via Frame-Drag Vortexes and Tidal Tendexes II. Stationary Black Holes.” *Phys. Rev. D* **86**, 084049 (2012). <https://doi.org/10.1103/PhysRevD.86.084049>
33. Fan Zhang, Jeandrew Brink, Béla Szilágyi, and **Geoffrey Lovelace**. “A geometrically motivated coordinate system for exploring spacetime dynamics using a quasi-Kinnersley tetrad.” *Phys. Rev. D* **86**, 084020 (2012). <https://doi.org/10.1103/PhysRevD.86.084020>
34. Bryant Garcia, **Geoffrey Lovelace**, Lawrence E. Kidder, Michael Boyle, Saul A. Teukolsky, Mark A. Scheel, and Béla Szilágyi. “Are different approaches to constructing initial data for binary black hole simulations of the same astrophysical situation equivalent?” *Phys. Rev. D* **86**, 084054 (2012). <https://doi.org/10.1103/PhysRevD.86.084054>

35. Andrea Taracchini, Yi Pan, Alessandra Buonanno, Enrico Barausse, Tony Chu, Lawrence E. Kidder, **Geoffrey Lovelace**, Harald P. Pfeiffer, and Mark A. Scheel. “A prototype effective-one-body model for non-precessing spinning inspiral-merger-ringdown waveforms.” *Phys. Rev. D* **86**, 024011 (2012). <https://doi.org/10.1103/PhysRevD.86.024011>
36. Michael Boyle et al. “The NINJA-2 catalog of hybrid post-Newtonian/numerical-relativity waveforms for non-precessing black-hole binaries.” *Class. Quantum Grav.* **29**, 124001 (2012). <https://doi.org/10.1088/0264-9381/29/12/124001>
37. **Geoffrey Lovelace**, Michael Boyle, Mark A. Scheel, and Béla Szilágyi. “High-accuracy gravitational waveforms for binary-black-hole mergers with nearly extremal spins.” *Class. Quantum Grav.* **29**, 045003 (2012). <https://doi.org/10.1088/0264-9381/29/4/045003>
38. David A. Nichols, Robert Owen, Fan Zhang, Aaron Zimmerman, Jeandrew Brink, Yanbei Chen, Jeffrey D. Kaplan, **Geoffrey Lovelace**, Keith D. Matthews, Mark A. Scheel, and Kip S. Thorne. “Visualizing spacetime curvature via frame-drag vortexes and tidal tendexes: General theory and weak-gravity applications.” *Phys. Rev. D* **84**, 124014 (2011). <https://doi.org/10.1103/PhysRevD.84.124014>
39. Stephen R. Lau, **Geoffrey Lovelace**, and Harald P. Pfeiffer. “Implicit-explicit (IMEX) evolutions of single black holes.” *Phys. Rev. D* **84**, 084023 (2011). <https://doi.org/10.1103/PhysRevD.84.084023>
40. Robert Owen, Jeandrew Brink, Yanbei Chen, Jeffrey D. Kaplan, **Geoffrey Lovelace**, Keith D. Matthews, David A. Nichols, Mark A. Scheel, Fan Zhang, Aaron Zimmerman, and Kip S. Thorne. “Frame-dragging vortexes and tidal tendexes attached to colliding black holes: visualizing the curvature of spacetime.” *Phys. Rev. Lett.* **106**, 151101 (2011). *Selected for cover of Phys. Rev. Lett. vol. 106, no. 15.* <https://doi.org/10.1103/PhysRevLett.106.151101>
41. **Geoffrey Lovelace**, Mark A. Scheel, and Béla Szilágyi. “Simulating merging binary black holes with nearly extremal spins.” *Phys. Rev. D* **83**, 024010 (2011). <https://doi.org/10.1103/PhysRevD.83.024010>
42. **Geoffrey Lovelace**, Yanbei Chen, Michael Cohen, Jeffrey D. Kaplan, Drew Keppel, Keith D. Matthews, David A. Nichols, Mark A. Scheel, and Ulrich Sperhake. “Momentum flow in black-hole binaries: II. Numerical simulations of equal-mass, head-on mergers with antiparallel spins.” *Phys. Rev. D* **82**, 064031 (2010). <https://doi.org/10.1103/PhysRevD.82.064031>
43. **Geoffrey Lovelace**. “Reducing spurious gravitational radiation in binary-black-hole simulations by using conformally curved initial data.” *Class. Quantum Grav.* **26**, 114002 (2009). <https://doi.org/10.1088/0264-9381/26/11/114002>
44. **Geoffrey Lovelace**, Robert Owen, Harald P. Pfeiffer, and Tony Chu. “Binary-black-hole initial data with nearly extremal spins.” *Phys. Rev. D* **78**, 084017 (2008). <https://doi.org/10.1103/PhysRevD.78.084017>
45. Chao Li and **Geoffrey Lovelace**. “Generalization of Ryan’s theorem: Probing tidal coupling with gravitational waves from nearly circular, nearly equatorial, extreme-mass-ratio inspirals.” *Phys. Rev. D* **77**, 064022 (2008). <https://doi.org/10.1103/PhysRevD.77.064022>

46. Duncan A. Brown, Jeandrew Brink, Hua Fang, Jonathan R. Gair, Chao Li, **Geoffrey Lovelace**, Ilya Mandel, and Kip S. Thorne. "Prospects for detection of gravitational waves from intermediate-mass-ratio inspirals." *Phys. Rev. Lett.* **99**, 201102 (2007). <https://doi.org/10.1103/PhysRevLett.99.201102>
47. Harald P. Pfeiffer, Duncan A. Brown, Lawrence E. Kidder, Lee Lindblom, **Geoffrey Lovelace**, and Mark A. Scheel. "Reducing orbital eccentricity in binary black hole simulations." *Class. Quantum Grav.* **24** S59 (2007). <https://doi.org/10.1088/0264-9381/24/12/S06>
48. **Geoffrey Lovelace**. "The dependence of test-mass thermal noises on beam shape in gravitational-wave interferometers." *Class. Quantum Grav.* **24**, 4491 (2007). <https://doi.org/10.1088/0264-9381/24/17/014>
49. Hua Fang and **Geoffrey Lovelace**. "Tidal coupling of a Schwarzschild black hole and circularly orbiting moon." *Phys. Rev. D.* **72**, 124016 (2005). <https://doi.org/10.1103/PhysRevD.72.124016>
50. Chung Kao, **Geoffrey Lovelace**, and Lynne H. Orr. "Detecting a Higgs pseudoscalar with a Z boson at the LHC." *Phys. Lett. B* **567**, 259 (2003). <https://doi.org/10.1016/j.physletb.2003.06.042>
51. Yun Wang and **Geoffrey Lovelace**. "Unbiased estimate of dark energy density from type Ia supernova data." *Astrophys. J.* **562** L115 (2001). <https://doi.org/10.1086/338142>

Thesis

Geoffrey Lovelace. "Topics in gravitational-wave physics." Ph.D. thesis, California Institute of Technology (2007). URL <http://resolver.caltech.edu/CaltechETD:etd-05232007-115433>.

Invited Presentations

- | | |
|---|-----------|
| 1. "Numerical relativity for next-generation gravitational-wave observatories"
<i>Presentation and discussion on invited panel, Physics and Astrophysics at the eXtreme (PAX) workshop, Cascina, Italy</i> | May 2019 |
| 2. "Numerical relativity in the era of gravitational-wave observations"
<i>High energy and Gravity Seminar, University of California, Santa Barbara Santa Barbara, California</i> | Jan. 2019 |
| 3. "Numerically modeling Brownian thermal noise in crystalline coatings."
<i>Workshop on AlGaAs thermal noise at American University Washington, D.C.</i> | Jun. 2018 |
| 4. "Numerical relativity in the era of gravitational-wave observations."
<i>Center for Computational Relativity and Gravitation Seminar, Rochester Institute of Technology, Rochester, New York</i> | Mar. 2018 |

5. "Numerical relativity in the era of gravitational-wave observations." Mar. 2018
*Center for Astrophysics and Space Sciences Seminar,
University of California, San Diego,
San Diego, California*
6. "Undergraduate research in the era of gravitational-wave astronomy." Mar. 2018
*Society of Physics Students Zone 18 Meeting Keynote,
Bakersfield, California*
7. "Simulating colliding black holes with the Spectral Einstein Code Nov. 2017
in the era of gravitational-wave astronomy"
*Cal Poly Pomona Physics and Astronomy Seminar
Pomona, California*
8. "Using supercomputers to simulate merging black holes in the era of Apr. 2017
gravitational-wave astronomy"
*Osher Lifelong Learning Institute Seminar
Irvine, California*
9. "The first observations of gravitational waves from merging black holes" Mar. 2017
*Physics and Astronomy Colloquium, Swarthmore College,
Swarthmore, Pennsylvania*
10. "Using supercomputers to simulate merging black holes in the era of Mar. 2017
gravitational-wave astronomy"
*Osher Lifelong Learning Institute Eclectics Seminar,
Fullerton, California*
11. "Colliding black holes and the dawn of gravitational-wave astronomy" Feb. 2017
*California State University, Fullerton Emeriti Association Lunch
Placentia, California*
12. "Doing science in the 21st century: colliding black holes and Feb. 2017
gravitational-wave astronomy"
*Keynote presentation, Better Together: CSU Fullerton EdTalk South—Next
Generation Science Standards, Discovery Cube Orange County,
Santa Ana, CA*
13. "Simulations of binary-black-hole mergers" Jan. 2017
American Physical Society April Meeting, Washington, D.C.
14. "The discovery of gravitational waves from merging black holes" Oct. 2016
*Scientific Symposium, Society for Advancement of Chicanos/Hispanics
and Native Americans in Science*
15. "The first observations of gravitational waves from merging black holes" Sep. 2016
*Physics and Astronomy Colloquium, California State University, Los Angeles,
Los Angeles, California*

16. "The first observations of gravitational waves from merging black holes" Sep. 2016
Physics and Astronomy Colloquium, University of Oklahoma, Norman, Oklahoma
17. "Observation of gravitational waves from merging black holes" Jul. 2016
Orange County Astronomers General Meeting, Orange, California
18. "Modeling merging black holes with numerical relativity in the era of first gravitational-wave observations" May 2016
Center for Astrophysics & Space Sciences Astrophysics Seminar, University of California, San Diego, San Diego, California
19. "The discovery of gravitational waves from merging black holes" Apr. 2016
Jim Woodward Faculty Research Award Colloquium, California State University, Fullerton, Fullerton, California
20. "The discovery of gravitational waves from merging black holes" Apr. 2016
STEM² Seminar, Cypress College, Cypress, California
21. "The discovery of gravitational waves from merging black holes" Apr. 2016
Osher Lifelong Learning Institute Presentation, California State University, Fullerton, Fullerton, California
22. "Colliding black holes and ripples in space and time" Nov. 2015
Public lecture, Santiago Canyon College, Orange, California
23. "Simulating colliding black holes and mirror thermal noise for gravitational-wave astronomy" Sep. 2015
Physics Colloquium, California State University, Northridge, California
24. "Supercomputer simulations of merging black holes for gravitational-wave astronomy" May 2015
Public lecture, Santiago Canyon College, Orange, California
25. "Simulations of colliding black holes for gravitational-wave astronomy" Mar. 2015
Physics Colloquium, Fresno State University, Fresno, California
26. "Supercomputer simulations of colliding black holes" Mar. 2015
College of Natural Sciences and Mathematics Inter-club Council Symposium, Fullerton, California
27. "Numerical simulations of merging black holes and neutron stars for gravitational-wave astronomy" Oct. 2014
Physics Colloquium, Washington State University
28. "Colliding black holes and ripples in space and time" May 2014
Public lecture, Santiago Canyon College, Orange, California
29. "Einstein's Gravitational Waves: Recent and Future Discoveries" May 2014
Town and Gown Series public lecture, co-presented with Jocelyn Read and Joshua Smith, Fullerton Public Library, Fullerton, California

30. "Collisions in warped space and time" May 2014
Orange County Astronomers General Meeting, Orange, California
31. "Numerical simulations of merging black holes for Apr. 2014
gravitational-wave astronomy"
American Physical Society April Meeting, Savannah, Georgia
32. "Supercomputer simulations of colliding black holes" Oct. 2013
*Physics & Astronomy Colloquium, California State University,
Long Beach, Long Beach, California*
33. "Supercomputer simulations of merging black holes and neutron stars" Sep. 2013
*N. D. Pearson Colloquium Series in Physics, California State University,
Dominguez Hills, Dominguez Hills, California*
34. "Supercomputer simulations of colliding black holes and neutron stars" Nov. 2012
Natural Science Seminar, Fullerton College, Fullerton, California
35. "Simulating compact-binary mergers containing Sep. 2012
nearly extremal black holes"
*Fall 2012 Meeting of the Eastern Section of the
American Mathematical Society, Rochester, New York*
36. "Numerical simulations of binary black holes in the presence of spins" Jul. 2012
*Rattle and Shine: Gravitational Wave and Electromagnetic Studies
of Compact Binary Mergers conference, Santa Barbara, California*
37. "Supercomputer simulations of colliding black holes" Jan. 2012
*Physics Department Colloquium,
California State University, Fullerton, California*
38. "Numerical simulations of coalescing black holes with nearly extremal Sep. 2011
spins: gravitational waveforms and horizon dynamics"
*Center for Computational Relativity and Gravitation Seminar,
Rochester Institute of Technology, Rochester, New York*
39. "Simulating merging black holes with spins above the Bowen-York limit" May 2011
*Advances and Challenges in Computational General Relativity
Workshop, Providence, Rhode Island*
40. "Implicit-explicit evolutions of black-hole spacetimes" Apr. 2010
"Selected Topics in Analysis and Numerics for PDEs" session,
*Spring 2010 Meeting of the Western Section of the American
Mathematical Society, Albuquerque, New Mexico*
41. "Numerical simulations of binary black holes with Nov. 2009
nearly extremal spins"
*Center for Gravitational Wave Physics Seminar, Penn State University,
University Park, Pennsylvania*

42. "Numerical simulations of binary black holes with nearly extremal spins" Sep. 2009
*Canadian Institute for Theoretical Astrophysics Seminar,
 University of Toronto, Toronto, Ontario*
43. "Momentum flow in numerical simulations of binary black hole mergers" Sep. 2009
*Canadian Institute for Theoretical Astrophysics
 20-minute Blackboard Lunch, University of Toronto, Toronto, Ontario*
44. "Momentum flow in numerical simulations of binary black hole mergers" Jun. 2009
30-minute seminar, Syracuse University, Syracuse, New York
45. "Spin and shape in binary-black-hole simulations" Feb. 2008
*Theoretical Astrophysics and Relativity Seminar,
 California Institute of Technology, Pasadena, California*
46. "Improving binary-black-hole initial data" Nov. 2007
*General Relativity and Astrophysics Seminar, University of Illinois
 at Urbana-Champaign, Urbana, Illinois*