

Geoffrey Lovelace

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Curriculum Vitae revised March 8, 2022

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

Professor of Physics <i>Department of Physics</i> <i>California State University, Fullerton</i>	Aug. 2021 – present
Associate Professor of Physics <i>Department of Physics</i> <i>California State University, Fullerton</i>	Aug. 2017 – Aug. 2021
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

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

Research

Philanthropic Support

Nicholas and Lee Begovich's Bequest to Cal State Fullerton <i>\$10,000,000 to CSUF, including \$6,650,000 to the Nicholas and Lee Begovich</i> <i>Center for Gravitational-Wave Physics and Astronomy</i>	2020
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Extramural Grants

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

1. PI, National Science Foundation, AST — PAARE, "The CSUF-led partnership for inclusion of underrepresented groups in gravitational-wave astronomy" <i>\$1,180,212 over five years, including sub-awards to Syracuse University, Northwestern University, and Washington State University, pending</i>	2022
2. PI, National Science Foundation, PHY — Gravitational Theory, "RUI: Next-generation numerical relativity for future gravitational-wave observatories" <i>\$225,832 over three years, pending</i>	2021
3. PI for CSUF, National Science Foundation, PHY — Gravitational Experiments, "Collaborative Research: The Next Generation of Gravitational Wave Detectors" <i>\$211,283 to CSUF, funded 2018–2021</i>	2018
4. Co-PI for CSUF, National Science Foundation, PHY — Gravitational Experiments, "Collaborative Research: The Next Generation of Gravitational Wave Detectors" <i>\$206,227 to CSUF, declined</i>	2017
5. PI for CSUF, National Science Foundation, PHY — LIGO Research Support, "Collaborative Research: LSC Center for Coatings Research" <i>\$136,819 to CSUF, funded 2017–2020, collaborative proposal spanning 10 institutions, led by Stanford</i>	2016
6. PI, National Science Foundation, PHY — Integrative Activities in Physics, "CAREER: Computational gravitational-wave science and education in the era of first observations" <i>\$400,070, funded 2017–2022</i>	2016

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7. PI, National Science Foundation, PHY — Gravitational Theory, 2015
 “RUI: Computational gravitational-wave research for the era of first observations”
\$135,000 over three years, funded 2016–2019
 8. Co-PI, National Science Foundation, AST — PAARE, “Catching a new wave: 2015
 the CSUF-Syracuse partnership for inclusion of underrepresented groups in gravitational-wave astronomy”
\$956,590 over five years, including sub-award to Syracuse University, funded 2016-2021
 9. PI, National Science Foundation, PHY — Integrative Activities in Physics, 2015
 “CAREER: Computational gravitational-wave science and education for the era of first observations”
\$420,190 over five years, declined
 10. PI, National Science Foundation, MRI, “MRI: Acquisition of a 2014
 high-performance computer cluster for gravitational-wave astronomy with Advanced LIGO”
\$119,791 over three years, funded 2014–2017
 11. Co-PI, National Science Foundation, AST - PAARE, “Catching the new wave: 2013
 the CSUF-Syracuse partnership for advancing minority participation in gravitational-wave astronomy”
\$977,931 over five years to CSUF, \$1,476,553 total budget, declined
 12. PI, Research Corporation for Science Advancement, Multi Investigator 2013
 2013 Cottrell College Science Award, “Developing a numerical injection analysis pipeline for gravitational waves from merging black holes and neutron stars”
\$75,000 over two years, funded 2014–2017
 13. PI, National Science Foundation, PHY - Gravitational Theory, 2012
 “RUI: 2012 Numerical Simulations of Merging Black Holes and Neutron Stars”
\$125,723 over three years, funded 2013–2016

Intramural Grants

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

External Computer Time Grants

Co-PI, Frontera Large-Scale Community Partnerships, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>42 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2021
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>8.2 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2021
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>15.1 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2020
Co-PI, Frontera Large-Scale Community Partnerships, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>56 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2020
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>14 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2019
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>7.1 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2018
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>Declined</i>	2018
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>6.41 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2016
Co-PI, Extreme Science and Engineering Discovery Environment, "Gravitational Waves from Compact Binaries: Computational Contributions to LIGO" <i>6.23 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration</i>	2015

- 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. Samuel Rodriguez
<i>Pursuing Ph.D. in physics at University of Mississippi in fall 2021</i> | M.S., May 2021 |
| 2. Teresita Ramirez Aguilar
<i>Pursuing Ph.D. in physics at Northwestern University in fall 2021</i> | B.S., May 2021 |
| 3. Sierra Thomas
<i>Pursuing Ph.D. in physics at Syracuse University starting fall 2021</i> | B.S., Dec. 2020 |
| 4. Jennifer Sanchez
<i>Pursuing Ph.D. in physics at Northwestern University starting fall 2021</i> | B.S., Dec. 2020 |

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5. **Denyz Melchor** B.S., May 2020
Pursuing Ph.D. in astrophysics at University of California, Los Angeles
NSF Graduate Research Fellow
 6. **Nicholas Demos** B.S., May 2017
Pursuing Ph.D. in physics at Massachusetts Institute of Technology
 7. **John Derby** M.S., May 2017
 8. **Alyssa Garcia** B.S., May 2017
Pursuing Ph.D. in physics at University of Michigan,
NSF Graduate Research Fellow
 9. **Haroon Khan** B.S., May 2017
Employed at NASA Ames
 10. **Nousha Afshari** B.S., May 2016
Pursuing a graduate degree in medical physics at Louisiana State University
 11. **Kevin Kuper** B.S., May 2015
Pursuing Ph.D. in optics at University of Arizona
 12. **Evan Foley** M.S., May 2014
Now Chief Engineer at DNB Engineering, Fullerton, California
 13. **Reza Katebi** M.S., May 2014
Ph.D. in physics, Ohio University, Oct. 2019
Now a Senior Advanced AI Engineer at Honeywell
 14. **Matthew Giesler** B.S., May 2013
Ph.D. in physics, California Institute of Technology, March 2020
Now a Research Associate at Cornell University

Selected Invited Presentations

1. "Modeling binary black holes with numerical relativity in the era of gravitational-wave observations" Mar. 2021
Virtual HEP-Astro Seminar, University of Michigan
2. "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
3. "Numerical relativity in the era of gravitational-wave observations" Jan. 2019
High energy and Gravity Seminar, University of California, Santa Barbara Santa Barbara, California
4. "Numerically modeling Brownian thermal noise in crystalline coatings." Jun. 2018
Workshop on ALGaAs thermal noise at American University Washington, D.C.

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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. "The first observations of gravitational waves from merging black holes" Mar. 2017
*Physics and Astronomy Colloquium, Swarthmore College,
Swarthmore, Pennsylvania*
 7. "Using supercomputers to simulate merging black holes in the era of gravitational-wave astronomy" Mar. 2017
*Osher Lifelong Learning Institute Eclectics Seminar,
Fullerton, California*
 8. "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*
 9. "Simulations of binary-black-hole mergers" Jan. 2017
American Physical Society April Meeting, Washington, D.C.
 10. "The discovery of gravitational waves from merging black holes" Oct. 2016
*Scientific Symposium, Society for Advancement of Chicanos/Hispanics
and Native Americans in Science*
 11. "The first observations of gravitational waves from merging black holes" Sep. 2016
*Physics and Astronomy Colloquium, University of Oklahoma,
Norman, Oklahoma*
 12. "Observation of gravitational waves from merging black holes" Jul. 2016
Orange County Astronomers General Meeting, Orange, California
 13. "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*
 14. "Simulating colliding black holes and mirror thermal noise for gravitational-wave astronomy" Sep. 2015
Physics Colloquium, California State University, Northridge, California
 15. "Numerical simulations of merging black holes and neutron stars for gravitational-wave astronomy" Oct. 2014
Physics Colloquium, Washington State University
 16. "Numerical simulations of merging black holes for gravitational-wave astronomy" Apr. 2014
American Physical Society April Meeting, Savannah, Georgia

Selected Contributed Presentations

1. "Progress toward simulating merging black holes with SpECTRE" Apr. 2021
Virtual April APS Meeting
2. "Progress toward simulating merging black holes with SpECTRE" Apr. 2020
Virtual April APS Meeting
3. "Can LIGO measure the spins of nearly extremal, merging binary black holes?" Apr. 2018
*American Physical Society April Meeting
Columbus, Ohio*
4. "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*
5. "Numerically modeling Brownian thermal noise in amorphous and Jul. 2017
crystalline thin coatings"
*12th Eduardo Amaldi Conference on Gravitational Waves
Pasadena, California*
6. "Simulations of binary-black-hole mergers" Feb. 2017
*The Dawning Era of Gravitational-Wave Astrophysics, Aspen Center for Physics
Winter Conference, Aspen, Colorado*
7. "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*
8. "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*
9. "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
10. "Modeling crystalline Brownian coating noise Jul. 2015
with high performance computing"
LIGO monthly coatings teleconference
11. "Nearly extremal apparent horizons in simulations of Jun. 2015
merging black holes"
International Conference on Black Holes, Fields Institute, Toronto, Ontario
12. "Nearly extremal apparent horizons in simulations of merging Apr. 2015
black holes"
American Physical Society April Meeting, Baltimore, Maryland

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| 13. “Collisions in Warped Space and Time”
<i>Outreach talk to physics classes at Grand Terrace High School,
Grand Terrace, California</i> | Oct. 2014 |
| 14. “Results from numerical simulations of binaries containing
nearly extremal black holes”
<i>2013 Numerical Relativity and Data Analysis Meeting, Mallorca, Spain</i> | Sep. 2013 |
| 15. “Nearly extremal black-hole spin in numerical
simulations of compact binaries”
<i>20th International Conference on General Relativity and Gravitation and
10th Amaldi Conference on Gravitational Waves, Warsaw, Poland</i> | Jul. 2013 |
| 16. “The tidal disruption of a neutron star by a nearly extremal black hole”
<i>29th Annual Pacific Coast Gravity Meeting, Davis, California</i> | Mar. 2013 |
| 17. “Supercomputer simulations of colliding black holes and neutron stars”
<i>Introductory talk to summer research undergraduates,
University of Oklahoma, Norman, Oklahoma</i> | Jun. 2012 |

Teaching

Supervision

Supervision of 14 undergraduate and 5 graduate students for research projects in computational gravitational-wave physics <i>California State University, Fullerton</i>	Aug. 2012 – present
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Co-supervision of 4 undergraduate students and 1 graduate student for computational relativity research projects <i>Cornell University</i>	Jun. 2008 – Jul. 2012
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Courses Taught

ASTR 101: Introduction to Astronomy ASTR 444: Applications of Gravitation PHYS 499: Independent Study PHYS 599: Independent Graduate Research PHYS 597: Master’s Project	Spring 2022
CSNM 101: Think Like Einstein PHYS 520: Analytical Mechanics PHYS 499: Independent Study PHYS 599: Independent Graduate Research PHYS 597: Master’s Project	Fall 2021

<p>ASTR 101: Introduction to Astronomy PHYS 330B: Electromagnetic Theory II PHYS 499: Independent Study PHYS 599: Independent Graduate Research PHYS 597: Master's Project</p>	Spring 2021
<p>ASTR 101: Introduction to Astronomy PHYS 330A: Electromagnetic Theory I PHYS 499: Independent Study PHYS 599: Independent Graduate Research PHYS 597: Master's Project</p>	Fall 2020
<p>ASTR 101: Introduction to Astronomy ASTR 444: Applications of Gravitation — <i>new course pilot</i> PHYS 499: Independent Study PHYS 599: Independent Graduate Research PHYS 597: Master's Project</p>	Spring 2020
<p>ASTR 101: Introduction to Astronomy PHYS 499: Independent Study</p>	Fall 2019
<p>PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i> ASTR 444: Applications of Gravitation — <i>new course pilot</i> PHYS 499: Independent Study PHYS 599: Independent Graduate Research</p>	Spring 2018
<p>PHYS 520: Analytical Mechanics PHYS 499: Independent Study</p>	Fall 2017
<p>PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i> PHYS 300: Survey of Mathematical Physics PHYS 499: Independent Study PHYS 597: Master's Project PHYS 599: Independent Graduate Research</p>	Spring 2017
<p>PHYS 520: Analytical Mechanics PHYS 499: Independent Study PHYS 597: Master's Project PHYS 599: Independent Graduate Research</p>	Fall 2016
<p>PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i> ASTR 444: Applications of Gravitation — <i>new course pilot</i> PHYS 499: Independent Study PHYS 597: Master's Project PHYS 599: Independent Graduate Research</p>	Spring 2016
<p>PHYS 499: Undergraduate Independent Study PHYS 520: Analytical Mechanics PHYS 599: Independent Graduate Research</p>	Fall 2015

PHYS 211: Elementary Physics PHYS 211L: Elementary Physics Laboratory PHYS 499: Undergraduate Independent Study	Spring 2015
PHYS 499: Undergraduate Independent Study PHYS 520: Analytical Mechanics	Fall 2014
PHYS 225: Fundamental Physics: Mechanics — <i>flipped classroom redesign</i> PHYS 499: Undergraduate Independent Study PHYS 597: Master’s Project PHYS 599: Independent Graduate Research	Spring 2014
PHYS 499: Undergraduate Independent Study PHYS 520: Analytical Mechanics PHYS 597: Master’s Project PHYS 599: Independent Graduate Research	Fall 2013
PHYS 211: Elementary Physics PHYS 499: Undergraduate Independent Study PHYS 597: Master’s Project PHYS 599: Independent Graduate Research	Spring 2013
PHYS 211: Elementary Physics PHYS 499: Undergraduate Independent Study PHYS 599: Independent Graduate Research	Fall 2012

Other Teaching Accomplishments

Virtual Workshop on Gravitational Waves and High-Performance Computing <i>Introduced 22 students from Citrus College to gravitational-wave science and high-performance computing through a 1-week virtual summer workshop</i>	Aug. 2021
Workshop on Gravitational Waves and High-Performance Computing <i>Introduced 22 students from Citrus College to gravitational-wave science and high-performance computing through a 1-week summer workshop</i>	Aug. 2019
Workshop on Gravitational Waves and High-Performance Computing <i>Introduced 16 students from Citrus College to gravitational-wave science and high-performance computing through a 1-week summer workshop</i>	Aug. 2018
Discussion Leader at Gordon Research Conference discussing “Relativity and Gravitation: Contemporary Research and Teaching of Einstein’s Physics” <i>Salve Regina University, Newport, Rhode Island</i>	Jun. 2016
Participant in “Proven Course Redesign” eAcademy on research-based, “flipped classroom” pedagogy <i>California State Polytechnic University, Pomona</i>	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 – Jan. 2021

Senior member, Gravitational-Wave Physics and Astronomy
 Center (GWPA) 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, Cosmic Explorer Project Jul. 2018 – present

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

Professional Service

External examiner, Oberlin College Physics honors program Jan. 2022 – May 2022

Member, Classical and Quantum Gravity Editorial Board Mar. 2021 – present

Member, Classical and Quantum Gravity Advisory Panel Dec. 2016 – Mar. 2021

Member, American Physical Society LeRoy Apker Award
 Selection Committee May 2019 – Aug. 2021

Ph.D. committee member for Rochester Institute of Technology
 student Jacob Lange Mar. 2018 – Aug. 2020

National Science Foundation Review Panelist Feb. 2019

Referee for journal Physical Review Letters,
 APS publishing Apr. 2008 – present

Referee for journal Physical Review D,
 APS publishing Mar. 2008 – present

Participate in CSU Webinar on grant writing Feb. 2017

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

Organize and host Theoretical Astrophysics in Southern California conference	Nov. 2015
National Science Foundation Review Panelist	Feb. 2015
Referee, Gravitational Physics Program, National Science Foundation	Jan. 2014 – present
Co-organize and host Numerical and Analytical Relativity and Data Analysis (NARDA) 2014 meeting	Aug. 2014
Reviewer, NASA Postdoctoral Program	May 2013
Reviewer, NSF Physics at the Information Frontier program	Feb. 2013
Referee for journal Classical and Quantum Gravity, IOP publishing	Mar. 2008 – present

Department, College, and University Committee Service

Department of Physics Personnel Committee	Aug. 2021 – present
College of Natural Sciences and Mathematics Personnel Committee	Aug. 2021 – present
Reviewer, NSM Jr/Sr Intramural Award Committee	Mar. 2020
Chair, Physics Department Faculty Search Committee	Aug. 2019 – Aug. 2020
Discuss NSF CAREER proposal writing with CSUF professors, hosted by the Office of Research Development & College of Engineering	Mar. 2019
Member, Center for Computational and Applied Mathematics Computing Committee	Aug. 2017 – present
Discuss NSF CAREER proposal writing with CSUF professors, hosted by the Office of Research Development	April 2017
Curriculum Committee Chair, Department of Physics, CSUF	Aug. 2015 – Aug. 2018
Member, search committee for high-performance computing system administrator	Aug. 2016 – Oct. 2017
Lab Development Committee, Department of Physics, California State University, Fullerton	Aug. 2015 – Aug. 2016
Curriculum Committee, College of Natural Sciences and Mathematics, California State University, Fullerton	Sep. 2014 – present
Safety Committee, College of Natural Sciences and Mathematics, California State University, Fullerton	Aug. 2013 – Sep. 2014

Outreach, Advocacy, and Fundraising

Speak and facilitate keynote address by Kip Thorne at the renaming ceremony for the Nicholas and Lee Begovich Center for Gravitational-Wave Physics and Astronomy	Oct. 2019
Outreach seminar at Citrus College, recruiting for a 1-week CSUF summer workshop on high-performance computing	Apr. 2019
Participant in American Physical Society Congressional Outreach Day	Feb. 2019
Interview with Tom Lovelace on local New York radio station WTbQ	Sep. 2018
Guest teaching in introductory calculus courses, demonstrating Monte Carlo integration with dice	Sep. 2018
Present 15-minute public lecture at Dock Mennonite Academy (high school)	Sep. 2018
Outreach seminar at Citrus College, recruiting for a 1-week CSUF summer workshop on high-performance computing	Apr. 2018
Q&A with Joshua Smith at Fullerton Community Center, hosted by Parents' Voice and the Lions Club	May 2017
Supervision of high school volunteer intern for a computational research project	Jun. 2016 – Aug. 2016
Presenter at CSUF fundraising dinner event, "Gravitational Waves: Examining the Universe in a Whole New Way"	Apr. 2016
Discuss gravitational-wave research with CSU Chancellor, CSUF President, GWPAC student researchers and professors	Feb. 2016
Co-lead CSUF press conference announcing the discovery of gravitational waves from merging black holes	Feb. 2016
Contribute to CSUF media relations outreach for gravitational-wave discovery http://news.fullerton.edu/gravitational-waves/	Feb. 2016
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

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

Media

Appeared with CSUF undergraduate Teresita Ramirez in documentary "LIGO: A Discovery that Shook the World" by Les Guthman https://vimeo.com/378452738 starting at 3:07	Dec. 2019
Quoted in Scientific American article on LIGO observation GW190814 https://www.scientificamerican.com/article/astronomers-spy-a-black-hole-devouring-a-neutron-star/	Aug. 2019
Visualization of LIGO's first ten binary-black-hole observations, created by CSUF undergraduate Teresita Ramirez, Geoffrey Lovelace, the SXS Collaboration, and the LIGO Virgo Collaboration, featured in national media https://youtu.be/gmmD72cFOU4 — 109,000+ views on YouTube https://arstechnica.com/science/2018/12/physicists-detected-gravitational-waves-from-four-new-black-hole-mergers/ https://www.scientificamerican.com/article/has-ligo-seen-galaxy-warped-gravitational-waves/	Dec. 2018

- 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 Feb. 2016
Contributed to creating cover image
- Article selected for cover of Phys. Rev. Lett. vol. 106, no. 15 Apr. 2011
- Research on visualizing curved spacetime featured in news media Apr. 2011
(e.g. <http://www.universetoday.com/84807/a-new-way-to-visualize-warped-space-and-time/>)

Complete Lists of Publications and Presentations

Peer-Reviewed Publications

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

1. Nils L. Fischer, Harald P. Pfeiffer, Gabriel S. Bonilla, Nils Deppe, François Hébert, Lawrence E. Kidder, **Geoffrey Lovelace**, Jordan Moxon, Mark A. Scheel, Saul A. Teukolsky, William Throwe, Nikolas A. Wittek, Tom Wlodarczyk. “A scalable elliptic solver with task-based parallelism for the SpECTRE numerical relativity code.” Accepted for publication in Phys. Rev. D (2022). Preprint <https://arxiv.org/abs/2111.06767>.
2. Katerina Chatziioannou, Roberto Cotesta, Sudarshan Ghonge, Jacob Lange, Ken KY Ng, Juan Calderón Bustillo, James Clark, Carl-Johan Haster, Sebastian Khan, Michael Pürrer, Vivien Raymond, Salvatore Vitale, **Nousha Afshari**, Stanislav Babak, Kevin Barkett, Jonathan Blackman, Alejandro Bohé, Michael Boyle, Alessandra Buonanno, Manuela Campanelli, Gregorio Carullo, Tony Chu, **Eric Flynn**, Heather Fong, **Alyssa Garcia**, Matthew Giesler, Maria Haney, Mark Hannam, Ian Harry, James Healy, Daniel Hemberger, Ian Hinder, Karan Jani, Bhavesh Khamersa, Lawrence E Kidder, Prayush Kumar, Pablo Laguna, Carlos O Lousto, **Geoffrey Lovelace**, Tyson B Littenberg, Lionel London, Margaret Millhouse, Laura K Nuttall, Frank Ohme, Richard O’Shaughnessy, Serguei Ossokine, Francesco Pannarale, Patricia Schmidt, Harald P Pfeiffer, Mark A Scheel, Lijing Shao, Deirdre Shoemaker, Bela Szilagy, Andrea Taracchini, Saul A Teukolsky, and Yosef Zlochower. “On the properties of the massive binary black hole merger GW170729.” Phys. Rev. D **100**, 104015 (2019). <https://doi.org/10.1103/PhysRevD.100.104015>

3. 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). <https://doi.org/10.1088/1361-6382/ab34e2>
4. 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>
5. "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>
6. 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>
7. **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>.
8. 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>
9. 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>
10. 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 Szilagy, 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>.

11. 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>
12. 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>
13. 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>
14. **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>
15. 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>
16. 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>
17. 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>
18. 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>
19. 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>
20. 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>

21. 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>
22. 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>
23. **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>
24. 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>
25. 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). <https://doi.org/10.1103/PhysRevD.89.061502>
26. 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>
27. 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). <https://doi.org/10.1103/PhysRevLett.111.241104>
28. 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).
29. 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>

30. 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>
31. **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>
32. 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>
33. 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>
34. 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>
35. 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>
36. 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>
37. 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>
38. 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>
39. **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>

40. 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>
41. 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>
42. 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>
43. **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>
44. **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>
45. **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>
46. **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>
47. 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>
48. 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>
49. 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>

50. **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>
51. 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>
52. 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>
53. 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>.

Submitted for Peer-Reviewed Publication

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

1. Nils L. Fischer, **Samuel Rodriguez**, Tom Wlodarczyk, **Geoffrey Lovelace**, Harald P. Pfeiffer, Gabriel S. Bonilla, Nils Deppe, François Hébert, Lawrence E. Kidder, Jordan Moxon, William Throwe. “High-accuracy numerical models of Brownian thermal noise in thin mirror coatings.” Submitted for publication in *Phys. Rev. D* (2021). Preprint <https://arxiv.org/abs/2111.06893>.
2. Nils Deppe, François Hébert, Lawrence E. Kidder, William Throwe, Isha Anantpurkar, Cristóbal Armaza, Gabriel S. Bonilla, Michael Boyle, Himanshu Chaudhary, Matthew D. Duez, Nils L. Fischer, Francois Foucart, Matthew Giesler, Jason S. Guo, Yoonsoo Kim, Prayush Kumar, Isaac Legred, Dongjun Li, **Geoffrey Lovelace**, Sizheng Ma, Alexandra Macedo, **Denyz Melchor**, **Marlo Morales**, Jordan Moxon, Kyle C. Nelli, Eamonn O’Shea, Harald P. Pfeiffer, **Teresita Ramirez**, Hannes R. Rüter, **Jennifer Sanchez**, Mark A. Scheel, **Sierra Thomas**, Daniel Vieira, Nikolas A. Wittek, Tom Wlodarczyk, Saul A. Teukolsky. “Simulating magnetized neutron stars with discontinuous Galerkin methods.” Submitted to *Phys. Rev. D* (2021). Preprint <https://arxiv.org/abs/2109.12033>.

Other Products

- i. **Geoffrey Lovelace**. “Computational challenges in numerical relativity in the gravitational-wave era.” *Nature Computational Science* **1**, 450 (2021). <https://doi.org/10.1038/s43588-021-00102-2>. Invited comment.

- ii. Matthew Evans, Rana X Adhikari, Chaitanya Afle, Stefan W. Ballmer, Sylvia Biscoveanu, Ssohrab Borhanian, Duncan A. Brown, Yanbei Chen, Robert Eisenstein, Alexandra Gruson, Anuradha Gupta, Evan D. Hall, Rachael Huxford, Brittany Kamai, Rahul Kashyap, Kevin Kuns, Philippe Landry, Amber Lenon, Geoffrey Lovelace, Lee McCuller, Ken K. Y. Ng, Alexander H. Nitz, Jocelyn Read, B. S. Sathyaprakash, David H. Shoemaker, Bram J. J. Slagmolen, Joshua R. Smith, Varun Srivastava, Ling Sun, Salvatore Vitale, Rainer Weissa. “A Horizon Study for Cosmic Explorer: Science, Observatories, and Community.” Cosmic Explorer Technical Report CE-P2100003 (2021). <https://arxiv.org/abs/2109.09882>.
- iii. David Reitze, Rana X. Adhikari, Stefan Ballmer, Barry Barish, Lisa Barsotti, GariLynn Billingsley, Duncan A. Brown, Yanbei Chen, Dennis Coyne, Robert Eisenstein, Matthew Evans, Peter Fritschel, Evan D. Hall, Albert Lazzarini, **Geoffrey Lovelace**, Jocelyn Read, B. S. Sathyaprakash, David Shoemaker, Joshua Smith, Calum Torrie, Salvatore Vitale, Rainer Weiss, Christopher Wipf, and Michael Zucker. “Cosmic Explorer: The U.S. Contribution to Gravitational-Wave Astronomy beyond LIGO.” *Bulletin of the American Astronomical Society* **51**, 034 (2019). <https://arxiv.org/abs/1907.04833>.
- iv. Nils Deppe, William Throwe, Lawrence E. Kidder, Nils L. Fischer, François Hébert, Jordon Moxon, Cristóbal Armaza, Gabriel S. Bonilla, Prayush Kumar, Geoffrey Lovelace, Eamonn O’Shea, Harald P. Pfeiffer, Mark A. Scheel, Saul A. Teukolsky, Isha Anantpurkar, Michael Boyle, Francois Foucart, Matthew Giesler, Jason S. Guo, Dante A. B. Iozzo, Yoonsoo Kim, Isaac Legred, Dongjun Li, *Alexandra Macedo*, *Denyz Melchor*, *Marlo Morales*, Kyle C. Nelli, *Teresita Ramirez*, Hannes R. Rüter, *Jennifer Sanchez*, *Sierra Thomas*, Nokias A. Wittek, Tom Włodarczyk. SpECTRE numerical relativity code. 2021. <https://doi.org/10.5281/zenodo.5083825>.

Invited Presentations

- | | | |
|----|--|-----------|
| 1. | “Modeling binary black holes with numerical relativity in the era of gravitational-wave observations”
<i>Virtual HEP-Astro Seminar, University of Michigan</i> | Mar. 2021 |
| 2. | “Computational Gravitational-Wave Physics and Astronomy at California State University, Fullerton”
<i>CSU Chancellor’s Office STEM-NET webcast</i> | Oct. 2020 |
| 3. | “Gravitational-Wave Astronomy and Cal State Fullerton”
<i>Virtual CSU Fullerton Emeriti Meeting</i> | Aug. 2020 |
| 4. | “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 |
| 5. | “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 |

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6. "Numerically modeling Brownian thermal noise in crystalline coatings." Jun. 2018
*Workshop on AlGaAs thermal noise at American University
Washington, D.C.*
 7. "Numerical relativity in the era of gravitational-wave observations." Mar. 2018
*Center for Computational Relativity and Gravitation Seminar,
Rochester Institute of Technology,
Rochester, New York*
 8. "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*
 9. "Undergraduate research in the era of gravitational-wave astronomy." Mar. 2018
*Society of Physics Students Zone 18 Meeting Keynote,
Bakersfield, California*
 10. "Simulating colliding black holes with the Spectral Einstein Code
in the era of gravitational-wave astronomy" Nov. 2017
*Cal Poly Pomona Physics and Astronomy Seminar
Pomona, California*
 11. "Using supercomputers to simulate merging black holes in the era of
gravitational-wave astronomy" Apr. 2017
*Osher Lifelong Learning Institute Seminar
Irvine, California*
 12. "The first observations of gravitational waves from merging black holes" Mar. 2017
*Physics and Astronomy Colloquium, Swarthmore College,
Swarthmore, Pennsylvania*
 13. "Using supercomputers to simulate merging black holes in the era of
gravitational-wave astronomy" Mar. 2017
*Osher Lifelong Learning Institute Eclectics Seminar,
Fullerton, California*
 14. "Colliding black holes and the dawn of gravitational-wave astronomy" Feb. 2017
*California State University, Fullerton Emeriti Association Lunch
Placentia, California*
 15. "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*
 16. "Simulations of binary-black-hole mergers" Jan. 2017
American Physical Society April Meeting, Washington, D.C.

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17. "The discovery of gravitational waves from merging black holes" Oct. 2016
Scientific Symposium, Society for Advancement of Chicanos/Hispanics and Native Americans in Science
 18. "The first observations of gravitational waves from merging black holes" Sep. 2016
Physics and Astronomy Colloquium, California State University, Los Angeles, Los Angeles, California
 19. "The first observations of gravitational waves from merging black holes" Sep. 2016
Physics and Astronomy Colloquium, University of Oklahoma, Norman, Oklahoma
 20. "Observation of gravitational waves from merging black holes" Jul. 2016
Orange County Astronomers General Meeting, Orange, California
 21. "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
 22. "The discovery of gravitational waves from merging black holes" Apr. 2016
Jim Woodward Faculty Research Award Colloquium, California State University, Fullerton, Fullerton, California
 23. "The discovery of gravitational waves from merging black holes" Apr. 2016
STEM² Seminar, Cypress College, Cypress, California
 24. "The discovery of gravitational waves from merging black holes" Apr. 2016
Osher Lifelong Learning Institute Presentation, California State University, Fullerton, Fullerton, California
 25. "Colliding black holes and ripples in space and time" Nov. 2015
Public lecture, Santiago Canyon College, Orange, California
 26. "Simulating colliding black holes and mirror thermal noise for gravitational-wave astronomy" Sep. 2015
Physics Colloquium, California State University, Northridge, California
 27. "Supercomputer simulations of merging black holes for gravitational-wave astronomy" May 2015
Public lecture, Santiago Canyon College, Orange, California
 28. "Simulations of colliding black holes for gravitational-wave astronomy" Mar. 2015
Physics Colloquium, Fresno State University, Fresno, California
 29. "Supercomputer simulations of colliding black holes" Mar. 2015
College of Natural Sciences and Mathematics Inter-club Council Symposium, Fullerton, California

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30. "Numerical simulations of merging black holes and neutron stars for gravitational-wave astronomy"
Physics Colloquium, Washington State University Oct. 2014
31. "Colliding black holes and ripples in space and time"
Public lecture, Santiago Canyon College, Orange, California May 2014
32. "Einstein's Gravitational Waves: Recent and Future Discoveries"
Town and Gown Series public lecture, co-presented with Jocelyn Read and Joshua Smith, Fullerton Public Library, Fullerton, California May 2014
33. "Collisions in warped space and time"
Orange County Astronomers General Meeting, Orange, California May 2014
34. "Numerical simulations of merging black holes for gravitational-wave astronomy"
American Physical Society April Meeting, Savannah, Georgia Apr. 2014
35. "Supercomputer simulations of colliding black holes"
Physics & Astronomy Colloquium, California State University, Long Beach, Long Beach, California Oct. 2013
36. "Supercomputer simulations of merging black holes and neutron stars"
N. D. Pearson Colloquium Series in Physics, California State University, Dominguez Hills, Dominguez Hills, California Sep. 2013
37. "Supercomputer simulations of colliding black holes and neutron stars"
Natural Science Seminar, Fullerton College, Fullerton, California Nov. 2012
38. "Simulating compact-binary mergers containing nearly extremal black holes"
Fall 2012 Meeting of the Eastern Section of the American Mathematical Society, Rochester, New York Sep. 2012
39. "Numerical simulations of binary black holes in the presence of spins"
Rattle and Shine: Gravitational Wave and Electromagnetic Studies of Compact Binary Mergers conference, Santa Barbara, California Jul. 2012
40. "Supercomputer simulations of colliding black holes"
Physics Department Colloquium, California State University, Fullerton, California Jan. 2012
41. "Numerical simulations of coalescing black holes with nearly extremal spins: gravitational waveforms and horizon dynamics"
Center for Computational Relativity and Gravitation Seminar, Rochester Institute of Technology, Rochester, New York Sep. 2011
42. "Simulating merging black holes with spins above the Bowen-York limit"
Advances and Challenges in Computational General Relativity Workshop, Providence, Rhode Island May 2011

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