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 — Oct. 2002 – Jun. 2007
California Institute of Technology

B.S. in Physics — Aug. 1998 – May 2002
University of Oklahoma

Employment

Associate Professor of Physics — Aug. 2017 – present
Department of Physics
California State University, Fullerton

Assistant Professor of Physics — Aug. 2012 – Aug. 2017
Department of Physics
California State University, Fullerton

Research Associate — Sep. 2007 – Aug. 2012
Department of Astronomy
Cornell University

Postdoctoral Scholar — Jul. 2007 – Aug. 2007
Department of Physics
California Institute of Technology

Visiting Appointments

Visiting Associate in Physics — Aug. 2012 – July 2013
Department of Physics
California Institute of Technology

Visitor in Theoretical Astrophysics — Aug. 2018 – Aug. 2019
Division of Physics, Mathematics, and Astronomy
California Institute of Technology

Research

Extramural Grants

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

1. Co-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
    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

11. 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 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, 2018
"Gravitational Waves from Compact Binaries: Computational Contributions to LIGO"
7.1 million CPU-hours computer time awarded to the Simulating eXtreme Spacetimes Collaboration

Co-PI, Extreme Science and Engineering Discovery Environment, 2018
"Gravitational Waves from Compact Binaries: Computational Contributions to LIGO"
Declined

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

Co-PI, Extreme Science and Engineering Discovery Environment, 2015
"Gravitational Waves from Compact Binaries: Computational Contributions to LIGO"
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 Szilagyi, 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 Anıl 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, 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).

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

1. ***Samuel Rodriguez*** B.S., May 2019
   Pursuing M.S. in physics at California State University, Fullerton

2. ***Nicholas Demos*** B.S., May 2017
   Pursing Ph.D. in physics at Massachusetts Institute of Technology

3. ***John Derby*** M.S., May 2017

4. ***Alyssa Garcia*** B.S., May 2017
   Pursing Ph.D. in physics at Brandeis University,
   NSF Graduate Research Fellow

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 in the era of first gravitational-wave observations" — Jul. 2016
   21st International Conference on General Relativity and Gravitation, Columbia University, New York, New York

7. "Modeling merging, rapidly rotating black holes with numerical relativity for the era of first gravitational-wave observations" — Apr. 2016
   American Physical Society April Meeting, Salt Lake City, Utah

8. "Modeling crystalline Brownian coating noise with high performance computing" — Jul. 2015
   LIGO monthly coatings teleconference

9. "Nearly extremal apparent horizons in simulations of merging black holes" — Jun. 2015
   International Conference on Black Holes, Fields Institute, Toronto, Ontario

10. "Nearly extremal apparent horizons in simulations of merging black holes" — Apr. 2015
    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 nearly extremal black holes" — Sep. 2013
    2013 Numerical Relativity and Data Analysis Meeting, Mallorca, Spain

13. "Nearly extremal black-hole spin in numerical simulations of compact binaries" — Jul. 2013
    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 — *flipped classroom redesign* — Spring 2016
ASTR 444: Applications of Gravitation — *new course pilot*
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 — *flipped classroom redesign* — 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 — Jun. 2016
"Relativity and Gravitation: Contemporary Research and
Teaching of Einstein's Physics"
Salve Regina University, Newport, Rhode Island

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

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

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, IOP publishing — Mar. 2008 – present

Department, College, and University Committee Service

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 – present

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

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 — Feb. 2016
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, — May 2017
$2,500, annual award given by the California State University, Fullerton College of Natural Sciences and Mathematics

Titan on the Rise: Early Career Investigator Award — May 2017
$750, award given by the California State University, Fullerton Office of Research Development

Special Breakthrough Prize in Fundamental Physics co-recipient — May 2016
$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."

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

Selected Student Awards

Nicholas Demos and Alyssa Garcia — April 2017
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

Haroon Khan — April 2017
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

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 — 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. 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 Szilagyi, 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" 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 Computational Relativity and Gravitation Seminar, Rochester Institute of Technology, Rochester, New York

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 in the era of gravitational-wave astronomy" Nov. 2017
   Cal Poly Pomona Physics and Astronomy Seminar
   Pomona, California

8. "Using supercomputers to simulate merging black holes in the era of gravitational-wave astronomy" Apr. 2017
   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 gravitational-wave astronomy" Mar. 2017
    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 gravitational-wave astronomy" Feb. 2017
    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 gravitational-wave astronomy" Apr. 2014
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 nearly extremal black holes" Sep. 2012
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 spins: gravitational waveforms and horizon dynamics" Sep. 2011
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 nearly extremal spins" Nov. 2009
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, Californi*a

46. "Improving binary-black-hole initial data" Nov. 2007
General Relativity and Astrophysics Seminar, University of Illinois
at Urbana-Champaign, Urbana, Illinois