Collin D. Capano

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Director, Syracuse University Open Source Program Office
Research Associate Professor
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Research Interests

- Gravitational-wave astronomy
- Multimessenger astrophysics
- Compact-object mergers
- Testing general relativity
- Equation of state of dense nuclear matter
- Statistical methods in astronomy

Education

Ph.D. Physics, Syracuse University — 2006–2011
Advisor: Duncan Brown

B.S. Physics, Cum Laude with Honors — 2001–2005
Syracuse University

Employment / Appointments

Director of Open Source Program Office, Syracuse University	2023–
Research Associate Professor, Syracuse University	2023–
Adjunct Assistant Professor, UMass Dartmouth	2023–
High Performance Computing Facilitator, UMass Dartmouth	2022–2023
Affiliate Faculty, UMass Dartmouth	2022–2023
Visiting Adjunct Professor, UMass Dartmouth	2021–2022
Postdoc/Senior Scientist, Max Planck Institute for Gravitational Physics	2014–2022
Research Associate, University of Maryland	2011–2014
Research Assistant, Syracuse University	2008–2011
Teaching Assistant, Syracuse University	2006–2008

Research Grants

PI: *Syracuse University Open Source Program Office (OSPO) Renewal* — 2025–2027
Sloan Foundation G-2025-79206
$719,330

Co-I: *A Bayesian Framework for Neutron Star Merger Observations using Fermi-GBM data* — 2026–2027
NASA Fermi Guest Investigator Program Cycle 18
$79,978

PI: *Development of Efficient Black Hole Spectroscopy and a Desktop Cluster for Detecting Compact Binary Mergers* — 2023–2027
National Science Foundation Award PHY-2412341
$156,570

Co-PI: *Collaborative Research: CDS&E: Data-Driven Discovery of Neural ODE Dynamics, Astrophysical Models, and Orbits (Neural ODE DynAMO)* — 2024–2027
National Science Foundation Award AST-2407454
$189,022

Co-PI: *Development and Implementation of Robust and Scalable Numerical Algorithms* — 2022
Defense University Research Instrumentation Program (DURIP)
$600,000

Research Experience

Research Associate Professor, Syracuse University 2023–

- Developed the first fully marginalized quasi-normal mode analysis of a black hole [10]. Used this to show that an overtone was not detectable in GW150914 due to timing uncertainty, contrary to prior claims [11].
- Discovered first strong evidence for a sub-dominant quasi-normal mode from a perturbed black hole [16]. Study was featured on the front page of Nature News Dec. 1–3, 2023 ["Gravitational waves from giant black-hole collision reveal long-sought 'ringing' "].
- Conceived and lead development of Preprint Bot, an AI-based utility to monitor pre-print servers for papers relevant to users' research interests. [`https://preprint-bot.syr.edu`]

HPC Facilitator / Affiliate Faculty, UMass Dartmouth 2022–2023

- Showed that Apple Silicon processors can obtain impressive performance for scientific applications as compared to Nvidia GPUs [18]. Study received coverage in New Scientist ["A stack of Apple laptops could work as a powerful supercomputer," 16 Nov. 2022].
- Validated statistical significance of sub-dominant quasi-normal mode detection in a perturbed black hole [12].

Postdoc/Senior Scientist, MPI for Gravitational Physics Hannover 2014–2022

- Showed that GW190521 may be the first detection of an intermediate mass ratio inspiral [25].
- Placed sub-atomic constraints on deviations from the Kerr geometry using the black hole formed by GW150914 [22].
- Constrained long-range "hair" on the component black holes of GW190814 and GW190412 [27].
- Combined state-of-the-art nuclear physics with multimessenger observations of GW170817 to place the tightest constraint at the time on neutron-star radii [31]. Study received coverage in the worldwide press, including Sky & Telescope magazine, Universe Today, the Bad Astronomy blog, Gizmodo, Business Insider, TechNews (Taiwan), Delo (Slovenia), AstroNews.ru (Russia), Futura Sciences (France), Global Science (Italy), and Asian News International (India). Also featured in Max Planck Research magazine.
- Placed tight constraints on the Kerr nature of black holes by looking for post-merger gravitational-wave echoes [34].
- Developed a test of Hawking's area theorem using gravitational waves [39].
- Lead developer of PyCBC Inference, a Python-based utility for gravitational-wave parameter estimation [37].
- Lead author of *GW150914: First results from the search for binary black hole coalescence with Advanced LIGO*, which detailed the templated search that detected GW150914 [47].
- Led effort to incorporate spin into the templated search used in Advanced LIGO [42], and to increase the mass upper limit of the search. This was key in the detection of GW150914, as the event was outside the bounds of the search originally used in initial LIGO.

Research Associate, University of Maryland (advisor: Alessandra Buonanno) 2011–2014

- Co-led LIGO's binary black hole working group in preparation for Advanced LIGO.
- Determined when sub-dominant modes are needed in searches for binary black holes with Advanced LIGO [45].
- Investigated overlap between analytic and numerical relativity waveform models of binary black hole mergers [58].
- Lead author on a LIGO publication presenting results from the search for low-mass compact binaries during initial LIGO's last science run [48].

Research Assistant, Syracuse University (advisor: Duncan Brown) 2008–2011

- Led search for gravitational waves from low-mass compact binaries ($M \leq 25\,M_{\odot}$) in initial LIGO's last science run.
- Developed the post-processing pipeline used to estimate the significance of candidate events in initial LIGO's fifth and sixth science runs.

Advising and Mentoring Experience

Syracuse University

- Postdocs:
  - Will Gearty 2024–2027
- Ph.D. students (advisor):
  - Alex Correia (Physics) 2023–
    Project: Black hole spectroscopy in current and future detectors
- Master's students (internship mentor):
  - Aryan Apte (Applied Data Science) 2024–2026
    Project: Syracuse University Research Chat Bot
  - Udayan Gaikwad (Data Science) 2025–2026
    Project: Preprint Bot
  - Siddhi Shitole (Computer and Information Science) 2025
    Project: Preprint Bot and Tariff Documents Digitization
  - Ramya Patchala (Applied Data Science) 2024–2025
    Project: Syracuse University Research Chat Bot & Tariff Documents Digitization
  - Kamaljit Aulakh (Computer Science) 2024–2025
    Project: Syracuse University Data Storage Finder
- Undergraduates (internship mentor):
  - David Pascual (Computer Science & Mathematics) 2025–2026
    Project: An Apple Silicon cluster for gravitational-wave astronomy
  - Adil Oryspayev (Computer Science & Mathematics) 2025–2026
    Project: Preprint Bot
  - Alisha Hassan (Engineering & Computer Science) 2024–2025
    Project: An Apple Silicon cluster for gravitational-wave astronomy

UMass Dartmouth

- Master's students (advisor):
  - Nereesh Kumar 2023
    Project: Benchmarking Apple Silicon processors for gravitational-wave astronomy
  - Alex Correia 2022–2023
    Project: Sky and time marginalization in black hole spectroscopy
- Undergraduates (internship mentor):
  - Rajrupa Mondal 2022–2023
    Project: Constraining the Kerr nature of astrophysical black holes

MPI for Gravitational Physics Hannover

- Ph.D. students (mentor):
  - Julian Westerweck 2017–2022
    Ph.D. June 2022
    Thesis: *Observational tests of fundamental physics from gravitational wave detections*
  - Miriam Cabero 2016–2018
    Ph.D. Feb. 2018
    Thesis: *Gravitational-wave astronomy with compact binary coalescences: from blip glitches to the black hole area increase law*
- Undergraduates:
  - Sarah Kate Sweeney, summer research intern 2021
    Project: Constraints on the neutron-star equation of state using binaries with unknown sky location
  - Richard Stiskalek, summer research intern 2020
    Project: Building a transdimensional MCMC for gravitational-wave applications
  - Suman Kulkarni, summer research intern 2019
    Project: Testing the Gaussianity of LIGO noise
    Publication: arXiv:2011.13764 [24]
  - Stephan Mohr, Bachelor's thesis 2018–2019
    Co-mentored with Frank Ohme
    Thesis: Black hole spin measurements from gravitational wave data
  - Hannah Griggs, summer research intern 2017
    Project: Searching for the presence of third bodies near compact binary mergers

Teaching Experience

Courses taught:

IST 400/600: Open Source Software Development Practicum, Syracuse University — Fall 2026

IST 356: Programming Techniques for Data Analytics, Syracuse University — Spring 2026

IST 356: Programming Techniques for Data Analytics, Syracuse University — Fall 2025

DSC 520: High Performance Scientific Computing, UMass Dartmouth — Spring 2023

PHY 113: Classical Physics I, UMass Dartmouth — Fall 2022

Other:

Git & GitHub, Bash, and Conda; OSPO Workshop: Computing 101, R, and Python; Syracuse University — 2025

Bayesian Inference in Gravitational-wave Astronomy; NP3M Summer School; Indiana University — 2025

Git & GitHub; OSPO Workshop: Computing 101 and R; Syracuse University — 2025

Object-oriented programming in Python; OSPO Workshop: Advanced Python; Syracuse University — 2024

Introduction to Bash, Conda, and Git & GitHub; OSPO Workshop: Computing 101 and Python; Syracuse University — 2024

Physics of Gravitational-wave Emission and Detection; 57th Karpacz Winter School of Theoretical Physics; Karpacz, Poland — 2021

Bayesian inference & PyCBC; Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects; ICERM, Brown University (online) — 2020

Bayesian inference with PyCBC; PyCBC Inference Online Workshop — 2020

Gravitational-wave parameter estimation with PyCBC Inference; PyCBC Inference workshop; University of Portsmouth, UK — 2019

Volunteer mentor for physics seminar; University of Maryland — 2013

Teaching assistant; Syracuse University — 2006–2008

Professional development:

2022 New Faculty Workshop — July 2022
- Learned active teaching pedagogies at a workshop organized by the American Association of Physics Teachers

Conference & Workshop Organization

OSPO Workshop: Computing 101, R, and Python — August 2025
(Organizer)
Syracuse University

OSPO Workshop: Computing 101 and R — January 2025
(Organizer)
Syracuse University

OSPO Workshop: Advanced Python — December 2024
(Organizer)
Syracuse University

OSPO Workshop: Computing 101 and Python — August 2024
(Organizer)
Syracuse University

PyCBC Inference Online Workshop 2020 — June 2020
(Co-organizer)
Online
Attended by over 50 scientists from the US, Europe, India, and China

Gravitational waves and parameter estimation in the era of detections — Jan. 2020
(Co-organizer)
Tagungsstätte Schloss Ringberg, Germany

Gravitational-wave parameter estimation with PyCBC Inference workshop — May 2019
(Science organizer)
University of Portsmouth, UK
Attended by over 30 scientists from the UK, US, and Europe.

Academic Service

Panel reviewer for the National Science Foundation	2025
Referee for Physical Review Letters	2023–
Member of the Cosmic Explorer Consortium	2020–
Core member of the LISA Consortium	2020–
Referee for ApJ, MNRAS, CQG Letters	2020–
Referee for Classical and Quantum Gravity	2017–
Colloquium speakers coordinator, Albert Einstein Institute	2019–2021
Member of the Albert Einstein Institute's IT committee	2016–2021
Member of the LIGO Scientific Collaboration (LSC)	2008–2018
Presentations reviewer for the LSC Publications & Presentations committee	2016–2018
Waveform reviewer for the LSC	2014–2017
Co-chair of the stellar-mass binary black hole group within the LSC	2012–2016
Referee for General Relativity and Gravitation	2015

Awards & Honors

Max-Planck-Gesellschaft performance bonus ("AT-Zulage")	2020
Gruber Cosmology Prize (one of ∼1,000 awardees from the LIGO Discovery Team)	2016

Special Breakthrough Prize (one of ∼1,000 awardees from the LIGO Contributors)	2016
Martin Luther King Jr. Unsung Hero Award	2009

Invited Talks

How can institutional RSE hubs and OSPOs work together for the betterment of research outputs? (Panelist) USRSE'26 San Jose, CA	October 2026
Probing cosmic expansion at high redshifts with neutron-star–black-hole dark sirens in Cosmic Explorer Los Alamos National Laboratory Los Alamos, NM	July 2026
OSPO Case Studies: the Syracuse University OSPO CURIOSS Gathering Dublin Dublin, Ireland	Feb. 2026
PyCBC Inference tutorial; standard IMR, ringdown, & hierarchical PE GWPAW Georgia Tech Atlanta, GA	Dec. 2025
The Open-Source Project Office at SU Research Computing Series Lecture Syracuse University Syracuse, NY	April 2024
High Performance Computing in Gravitational-wave Astronomy HPC Day 2023 UMass Dartmouth Dartmouth, MA	Nov. 2023
Observational evidence for quasi-normal modes from astrophysical black holes Gravitational Waves meet Amplitudes in the Southern Hemisphere ICTP-SAIFR São Paulo, Brazil	Aug. 2023
Joint Bayesian inference of gravitational-wave & NICER data Neutron Stars as Multi-Messenger Laboratories for Dense Matter ECT* Trento, Italy	June 2022
Observational evidence for quasi-normal modes from astrophysical black holes At the Interface of Mathematical Relativity and Astrophysics Banff International Research Station Banff, Canada	April 2022
What have the data told us? Black hole workshop Center for Computational Astrophysics Flatiron Institute New York, NY	Feb. 2022
Probing fundamental physics with gravitational waves The University of Texas Rio Grande Valley Online	Feb. 2021

How to do astronomy with gravitational waves — Feb. 2021
The Cooper Union for the Advancement of Science and Art
New York, NY
Online

Probing fundamental physics with gravitational waves — Feb. 2021
Center for Computational Astrophysics
Flatiron Institute
New York, NY
Online

How to estimate parameters and test GR with PyCBC (tutorial) — Nov. 2020
Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects
ICERM, Providence, RI
Online

Understanding the heaviest gravitational-wave observation: Could GW190521 be an intermediate mass ratio inspiral? — Nov. 2020
Perimeter Institute
Waterloo, ON
Online

Understanding the heaviest gravitational-wave observation: Could GW190521 be an intermediate mass ratio inspiral? — Nov. 2020
Albert Einstein Institute Colloquium
Hannover & Potsdam, Germany
Online

Panelist, From heavy-ion collision to neutron stars — Aug. 2020
Online workshop
Hosted by the University of Illinois Urbana-Champaign

Probing fundamental physics with gravitational waves — April 2020
SUNY Albany, Albany, NY
via Zoom

Probing fundamental physics with gravitational waves — April 2020
Union College, Schenectady, NY
via Zoom

Measuring the neutron-star equation of state from multimessenger observations — April 2020
APS April Meeting 2020
Online

Testing GR with gravitational waves: current status and future prospects — March 2020
DPG Spring Meeting
Bonn, Germany
Cancelled due to the COVID-19 pandemic

The equation of state of dense nuclear matter from multimessenger observations of binary neutron stars — Feb. 2020
Universidade de Santiago de Compostela
Santiago de Compostela, Spain

Constraining the equation of state of dense nuclear matter from multimessenger observations of binary neutron stars — Nov. 2019
University of Washington, Seattle

GW170817: Stringent constraints on neutron-star radii from multimessenger observations — Oct. 2019
The first compact star merger event – Implications for nuclear and particle physics
ECT*
Trento, Italy

Current and future challenges in gravitational wave parameter estimation — Nov. 2018
Gravitational Wave Physics and Astronomy Workshop (GWPAW)
University of Maryland

Gravitational-wave astronomy with Python-based parameter estimation — May 2018
University of Birmingham, Birmingham, England

Search challenges in third generation detectors — Aug. 2017
Physics and Astrophysics at the eXtreme (PAX)
Amsterdam, Netherlands

Applications of Python-based parameter estimation of gravitational waves — June 2017
Cardiff University, Cardiff, Wales

The detection and analysis of the first gravitational-wave observations — Feb. 2017
Montclair State University, Montclair, NJ

Detecting & interpreting GW150914 with unmodeled & modeled searches — May 2016
The first detection of a binary black hole merger: Status and future prospects
Hannover, Germany

Prospects for the first detections — May 2015
Black holes and gravitational waves workshop
Cardiff University, Cardiff, Wales

Searching for gravitational waves: Detection challenges and prospects for the advanced detector era — Jan. 2014
Rochester Institute of Technology, Rochester, NY

Refereed Publications

[1] B. T. Reed, C. L. Armstrong, R. Somasundaram, **C. D. Capano**, S. De, and I. Tews, "Direct inference of nuclear equation-of-state parameters from gravitational-wave observations," Class. Quant. Grav. **43**, 055015 (2026), arXiv:2506.15984 [astro-ph.HE].

[2] J. Banks, J. Stromer-Galley, S. Singh, and **C. Capano**, "DiSCoKit: An open-source toolkit for deploying live LLM experiences in survey research," PLOS ONE **21**, 1–10 (2026).

[3] A. Akyüz, A. Correia, J. Garofalo, K. Kacanja, L. Roy, K. Soni, H. Tan, V. J. Y, A. H. Nitz, and **C. D. Capano**, "Potential science with GW250114 – the loudest binary black hole merger detected to date," (2025), arXiv:2507.08789 [gr-qc].

[4] A. Akyüz, A. Correia, J. Garofalo, K. Kacanja, V. J. Y, L. Roy, K. Soni, H. Tan, **C. D. Capano**, and A. H. Nitz, "Mining the Alerts: A Preliminary Catalog of Compact Binaries from the Fourth Observing Run," (2025), arXiv:2507.08778 [astro-ph.HE].

[5] R. Mondal, J. Westerweck, Y. Sherf, and **C. D. Capano**, "Hierarchical constraints on gravitational waves from horizonless compact objects," (2025), arXiv:2506.17215 [gr-qc].

[6] S. Wu, A. H. Nitz, I. Harry, S. Babak, M. J. Williams, **C. D. Capano**, and C. Weaving, "Multiband parameter estimation with phase coherence and extrinsic marginalization: Extracting more information from low-SNR CBC signals in LISA data," (2025), arXiv:2506.01898 [gr-qc].

[7] M. Lopez, G. Caneva Santoro, A. Martins, S. Schmidt, J. Schoppink, W. van Straalen, **C. D. Capano**, and S. Caudill, "Ameliorating transient noise bursts in gravitational-wave searches for intermediate-mass black holes," Phys. Rev. D **111**, 103020 (2025), arXiv:2412.17169 [astro-ph.IM].

[8] Y.-F. Wang, **C. D. Capano**, J. Abedi, S. Kastha, B. Krishnan, A. B. Nielsen, A. H. Nitz, and J. Westerweck, "Gating-and-inpainting perspective on GW150914 ringdown overtone: Understanding the data analysis systematics," Phys. Rev. D **112**, 083023 (2025), arXiv:2310.19645 [gr-qc].

[9] B. T. Reed, R. Somasundaram, S. De, C. L. Armstrong, P. Giuliani, **C. D. Capano**, D. A. Brown, and I. Tews, "Toward Accelerated Nuclear-physics Parameter Estimation from Binary Neutron Star Mergers: Emulators for the Tolman–Oppenheimer–Volkoff Equations," Astrophys. J. **974**, 285 (2024), arXiv:2405.20558 [astro-ph.HE].

[10] A. Correia and **C. D. Capano**, "Sky marginalization in black hole spectroscopy and tests of the area theorem," Phys. Rev. D **110**, 044018 (2024), arXiv:2312.15146 [gr-qc].

[11] A. Correia, Y.-F. Wang, J. Westerweck, and **C. D. Capano**, "Low evidence for ringdown overtone in GW150914 when marginalizing over time and sky location uncertainty," Phys. Rev. D **110**, L041501 (2024), arXiv:2312.14118 [gr-qc].

[12] **C. D. Capano**, J. Abedi, S. Kastha, A. H. Nitz, J. Westerweck, Y.-F. Wang, M. Cabero, A. B. Nielsen, and B. Krishnan, "Estimating false alarm rates of sub-dominant quasi-normal modes in GW190521," Class. Quant. Grav. **41**, 245009 (2024), arXiv:2209.00640 [gr-qc].

[13] J. Abedi, **C. D. Capano**, S. Kastha, Y.-F. Wang, J. Westerweck, A. B. Nielsen, and B. Krishnan, "Spectroscopy for asymmetric binary black hole mergers," Phys. Rev. D **108**, 104009 (2023), arXiv:2309.03121 [gr-qc].

[14] C. Afle, P. R. Miles, S. Caino-Lores, **C. D. Capano**, I. Tews, K. Vahi, E. Deelman, M. Taufer, and D. A. Brown, "Reproducing the results for NICER observation of PSR J0030+0451," (2023), arXiv:2304.01035 [astro-ph.HE].

[15] A. H. Nitz, S. Kumar, Y.-F. Wang, S. Kastha, S. Wu, M. Schäfer, R. Dhurkunde, and **C. D. Capano**, "4-OGC: Catalog of Gravitational Waves from Compact Binary Mergers," Astrophys. J. **946**, 59 (2023), arXiv:2112.06878 [astro-ph.HE].

[16] **C. D. Capano**, M. Cabero, J. Westerweck, J. Abedi, S. Kastha, A. H. Nitz, A. B. Nielsen, and B. Krishnan, "Multimode quasinormal spectrum from a perturbed black hole," Phys. Rev. Lett. **131**, 221402 (2023), arXiv:2105.05238 [gr-qc].

[17] A. A. Shoom, P. K. Gupta, B. Krishnan, A. B. Nielsen, and **C. D. Capano**, "Testing the post-Newtonian expansion with GW170817," Gen. Rel. Grav. **55**, 55 (2023), arXiv:2105.02191 [gr-qc].

[18] C. Kenyon and **C. D. Capano**, "Apple Silicon Performance in Scientific Computing," 2022 IEEE HPEC (2022), arXiv:2211.00720 [cs.DC].

[19] Y.-F. Wang, A. H. Nitz, **C. D. Capano**, X. I. Wang, Y.-H. Yang, and B.-B. Zhang, "Search for Coincident Gravitational Waves and Long Gamma-Ray Bursts from 4-OGC and the Fermi-GBM/Swift-BAT Catalog," Astrophys. J. Lett. **939**, L14 (2022), arXiv:2208.03279 [astro-ph.HE].

[20] S. Kastha, **C. D. Capano**, J. Westerweck, M. Cabero, B. Krishnan, and A. B. Nielsen, "Model systematics in time domain tests of binary black hole evolution," Phys. Rev. D **105**, 064042 (2022), arXiv:2111.13664 [gr-qc].

[21] S. M. Brown, **C. D. Capano**, and B. Krishnan, "Using gravitational waves to distinguish between neutron stars and black holes in compact binary mergers," Astrophys. J. **941**, 98 (2022), arXiv:2105.03485 [gr-qc].

[22] J. Westerweck, Y. Sherf, **C. D. Capano**, and R. Brustein, "Sub-atomic constraints on the Kerr geometry of GW150914," (2021), arXiv:2108.08823 [gr-qc].

[23] A. H. Nitz, **C. D. Capano**, S. Kumar, Y.-F. Wang, S. Kastha, M. Schäfer, R. Dhurkunde, and M. Cabero, "3-OGC: Catalog of Gravitational Waves from Compact-binary Mergers," Astrophys. J. **922**, 76 (2021), arXiv:2105.09151 [astro-ph.HE].

[24] S. Kulkarni and **C. D. Capano**, "Reliability of parameter estimates in the first observing run of Advanced LIGO," Phys. Rev. D **103**, 104002 (2021), arXiv:2011.13764 [gr-qc].

[25] A. H. Nitz and **C. D. Capano**, "GW190521 may be an intermediate mass ratio inspiral," Astrophys. J. Lett. **907**, L9 (2021), arXiv:2010.12558 [astro-ph.HE].

[26] D. S. Deighan, S. E. Field, **C. D. Capano**, and G. Khanna, "Genetic-algorithm-optimized neural networks for gravitational wave classification," Neural Computing and Applications **33**, 13859–13883 (2021), arXiv:2010.04340 [gr-qc].

[27] **C. D. Capano** and A. H. Nitz, "Binary black hole spectroscopy: a no-hair test of GW190814 and GW190412," Phys. Rev. D **102**, 124070 (2020), arXiv:2008.02248 [gr-qc].

[28] M. Cabero, J. Westerweck, **C. D. Capano**, S. Kumar, A. B. Nielsen, and B. Krishnan, "Black hole spectroscopy in the next decade," Phys. Rev. D **101**, 064044 (2020), arXiv:1911.01361 [gr-qc].

[29] S. Bhagwat, M. Cabero, **C. D. Capano**, B. Krishnan, and D. A. Brown, "Detectability of the subdominant mode in a binary black hole ringdown," Phys. Rev. D **102**, 024023 (2020), arXiv:1910.13203 [gr-qc].

[30] A. H. Nitz, T. Dent, G. S. Davies, S. Kumar, **C. D. Capano**, I. Harry, S. Mozzon, L. Nuttall, A. Lundgren, and M. Tápai, "2-OGC: Open Gravitational-wave Catalog of binary mergers from analysis of public Advanced LIGO and Virgo data," Astrophys. J. **891**, 123 (2020), arXiv:1910.05331 [astro-ph.HE].

[31] **C. D. Capano**, I. Tews, S. M. Brown, B. Margalit, S. De, S. Kumar, D. A. Brown, B. Krishnan, and S. Reddy, "Stringent constraints on neutron-star radii from multimessenger observations and nuclear theory," Nature Astron. **4**, 625–632 (2020), arXiv:1908.10352 [astro-ph.HE].

[32] A. H. Nitz, A. B. Nielsen, and **C. D. Capano**, "Potential Gravitational-wave and Gamma-ray Multi-messenger Candidate from 2015 October 30," Astrophys. J. Lett. **876**, L4 (2019), arXiv:1902.09496 [astro-ph.HE].

[33] S. De, C. M. Biwer, **C. D. Capano**, A. H. Nitz, and D. A. Brown, "Posterior samples of the parameters of binary black holes from Advanced LIGO, Virgo's second observing run," Sci. Data **6**, 81 (2019), arXiv:1811.09232 [gr-qc].

[34] A. B. Nielsen, **C. D. Capano**, O. Birnholtz, and J. Westerweck, "Parameter estimation and statistical significance of echoes following black hole signals in the first Advanced LIGO observing run," Phys. Rev. D **99**, 104012 (2019), arXiv:1811.04904 [gr-qc].

[35] A. B. Nielsen, A. H. Nitz, **C. D. Capano**, and D. A. Brown, "Investigating the noise residuals around the gravitational wave event GW150914," JCAP **02**, 019 (2019), arXiv:1811.04071 [astro-ph.HE].

[36] A. H. Nitz, **C. Capano**, A. B. Nielsen, S. Reyes, R. White, D. A. Brown, and B. Krishnan, "1-OGC: The first open gravitational-wave catalog of binary mergers from analysis of public Advanced LIGO data," Astrophys. J. **872**, 195 (2019), arXiv:1811.01921 [gr-qc].

[37] C. M. Biwer, **C. D. Capano**, S. De, M. Cabero, D. A. Brown, A. H. Nitz, and V. Raymond, "PyCBC Inference: A Python-based parameter estimation toolkit for compact binary coalescence signals," Publications of the Astronomical Society of the Pacific **131**, 024503 (2019), arXiv:1807.10312 [astro-ph.IM].

[38] J. Westerweck, A. Nielsen, O. Fischer-Birnholtz, M. Cabero, **C. Capano**, T. Dent, B. Krishnan, G. Meadors, and A. H. Nitz, "Low significance of evidence for black hole echoes in gravitational wave data," Phys. Rev. D **97**, 124037 (2018), arXiv:1712.09966 [gr-qc].

[39] M. Cabero, **C. D. Capano**, O. Fischer-Birnholtz, B. Krishnan, A. B. Nielsen, A. H. Nitz, and C. M. Biwer, "Observational tests of the black hole area increase law," Phys. Rev. D **97**, 124069 (2018), arXiv:1711.09073 [gr-qc].

[40] **C. Capano**, T. Dent, C. Hanna, M. Hendry, Y.-M. Hu, C. Messenger, and J. Veitch, "Systematic errors in estimation of gravitational-wave candidate significance," Phys. Rev. D **96**, 082002 (2017), arXiv:1708.06710 [astro-ph.IM].

[41] M. Cabero, A. B. Nielsen, A. P. Lundgren, and **C. D. Capano**, "Minimum energy and the end of the inspiral in the post-Newtonian approximation," Phys. Rev. D **95**, 064016 (2017), arXiv:1602.03134 [gr-qc].

[42] **C. Capano**, I. Harry, S. Privitera, and A. Buonanno, "Implementing a search for gravitational waves from binary black holes with nonprecessing spin," Phys. Rev. D **93**, 124007 (2016), arXiv:1602.03509 [gr-qc].

[43] S. A. Usman, A. H. Nitz, I. W. Harry, C. M. Biwer, D. A. Brown, M. Cabero, **C. D. Capano**, et al., "The PyCBC search for gravitational waves from compact binary coalescence," Class. Quant. Grav. **33**, 215004 (2016), arXiv:1508.02357 [gr-qc].

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LIGO Scientific Collaboration Publications

As a member of the LIGO Scientific Collaboration (LSC), I was a co-author on every paper the collaboration published between 2009 and 2018. The following are LSC papers in which I was the lead author/editor.

[47] B. P. Abbott et al. (LIGO Scientific, Virgo), "GW150914: First results from the search for binary black hole coalescence with Advanced LIGO," Phys. Rev. D **93**, 122003 (2016), arXiv:1602.03839 [gr-qc], ***Lead author***.

[48] J. Abadie et al. (LIGO Scientific, Virgo), "Search for Gravitational Waves from Low Mass Compact Binary Coalescence in LIGO's Sixth Science Run and Virgo's Science Runs 2 and 3," Phys. Rev. D **85**, 082002 (2012), arXiv:1111.7314 [gr-qc], ***Lead author***.

The following are additional LSC papers to which I made a significant contribution.

[49] B. P. Abbott et al. (LIGO Scientific, Virgo), "Tests of General Relativity with the Binary Black Hole Signals from the LIGO-Virgo Catalog GWTC-1," Phys. Rev. D **100**, 104036 (2019), arXiv:1903.04467 [gr-qc].

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