

Carl Rodriguez | Curriculum Vitae

Department of Physics and Astronomy – University of North Carolina, Chapel Hill

✉ carl.rodriguez@unc.edu • 🌐 dynamics.unc.edu

Education and Employment

University of North Carolina

Chapel Hill, NC

Assistant Professor of Physics and Astronomy

Adjunct Professor of Computer Science

Faculty

2023-Present

Carnegie Mellon University

Pittsburgh, PA

Assistant Professor of Physics (2020-2022)

Adjunct Professor of Physics (2023)

Faculty

2020-Present

Harvard University

Cambridge, MA

Institute for Theory and Computation (ITC) Postdoctoral Fellow

Postdoc

2019-2020

Massachusetts Institute of Technology

Cambridge, MA

Pappalardo Postdoctoral Fellow

Postdoc

2016-2019

Northwestern University

Evanston, IL

Ph.D. Physics

2010-2016

Reed College

Portland, OR

B.A. Physics

2006-2010

Honors, Awards, and Fellowships

- AAS Helen B. Warner Prize for Astronomy 2024
- AAS Vera Rubin Early Career Award 2023
- Packard Fellowship for Science and Engineering 2022-2027
- Sloan Research Fellowship 2022-2024
- Kaufman Foundation New Investigator Award 2020-2022
- ITC Fellowship, Harvard University 2019-2020
- MIT Pappalardo Fellowship 2016-2019
- NSF Graduate Research Fellowship 2011-2016
- NSF GK12 Fellowship 2013-2014
- Illinois Space Grant Consortium Fellowship 2010-2011, 2015-2016
- NSF S-STEM Scholar 2008-2010

Grants

As of December 2023:

- \$2.6M Total Funding (\$2.1M to UNC/CMU)

A new theoretical framework for globular cluster science with the Roman Wide-Field Imager

PI: R. Sanderson, co-I: T. Starkenburg, C. L. Rodriguez; Nancy Grace Roman Space Telescope Research and Support Participation Opportunities (\$326K; \$63K to UNC)

NASA

2023

Packard Fellowship for Science and Engineering

PI: C. L. Rodriguez; David and Lucile Packard Foundation (\$875K)

Foundation

2023

Sloan Research Fellowship <i>PI: C. L. Rodriguez</i> ; Alfred P. Sloan Foundation (\$75K)	Foundation 2022
Stellar Dynamics and Stellar Collisions in Star-by-Star Models of Nuclear Star Clusters <i>PI: C. L. Rodriguez, co-I: H. Trac, F. Rasio, G. Fragione</i> ; NASA Astrophysical Theory Award 80NSSC22K0722 (\$746K; \$429K to UNC/CMU)	NASA 2021
The Lives and Deaths of Star Clusters, and the Gravitational Waves They Leave Behind <i>PI: C. L. Rodriguez</i> ; Kaufman Foundation New Investigator Grant (\$150K)	Foundation 2020
WoU-MMA: The Evolution, Destruction, and Gravitational-wave Sources of Dense Star Clusters in Cosmological Simulations <i>PI: C. L. Rodriguez</i> ; NSF Award AST-2009916 (\$434K)	NSF 2020
Astrophysics and Cyberinfrastructure Initiatives for Decihertz Gravitational-Wave Missions <i>PI: A. Miguel Holgado, co-I: C. L. Rodriguez</i> ; McWilliams Seed Grant (\$10K)	CMU Grant 2020
Modeling Dense Star Clusters and their Gravitational-wave Sources from Cosmological Simulations <i>PI: C. L. Rodriguez, Co-I: Astrid Lamberts, Mike Grudić</i> ; 1.1M CPU Hours (\$20K Value)	XSEDE 2018

Publications (with links)

A complete list of publications can also be found at the NASA ADS service [here](#) or on Google Scholar (which includes LIGO Collaboration Papers) [here](#).

Publication Metrics (via ADS)

As of March 2024:

- All Publications (excluding LIGO collaboration papers) – **6873 citations, h-index of 44**
- Major Contributor/PI Publications – **4211 citations**

5 Most Cited Papers As Major Contributor (By Publication Year)

Black Holes: The Next Generation – Repeated Mergers in Dense Star Clusters and their Gravitational-Wave Properties [243 Citations] <i>C. L. Rodriguez, M. Zevin, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. Rasio, S. Ye</i> ; Phys. Rev. D, 100 , 043027	PRD 2019
Post-Newtonian Dynamics in Dense Star Clusters: Highly-Eccentric, Highly-Spinning, and Repeated Binary Black Hole Mergers [264 Citations] <i>C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, F. Rasio</i> ; Phys. Rev. Lett, 120 , 151101 - Articles in <i>Boston Globe</i> , <i>MIT News</i> (Links), - Prediction Referenced in <i>The Atlantic</i> (link)	PRL 2018
Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO [264 Citations] <i>C. L. Rodriguez, M. Zevin, C. Pankow, V. Kalogera, F. Rasio</i> ; Astrophys. J. Lett., 832 , L2	ApJL 2016
Binary Black Hole Mergers from Globular Clusters: Masses, Merger Rates, and the Impact of Stellar Evolution [478 Citations] <i>C. L. Rodriguez, S. Chatterjee, F. Rasio</i> ; Phys. Rev. D, 93 , 084029	PRD 2016
Binary Black Hole Mergers from Globular Clusters: Implications for Advanced LIGO [338 Citations] <i>C. L. Rodriguez, M. Morscher, B. Pattabiraman, S. Chatterjee, C.J. Haster, and F. Rasio</i> ; Phys. Rev. Lett. 115 , 051101 - Synopsis by APS in <i>Physics</i> (Link)	PRL 2015

Papers as Major Contributor or Primary Advisor.....

- From Young Massive Clusters to Old Globular Clusters: Density Profile Evolution and IMBH Formation** 2024
K. Sharma, C. L. Rodriguez; *Astrophys. J.* (submitted)
- Young Star Clusters Dominate the Production of Detached Black Hole-Star Binaries** ApJ 2024
U. N. Di Carlo, P. Agrawal, C. L. Rodriguez, K. Breivik; *Astrophys. J.*, **965**, 22
- Great Balls of FIRE III: Modeling Black Hole Mergers from Massive Star Clusters in Simulations of Galaxies** 2023
T. Bruel, C. L. Rodriguez, A. Lamberts, Grudić, Z. Hafen, R. Feldmann; *Astron. & Astrophys.* (submitted)
- Modelling stellar evolution in mass-transferring binaries and gravitational-wave progenitors with METISSE** MNRAS 2023
P. Agrawal, J. Hurley, S. Stevenson, C. L. Rodriguez, D. Szecsi, A. Kemp; *Mon. Not. R. Astron. Soc.*, **521**, 033
- Constraints on Cosmological Coupling of Black Holes from the Globular Cluster NGC 3201** ApJL 2023
C. L. Rodriguez; *Astrophys. J.*, **947**, L12
- Runaway and Hypervelocity Stars from Compact Object Encounters in Globular Clusters** ApJ 2023
T. Cabrera, C. L. Rodriguez; *Astrophys. J.*, **953**, 1
- Synopsis in *Universe Today* (Link)
- Great Balls of FIRE II: The evolution and destruction of star clusters across cosmic time in a Milky Way-mass galaxy** MNRAS 2023
C. L. Rodriguez, Z. Hafen, Grudić, A. Lamberts, K. Sharma, C.A. Faucher-Giguère, A. Wetzel; *Mon. Not. R. Astron. Soc.*, **521**, 2
- Great Balls of FIRE I: The formation of star clusters across cosmic time in a Milky Way-mass galaxy** MNRAS 2023
M. Grudić, Z. Hafen, C. L. Rodriguez, D. Guszejnov, A. Lamberts, A. Wetzel, M. Boylan-Kolchin, C.A. Faucher-Giguère; *Mon. Not. R. Astron. Soc.*, **519**, 1
- Modeling Dense Star Clusters in the Milky Way and Beyond with the Cluster Monte Carlo Code** ApJS 2022
C. L. Rodriguez, N. Weatherford, S. Coughlin, P. Amaro-Seoane, K. Breivik, S. Chatterjee, G. Fragione, F. Kiroğlu, K. Kremer, N. Rui, S. Ye, M. Zevin, F. Rasio; *Astrophys. J. Supp.* **258**, 22
- On the Mass Ratio Distribution of Black Hole Mergers in Triple Systems** ApJ 2022
M. Martinez, C. L. Rodriguez, G. Fragione; *Astrophys. J.*, **937**, 2
- Compact Object Modeling in the Globular Cluster 47 Tucanae** ApJ 2022
S. Ye, K. Kremer, C. L. Rodriguez, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, F. Rasio; *Astrophys. J.*, **931**, 2, 84
- The Observed Rate of Binary Black Hole Mergers can be Entirely Explained by Globular Clusters** RNAAS 2021
C. L. Rodriguez, K. Kremer, S. Chatterjee, G. Fragione, A. Loeb, F. Rasio, N. Weatherford, S. Ye; *Research Notes AAS*, **5**, 19
- Referenced in *The Atlantic* (Link)
- Fast Multipole Methods for Simulating Collisional Star Systems** ApJ 2021
D. Mukherjee, Q. Zhu, H. Trac, C. L. Rodriguez; *Astrophys. J.*, **916**, 9
- Dynamical Formation Scenarios for GW190521 and Prospects for Decihertz Gravitational-Wave Astronomy with GW190521-Like Binaries** ApJL 2021
A. M. Holgado, A. Ortega, C. L. Rodriguez; *Astrophys. J. Lett.*, **909**, L24
- Relativistic Three-body Effects in Hierarchical Triples** PRD 2020
H. Lim, C. L. Rodriguez; *Phys. Rev. D* **102**, 064033

GW190412 as a Third-Generation Black Hole Merger from a Super Star Cluster <i>C. L. Rodriguez, K. Kremer, M. Grudić, Z. Hafen, S. Chatterjee, G. Fragione, A. Lamberts, M. Martinez, F. Rasio, N. Weatherford, S. Ye</i> ; <i>Astrophys. J. Lett.</i> , 896 , L10	ApJL 2020
Post-Newtonian Dynamics in Dense Star Clusters: Binary Black Holes in the LISA Band <i>K. Kremer, C. L. Rodriguez, P. Amaro-Seoane, K. Breivik, S. Chatterjee, M. Katz, S. Larson, F. Rasio, J. Samsing, S. Ye, M. Zevin</i> ; <i>Phys. Rev. D</i> , 99 , 063003	PRD 2019
Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters <i>M. Zevin, J. Samsing, C. L. Rodriguez, C. Haster, E. Ramirez-Ruiz</i> ; <i>Astrophys. J.</i> , 871 , 1	ApJ 2018
Post-Newtonian Dynamics in Dense Star Clusters: Formation, Masses, and Merger Rates of Highly-Eccentric Black Hole Mergers <i>C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. Rasio, J. Samsing, S. Ye, M. Zevin</i> ; <i>Phys. Rev. D</i> , 98 , 123005	PRD 2018
Redshift Evolution of the Black Hole Merger Rate From Globular Clusters <i>C. L. Rodriguez, A. Loeb</i> ; <i>Astrophys. J.</i> , 865 , L5	ApJL 2018
A Triple Origin for the Heavy and Low-Spin Binary Black Holes Detected by LIGO/Virgo <i>C. L. Rodriguez, F. Antonini</i> ; <i>Astrophys. J.</i> , 963 , 1, 7	ApJ 2018
Precessional Dynamics of Black Hole Triples: Binary Mergers with near-zero Effective Spin <i>F. Antonini, C. L. Rodriguez, C. Petrovich, C. Fischer</i> ; <i>Mon. Not. R. Astron. Soc. Lett.</i> , 480 , 1, L58	MNRASL 2018
A New Hybrid Technique for Modeling Dense Star Clusters <i>C. L. Rodriguez, B. Pattabiraman, S. Chatterjee, M. Morscher, F. Rasio, A. Choudhary, W-K. Liao</i> ; <i>Computational Astrophysics and Cosmology</i> , 5 , 1	CompAC 2018
Binary Black Holes in Dense Star Clusters: Exploring the Theoretical Uncertainties <i>S. Chatterjee, C. L. Rodriguez, F. Rasio</i> ; <i>Astrophys. J.</i> , 834 , 1, 68	ApJ 2017
Dynamical Formation of Low-mass Merging Black Hole Binaries like GW151226 <i>S. Chatterjee, C. L. Rodriguez, V. Kalogera, F. Rasio</i> ; <i>ApJL</i> , 836 , L26	ApJL 2017
Constraining Formation Models of Binary Black Hole Formation with Gravitational-Wave Observations <i>M. Zevin, C. Pankow, C. L. Rodriguez, L. Sampson, E. Chase, V. Kalogera, F. Rasio</i> ; <i>Astrophys. J.</i> , 846 , 82Z	ApJ 2017
Black Hole Mergers and Blue Stragglers from Hierarchical Triples Formed in Globular Clusters <i>F. Antonini, S. Chatterjee, C. L. Rodriguez, M. Morscher, B. Pattabiraman, V. Kalogera, F. Rasio</i> ; <i>Astrophys. J.</i> , 816 , 2, 65	ApJ 2016
Distinguishing Between Formation Channels for Binary Black Holes with LISA <i>K. Breivik, C. L. Rodriguez, S. Larson, V. Kalogera, F. Rasio</i> ; <i>Astrophys. J. Lett.</i> , 830 , L18	ApJL 2016
Dynamical Formation of the GW150914 Binary Black Hole <i>C. L. Rodriguez, C.-J. Haster, S. Chatterjee, V. Kalogera, F. Rasio</i> ; <i>Astrophys. J. Lett.</i> , 824 , L8	ApJL 2016
Million-Body Star Cluster Simulations: Comparisons between Monte Carlo and Direct N-body <i>C. L. Rodriguez, M. Morscher, L. Wang, S. Chatterjee, F. Rasio, R. Spurzem</i> ; <i>Mon. Not. R. Astron. Soc.</i> 463 , 2109	MNRAS 2016
Basic Parameter Estimation of Binary Neutron Star Systems by the Advanced LIGO/Virgo Network <i>C. L. Rodriguez, B. Farr, V. Raymond, W. Farr, T. Littenberg, D. Fazi, V. Kalogera</i> ; <i>Astrophys. J.</i> , 785 , 2, 119	ApJ 2014
The Dynamical Evolution of Stellar Black Holes in Globular Clusters <i>M. Morscher, B. Pattabiraman, C. L. Rodriguez, F. Rasio, S. Umbreit</i> ; <i>Astrophys. J.</i> , 800 , 1, 21	ApJ 2015

Inadequacies of the Fisher Information Matrix in gravitational-wave parameter Estimation <i>C. L. Rodriguez, B. Farr, W. Farr, I. Mandel</i> ; Phys. Rev. D, 88 , 8, 084013	PRD 2013
Verifying the no-hair property of massive compact objects with intermediate-mass-ratio inspirals in advanced gravitational-wave detectors <i>C. L. Rodriguez, I. Mandel, J. Gair</i> ; Phys. Rev. D, 85 , 6, 062002 - Synopsis in <i>Astrobites</i> (Link)	PRD 2012
Contributing Author Papers	
Weighing the Darkness. II. Astrometric Measurement of Partial Orbits with Gaia <i>J. Andrews, K. Breivik, C. Chawla, C. L. Rodriguez, S. Chatterjee</i> ; Astrophys. J., 946 , 111	ApJ 2023
White Dwarf Subsystems in Core-Collapsed Globular Clusters <i>K. Kremer, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, F. Rasio, S. Ye, C. L. Rodriguez</i> ; Astrophys. J., 917 , 28	ApJ 2021
Matching Globular Cluster Models to Observations <i>N. Rui, K. Kremer, N. Weatherford, S. Chatterjee, F. Rasio, C. L. Rodriguez, S. Ye</i> ; Astrophys. J., 912 , 2	ApJ 2021
No Black Holes in NGC 6397 <i>N. Rui, N. Weatherford, K. Kremer, S. Chatterjee, G. Fragione, F. Rasio, S. Ye, C. L. Rodriguez</i> ; Research Notes AAS, 5 , 47	RNAAS 2021
Black Hole Mergers from Star Clusters with Top-heavy Initial Mass Functions <i>N. Weatherford, G. Fragione, K. Kremer, S. Chatterjee, S. Ye, C. L. Rodriguez, F. Rasio</i> ; Astrophys. J. Lett., 907 , 25	ApJL 2021
Probing Multiple Populations of Compact binaries with Third-generation Gravitational-wave Detectors <i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez</i> ; Astrophys. J. Lett., 913 , L5	ApJL 2021
One Channel to Rule Them All? Constraining the Origins of Binary Black Holes using Multiple Formation Pathways <i>M. Zevin, S. Bavera, C. Berry, V. Kalogera, T. Fragos, P. Marchant, C. L. Rodriguez, F. Antonini, D. Holz, C. Pankow</i> ; Astrophys. J., 910 , 152	ApJ 2021
Intermediate-mass Black Holes from High Massive-star Binary Fractions in Young Star Clusters <i>E. González, K. Kremer, S. Chatterjee, G. Fragione, C. L. Rodriguez, N. Weatherford, S. Ye, F. Rasio</i> ; Astrophys. J. Lett., 908 , 29	ApJL 2021
Modeling Dense Star Clusters in the Milky Way and Beyond with the CMC Cluster Catalog <i>K. Kremer, S. Ye, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, C. L. Rodriguez, M. Spera, F. Rasio</i> ; Astrophys. J. Supp., 247 , 48	ApJS 2021
Black Hole Mergers from Hierarchical Triples in Dense Star Clusters <i>M. Martinez, G. Fragione, K. Kremer, S. Chatterjee, C. L. Rodriguez, J. Samsing, S. Ye, N. Weatherford, M. Zevin, S. Naoz, F. Rasio</i> ; Astrophys. J., 903 , 67	ApJ 2020
Populating the Upper Black Hole Mass Gap through Stellar Collisions in Young Star Clusters <i>K. Kremer, M. Spera, D. Becker, S. Chatterjee, U. N. Di Carlo, G. Fragione, C. L. Rodriguez, F. Rasio, N. Weatherford, S. Ye</i> ; Astrophys. J., 903 , 45	ApJ 2020
Measuring the Star Formation Rate with Gravitational Waves from Binary Black Holes <i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez</i> ; Astrophys. J. Lett., 886 , 1	ApJL 2018
On the Rate of Neutron Star Binary Mergers from Globular Clusters <i>C. Ye, W.-F. Fong, K. Kremer, C. L. Rodriguez, S. Chatterjee, G. Fragione, F. Rasio</i> ; Astrophys. J. Lett., 888 , 10	ApJL 2020

Single-single gravitational-wave captures in globular clusters: Eccentric deci-Hertz sources observable by DECIGO and Tian-Qin PRD
2019
J. Samsing, D. D’Orazio, K. Kremer, C. L. Rodriguez, A. Askar; Phys. Rev. D **101**, 123010

COSMIC Variance in Binary Population Synthesis ApJ
2019
K. Breivik, S. Coughlin, M. Zevin, C. L. Rodriguez, K. Kremer, C. Ye, J. Andrews, M. Kurkowski, M. Digman, S. Larson, F. Rasio; Astrophys. J. **898**,71

Millisecond Pulsars and Black Holes in Globular Clusters ApJ
2019
C. Ye, K. Kremer, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. , **877**, 122

The fate of binaries in the Galactic Center: The Mundane and the Exotic ApJ
2019
S. Alexander, S. Naoz, A. Ghez, M. Morris, A. Ciurlo, T. Do, K. Breivik, S. Coughlin, C. L. Rodriguez; Astrophys. J. , **878**, 58S

Predicting Stellar-mass Black Hole Populations in Globular Clusters ApJ
2018
N. Weatherford, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. , **864**, 13

How initial size governs core collapse in globular clusters ApJ
2018
K. Kremer, S. Chatterjee, C. Ye, C. L. Rodriguez, F. Rasio; Astrophys. J. , **871**, 38

LISA Sources in Milky Way Globular Clusters PRL
2018
K. Kremer, S. Chatterjee, K. Breivik, C. L. Rodriguez, S. Larson, F. Rasio; PRL, **120**, 19

How Black Holes Shape Globular Clusters: Modeling NGC 3201 ApJL
2018
K. Kremer, C. Ye, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. Lett., **855**, 15

Accreting Black Hole Binaries in Globular Clusters ApJ
2017
K. Kremer, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J., **852**, 29

Parameter estimation for compact binaries with ground-based gravitational-wave observations using the LALInference software library PRD
2015
J. Veitch, V. Raymond, B. Farr, W. Farr, P. Graff, S. Vitale, B. Aylott, K. Blackburn, N. Christensen, M. Coughlin, W. Del Pozzo, F. Feroz, J. Gair, C.J. Haster, V. Kalogera, T. Littenberg, I. Mandel, R. O’Shaughnessy, M. Pitkin, C. L. Rodriguez, C. Röver, T. Sidery, R. Smith, M. Van Der Sluys, A. Vecchio, W. Voudsen, L. Wade; Phys. Rev. D, **91**, 4, 042003

Comparison of Gravitational Wave Detector Network Sky Localization Approximations PRD
2014
K. Grover, S. Fairhurst, B. Farr, I. Mandel, C. L. Rodriguez, T. Sidery, A. Vecchio; Phys. Rev. D, **89**, 4, 042004

Estimating Parameters of Coalescing Compact Binaries with proposed Advanced Detector Networks PRD
2012
J. Veitch, I. Mandel, B. Aylott, B. Farr, V. Raymond, C. L. Rodriguez, M. van der Sluys, V. Kalogera, A. Vecchio; Phys. Rev. D **85**, 104045

Mock data challenge for the Einstein Gravitational-Wave Telescope PRD
2012
T. Regimbau, T. Dent, W. Del Pozzo, S. Giampanis, T.G.F. Li, C. Robinson, C. Van Den Broeck, D. Meacher, C. L. Rodriguez, B.S. Sathyaprakash, K. Wójcik; Phys. Rev. D **86**, 122001

Collaboration Papers.....

Coauthor on 23 Collaboration Papers as Member of LIGO Scientific Collaboration

Click ([Here](#)) for Full List of Citations

2011-2015

- Characterization of the LIGO detectors during their sixth science run
- Searching for stochastic gravitational waves using data from the two colocated LIGO Hanford detectors
- Constraints on Cosmic Strings from the LIGO-Virgo Gravitational-Wave Detectors
- Application of a Hough search for continuous gravitational waves on data from the fifth LIGO science run
- Gravitational Waves from Known Pulsars: Results from the Initial Detector Era
- First Searches for Optical Counterparts to Gravitational-wave Candidate Events
- Search for long-lived gravitational-wave transients coincident with long gamma-ray bursts
- Directed search for continuous gravitational waves from the Galactic center

- Parameter estimation for compact binary coalescence signals with the first generation gravitational-wave detector network
- A first search for coincident gravitational waves and high energy neutrinos using LIGO, Virgo and ANTARES data from 2007
- Einstein@Home all-sky search for periodic gravitational waves in LIGO S5 data
- Search for gravitational waves from binary black hole inspiral, merger, and ringdown in LIGO-Virgo data from 2009-2010
- Swift Follow-up Observations of Candidate Gravitational-wave Transient Events
- Search for Gravitational Waves Associated with Gamma-Ray Bursts during LIGO Science Run 6 and Virgo Science Runs 2 and 3
- The characterization of Virgo data and its impact on gravitational-wave searches
- All-sky search for gravitational-wave bursts in the second joint LIGO-Virgo run
- Upper limits on a stochastic gravitational-wave background using LIGO and Virgo interferometers at 600-1000 Hz
- Search for gravitational waves from intermediate mass binary black holes
- First low-latency LIGO+Virgo search for binary inspirals and their electromagnetic counterparts
- Search for gravitational waves from low mass compact binary coalescence in LIGO's sixth science run and Virgo's science runs 2 and 3
- Implementation and testing of the first prompt search for gravitational wave transients with electromagnetic counterparts
- All-sky search for periodic gravitational waves in the full S5 LIGO data
- A gravitational wave observatory operating beyond the quantum shot-noise limit

Mentoring

Postdocs

- Kerwann Tep, Postdoc Associate, UNC **2023-Present**
- Ugo di Carlo, Postdoc Associate, Carnegie Mellon/UNC **2021-2023**
- Poojan Agrawal, Postdoc Associate, Carnegie Mellon/UNC **2021-Present**
- Miguel Holgado, McWilliams Fellow, Carnegie Mellon **2020-2022**

Graduate Students (* indicates primary advisor)

- Brian Cook, UNC ***2023-Present**
- Duncan Maclean, UNC ***2023-Present**
- Gina Chen, Carnegie Mellon ***2021-2023**
- Kuldeep Sharma, Carnegie Mellon ***2020-Present**
- Tomás Cabrera, Carnegie Mellon ***2020-2023**
- Diptajyoti Mukherjee, Carnegie Mellon **2020-2022**
- Miguel Martinez, Northwestern University **2020-2022**
- Halston Lim, MIT **2018-2020**
- Michael Zevin, Northwestern University **2017-2018**

Undergraduate Students

- Jiya Jolly, UNC **2023-Present**
- Tristen McLaurin, UNC **2023-Present**
- Christopher Crow, UNC **2023-Present**
- Dustin Macguire, UNC **2023-Present**
- Carson Faulkner, UNC **2023**
- David Sanchez, Carnegie Mellon **2022-2023**
- Inés Rodríguez-Hsu, Carnegie Mellon **2022-2023**
- Christoph Gauffud, Carnegie Mellon **2021-2023**
- Jason DiMasi, Carnegie Mellon **2022**
- Jason Weng, Carnegie Mellon **2021**
- Emily Sespico, Carnegie Mellon **2021**
- Kevin Quigley, Carnegie Mellon **2021**
- Sofi Martinez Fortis, University of Pittsburgh **2021**
Now PhD Student in Physics at Vanderbilt University
- Alexis Ortega, Carnegie Mellon **2020-2021**

Now PhD Student in Physics at Brown University

o Caitlin Fischer, MIT

o Joshua Fuhrman, Northwestern University

2017-2018
2016

Teaching

Physics-119 Introductory Calculus-based Electromagnetism and Quanta

Instructor of Record; University of North Carolina, Chapel Hill, NC
Intro Physics Course for Physics Majors

Studio Instructor
Spring 2024

Physics-331 Numerical Techniques for the Sciences I

Instructor of Record; University of North Carolina, Chapel Hill, NC
Intro to Scientific Computing and Math Methods for Physics Majors

Lecturer
Fall 2023

33-121 Physics I for Science Students

Instructor of Record; Carnegie Mellon University, Pittsburgh, PA
Intro Physics for Non-majors

Lecturer
Spring 2022

33-331 Physical Mechanics

Instructor of Record; Carnegie Mellon University, Pittsburgh, PA
Upper Divisional Classical Mechanics for Undergraduate Majors

Lecturer
Fall 2020-2022

General Relativity

Guest Lecturer and TA; Northwestern University, Evanston, IL

Lecture/TA
2015

GK12 Fellowship

Reach for the Stars; Highland Park, IL
Co-taught weekly in math department of Highland Park High School
Developed mathematics lessons, visualizations, and applets for high-school students ([Link](#))

High School
2013-2014

Einstein and the 20th Century

Guest Lecturer and TA; Northwestern University, Evanston, IL

Lecture/TA
2013

Colloquia, Invited Talks, and Seminars

- o Vera Rubin Prize Plenary Talk, 55th DDA Meeting, Toronto, Ontario 2024
- o CITA Seminar, Toronto, Ontario 2024
- o University of Mary Washington, Physics Colloquium, Fredericksburg, VA 2024
- o Northwestern University, Panel on Gravitational Waves at MODEST2023 Conference 2023
- o University of Oregon, Physics Colloquium 2023
- o SESTAS Seminar, Max Planck Institute for Astrophysics, Garching, Germany 2023
- o Astrophysics Seminar, SISSA, Trieste, Italy 2023
- o University of Washington, Astronomy Colloquium 2023
- o Nevada Center For Astrophysics workshop on Multi-messenger Astronomy, Las Vegas, NV 2023
- o University of North Carolina Physics Colloquium, Chapel Hill, NC 2022
- o Penn State Astrophysics Colloquium, State College, PA (Remote) 2022
- o AAS Division of Dynamical Astronomy, Invited Talk (Remote) 2021
- o “Dynamical Formation of LIGO’s Binary Black Hole Mergers”
- o APS April Meeting, Invited Talk (Remote) 2021
- o “Merger Rates of Binary Black Holes across Cosmic Space and Time”
- o California State University, Long Beach Physics Colloquium, Long Beach, CA (Remote) 2021
- o University of Texas, Dallas Physics Colloquium, Dallas, TX (Remote) 2021
- o Michigan State University Physics Colloquium, Lansing, MI (Remote) 2021
- o University of British Columbia Astrophysics Seminar, Vancouver, BC (Remote) 2021
- o University of Alberta Theory Seminar, Alberta, ON (Remote) 2021
- o University of Pennsylvania Astrophysics Seminar, Philadelphia, PA (Remote) 2021
- o Tel Aviv University Astronomy Seminar, Tel Aviv, Israel (Remote) 2020
- o University of Milwaukee Astronomy Seminar, Milwaukee, WI (Remote) 2020
- o Oregon State University Astronomy Colloquium, Corvallis, OR (Remote) 2020
- o Carnegie Observatories Astronomy Colloquium, Pasadena, CA (Remote) 2020
- o UC Berkeley Astronomy Colloquium, Berkeley, CA (Remote) 2020

- ITC Colloquium, Center for Astrophysics | Harvard and Smithsonian, Cambridge, MA (Remote) 2020
- YITP Black Holes and Neutron Stars with Gravitational Waves, Invited Talk, Kyoto, Japan (Remote) 2019
- Black Hole Initiative Colloquium, Harvard University, Cambridge, MA (Remote) 2019
- KITP Merging Visions: Exploring Compact-Object Binaries with Gravity and Light, Invited Talk, Santa Barbara, CA 2019
- UCLA Astrophysics Colloquium, Los Angeles, CA 2019
- University of Colorado Astronomy and Planetary Science Colloquium, Boulder, CO 2019
- Vanderbilt University Colloquium, Nashville, TN 2019
- Syracuse Physics Colloquium, Syracuse, NY 2019
- Carnegie Mellon Physics Colloquium, Pittsburgh, PA 2019
- UIUC Gravitation Seminar, Urbana, IL 2019
- UIUC Astronomy Colloquium, Urbana, IL 2018
- Perimeter Institute Strong Gravity Seminar, Waterloo, ON 2018
- Stanford KIPAC Cosmology Seminar, Palo Alto, CA 2018
- University of Cambridge IoA Galaxy Discussion, Cambridge, UK 2018
- University of Surrey Astrophysics Seminar, Guildford, UK 2018
- Harvard-Smithsonian Center for Astrophysics Galaxy and Cosmology Seminar, Cambridge, MA 2018
- Caltech Astronomy Colloquium, Pasadena, CA 2018
- Harvard Particle Theory Seminar, Cambridge, MA 2018
- Columbia Astrophysics Colloquium, New York, NY 2017
- Invited Talk, Strong Gravity and Binary Dynamics with Gravitational Wave Observations Conference, Oxford, MS 2017
- Harvard ITC Lunch Seminar ([Link](#)), Cambridge, MA 2017
- UCSC Flash Seminar, Invited Talk, Santa Cruz, CA 2017
- APS April Meeting, Invited Talk, Washington, DC 2017
- JSI Fall Workshop: Astrophysics in the Era of Grav. Wave Observations, Invited Talk, Baltimore, MD 2016
- KITP Rapid Response Workshop on Gravitational Waves, Invited Talk, Santa Barbara, CA 2016
- KITP Rapid Response Workshop on Gravitational Waves, Invited Talk, Santa Barbara, CA 2016
- University of Chicago Compton Lecture Series Guest Seminar, Chicago, IL 2016
- Stellar N-body Conference, Invited Talk, Sexton, Italy 2014
- Georgia Tech Center for Relativistic Astrophysics, Invited Talk, Atlanta, GA 2011

Selected Contributed Talks/Posters

- Aspen Center for Physics: Dynamical Formation of Gravitational Wave Sources, Aspen, CO 2022
- APS April Meeting, Contributed Talk, New York, NY 2022
- Triple Evolution and Dynamics Trendy-2, Contributed Talk, Leiden, Netherlands 2018
- Aspen Center for Physics: Dawning Era of Gravitational-Wave Astrophysics, Aspen, CO 2017
- APS April Meeting, Contributed Talk, Salt Lake City, UT 2016
- APS April Meeting, Contributed Talk, Baltimore, MD 2015
- IAU Splinter Meeting, Contributed Talk, Beijing, China 2014
- AAS HEAD Meeting, Contributed Poster, Chicago, IL 2014
- LIGO Scientific Collaboration Meeting, Contributed Talk, Bethesda, MD 2013
- Gravitational-Wave Physics and Astronomy Workshop, Contributed Poster (3rd place award for best poster), Hannover, Germany 2012
- Gravitational-Wave Burst Workshop, Contributed Talk, Tobermory, Scotland 2012
- Gravitational-Wave Physics and Astronomy Workshop, Contributed Talk Milwaukee, WI 2012

Public Lectures/Outreach

- Carnegie Science Center** **Public Talk**
Conversations with Carnegie Mellon Physicists; Pittsburgh, PA 2021
- MIT Independent Activities Period** **Public Talk**
The era of Gravitational-wave Astronomy; Cambridge, MA 2017, 2018
- Compton Lecture Series** **Guest Seminar**
Dense Star Clusters as Binary Black Hole Factories ([Link](#)) 2016

Chicago, IL

TEDxNorthwesternU

Listening to Einstein's Final Symphony ([Link](#))

Evanston, IL

TEDx Talk

2016

Conversations with an Astronomer

Series of Public Lectures at Adler Planetarium
Chicago, IL

Lecture Series

2011–2016

Film Submission: Jackson Hole Science Media Festival

Black Holes and Globular Clusters ([Link](#))

Short Film

2014

Mentoring Telescope Interns

Teaching High School Summer Interns at Adler Planetarium; Chicago, IL

Mentoring

2013

Science Club Mentor

Weekly after-school science program at Boys and Girls Club; Chicago, IL

Mentoring

2012–2013

Visualization Creation

Produced for Adler Planetarium Space Visualization Lab and; Chicago, IL
Black Hole Dynamics in Core of Globular Cluster N-Body Simulation ([Link](#))
Binary Black Holes Emitting Gravitational Waves ([Link](#))

Visualizations

2011-2016

Perseid Meteor Shower

Illinois Science Council in coordination with Chicago Parks Department
Chicago, IL

Public Talk

2013

Public Lecture at North Central Purdue University

Catching Gravitational Waves with LIGO
Westville, IN

Public talk

2011

Service Work

Conference Organizing Committees:

- - MODEST-24: Exploring Dense Stellar Systems Across Cosmic Time
- 54th AAS Division of Dynamical Astronomy (DDA)

SOC

2024

2023

Dynamical Formation of Gravitational Wave Sources

Proposed, organized, and chaired session at 19th AAS HEAD Meeting
Pittsburgh, PA

Organizer

2022

2021 Multiband Gravitational-Wave Science Workshop

Workshop on future and proposed gravitational-wave detectors
Carnegie Mellon University, Pittsburgh, PA (remote)

Co-Organizer

2021

**Black Holes, Neutron Stars, and Gravitational Waves:
The New Era of Multi-Messenger Astronomy**

Proposed, chaired, and spoke at session at SACNAS (national conference for diversity in STEM)
Honolulu, HI

Organizer

2019

Committee Work at University of North Carolina:

- Graduate Admissions Committee
- Undergraduate Affairs

Committee Service

2023

2023

Committee Work at Carnegie Mellon:

- McWilliams Postdoctoral Fellowship Committee
 - * Committee Chair
- Colloquium Committee
- Equity, Diversity, and Inclusion Committee
 - Organized APS Site Visit to CMU, March 2022

Committee Service

2019-2020, 2021-2022*

2020-2021, 2021-2022

2020-2021, 2021-2022

Peer Reviewer for (years are left blank for confidentiality):

- Nature
- Nature Astronomy

Referee

2015-Present

- Physical Review Letters
- Physical Review D
- Astrophysical Journal Letters
- Astrophysical Journal
- Monthly Notices of the Royal Astronomical Society

Proposal Reviewer for (years are left blank for confidentiality):

- NSF Graduate Research Fellowship Program
- European Research Council (ERC) Grants
- NSF Astronomy and Astrophysics Research Grants (x2)
- NASA Astrophysical Theory Program
- US-Israel Binational Science Foundation

Reviewer
2018-Present

IAP Co-Organizer

MIT Independent Activities Period; Cambridge, MA

Organizer
2017

Astronomy On Tap – Boston

Public Outreach Event at Local Pubs
Cambridge, MA

Co-Organizer
2016-2018