

Carl Rodriguez | Curriculum Vitae

Department of Physics – Carnegie Mellon University – Pittsburgh, PA

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Education and Employment

Carnegie Mellon University <i>Pittsburgh, PA</i> Assistant Professor of Physics	Professor <i>Sept. 2020</i>
Harvard University <i>Cambridge, MA</i> ITC Postdoctoral Fellow	Postdoc <i>2019-2020</i>
Massachusetts Institute of Technology <i>Cambridge, MA</i> Pappalardo Postdoctoral Fellow	Postdoc <i>2016-2019</i>
Northwestern University <i>Evanston, IL</i>	Ph.D. Physics <i>2010-2016</i>
Reed College <i>Portland, OR</i>	B.A. Physics <i>2006-2010</i>

Honors, Awards, and Fellowships

○ Alfred P. Sloan Foundation Fellowship	2022
○ Kaufman Foundation New Investigator Award	2020
○ ITC Fellowship, Harvard University	2019-2020
○ MIT Spot Award	2017
○ 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 June 2022:

- As PI: \$1.4M Active Funding (\$1.1M to CMU)

Alfred P. Sloan Foundation Fellowship <i>PI: C. L. Rodriguez; Sloan Research Fellowships (\$75K)</i>	Foundation <i>2022</i>
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; NASA Award 21-ATP21-0144 (\$746K; \$429K to CMU)</i>	NASA ATP <i>2021</i>
The Lives and Deaths of Star Clusters, and the Gravitational Waves They Leave Behind <i>PI: C. L. Rodriguez; Kaufman Foundation New Investigator Grant (\$150K)</i>	Foundation <i>2020</i>
WoU-MMA: The Evolution, Destruction, and Gravitational-wave Sources of Dense Star Clusters in Cosmological Simulations <i>PI: C. L. Rodriguez; NSF Award AST-2009916 (\$434K)</i>	NSF-AST <i>2020</i>
Astrophysics and Cyberinfrastructure Initiatives for Decihertz Gravitational-Wave Missions <i>PI: A. Miguel Holgado, co-I: C. L. Rodriguez; McWilliams Seed Grant (\$10K)</i>	CMU Grant <i>2020</i>

Modeling Dense Star Clusters and their Gravitational-wave Sources from Cosmological Simulations

XSEDE
2018

PI: *C. L. Rodriguez*, Co-I: *Astrid Lamberts*, *Mike Grudić*; 1.1M CPU Hours (\$20K Value)

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 June 2022:

- All Publications (excluding LIGO collaboration papers) – **5137 citations**, **h-index of 40**
- Major Contributor/PI Publications – **3225 citations**

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

Post-Newtonian Dynamics in Dense Star Clusters: Highly-Eccentric, Highly-Spinning, and Repeated Binary Black Hole Mergers **PRL**
2018
[200 Citations]

C. L. Rodriguez, *P. Amaro-Seoane*, *S. Chatterjee*, *F. Rasio*; *Phys. Rev. Lett.*, **120**, 151101
- Articles in *Boston Globe*, *MIT News* (Links),

Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO **ApJL**
2016
[199 Citations]

C. L. Rodriguez, *M. Zevin*, *C. Pankow*, *V. Kalogera*, *F. Rasio*; *Astrophys. J. Lett.*, **832**, L2

Binary Black Hole Mergers from Globular Clusters: Masses, Merger Rates, and the Impact of Stellar Evolution **PRD**
2016
[388 Citations]

C. L. Rodriguez, *S. Chatterjee*, *F. Rasio*; *Phys. Rev. D*, **93**, 084029

Binary Black Hole Mergers from Globular Clusters: Implications for Advanced LIGO **PRL**
2015
[280 Citations]

C. L. Rodriguez, *M. Morscher*, *B. Pattabiraman*, *S. Chatterjee*, *C.J. Haster*, and *F. Rasio*; *Phys. Rev. Lett.* **115**, 051101

- Synopsis by APS in *Physics* (Link)

The Dynamical Evolution of Stellar Black Holes in Globular Clusters **ApJ**
2015
[188 Citations]

M. Morscher, *B. Pattabiraman*, *C. L. Rodriguez*, *F. Rasio*, *S. Umbreit*; *Astrophys. J.*, **800**, 1, 21

Papers as Major Contributor or Primary Advisor

Great Balls of FIRE II: The evolution and destruction of star clusters across cosmic time in a Milky Way-mass galaxy 2022

C. L. Rodriguez, *Z. Hafen*, *Grudić*, *A. Lamberts*, *K. Sharma*, *C.A. Faucher-Giguère*, *A. Wetzel*; *MNRAS* (Submitted)

Great Balls of FIRE I: The formation of star clusters across cosmic time in a Milky Way-mass galaxy 2022

M. Grudić, *Z. Hafen*, *C. L. Rodriguez*, *D. Guszejnov*, *A. Lamberts*, *A. Wetzel*, *M. Boylan-Kolchin*, *C.A. Faucher-Giguère*; *MNRAS* (Submitted)

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

Compact Object Modeling in the Globular Cluster 47 Tucanae <i>S. Ye, K. Kremer, C. L. Rodriguez, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, F. Rasio;</i> <i>Astrophys. J., 931, 2, 84</i>	ApJ 2022
On the Mass Ratio Distribution of Black Hole Mergers in Triple Systems <i>M. Martinez, C. L. Rodriguez, G. Fragione;</i> <i>Astrophys. J. (submitted)</i>	2021
The Observed Rate of Binary Black Hole Mergers can be Entirely Explained by Globular Clusters <i>C. L. Rodriguez, K. Kremer, S. Chatterjee, G. Fragione, A. Loeb, F. Rasio, N. Weatherford, S. Ye;</i> <i>Research Notes AAS, 5, 19</i>	RNAAS 2021
Fast Multipole Methods for Simulating Collisional Star Systems <i>D. Mukherjee, Q. Zhu, H. Trac, C. L. Rodriguez;</i> <i>Astrophys. J., 916, 9</i>	ApJ 2021
Dynamical Formation Scenarios for GW190521 and Prospects for Decihertz Gravitational-Wave Astronomy with GW190521-Like Binaries <i>A. M. Holgado, A. Ortega, C. L. Rodriguez;</i> <i>Astrophys. J. Lett, 909, L24</i>	ApJL 2021
Relativistic Three-body Effects in Hierarchical Triples <i>H. Lim, C. L. Rodriguez;</i> <i>Phys. Rev. D 102, 064033</i>	PRD 2020
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., 896, L10</i>	ApJL 2020
Black Holes: The Next Generation – Repeated Mergers in Dense Star Clusters and their Gravitational-Wave Properties <i>C. L. Rodriguez, M. Zevin, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. Rasio, S. Ye;</i> <i>Phys. Rev. D, 100, 043027</i>	PRD 2019
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 , 99, 063003</i>	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. , 871, 1</i>	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, 98, 123005</i>	PRD 2018
Redshift Evolution of the Black Hole Merger Rate From Globular Clusters <i>C. L. Rodriguez, A. Loeb;</i> <i>Astrophys. J., 865, L5</i>	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., 963, 1, 7</i>	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., 480, 1, L58</i>	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, 5, 1</i>	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., 834, 1, 68</i>	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, 836, L26</i>	ApJL 2017

Constraining Formation Models of Binary Black Hole Formation with Gravitational-Wave Observations	ApJ
<i>M. Zevin, C. Pankow, C. L. Rodriguez, L. Sampson, E. Chase, V. Kalogera, F. Rasio; Astrophys. J., 846, 82Z</i>	2017
Black Hole Mergers and Blue Stragglers from Hierarchical Triples Formed in Globular Clusters	ApJ
<i>F. Antonini, S. Chatterjee, C. L. Rodriguez, M. Morscher, B. Pattabiraman, V. Kalogera, F. Rasio; Astrophys. J., 816, 2, 65</i>	2016
Distinguishing Between Formation Channels for Binary Black Holes with LISA	ApJL
<i>K. Breivik, C. L. Rodriguez, S. Larson, V. Kalogera, F. Rasio; Astrophys. J. Lett., 830, L18</i>	2016
Million-Body Star Cluster Simulations: Comparisons between Monte Carlo and Direct N-body	MNRAS
<i>C. L. Rodriguez, M. Morscher, L. Wang, S. Chatterjee, F. Rasio, R. Spurzem; Mon. Not. R. Astron. Soc. 463, 2109</i>	2016
Basic Parameter Estimation of Binary Neutron Star Systems by the Advanced LIGO/Virgo Network	ApJ
<i>C. L. Rodriguez, B. Farr, V. Raymond, W. Farr, T. Littenberg, D. Fazi, V. Kalogera; Astrophys. J., 785, 2, 119</i>	2014
Inadequacies of the Fisher Information Matrix in gravitational-wave parameter Estimation	PRD
<i>C. L. Rodriguez, B. Farr, W. Farr, I. Mandel; Phys. Rev. D, 88, 8, 084013</i>	2013
Verifying the no-hair property of massive compact objects with intermediate-mass-ratio inspirals in advanced gravitational-wave detectors	PRD
<i>C. L. Rodriguez, I. Mandel, J. Gair; Phys. Rev. D, 85, 6, 062002</i>	2012
- Synopsis in <i>Astrobites</i> (Link)	
Contributing Author Papers	
White Dwarf Subsystems in Core-Collapsed Globular Clusters	ApJ
<i>K. Kremer, N. Rui, N. Weatherford, S. Chatterjee G. Fragione, F. Rasio, S. Ye C. L. Rodriguez; Astrophys. J., 917, 28</i>	2021
Matching Globular Cluster Models to Observations	ApJ
<i>N. Rui, K. Kremer, N. Weatherford, S. Chatterjee, F. Rasio, C. L. Rodriguez, S. Ye ; Astrophys. J., 912, 2</i>	2021
No Black Holes in NGC 6397	RNAAS
<i>N. Rui, N. Weatherford, K. Kremer, S. Chatterjee G. Fragione, F. Rasio, S. Ye C. L. Rodriguez; Research Notes AAS, 5, 47</i>	2021
Black Hole Mergers from Star Clusters with Top-heavy Initial Mass Functions	ApJL
<i>N. Weatherford, G. Fragione, K. Kremer, S. Chatterjee, S. Ye , C. L. Rodriguez, F. Rasio; Astrophys. J. Lett., 907, 25</i>	2021
Probing Multiple Populations of Compact binaries with Third-generation Gravitational-wave Detectors	ApJL
<i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez; Astrophys. J. Lett., 913, L5</i>	2021
One Channel to Rule Them All? Constraining the Origins of Binary Black Holes using Multiple Formation Pathways	ApJ
<i>M. Zevin, S. Bavera, C. Berry, V. Kalogera, T. Fragos, P. Marchant, C. L. Rodriguez, F. Antonini, D. Holz, C. Pankow; Astrophys. J., 910, 152</i>	2021
Intermediate-mass Black Holes from High Massive-star Binary Fractions in Young Star Clusters	ApJL
<i>E. González, K. Kremer, S. Chatterjee, G. Fragione, C. L. Rodriguez, N. Weatherford, S. Ye, F. Rasio; Astrophys. J. Lett, 908, 29</i>	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; Astrophys. J., 903, 67</i>	ApJ 2020
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; Astrophys. J. Supp., 247, 48</i>	ApJS 2021
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; Astrophys. J., 903, 45</i>	ApJ 2020
Measuring the Star Formation Rate with Gravitational Waves from Binary Black Holes <i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez; Astrophys. J. Lett., 886, 1</i>	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; Astrophys. J. Lett., 888, 10</i>	ApJL 2020
Single-single gravitational-wave captures in globular clusters: Eccentric deci-Hertz sources observable by DECIGO and Tian-Qin <i>J. Samsing, D. D'Orazio, K. Kremer, C. L. Rodriguez, A. Askar; Phys. Rev. D 101, 123010</i>	PRD 2019
COSMIC Variance in Binary Population Synthesis <i>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</i>	ApJ 2019
Millisecond Pulsars and Black Holes in Globular Clusters <i>C. Ye, K. Kremer, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. , 877, 122</i>	ApJ 2019
The fate of binaries in the Galactic Center: The Mundane and the Exotic <i>S. Alexander, S. Naoz, A. Ghez, M. Morris, A. Ciurlo, T. Do, K. Breivik, S. Coughlin, C. L. Rodriguez; Astrophys. J. , 878, 58S</i>	ApJ 2019
Predicting Stellar-mass Black Hole Populations in Globular Clusters <i>N. Weatherford, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. , 864, 13</i>	ApJ 2018
How initial size governs core collapse in globular clusters <i>K. Kremer, S. Chatterjee, C. Ye, C. L. Rodriguez, F. Rasio; Astrophys. J. , 871, 38</i>	ApJ 2018
LISA Sources in Milky Way Globular Clusters <i>K. Kremer, S. Chatterjee, K. Breivik, C. L. Rodriguez, S. Larson, F. Rasio; PRL, 120, 19</i>	PRL 2018
How Black Holes Shape Globular Clusters: Modeling NGC 3201 <i>K. Kremer, C. Ye, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J. Lett., 855, 15</i>	ApJL 2018
Accreting Black Hole Binaries in Globular Clusters <i>K. Kremer, S. Chatterjee, C. L. Rodriguez, F. Rasio; Astrophys. J., 852, 29</i>	ApJ 2017
Parameter estimation for compact binaries with ground-based gravitational-wave observations using the LALInference software library <i>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. Vousden, L. Wade; Phys. Rev. D, 91, 4, 042003</i>	PRD 2015
Comparison of Gravitational Wave Detector Network Sky Localization Approximations <i>K. Grover, S. Fairhurst, B. Farr, I. Mandel, C. L. Rodriguez, T. Sidery, A. Vecchio; Phys. Rev. D, 89, 4, 042004</i>	PRD 2014
Estimating Parameters of Coalescing Compact Binaries with proposed Advanced Detector Networks <i>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</i>	PRD 2012

Mock data challenge for the Einstein Gravitational-Wave Telescope

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

PRD
2012

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

Postdocs Mentored

Miguel Holgado

McWilliams Fellow; Carnegie Mellon

Postdoc Fellow

2020-Present

Ugo di Carlo

NSF Supported Postdoc; Carnegie Mellon

Associate

2021-Present

Poojan Agrawal

Kaufman Foundation Supported Postdoc; Carnegie Mellon

Associate

2021-Present

Graduate Students

Tomás Cabrera

Primary Advisor – Hypervelocity stars from clusters, nuclear star clusters; Carnegie Mellon

Grad Student

2020-Present

Kuldeep Sharma

Primary Advisor – Clusters in cosmological simulations; runaway stellar mergers; Carnegie Mellon

Grad Student

2020-Present

Diptajyoti Mukherjee

Co-advising with Hy Trac – Fast multipole methods for N -body problems; Carnegie Mellon

Grad Student

2020-Present

Gina Chen Co-advising with Tiziana Di Matteo – Gravitational waves in cosmology simulations; Carnegie Mellon	Grad Student 2021-Present
Miguel Martinez Primary Advisor for Project – Stellar Triples and gravitational waves; Northwestern University	Grad Student 2020-2021
Halston Lim Primary Advisor for Project – Post-Newtonian dynamics in black hole triples; MIT	Grad Student 2018-2020
Michael Zevin Co-advised on Project – Post-Newtonian effects in binary-binary encounters; KSPI Summer Program	Grad Student 2017-2018

Undergraduate Students

Christoph Gaffud New Techniques for N -body Integrations; Carnegie Mellon	Undergraduate Spring 2022
Jason DiMasi Clusters Spiraling into the Galactic Center; Carnegie Mellon	Undergraduate Spring 2022
Jason Weng Three-body Binary Formation in Star Clusters; Carnegie Mellon	Undergraduate Fall 2021
Emily Sespico Compact-object Populations in the Galactic Center; Carnegie Mellon	Undergraduate Fall 2021
Kevin Quigley Machine Learning for Gravitational-wave Populations; Carnegie Mellon	Undergraduate Summer 2021
Alexis Ortega Gravitational-wave Captures in Dense Stellar Environments; Carnegie Mellon Now in Physics PhD Program at Brown University	Undergraduate 2020-2021
Sofi Martinez Fortis Numerical Integrators for the Gravitational N -body problem; University of Pittsburgh	Undergraduate 2021
Caitlin Fischer Spinning Black Hole Triples; MIT Undergraduate Research Opportunities Program	Undergraduate 2017-2018
Joshua Fuhrman Merging Binary Black Holes in Open Clusters; Northwestern REU	Undergraduate 2016

Teaching

33-121 Physics I for Science Students <i>Instructor of Record</i> ; Carnegie Mellon University, Pittsburgh, PA Intro Physics for Non-majors	Lecturer Spring 2022
33-331 Physical Mechanics <i>Instructor of Record</i> ; Carnegie Mellon University, Pittsburgh, PA Upper Divisional Classical Mechanics for Undergraduate Majors	Lecturer Fall 2020, 2021
General Relativity <i>Guest Lecturer and TA</i> ; Northwestern University, Evanston, IL	Lecture/TA 2015
GK12 Fellowship <i>Reach for the Stars</i> ; 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)	Teaching 2013–2014
Einstein and the 20th Century <i>Guest Lecturer and TA</i> ; Northwestern University, Evanston, IL	Lecture/TA 2013

Invited Talks/Seminars

Penn State Astrophysics Colloquium State College, PA (Remote)	Colloquium 2022
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AAS Division of Dynamical Astronomy <i>Remote Conference; Dynamical Formation of LIGO's Binary Black Hole Mergers</i>	Invited Talk 2021
APS April Meeting <i>Remote Conference; Merger Rates of Binary Black Holes across Cosmic Space and Time</i>	Invited Talk 2021
California State University, Long Beach Physics Colloquium <i>Long Beach, CA (remote)</i>	Colloquium 2021
University of Texas, Dallas Physics Colloquium <i>Dallas, TX (remote)</i>	Colloquium 2021
Michigan State University Physics Colloquium <i>Lansing, MI (remote)</i>	Colloquium 2021
Astrophysics Seminar, University of British Columbia <i>Vancouver, Canada (remote)</i>	Seminar 2021
Theory Seminar, University of Alberta <i>Alberta, ON (remote)</i>	Seminar 2021
Astrophysics Seminar, University of Pennsylvania <i>Philadelphia, PA (remote)</i>	Seminar 2021
Astronomy Seminar, Tel Aviv University <i>Tel Aviv, Israel (remote)</i>	Seminar 2020
Astronomy Seminar, University of Wisconsin, Milwaukee <i>Milwaukee, WI (remote)</i>	Seminar 2020
Astronomy Colloquium, Oregon State University <i>Corvallis, OR (remote)</i>	Colloquium 2020
Astronomy Colloquium, Carnegie Observatories <i>Pasadena, CA (remote)</i>	Colloquium 2020
Astronomy Colloquium, UC Berkeley <i>Berkeley, CA (remote)</i>	Colloquium 2020
ITC Colloquium, Center for Astrophysics Harvard and Smithsonian <i>Cambridge, MA (remote)</i>	Colloquium 2020
YITP Black Holes and Neutron Stars with Gravitational Waves <i>Kyoto, Japan</i>	Invited Talk 2019
KITP Merging Visions: Exploring Compact-Object Binaries with Gravity and Light <i>Santa Barbara, CO</i>	Invited Talk 2019
University of Colorado Astronomy and Planetary Science Colloquium <i>Boulder, CO</i>	Colloquium 2019
UCLA Astrophysics Colloquium <i>Los Angeles, CA</i>	Colloquium 2019
Vanderbilt Physics Colloquium <i>Nashville, TN</i>	Colloquium 2019
Syracuse Physics Colloquium <i>Syracuse, NY</i>	Colloquium 2019
Carnegie Mellon Astrophysics Colloquium <i>Pittsburgh, PA</i>	Colloquium 2019
UIUC Gravitation Seminar <i>Urbana-Champaign, IL</i>	Seminar 2019
UIUC Astronomy Colloquium <i>Urbana-Champaign, IL</i>	Colloquium 2018
Perimeter Institute Strong Gravity Seminar <i>Waterloo, Canada</i>	Seminar 2018
Stanford KIPAC Cosmology Seminar <i>Palo Alto, CA</i>	Seminar 2018

University of Cambridge IoA Galaxy Discussion <i>Cambridge, UK</i>	Seminar 2018
University of Surrey Astrophysics Seminar <i>Guildford, UK</i>	Seminar 2018
Harvard CfA Galaxy and Cosmology Seminar <i>Cambridge, MA</i>	Seminar 2018
CalTech Astronomy Colloquium <i>Pasadena, CA</i>	Colloquium 2018
Harvard Particle Theory Seminar <i>Cambridge, MA</i>	Seminar 2018
Columbia Astrophysics Colloquium <i>New York, NY</i>	Colloquium 2017
Harvard ITC Lunch Seminar <i>Cambridge, MA</i> (Link)	Seminar 2017
Strong Gravity and Binary Dynamics with Gravitational Wave Observations <i>Oxford, MS</i>	Invited Talk 2017
UCSC Flash Seminar <i>Santa Cruz, CA</i>	Seminar 2017
April APS Meeting <i>Washington, DC</i>	Invited Talk 2017
JSI Fall Workshop: Astrophysics in the Era of Grav. Wave Observations <i>Annapolis, MD</i>	Invited Talk 2016
KITP Rapid Response Workshop on Gravitational Waves <i>Santa Barbara, CA</i>	Invited Talk 2016
Compton Lecture Series <i>Chicago, IL</i> (Link)	Guest Seminar 2016
Stellar N-body Conference <i>Sexten, Italy</i>	Invited Talk 2014
Georgia Tech Center for Relativistic Astrophysics <i>Atlanta, GA</i>	Seminar 2011

Selected Contributed Talks/Posters

Black Holes, Neutron Stars, and Gravitational Waves: The New Era of Multi-Messenger Astronomy <i>Honolulu, HI</i>	Chair 2019
- Proposed, chaired, and spoke at session at SACNAS (national conference for diversity in STEM)	
Triple Evolution and Dynamics Trendy-2 <i>Leiden, Netherlands</i>	Talk 2018
Aspen Center for Physics: Dawning Era of Gravitational-Wave Astrophysics <i>Aspen, CO</i>	Talk 2017
APS Meeting <i>Salt Lake City, UT</i>	Talk 2016
April APS Meeting <i>Baltimore, MD</i>	Talk 2015
IAU Meeting <i>Beijing, China</i>	Talk 2014
AAS Head Meeting <i>Chicago, IL</i>	Poster 2014
LIGO Scientific Collaboration Meeting <i>Bethesda, MD</i>	Talk 2013
Gravitational-Wave Physics and Astronomy Workshop <i>Hannover, Germany</i>	Poster 2012
- 3rd place award for best poster	

Gravitational-Wave Burst Workshop <i>Tobermory, Scotland</i>	Talk 2012
Midwest Relativity Meeting <i>Urbana, IL</i>	Talk 2011
Gravitational-Wave Physics and Astronomy Workshop <i>Milwaukee, WI</i>	Talk 2011

Public Lectures/Outreach

MIT Independent Activities Period <i>The era of Gravitational-wave Astronomy; Cambridge, MA</i>	Public Talk 2017, 2018
Compton Lecture Series <i>Dense Star Clusters as Binary Black Hole Factories (Link)</i> Chicago, IL	Guest Seminar 2016
TEDxNorthwesternU <i>Listening to Einstein's Final Symphony (Link)</i> 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 <i>Black Holes and Globular Clusters (Link)</i>	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 <i>Catching Gravitational Waves with LIGO</i> Westville, IN	Public talk 2011

Service Work

Committee Work at Carnegie Mellon:	Committee Service
- - McWilliams Postdoctoral Fellowship Committee	2019-2020, 2021-2022*
· * Committee Chair	
- Colloquium Committee	2020-2021, 2021-2022
- Equity, Diversity, and Inclusion Committee	2020-2021, 2021-2022
· Organized APS Site Visit to CMU, March 2022	
Peer Reviewer for:	Referee
- Physical Review Letters	2015-Present
- Physical Review D	
- Astrophysical Journal Letters	
- Astrophysical Journal	
- Monthly Notices of the Royal Astronomical Society	
- Nature	
- Nature Astronomy	

Proposal Reviewer for:

- NSF Astronomy and Astrophysics Research Grants
- NASA Astrophysical Theory Program
- US-Israel Binational Science Foundation

Reviewer

2021

2019

2018

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

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

Chair

2019

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