

# Carl Rodriguez | Curriculum Vitae

Department of Physics – Carnegie Mellon University – Pittsburgh, PA

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## Education and Employment

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

## Honors, Awards, and Fellowships

○ 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 STEM Scholar	2008-2010

## Grants

<b>Stellar Dynamics and Stellar Collisions in Star-by-Star Models of Nuclear Star Clusters</b> <i>PI: C. L. Rodriguez, co-I: H. Trac, F. Rasio, G. Fragione; NASA Award 21-ATP21-0144 (\$746K; \$429K to CMU)</i>	<b>NASA ATP</b> 2021
<b>The Lives and Deaths of Star Clusters, and the Gravitational Waves They Leave Behind</b> <i>PI: C. L. Rodriguez; Kaufman Foundation New Investigator Grant (\$150K)</i>	<b>Foundation</b> 2020
<b>WoU-MMA: The Evolution, Destruction, and Gravitational-wave Sources of Dense Star Clusters in Cosmological Simulations</b> <i>PI: C. L. Rodriguez; NSF Award AST-2009916 (\$434K)</i>	<b>NSF-AST</b> 2020
<b>Astrophysics and Cyberinfrastructure Initiatives for Decihertz Gravitational-Wave Missions</b> <i>PI: A. Miguel Holgado, co-I: C. L. Rodriguez; McWilliams Seed Grant (\$10K)</i>	<b>CMU Grant</b> 2020
<b>Modeling Dense Star Clusters and their Gravitational-wave Sources from Cosmological Simulations</b> <i>PI: C. L. Rodriguez, Co-I: Astrid Lamberts, Mike Grudić; 1.1M CPU Hours (\$20K Value)</i>	<b>XSEDE</b> 2018

## Publications (with links)

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A complete list of publications can also be found at the NASA ADS service [here](#).

### Publication Metrics

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As of November 2021:

- o All Publications (excluding LIGO collaboration papers) – **4486 citations, h-index of 38**

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

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<b>Post-Newtonian Dynamics in Dense Star Clusters: Highly-Eccentric, Highly-Spinning, and Repeated Binary Black Hole Mergers</b> [183 Citations] <i>C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, F. Rasio</i> ; Phys. Rev. Lett, <b>120</b> , 151101 - Articles in <i>Boston Globe</i> , <i>MIT News</i> (Links),	<b>PRL</b> 2018
<b>Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO</b> [170 Citations] <i>C. L. Rodriguez, M. Zevin, C. Pankow, V. Kalogera, F. Rasio</i> ; Astrophys. J. Lett., <b>832</b> , L2	<b>ApJL</b> 2016
<b>Binary Black Hole Mergers from Globular Clusters: Masses, Merger Rates, and the Impact of Stellar Evolution</b> [355 Citations] <i>C. L. Rodriguez, S. Chatterjee, F. Rasio</i> ; Phys. Rev. D, <b>93</b> , 084029	<b>PRD</b> 2016
<b>Binary Black Hole Mergers from Globular Clusters: Implications for Advanced LIGO</b> [260 Citations] <i>C. L. Rodriguez, M. Morscher, B. Pattabiraman, S. Chatterjee, C.J. Haster, and F. Rasio</i> ; Phys. Rev. Lett. <b>115</b> , 051101 - Synopsis by APS in <i>Physics</i> (Link)	<b>PRL</b> 2015
<b>The Dynamical Evolution of Stellar Black Holes in Globular Clusters</b> [172 Citations] <i>M. Morscher, B. Pattabiraman, C. L. Rodriguez, F. Rasio, S. Umbreit</i> ; Astrophys. J., <b>800</b> , 1, 21	<b>ApJ</b> 2015

### Papers as Major Contributor or Primary Advisor

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<b>Compact Object Modeling in the Globular Cluster 47 Tucanae</b> <i>S. Ye, K. Kremer, C. L. Rodriguez, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, F. Rasio</i> ; Astrophys. J. (submitted)	2021
<b>Modeling Dense Star Clusters in the Milky Way and Beyond with the Cluster Monte Carlo Code</b> <i>C. L. Rodriguez, N. Weatherford, S. Coughlin, P. Amaro-Seoane, K. Breivik, S. Chatterjee, G. Fragione, F. Kiroglu, K. Kremer, N. Rui, S. Ye, M. Zevin, F. Rasio</i> ; Astrophys. J. Supp. (in press)	<b>ApJS</b> 2021
<b>On the Mass Ratio Distribution of Black Hole Mergers in Triple Systems</b> <i>M. Martinez, C. L. Rodriguez, G. Fragione</i> ; Astrophys. J. (submitted)	2021
<b>The Observed Rate of Binary Black Hole Mergers can be Entirely Explained by Globular Clusters</b> <i>C. L. Rodriguez, K. Kremer, S. Chatterjee, G. Fragione, A. Loeb, F. Rasio, N. Weatherford, S. Ye</i> ; Research Notes AAS, <b>5</b> , 19	<b>RNAAS</b> 2021
<b>Fast Multipole Methods for Simulating Collisional Star Systems</b> <i>D. Mukherjee, Q. Zhu, H. Trac, C. L. Rodriguez</i> ; Astrophys. J., <b>916</b> , 9	<b>ApJ</b> 2021
<b>Dynamical Formation Scenarios for GW190521 and Prospects for Decihertz Gravitational-Wave Astronomy with GW190521-Like Binaries</b> <i>A. M. Holgado, A. Ortega, C. L. Rodriguez</i> ; Astrophys. J. Lett, <b>909</b> , L24	<b>ApJL</b> 2021

<b>Relativistic Three-body Effects in Hierarchical Triples</b> <i>H. Lim, C. L. Rodriguez</i> ; Phys. Rev. D <b>102</b> , 064033	<b>PRD</b> 2020
<b>GW190412 as a Third-Generation Black Hole Merger from a Super Star Cluster</b> <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> ; Astrophys. J. Lett., <b>896</b> , L10	<b>ApJL</b> 2020
<b>Black Holes: The Next Generation – Repeated Mergers in Dense Star Clusters and their Gravitational-Wave Properties</b> <i>C. L. Rodriguez, M. Zevin, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. Rasio, S. Ye</i> ; Phys. Rev. D, <b>100</b> , 043027	<b>PRD</b> 2019
<b>Post-Newtonian Dynamics in Dense Star Clusters: Binary Black Holes in the LISA Band</b> <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> ; Phys. Rev. D , <b>99</b> , 063003	<b>PRD</b> 2019
<b>Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters</b> <i>M. Zevin, J. Samsing, C. L. Rodriguez, C. Haster, E. Ramirez-Ruiz</i> ; Astrophys. J. , <b>871</b> , 1	<b>ApJ</b> 2018
<b>Post-Newtonian Dynamics in Dense Star Clusters: Formation, Masses, and Merger Rates of Highly-Eccentric Black Hole Mergers</b> <i>C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. Rasio, J. Samsing, S. Ye, M. Zevin</i> ; Phys. Rev. D, <b>98</b> , 123005	<b>PRD</b> 2018
<b>Redshift Evolution of the Black Hole Merger Rate From Globular Clusters</b> <i>C. L. Rodriguez, A. Loeb</i> ; Astrophys. J., <b>865</b> , L5	<b>ApJL</b> 2018
<b>A Triple Origin for the Heavy and Low-Spin Binary Black Holes Detected by LIGO/Virgo</b> <i>C. L. Rodriguez, F. Antonini</i> ; Astrophys. J., <b>963</b> , 1, 7	<b>ApJ</b> 2018
<b>Precessional Dynamics of Black Hole Triples: Binary Mergers with near-zero Effective Spin</b> <i>F. Antonini, C. L. Rodriguez, C. Petrovich, C. Fischer</i> ; Mon. Not. R. Astron. Soc. Lett., <b>480</b> , 1, L58	<b>MNRASL</b> 2018
<b>A New Hybrid Technique for Modeling Dense Star Clusters</b> <i>C. L. Rodriguez, B. Pattabiraman, S. Chatterjee, M. Morscher, F. Rasio, A. Choudhary, W-K. Liao</i> ; Computational Astrophysics and Cosmology, <b>5</b> , 1	<b>CompAC</b> 2018
<b>Binary Black Holes in Dense Star Clusters: Exploring the Theoretical Uncertainties</b> <i>S. Chatterjee, C. L. Rodriguez, F. Rasio</i> ; Astrophys. J., <b>834</b> , 1, 68	<b>ApJ</b> 2017
<b>Dynamical Formation of Low-mass Merging Black Hole Binaries like GW151226</b> <i>S. Chatterjee, C. L. Rodriguez, V. Kalogera, F. Rasio</i> ; ApJL, <b>836</b> , L26	<b>ApJL</b> 2017
<b>Constraining Models of Binary Black Hole Formation with Gravitational-Wave Observations</b> <i>M. Zevin, C. Pankow, C. L. Rodriguez, L. Sampson, E. Chase, V. Kalogera, F. Rasio</i> ; Astrophys. J., <b>846</b> , 82Z	<b>ApJ</b> 2017
<b>Black Hole Mergers and Blue Stragglers from Hierarchical Triples Formed in Globular Clusters</b> <i>F. Antonini, S. Chatterjee, C. L. Rodriguez, M. Morscher, B. Pattabiraman, V. Kalogera, F. Rasio</i> ; Astrophys. J., <b>816</b> , 2, 65	<b>ApJ</b> 2016
<b>Distinguishing Between Formation Channels for Binary Black Holes with LISA</b> <i>K. Breivik, C. L. Rodriguez, S. Larson, V. Kalogera, F. Rasio</i> ; Astrophys. J. Lett., <b>830</b> , L18	<b>ApJL</b> 2016
<b>Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO</b> <i>C. L. Rodriguez, M. Zevin, C. Pankow, V. Kalogera, F. Rasio</i> ; Astrophys. J. Lett., <b>832</b> , L2	<b>ApJL</b> 2016
<b>Million-Body Star Cluster Simulations: Comparisons between Monte Carlo and Direct <math>N</math>-body</b> <i>C. L. Rodriguez, M. Morscher, L. Wang, S. Chatterjee, F. Rasio, R. Spurzem</i> ; Mon. Not. R. Astron. Soc. <b>463</b> , 2109	<b>MNRAS</b> 2016

<b>Basic Parameter Estimation of Binary Neutron Star Systems by the Advanced LIGO/Virgo Network</b>	<b>ApJ</b> 2014
<i>C. L. Rodriguez, B. Farr, V. Raymond, W. Farr, T. Littenberg, D. Fazi, V. Kalogera</i> ; <i>Astrophys. J.</i> , <b>785</b> , 2, 119	
<b>Inadequacies of the Fisher Information Matrix in gravitational-wave parameter estimation</b>	<b>PRD</b> 2013
<i>C. L. Rodriguez, B. Farr, W. Farr, I. Mandel</i> ; <i>Phys. Rev. D</i> , <b>88</b> , 8, 084013	
<b>Verifying the no-hair property of massive compact objects with intermediate-mass-ratio inspirals in advanced gravitational-wave detectors</b>	<b>PRD</b> 2012
<i>C. L. Rodriguez, I. Mandel, J. Gair</i> ; <i>Phys. Rev. D</i> , <b>85</b> , 6, 062002 - Synopsis in <i>Astrobites</i> (Link)	
<b>Contributing Author Papers</b> .....	
<b>White Dwarf Subsystems in Core-Collapsed Globular Clusters</b>	<b>ApJ</b> 2021
<i>K. Kremer, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, F. Rasio, S. Ye, C. L. Rodriguez</i> ; <i>Astrophys. J.</i> , <b>917</b> , 28	
<b>Matching Globular Cluster Models to Observations</b>	<b>ApJ</b> 2021
<i>N. Rui, K. Kremer, N. Weatherford, S. Chatterjee, F. Rasio, C. L. Rodriguez, S. Ye</i> ; <i>Astrophys. J.</i> , <b>912</b> , 2	
<b>No Black Holes in NGC 6397</b>	<b>RNAAS</b> 2021
<i>N. Rui, N. Weatherford, K. Kremer, S. Chatterjee, G. Fragione, F. Rasio, S. Ye, C. L. Rodriguez</i> ; <i>Research Notes AAS</i> , <b>5</b> , 47	
<b>Black Hole Mergers from Star Clusters with Top-heavy Initial Mass Functions</b>	<b>ApJL</b> 2021
<i>N. Weatherford, G. Fragione, K. Kremer, S. Chatterjee, S. Ye, C. L. Rodriguez, F. Rasio</i> ; <i>Astrophys. J. Lett.</i> , <b>907</b> , 25	
<b>Probing Multiple Populations of Compact binaries with Third-generation Gravitational-wave Detectors</b>	<b>ApJL</b> 2021
<i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez</i> ; <i>Astrophys. J. Lett.</i> , <b>913</b> , L5	
<b>One Channel to Rule Them All? Constraining the Origins of Binary Black Holes using Multiple Formation Pathways</b>	<b>ApJ</b> 2021
<i>M. Zevin, S. Bavera, C. Berry, V. Kalogera, T. Fragos, P. Marchant, C. L. Rodriguez, F. Antonini, D. Holz, C. Pankow</i> ; <i>Astrophys. J.</i> , <b>910</b> , 152	
<b>Intermediate-mass Black Holes from High Massive-star Binary Fractions in Young Star Clusters</b>	<b>ApJL</b> 2021
<i>E. González, K. Kremer, S. Chatterjee, G. Fragione, C. L. Rodriguez, N. Weatherford, S. Ye, F. Rasio</i> ; <i>Astrophys. J. Lett.</i> , <b>908</b> , 29	
<b>Black Hole Mergers from Hierarchical Triples in Dense Star Clusters</b>	<b>ApJ</b> 2020
<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> ; <i>Astrophys. J.</i> , <b>903</b> , 67	
<b>Modeling Dense Star Clusters in the Milky Way and Beyond with the CMC Cluster Catalog</b>	<b>ApJS</b> 2021
<i>K. Kremer, S. Ye, N. Rui, N. Weatherford, S. Chatterjee, G. Fragione, C. L. Rodriguez, M. Spera, F. Rasio</i> ; <i>Astrophys. J. Supp.</i> , <b>247</b> , 48	
<b>Populating the Upper Black Hole Mass Gap through Stellar Collisions in Young Star Clusters</b>	<b>ApJ</b> 2020
<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> ; <i>Astrophys. J.</i> , <b>903</b> , 45	
<b>Measuring the Star Formation Rate with Gravitational Waves from Binary Black Holes</b>	<b>ApJL</b> 2018
<i>S. Vitale, W. Farr, K. Ng, C. L. Rodriguez</i> ; <i>Astrophys. J. Lett.</i> , <b>886</b> , 1	
<b>On the Rate of Neutron Star Binary Mergers from Globular Clusters</b>	<b>ApJL</b> 2020
<i>C. Ye, W.-F. Fong, K. Kremer, C. L. Rodriguez, S. Chatterjee, G. Fragione, F. Rasio</i> ; <i>Astrophys. J. Lett.</i> , <b>888</b> , 10	

**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

## Graduate Students

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<b>Tomás Cabrera</b> Primary Advisor; Carnegie Mellon	<b>Grad Student</b> <i>2020-Present</i>
<b>Xiaoqi Yu</b> Primary Advisor; Carnegie Mellon	<b>Grad Student</b> <i>2020-Present</i>
<b>Kuldeep Sharma</b> Primary Advisor; Carnegie Mellon	<b>Grad Student</b> <i>2020-Present</i>
<b>Diptajyoti Mukherjee</b> Co-advised on project with Hy Trac; Carnegie Mellon	<b>Grad Student</b> <i>2020-Present</i>
<b>Gina Chen</b> Co-advising with Tiziana Di Matteo; Carnegie Mellon	<b>Grad Student</b> <i>2021-Present</i>
<b>Miguel Martinez</b> Primary Advisor for Project; Northwestern University	<b>Grad Student</b> <i>2020-2021</i>
<b>Halston Lim</b> Co-advised on project with Scott Hughes; MIT	<b>Grad Student</b> <i>2018-2020</i>
<b>Michael Zevin</b> Co-advised on project; KSPI Summer Program	<b>Grad Student</b> <i>2017-2018</i>

## Undergraduate Students

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<b>Jason Weng</b> Three-body Binary Formation in Star Clusters; Carnegie Mellon	<b>Undergraduate</b> <i>Fall 2021</i>
<b>Emily Sespico</b> Compact-object Populations in the Galactic Center; Carnegie Mellon	<b>Undergraduate</b> <i>Fall 2021</i>
<b>Kevin Quigley</b> Machine Learning for Gravitational-wave Populations; Carnegie Mellon	<b>Undergraduate</b> <i>Summer 2021</i>
<b>Alexis Ortega</b> Gravitational-wave Captures in Dense Stellar Environments; Carnegie Mellon Now in Physics PhD Program at Brown University	<b>Undergraduate</b> <i>2020-2021</i>

<b>Sofi Martinez Fortis</b> Numerical Integrators for the Gravitational $N$ -body problem; University of Pittsburgh	<b>Undergraduate</b> 2021
<b>Caitlin Fischer</b> Spinning Black Hole Triples; MIT Undergraduate Research Opportunities Program	<b>Undergraduate</b> 2017-2018
<b>Joshua Fuhrman</b> Merging Binary Black Holes in Open Clusters; Northwestern REU	<b>Undergraduate</b> 2016

## Teaching

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<b>33-331 Physical Mechanics</b> <i>Instructor of Record</i> ; Carnegie Mellon University, Pittsburgh, PA Upper Divisional Classical Mechanics for Undergraduate Majors	<b>Lecturer</b> 2020
<b>General Relativity</b> <i>Guest Lecturer and TA</i> ; Northwestern University, Evanston, IL	<b>Lecture/TA</b> 2015
<b>GK12 Fellowship</b> <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 ( <a href="#">Link</a> )	<b>Teaching</b> 2013-2014
<b>Einstein and the 20th Century</b> <i>Guest Lecturer and TA</i> ; Northwestern University, Evanston, IL	<b>Lecture/TA</b> 2013

## Invited Talks/Seminars

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<b>AAS Division of Dynamical Astronomy</b> <i>Remote Conference</i> ; Dynamical Formation of LIGO's Binary Black Hole Mergers	<b>Invited Talk</b> 2021
<b>APS April Meeting</b> <i>Remote Conference</i> ; Merger Rates of Binary Black Holes across Cosmic Space and Time	<b>Invited Talk</b> 2021
<b>California State University, Long Beach Physics Colloquium</b> <i>Long Beach, CA (remote)</i>	<b>Colloquium</b> 2021
<b>University of Texas, Dallas Physics Colloquium</b> <i>Dallas, TX (remote)</i>	<b>Colloquium</b> 2021
<b>Michigan State University Physics Colloquium</b> <i>Lansing, MI (remote)</i>	<b>Colloquium</b> 2021
<b>Astrophysics Seminar, University of British Columbia</b> <i>Vancouver, Canada (remote)</i>	<b>Seminar</b> 2021
<b>Astrophysics Seminar, University of Pennsylvania</b> <i>Philadelphia, PA (remote)</i>	<b>Seminar</b> 2021
<b>Astronomy Colloquium, Carnegie Observatories</b> <i>Tel Aviv, Israel (remote)</i>	<b>Seminar</b> 2020
<b>Astronomy Seminar, University of Wisconsin, Milwaukee</b> <i>Milwaukee, WI (remote)</i>	<b>Seminar</b> 2020
<b>Astronomy Colloquium, Oregon State University</b> <i>Corvallis, OR (remote)</i>	<b>Colloquium</b> 2020
<b>Astronomy Colloquium, Carnegie Observatories</b> <i>Pasadena, CA (remote)</i>	<b>Colloquium</b> 2020
<b>Astronomy Colloquium, UC Berkeley</b> <i>Berkeley, CA (remote)</i>	<b>Colloquium</b> 2020
<b>ITC Colloquium, Center for Astrophysics   Harvard and Smithsonian</b> <i>Cambridge, MA (remote)</i>	<b>Colloquium</b> 2020
<b>YITP Black Holes and Neutron Stars with Gravitational Waves</b> <i>Kyoto, Japan</i>	<b>Invited Talk</b> 2019

<b>KITP Merging Visions: Exploring Compact-Object Binaries with Gravity and Light</b> <i>Santa Barbara, CO</i>	<b>Invited Talk</b> 2019
<b>University of Colorado Astronomy and Planetary Science Colloquium</b> <i>Boulder, CO</i>	<b>Colloquium</b> 2019
<b>UCLA Astrophysics Colloquium</b> <i>Los Angeles, CA</i>	<b>Colloquium</b> 2019
<b>Vanderbilt Physics Colloquium</b> <i>Nashville, TN</i>	<b>Colloquium</b> 2019
<b>Syracuse Physics Colloquium</b> <i>Syracuse, NY</i>	<b>Colloquium</b> 2019
<b>Carnegie Mellon Astrophysics Colloquium</b> <i>Pittsburgh, PA</i>	<b>Colloquium</b> 2019
<b>UIUC Gravitation Seminar</b> <i>Urbana-Champaign, IL</i>	<b>Seminar</b> 2019
<b>UIUC Astronomy Colloquium</b> <i>Urbana-Champaign, IL</i>	<b>Colloquium</b> 2018
<b>Perimeter Institute Strong Gravity Seminar</b> <i>Waterloo, Canada</i>	<b>Seminar</b> 2018
<b>Stanford KIPAC Cosmology Seminar</b> <i>Palo Alto, CA</i>	<b>Seminar</b> 2018
<b>University of Cambridge IoA Galaxy Discussion</b> <i>Cambridge, UK</i>	<b>Seminar</b> 2018
<b>University of Surrey Astrophysics Seminar</b> <i>Guildford, UK</i>	<b>Seminar</b> 2018
<b>Harvard CfA Galaxy and Cosmology Seminar</b> <i>Cambridge, MA</i>	<b>Seminar</b> 2018
<b>CalTech Astronomy Colloquium</b> <i>Pasadena, CA</i>	<b>Colloquium</b> 2018
<b>Harvard Particle Theory Seminar</b> <i>Cambridge, MA</i>	<b>Seminar</b> 2018
<b>Columbia Astrophysics Colloquium</b> <i>New York, NY</i>	<b>Colloquium</b> 2017
<b>Harvard ITC Lunch Seminar</b> <i>Cambridge, MA</i> ( <a href="#">Link</a> )	<b>Seminar</b> 2017
<b>Strong Gravity and Binary Dynamics with Gravitational Wave Observations</b> <i>Oxford, MS</i>	<b>Invited Talk</b> 2017
<b>UCSC Flash Seminar</b> <i>Santa Cruz, CA</i>	<b>Seminar</b> 2017
<b>April APS Meeting</b> <i>Washington, DC</i>	<b>Invited Talk</b> 2017
<b>JSI Fall Workshop: Astrophysics in the Era of Grav. Wave Observations</b> <i>Annapolis, MD</i>	<b>Invited Talk</b> 2016
<b>KITP Rapid Response Workshop on Gravitational Waves</b> <i>Santa Barbara, CA</i>	<b>Invited Talk</b> 2016
<b>Compton Lecture Series</b> <i>Chicago, IL</i> ( <a href="#">Link</a> )	<b>Guest Seminar</b> 2016
<b>Stellar N-body Conference</b> <i>Sexten, Italy</i>	<b>Invited Talk</b> 2014
<b>Georgia Tech Center for Relativistic Astrophysics</b> <i>Atlanta, GA</i>	<b>Seminar</b> 2011



## Selected Contributed Talks/Posters

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<b>Black Holes, Neutron Stars, and Gravitational Waves: The New Era of Multi-Messenger Astronomy</b> <i>Honolulu, HI</i> <ul style="list-style-type: none"><li>- Proposed, chaired, and spoke at session at SACNAS (national conference for diversity in STEM)</li></ul>	<b>Chair</b> 2019
<b>Triple Evolution and Dynamics Trendy-2</b> <i>Leiden, Netherlands</i>	<b>Talk</b> 2018
<b>Aspen Center for Physics: Dawning Era of Gravitational-Wave Astrophysics</b> <i>Aspen, CO</i>	<b>Talk</b> 2017
<b>APS Meeting</b> <i>Salt Lake City, UT</i>	<b>Talk</b> 2016
<b>April APS Meeting</b> <i>Baltimore, MD</i>	<b>Talk</b> 2015
<b>IAU Meeting</b> <i>Beijing, China</i>	<b>Talk</b> 2014
<b>AAS Head Meeting</b> <i>Chicago, IL</i>	<b>Poster</b> 2014
<b>LIGO Scientific Collaboration Meeting</b> <i>Bethesda, MD</i>	<b>Talk</b> 2013
<b>Gravitational-Wave Physics and Astronomy Workshop</b> <i>Hannover, Germany</i> <ul style="list-style-type: none"><li>- 3rd place award for best poster</li></ul>	<b>Poster</b> 2012
<b>Gravitational-Wave Burst Workshop</b> <i>Tobermory, Scotland</i>	<b>Talk</b> 2012
<b>Midwest Relativity Meeting</b> <i>Urbana, IL</i>	<b>Talk</b> 2011
<b>Gravitational-Wave Physics and Astronomy Workshop</b> <i>Milwaukee, WI</i>	<b>Talk</b> 2011

## Public Lectures/Outreach

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<b>MIT Independent Activities Period</b> <i>The era of Gravitational-wave Astronomy; Cambridge, MA</i>	<b>Public Talk</b> 2017, 2018
<b>Compton Lecture Series</b> <i>Dense Star Clusters as Binary Black Hole Factories (Link)</i> Chicago, IL	<b>Guest Seminar</b> 2016
<b>TEDxNorthwesternU</b> <i>Listening to Einstein's Final Symphony (Link)</i> Evanston, IL	<b>TEDx Talk</b> 2016
<b>Conversations with an Astronomer</b> Series of Public Lectures at Adler Planetarium Chicago, IL	<b>Lecture Series</b> 2011–2016
<b>Film Submission: Jackson Hole Science Media Festival</b> <i>Black Holes and Globular Clusters (Link)</i>	<b>Short Film</b> 2014
<b>Mentoring Telescope Interns</b> Teaching High School Summer Interns at Adler Planetarium; Chicago, IL	<b>Mentoring</b> 2013
<b>Science Club Mentor</b> Weekly after-school science program at Boys and Girls Club; Chicago, IL	<b>Mentoring</b> 2012–2013
<b>Visualization Creation</b> Produced for Adler Planetarium Space Visualization Lab and; Chicago, IL <ul style="list-style-type: none"><li>Black Hole Dynamics in Core of Globular Cluster N-Body Simulation (Link)</li><li>Binary Black Holes Emitting Gravitational Waves (Link)</li></ul>	<b>Visualizations</b> 2011–2016

<b>Perseid Meteor Shower</b> Illinois Science Council in coordination with Chicago Parks Department Chicago, IL	<b>Public Talk</b> 2013
<b>Public Lecture at North Central Purdue University</b> <i>Catching Gravitational Waves with LIGO</i> Westville, IN	<b>Public talk</b> 2011

## Service Work

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<b>Committee Work at Carnegie Mellon:</b>	<b>Committee Service</b>
- - McWilliams Postdoctoral Fellowship Committee	2019-2020, 2021-2022*
· * Committee co-chair	
- Colloquium Committee	2020-2021, 2021-2022
- Equity, Diversity, and Inclusion Committee	2020-2021, 2021-2022
<b>Peer Reviewer for:</b>	<b>Referee</b>
- Physical Review Letters	2015-Present
- Physical Review D	
- Astrophysical Journal Letters	
- Astrophysical Journal	
- Monthly Notices of the Royal Astronomical Society	
- Nature	
- Nature Astronomy	
<b>Proposal Reviewer for:</b>	<b>Reviewer</b>
- NSF Astronomy and Astrophysics Research Grants	2021
- NASA Astrophysical Theory Program	2019
- US-Israel Binational Science Foundation	2018
<b>2021 Multiband Gravitational-Wave Science Workshop</b>	<b>Co-Organizer</b>
Workshop on future and proposed gravitational-wave detectors Carnegie Mellon University, Pittsburgh, PA (remote)	2021
<b>Black Holes, Neutron Stars, and Gravitational Waves</b>	<b>Chair</b>
Proposed, chaired, and spoke at session at SACNAS (conference for diversity in STEM) SACNAS, Honolulu, HI	2021
<b>IAP Co-Organizer</b>	<b>Organizer</b>
MIT Independent Activities Period; Cambridge, MA	2017
<b>Astronomy On Tap – Boston</b>	<b>Co-Organizer</b>
Public Outreach Event at Local Pubs Cambridge, MA	2016-2018