

# Michael J. Zevin || Curriculum Vitae

University of Chicago/Enrico Fermi Institute — 5640 S Ellis Ave — Chicago, IL 60637

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NHFP postdoctoral fellow with research interests in gravitational waves, compact objects, and stellar evolution.

## Education

### Academic Qualifications .....

#### Northwestern University

Evanston, IL

Ph.D., September 2020

M.Sc., December 2016

Program: Physics and Astronomy

Certificates: Integrated Data Science

Thesis: Unveiling the Lives and Deaths of Stars through Compact Object Mergers

Advisor: Vicky Kalogera

#### University of Illinois

Champaign, IL

B.S., May 2012

Majors: Astronomy, Physics

Minor: Music Performance

### Fellowships .....

- ▷ NASA Hubble Fellowship Program: Hubble postdoctoral fellow 2020–present
- ▷ Zhengtong/Enrico Fermi Postdoctoral Fellow expected: 2023
- ▷ KICP Fellow expected: 2023
- ▷ NSF IDEAS Fellowship 2016–2020
- ▷ Illinois Space Grant Consortium Fellowship 2017–2020
- ▷ NSF GK12 Fellowship 2017–2018
- ▷ Oxford Centre for Cosmological Studies Balzan Fellowship<sup>1</sup> 2018
- ▷ Kavli Summer Fellowship<sup>2</sup> 2017

## Publications

### First Author & Chaired Papers (with links) .....

#### One Channel to Rule Them All? Constraining the Origins of Binary Black Holes using Multiple Formation Pathways

ApJ

2021

[M. Zevin](#), S. Bavera, C. Berry, V. Kalogera, T. Fragos, P. Marchant, C. Rodriguez, F. Antonini, D. Holz, C. Pankow  
The Astrophysical Journal **910**, 152

#### Forward Modeling of Double Neutron Stars: Insights from Highly-Offset Short Gamma-ray Bursts

ApJ

2020

[M. Zevin](#), L. Kelley, A. Nugent, W. Fong, C. Berry, V. Kalogera

The Astrophysical Journal **904**, 190

#### Exploring the Lower Mass Gap and Unequal Mass Regime in Compact Binary Evolution

ApJL

2020

[M. Zevin](#), M. Spera, C. Berry, V. Kalogera

The Astrophysical Journal Letters **899**, L1

#### You Can't Always Get What You Want: The Impact of Prior Assumptions on Interpreting GW190412

ApJL

<sup>1</sup>Research Advisor: Dr. Chris Lintott (New College, University of Oxford)

<sup>2</sup>Research Advisor: Dr. Enrico Ramirez-Ruiz (University of California Santa Cruz)

- [M. Zevin](#), C. Berry, S. Coughlin, K. Chatziioannou, S. Vitale 2020  
The Astrophysical Journal Letters **899**, L17
- Can Neutron-Star Mergers Explain the r-process Enrichment in Globular Clusters?** ApJ  
[M. Zevin](#), K. Kremer, D. M. Siegel, S. Coughlin, B. T.-H. Tsang, C. P. L. Berry, V. Kalogera 2019  
The Astrophysical Journal **886**, 1
- Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters** ApJ  
[M. Zevin](#), J. Samsing, C. L. Rodriguez, C. J. Haster, E. Ramirez-Ruiz 2019  
The Astrophysical Journal **871**, 91  
– Covered by AAS Nova
- On the Progenitor of Binary Neutron Star Merger GW170817** ApJL  
The LIGO Scientific Collaboration and Virgo Collaboration<sup>3</sup> 2017  
The Astrophysical Journal Letters **850**, L40
- Constraining Formation Models of Binary Black Holes with Gravitational-Wave Observations** ApJ  
[M. Zevin](#), C. Pankow, C. Rodriguez, L. Sampson, E. Chase, V. Kalogera, F. Rasio 2017  
The Astrophysical Journal **846**, 82
- Gravity Spy: Integrating Advanced LIGO Detector Characterization, Machine Learning, and Citizen Science** CQG  
[M. Zevin](#), S. Coughlin, S. Bahaadini, E. Besler, N. Rohani, S. Allen, M. Cabero, K. Crowston, A. Katsaggelos, S. Larson, T. Lee, C. Lintott, T. Littenberg, A. Lundgren, C. Østerlund, J. Smith, L. Trouille, V. Kalogera 2017  
Classical and Quantum Gravity **34**, 064003  
– Covered by AAS Press

## Highlighted Contributed Papers .....

- Approximations to the spin of close Black-hole–Wolf-Rayet binaries** 2021  
S. Bavera, [M. Zevin](#), T. Fragos  
Research Notes of the American Astronomical Society (submitted)  
arXiv: 2105.09077
- GW190412: Observation of a Binary-Black-Hole Coalescence with Asymmetric Masses** PRD  
The LIGO Scientific Collaboration and Virgo Collaboration<sup>4</sup> 2020  
Physical Review D **102**, 043015
- COSMIC: Open-Source Binary Population Synthesis** ApJ  
K. Breivik, S. Coughlin, [M. Zevin](#), C. Rodriguez, K. Kremer, C. Ye, J. Andrews, M. Kurkowski, M. Digman, S. Larson, F. Rasio 2019  
The Astrophysical Journal **898**, 71
- Black Holes: The Next Generation** PRD  
C. Rodriguez, [M. Zevin](#), P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. A. Rasio, C. S. Ye 2019  
Physical Review D **100**, 043027
- Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO** ApJL  
C. Rodriguez, [M. Zevin](#), C. Pankow, V. Kalogera, F. A. Rasio 2016  
The Astrophysical Journal Letters **832**, L2

## Contributed Papers (with links) .....

- Evidence for Hierarchical Black Hole Mergers in the Second LIGO–Virgo Gravitational-Wave Catalog** 2020  
C. Kimball, C. Talbot, C. Berry, [M. Zevin](#), E. Thrane, V. Kalogera, R. Buscicchio, M. Carney, T. Dent, H. Middleton, E. Payne, J. Veitch, D. Williams  
The Astrophysical Journal Letters (submitted)  
arXiv: 2011.05332
- The Impact of Mass-Transfer Physics on the Observable Properties of** A&A

<sup>3</sup>[M. Zevin](#): Chair of paper-writing team and analysis lead

<sup>4</sup>[M. Zevin](#): Paper-writing team, populations and astrophysical implications lead

- Field Binary Black Hole Populations** 2021  
S. Bavera, T. Fragos, [M. Zevin](#), C. Berry, P. Marchant, J. Andrews, S. Coughlin, A. Dotter, K. Kovlakas, D. Misra, J. Serra-Perez, Y. Qin, K. Rocha, J. Romn-Garza, N. Tran, E. Zapartas  
*Astronomy & Astrophysics* **647**, 153
- Black hole genealogy: Identifying hierarchical mergers with gravitational waves** ApJ 2020  
C. Kimball, C. Talbot, C. Berry, M. Carney, [M. Zevin](#), E. Thrane, V. Kalogera  
*The Astrophysical Journal* **900** 177
- Black Hole Mergers from Hierarchical Triples in Dense Star Clusters** ApJ 2020  
M. Martinez, G. Fragione, K. Kremer, S. Chatterjee, C. L. Rodriguez, J. Samsing, C. S. Ye, N. Weatherford, [M. Zevin](#), S. Naoz, F. A. Rasio  
*The Astrophysical Journal* **903**, 67
- Teaching Citizen Scientists to Categorize Glitches using Machine Learning Guided Training** CHB 2019  
C. Jackson, C. Østerlund, K. Crowston, M. Harandi, S. Allen, S. Bahaadini, S. Coughlin, V. Kalogera, A. Katsaggelos, S. Larson, N. Rohani, J. Smith, L. Trouille, [M. Zevin](#)  
*Computers in Human Behavior* (accepted)
- The Missing Link in Gravitational-Wave Astronomy: Discoveries waiting in the decihertz range** ESA WP 2019  
M. Arca Sedda, C. Berry, K. Jani, P. Amaro-Seoane, P. Auclair, J. Baird, T. Baker, E. Berti, K. Breivik, C. Caprini, X. Chen, D. Doneva, J. Ezquiaga, S. Ford, M. Katz, S. Kolkowitz, B. McKernan, G. Mueller, G. Nardini, I. Pikovski, S. Rajendran, A. Sesana, L. Shao, N. Tamanini, N. Warburton, H. Witek, K. Wong, [M. Zevin](#)  
*ESA's Voyage 2050 White Paper*
- Knowledge Tracing to Model Learning in Online Citizen Science Projects** IEEE TLT 2019  
K. Crowston, C. Østerlund, T. Lee, C. Jackson, M. Harandi, S. Allen, S. Bahaadini, S. Coughlin, A. Katsaggelos, S. Larson, N. Rohani, J. Smith, L. Trouille, [M. Zevin](#)  
*IEEE Transactions on Learning Technologies* (accepted)
- Classifying the Unknown: Discovering Novel Gravitational-Wave Detector Glitches using Similarity Learning** PRD 2019  
S. Coughlin, S. Bahaadini, N. Rohani, [M. Zevin](#), O. Patane, M. Harandi, C. Jackson, V. Noroozi, S. Allen, J. Areeda, M. Coughlin, P. Ruiz, C. P. L. Berry, K. Crowston, A. K. Katsaggelos, A. Lundgren, C. Østerlund, J. R. Smith, L. Trouille, V. Kalogera  
*Physical Review D* **99**, 082002
- Post-Newtonian Dynamics in Dense Star Clusters: Binary Black Holes in the LISA Band** PRD 2019  
K. Kremer, C. L. Rodriguez, P. Amaro-Seoane, K. Breivik, S. Chatterjee, M. L. Katz, S. Larson, F. A. Rasio, J. Samsing, C. S. Ye, [M. Zevin](#)  
*Physical Review D* **99**, 063003
- Post-Newtonian Dynamics in Dense Star Clusters: Formation, Masses, and Merger Rates of Highly-Eccentric Black Hole Binaries** PRD 2018  
C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. A. Rasio, J. Samsing, C. S. Ye, [M. Zevin](#)  
*Physical Review D* **98**, 123005
- DIRECT: Deep Discriminative Embedding for Clustering of LIGO Data** ICIP 2018  
S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, [M. Zevin](#), V. Kalogera, A. K. Katsaggelos  
*25th IEEE International Conference on Image Processing Proceedings*
- Machine Learning for Gravity Spy: Glitch Classification and Dataset** ISJ 2018  
S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, [M. Zevin](#), J. R. Smith, V. Kalogera, A. K. Katsaggelos  
*Information Sciences Journal* **444**, 172
- Improvements in Gravitational-wave Sky Localization with Expanded Networks of Interferometers** ApJL 2018  
C. Pankow, E. A. Chase, S. Coughlin, [M. Zevin](#), V. Kalogera  
*The Astrophysical Journal Letters* **854**, L25
- Deep Multi-view Models for Glitch Classification** ICASSP 2018  
S. Bahaadini, N. Rohani, S. Coughlin, [M. Zevin](#), V. Kalogera, A. K. Katsaggelos

**Incorporating Current Research into Formal Higher Education Settings using Astrobites**

N. E. Sanders, S. Kohler, C. Faesi, A. Villar, **M. Zevin**

*American Journal of Physics* **85**, 741

**AJP**

2017

**Astrophysical Prior Information and Gravitational-Wave Parameter Estimation**

C. Pankow, L. Sampson, L. Perri, E. A. Chase, S. Coughlin, **M. Zevin**, V. Kalogera

*The Astrophysical Journal* **834**, 154

**APJ**

2017

**Collaboration Papers (as part of the LIGO Scientific Collaboration, 2015–Present) . . . . .**

- Search for Gravitational Waves Associated with Gamma-Ray Bursts Detected by Fermi and Swift During the LIGO-Virgo Run O3a
- Population Properties of Compact Objects from the Second LIGO-Virgo Gravitational-Wave Transient Catalog
- Tests of General Relativity with Binary Black Holes from the second LIGO-Virgo Gravitational-Wave Transient Catalog
- GWTC-2: Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run
- Gravitational-wave Constraints on the Equatorial Ellipticity of Millisecond Pulsars
- GW190521: A Binary Black Hole Merger with a Total Mass of  $150 M_{\odot}$
- Prospects for observing and localizing gravitational-wave transients with Advanced LIGO, Advanced Virgo and KAGRA
- Properties and Astrophysical Implications of the  $150 M$  Binary Black Hole Merger GW190521
- GW190814: Gravitational Waves from the Coalescence of a 23 Solar Mass Black Hole with a 2.6 Solar Mass Compact Object
- Optically targeted search for gravitational waves emitted by core-collapse supernovae during the first and second observing runs of advanced LIGO and advanced Virgo
- GW190412: Observation of a binary-black-hole coalescence with asymmetric masses<sup>5</sup>
- A Joint Fermi-GBM and LIGO/Virgo Analysis of Compact Binary Mergers from the First and Second Gravitational-wave Observing Runs
- A guide to LIGO-Virgo detector noise and extraction of transient gravitational-wave signals
- Model comparison from LIGO-Virgo data on GW170817's binary components and consequences for the merger remnant
- Search for gravitational waves from Scorpius X-1 in the second Advanced LIGO observing run with an improved hidden Markov model
- Open data from the first and second observing runs of Advanced LIGO and Advanced Virgo
- Tests of general relativity with the binary black hole signals from the LIGO-Virgo catalog GWTC-1
- Search for Gravitational-wave Signals Associated with Gamma-Ray Bursts during the Second Observing Run of Advanced LIGO and Advanced Virgo
- Search for Subsolar Mass Ultracompact Binaries in Advanced LIGO's Second Observing Run
- Search for Eccentric Binary Black Hole Mergers with Advanced LIGO and Advanced Virgo during Their First and Second Observing Runs
- Search for intermediate mass black hole binaries in the first and second observing runs of the Advanced LIGO and Virgo network<sup>6</sup>
- Directional limits on persistent gravitational waves using data from Advanced LIGO's first two observing runs
- Search for the isotropic stochastic background using data from Advanced LIGO's second observing run
- Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo<sup>7</sup>
- A gravitational-wave measurement of the Hubble constant following the second observing run of Advanced LIGO and Virgo
- GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs
- Tests of General Relativity with GW170817
- All-sky search for short gravitational-wave bursts in the second Advanced LIGO and Advanced Virgo run

<sup>5</sup>**M. Zevin**: Paper-writing team, populations and astrophysical implications lead, education and public outreach liaison

<sup>6</sup>**M. Zevin**: Parameter estimation lead for highest-significance IMBH trigger

<sup>7</sup>**M. Zevin**: Education and public outreach liaison

- All-sky search for continuous gravitational waves from isolated neutron stars using Advanced LIGO O2 data
- Searches for Gravitational Waves from Known Pulsars at Two Harmonics in 2015–2017 LIGO Data
- Narrow-band search for gravitational waves from known pulsars using the second LIGO observing run
- All-sky search for long-duration gravitational-wave transients in the second Advanced LIGO observing run
- First Measurement of the Hubble Constant from a Dark Standard Siren using the Dark Energy Survey Galaxies and the LIGO/Virgo Binary-Black-hole Merger GW170814
- Low-latency Gravitational-wave Alerts for Multimessenger Astronomy during the Second Advanced LIGO and Virgo Observing Run
- Search for Gravitational Waves from a Long-lived Remnant of the Binary Neutron Star Merger GW170817
- Searches for Continuous Gravitational Waves from 15 Supernova Remnants and Fomalhaut b with Advanced LIGO
- Search for Transient Gravitational-wave Signals Associated with Magnetar Bursts during Advanced LIGO's Second Observing Run
- Constraining the p-Mode–g-Mode Tidal Instability with GW170817
- Properties of the Binary Neutron Star Merger GW170817
- A Fermi Gamma-Ray Burst Monitor Search for Electromagnetic Signals Coincident with Gravitational-wave Candidates in Advanced LIGO's First Observing Run
- Search for Multimessenger Sources of Gravitational Waves and High-energy Neutrinos with Advanced LIGO during Its First Observing Run, ANTARES, and IceCube
- Search for Subsolar-Mass Ultracompact Binaries in Advanced LIGO's First Observing Run
- GW170817: Measurements of Neutron Star Radii and Equation of State
- Search for Tensor, Vector, and Scalar Polarizations in the Stochastic Gravitational-Wave Background
- Full band all-sky search for periodic gravitational waves in the O1 LIGO data
- Constraints on cosmic strings using data from the first Advanced LIGO observing run
- Prospects for observing and localizing gravitational-wave transients with Advanced LIGO, Advanced Virgo and KAGRA
- GW170817: Implications for the Stochastic Gravitational-Wave Background from Compact Binary Coalescences
- Effects of data quality vetoes on a search for compact binary coalescences in Advanced LIGO's first observing run
- All-sky search for long-duration gravitational wave transients in the first Advanced LIGO observing run
- First Search for Nontensorial Gravitational Waves from Known Pulsars
- First narrow-band search for continuous gravitational waves from known pulsars in advanced detector data
- First low-frequency Einstein@Home all-sky search for continuous gravitational waves in Advanced LIGO data
- GW170608: Observation of a 19 Solar-mass Binary Black Hole Coalescence
- Search for Post-merger Gravitational Waves from the Remnant of the Binary Neutron Star Merger GW170817
- Estimating the Contribution of Dynamical Ejecta in the Kilonova Associated with GW170817
- Search for High-energy Neutrinos from Binary Neutron Star Merger GW170817 with ANTARES, IceCube, and the Pierre Auger Observatory
- On the Progenitor of Binary Neutron Star Merger GW170817<sup>8</sup>
- A gravitational-wave standard siren measurement of the Hubble constant
- Gravitational Waves and Gamma-Rays from a Binary Neutron Star Merger: GW170817 and GRB 170817A
- Multi-messenger Observations of a Binary Neutron Star Merger
- GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral<sup>9</sup>
- GW170814: A Three-Detector Observation of Gravitational Waves from a Binary Black Hole Coalescence
- All-sky search for periodic gravitational waves in the O1 LIGO data
- Upper Limits on Gravitational Waves from Scorpius X-1 from a Model-based Cross-correlation Search in Advanced LIGO Data
- Search for high-energy neutrinos from gravitational wave event GW151226 and candidate LVT151012 with ANTARES and IceCube
- Search for intermediate mass black hole binaries in the first observing run of Advanced LIGO
- GW170104: Observation of a 50-Solar-Mass Binary Black Hole Coalescence at Redshift 0.2
- Search for gravitational waves from Scorpius X-1 in the first Advanced LIGO observing run with a hidden Markov model
- Search for Gravitational Waves Associated with Gamma-Ray Bursts during the First Advanced LIGO Observing Run and Implications for the Origin of GRB 150906B
- Effects of waveform model systematics on the interpretation of GW150914
- Search for continuous gravitational waves from neutron stars in globular cluster NGC 6544

<sup>8</sup>M. Zevin: Paper-writing chair and analysis lead

<sup>9</sup>M. Zevin: Education and public outreach liaison



- First Search for Gravitational Waves from Known Pulsars with Advanced LIGO
- Directional Limits on Persistent Gravitational Waves from Advanced LIGO's First Observing Run
- Upper Limits on the Stochastic Gravitational-Wave Background from Advanced LIGO's First Observing Run
- Calibration of the Advanced LIGO detectors for the discovery of the binary black-hole merger GW150914
- All-sky search for short gravitational-wave bursts in the first Advanced LIGO run
- Exploring the sensitivity of next generation gravitational wave detectors
- The basic physics of the binary black hole merger GW150914
- Supplement: The Rate of Binary Black Hole Mergers Inferred from Advanced LIGO Observations Surrounding GW150914 (2016, ApJL, 833, L1)
- The Rate of Binary Black Hole Mergers Inferred from Advanced LIGO Observations Surrounding GW150914
- Upper Limits on the Rates of Binary Neutron Star and Neutron Star-Black Hole Mergers from Advanced LIGO's First Observing Run
- Results of the deepest all-sky survey for continuous gravitational waves on LIGO S6 data running on the Einstein@Home volunteer distributed computing project
- First targeted search for gravitational-wave bursts from core-collapse supernovae in data of first-generation laser interferometer detectors
- Binary Black Hole Mergers in the First Advanced LIGO Observing Run
- Improved Analysis of GW150914 Using a Fully Spin-Precessing Waveform Model
- Directly comparing GW150914 with numerical solutions of Einstein's equations for binary black hole coalescence
- Comprehensive all-sky search for periodic gravitational waves in the sixth science run LIGO data
- Characterization of transient noise in Advanced LIGO relevant to gravitational wave signal GW150914
- Supplement: Localization and Broadband Follow-up of the Gravitational-wave Transient GW150914 (2016, ApJL, 826, L13)
- Localization and Broadband Follow-up of the Gravitational-wave Transient GW150914
- GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence
- Properties of the Binary Black Hole Merger GW150914
- Tests of General Relativity with GW150914
- High-energy neutrino follow-up search of gravitational wave event GW150914 with ANTARES and IceCube
- Search for transient gravitational waves in coincidence with short-duration radio transients during 2007-2013
- Observing gravitational-wave transient GW150914 with minimal assumptions
- GW150914: First results from the search for binary black hole coalescence with Advanced LIGO
- GW150914: The Advanced LIGO Detectors in the Era of First Discoveries
- GW150914: Implications for the Stochastic Gravitational-Wave Background from Binary Black Holes
- All-sky search for long-duration gravitational wave transients with initial LIGO
- Astrophysical Implications of the Binary Black-hole Merger GW150914
- Observation of Gravitational Waves from a Binary Black Hole Merger
- Prospects for Observing and Localizing Gravitational-Wave Transients with Advanced LIGO and Advanced Virgo

## Presentations

### Invited Talks .....

<b>Fermi Lab Cosmic Physics Center Seminar</b>	Virtual
<i>Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone</i>	May 2021
<b>Yale Astronomy Colloquium</b>	Virtual
<i>Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone</i>	April 2021
<b>University of Chicago Astro Lunch Seminar</b>	Virtual
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>	January 2021
<b>Zooniverse Transient Workshop</b>	Virtual
<i>Gravity Spy: Leveling Up &amp; Training Volunteers using Machine Learning</i>	November 2020
<b>CE Explorer Panel</b>	Virtual
<i>Binary Formation, panelist</i>	October 2020
<b>Perimeter Institute Strong Gravity Seminar</b>	Waterloo, ON

<i>Deciphering the Landscape of Compact Binary Formation Channels</i>	December 2019
<b>AEI Seminar</b>	Postdam, DE
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>	December 2019
<b>Caltech TAPIR Seminar</b>	Pasadena, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>	November 2019
<b>UCLA Lunch Talk</b>	Los Angeles, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>	November 2019
<b>UCSC FLASH Seminar</b>	Santa Cruz, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>	November 2019
<b>UCSB Astro Lunch</b>	Santa Barbara, CA
<i>Deciphering the Landscape of Binary Black Hole Formation Channels</i>	November 2019
<b>Colombia Astronomy Seminar</b>	New York, NY
<i>Getting the boot: Lonely GRBs, enigmatic r-process, and the birth of neutron stars</i>	October 2019
<b>MIT GRITTS Seminar</b>	Cambridge, MA
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>	October 2019
<b>CfA High Energy Astrophysics Seminar</b>	Cambridge, MA
<i>Deciphering the Landscape of Binary Black Hole Formation Channels</i>	October 2019
<b>CGCA Seminar</b>	Milwaukee, WI
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>	March 2019
<b>IGC Seminar</b>	Portsmouth, UK
<i>From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard &amp; the Next Generation of Citizen Science</i>	March 2018
<b>SPI-MAX Seminar</b>	Oxford, UK
<i>From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard &amp; the Next Generation of Citizen Science</i>	February 2018

## Contributed Talks & Posters.....

<b>NASA Hubble Fellowship Symposium (Talk)</b>	Virtual
<i>Research Overview</i>	September 2020
<b>Aspen Winter Conference (Talk)</b>	Aspen, CO
<i>Eccentric Black Hole Mergers in Dense Star Clusters: Post-Newtonian Effects &amp; Higher Multiplicity Encounters</i>	February 2019
<b>AAS 233 (Talk)</b>	Seattle, WA
<i>Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters</i>	January 2019
<b>NSF Research Traineeship Annual Meeting (Poster)</b>	Washington, DC
<i>Gravity Spy: Integrating Gravitational-Wave Astrophysics, Machine Learning, and Citizen Sciences</i>	September 2018
<b>MODEST-18 (Talk)</b>	Santorini, Greece
<i>The Role of Binary-Binary Interactions in Inducing Eccentric Black Hole Mergers</i>	June 2018
<b>APS April Meeting (Talk)</b>	Columbus, OH
<i>On the Progenitor of Binary Neutron Star Merger GW170817</i>	April 2018
<b>Detecting the Unexpected: Discovery in the Era of Astronomically Big Data (Talk)</b>	Baltimore, MD
<i>The Future of Citizen Science: Coupling Crowdsourcing and Machine Learning</i>	March 2017
<b>APS April Meeting (Talk)</b>	Washington, DC
<i>Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO</i>	January 2017
<b>AAS 229 (Talk)</b>	Grapevine, TX
<i>Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO</i>	January 2017
<b>AAS 229 (Workshop &amp; Poster)</b>	Grapevine, TX

<i>Astrobiters: Engaging Undergraduate Science Majors with Current Astrophysical Research</i>	January 2017
<b>AAS 228 (Talk)</b>	San Diego, CA
<i>Gravity Spy: Integrating aLIGO detector characterization, machine learning, and citizen science</i>	June 2016
<b>Northwestern Computational Research Exposition (Poster)</b>	Evanston, IL
<i>Integrating aLIGO detector characterization, machine learning, and citizen science</i>	April 2016
– Awarded first prize in poster competition	
<b>Midwest Relativity Meeting (Talk)</b>	Evanston, IL
<i>LIGO glitch classification through the combination of machine learning and citizen science</i>	September 2015

## Outreach & Public Engagement

### Science Communication .....

#### Astrobiters

#### Blog

Author, Administrator, & Leadership Team

2014–Present

- Astronomy blog partnered with the AAS, provides daily summaries of recent astronomy research articles
- Initiated the “Beyond” series, which covers topics on career advice, graduate school applications, and diversity, equity, and inclusivity in astronomy

#### ComSciCon

#### Workshop

Organizer, Attendee

2017–Present

- National graduate-student run science communication workshop for graduate students in STEM fields

#### Astronomy on Tap

#### Public Event

Co-founder, organizer, host, speaker

2015–Present

- Co-founded the Chicago branch of Astronomy on Tap, which hosts astronomy talks and space-based trivia at bars and breweries in the Chicago-land area

#### Rapid Fire Research

#### Departmental Event

Founder, Chair

2016–Present

- Annual research presentation event for graduate and undergraduate students in Northwestern Department of Physics and Astronomy

#### Machine Learning Meetups

#### Public Event

Organizer, Host

2016–2018

- Quarterly interdisciplinary colloquia on data science and machine learning topics

#### Chicagoland Science Penpals

#### Event

Participant

2017

- Correspondence with students in Chicago public schools about scientific research and science as a profession, using handwritten letters

### Public Talks & Lectures .....

#### Lifelong Learning

#### Lecture Series

Remote

2021–Present

- Public talks to older adults throughout Chihicago

#### Astronomer Conversations

#### Lecture Series

Adler Planetarium, Space Visualization Laboratory

2014–Present

- Monthly public presentations at the Adler Planetarium for museum guests

#### Astronomer Evenings

#### Lecture Series

Northwestern University, Dearborn Observatory

2016–Present

- Presentations during public observing hours at the Dearborn Observatory

#### UBS Investment Banking: Gravity Spy and LIGO

#### Invited Speaker

Virtual

September 2020



**Chipping Norton Amateur Astronomy Group***Chipping Norton, UK***Take Our Children to Work Day***Northwestern University***Haven Midde School***Evanston, IL***Chicago Astronomical Society***Adler Planetarium***Avery Coonley School***Downers Grove, IL***Seven Minutes of Science: An Interdisciplinary Symposium***Northwestern University***Highcrest Elementary***Wilmette, IL***Einstein Evenings***Northwestern University, Dearborn Observatory*

- Monthly presentations during observing hours on LIGO discoveries in celebration of the 100th anniversary of General Relativity

**Nettlehorst Elementary***Chicago, IL***Keynote Lecture***February 2018***Lecture***April 2016, 2018***Invited Speaker***April 2017, 2018***Keynote Lecture***May 2017***Invited Speaker***May 2017***Public Talk***April 2017***Invited Speaker***March 2017***Lecture Series***2015–2016***Invited Speaker***February 2016***Publications** .....**Astrobites***Authored over 20 blog posts on current research in astrophysics ([Link](#))***Blog***2014–Present***LIGO Science Summary***Companion science summary to the LIGO-Virgo O2 Populations paper ([Link](#))**Companion science summary to the GW170817 Detection paper ([Link](#))***Article***November 2018**October 2017***LIGO Magazine***The Gravity Spy Project - Machine Learning and Citizen Science ([Link](#))***Magazine Article***March 2017***Helix Magazine***The Legacy of Scientific Discovery ([Link](#))***Magazine Article***March 2017***Teaching & Work Experience****Northwestern University***Introduction to Astronomy, Stellar Astrophysics, Data-Driven Research in Astronomy*

- Guest lectured, developed assignments, graded, and ran telescope observing sessions

**Lecture/TA***2015–Present***GK12 Fellowship***Reach for the Stars; Evanston, IL*

- Co-taught astronomy classes at Evanston Township High School

- Developed curriculum, coding-based lessons, and visualizations for high-school students

**Teaching***2017–2018***Kids Science Labs***Lead Teacher; Chicago, IL*

- Taught classes of 3-12 year old students in hands-on, experiential science classes

- Designed curriculum for science summer camps

**Teaching***2013–2015***Adler Planetarium***Science Leadership Corps Instructor; Mission Specialist; Chicago, IL*

- Designed educational programming

- Facilitated exhibits, performed experiments, and gave astronomy talks to the public

**Teaching***2012–2014*

– Led under-represented students in designing experiments for high-altitude balloon launches

## Students Mentored .....

<b>Camille Liotine</b> <i>HMXB Progenitors to Binary Black Hole Mergers; CIERA Graduate Student</i>	<b>Graduate</b> 2020–present
<b>Michael Kurkowski</b> <i>Pair Instability Supernova Prescriptions in Binary Population Synthesis; CIERA REU Student</i>	<b>Undergraduate</b> 2019
<b>Jared Machtinger</b> <i>Population properties of binary black holes detected by LIGO; CIERA Summer Student</i>	<b>High School</b> 2019
<b>Danai Avdela</b> <i>Population properties of binary black holes detected by LIGO; CIERA Summer Student</i>	<b>High School</b> 2019
<b>Isaac Rivera</b> <i>Offset distributions of short gamma-ray bursts; CIERA REU Student</i>	<b>Undergraduate</b> 2018
<b>Grace Kern</b> <i>Optimization of Gravity Spy image retirement; CIERA Summer Student</i>	<b>High School</b> 2018
<b>Hannah Stein</b> <i>Optimization of Gravity Spy image retirement; CIERA Summer Student</i>	<b>High School</b> 2018
<b>Yuqi Yun</b> <i>Gaussian Process regression of black hole mass distributions; CIERA REU Student</i>	<b>Undergraduate</b> 2016
<b>Sophie Haight</b> <i>Gaussian Process regression of binary stellar evolution sequences; CIERA Summer Student</i>	<b>High School</b> 2016

## Awards & Honors

▷ Avery Coonley School, Graduate Keynote Speaker	June 2018
▷ American Astronomical Society, Media Intern	June 2016
▷ Breakthrough Prize in Fundamental Physics (as part of the LIGO-Virgo Collaboration)	May 2016
▷ Gruber Cosmology Prize (as part of the LIGO-Virgo Collaboration)	May 2016
▷ National Science Foundation Graduate Research Fellowship (honorable mention)	April 2016
▷ First Place, Poster Competition (Computational Research Day, Northwestern University)	April 2016
▷ High Distinction in Physics (University of Illinois Urbana-Champaign)	May 2012

## Affiliations & Leadership Positions

▷ Astrobites: Administrator, Author	2014–Present
▷ ComSciCon National: Organizer	2017–Present
▷ LIGO Scientific Collaboration: Member	2015–Present
▷ American Astronomical Society: Junior Member	2016–Present
▷ American Physical Society: Member	2016–Present
▷ CIERA Compact Objects Coffee: Founder, chair	2018–Present
▷ Chicago Metropolitan Symphony Orchestra: Double Bassist	2014–Present
▷ Physics and Astronomy Graduate Student Council: Quality of Life Chair	2016–2018
▷ Rapid Fire Research: Founder, chair	2016–2018

## **Service Work**

### **Peer Reviewer for:**

*2017–Present*

- *The Astrophysical Journal*
- *The Astrophysical Journal Letters*
- *Astronomy and Astrophysics*
- *Monthly Notices of the Royal Astronomical Society*
- *Nature Astronomy*
- *Physical Review D*
- *Physical Review Letters*