

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 Fellowship¹ 2018
- ▷ Kavli Summer Fellowship² 2017

Publications

First Author & Chaired Papers (with links)

Observational Inference on the Delay Time Distribution of Short Gamma-ray Bursts

[M. Zevin](#), A. Nugent, S. Adhikari, W.-f. Fong, D. Holz, L. Kelley

2022

The Astrophysical Journal Letters (under review)

arXiv: 2206.02814

Avoiding a Cluster Catastrophe: Retention Efficiency and the Binary Black Hole Mass Spectrum

ApJL

[M. Zevin](#), D. Holz

2022

The Astrophysical Journal Letters 935 L20

Suspicious Siblings: The Distribution of Mass and Spin Across Component Black Holes in Isolated Binary Evolution

ApJ

2022

[M. Zevin](#), S. Bavera

The Astrophysical Journal 933 86

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

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

Implications of Eccentric Observations on Binary Black Hole Formation Channels <i>M. Zevin, I. Romero-Shaw, K. Kremer, E. Thrane, P. Lasky</i> The Astrophysical Journal Letters 921 , L43	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. Rodriguez, F. Antonini, D. Holz, C. Pankow</i> The Astrophysical Journal 910 , 152	ApJ 2021
Forward Modeling of Double Neutron Stars: Insights from Highly-Offset Short Gamma-ray Bursts <i>M. Zevin, L. Kelley, A. Nugent, W.-f. Fong, C. Berry, V. Kalogera</i> The Astrophysical Journal 904 , 190	ApJ 2020
Exploring the Lower Mass Gap and Unequal Mass Regime in Compact Binary Evolution <i>M. Zevin, M. Spera, C. Berry, V. Kalogera</i> The Astrophysical Journal Letters 899 , L1	ApJL 2020
You Can't Always Get What You Want: The Impact of Prior Assumptions on Interpreting GW190412 <i>M. Zevin, C. Berry, S. Coughlin, K. Chatziioannou, S. Vitale</i> The Astrophysical Journal Letters 899 , L17	ApJL 2020
Can Neutron-Star Mergers Explain the r-process Enrichment in Globular Clusters? <i>M. Zevin, K. Kremer, D. M. Siegel, S. Coughlin, B. T.-H. Tsang, C. P. L. Berry, V. Kalogera</i> The Astrophysical Journal 886 , 1	ApJ 2019
Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters <i>M. Zevin, J. Samsing, C. L. Rodriguez, C. J. Haster, E. Ramirez-Ruiz</i> The Astrophysical Journal 871 , 91 – Covered by AAS Nova	ApJ 2019
On the Progenitor of Binary Neutron Star Merger GW170817 The LIGO Scientific Collaboration and Virgo Collaboration ³ The Astrophysical Journal Letters 850 , L40	ApJL 2017
Constraining Formation Models of Binary Black Holes with Gravitational-Wave Observations <i>M. Zevin, C. Pankow, C. Rodriguez, L. Sampson, E. Chase, V. Kalogera, F. Rasio</i> The Astrophysical Journal 846 , 82	ApJ 2017
Gravity Spy: Integrating Advanced LIGO Detector Characterization, Machine Learning, and Citizen Science <i>M. Zevin, S. Coughlin, S. Bahaadini, et al.</i> Classical and Quantum Gravity 34 , 064003 – Covered by AAS Press	CQG 2017

Highlighted Contributed Papers

Cosmologically coupled compact objects: a single parameter model for LIGO–Virgo mass and redshift distributions <i>K. Croker, M. Zevin, D. Farrah, K. Nishimura, G. Tarle</i> The Astrophysical Journal Letters 922 , L22	ApJL 2021
The Impact of Mass-Transfer Physics on the Observable Properties of Field Binary Black Hole Populations <i>S. Bavera, T. Fragos, M. Zevin, et al.</i> Astronomy & Astrophysics 647 , 153	A&A 2021
Approximations to the spin of close Black-hole–Wolf-Rayet binaries <i>S. Bavera, M. Zevin, T. Fragos</i> Research Notes of the American Astronomical Society 5 127	RNAAS 2021
GW190412: Observation of a Binary-Black-Hole Coalescence with Asymmetric Masses The LIGO Scientific Collaboration and Virgo Collaboration ⁴	PRD 2020

³*M. Zevin*: Chair of paper-writing team and analysis lead

⁴*M. Zevin*: Paper-writing team, populations and astrophysical implications lead

Physical Review D **102**, 043015

COSMIC: Open-Source Binary Population Synthesis

K. Breivik, S. Coughlin, [M. Zevin](#), et al.

The Astrophysical Journal **898**, 71

ApJ

2019

Black Holes: The Next Generation

C. Rodriguez, [M. Zevin](#), P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. A. Rasio, C. S. Ye

Physical Review D **100**, 043027

PRD

2019

Illuminating Black Hole Binary Formation Channels with Spins in Advanced LIGO

C. Rodriguez, [M. Zevin](#), C. Pankow, V. Kalogera, F. A. Rasio

The Astrophysical Journal Letters **832**, L2

ApJL

2016

Contributed Papers (with links)

Intermediate-mass Black Holes on the Run from Young Star Clusters

E. Gonzalez, K. Kremer, G. Fragione, M. Martinez, N. Weatherford, [M. Zevin](#), F. Rasio

The Astrophysical Journal (submitted)

arXiv: 2208.07881

2022

Discriminative Dimensionality Reduction using Deep Neural Networks for Clustering of LIGO Data

S. Baahadini, Y. Wu, S. Coughlin, [M. Zevin](#), A. Katsaggelos

IEEE Transactions on Neural Networks and Learning Systems (submitted)

arXiv: 2205.13672

2022

Short GRB Host Galaxies II: A Legacy Sample of Redshifts, Stellar Population Properties, and Implications for their Neutron Star Merger Origins

A. Nugent, W.-f. Fong, Y. Dong, J. Leja, E. Berger, [M. Zevin](#), et al.

The Astrophysical Journal (submitted)

arXiv: 2206.01764

2022

Black hole - black hole total merger mass and the origin of LIGO/Virgo sources

K. Belczynski, Z. Doctor, [M. Zevin](#), A. Olejak, S. Banerjee, D. Chattopadhyay

The Astrophysical Journal (submitted)

arXiv: 2204.11730

2022

The $\chi_{\text{eff}} z$ correlation of field binary black hole mergers and how 3G gravitational-wave detectors can constrain it

S.S. Bavera, M. Fishbach, [M. Zevin](#), E. Zapartas, T. Fragos

Astronomy & Astrophysics (submitted)

arXiv: 2204.02619

2022

POSDON: A General-Purpose Population Synthesis Code with Detailed Binary-Evolution Simulations

T. Fragos, J.J. Andrews, S.S. Bavera, ..., [M. Zevin](#)

The Astrophysical Journal Supplements (submitted)

arXiv: 2202.05892

2021

Stochastic gravitational-wave background as a tool to investigate multi-channel astrophysical and primordial black-hole mergers

S. Bavera, G. Franciolini, G. Cusin, A. Riotto, [M. Zevin](#), T. Fragos

Astronomy & Astrophysics **660**, 26

A&A

2022

Probing the progenitors of spinning binary black-hole mergers with long gamma-ray bursts

S. Bavera, T. Fragos, E. Zapartas, E. Ramirez-Ruiz, P. Marchant, L. Kelley, [M. Zevin](#), et al.

Astronomy & Astrophysics Letters **657**, L8

A&A

2022

Evidence for Hierarchical Black Hole Mergers in the Second LIGO–Virgo Gravitational-Wave Catalog

C. Kimball, C. Talbot, C. Berry, [M. Zevin](#), E. Thrane, V. Kalogera, et al.

The Astrophysical Journal Letters **915**, L35

ApJL

2020

The Impact of Mass-Transfer Physics on the Observable Properties of Field Binary Black Hole Populations

S. Bavera, T. Fragos, [M. Zevin](#), C. Berry, P. Marchant, J. Andrews, S. Coughlin, A. Dotter, et al.

A&A

2021

<i>Astronomy & Astrophysics</i> 647 , 153	
Black hole genealogy: Identifying hierarchical mergers with gravitational waves C. Kimball, C. Talbot, C. Berry, M. Carney, M. Zevin , E. Thrane, V. Kalogera <i>The Astrophysical Journal</i> 900 , 177	ApJ 2020
Black Hole Mergers from Hierarchical Triples in Dense Star Clusters M. Martinez, G. Fragione, K. Kremer, . . . , M. Zevin , S. Naoz, F. A. Rasio <i>The Astrophysical Journal</i> 903 , 67	ApJ 2020
Teaching Citizen Scientists to Categorize Glitches using Machine Learning Guided Training C. Jackson, C. Østerlund, K. Crowston, . . . , M. Zevin <i>Computers in Human Behavior</i> 105 , 106198	CHB 2020
The Missing Link in Gravitational-Wave Astronomy: Discoveries waiting in the decihertz range M. Arca Sedda, C. Berry, K. Jani, . . . , M. Zevin <i>Classical and Quantum Gravity</i> 37 , 215011 (<i>ESA's Voyage 2050 White Paper</i>)	CQG 2020
Knowledge Tracing to Model Learning in Online Citizen Science Projects K. Crowston, C. Østerlund, T. Lee, . . . , M. Zevin <i>IEEE Transactions on Learning Technologies</i> 13 , 1	IEEE TLT 2019
Classifying the Unknown: Discovering Novel Gravitational-Wave Detector Glitches using Similarity Learning S. Coughlin, S. Bahaadini, N. Rohani, M. Zevin , et al. <i>Physical Review D</i> 99 , 082002	PRD 2019
Post-Newtonian Dynamics in Dense Star Clusters: Binary Black Holes in the LISA Band K. Kremer, C. L. Rodriguez, . . . , M. Zevin <i>Physical Review D</i> 99 , 063003	PRD 2019
Post-Newtonian Dynamics in Dense Star Clusters: Formation, Masses, and Merger Rates of Highly-Eccentric Black Hole Binaries C. L. Rodriguez, P. Amaro-Seoane, S. Chatterjee, K. Kremer, F. A. Rasio, J. Samsing, C. S. Ye, M. Zevin <i>Physical Review D</i> 98 , 123005	PRD 2018
DIRECT: Deep Discriminative Embedding for Clustering of LIGO Data S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, M. Zevin , V. Kalogera, A. K. Katsaggelos <i>25th IEEE International Conference on Image Processing Proceedings</i>	ICIP 2018
Machine Learning for Gravity Spy: Glitch Classification and Dataset S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, M. Zevin , J. R. Smith, V. Kalogera, A. K. Katsaggelos <i>Information Sciences Journal</i> 444 , 172	ISJ 2018
Improvements in Gravitational-wave Sky Localization with Expanded Networks of Interferometers C. Pankow, E. A. Chase, S. Coughlin, M. Zevin , V. Kalogera <i>The Astrophysical Journal Letters</i> 854 , L25	ApJL 2018
Deep Multi-view Models for Glitch Classification S. Bahaadini, N. Rohani, S. Coughlin, M. Zevin , V. Kalogera, A. K. Katsaggelos <i>IEEE International Conference on Acoustics, Speech, and Signal Processing Proceedings</i>	ICASSP 2018
Incorporating Current Research into Formal Higher Education Settings using Astrobites N. E. Sanders, S. Kohler, C. Faesi, A. Villar, M. Zevin <i>American Journal of Physics</i> 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 <i>The Astrophysical Journal</i> 834 , 154	APJ 2017

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

- All-sky, all-frequency directional search for persistent gravitational waves from Advanced LIGO's and Advanced Virgo's first three observing runs
- First joint observation by the underground gravitational-wave detector KAGRA with GEO 600

- *Narrowband Searches for Continuous and Long-duration Transient Gravitational Waves from Known Pulsars in the LIGO-Virgo Third Observing Run*
- *Search for continuous gravitational wave emission from the Milky Way center in O3 LIGO–Virgo data*
- *Search of the early O3 LIGO data for continuous gravitational waves from the Cassiopeia A and Vela Jr. supernova remnants*
- *Search for Gravitational Waves Associated with Gamma-Ray Bursts Detected by Fermi and Swift during the LIGO-Virgo Run O3b*
- *Search for Gravitational Waves Associated with Fast Radio Bursts Detected by CHIME/FRB During the LIGO–Virgo Observing Run O3a*
- *Constraints on dark photon dark matter using data from LIGO’s and Virgo’s third observing run*
- *Search for intermediate-mass black hole binaries in the third observing run of Advanced LIGO and Advanced Virgo*
- *Search for gravitational waves from Scorpius X-1 with a hidden Markov model in O3 LIGO data*
- *All-sky search for continuous gravitational waves from isolated neutron stars using Advanced LIGO and Advanced Virgo O3 data*
- *Narrowband searches for continuous and long-duration transient gravitational waves from known pulsars in the LIGO-Virgo third observing run*
- *Tests of General Relativity with GWTC-3*
- *All-sky search for short gravitational-wave bursts in the third Advanced LIGO and Advanced Virgo run*
- *Search for Lensing Signatures in the Gravitational-Wave Observations from the First Half of LIGO-Virgo’s Third Observing Run*
- *All-sky search for gravitational wave emission from scalar boson clouds around spinning black holes in LIGO O3 data*
- *Searches for Gravitational Waves from Known Pulsars at Two Harmonics in the Second and Third LIGO-Virgo Observing Runs*
- *The population of merging compact binaries inferred using gravitational waves through GWTC-3⁵*
- *GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run⁶*
- *Constraints on the cosmic expansion history from GWTC-3*
- *All-sky search for long-duration gravitational-wave bursts in the third Advanced LIGO and Advanced Virgo run*
- *Constraints from LIGO O3 Data on Gravitational-wave Emission Due to R-modes in the Glitching Pulsar PSR J0537-6910*
- *Searches for Continuous Gravitational Waves from Young Supernova Remnants in the Early Third Observing Run of Advanced LIGO and Virgo*
- *All-sky search for continuous gravitational waves from isolated neutron stars in the early O3 LIGO data*
- *Search for subsolar-mass binaries in the first half of Advanced LIGO and Virgo’s third observing run*
- *Search for continuous gravitational waves from 20 accreting millisecond X-ray pulsars in O3 LIGO data*
- *GWTC-2.1: Deep Extended Catalog of Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run*
- *Search for anisotropic gravitational-wave backgrounds using data from Advanced LIGO and Advanced Virgo’s first three observing runs*
- *Upper limits on the isotropic gravitational-wave background from Advanced LIGO and Advanced Virgo’s third observing run*
- *Observation of Gravitational Waves from Two Neutron Star-Black Hole Coalescences*
- *Search for Gravitational Waves Associated with Gamma-Ray Bursts Detected by Fermi and Swift During the LIGO-Virgo Run O3a*
- *Constraints on Cosmic Strings Using Data from the Third Advanced LIGO-Virgo Observing Run*
- *Tests of general relativity with binary black holes from the second LIGO-Virgo gravitational-wave transient catalog*
- *Diving below the Spin-down Limit: Constraints on Gravitational Waves from the Energetic Young Pulsar PSR J0537-6910*
- *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*

⁵[M. Zevin](#): Astrophysical interpretation review lead, code reviewer for high-mass injection set

⁶[M. Zevin](#): Parameter estimation section review lead

- 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 masses⁷
- 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 network⁸
- 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 Virgo⁹
- 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
- 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

⁷M. Zevin: Paper-writing team, populations and astrophysical implications lead, education and public outreach liaison

⁸M. Zevin: Parameter estimation lead for highest-significance IMBH trigger

⁹M. Zevin: Education and public outreach liaison

- *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 GW170817¹⁰*
- *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 Inspiral¹¹*
- *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*
- *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*

¹⁰ *M. Zevin*: Paper-writing chair and analysis lead

¹¹ *M. Zevin*: Education and public outreach liaison

- 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		
AAS HEAD Meeting		Pittsburgh, PA
<i>One Channel to Rule Them All? Deciphering the Formation Pathways of Compact Object Mergers</i>		March 2022
Caltech/MIT LIGO–GRITTS Seminar		Virtual
<i>Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone</i>		June 2021
Fermi Lab Cosmic Physics Center Seminar		Virtual
<i>Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone</i>		May 2021
Yale Astronomy Colloquium		Virtual
<i>Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone</i>		April 2021
University of Chicago Astro Lunch Seminar		Virtual
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>		January 2021
Zooniverse Transient Workshop		Virtual
<i>Gravity Spy: Leveling Up & Training Volunteers using Machine Learning</i>		November 2020
CE Explorer Panel		Virtual
<i>Binary Formation, panelist</i>		October 2020
Perimeter Institute Strong Gravity Seminar		Waterloo, ON
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>		December 2019
AEI Seminar		Postdam, DE
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>		December 2019
Caltech TAPIR Seminar		Pasadena, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>		November 2019
UCLA Lunch Talk		Los Angeles, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>		November 2019
UCSC FLASH Seminar		Santa Cruz, CA
<i>Deciphering the Landscape of Compact Binary Formation Channels</i>		November 2019
UCSB Astro Lunch		Santa Barbara, CA

<i>Deciphering the Landscape of Binary Black Hole Formation Channels</i>	November 2019
Colombia Astronomy Seminar	New York, NY
<i>Getting the boot: Lonely GRBs, enigmatic r-process, and the birth of neutron stars</i>	October 2019
MIT GRITTS Seminar	Cambridge, MA
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>	October 2019
CfA High Energy Astrophysics Seminar	Cambridge, MA
<i>Deciphering the Landscape of Binary Black Hole Formation Channels</i>	October 2019
CGCA Seminar	Milwaukee, WI
<i>Unveiling the Lives and Deaths of Stars through Compact Object Mergers</i>	March 2019
IGC Seminar	Portsmouth, UK
<i>From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard & the Next Generation of Citizen Science</i>	March 2018
SPI-MAX Seminar	Oxford, UK
<i>From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard & the Next Generation of Citizen Science</i>	February 2018
Contributed Talks & Posters	
Intermediate-Mass Black Holes: New Science from Stellar Evolution to Cosmology (Talk)	San Juan, PR
<i>The growth of intermediate-mass black holes through hierarchical mergers: implications for ground-based gravitational-wave detections</i>	April 2022
APS April Meeting (Talk)	New York, NY
<i>Lessons learned from the galactic hosts of short gamma-ray bursts</i>	April 2022
Aspen Winter Conference (Talk)	Aspen, CO
<i>Growing Black Holes: The Impact of Retention Efficiency on Hierarchical Mergers and the BBH Mass Spectrum</i>	January 2022
Amaldi 14 (Talk)	Virtual
<i>Constraining dynamical formation channels of binary black holes with eccentric observations</i>	July 2021
NASA Hubble Fellowship Symposium (Talk)	Virtual
<i>Research Overview</i>	September 2020
Aspen Winter Conference (Talk)	Aspen, CO
<i>Eccentric Black Hole Mergers in Dense Star Clusters: Post-Newtonian Effects & Higher Multiplicity Encounters</i>	February 2019
AAS 233 (Talk)	Seattle, WA
<i>Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters</i>	January 2019
NSF Research Traineeship Annual Meeting (Poster)	Washington, DC
<i>Gravity Spy: Integrating Gravitational-Wave Astrophysics, Machine Learning, and Citizen Sciences</i>	September 2018
MODEST-18 (Talk)	Santorini, Greece
<i>The Role of Binary-Binary Interactions in Inducing Eccentric Black Hole Mergers</i>	June 2018
APS April Meeting (Talk)	Columbus, OH
<i>On the Progenitor of Binary Neutron Star Merger GW170817</i>	April 2018
Detecting the Unexpected: Discovery in the Era of Astronomically Big Data (Talk)	Baltimore, MD
<i>The Future of Citizen Science: Coupling Crowdsourcing and Machine Learning</i>	March 2017
APS April Meeting (Talk)	Washington, DC
<i>Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO</i>	January 2017
AAS 229 (Talk)	Grapevine, TX
<i>Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO</i>	January 2017
AAS 229 (Workshop & Poster)	Grapevine, TX
<i>Astrobites: Engaging Undergraduate Science Majors with Current Astrophysical Research</i>	January 2017

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

Outreach & Public Engagement

Science Communication	
Lifelong Learning <i>Organizer & Speaker</i> – Public talk series for seniors, based in public libraries and senior centers in the Chicago-land area.	Talk Series 2021–Present
Astrobitess <i>Author, Administrator, & Leadership Team</i> – 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	Blog 2014–Present
ComSciCon <i>Organizer, Attendee</i> – National graduate-student run science communication workshop for graduate students in STEM fields	Workshop 2017–2020
Astronomy on Tap <i>Co-founder, organizer, host, speaker</i> – 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	Public Event 2015–2020
Rapid Fire Research <i>Founder, Chair</i> – Annual research presentation event for graduate and undergraduate students in Northwestern Department of Physics and Astronomy	Departmental Event 2016–2019
Machine Learning Meetups <i>Organizer, Host</i> – Quarterly interdisciplinary colloquia on data science and machine learning topics	Public Event 2016–2018
Chicagoland Science Penpals <i>Participant</i> – Correspondence with students in Chicago public schools about scientific research and science as a profession, using handwritten letters	Event 2017

Public Talks & Lectures	
Lifelong Learning <i>Remote</i> – Public talks to older adults throughout Chihcago	Lecture Series 2021–Present
Astronomer Conversations <i>Adler Planetarium, Space Visualization Laboratory</i> – Monthly public presentations at the Adler Planetarium for museum guests	Lecture Series 2014–Present
Hinsdale Social Studies Circle: Uncovering the Universe’s Symphony <i>Virtual</i>	Invited Speaker January 2022
Finding Genius Podcast <i>Virtual</i>	Invited Speaker December 2021

UBS Investment Banking: Gravity Spy and LIGO

Virtual

Astronomer Evenings

Northwestern University, Dearborn Observatory

- Presentations during public observing hours at the Dearborn Observatory

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

Invited Speaker

September 2020

Lecture Series

2016–2019

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

2014–2020

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

Teaching

2013–2015

- Taught classes of 3-12 year old students in hands-on, experiential science classes
- Designed curriculum for science summer camps

Adler Planetarium

Science Leadership Corps Instructor; Mission Specialist; Chicago, IL

Teaching
2012–2014

- Designed educational programming
- Facilitated exhibits, performed experiments, and gave astronomy talks to the public
- Led under-represented students in designing experiments for high-altitude balloon launches

Students Mentored

Anya Nugent

Host demographics and progenitors of short GRBs; CIERA Graduate Student

Graduate
2021–present

Amanda Farah

Cosmology from evolving non-parametric mass distribution; University of Chicago Graduate Student

Graduate
2021–present

Camille Liotine

HMXB Progenitors to Binary Black Hole Mergers; CIERA Graduate Student

Graduate
2020–present

Michael Kurkowski

Pair Instability Supernova Prescriptions in Binary Population Synthesis; CIERA REU Student

Undergraduate
2019

Jared Machtinger

Population properties of binary black holes detected by LIGO; CIERA Summer Student

High School
2019

Danai Avdela

Population properties of binary black holes detected by LIGO; CIERA Summer Student

High School
2019

Isaac Rivera

Offset distributions of short gamma-ray bursts; CIERA REU Student

Undergraduate
2018

Grace Kern

Optimization of Gravity Spy image retirement; CIERA Summer Student

High School
2018

Hannah Stein

Optimization of Gravity Spy image retirement; CIERA Summer Student

High School
2018

Yuqi Yun

Gaussian Process regression of black hole mass distributions; CIERA REU Student

Undergraduate
2016

Sophie Haight

Gaussian Process regression of binary stellar evolution sequences; CIERA Summer Student

High School
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

- ▷ **GWPAW Conference: Scientific Organizing Committee** 2022

▷ NHFP Symposium: Scientific Organizing Committee	2022
▷ Lifelong Learning: Organizer	2021–2022
▷ Astrobits: Administrator, Author	2014–2020
▷ ComSciCon National: Organizer	2017–2020
▷ 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	2018–2020
▷ 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

Served on NSF panel	2021
Peer Reviewer for:	2017–Present
– <i>The Astrophysical Journal</i>	
– <i>The Astrophysical Journal Letters</i>	
– <i>Astronomy and Astrophysics</i>	
– <i>Monthly Notices of the Royal Astronomical Society</i>	
– <i>Nature Astronomy</i>	
– <i>Physical Review D</i>	
– <i>Physical Review Letters</i>	