Michael J. Zevin || *Curriculum Vitae*

Adler Planetarium — 1300 South DuSable Lake Shore Drive, — Chicago, IL 60605

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Astrophysicist at the Adler Planetarium with research interests in gravitational waves, compact objects, high-energy transients, stellar evolution, and citizen science.

Academic Positions

Adler Planetarium — Chicago, IL
Astronomer — *2023–Present*

Northwestern University — Evanston, IL
CIERA Visiting Scholar — *2023–Present*

University of Chicago — Chicago, IL
NASA Hubble Fellowship Program: Hubble Postdoctoral Fellow — *2020–2023*
Zhengtong/Enrico Fermi Postdoctoral Fellow
KICP Fellow

Education

Northwestern University — Evanston, IL
Ph.D. in Physics and Astronomy — *August 2020*

- Thesis: Unveiling the Lives and Deaths of Stars through Compact Object Mergers
- Advisor: Vicky Kalogera
- Additional Certificates: Integrated Data Science

Master of Science in Physics and Astronomy — *December 2016*

University of Illinois — Champaign, IL
Bachelor of Science — *May 2012*

- Double Major in Astronomy and Physics
- Minor in Music Performance

Awards & Honors

- **IOP Publishing Top Cited Paper Award**[1] — *2023*
- **NASA Hubble Fellowship Program: Hubble Postdoctoral Fellow** — *2020–2023*
- **Zhengtong/Enrico Fermi Postdoctoral Fellow** — *2020–2023*
- **KICP Postdoctoral Fellow** — *2020–2023*
- **Oxford Centre for Cosmological Studies Balzan Fellowship**[2] — *2018*
- **Illinois Space Grant Consortium Fellowship** — *2017–2020*
- **NSF GK12 Fellowship** — *2017–2018*
- **Kavli Summer Fellowship**[3] — *2017*
- **NSF IDEAS Fellowship** — *2016–2020*

[1] Zevin et al. 2020a & Zevin et al. 2021a both in the top 1% of most-cited articles in IOP Journals between 2020-2022
[2] Research Advisor: Dr. Chris Lintott (New College, University of Oxford)
[3] Research Advisor: Dr. Enrico Ramirez-Ruiz (University of California Santa Cruz)

- ▷ **National Science Foundation Graduate Research Fellowship** (*honorable mention*) *2016*
- ▷ **Gruber Cosmology Prize** (*as part of the LIGO-Virgo Collaboration*) *2016*
- ▷ **Breakthrough Prize in Fundamental Physics** (*as part of the LIGO-Virgo Collaboration*) *2016*
- ▷ **First Place in Poster Competition** (*Computational Research Day, Northwestern University*) *2016*
- ▷ **High Distinction in Physics** (*University of Illinois Urbana-Champaign*) *2012*

Publications

all paper titles are hyperlinked to their ADS entries

First Author Papers

https://ui.adsabs.harvard.edu/abs/2023arXiv230815530Z/abstract **EPJ+**
M. Zevin, C. Jackson, Z. Doctor, et al. *2023*
The European Physical Journal Plus (submitted)
Invited article for focus issue on citizen science for physics

Observational Inference on the Delay Time Distribution of Short Gamma-ray Bursts **ApJL**
M. Zevin, A. Nugent, S. Adhikari, W.-f. Fong, D. Holz, L. Kelley *2022*
The Astrophysical Journal Letters **940** L18

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

Implications of Eccentric Observations on Binary Black Hole Formation Channels **ApJL**
M. Zevin, I. Romero-Shaw, K. Kremer, E. Thrane, P. Lasky *2021*
The Astrophysical Journal Letters **921**, L43

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**
M. Zevin, L. Kelley, A. Nugent, W.-f. Fong, C. Berry, V. Kalogera *2020*
The Astrophysical Journal **904**, 190

Exploring the Lower Mass Gap and Unequal Mass Regime in Compact Binary Evolution **ApJL**
M. Zevin, M. Spera, C. Berry, V. Kalogera *2020*
The Astrophysical Journal Letters **899**, L1

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

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** *2017*
M. Zevin, S. Coughlin, S. Bahaadini, et al.
Classical and Quantum Gravity **34**, 064003
– Covered by *AAS Press*

Highlighted Contributed Papers

What You Don't Know Can Hurt You: Use and Abuse of Astrophysical Models in Gravitational-wave Population Analyses **ApJ** *2023*
A.Q. Cheng, M. Zevin, S. Vitale
The Astrophysical Journal **955**, 127

Things that might go bump in the night: Assessing structure in the binary black hole mass spectrum **ApJ**
A Farah, B. Edelman, M. Zevin, M. Fishbach, J. Ezquiaga, B. Farr, D. Holz *2023*
The Astrophysical Journal **955**, 107

Inferring Interference: Identifying a Perturbing Tertiary with Eccentric Gravitational Wave Burst Timing **PRD** *2023*
I. Romero-Shaw, N. Loutrel, M. Zevin
The Astrophysical Journal **107**, 122001

The Missing Link Between Black Holes in High-Mass X-ray Binaries and Gravitational-Wave Sources: Observational Selection Effects **ApJ** *2023*
C. Liotine, M. Zevin, C. Berry, Z. Doctor, V. Kalogera
The Astrophysical Journal **946**, 4

Cosmologically coupled compact objects: a single parameter model for LIGO–Virgo mass and redshift distributions **ApJL** *2021*
K. Croker, M. Zevin, D. Farrah, K. Nishimura, G. Tarle
The Astrophysical Journal Letters **922**, L22

The Impact of Mass-Transfer Physics on the Observable Properties of Field Binary Black Hole Populations **A&A** *2021*
S. Bavera, T. Fragos, M. Zevin, et al.
Astronomy & Astrophysics **647**, 153

Approximations to the spin of close Black-hole–Wolf-Rayet binaries **RNAAS**
S. Bavera, M. Zevin, T. Fragos *2021*
Research Notes of the American Astronomical Society **5** 127

COSMIC Variance in Binary Population Synthesis **ApJ**
K. Breivik, S. Coughlin, M. Zevin, et al. *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

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

only papers with significant contributions from M. Zevin are listed, click here for full list

The population of merging compact binaries inferred using gravitational waves through GWTC-3 **PRX**
Physical Review X **13**, 011048 *2023*
– *M. Zevin*: Astrophysical interpretation review lead, code reviewer for high-mass injection set

Search for intermediate-mass black hole binaries in the third observing run of Advanced LIGO and Advanced Virgo **A&A** *2022*
Astronomy and Astrophysics **659**, A84
– ***M. Zevin***: Reviewer for high-mass injection set

GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run *2021*
Physical Review X (submitted), arxiv:2111.03634
– ***M. Zevin***: Parameter estimation section review lead

Properties and Astrophysical Implications of the 150 $M_\odot$ Binary Black Hole Merger GW190521 **ApJL** *2020*
The Astrophysical Journal Letters **900**, L13
– ***M. Zevin***: Astrophysical implications reviewer

GW190412: Observation of a Binary-Black-Hole Coalescence with Asymmetric Masses **PRD** *2020*
Physical Review D **102**, 043015
– ***M. Zevin***: Paper-writing team, populations and astrophysical implications lead, education and public outreach liaison, science summary writer, science case study team

GW190814: Gravitational Waves from the Coalescence of a 23 Solar Mass Black Hole with a 2.6 Solar Mass Compact Object **ApJL** *2020*
The Astrophysical Journal Letters **896**, L44
– ***M. Zevin***: Astrophysical implications reviewer

Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo **ApJL** *2019*
The Astrophysical Journal Letters **882**, L24
– ***M. Zevin***: Education and public outreach liaison, science summary writer

On the Progenitor of Binary Neutron Star Merger GW170817 **ApJL** *2017*
The Astrophysical Journal Letters **850**, L40
– ***M. Zevin***: Chair of paper-writing team, analysis lead

GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral **PRL** *2017*
Physical Review Letters **119**, 161101
– ***M. Zevin***: Education and public outreach liaison

Observation of Gravitational Waves from a Binary Black Hole Merger **PRL** *2016*
Physical Review Letters **116**, 061102
– ***M. Zevin***: Ran exploratory parameter estimation

Contributed Papers

A Population of Short-duration Gamma-ray Bursts with Dwarf Host Galaxies
A. Nugent, W.-f. Fong, C. Castrejon, J. Leja, ***M. Zevin****, A. Ji* *2023*
The Astrophysical Journal (submitted)

Data quality up to the third observing run of Advanced LIGO: Gravity Spy glitch classifications **CQG**
J. Glanzer, S. Banagiri, S. Coughlin, S. Soni, C. Berry, ***M. Zevin****, et al.* *2023*
Classical and Quantum Gravity **40**, 065004

POSYDON: A General-Purpose Population Synthesis Code with Detailed Binary-Evolution Simulations **ApJS**
T. Fragos, J.J. Andrews, S.S. Bavera, . . . , ***M. Zevin*** *2023*
The Astrophysical Journal Supplements **264**, 45

Observational evidence for cosmological coupling of black holes and its implications for an astrophysical source of dark energy **ApJL** *2023*
D. Farrah, K. Croker, ***M. Zevin****, et al.*
The Astrophysical Journal Letters **944**, L31

A Preferential Growth Channel for Supermassive Black Holes in Elliptical Galaxies at z¡2 **ApJ**
D. Farrah, S. Petty, K. Croker, G. Tarlé, ***M. Zevin****, et al.* *2023*
The Astrophysical Journal **943**, 133

Intermediate-mass Black Holes on the Run from Young Star Clusters **ApJ**
*E. Gonzlez, K. Kremer, G. Fragione, M. Martinez, N. Weatherford, **M. Zevin**, F. Rasio* *2022*
The Astrophysical Journal **940**, 131

Discriminative Dimensionality Reduction using Deep Neural Networks for Clustering of LIGO Data
*S. Baahadini, Y. Wu, S. Coughlin, **M. Zevin**, A. Katsaggelos* *2022*
IEEE Transactions on Neural Networks and Learning Systems (submitted), arXiv: 2205.13672

Short GRB Host Galaxies II: A Legacy Sample of Redshifts, Stellar Population Properties, and Implications for their Neutron Star Merger Origins **ApJ** *2022*
*A. Nugent, W.-f. Fong, Y. Dong, J. Leja, E. Berger, **M. Zevin**, et al.*
The Astrophysical Journal **935**, 126

Black hole - black hole total merger mass and the origin of LIGO/Virgo sources **ApJ**
*K. Belczynski, Z. Doctor, **M. Zevin**, A. Olejak, S. Banerjee, D. Chattopadhyay* *2022*
The Astrophysical Journal **935**, 126

The $\chi_{\rm eff}z$ correlation of field binary black hole mergers and how 3G gravitational-wave detectors can constrain it **A&A** *2022*
*S.S. Bavera, M. Fishbach, **M. Zevin**, E. Zapartas, T. Fragos*
Astronomy & Astrophysics **665**, A59

Stochastic gravitational-wave background as a tool to investigate multi-channel astrophysical and primordial black-hole mergers **A&A** *2022*
*S. Bavera, G. Franciolini, G. Cusin, A. Riotto, **M. Zevin**, T. Fragos*
Astronomy & Astrophysics **660**, 26

Probing the progenitors of spinning binary black-hole mergers with long gamma-ray bursts **A&A**
*S. Bavera, T. Fragos, E. Zapartas, E. Ramirez-Ruiz, P. Marchant, L. Kelley, **M. Zevin**, et al.* *2022*
Astronomy & Astrophysics Letters **657**, L8

Evidence for Hierarchical Black Hole Mergers in the Second LIGO–Virgo Gravitational-Wave Catalog **ApJL**
*C. Kimball, C. Talbot, C. Berry, **M. Zevin**, E. Thrane, V. Kalogera, et al.* *2020*
The Astrophysical Journal Letters **915**, L35

The Impact of Mass-Transfer Physics on the Observable Properties of Field Binary Black Hole Populations **A&A** *2021*
*S. Bavera, T. Fragos, **M. Zevin**, C. Berry, P. Marchant, J. Andrews, S. Coughlin, A. Dotter, et al.*
Astronomy & Astrophysics **647**, 153

Black hole genealogy: Identifying hierarchical mergers with gravitational waves **ApJ**
*C. Kimball, C. Talbot, C. Berry, M. Carney, **M. Zevin**, E. Thrane, V. Kalogera* *2020*
The Astrophysical Journal **900**, 177

Black Hole Mergers from Hierarchical Triples in Dense Star Clusters **ApJ**
*M. Martinez, G. Fragione, K. Kremer, . . . , **M. Zevin**, S. Naoz, F. A. Rasio* *2020*
The Astrophysical Journal **903**, 67

Teaching Citizen Scientists to Categorize Glitches using Machine Learning Guided Training **CHB**
*C. Jackson, C. Østerlund, K. Crowston, . . . , **M. Zevin*** *2020*
Computers in Human Behavior **105**, 106198

The Missing Link in Gravitational-Wave Astronomy: Discoveries waiting in the decihertz range **CQG**
*M. Arca Sedda, C. Berry, K. Jani, . . . , **M. Zevin*** *2020*
Classical and Quantum Gravity **37**, 215011 (ESA's Voyage 2050 White Paper)

Knowledge Tracing to Model Learning in Online Citizen Science Projects **IEEE TLT**
*K. Crowston, C. Østerlund, T. Lee, . . . , **M. Zevin*** *2019*
IEEE Transactions on Learning Technologies **13**, 1

Classifying the Unknown: Discovering Novel Gravitational-Wave Detector Glitches using Similarity Learning **PRD** *2019*
*S. Coughlin, S. Bahaadini, N. Rohani, **M. Zevin**, et al.*
Physical Review D **99**, 082002

Post-Newtonian Dynamics in Dense Star Clusters: Binary Black Holes in the LISA Band **PRD**
*K. Kremer, C. L. Rodriguez, . . . , **M. Zevin*** *2019*
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**
*S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, **M. Zevin**, V. Kalogera, A. K. Katsaggelos* *2018*
25th IEEE International Conference on Image Processing Proceedings

Machine Learning for Gravity Spy: Glitch Classification and Dataset **ISJ**
*S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, **M. Zevin**, J. R. Smith, V. Kalogera, A. K. Katsaggelos* *2018*
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**
*S. Bahaadini, N. Rohani, S. Coughlin, **M. Zevin**, V. Kalogera, A. K. Katsaggelos* *2018*
IEEE International Conference on Acoustics, Speech, and Signal Processing Proceedings

Incorporating Current Research into Formal Higher Education Settings using Astrobites **AJP**
*N. E. Sanders, S. Kohler, C. Faesi, A. Villar, **M. Zevin*** *2017*
American Journal of Physics **85**, 741

Astrophysical Prior Information and Gravitational-Wave Parameter Estimation **APJ**
*C. Pankow, L. Sampson, L. Perri, E. A. Chase, S. Coughlin, **M. Zevin**, V. Kalogera* *2017*
The Astrophysical Journal **834**, 154

Presentations

Invited Talks

Notre Dame Astrophysics Seminar *South Bend, IN*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone November 2023

Caltech TAPIR Seminar *Pasadena, CA*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone May 2023

CITA Seminar *Toronto, Canada*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone November 2022

AAS HEAD Meeting *Pittsburgh, PA*
One Channel to Rule Them All? Deciphering the Formation Pathways of Compact Object Mergers March 2022

Caltech/MIT LIGO–GRITTS Seminar *Virtual*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone June 2021

Fermi Lab Cosmic Physics Center Seminar *Virtual*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone May 2021

Yale Astronomy Colloquium *Virtual*
Deciphering the Biography of Massive Stars: Compact Object Mergers as a Rosetta Stone April 2021

University of Chicago Astro Lunch Seminar *Virtual*
Unveiling the Lives and Deaths of Stars through Compact Object Mergers January 2021

Zooniverse Transient Workshop *Virtual*
Gravity Spy: Leveling Up & Training Volunteers using Machine Learning November 2020

Cosmic Explorer Panel — *Virtual*
Binary Formation, panelist — October 2020

Perimeter Institute Strong Gravity Seminar — *Waterloo, ON*
Deciphering the Landscape of Compact Binary Formation Channels — December 2019

AEI Seminar — *Postdam, DE*
Deciphering the Landscape of Compact Binary Formation Channels — December 2019

Caltech TAPIR Seminar — *Pasadena, CA*
Deciphering the Landscape of Compact Binary Formation Channels — November 2019

UCLA Lunch Talk — *Los Angeles, CA*
Deciphering the Landscape of Compact Binary Formation Channels — November 2019

UCSC FLASH Seminar — *Santa Cruz, CA*
Deciphering the Landscape of Compact Binary Formation Channels — November 2019

UCSB Astro Lunch — *Santa Barbara, CA*
Deciphering the Landscape of Binary Black Hole Formation Channels — November 2019

Colombia Astronomy Seminar — *New York, NY*
Getting the boot: Lonely GRBs, enigmatic r-process, and the birth of neutron stars — October 2019

MIT GRITTS Seminar — *Cambridge, MA*
Unveiling the Lives and Deaths of Stars through Compact Object Mergers — October 2019

CfA High Energy Astrophysics Seminar — *Cambridge, MA*
Deciphering the Landscape of Binary Black Hole Formation Channels — October 2019

CGCA Seminar — *Milwaukee, WI*
Unveiling the Lives and Deaths of Stars through Compact Object Mergers — March 2019

IGC Seminar — *Portsmouth, UK*
From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard & the Next Generation of Citizen Science — March 2018

SPI-MAX Seminar — *Oxford, UK*
From the Detected to the Detectors: Using Gravitational Waves to Enable Insights from the Stellar Graveyard & the Next Generation of Citizen Science — February 2018

Contributed Talks, Panels, & Posters

APS April Meeting (Talk) — *Minneapolis, MN*
Astrophysical Implications of Eccentric Black Hole Mergers — April 2023

GWPAW (Panel) — *Melbourne, Australia*
Panel discussion chair, Scientific Organizing Committee — December 2022

NHFP Symposium (Talk) — *Baltimore, MD*
Lessons learned from the galactic hosts of short gamma-ray bursts — September 2022

Post-PAX Meeting (Talk) — *Cambridge, MA*
Formation Channels of Binary Black Holes: Open Questions — August 2022

Intermediate-Mass Black Holes: New Science from Stellar Evolution to Cosmology (Talk) — *San Juan, PR*
The growth of intermediate-mass black holes through hierarchical mergers: implications for ground-based gravitational-wave detections — April 2022

APS April Meeting (Talk) — *New York, NY*
Lessons learned from the galactic hosts of short gamma-ray bursts — April 2022

Aspen Winter Conference (Talk) — *Aspen, CO*
Growing Black Holes: The Impact of Retention Efficiency on Hierarchical Mergers and the BBH Mass Spectrum — January 2022

NHFP Symposium (Talk) — *Virtual*
Constraining dynamical formation channels of binary black holes with eccentric observations — September 2021

Amaldi 14 (Talk) *Virtual*
Constraining dynamical formation channels of binary black holes with eccentric observations July 2021

NHFP Symposium (Talk) *Virtual*
Research Overview September 2020

Aspen Winter Conference (Talk) *Aspen, CO*
Eccentric Black Hole Mergers in Dense Star Clusters: Post-Newtonian Effects & Higher Multiplicity Encounters February 2019

AAS 233 (Talk) *Seattle, WA*
Eccentric Black Hole Mergers in Dense Star Clusters: The Role of Binary-Binary Encounters January 2019

NSF Research Traineeship Annual Meeting (Poster) *Washington, DC*
Gravity Spy: Integrating Gravitational-Wave Astrophysics, Machine Learning, and Citizen Sciences September 2018

MODEST-18 (Talk) *Santorini, Greece*
The Role of Binary-Binary Interactions in Inducing Eccentric Black Hole Mergers June 2018

APS April Meeting (Talk) *Columbus, OH*
On the Progenitor of Binary Neutron Star Merger GW170817 April 2018

Detecting the Unexpected: Discovery in the Era of Astronomically Big Data (Talk) *Baltimore, MD*
The Future of Citizen Science: Coupling Crowdsourcing and Machine Learning March 2017

APS April Meeting (Talk) *Washington, DC*
Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO January 2017

AAS 229 (Talk) *Grapevine, TX*
Discriminating Formation Channels of Binary Black Hole Systems with Advanced LIGO January 2017

AAS 229 (Workshop & Poster) *Grapevine, TX*
Astrobites: Engaging Undergraduate Science Majors with Current Astrophysical Research January 2017

AAS 228 (Talk) *San Diego, CA*
Gravity Spy: Integrating aLIGO detector characterization, machine learning, and citizen science June 2016

Northwestern Computational Research Exposition (Poster) *Evanston, IL*
Integrating aLIGO detector characterization, machine learning, and citizen science April 2016
– Awarded first prize in poster competition

Midwest Relativity Meeting (Talk) *Evanston, IL*
LIGO glitch classification through the combination of machine learning and citizen science September 2015

Outreach & Public Engagement

Science Communication & Outreach

Gravity Spy **Citizen Science**
Researcher, Developer *2015–Present*
– Developed Zooniverse citizen science project to classify and characterize LIGO–Virgo detector data, as part of a team of gravitational wave, machine learning, Zooniverse, and social scientists
– Led construction of user interface on the Zooniverse Lab platform, point person for communication between the Zooniverse volunteers and science team
– Project has accumulated over 7,000,000 classifications from over 30,000 registered users (January 2022)

Lifelong Learning **Talk Series**
Organizer *2021–2022*
– Public talk series for seniors, based in public libraries and senior centers in the Chicago-land area.

Astrobites **Blog**
Author, Administrator, & Leadership Team *2014–2020*
– 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 *2017–2020*
– National graduate-student run science communication workshop for graduate students in STEM fields

Astronomy on Tap **Public Event**
Co-founder, organizer, host, speaker *2015–2020*
– 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 *2016–2019*
– 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

Astronomer Conversations **Lecture Series**
Adler Planetarium, Space Visualization Laboratory *2014–2020*
– Public presentations at the Adler Planetarium for museum guests

Lifelong Learning: JWST **Lecture Series**
Remote *November 2022*

Art of Science **Invited Speaker**
Chicago, IL *October 2022*

Hinsdale Social Studies Circle: Uncovering the Universe's Symphony **Invited Speaker**
Virtual *January 2022*

Finding Genius Podcast **Invited Speaker**
Virtual *December 2021*

Lifelong Learning: Gravitational Waves **Lecture Series**
Remote *November 2021*

Lifelong Learning: Gravitational Waves **Lecture Series**
Remote *March 2021*

UBS Investment Banking: Gravity Spy and LIGO **Invited Speaker**
Virtual *September 2020*

Astronomer Evenings **Lecture Series**
Northwestern University, Dearborn Observatory *2016–2019*
– Presentations during public observing hours at the Dearborn Observatory

Chipping Norton Amateur Astronomy Group **Keynote Lecture**
Chipping Norton, UK *February 2018*

Take Our Children to Work Day **Lecture**
Northwestern University *April 2016, 2018*

Haven Midde School — **Invited Speaker**
Evanston, IL — *April 2017, 2018*

Chicago Astronomical Society — **Keynote Lecture**
Adler Planetarium — *May 2017*

Avery Coonley School — **Invited Speaker**
Downers Grove, IL — *May 2017*

Seven Minutes of Science: An Interdisciplinary Symposium — **Public Talk**
Northwestern University — *April 2017*

Highcrest Elementary — **Invited Speaker**
Wilmette, IL — *March 2017*

Einstein Evenings — **Lecture Series**
Northwestern University, Dearborn Observatory — *2015–2016*
– Monthly presentations during observing hours on LIGO discoveries in celebration of the 100th anniversary of General Relativity

Nettlehorst Elementary — **Invited Speaker**
Chicago, IL — *February 2016*

Publications

Astrobites — **Blog**
Authored over 20 blog posts on current research in astrophysics (**Link**) — *2014–2020*

LIGO Science Summary — **Article**
Companion science summary to the LIGO–Virgo O2 Populations paper (**Link**) — *November 2018*
Companion science summary to the GW170817 Detection paper (**Link**) — *October 2017*

LIGO Magazine — **Magazine Article**
The Gravity Spy Project — Machine Learning and Citizen Science (**Link**) — *March 2017*

Helix Magazine — **Magazine Article**
The Legacy of Scientific Discovery (**Link**) — *March 2017*

Teaching & Work Experience

Illinois Institute of Technology — **Guest Lecturer**
Undergraduate Level Observational Astrophysics — *2023*

University of Chicago — **Guest Lecturer**
Graduate Level Stellar Astrophysics, Graduate Level Space Physics — *2022–Present*

Northwestern University — **Lecturer/TA**
Introduction to Astronomy, Stellar Astrophysics, Data-Driven Research in Astronomy — *2015–2017*
– Guest lectured, developed assignments, graded, and ran telescope observing sessions

GK12 Fellowship — **Teaching**
Reach for the Stars; Evanston, IL — *2017–2018*
– Co-taught astronomy classes at Evanston Township High School
– Developed curriculum, coding-based lessons, and visualizations for high-school students

Kids Science Labs — **Teaching**
Lead Teacher; Chicago, IL — *2013–2015*
– Taught classes of 3–12 year old students in hands-on, experiential science classes
– Designed curriculum for science summer camps

Adler Planetarium **Museum Education**
Mission Specialist, Science Leadership Corps Instructor; Chicago, IL *2012–2014*
– Facilitated exhibits, performed experiments, and gave astronomy talks to the public
– Designed educational programming
– Led under-represented students in designing experiments for high-altitude balloon launches

Students Mentored

Alex Hanselman **Graduate**
Self-consistent eccentricity definitions; University of Chicago Graduate Student *2023–present*

Ethan Payne **Graduate**
Measurability of spin and precession in hierarchical mergers; Caltech Graduate Student *2022–present*

April Cheng **Undergraduate**
Multi-channel model selection with GWTC-3; MIT Undergraduate Student *2022–present*

Aditya Vijaykumar **Graduate**
Evolution of binary neutron stars in cosmological simulations; KICP Visiting Graduate Student *2022–present*

Anya Nugent **Graduate**
Host demographics and progenitors of short GRBs; CIERA Graduate Student *2021–present*

Amanda Farah **Graduate**
Cosmology from evolving non-parametric mass distribution; University of Chicago Graduate Student *2021–present*

Camille Liotine **Graduate**
HMXB Progenitors to Binary Black Hole Mergers; CIERA Graduate Student *2020–2023*

Simone Bavera **Graduate**
Isolated Evolution and Tidal Spin-up of Wolf-Rayet Stars; University of Geneva Graduate Student *2019–2021*

Michael Kurkowski **Undergraduate**
Pair Instability Supernova Prescriptions in Binary Population Synthesis; CIERA REU Student *2019*

Jared Machtinger **High School**
Population properties of binary black holes detected by LIGO; CIERA Summer Student *2019*

Danai Avdela **High School**
Population properties of binary black holes detected by LIGO; CIERA Summer Student *2019*

Isaac Rivera **Undergraduate**
Offset distributions of short gamma-ray bursts; CIERA REU Student *2018*

Grace Kern **High School**
Optimization of Gravity Spy image retirement; CIERA Summer Student *2018*

Hannah Stein **High School**
Optimization of Gravity Spy image retirement; CIERA Summer Student *2018*

Yuqi Yun **Undergraduate**
Gaussian Process regression of black hole mass distributions; CIERA REU Student *2016*

Sophie Haight **High School**
Gaussian Process regression of binary stellar evolution sequences; CIERA Summer Student *2016*

Affiliations & Leadership Positions

- **LSST Discovery Alliance:** Institutional Representative *2023–present*
- **GWPAW Conference:** Scientific Organizing Committee *2022*
- **NHFP Symposium:** Scientific Organizing Committee *2022*
- **Lifelong Learning:** Organizer *2021–2022*
- **NHFP DEI Working Group:** Statistics Co-Lead *2020–2022*

- **ComSciCon National:** Organizer *2017–2020*
- **American Astronomical Society:** Member *2016–Present*
- **American Physical Society:** Member *2016–Present*
- **American Astronomical Society, Media Intern** *2016*
- **Physics and Astronomy Graduate Student Council:** Quality of Life Chair *2016–2018*
- **Rapid Fire Research:** Founder, chair *2016–2018*
- **LIGO Scientific Collaboration:** Member *2015–Present*
- **Astrobites:** Administrator, Author *2014–2020*
- **Chicago Metropolitan Symphony Orchestra:** Double Bassist *2014–2020*

Service Work

Served on NSF panel *2021*

Peer Reviewer for: *2017–Present*

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