

## Education & Appointments

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### PhD Candidate, Astronomy & Astrophysics

University of Chicago.

**Thesis:** *Probing Chemical Enrichment Patterns in Globular Clusters Using Stellar Streams*

Expected: 2025

Advisor: Prof. Alexander Ji

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### Fermi National Laboratory, Computer Science Division.

Summer Research Intern.

Summer 2020

Advisor: Dr. Brian Nord.

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### NASA Goddard, Gravitational Astrophysics Laboratory.

Summer Research Intern.

Summer 2019

Advisor: Dr. John G Baker.

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### MPhil, Physics & Astronomy

Cardiff University.

**Thesis:** *Rapid Parameterization & Estimated Inclination of Gravitational Waves from Binary Systems*

2018

Advisor: Prof. Stephen Fairhurst

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### BS, Physics & Math (Double Major)

Syracuse University. French Minor, Summa Cum Laude.

**Thesis:** *The PyCBC Search for Gravitational Waves from Compact Binary Coalescence*

2016

Advisor: Prof. Duncan Brown

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### California Institute of Technology, Gravitational-Wave Group.

Summer Research Intern.

Summer 2015

Advisor: Prof. Alan Weinstein.

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### Laboratoire de l'Accélérateur Linéaire, Gravitational-Wave Group.

Summer Research Intern.

Summer 2014

Advisor: Dr. Florent Robinet.

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## Teaching

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### Graduate Pedagogy Fellow

*Chicago Center for Teaching and Learning, University of Chicago.*

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2023-2024

### Curriculum Developer

*Department of Astronomy and Astrophysics, University of Chicago.*

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Spring 2024

Spring 2023

Fall 2022

### Teaching Assistant

*Department of Astronomy and Astrophysics, University of Chicago.*

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Galaxies

Winter 2024

Winter 2023

Winter 2020

Winter 2019

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Stars

Fall 2023

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Exoplanets

Spring 2021

Spring 2020

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The Big Bang

Spring 2019

Spring 2020

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Matter, Energy, Space & Time

Fall 2020

Fall 2018

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### Teaching Assistant

*Chicago Center for Teaching and Learning, University of Chicago.*

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Course Design and College Teaching.

Fall 2023

## Telescope Allocation

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### Magellan Clay – MIKE (1 night)

2023B

*Constraining multiple populations in globular cluster stellar streams.*

## Awards & Honors

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### American Dissertation Fellowship

*American Association for University Women*

2024-2025

### Graduate Fellowship

*Chicago Center for Teaching and Learning*

2023-2024

### LGBT+ Community Engagement Award

*UChicago Alumni Association and the Center for Sexuality and Gender Studies*

2023

### Out to Innovate Scholarship

*Out to Innovate (formerly known as National Organization of Gay and Lesbian Scientists and Technical Professionals (NOGLSTP))*

2022

### Radix Trading Fellowship

*Radix Trading, LLC.*

2021-2022

### URA Summer Graduate Fellowship

*Universities Research Association*

2021

### Illinois Space Grant

*Illinois Space Grant Consortium*

2019

### Special Breakthrough Prize in Fundamental Physics

*Breakthrough Prize Board*

2016

### Cardiff University USA Excellence Scholarship

*Cardiff University*

2016

### Syracuse University Scholar

*Syracuse University*

2016

### Norma Slepecky Undergraduate Research Prize

*Women in Science and Engineering (WiSE) at Syracuse University*

2016

### Renée Crown Honors Prize

*Renée Crown University Honors Program*

2016

### Paul M. Gelling Fellowship Fund

*Syracuse University, Department of Physics*

2016

### Astronaut Scholarship

*Astronaut Scholarship Foundation*

2015

### Barry Goldwater Scholarship Honorable Mention

*The Barry Goldwater Scholarship and Excellence in Education Foundation*

2014, 2015

## Publications

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### First-Author and Mentored Publications

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5. Chemical Abundances in the Metal-Poor Globular Cluster ESO280-SC06: A Tidally Disrupted Globular Cluster In prep  
**S. A. Usman**, A. P. Ji, J. Rodriguez, A. Bonaca, S. Shah, J. Simpson, T. S. Li, and S. Martell.  
*In preparation for publication in the Open Journal of Astrophysics.*
4. Chemical Abundances in the Leiptr Stellar Stream: a Disrupted Ultra-faint Dwarf Galaxy? 2024  
K. R. Atzberger, **S. A. Usman**, A. P. Ji, L. R. Cullinane, D. Erkal, T. T. Hansen, G. F. Lewis, T. S. Li, G. Limberg, A. Luna, S. L. Martell, et al.  
*Submitted to Open Journal of Astrophysics.*
3. Multiple Populations and a CH Star Found in the 300S Globular Cluster Stellar Stream 2024  
**S. A. Usman**, A. P. Ji, T. S. Li, A. B. Pace, L. R. Cullinane, G. S. Da Costa, S. E. Koposov, G. F. Lewis, D. B. Zucker, et al. (The  $S^5$  Collaboration)  
*Monthly Notices of the Royal Astronomical Society, Volume 529, Issue 3, pp.2413-2427..*
2. Constraining the Inclination of Binary Mergers from Gravitational-wave Observations 2019  
**S. A. Usman**, J. C. Mills, and S. Fairhurst.  
*The Astrophysical Journal, Volume 877, Issue 2, article id. 82, 10 pp.*
1. The PyCBC search for gravitational waves from compact binary coalescence 2016  
**S. A. Usman**, A. H. Nitz, I. W. Harry, C. M. Biwer, D. A. Brown, M. Cabero, C. D. Capano, T. Dal Canton, T. Dent, S. Fairhurst, et al.  
*Classical and Quantum Gravity, Volume 33, Issue 21, article id. 215004.*

### Contributed Publications

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10. DeepSZSim: Python code for fast, tunable simulations of the thermal Sunyaev–Zeldovich effect in galaxy clusters In prep  
E. M. Vavagiakis, S. McDermott, H. Awan, E. Ran, K. Banker, **S. A. Usman**, C. Avestruz and B. Nord  
*In preparation for publication in the Journal of Open Source Software.*
9.  $S^5$ : New insights from deep spectroscopic observations of the tidal tails of the globular clusters NGC 1261 and NGC 1904 2024  
P. Awad, T. S. Li, D. Erkal, R. F. Peletier, K. Bunte, S. E. Koposov, A. Li, E. Balbinot, R. Smith, M. Canducci, P. Tiño, A. M. Senkevich et al.  
*Accepted to Astronomy & Astrophysics.*
8. Inferring dark matter subhalo properties from simulated subhalo-stream encounters 2024  
T. Hilmi, D. Erkal, S. E. Koposov, T. S. Li, S. Lilleengen, A. P. Ji, G. F. Lewis, N. Shipp, A. B. Pace, D. B. Zucker, G. Limberg, and **S. A. Usman**.  
*Submitted to Monthly Notices of the Royal Astronomical Society.*
7. Extending the Chemical Reach of the H3 Survey: Detailed Abundances of the Dwarf-galaxy Stellar Stream Wukong/LMS-1 2024  
G. Limberg, A. P. Ji, R. P. Naidu, A. Chiti, S. Rossi, **S. A. Usman**, Y.-S. Ting, D. Zaritsky, A. Bonaca, L. Borbolato, J. S. Speagle, et al.  
*Monthly Notices of the Royal Astronomical Society, Volume 530, Issue 3, pp.2512-2525y.*
6. Spectacular Nucleosynthesis from Early Massive Stars 2024  
A. P. Ji, S. Curtis, N. Storm, V. Chandra, K. C. Schlafman, K. G. Stassun, A. Heger, M. Pignatari, A. M. Price-Whelan, M. Bergemann, et al.  
*The Astrophysical Journal Letters, Volume 961, Issue 2, id.L41, 25 pp..*
5. Simple parameter estimation using observable features of gravitational-wave signals 2023  
S. Fairhurst, C. Hoy, R. Green, C. Mills, **S. A. Usman**  
*Physical Review D 108, 082006.*
4. Observation of Gravitational Waves from a Binary Black Hole Merger 2016  
B. P. Abbott et al. (The LIGO Scientific Collaboration and Virgo Scientific Collaboration)  
*Physical Review Letters 116, 061102.*
3. GW150914: First Results from the search for binary black hole coalescence with Advanced LIGO 2016  
B. P. Abbott et al. (The LIGO Scientific Collaboration and Virgo Scientific Collaboration)  
*Physical Review D 93, 122003.*
2. Characterization of transient noise in Advanced LIGO relevant to gravitational wave signal GW150914 2016  
B. P. Abbott et al. (The LIGO Scientific Collaboration and Virgo Scientific Collaboration)  
*Classical and Quantum Gravity 33, 134001.*
1. The Rate of Binary Black Hole Mergers Inferred from Advanced LIGO Observations Surrounding GW150914 2016  
B. P. Abbott et al. (The LIGO Scientific Collaboration and Virgo Scientific Collaboration)  
*The Astrophysical Journal Letters, 833, 1, L1, 8.*

## Other LIGO Papers

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21. Search for Lensing Signatures in the Gravitational-Wave Observations from the First Half of LIGO–Virgo’s [...] 2021  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*The Astrophysical Journal*, Volume 923, Issue 1, id.14, 24.
20. A Gravitational-wave Measurement of the Hubble Constant Following the Second Observing Run of [...] 2021  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*The Astrophysical Journal*, Volume 909, Issue 2, id.218, 18 pp.
19. Open data from the first and second observing runs of Advanced LIGO and Advanced Virgo 2021  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*SoftwareX*, Volume 13, article id. 100658.
18. Prospects for observing and localizing gravitational-wave transients with Advanced LIGO, Advanced Virgo and KAGRA 2020  
B. P. Abbott, et al. (The KAGRA Collaboration, The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Living Reviews in Relativity*, Volume 23, Issue 1, article id.3.
17. Gravitational-wave Constraints on the Equatorial Ellipticity of Millisecond Pulsars 2020  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*The Astrophysical Journal Letters*, Volume 902, Issue 1, id.L21, 17 pp.
16. GW190521: A Binary Black Hole Merger with a Total Mass of  $150 M_{\odot}$  2020  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review Letters*, Volume 125, Issue 10, article id.101102.
15. Properties and Astrophysical Implications of the  $150 M_{\odot}$  Binary Black Hole Merger GW190521 2020  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*The Astrophysical Journal Letters*, Volume 900, Issue 1, id.L13, 27 pp.
14. GW190412: Observation of a binary-black-hole coalescence with asymmetric masses 2020  
R. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D*, Volume 102, Issue 4, article id.043015.
13. Full band all-sky search for periodic gravitational waves in the O1 LIGO data 2018  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D*, Volume 97, Issue 10, article id.102003.
12. Constraints on cosmic strings using data from the first Advanced LIGO observing run 2018  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D*, Volume 97, Issue 10, id.102002.
11. GW170817: Implications for the Stochastic Gravitational-Wave Background from Compact Binary Coalescences 2018  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review Letters*, Volume 120, Issue 9, id.091101.
10. Effects of data quality vetoes on a search for compact binary coalescences in Advanced LIGO’s first observing run 2018  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Classical and Quantum Gravity*, Volume 35, Issue 6, article id. 065010.
9. Search of the Orion spur for continuous gravitational waves using a loosely coherent algorithm on data from [...] 2016  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D*, Volume 93, Issue 4, id.042006.
8. All-sky search for long-duration gravitational wave transients in the first Advanced LIGO observing run 2016  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D*, Volume 93, Issue 4, id.042005.
7. Astrophysical Implications of the Binary Black-hole Merger GW150914 2016  
B. P. Abbott, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*The Astrophysical Journal Letters*, Volume 818, Issue 2, article id. L22, 15 pp.
6. Advanced LIGO 2015  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Classical and Quantum Gravity*, Volume 32, Issue 7, article id. 074001.

5. Directed search for gravitational waves from Scorpius X-1 with initial LIGO data 2015  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D, Volume 91, Issue 6, id.062008.*
4. Narrow-band search of continuous gravitational-wave signals from Crab and Vela pulsars in Virgo VSR4 data 2015  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D, Volume 91, Issue 2, id.022004.*
3. Multimessenger search for sources of gravitational waves and high-energy neutrinos: Initial results for LIGO-Virgo [...] 2014  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D, Volume 90, Issue 10, id.102002.*
2. Search for Gravitational Waves Associated with  $\gamma$ -ray Bursts Detected by the Interplanetary Network 2014  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review Letters, Volume 113, Issue 1, id.011102.*
1. Methods and results of a search for gravitational waves associated with gamma-ray bursts using the GEO 600, LIGO, [...] 2014  
J. Aasi, et al. (The LIGO Scientific Collaboration and The VIRGO Collaboration)  
*Physical Review D, Volume 89, Issue 12, id.122004.*

## Posters and Presentations

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### Invited Talks

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4. **Colloquium** San José State University September 2024
3. **Invited Talk** CeNAM Frontiers Conference June 2024
2. **Colloquium** Lowell Observatory May 2024
1. **Astrophysics Seminar** University of Notre Dame March 2024

### Contributed Talks

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12. **Contributed Talk** Out in STEM (oSTEM) National Conference November 2023
11. **Contributed Talk** the Great Lakes Clusters and Streams Conference August 2023
10. **Contributed Talk** Non-Local Thermodynamic Equilibrium (Non-LTE) Workshop June 2023
9. **Contributed Talk** CeNAM Frontiers in Nuclear Astrophysics Conference May 2023
8. **Contributed Talk** Queer Atlantic Canadian STEM (QAtCanSTEM) Conference October 2022
7. **Talk** University of Chicago Society of Physics Students December 2019
6. **Talk** Columbia University June 2016
5. **Internship Talk** California Institute of Technology August 2015
4. **Internship Talk** La Laboratoire de l'Accélérateur Linéaire d'Orsay July 2014
3. **Internship Talk** University of Florida July 2014
2. **Talk** National Institute for Subatomic Physics (NIKHEF) May 2014
1. **Talk** California State University, Fullerton May 2014

### Posters

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6. **Dwarf Galaxies, Star Clusters, and Streams in the LSST Era Workshop** June 2024
5. **Rare Gems in Big Data in Tuscon, AZ** May 2024
4. **JINA-CEE, Frontiers in Nuclear Astrophysics** May 2022
3. **NASA Goddard Space Center** July 2019
2. **LIGO-Virgo Collaboration Meeting** March 2015
1. **LIGO-Virgo Collaboration Meeting** March 2014

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## Volunteer, Outreach and Mentorship Activities

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### Volunteer

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**Founder & president.** UChicago Plus. October 2020 - Current  
*UChicago's largest LGBT+ student network, comprised of 480+ undergraduate and graduate students.*

### Mentorship

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**Graduate Student Peer Mentor.** Physical Sciences Division Peer Mentorship Program. 2023 - 2024

**Graduate Student Mentor.** Women in Physics Mentorship Program. 2018 - 2021

**Graduate Student Peer Mentor.** Astronomy & Astrophysics Graduate Student Peer Mentorship Program. 2020 - 2021

**Graduate Student Peer Mentor.** Physical Sciences Division Diversity, Equity and Inclusion Peer Mentorship Program. 2020 - 2021

### Outreach

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**Public Outreach Speaker.** Lowell Observatory. May 2024  
*Special invited speaker to historic research observatory.*

**Public Outreach Speaker.** Bryce Canyon Annual Astronomy Festival. June 2022  
*Speaker at yearly public astronomy festival at Bryce Canyon National Park.*

**LGBT+ Outreach Participant.** Out in PSD. October 2019  
*Month-long celebration of LGBT+ and ally scientists in the UChicago Physical Sciences Division.*

**Physics Outreach Volunteer.** Adopt-A-Physicist. Octobers 2015 - 2019  
*Program connecting high school physics students to physicists to discuss research.*

**Event Creator and Organizer.** International LGBT+ in STEM Day at Cardiff University. July 2018  
*Event recognizing and celebrating the first International LGBT+ in STEM day, discussing adversity faced by LGBT+ scientists.*

**REU Session Facilitator.** Conference for Undergraduate Women in Physics (CUWiP). January 2016  
*Conference discussing, promoting and supporting undergraduate women interested in pursuing careers in physics.*