

# Monica Gallegos-Garcia

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## Education

### Northwestern University

*PhD candidate*, Astronomy, 2018-2024 (expected)

Advisor: Prof. Vicky Kalogera

GPA: 3.84

### University of California, Santa Cruz

*Bachelor of Science*, Physics (Astrophysics), 2018

Advisor: Prof. Enrico Ramirez-Ruiz

GPA: 3.8 *Cum Laude*

## Publications

**Gallegos-Garcia M.**, Jacquemin-Ide J., Kalogera V.

*Angular Momentum Loss During Stable Mass Transfer onto a Compact object: the Effect of Mass Loss via Accretion Disk Winds*, 2023, submitted to ApJ, [arXiv:2308.13146v1](#)

**Gallegos-Garcia M.**, Berry C. P. L., Kalogera V.

*Evolutionary Origins of Binary Neutron Star Mergers: Effects of Common Envelope Efficiency and Metallicity*, 2023, [ApJ 955 133](#)

**Gallegos-Garcia M.**, Fishbach M., Doctor Z., Berry C. P. L., Kalogera V.

*Do High-spin High-mass X-ray Binaries contribute to the Binary Black Hole Merger Population?*, 2022 [ApJL, 938, 19](#)

**Gallegos-Garcia M.**, Berry C. P. L., Marchant P., Kalogera V.

*Binary Black Hole Formation with Detailed Modeling: Stable Mass Transfer Leads to Lower Merger Rates*, 2021 [ApJ, 922, 110](#)

Marchant P., Pappas K., **Gallegos-Garcia M.**, et al.

*The role of mass transfer and common envelope evolution in the formation of merging binary black holes*, 2020, [A&A, 650, A107](#)

**Gallegos-Garcia M.**, Burkhardt B., Rosen A. L., Naiman J., Ramirez-Ruiz E.

*Winds in Star Clusters Drive Kolmogorov Turbulence*, 2020 [ApJL, 899, L30](#)

**Gallegos-Garcia M.**, Law-Smith, J., Ramirez-Ruiz E.

*Tidal Disruptions of Main Sequence Stars of Varying Mass and Age: Inferences from the Composition of the Fallback Material*, 2018 [ApJ, 857, 109](#)

## Awards

### 2023 Northwestern Presidential Fellow

Northwestern University, \$84,000 over 2 years — [website](#)

“The Presidential Fellowship is the highest honor Northwestern University bestows upon a graduate student. Selection for this distinction represents esteemed regard for the student and their work to date, their demonstrated leadership at Northwestern, and future potential.”

### 2022 Edward A. Bouchet Graduate Honor Society Inductee

Northwestern University, \$2,000 — [website](#)

“The Society commemorates the first African American to earn a doctorate degree from an American university. Awarded to scholars who exemplify academic and personal excellence, foster environments of support, and serve as examples of scholarship, leadership, character, service, and advocacy for students who have been traditionally underrepresented in the academy.”

### **2019 Ford Foundation Predoctoral Fellowship**

\$78,000 over 3 years — [website](#)

“National competition that awards individuals who demonstrate superior academic achievement, are committed to a career in teaching and research at the college or university level, show promise of future achievement as scholars and teachers, and are well prepared to use diversity as a resource for enriching the education of all students.”

### **2019 Dean’s Undergraduate Award**

University of California, Santa Cruz — [website](#)

Awarded to ten students from each academic division. Dean’s Awards recognize excellence in research and creativity among undergraduate students as evidenced through their senior thesis.

### **2018 Highest Honors in Major**

Department of Physics and Astronomy, University of California, Santa Cruz — [website](#)

Awarded to no more than 15 percent of graduating class in major. Award recognizes top graduating students each year.

### **2018 Marilyn Stevens Memorial Scholarship**

University of California, Santa Cruz — [website](#)

Award which considers academic excellence, community service, service in and out of UCSC, and any outstanding contribution made to the Physics Department.

### **2018 Top Honors Poster Award — [website](#)**

University of California Leadership Excellence through Advanced Degrees (UC LEADS)

For exceptional poster presentation at the UC LEADS research symposium at the University of California, Santa Barbara

### **Dean’s Honors List**

University of California, Santa Cruz, Quarterly from Fall 2015 - Spring 2018 — [website](#)

Awarded quarterly for a grade point average in the top 15 percent of academic group.

### **2017 Educational Opportunity Programs (EOP) Honors**

University of California, Santa Cruz

Award for students with high grade point average recognized by EOP, a program to provide academic and personal support programs to first-generation to college, low-income students from historically marginalized backgrounds.

### **2016 Julie Packard Donation Recipient**

University of California, Santa Cruz

Selected to receive funding for undergraduate research.

## **Seminars**

Kavli Institute for Cosmological Physics Seminar

University of Chicago, Kavli Institute, October 2023

*Gaining Physical Insights into the Formation of Binary Black Hole Mergers*

Theoretical AstroPhysics Including Relativity Seminar

Caltech, Division of Physics, Mathematics, and Astronomy, September 2023

*Gaining Physical Insights into the Formation of Binary Black Hole Mergers*

Theoretical Astrophysics Center Seminar

University of California, Berkeley, Department of Astronomy, September 2023

*Gaining Physical Insights into the Formation of Binary Black Hole Mergers*

Astrophysics, Gravitation, and Cosmology Seminar

University of Illinois at Urbana-Champaign, Department of Astronomy, March 2022

*Do high-spinning high-mass X-ray binaries contribute to the population of merging binary black holes?*

Monday Science Seminar

University of Wisconsin-Madison, Department of Astronomy, November 2020

**Funded Research Experience**

Graduate Student  
Northwestern University, September 2018 - present  
*Advisors:* Prof. Vicky Kalogera, Prof. Christopher Berry, Prof. Zoheyr Doctor  
Developing and implementing detailed stellar and binary evolution models and simulations to study compact object populations and merger progenitors. I plan to focus on improving binary evolution models to advance our understanding of how compact object mergers occur in the Universe.

Summer Research Fellow  
Center for Astrophysics, Harvard University, Summer 2018  
*Advisors:* Dr. Blakesley Burkhart, Dr. Jill Naiman, Dr. Anna Rosen, Prof. Enrico Ramírez-Ruiz  
Studied stellar wind interactions in a star cluster using the hydrodynamic simulation FLASH code. Specifically interested in the evolution of turbulence and kinetic energy injection scales in our simulations.

Undergraduate Research Fellow  
UCSC Supercomputer Lab for Undergraduates, November 2015 - August 2018  
*Advisors:* Prof. Enrico Ramirez-Ruiz and Jamie Law-Smith  
Developed an analytical formalism to study the element abundance variations of the fallback material during tidal disruption events of main sequence stars of differing masses and ages.

Summer Research Fellow, Banneker and Aztlán Institute  
Center for Astrophysics, Harvard University, Summer 2017  
*Advisors:* Dr. Blakesley Burkhart, Dr. Jill Naiman, Prof. Enrico Ramírez-Ruiz, Prof. Jorge Moreno  
Studied stellar wind interactions in different types of star clusters using the hydrodynamic simulation FLASH code.

Lamat Summer Research Fellow, Lamat Research Experience for Undergraduates  
University of California, Santa Cruz, Summer 2016  
*Advisors:* Jamie Law-Smith, Prof. Enrico Ramirez-Ruiz  
Developed code to analytically describe the accretion rate of tidal disruption events for stars of varying polytropic index.

**Research Presentations**

MODEST-23: Star Clusters in the Post-Pandemic Era, Evanston, August 2023  
**Invited Panelist**, *Compact Objects and Gravitational Wave Sources*

Gravitational-wave populations: What's Next? Workshop, Italy, July 2023  
**Invited Panelist**, *What is the predictive power of pop-synth codes? Are we learning more than our assumptions?*

American Physical Society Spring Meeting, Minnesota, April 2023  
Talk, *Formation of Binary Neutron Star Mergers*

High Energy Astrophysics Division 20, Hawaii, March 2023  
Poster, *Formation of Binary Neutron Star Mergers*

Post-PAX meeting, Center for Astrophysics, Harvard University, August 2022  
**Invited discussion co-leader**, *High-spin High-mass X-ray Binaries and Spins of Merging Binary Black Holes*

Center for Computational Astrophysics, Flatiron Institute, July 2022  
**Leading discussion**, *Do high-spinning high-mass X-ray binaries contribute to merging binary black holes?*

Intermediate Mass Black Hole conference, Puerto Rico, May 2022  
Talk, *Do high-spinning high-mass X-ray binaries contribute to merging binary black*

holes?

Bouchet 3 Minute Thesis Speaker Series, Northwestern University, April 2022

**Invited Talk**, *Understanding Merging Binary Black Holes*

Midwest Relativity Meeting, University of Illinois Urbana-Champaign, November 2021

Talk, *Binary Black Hole Formation with Detailed Modeling: Stable Mass Transfer Leads to Lower Merger Rates*

European Astronomical Society Annual Meeting, Virtual, June 2021

Talk, *Binary Black Hole Mergers in Rapid Population-synthesis Codes and the Impact of Improved Modeling of Binary Physics*

Triple Evolution and Dynamics 3, Virtual, March 2021

Poster, *Binary Black Hole Merger Rates in Rapid Population-synthesis Codes and the Impact of Improved Modeling of Binary Physics*

Conference of Ford Fellows, Virtual, October 2020

Talk, *The Impact of Improved Stellar and Binary Physics on Binary Black Hole Mergers*

American Physical Society Spring Meeting, Virtual, April 2020

Talk, *The Impact of Improved Stellar and Binary Physics on Binary Black Hole Mergers*

The Deaths & Afterlives of Stars, Space Telescope Science Institute, April 2019

Poster, *Revisiting the treatment of common-envelope evolution*

UC LEADS Symposium, University of California, Santa Barbara, March 2018

Poster, *Tidal Disruptions of Main Sequence Stars: Inferences from the Composition of the Fallback Material*

American Astronomical Society, Washington, DC, January 2018

Poster, *Tidal Disruptions of Main Sequence Stars: Inferences from the Composition of the Fallback Material*

Center for Astrophysics, Harvard University, August 2017

Talk, *Stellar Winds in Star Clusters and Their Effects on the Interstellar Medium*

SACNAS Conference, Long Beach, CA, October 2016

Poster, *Revisiting the Evolution of Flares Ignited By Supermassive Black Holes*

Undergraduate Research Symposium, University of California Santa Cruz, August 2016

Poster, *Revisiting Flares Ignited by Supermassive Black Holes*

**Selected Service,  
Outreach, and  
Advocacy**

Introduction to Graduate Education at Northwestern (IGEN)

Northwestern University, September 2022 — [website](#)

**Invited Talk**, *Rate, Spins, and the Formation of Binary Black Holes*

IGEN is a program for underrepresented students interested in Northwestern doctoral programs to visit campus and engage with Northwestern faculty, staff, and students.

**Invited Panelist**, Physical Sciences Opportunities for Women in Education and Research (POWER) Mentoring program and workshop series

University of California, Berkeley, April 2022 — [website](#)

**Invited Panelist**, The In's and Out's of Graduate Fellowship Applications

Northwestern University, October 2020

**Invited Presenter**, Adler Planetarium Latinx Heritage Month, October 2019

Research Experiences in Astronomy at CIERA for High School Students program

Northwestern University, Summers 2020, 2021, 2022 — [website](#)

Created astronomy education projects and tutorials for high school students. Worked one-on-one with two high school students to study progenitors of binary black hole mergers in binary evolution simulations.

Secretary and Co-Chair of Communications, Comunidad Latinx (CLX)  
Northwestern University, Three academic years, 2019-2022 — [website](#)  
Executive positions in CLX, a graduate student group that aims to foster a community at Northwestern oriented around Latinx identity, culture, and history.

The Graduate School Diversity Peer Mentor  
Northwestern University, 2020-2021 — [website](#)  
Mentored first-year student during academic year as part of the inaugural Mentorship Program designed to help first-year PhD students from diverse backgrounds become acclimated to Northwestern.

Onaketa Tutor  
January - June 2021 — [website](#)  
Invited to be part of Onaketa, a non-profit organization that partners with Bay Area schools and organizations to provide free tutoring to under-served students of color.

Panelist at Life After College Conference  
Undocumented Student Services, University of California, Santa Cruz, 2018, 2019  
Conference to better-prepare UCSC's undocumented undergraduate students for successful careers after college.

**Founder** of the Underrepresented Minorities in STEM Journal Club (Social Justice Journal Club),  
STEM Diversity Programs, University of California, Santa Cruz, Spring 2018  
Organized weekly journal club to read about issues related to social justice. Journal Club aimed to build community through discussions on education tools and practices to overcome cultural and institutional barriers as minorities in STEM education.

## Professional Development

[Code/Astro](#), Caltech, Summer 2022  
Week-long astronomy software development workshop to teach participants fundamental software engineering skills and best practices for building sustainable open-source packages for astronomy applications.

[Research Communication Training Program](#), Northwestern University, Summer 2022  
10-week workshop series designed to enhance the communication skills of The Graduate School students and postdoctoral trainees across disciplines and backgrounds.

[MESA](#) Summer School, University of California, Santa Barbara, Summer 2019  
Week-long workshop to gain familiarity with the open-source stellar evolution software instrument MESA and learn how to make better use of it in their own astrophysics research through extensive hands-on labs and constant interaction with MESA developers and other experienced users.