Arcelia Hermosillo Ruiz

Contact

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Education

2014 - 2018	**The University of California, Berkeley**
Dec. 2018	B.A Physics; B.A. Astrophysics
2019 -	**The University of California, Santa Cruz**
Aug. 2021	M.S Astronomy and Astrophysics
Jun. 2025	(expected) Ph.D Astronomy and Astrophysics
	Advisor: Ruth Murray-Clay

Research Experience

2019-

Graduate Student Researcher
UC Santa Cruz Astronomy and Astrophysics
Constraining Migration Processes in the Outer Solar System and Planet Architecture in Debris Disks
Advisors: Prof. Ruth Murray-Clay

I explore how the outer Solar System has evolved. By comparing nbody simulations with observations, we get closer to constraining how the planets' orbits changed over the last 4 billion years because of how they gravitationally interact with planetesimals which make up today's Kuiper Belt. I also run simulations to understand how planets dynamically excite debris around other stars to understand observations from HST, ALMA, JWST and more.

2016-2020

Undergraduate Researcher
UC Berkeley Astrophysics
Thermalization Effects In Late-Time Type Ia Supernova Light Curves
Advisors: Prof. Daniel Kasen, Dr. Jennifer Barnes

Explored the discrepancy of "twin" Supernovae (SNe) lightcurves several hundred days after explosion. Simulated how radioactive isotopes and magnetic fields affect heating in the ejecta using Python and C++.

SACNAS Poster Presentation Award Winner

Summer 2018

Department of Energy-Istituto Nazionale di Fisica Nucleare Summer Exchange Program
INFN - Padova; Padova, Italy
b-Jet and c-Jet Identificaton at LHCb Using Deep Learning Techniques
Advisors: Prof. Donatella Lucchesi, Dr. Lorenzo Sestini, Dr. Alessio Gianelle

I improved a deep learning algorithm identifying subatomic particles from the Large Hadron Collider beauty (LHCb) experiment at CERN. I accomplished this by analyzing newly simulated data with recent LHCb conditions and assessing which observables and configurations would improve the performance of the algorithm.

Summer 2017

Banneker & Aztlan Summer Institute
Harvard-Smithsonian Center for Astrophysics
Identifying M Dwarfs and their Stellar Companions
Advisor: Dr. Jennifer Winters

I studied the environment of M dwarf stars to assess the number of close-orbit stellar companions. By translating an existing IDL program to python, I cross checked two data sets to find distances and colors of the stars. From the 800 images, I discovered 10 new binary candidates.

SACNAS Poster Presentation Award Winner & NSF CAMP Symposium Honorable Mention Winner

Awards and Honors

2019-now	NSF Graduate Research Fellowship
2021-2023	LSSTC Data Science Fellowship
2021	Division of Dynamical Astronomy Duncombe Student Research Prize
2020	Outstanding Graduate Student Mentor Award
2019-2020	Regents Fellowship
2019	UW Graduate Opportunities and Minority Achievement Program (not accepted)
2017-2018	Bergeron Women in STEM Leadership Scholarship
2017-2018	NSF CAMP (LSAMP) Scholar
2014-2018	S-STEM Scholar
2018	Honorable Mention, NSF CAMP Symposium
2018	Berkeley Student Cooperative-85th Anniversary Celebration Keynote Speaker
2016,2017	Undergraduate Poster Presentation Award, SACNAS Conference
2014-2016	Hispanic Scholarship Fund Recipient

Science Communication and Teaching

April 2023	Astronomy on Tap, Santa Cruz
March 2023	Noche de Estrellas Invited Speaker, San Francisco State Planetarium Developed an accessible research talk. Gave two talks about my field of research; one in Spanish, one in English to crowds spanning all ages.
Summer 2021	Python Instructor and Tutor for LAMAT Undergraduate Research Program, UC Santa Cruz Developed python instruction material and held 6, 3hr workshops. Held weekly, 2 hour office hour sessions for 9 weeks.
Spring 2021	Teacher Assistant for ASTR 19, UC Santa Cruz developed review material and held office hours twice a week
Spring 2020	Teacher Assistant for ASTR 3, UC Santa Cruz developed lecture review material and held discussion section twice a week
Winter 2020	Teacher Assistant for ASTR 6, UC Santa Cruz developed lecture review material and held discussion section twice a week
2016-2019	Planetarium Presenter at Lawrence Hall of Science, Berkeley I engaged university guests and students in constellation, eclipse, universe, and NASA space mission shows. I taught the public how to navigate a star map, how astronomers find exoplanets, and more
Summer 2015	Instructor at DaVinci Camp Summer Institute, Berkeley I developed and taught physics and math curricula to 22 Latino middle school and high school students. I worked with students for 10 hours a day and refined their problem solving and arithmetic skills and understanding of poetry, World War I technology, and literature

Service and Leadership

2022-	IDEA practitioner for the Astrophysics Division of the Science Mission Directorate for NASA
2022-2023	Coordinator, Women of Color Graduate CommUNITY Group
2022-2023	Mentor, Grad Path Mentorshp Program
2020-2022	Mentor, Undergraduate Society of Physics Students Mentorship Program
2021-22	Mentor, Matriculating, Influencing, Networking, and Triumphing (M.I.N.T.) Mentorship Program
2021-2022	Graduate Student Liaison, UC Santa Cruz Astronomy and Astrophysics
2020-2021	Astronomy and Astrophysics Graduate Student Representative, UC Santa Cruz Graduate Student Association
2014-2018	Hispanic Engineers and Scientists, UC Berkeley Positions held: Secretary (2 years) and President (1 year) Played an active role in increasing our membership by 7 times. I mentor and support physics and astrophysics students by providing information on courses, resources, and study skills. I led meetings with corporate representatives and faculty to discuss how they can help first generation Latinx students succeed in Berkeley. I oversaw and participated in k-12 outreach events.
2015-2017	RAICES Center, UC Berkeley Position Held: Co-Lead for Spring Break Higher Education Outreach We contacted staff members from 20 high schools to participate in our outreach efforts by allowing us to visit their classrooms and present. I visited 10 high schools in 4 days and engaged 1200 students in conversations about demystifying higher education and preparing applications for universities.

Poster, Presentations, Publications

Publications

Arcelia Hermosillo Ruiz, Ruth Murray-Clay, Harriet Lau, *Impact of Neptune's Random Walk Noise on Weak Resonances in the Kuiper Belt*, in prep

Arcelia Hermosillo Ruiz, Kathryn Volk, Ruth Murray-Clay, Rosemary Pike, *Modifications to Equations of Motion in Nbody Codes*, in prep

Sricharan Balaji, Nihaal. Zaveri, Nenae Hayashi, Arcelia Hermosillo Ruiz, Jackson Barnes, Ruth Murray-Clay, Kathryn Volk, Jake Gerhardt, and Zain Syed, *Can the 3:2 mean motion resonance orbital distribution result from stability sculpting*, MNRAS–**graduate student mentor to group of undergrads**

Posters

Arcelia Hermosillo Ruiz, Ruth Murray-Clay, *Investigating how eccentric, inclined planets affect planetesimal debris around young stars*, GRC: Origins of Solar Systems, South Hadley, MA, June 11-16 2023

Arcelia Hermosillo Ruiz, Ruth Murray-Clay, *Constraints on Migration Scenarios of Neptune that Explain the Kuiper Belt*, American Astronomical Society Exoplanets iv, Las Vegas, May2-6 2022

A. H. R., J. Barnes, D. Kasen. *Thermalization Effects In Late-Time Type Ia Supernova Light Curves.* Presented at 2016 SACNAS Conference and again at Director's Review of the Nuclear Science Division at Lawrence Berkeley National Lab in October 2016

A.H.R., J. Winters, et. al. *Identifying M Dwarfs and their Stellar Companions.* Presented at 2017 SACNAS Conference and again at 2018 NSF CAMP Symposium

A.H.R., D. Lucchesi, et. al. *b-Jet and c-Jet Identificaton at LHCb Using Deep Learning Techniques.* Presented at SACNAS 2018 Conference.

Talks

Arcelia Hermosillo Ruiz , Ruth Murray-Clay, *Investigating how eccentric, inclined planets scatter planetesimal debris in and outside of our solar system*, Yale Stars and Exoplanets Seminar, Virtual/Yale, March 2022

Arcelia Hermosillo Ruiz, Ruth Murray-Clay, *Constraints on Migration Scenarios of Neptune due to Stochasticity in Planetesimal-Driven Migration*, Division of Dynamical Astronomy Meeting #53, New York, April 25-28 2022

A.H.R., J. Winters, et. al. *Identifying M Dwarfs and their Stellar Companions.* Gave a 15 minute talk at the Harvard-Smithsonian Center for Astrophysics for the end of summer review. Watch here

Computer Skills

Programming Language: C++, python, idl, FORTRAN
Software & Tools: Matlab, Mathematica, LabView, GitHub, ROOT, LaTeX