

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

POSTER, PRESENTATIONS, PUBLICATIONS

- Publ | Arcelia Hermosillo Ruiz, Kathryn Volk, Ruth Murray-Clay, Rosemary Pike, *Forcing Planets to Evolve: Uranus' Eccentricity Damping Could be Linked to Neptune*, in prep
- Arcelia Hermosillo Ruiz, Ruth Murray-Clay, Meredith MacGregor, *Nbody Simulations of an Inclined, Eccentric Planet and Exterior Debris Disk Show Asymmetric Structure Similar to AU Mic*, in prep
- Arcelia Hermosillo Ruiz, Ruth Murray-Clay, Harriet Lau, *Impact of Neptune's Random Walk Noise on Weak Resonances in the Kuiper Belt*, MNRAS
- Sricharan Balaji, Nihaal. Zaveri, Nенаe 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 | Hermosillo Ruiz Arcelia, Murray-Clay Ruth, MacGregor Meredith, *Nbody Simulations of an Inclined, Eccentric Planet and Exterior Debris Disk Show Asymmetric Structure Similar to the AU Mic Debris Disk*, Extreme Solar Systems, Christchurch New Zealand, March 16-21 2024
- 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 | Hermosillo Ruiz Arcelia, Murray-Clay Ruth, Volk Kathryn, Pike Rosemary, *Using Surface Colors of Resonant TNOs to Probe Neptune's Migration History With Well-Controlled Planetary Evolution Simulations*, Trans Neptunian Objects, Taipei City Taiwan, June 23-28
- Hermosillo Ruiz Arcelia, Murray-Clay Ruth, Volk Kathryn, Pike Rosemary, *Forcing Planets to Evolve: Uranus' Eccentricity Damping Could be Linked to Neptune*, Division of Dynamical Astronomy, Toronto Candada, May 12-17 2024
- Hermosillo Ruiz Arcelia, Murray-Clay Ruth, MacGregor Meredith, *Nbody Simulations of an Inclined, Eccentric Planet and Exterior Debris Disk Show Asymmetric Structure Similar to AU Mic*, Dust Devils, Tucson Arizona, March 25-29 2024
- 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](#)

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, TEACHING, AND SELECTED OUTREACH

APRIL 2024	UCSC Astronomy and Astrophysics outreach event organizer, UCSC co-lead a 3 hour event for local students from the MESA college prep program to visit our department lab for adaptive optics, UCO machine shops, and participate in a first-gen undergraduate and graduate student panel
MARCH 2024	UCSC MESA Day Keynote Speaker, UCSC
FEBRUARY 2024	Pathways to Research: First-Gen Graduate Students Panelist, UCSC
OCTOBER 2023	STEM PhD Research at UCSC Panelist and Moderator, UCSC for Spanish speaking recently immigrated, students from Salinas Unified School District
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.
JANUARY 2023	Conference for Undergraduate Women in Physics Panelist, UCSC
AUGUST 2022	LAMAT Summer REU Panelist, UCSC
MAY 2022	Mujeres en STEM Panelist, UCSC
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

- 2015- Mentor to 3-5 community college/4-yr university undergraduate students in physics/astrophysics who are interested in going to grad school
- 2022- IDEA practitioner for the Astrophysics Division of the Science Mission Directorate for NASA
- 2022-2024 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 Triumphant (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.

COMPUTER SKILLS

Programming Language: C++, PYTHON, IDL, FORTRAN
Software & Tools: MATLAB, Mathematica, LabView, GitHub, ROOT, L^AT_EX