



<b>AWARDS &amp; SCHOLARSHIPS</b>	\$1,000 – UC Irvine Latino Excellence and Achievement Award	Spring 2021
	\$9,000 – UC Irvine Physical Sciences Diversity Fellowship	Spring 2021
	\$4,500 – UC Irvine Diversity Recruitment Fellowship	Fall 2017
	\$800 – President's Student Research Travel Scholarship	Winter 2016
	\$20,000 – Cal-Bridge Scholarship	2015 - 2017
	\$4,000 – TELACU Scholarship	2013-2017

<b>TEACHING</b>	Instructor of record in <b>boldface</b>	
	<u>POMONA COLLEGE:</u>	
	<b>Introduction to Galaxies &amp; Cosmology (ASTR 002)</b>	<b>Spring 2024</b>
	Regular Discussion Guest – Extragalactic Astronomy (ASTR 125)	Spring 2024
	Guest Lecture – Astro Collective (ASTR 001)	Oct 2023

SOUTHERN CALIFORNIA UNIVERSITY OF HEALTH SCIENCES:

<b>Basic Physics I</b>	<b>Spring 2023</b>
<b>Basic Physics I Online Laboratory</b>	<b>Spring 2023</b>
<b>Basic Physics II</b>	<b>Spring 2023</b>
<b>Basic Physics II Online Laboratory</b>	<b>Spring 2023</b>

UC IRVINE:

<b>Basic Physics I</b>	<b>Summer 2022</b>
<b>Basic Physics II</b>	<b>Summer 2021 &amp; 2022</b>
<b>Intro to Mathematical Methods for Physics</b>	<b>Summer 2021</b>
Statistical Mechanics	Fall 2018
Life in the Universe	Spring/Fall 2018
Introduction to Mathematical Physics	Fall 2017

CAL POLY POMONA:

Electrostatics	Fall 2015/Winter 2016
Introductory Physics	Spring 2015

ELSEWHERE:

<a href="#">Learning Shack</a> Math and Physics Tutor	2018 - 2022
<b><a href="#">Ardent Academy</a> AP Physics C Instructor</b>	<b>Winter 2020</b>

TRAINING & CERTIFICATIONS

UCI/CSULB <a href="#">PRE-Professor Program</a>	Spring 2021
UCI OIE <a href="#">Inclusive Excellence Certificate</a>	Fall 2020
UCI DTEI <a href="#">Certificate in Course Design</a>	Spring 2020
<a href="#">CIRTL Associate Level</a>	Spring 2020

**MENTORSHIP** RESEARCH ADVISING/CO-ADVISING:

<b>Kaitlyn Chen</b>   Harvey Mudd College Undergrad	Fall 2024
Effect of reionization on Local Group dwarf galaxies (project continuation)	
<b>Benjamin Hanf</b> ( <a href="#">Supervising Senior Thesis</a> )   Pomona College Undergrad	AY 2024-2025
Stellar streams and their connection to host galaxy and halo properties	
<b>Brian Giraud Calderon</b>   Pomona College Undergrad	Summer 2024
Environmental effects on galaxy formation timescales	
<b>Isa Hahn</b>   Pomona College Undergrad	Summer 2023
Finding voids in simulated cosmological volumes	
<b>Pei Qin</b>   Pomona College Undergrad	Summer 2022

Finding galaxy streams in the FIREbox simulation	
<b>Necdet Canim</b>   Pomona College Undergrad	Summer 2022
Finding galaxy streams in the FIREbox simulation (worked with Pei)	
<b>Helen Meskhidse</b>   UC Irvine Grad	2021-2022
Comparing implementations of SIDM in the GIZMO and AREPO codes	
<b>Evangelina Chicas</b>   Cal State Long Beach Undergrad	Summer 2020
Effect of reionization on Local Group dwarf galaxies	
<b>Imani Ware</b>   San Francisco State University Undergrad	Summer 2020
Effect of reionization on Local Group dwarf galaxies (worked with Evangelina)	
<b>Daniel McKewon</b>   UC Irvine Grad	Summer 2020
Amplified J-factors in the galactic center in FIRE simulations	
<u>PROFESSIONAL/ACADEMIC MENTORSHIP:</u>	
UC Irvine PACE Mentorship Program Peer Mentor   4 grads	2018 - 2023
UC Irvine Competitive Edge Peer Mentor   2 grads	Summer 2022
Cal-Bridge Graduate Mentor   2 undergrads	2019 - 2022
TELACU Graduate Mentor   2 undergrads	2019 - 2022

## RESEARCH INTERESTS

I am a computational astrophysicist with expertise and interests in a wide range of topics, including galaxy formation and evolution, low-mass galaxies, kinematics and dynamics, chemical evolution, abundances, the nature of dark matter, and machine learning. In my work, I use state of the art cosmological, galaxy formation simulations. I have a strong track record of using such simulations to make predictions that are immediately testable with observations. Some of my past work involves predicting a new galaxy scaling relation (the Gradient-Strength-Galaxy-Age Relation) as well as putting forth a powerful test that reaffirms the position of the dark matter model as the model that best describes the Universe.

## PUBLICATIONS LEAD AUTHOR/MAJOR CONTRIBUTOR

Mentees highlighted in *bolded italics*

11. Effects of galactic environment on size and dark matter content in low-mass galaxies: **F. J. Mercado**, J. Moreno, J. A. Benavides, R. Feldmann, Marckie Zeender[PO] (2024); [Submitted to ApJ](#)
10. Hooks & Bends in the Radial Acceleration Relation: Discriminatory Tests for Dark Matter and MOND: **F. J. Mercado**, J. S. Bullock, J. Moreno, M. Boylan-Kolchin, A. Wetzel, C. Faucher-Giguère, J. Samuel (2024); [MNRAS, Volume 530, Issue 2, pp.1349-1362](#)
9. Comparing implementations of self interacting dark matter in the GIZMO and AREPO codes: **H. Meskhidse**, **F. J. Mercado**, O. Sameie, V. Robles, J. S. Bullock, M. Kaplinghat, J. O. Weatherall (2022); [MNRAS, Volume 513, Issue 2, pp.2600-2608](#)
8. Amplified J-factors in the galactic center for velocity-dependent dark matter annihilation in FIRE simulations: **D. McKewon**, J. Bullock, **F. J. Mercado**, Z. Hafen, M. Boylan-Kolchin, A. Wetzel, L. Necib, P. F. Hopkins, S. Yu (2021); [MNRAS, Volume 513, Issue 1, pp.55-70](#)
7. A Relationship Between Stellar Metallicity Gradients & Galaxy Age in Dwarf Galaxies: **F. J. Mercado**, J. Bullock, M. Boylan-Kolchin, J. Moreno, A. Wetzel, K. El-Badry, A.S. Graus, A. Fitts, P. F. Hopkins, C. Faucher-Giguère, A. B. Gurvich (2020); [MNRAS, Volume 501, Issue 4, pp.5121-5134](#)

## CONTRIBUTING CO-AUTHOR

6. Stellar Metallicities and Gradients in the Faint M31 Satellites Andromeda XVI and Andromeda XXVIII: S. W. Fu, D. R. Weisz, E. Starkenburg, N Martin, M. L. M. Collins, A. Savino, M. Boylan-Kolchin, P. Côté, E. Dolphin, N. Longeard, M. L. Mateo, **F. J. Mercado**, N. R. Sanford, E. D. Skillman (2024); [Accepted to ApJ, eprint arXiv:2407.04698](#)
5. Size-mass relations for simulated low-mass galaxies: mock imaging versus intrinsic properties: C. Klein, J. S. Bullock, J. Moreno, **F. J. Mercado**, P. F. Hopkins, R. K. Cochrane, J. A. Benavides (2024); [MNRAS, Volume 532, Issue 1, pp.538-548](#)
4. Confronting the Diversity Problem: The Limits of Galaxy Rotation Curves as a tool to Understand Dark Matter Profiles: I. S. Sands, P. F. Hopkins, A. Shen, M. Boylan-Kolchin, J. S. Bullock, C. Faucher-Giguère, **F. J. Mercado**, J. Moreno, L. Necib, X. Ou, S. Wellons, A. Wetzel (2024); [eprint arXiv:2404.16247](#)
3. Stellar Metallicities and Gradients in the Isolated, Quenched Low-mass Galaxy Tucana: S. W. Fu, D. L. Weisz, E. Starkenburg, N Martin, **F. J. Mercado**, A. Savino, M. Boylan-Kolchin, P. Côté, A. E. Dolphin, N. Longeard, M. L. Mateo, J. Samuel, N. R. Sanford (2024); [ApJ, Volume 965, Issue 1, id.36, 23 pp.](#)
2. Galaxies lacking dark matter produced by close encounters in a cosmological simulation: J. Moreno, S. Danieli, J. S. Bullock, R. Feldmann, P.F.Hopkins, O. Catmabacak, A. Gurvich, A. Lazar, C. Klein, C. B. Hummels, Z. Hafen, **F. J. Mercado**, S. Yu, F.Jiang, C. Wheeler, A. Wetzel, D. Angles-Alcázar, M. Boylan-Kolchin, E. Quataert, C.A. Faucher-Giguère, D. Keres (2022); [Nature Astronomy, Volume 6, p. 496-502](#)
1. The time-scales probed by star formation rate indicators for realistic, bursty star formation histories from the FIRE simulations: J. Florez Velázquez, A. Gurvich, C. Faucher-Giguère, J. Bullock, T. Starkenburg, J. Moreno, A. Lazar, **F. J. Mercado**, J. Stern, M. Sparre, C. Hayward, A. Wetzel, K. El-Badry (2020); [MNRAS Volume 501, Issue 4, pp.4812-4824](#)

## **PAST & UPCOMING PRESENTA- TIONS**

### INVITED CONFERENCE PRESENTATIONS:

First Joint NSBP-NSHP Conference (Houston, TX) Nov 2024

### INVITED COLLOQUIA & SEMINARS:

UCSD/CSUSD Astronomy & Astrophysics Colloquium (La Jolla, CA) Jan 2025  
Cal Poly Pomona Physics & Astronomy Colloquium (Pomona, CA) Oct 2024  
Cal State LA Colloquium (Los Angeles, CA) March 2024  
Carnegie Observatories Colloquium (Pasadena, CA) Feb 2024  
TAPIR Seminar at Caltech (Pasadena, CA) Jan 2024  
CSU San Bernardino Physics & Astronomy Colloquium (San Bernardino, CA) Nov 2023  
UC Riverside Astronomy Seminar (Riverside, CA) Oct 2023  
Pomona College Physics & Astronomy Colloquium (Claremont, CA) Sep 2023  
Northwestern University Science Happy Hour [Virtual] (Evanston, IL) Apr 2021  
Ohio Sate ArXiv Seminar [Virtual] (Columbus, OH) Feb 2021

### CONTRIBUTED CONFERENCE PRESENTATIONS:

NSF MPS-Ascend Postdoctoral Fellow Conference (Nashville, TN) Oct 2024  
Galaxy Formation & Evolution in Southern California (Pasadena, CA) Aug 2024  
Dwarf Galaxies, Star Clusters & Stellar Streams in the LSST Era (Chicago, IL) Jul 2024  
22nd NSF Astronomy & Astrophysics Postdoc Symposium (New Orleans, LA) Jan 2024  
4th Regional Extragalactic Astronomy Meeting (Córdoba, Argentina) Dec 2023  
Galaxy Formation & Evolution in Southern California (Riverside, CA) Aug 2024  
240th AAS Meeting (Pasadena, CA) Jun 2022

Flatiron Center for Computational Astrophysics Symposium (New York City, NY)	Aug 2021
Galaxy Formation & Evolution in Southern California (Pasadena & Irvine, CA)	2017-2019
Cal Poly Pomona SIAM Research Symposium (Pomona, CA)	Apr 2016
UC Irvine Summer Research Symposium (Irvine, CA)	May 2017
Cal Poly Pomona SIAM Research Symposium (Pomona, CA)	Apr 2017
229th AAS Meeting (Grapevine, TX)	Jan 2017
Cal-Bridge/Campare Symposium, Cal Poly Pomona (Pomona, CA)	Sep 2016
UC Irvine Summer Research Symposium (Irvine, CA)	Aug 2016
Galaxy Formation & Evolution in Southern California (Pasadena, CA)	Aug 2016
227th AAS Meeting (Kissemee, FL)	Jan 2016

VISITING GROUP MEETING PRESENTATIONS:

Andrew Benson's Group Meeting, Carnegie Observatories (Pasadena, CA)	Nov 2024
Phil Hopkins' Group Meeting, Caltech (Pasadena, CA)	Sep 2023
Tom Quinn's Group Meeting, University of Washington (Seattle, WA)	Mar 2017
Mark Vogelsberger's Group Meeting, MIT (Cambridge, MA)	Jul 2015
Lars Hernquist's Group Meeting, Harvard CfA (Cambridge, MA)	Jul 2015

Workshops:

Mentorship and cultivating the next generation of leaders (Pasadena, CA)	Jun 2022
<a href="#">PACE workshops</a> on topics relevant to first year grads	2021-2022

OUTREACH:

UCI Astronomy Club Invited Graduate Research Talk (Irvine, CA)	Apr 2023
UCI Astronomy Club Invited Astronomer Talk (Irvine, CA)	May 2020
UC Irvine SACNAS Chapter High School Visit Day (Irvine, CA)	Mar 2019
WATzUP Middle School Workshop Speaker (Orange County, CA)	Spring 2018
BUILD Star Party Speaker (Upland, CA)	May 2017

**SERVICE**

SCIENTIFIC ORGANIZING COMMITTEES:

23rd Annual NSF AAPF Postdoc Symposium ( <b>Chair</b> ; National Harbor, MD)	Jan 2025
<a href="#">Galaxy Formation &amp; Evolution in Southern California</a> (Member; Pasadena, CA)	Sep 2024
<a href="#">Galaxy Formation &amp; Evolution in Southern California</a> ( <b>Chair</b> ; Irvine, CA)	Aug 2019

REVIEWER:

The Astrophysical Journal	2023 - Present
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STUDENT ORGANIZATIONS:

UC Irvine <a href="#">PACE Mentorship Program</a> <b>Co-Chair</b> & Administrator	2022 - 2023
UC Irvine <a href="#">Physics Graduate Caucus</a> <b>Diversity Chair</b>	2020 - 2022
UC Irvine <a href="#">DECADE</a> Physics Graduate Representative	2018 -2022

OUTREACH:

UC Irvine Telescope Outreach Program Co-Organizer	2018 - 2019
UC Irvine <a href="#">WATzUP</a> Group Leader	2017 - 2019