Miguel Montalvo

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Education

Princeton Universisty — *Jun 2023 — May 2029*
Ph.D. in Astrophysical Sciences — *Princeton, NJ*

University of California, Berkeley — *Aug 2021 — May 2023*
B.S. in Engineering Physics | **GPA:** 3.45 — *Berkeley, CA*

Diablo Valley College — *Aug 2018 — May 2021*
A.S. in Physics for Transfer | **GPA:** 3.95 — *Pleasant Hill, CA*

University of El Salvador — *Jan 2014 — Dec 2015*
Work towards B.S. in Physics | **CUM:** 7.73 — *San Salvador, SV*

Undergraduate GPA: *3.77*

Research

NAC Research Fellow — *Jun 2023 — Aug 2023*
Princeton University | Department of Astrophysical Sciences — *Princeton, NJ*

- Conducted research in observational astrophysics as part of the National Astronomy Consortium (NAC) program with the guidance of Drs. Jenny Greene and Andy Goulding.
- **Motivation:** Analyze an Active Galactic Nuclei (AGN) sample comprising both obscured and unobscured type-1 quasars to gain a comprehensive understanding of the origins and characteristics of the observed obscuration.
- Tested the plausibility of a moderate inclination angle that grazes through the dusty torus causing the observed obscuration.
- Modeled the Spectral Energy Distribution (SED) of each source using the Code Investigating GALaxy Emission (CIGALE) and obtained properties of the AGN like inclination angle, optical depth of the dusty torus, reddening, opening angle of the dusty torus, etc.
- Provided CIGALE with photometry points from the Hyper Suprime-Cam (HSC) and the Wide-field Infrared Survey Explorer (WISE).
- Showed that the inclination angle for both samples is similarly low, so the obscuration might be coming from gas in the host galaxy.

NAC Research Fellow — *Jun 2022 — Aug 2022*
Facility for Rare Isotope Beams — *East Lansing, MI*

- Conducted research in nuclear detector instrumentation as part of the National Astronomy Consortium (NAC) program with the guidance of Dr. Erin Good and professor Artemis Spyrou within the SuN research group.
- **Motivation:** Understand the β-decay properties that go into the rapid neutron capture (r-) process responsible for the production of elements heavier than iron in neutron-rich stellar environments
- Tested Silicon Photomultipliers (SiPM) as a replacement for Photomultiplier Tubes in β-decay detection experiments.
- Experimented with different setups for two SiPMs connected to a plastic scintillator detector, by varying parameters in the data acquisition system like energy thresholds as well as varying voltages.
- Showed that there was a problem with light propagation through the plastic scintillator and fiber optics needed to be attached to transport the light, collected from β^- decay events in ^{90}Sr, to the SiPMs.

NAC Research Fellow — *Jun 2021 — Aug 2021*
National Radio Astronomy Observatory — *Charlottesville, VA*

- Conducted research in radio astronomy as part of the National Astronomy Consortium (NAC) program with the guidance of Drs. Loreto Barcos-Muñoz and Devaky Kunneriath within the GOALS-East research group.
- **Motivation:** Study the Luminous Infrared Galaxy (LIRG) ESO 203-IG001 to understand star formation in extreme environments through the analysis of band 7 observations from the Atacama Large Millimeter/submillimeter Array (ALMA).
- Retrieved the archival data and used calibration scripts to then image the galaxy in the continuum radio emission as well as in the continuum-subtracted dense gas tracers HCN(4-3) and HCO+(4-3) using Common Astronomy Software Applications (CASA).
- Determined the mass and sizes of gas and dust using the flux densities of each tracer, later used to calculate the star formation rate.
- Generated moment maps and studied the distribution and kinematics of the gas, finding that similar gas tracers presented different kinematics, which motivated a new ALMA proposal.

Lamat Research Fellow *Jun 2020 — Aug 2020*

University of California, Santa Cruz | Department of Astronomy and Astrophysics *Santa Cruz, CA*

- Conducted research in computational astrophysics as part of a Research Experience for Undergraduates (REU) program with the guidance of Dr. Nicole Drakos and professor Brant Robertson within the computational astrophysics research group.
- **Motivation:** Obtain new simulations on the connection between dark matter halos and the distribution of galaxies within them, to improve our understanding of how galaxies have evolved since the beginning of time.
- Plotted a Navarro-Frenk-White density profile of dark matter, and then calculated the corresponding enclosed mass profile as well as the circular velocity profile to determine from the plot the maximum value V_{max}
- Tested the theoretical predictions by comparing different halo mass function parameterizations to the one derived from the data.

Teaching/Tutoring Experience

Physics Tutor *Jan 2020 — May 2021*

Diablo Valley College *Pleasant Hill, CA*

- Tutored students enrolled in any of the physic classes offered at Diablo Valley College.
- Reinforced and expanded key concepts in physics that they had learned in class.
- Taught skills to improve academic performance, including study and test-taking strategies, as well as note-taking skills.
- Provided students with positive and constructive feedback.

Math Supplemental Instruction Facilitator *Aug 2019 — Dec 2019*

Diablo Valley College *Pleasant Hill, CA*

- Planned and facilitated the Supplemental Instruction (SI) sessions for Calculus II, organizing students in study groups.
- Assisted students in developing transferable learning and study skills.
- Assisted with SI program implementation, building professional relationships with faculty and students.

Presentations

Jul 2023 **Talk -** 2023 Undergraduate Summer Research Program Symposium *Princeton, NJ*
SED Modeling of Type-1 Quasars

Feb 2023 **Poster -** NSF California Louis Stokes Alliance for Minority Participation (CAMP) Symposium *Riverside, CA*
Testing Silicon Photomultipliers for Beta-Decay Experiments

Jan 2023 **iPoster -** 241st American Astronomical Society Conference | Link *Seattle, WA*
Testing Silicon Photomultipliers for Beta-Decay Experiments

Oct 2022 **Poster -** 2022 SACNAS National Diversity in STEM Conference *San Juan, PR*
ALMA Band 7 Imaging and Analysis of the Luminous Infrared Galaxy ESO 203-IG001

Oct 2022 **Talk -** 2022 National Astronomy Consortium Conference *Washington, DC*
Testing Silicon Photomultipliers for Beta-Decay Experiments

Jul 2022 **Poster -** 2022 Physics & Astronomy REU Poster Session *East Lansing, MI*
Testing Silicon Photomultipliers for Beta-Decay Experiments

Jun 2022 **iPoster -** 240th American Astronomical Society Conference | Link *Pasadena, CA*
ALMA Band 7 Imaging and Analysis of the Luminous Infrared Galaxy ESO 203-IG001

Oct 2021 **Talk -** 2021 National Astronomy Consortium Conference *Virtual*
ALMA Band 7 Imaging and Analysis of the Luminous Infrared Galaxy ESO 203-IG001

Aug 2021 **Talk -** 2021 NRAO/GBO Summer Student Symposium *Greenbank, WV*
ALMA Band 7 Imaging and Analysis of the Luminous Infrared Galaxy ESO 203-IG001

Jul 2020 **Talk -** 9th Annual Lamat Astrophysics Research Symposium *Virtual*
Abundance Matching Technique for Modeling the Galaxy-Halo Connection

Awards & Scholarships

Mar 2023	**NSF Graduate Research Fellowship Program** National Science Foundation	*$36,000 / 3 years*
Mar 2023	**Kennedy-King Memorial Graduate Scholarship** Kennedy-King Memorial Scholarship Fund Ltd.	*$6,000*
Mar 2023	**Chambliss Astronomy Achievement Student Award** American Astronomical Society	*Medal*
Jul 2022	**HSF Scholars** Hispanic Scholarship Fund	*National Honor*
Jan 2022	**Spotlight Scholarship** Assistance League of Diablo Valley	*$5,000*
Aug 2021	**Intel Scholars** Intel Corporation	*National Honor*
Jul 2021	**Latinos in Technology Scholarship** Hispanic Foundation of Silicon Valley	*$6,000 / 2 years*
May 2021	**Assitance League Community College Scholarship** Assistance League of Diablo Valley	*$2,000*
May 2021	**Rossmoor Scholarship** Rossmoor Scholarship Foundation	*$3,000*
Apr 2021	**ASDVC Academic Excellence Scholarship** DVC Foundation	*$500*
Mar 2021	**Kennedy-King Memorial Scholarship** Kennedy-King Memorial Scholarship Fund Ltd.	*$6,000 / 2 years*
May 2020	**Regalia Scholarship** DVC Foundation	*$1,000*
2018-21	**Academic Honors** Diablo Valley College	*Recognition*

Skills

Languages	English, Spanish (native)
Programming	Python (Scipy, NumPy, Astropy, Matplotlib, Pandas), ROOT, MATLAB, C++
Miscellaneous	Linux, Shell (Bash), LaTeX(Overleaf), Microsoft Office, Git.
Soft Skills	Time Management, Teamwork, Problem-solving, Documentation, Critical Thinking.

Media & Press

07/26/23	**Investing in the Future: Two Berkeley Grads Are Grateful to RSF** Rossmoor News	*p. 14A*
07/21/23	**Celebrating the success of a human-centered approach to supporting emerging scientists** University of California Santa Cruz NewsCenter	*Article*
07/05/23	**Recipients of the 2023 AUI Board of Trustees NAC Bridge Scholarship Award** National Radio Astronomy Observatory News	*Article*
05/08/23	**NAC Student Researchers Receive Prestigious Chambliss Medals at AAS 241** National Radio Astronomy Observatory News	*Article*
03/28/23	**Lamat Alumnus Miguel Montalvo is an AAS Chambliss Student Award Winner!** Lamat Institute Alumni News	*Article*
03/02/22	**I thought STEM was not for me** Hispanic Foundation of Silicon Valley	*Article*

Academic Service

Epsilon Pi - Engineering Physics Honor Society *2022-23*

Officer - Organized bi-weekly events to provide students with resources for academic success, including professional development workshops, invited speakers from industry and academia as well as social gatherings.

Physics Latinx Community Group *2021-22*

Co-founder - Organized monthly events to promote a sense of belonging to students, professors, and staff that identify with the Latinx community within the physics department at Berkeley.