

Maximiliano Silva-Feaver

E-mail: maximiliano.silva-feaver@yale.edu

Wright Laboratory Connector Room 258
New Haven, CT, USA

Employment

Mossman Postdoctoral Fellow *September 2023 - Present*
Yale University, New Haven, Connecticut

Education

University of California, San Diego *September 2016 - July 2023*
La Jolla, California
M.S. Physics Nov 2017
Ph.D. Physics July 2023

Santa Clara University *September 2011 - June 2015*
Santa Clara, California
B.S. Physics, *magna cum laude*

Academic Appointments

Mossman Postdoctoral Fellow—Yale University, New Haven *2023 - Present*
Advisors: *Laura Newburgh, Reina Maruyama, and Steve Lamoreaux*
• ALPHA electronics working group lead and work on overall experiment design and construction.
• HAYSTAC operations and upgrade including lead of vibration mitigation strategy.
• SO CMB analysis including lead of time ordered data preprocessing pipeline.

PhD Student—University of California, San Diego *2016 - 2023*
Advisor: *Kam Arnold*
• I led the design and construction of a new cryogenics research lab.
• I modeled, designed, and tested novel superconducting readout electronics for the Simons Observatory and Polarbear CMB telescopes.
• I integrated and tested the first 1000x microwave multiplexing readout in the Simons Observatory Small Aperture Telescope and deployed the instrument to its Chilean site.

Research Assistant—Stanford University *2014-2016*
Advisor: *Kent Irwin*
• I designed and constructed the Dark Matter Radio Pathfinder and learned general cryogenics experience for X-Ray and CMB quantum sensor testing.

Honors & Awards

- Center for Computational Astrophysics Predoctoral Program *Aug 2022 - Jan 2023*
– *Advisor: Simone Aiola, Co-Advisor: Matthew Hasselfield*
- DoE Office of Science Graduate Student Research (SCGSR) Program *June 2021 - March 2022*
– *Advisor: Zeeshan Ahmed, Co-Advisor: Shawn Henderson*
- Geoff and Josie Fox Undergraduate Research Fellowship *May 2015*
- Santa Clara University Physics Department Award *June 2015*
- Sigma Pi Sigma honor society member *June 2015*

Service to the University and Scientific Community

- PhD Student Representative, Space Allocation Committee, CASS at UCSD 2016 - 2022
- Early Career Researcher Committee ALPHA Collaboration 2023 - Present
 - Early Career Representative to the ALPHA Institutional Board 2023 - Present
- Junior Member, Simons Observatory Collaboration 2016 - Present
 - Junior Member Representative to SO Collaboration Board 2023 - Present
 - Member of Junior Member Organization Formation Committee 2022
- Lead SO Readout and Detector Testbed Meeting 2019 - 2022

Mentorship

Eunice Beato - (2024 - Present) PhD student at Yale mentored in design of instrument control and monitoring software for ALPHA.

Kelly Dai - (2024 - 2025) Undergraduate student at Yale mentored in design of instrument control and monitoring software for ALPHA.

Ayanna Beardan - (Summer 2024) Undergraduate student at Elon University mentored project on data cuts from half wave plate synchronous signal data through the Simons National Society of Black Physicists summer program.

Maryam Esmat - (2023 - 2024) PhD student at Yale mentored in design and testing of intermediate frequency amplifier board for ALPHA.

Chloe Greenstein - (2023 - Present) PhD student at Johns Hopkins University mentored in design and testing of room temperature microwave receiver electronics for ALPHA.

Claire Laffan - (2023 - Present) PhD student at Yale mentored research project on ALPHA squeezing and system noise study.

David Nguyen - (2023 - Present) PhD candidate at Yale mentored analysis project on data quality visualization and calibration off of half-wave plate synchronous signal.

Yogesh Mehta - (2023 - Present) PhD candidate at Arizona State University through the SO mentorship program.

Sanah Bhimani - (2023 - 2024) PhD candidate at Yale now Postdoc at University of Chicago mentored thesis project on using atmospheric PCA for data quality cuts.

Jason Weitz - (2022 - 2023) undergrad research SO receiver commissioning and PCB layout for automated resistance probe card.

Joseph Rodriguez - (2019 - 2021) undergrad research SO receiver commissioning and low temperature coupling voltage regulator now a Senior Performance Analyst at TuSimple

Nathaniel Stowell - (2018 - 2020) undergrad research on RF component testing now a Senior Performance Analyst at TuSimple

Chris Ellis - (2017 - 2020) undergrad research on polarbear readout electronics and SO-SAT integration now in a PhD at University of Nevada - Reno (started 2020).

Bryce Bixler - (2016 - 2019) undergrad research on polarbear readout electronics and half wave plate now in a PhD at UCSD (started 2019)

Community Outreach

- Organizer, I'm a Cosmologist Ask Me Anything *Amplified Ale Works San Diego, July 2022*
 - Panel of faculty, postdocs, and graduate students moderated by the Fleet Science Center attended by ~100 members of the public.
 - I got the venue, co-sponsor, and moderators, organized ticket sales and marketing, and prepared the panelists.

- Co-lead, Simons NSBP Professional Development Workshop *Virtual 2020*
 - 6 week career development seminar series during the Simons National Society of Black Physicists Summer Undergraduate Research program.
 - Prepared and delivered workshop course materials on grad school applications, how to give presentations, and general research skills.
- Physics Demonstrator, Expo Day *Petco Park, 2017, 2019, 2020*
 - Booth with physics demos for elementary and middle school children free to the public over one weekend a year in the baseball standard attended by 1000s.
- Speaker, Astronomy on Tap San Diego *New English Brewing, February 2018*
 - Talk title: How we measure the Universe
 - Astronomy on Tap is a nationwide outreach event with a local chapter in San Diego which hosts public science talks in casual settings and is very well attended.

Talk and Poster Contributions

- Jun 2025 (Talk) - “The Simons Observatory,” mm Universe, Chicago, IL USA
- Jun 2025 (Talk) - “The Simons Observatory,” 15th Conference on the Intersections of Particle and Nuclear Physics, Madison, WI USA
- Apr 2025 (Talk) - “Updates on the HAYSTAC and ALPHA axion searches at Yale,” Harvard University Laboratory for Particle Physics and Cosmology Seminar, Cambridge, MA USA
- Nov 2024 (Talk) - “Updates on the HAYSTAC and ALPHA axion searches at Yale,” Cornell University Physics Department LEPP Journal Club Seminar, Ithaca, NY USA
- Sept 2024 (Talk) - “The Axion Longitudinal Plasma Haloscope (ALPHA),” 19th Patras Workshop on Axions, WIMPs, and WISPs, Patras, Greece
- May 2023 (Talk) - “The Simons Observatory CMB Telescopes: Instrument Status and Forecasts,” Santa Clara University Physics Department Colloquium, Santa Clara, CA USA
- Nov 2022 (Talk) - “Time-Ordered Data Processing with Half-Wave Plate Modulation for the Simons Observatory Small Aperture Telescopes,” Princeton University Gravity Group Lunch Seminar, Princeton, NJ USA
- Oct 2022 (Talk) - “Optimizations of RF Enclosure Geometry in Microwave Multiplexer Arrays,” Applied Superconductivity Conference, Honolulu, HI USA
- Sept 2022 (Talk) - “Microwave SQUID Multiplexer Development for the Simons Observatory,” Yale Nuclear, Particle, Astrophysics Seminar, New Haven, CT USA
- July 2022 (Talk) - “Microwave SQUID Multiplexing for CMB Observatories,” SPIE Astronomical Telescopes + Instrumentation, Montreal, Canada
- July 2019 (Poster) - “Simons Observatory Microwave Multiplexing Readout System Overview,” 18th Low Temperature Detector Conference, Milan, Italy
- Feb 2019 (Talk) - “How We Measure the Universe,” Astronomy on Tap, San Diego, CA USA
- July 2017 (Poster) - “SQUID Characterization for Next Generation Digital Frequency Domain Multiplexing,” 17th Low Temperature Detector Conference, Kurume City, Japan
- Sept 2016 (Poster) - “Design of a Pathfinder Experiment To Search For Hidden Photon Dark Matter,” Applied Superconductivity Conference, Denver, CO USA

Publications

Major Contributions

1. “Dark Matter Axion Search with HAYSTAC Phase II,” - Xiran Bai, M.J. Jewell, J. Echevers, *et. al.* - PRL Apr 2025
2. “The Simons Observatory: Design, integration, and testing of the small aperture telescopes,” Nicholas Galitzki, Tran Tsan, Jake Spisak, Michael Randall, Max Silva-Feaver, *et. al.* - ApJ Sept 2024
3. “Crosstalk Effects in Microwave SQUID Multiplexed TES Bolometer Readout,” - Nov 2023 JLTP
4. “Phase drift monitoring for tone tracking readout of superconducting microwave resonators,” Max Silva-Feaver, *et. al.* - 2022 SPIE

5. "SLAC Microresonator RF (smurf) Electronics: A Tone-tracking Readout System for Superconducting Microwave Resonator Arrays," Cyndia Yu, Zeeshan Ahmed, Josef C. Frisch, Shawn W. Henderson, Max Silva-Feaver, *et. al.* - RSI Jan 2023
6. "Simons Observatory Microwave SQUID Multiplexing Readout - Cryogenic RF Amplifier and Coax Chain Design," Mayuri Sathyaranayana Rao, Maximiliano Silva-Feaver, *et. al.* - JLTP Mar 2020
7. "Studies of Systematic Uncertainties for Simons Observatory: Detector Array Effects," Kevin T. Crowley, Sara M. Simon, Max Silva-Feaver, *et. al.* - 2018 SPIE Astronomical Telescopes and Instrumentation Conference Proceedings
8. "Comparison of NIST SA13a and SA4b SQUID Array Amplifier," Max Silva-Feaver, *et. al.* - JLTP Sept 2018
9. "Design overview of DM radio pathfinder experiment," Maximiliano Silva-Feaver, *et. al.* - IEEE Transactions on Applied Superconductivity June 2017

Collaborating Contributions

1. "The Simons Observatory: forecasted constraints on primordial gravitational waves with the expanded array of Small Aperture Telescopes," - Simons Observatory Collaboration Arxiv Preprint (Dec 2025)
2. "Search for Dark Photons between 16.96–19.52 μ eV with the HAYSTAC Experiment," - Bai, X *et al* Arxiv Preprint (Oct 2025)
3. "Demonstration of a 1820 channel multiplexer for transition-edge sensor bolometers," - Groh, JC *et al* APL (Oct 2025)
4. "The Simons Observatory: science goals and forecasts for the enhanced Large Aperture Telescope," - Simons Observatory Collaboration JCAP (Aug 2025)
5. "Simons Observatory: Characterization of the Large Aperture Telescope Receiver," - Bhandarkar, T *et al* ApJS (Jul 2025)
6. "The Simons Observatory: validation of reconstructed power spectra from simulated filtered maps for the small aperture telescope survey," - Hervias-Caimapo, C *et al* JCAP (Jun 2025)
7. "Simons Observatory: Predeployment Performance of a Large Aperture Telescope Optics Tube in the 90 and 150 GHz Spectral Bands," - Sierra, C *et al* ApJS (Jan 2025)
8. "The Simons Observatory: laboratory beam characterization for the first small aperture telescope," - Gerras, RG *et al* SPIE (Sept 2024)
9. "The Simons Observatory: deployment and current configuration of the observatory control system for SAT-MF1 and data access software systems," - Bhimani, S *et al* SPIE (Aug 2024)
10. "The Simons Observatory: studies of detector yield and readout noise from the first large-scale deployment of microwave multiplexing at the large aperture telescope," - Satterthwaite, TP *et al* SPIE (Aug 2024)
11. "The Simons Observatory: dark characterization of the large aperture telescope," - Haridas, SK *et al* SPIE (Aug 2024)
12. "The Simons Observatory: alarms and detector quality monitoring," - SPIE (Aug 2024)
13. "Simons Observatory: observatory scheduler and automated data processing," - Guan, Y *et al* SPIE (Jul 2024)
14. "The Simons Observatory: Development and Optical Evaluation of Achromatic Half-Wave Plates" - Sugiyama, J *et al* JLTP (Jan 2024)
15. "The Simons Observatory: A fully remote controlled calibration system with a sparse wire grid for cosmic microwave background telescopes" - Murata, M *et al* RSI (Dec 2023)
16. "Simons Observatory Focal-Plane Module: In-lab Testing and Characterization Program" - Wang, Y *et al* JLTP (Oct 2022)
17. "A simulation suite for readout with SMuRF tone-tracking electronics" - Yu, C *et al* SPIE (Aug 2022)
18. "The Simons Observatory: development and validation of the large aperture telescope receiver" - Bhandarkar, T *et al* SPIE (Aug 2022)
19. "Bandwidth and Aliasing in the Microwave SQUID Multiplexer" - Yu, C *et al* JLTP (Aug 2022)
20. "The Simons Observatory Microwave SQUID Multiplexing Detector Module Design" - McCarrick, H *et al* ApJ (Nov 2021)
21. "The Simons Observatory: The Large Aperture Telescope (LAT)" - Xu, Z et al Research Notes of the AAS (Apr 2021)

22. "The Simons Observatory: Magnetic Sensitivity Measurements of Microwave SQUID Multiplexers" - Vavagiakis, E et al, IEEE Transactions on Applied Superconductivity (Aug 2021)
23. "Anomalous Frequency Noise From the Megahertz Channelizing Resonators in Frequency-Division Multiplexed Transition Edge Sensor Readout" - Groh, J et al, IEEE Transactions on Applied Superconductivity (Aug 2021)
24. "A microwave SQUID multiplexer optimized for bolometric applications" - Dober, B et al, APL (Feb 2021)
25. "Assembly development for the Simons Observatory focal plane readout module" - Healy, E. et al, Proceedings Volume 11453, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy X (Dec 2020)
26. "The Simons Observatory: the Large Aperture Telescope Receiver (LATR) integration and validation results" - Xu, Z et al, Proceedings Volume 11453, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy X (Dec 2020)
27. "Small Aperture Telescopes for the Simons Observatory" - Ali, A et al, Journal of Low Temperature Physics (Apr 2020)
28. "A Measurement of the Degree-scale CMB B-mode Angular Power Spectrum with Polarbear" - The Polarbear Collaboration, ApJ (July 2020)
29. "Effect of Stray Impedance in Frequency-Division Multiplexed Readout of TES Sensors in POLARBEAR-2b" - Ellefot, T. et al, Journal of Low Temperature Physics (Mar 2020)
30. "Deployment of POLARBEAR-2A" - Kaneko, D. et al, Journal of Low Temperature Physics (Mar 2020)
31. "Assembly and Integration Process of the High-Density Detector Array Readout Modules for the Simons Observatory" - Li, Y. et al, Journal of Low Temperature Physics (Mar 2020)
32. "Measurement of the Cosmic Microwave Background Polarization Lensing Power Spectrum from Two Years of POLARBEAR Data" - Aguilar Faundez, M. et al, ApJ (Apr 2020)
33. "Internal Delensing of Cosmic Microwave Background Polarization B-Modes with the POLARBEAR Experiment" - Adachi, S. et al, PRL (Apr 2020)
34. "Evidence for the Cross-correlation between Cosmic Microwave Background Polarization Lensing from POLARBEAR and Cosmic Shear from Subaru Hyper Suprime-Cam" – Namikawa, T et al ApJ (Sep 2019)
35. "Cross-correlation of POLARBEAR CMB Polarization Lensing with High- Sub-mm Herschel-ATLAS galaxies" - Faundez MA et al Accepted to ApJ Nov (2019)
36. "Measurements of tropospheric ice clouds with a ground-based CMB polarization experiment, POLARBEAR" – Takakura et al, ApJ (2019)
37. "The Simons observatory: Science goals and forecasts" - Aguirre, J. et al Journal of Cosmology and Astroparticle Physics (2019)
38. "The polarbear-2 and simons array focal plane fabrication status" - Westbrook, B et al Journal of Low Temperature Physics (2018)
39. "Detector and readout assembly and characterization for the Simons array" – Ellefot, T et al Journal of Low Temperature Physics (2018)
40. "The Simons Observatory: Instrument Overview" – Galitzki, N et al Proc. SPIE, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy IX, 2018
41. "Simons Observatory Large Aperture Telescope Receiver Design Overview" – Zhu, N et al Proc. SPIE, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy IX, 2018
42. "The Simons Observatory: Science goals and forecasts" – Simons Observatory Collaboration in arxiv preprint submitted to JCAP.
43. "Simons Observatory large aperture receiver simulation overview" – Orlowski-Scherer , J et al Proc. SPIE, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy IX, 2018
44. "Prime-Cam: A first-light instrument for the CCAT-prime telescope" – Vaviagiakis, E. et al Proc. SPIE, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy IX, 2018
45. "A Measurement of the Cosmic Microwave Background B-Mode Polarization Power Spectrum at Sub-Degree Scales from 2 years of POLARBEAR Data" – The POLARBEAR Collaboration, ApJ 2017