

Lucia A. Perez

Flatiron Research Fellow, Center for Computational Astrophysics

☎ (212) 767-9516 • ✉ lperez@flatironinstitute.org — lucia.perez@princeton.edu

🌐 luciaperez.owlstown.net

Academic Appointments

- 2023 - present: **Flatiron Research Fellowship, Center for Computational Astrophysics**, Flatiron Institute & Simons Foundation, New York NY 10010.
- 2022 - present: **Future Faculty in the Physical Sciences Postdoctoral Fellowship, Department of Astrophysics, Princeton University**, Princeton NJ 08540. Fall 2022 - 2023 full-time, visiting appointment through 2026.
- Fall 2020: **PreDoctoral Fellow, Center for Computational Astrophysics**, New York NY 10010.
- 2016 - 2022: **Research & Teaching Assistant, School of Earth and Space Exploration, Arizona State University**, Tempe AZ 85281. PhD Advisors: Drs. Sangeeta Malhotra & James Rhoads.

Education

Arizona State University, Astrophysics PhD, GPA: 4.00 / 4.00.....

Defended April 2022. "The Void Clustering of Ly-Alpha Emitters as a Probe of Reionization."

Wellesley College: B.A. in Astrophysics, 2014. GPA: 3.55 / 4.00.....

Fellowships, Honors, and Awards (abridged)

- Arizona State University Graduate College Fellowship, Spring 2018 and Fall 2019 - Spring 2020
- National GEM Consortium University Fellow, Ph.D. Science Fellowship, with Arizona State University and Pacific Northwest National Laboratory, April 2015-2017
- Ford Foundation Predoctoral Fellowship Honorable Mention, June 2017
- Fulbright Fellow, Student Program, South Africa, carried out November 2015 - July 2016
- NASA Marshall Space Flight Center 2014 Intern Poster Expo, 1st Place Prize in Science Posters, August 2014. *Comparative Imaging and Analysis of the Auroral Morphology of Ganymede*.
- Sigma Xi Honors, Wellesley College, April 2014
- Wellesley College Academic Excellence Achievement Award, ($GPA > 3.5 / 4.0$), 2011-2014.

Academic Supervision

Richard Stiskalek, University of Oxford.....

Spring 2025 for CCA PreDoctoral Program.

Anne Moore, University of Arizona.....

2025-26 on project building b_ϕ priors conditioned on observations and the Santa Cruz SAM.

Angeli Sandoval, City University of New York.....

2023-2025 for CUNY Master's Program in Astrophysics.

Ishika Gobin, University of Virginia.....

Summer 2024 for Simons-National Society of Black Physicists Fellowship.

James Robinson, Princeton University.....

Summer 2023 for Department of Astrophysics' Undergraduate Summer Research Program.

Teaching

- 2023-4: Work with Dr. Viviana Acquaviva (CUNY, Simons Foundation) to translate her 'Machine Learning for Physics and Astronomy' course into Spanish; includes lecture slides, Python notebooks, and select video lectures.
- Spring 2023: Guest lecturer for Prof. Kelle Cruz's *Astro 100* class at Hunter College. Topics covered: Moon Phases & Eclipses, The Copernican & Keplerian Revolutions, and an overview of Cultural Astronomy.
- 2022: Teaching assistant with Dr. Frank Timmes. Managed online introductory astronomy class.
- Spring 2018: Teaching assistant with Dr. Jennifer Patience. Ran three sections of an introductory astronomy lab for a class of 60 astrophysics majors, in which I was responsible for teaching and grading each lesson.
- Fall 2017: Teaching assistant with Dr. Alyssa Rhoden. Created assignments, guide lectures, grade, and interface for a class of 300 introductory astronomy students.
- November 2014-May 2015: I worked as a tutor for Bespoke Education in New York City, specializing in mathematics for middle school students and physics for high school students. I also worked with Varsity Tutors helped students with GRE prep and college-level calculus.

Professional Service

- Co-organizer and SOC co-head for MockNYC ~ 50 person workshop on the galaxy-halo connection and improving galaxy modeling for cosmological inference. January 13-15, 2026 at the Flatiron Institute. <https://mocknyc.owlstown.net/>
- Hubble Cycles 32, 32 Bridge, and 33 external reviewer for galaxies, 2024 and 2025.
- Career Mentor for CUNY Master's program, 2023-2024.
- Reviewer for MNRAS and ApJ.

Selected Outreach

- January 2024: **SF Presents: To the Stars and Back** panel with Dr. Thebe Medupe, reflecting on our work and time together during my Fulbright Fellowship to South Africa.
- May 2023: Commencement Address to the the graduating class of the Nightingale-Bamford School.
- Fall 2022: Organized and ran a public observing night at Princeton's observatory wholly in Spanish for a local school.
- August 2017, Spring 2018: academic facilitator with SunDial, an ASU early start program for incoming Physics and SESE first year students. I led lessons covering the Stefan-Boltzmann law and coarsely deriving planets' temperatures, as well as conversations about impostor syndrome and mental health. I guided four students through a Python coding project analyzing Kepler telescope light curves to derive exoplanet properties.
- September 2016-May 2018: telescope operator with the SESE Open Houses and Night of the Open Door.

Other Research Experience

- Aug 19 - 29, 2018: **La Serena School for Data Science, La Serena, Chile.** Drs. Matthew Graham (Caltech), Amelia Bayo (U. de Valparaiso), Mauricio Cerda (U. Chile).
 - Practiced implementing statistical regression, (un)supervised machine learning, deep learning, databases, high

performance computing, and image processing in the context of big astronomical data.

- Led a group project implementing supervised and unsupervised machine learning to a catalog of possible variable stars from the Asteroid Terrestrial-Impact Last Alert System.
- Aug 14 - 18, 2018: **Observations for LAGER.** *with Dr. James Rhoads and Weida Hu*
 - Five nights of observations using the N9640 filter of Cerro Tololo's DECam.
- 2017: **LOFAR Collaboration, Hamburg, Germany** *Drs. Evan Scannapieco and Chris Groppi. (ASU)*
 - Imaged and analyzed magnetic field signatures of M51 using the new LOFAR software FACTOR at 143 MHz, 9 arcsecond resolution, and noise levels around $125 \mu\text{Jy}$.
- 2015 - 2016: **Fulbright Fellowship at North West University, Mafikeng, South Africa** *Dr. Thebe Medupe*
 - Fourier analysis of archived SuperWASP light curves in search of pulsating A-type stars
 - Mentor for the NAOO Winter School, which brings 50 young black South African physics students to carry out astronomy projects and learn about their country's astronomical resources and history

Selected Invited Talks

- Workshop for mock ELG challenge development, Donostia, Spain. *Semi-analytic modeling of ELGs? Lessons & Resources from CAMELS-SAM*, February 17-21, 2025.
- Cosmology and galaxy astrophysics with simulations and machine learning 2024 in New York, NY. Talk: *Toward Constraints on Cosmology and Astrophysics with Observed Galaxy Clustering: the new photometric expansion to CAMELS-SAM*, December 10, 2024.
- Seminar for Institut de Física D'Altes Energies (IFAE) in Barcelona, Spain. *(Machine) Learning the Universe with CAMELS-SAM and beyond*, October 11, 2024.
- Oral presentation at Mock Barcelona in Spain. *The Influence of Galaxy Formation Modeling on b_ϕ , b_1 , and constraints on f_{NL}* , October 10, 2024.
- Invited oral presentation at LACAR in Bogota, Colombia. *CAMELS-SAM: how to crack open the galaxy-halo connection and (machine) learn the Universe*, June 27, 2024.
- University of Washington, Department of Astronomy 'DUSC' Seminar, *CAMELS-SAM and beyond: untangling the galaxy-halo connection with machine learning*, Apr. 30, 2024.
- University of Arizona, Department of Astronomy 'TACOS' Seminar on CAMELS-SAM, Apr. 24, 2024.
- Wesleyan University, Department of Astronomy Colloquium *CAMELS-SAM and beyond: cracking open the galaxy-halo connection with machine learning*, Oct. 11, 2023.
- Long seminar for the Observatório Nacional of Brazil's Ciclo de Seminários da COAST 2023, August 2023 via Youtube Live. *CAMELS-SAM: untangling the galaxy-halo connection with machine learning*.
- Attendance and oral presentation at Future Cosmology school at L'Institut d'Etude Scientifique de Cargèse, Corsica, France. *CAMELS-SAM: untangling the galaxy-halo connection with machine learning*.
- Dissertation talk at AAS240, June 2022. *Constraining cosmology and reionization with the Void Probability Function, feat. the new CAMELS-SAM suite for machine learning*.
- Presentation at ASU's SESE Colloquium, 17 November 2021. *Constraining Reionization with the Void Clustering of Lyman- α Emitters*.
- Presentation at the 2020 WFIRST Jamboree, 2 March 2020, Flatiron Institute. *Probing Patchy Reionization with the Void Probability Function in the era of WFIRST*.
- Presentation at the 2019 COSMOS Team Meeting, 14-17 May 2019, Flatiron Institute. *The Clustering of LAGER $z \approx 0.9$ [OIII] and $z \approx 0.4$ H α Emitters in the COSMOS field*.
- Poster Presentation at the Snowbird Cosmic Lyman-Alpha Workshop (SnowCLAW), 19 - 24 March 2017. *Comparison of Clustering Analysis Methods for Ly α -Emitter-Inhabited Dark Matter Halo Simulations*.

- **Perez, et al. 2026, arXiv:2602.04987 (submitted to ApJ).**
The Impact of Galaxy Formation on Galaxy Biasing, and Implications for Primordial non-Gaussianity Constraints.
- **Perez, Genel, et al. 2023, 2023ApJ...954....11P.**
CAMELS-SAM: new simulations for constraining cosmology with galaxy clustering and machine learning
- **Perez et al. 2023, 2023ApJ...949....3P.**
Constraints on the Epoch of Reionization with Roman Space Telescope and the Void Probability Function of Lyman- α Emitters.
- **Perez et al. 2022. 2022ApJ...940..102P.**
Probing Patchy Reionization with the Void Probability Function of Lyman- α Emitters.
- **Perez et al. 2021. 2021ApJ...906...58P.**
The Void Probability Function of simulated surveys of high-redshift Lyman- α Emitters.
- Publications by students I have mentored:
 - *Informative Priors on Primordial non-Gaussianity Bias b_ϕ From Galaxy Formation*; Moore, Krause, ... **Perez 2025, arXiv:2604.21790**, submitted to JCAP.
 - *Cosmological Rescaling of Merger Trees for Semi-Analytic Galaxy Modelling*; Stiskalek, **Perez**, and Genel, **in prep**, expected Feb 2026.
 - *CosmoBench: A Multiscale, Multiview, Multitask Cosmology Benchmark for Geometric Deep Learning*, 2025arXiv250703707H, Huang, Stiskalek, ..., **Perez**, et al. 2025, accepted to the competitive NeurIPS2025 and to be published in conference proceedings.
 - *The Clustering and Halo Occupation of $z = 0.47$ and $z = 0.92$ Emission Line Galaxies in COSMOS*; Robinson, **Perez**, et al. 2025, **in final prep**. Read draft here: <https://tinyurl.com/2s4badrc>
- Learning the Universe collaboration co-authorships:
 - *Learning the Universe: physically-motivated priors for dust attenuation curves*, Sommovigo et al. 2025ApJ...990..114S, due to my involvement with the Synthetic Observations group and upcoming application of priors to photometric work with CAMELS-SAM.
 - *How does feedback affect the star formation histories of galaxies?* Iyer et al. 2025arXiv250821152I, involvement in the Synthetic Observations groups and hands-on testing with CAMELS-SAM star formation histories.
 - *LtU-ILL: An All-in-One Framework for Implicit Inference in Astrophysics and Cosmology*, Ho et al. 2024OJAp....7E..54H, due to my involvement with the pipeline and support in completing the manuscript.
- CAMELS collaboration co-authorships:
 - *Galaxy Phase-Space and Field-Level Cosmology: The Strength of Semi-Analytic Models*, de Santi, et al. arXiv:2512.10222, for assistance with SAMs, results interpretation, and thorough manuscript support.
 - *Field-level simulation-based inference with galaxy catalogs: the impact of systematic effects*, de Santi, et al. 2025JCAP...01..082D, for assistance with SAMs, guidance on galaxy large scale structure, and thorough manuscript support.
 - *The CAMELS Multifield Dataset: Learning the Universe's Fundamental Parameters with Artificial Intelligence*, Villaescusa-Navarro, et al. 2022ApJS..259...61V, due to my development and public release of CAMELS-SAM.
 - *The CAMELS Project: Public Data Release*, arXiv:2201.01300, Villaescusa-Navarro et al. 2023ApJS..265...54V, due to my development and public release of CAMELS-SAM.
- LAGER collaboration co-authorships:
 - *New Spectroscopic Confirmations of Ly- α Emitters at $z \sim 7$ from the LAGER Survey*, Harish et al. 2022ApJ...934..167H, in which I helped visually confirm candidate LAEs for spectroscopic follow-up.
 - *LAGER Ly α Luminosity Function at $z \sim 7$: Implications for Reionization*, Wold, et al. 2022ApJ...927...36W, in which I helped visually confirm candidate LAEs for spectroscopic follow-up.
 - *A Lyman- α protocluster at redshift 6.9*, Hu, ..., **Perez**, et al. 2021NatAs...5..485H, in which I helped visually confirm candidate LAEs for spectroscopic follow-up.

- *Correlations between $H\alpha$ equivalent width and galaxy properties at $z = 0.47$: Physical or selection-driven?* Khostovan, ..., Perez, et al. 2021MNRAS.503.5115K, which uses the sample of $H\alpha$ emitters I helped select in the COSMOS field.
 - *A large, deep 3 deg^2 survey of $H\alpha$, $[O III]$, and $[O II]$ emitters from LAGER: constraining luminosity functions,* Khostovan, ..., **Perez**, et al. 2020MNRAS.493.3966K. I carried out half the ELG selection based on COSMOS2015 photometric redshifts.
 - *The $Ly\alpha$ Luminosity Function and Cosmic Reionization at $z \sim 7.0$,* Hu, ..., **Perez**, et al. 2019ApJ...886...90H, for membership in LAGER.
 - *Design for the First Narrowband Filter for the Dark Energy Camera: Optimizing the LAGER Survey for $z \sim 7$ Galaxies,* Zheng, ..., **Perez**, et al. 2019PASP..131g4502Z, for membership in LAGER.
- Other Co-authorships:
- *A Comprehensive Study of $H\alpha$ Emitters at $z \approx 0.62$ in the DAWN Survey: The Need for Deep and Wide Regions,* Harish et al. 2020ApJ...892...30H, assisted with finalizing the $H\alpha$ emitter selection and general publication support.
 - *Calibrating the relation of low-frequency radio continuum to star formation rate at 1 kpc scale with LOFAR,* Heesen et al. 2019A&A...622A...8H. I calibrated and processed the LOFAR data that created the 145 MHz image of NGC 5194 in Fig. 2a.