MICHELLE PARK

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RESEARCH INTERESTS

Observational galaxy formation and evolution, galaxy star formation histories and quenching, dark matter cosmology, dark matter high-energy particle physics

EDUCATION

Bachelor of Physics on astrophysics track, Stanford University   2022 - Present

Software Skills   Python, LaTeX, bash, git

RESEARCH EXPERIENCE

Current Research: Producing Mock High-Redshift Galaxy Spectra through UniverseMachine to Compare with James Webb Space Telescope Observations   January 2023 - Present
Stanford University

- **Mentors:** Prof. Risa Wechsler (Stanford University, Kavli Institute for Particle Astrophysics and Cosmology (KIPAC)), Dr. Wren Suess (Stanford-Santa Cruz Cosmology Fellow), Dr. Mia de los Reyes (Stanford University)
- Producing mock galaxy spectra and photometries through the large volume simulation UniverseMachine and implementing the Prospector tool in Python to find stellar population properties through Bayesian fitting. We aim to recover the true properties of the mock galaxies, which will recommend the best measurement and modeling techniques for high-redshift galaxy observations from the James Webb Space Telescope (JWST). By observing how galactic composition and stellar populations evolve, we would like to directly identify the timescale for galaxies to cease star formation, which is an active area of research for JWST.

The Search for Dark Matter Through Soft Unclustered Energy Patterns at CMS   June - August 2021
Massachusetts Institute of Technology

- **Mentors:** Prof. Christoph Paus, Dr. Chad Freer (MIT, Large Hadron Collider's Compact Muon Solenoid (LHCC CMS) Experiment)
- Selected as one of 50 students worldwide to conduct research through the Research Science Institute (RSI) program by MIT (5% acceptance).
- Developed and investigated Monte Carlo simulations of potential candidates for dark matter particles known as soft unclustered energy patterns (SUEPs) at LHC CMS. First study to implement and conclude boosting strategies for discriminating SUEPs from background events. Will be tested experimentally in LHC Run 3.
- Selected as one of 5 papers to be published in January 2022 in the [RSI Compendium](#) by the Center of Excellence in Education and MIT (see link).

A Novel Method for Identifying Kepler Exoplanet Habitability Using Python-Based Analysis of Standardized Transit Light Curves and Calculated Parameter Values   July 2019 - March 2021

- **Mentor:** Prof. Dustin Schroeder (Stanford University)
- Developed Python program to produce valuable exoplanet analyses from the Mikulski Archive for Space Telescopes and the NASA Exoplanet Archive. Outputs included transit light curve graphs, tables of transit data, exoplanet parameters, and habitability evaluation through parameter relationship graphs. Measured program's accuracy by running program on 50 distinct Kepler exoplanets and comparing with known results.

Alterations of the [Fe/H] Values Modulate Light Curves by Absolute Magnitude in non-Blazhko RRab Lyraes   August 2018 - March 2019

- **Mentor:** Prof. Dustin Schroeder (Stanford University)

- Captured 135 images of 15 RR Lyraes through remotely accessible Slooh telescopes in the Canary Islands. Produced light curves through image analysis softwares to observe how an RR Lyrae's composition affects light curve phenomenology and to recommend metallicity corrections for distance measurements to variable stars.
- Published in December 2020 in the Journal of Emerging Investigators (see link).

EXTRA-CURRICULAR ACTIVITIES

Stanford Science Policy Group (SSPG). Founder of SSPG's book club for *The Code Breaker* by Walter Isaacson with roughly 30 graduate and phD students; outreach manager for SSPG communication and social media.

Stanford Space Initiative. Software developer for Mars Polar Rover electrical team, working with Raspberry Pi, OpenCV, and Ardupilot to develop rover sensors that will detect potential obstacles on the terrain.

The Gigaton. Writer for The Gigaton, a graduate-run newsletter on providing climate solutions and career paths by identifying key companies and quantifying carbon impact. Reached more than 1,000 views on Electricity Waste: Bright Solutions Needed, which discusses innovation opportunities to alleviate inefficient electricity generation, transmission, and distribution.

The Dish on Science. Writer for Stanford's Dish on Science, a graduate science journal that aims to make complex scientific topics approachable. Currently publishing article on the James Webb Space Telescope's astrophysical discoveries.

Founder's Circle for Explore Energy Theme House. One of the house leads for Junipero, the Explore Energy theme house at Stanford University. Hosting energy-related community events, founded the first student-run event with the Canopy Organization.