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Sheila A. Sagear

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Education

Ph.D. in Astronomy *In Progress (Expected May 2025)*
University of Florida, Gainesville, FL

M.S. in Astronomy *May 2022*
University of Florida, Gainesville, FL

***B.A. in Astronomy and Physics**, Cum Laude* *May 2020*
Boston University, Boston, MA

Research Experience

***Predoctoral Research Fellow,** Center for Computational Astrophysics*
January 2023 – Present
Advisor: Adrian Price-Whelan
Constraining stellar ages and metallicities for M dwarf Kepler exoplanet hosts using Gaia kinematics and spectra. Investigating the relationship between stellar properties and planetary system orbital dynamics in an evolutionary perspective.

***Graduate Research Assistant,** University of Florida Dept. of Astronomy*
Sept 2020 – Present
Advisor: Sarah Ballard
Investigating the relationship between eccentricity, stellar metallicity, and planet occurrence rate for exoplanets around M dwarfs. Developing an open-source Python package called `photoeccentric` to measure exoplanet eccentricities using Kepler light curves and stellar data.

***Research Assistant,** Boston University Dept. of Physics*
Jan 2020 – Aug 2020
Advisors: Manher Jariwala, Andrew Duffy, Emily Allen
Measured the effectiveness of in-person, virtual, and hybrid teaching models by comparing student learning outcomes in introductory college physics labs. Developed an understanding of qualitative research methods and coding in R.

***Undergraduate Research Assistant,** Boston University Dept. of Astronomy*
Jan 2017 – May 2020
Advisors: Philip Muirhead, Julie Skinner
Conducted an exoplanet search around small stars and ultracool dwarfs observed by K2 using the transit method and constrained planet occurrence rates based on a null result. Results described in a first-author paper accepted to the Astronomical Journal. Conducted a sample literature search for the PINES survey, a photometric search for transiting planets around L and T dwarfs.

***Directed Studies Intern**, CERN (CMS Experiment)*
Jan 2019 – Jul 2019
Advisors: Jennifer Ngadiuba, Tiziano Camporesi
Improved the CMS Trigger System by training particle identification models with machine learning and testing performance of machine learning models in FPGAs using the Python package `hls4ml`. Results described in a co-authored paper accepted to Machine Learning: Science and Technology.

***Intern**, NASA Ames Research Center (Kepler/K2 Guest Observer Office)*

Jun 2018 – Aug 2018
Advisors: Michael Gully-Santiago, Christina Hedges
Developed an exoplanet and supernova injection and recovery tool for Kepler GO's Python package `lightkurve`, a package to aid in data processing for Kepler, K2 and TESS data.

Outreach

Scientist Pen Pal, *Letters to a Pre-Scientist* 2021-2022
Mentoring Chair, *Graduate Astronomy Organization, University of Florida* 2021
Founder of BU Astronomy Dept. Undergraduate Research Symposia 2018-2020
President of Society of Physics Students (Photon), BU 2019-2020

Publications

Papers:

Sagear, Sheila; Ballard, Sarah
"The Orbital Eccentricity Distribution of Planets Orbiting M dwarfs" (2023)
Submitted to PNAS

Tamburo, Patrick; Muirhead, Philip S.; McCarthy, Allison M.; Hart, Murdock; Gracia, David; Vos, Johanna M.; Bardalez Gagliuffi, Daniella C.; Faherty, Jacqueline; Theissen, Christopher; Agol, Eric; Skinner, Julie N.; **Sagear, Sheila**
"The Perkins INfrared Exosatellite Survey (PINES) I. Survey Overview, Reduction Pipeline, and Early Results" (2022)
Accepted to The Astronomical Journal

Di Guglielmo, Giuseppe; Duarte, Javier; Harris, Philip; Hoang, Duc; Jindariani, Sergo; Kreinar, Edward; Liu, Mia; Loncar, Vladimir; Ngadiuba, Jennifer; Pedro, Kevin; Pierini, Maurizio; Rankin, Dylan; **Sagear, Sheila;** Summers, Sioni; Tran, Nhan; Wu, Zhenbin
"Compressing Deep Neural Networks on FPGAs to Binary and Ternary Precision with HLS4ML" (2021)
Machine Learning: Science and Technology, 2, 015001

Sagear, Sheila; Allen, Emily; Duffy, Andrew; Jariwala, Manher
"Student learning outcomes with hybrid computer simulations and hands-on labs" (2020)
2020 Physics Education Research Conference Proceedings, 448-453

Sagear, Sheila A.; Skinner, Julie N.; Muirhead, Philip S.
"Upper Limits on Planet Occurrence around Ultracool Dwarfs with K2" (2020)
The Astronomical Journal, 160, 19

Software:

"Lightkurve: Kepler and TESS time series analysis in Python" (2018)
Lightkurve Collaboration, *Astrophysics Source Code Library*, ascl:1812.013

Selected Talks and Posters

Poster: "**The Orbital Eccentricities of the Kepler M dwarf Planets: A Population-Level View of Planet Dynamics around Small Stars**"
Exoplanets IV, Las Vegas, NV May 2022
Poster: "**Machine Learning Improvements to the CMS Trigger System**"
2019 Physics Congress (PhysCon), Providence, RI Nov 2019
Poster: "**Constraining Planet Occurrence Around Ultracool Dwarfs Observed by *K2***"
American Astronomical Society Meeting #233, Seattle, WA Jan 2019
Poster: "**Measuring Transit Detection Efficiency in Ultracool Dwarfs and an Open Source Injection and Recovery Tool**"
The 20th Cambridge Workshop on Cool Stars and the Sun, Boston, MA Aug 2018