MILES CURRIE

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EDUCATION

University of Washington 2018-present
Astronomy and Astrobiology PhD student GPA: 3.7
Advisor: Vikki Meadows

Florida State University 2013-2017
Physics & Astrophysics, B.S. GPA: 3.8
Minor in Mathematics

RESEARCH EXPERIENCE

University of Washington August 2018 - present
Doctoral Researcher, Astronomy and Astrobiology

- Advisor: Vikki Meadows
- Interests: Detection, characterization, and habitability of exoplanet atmospheres with high-resolution ground-based spectroscopy
- Uses 1D atmospheric modeling codes to understand biosignatures and their false positives
- Develops retrieval algorithms for James Webb Space Telescope and thirty meter class ground-based telescopes

Space Telescope Science Institute August 2017 - August 2018
Post-Baccalaureate Researcher, Astrophysics

- Advisors: David Rubin, Susana Deustua, Andy Fruchter
- Used Bayesian statistics to calibrate type Ia supernova observations from ground-based surveys for cosmology fits (see publications)
- Used a convolutional neural network to develop an automated transient finder in HST and JWST cross-observations

Geophysical Fluid Dynamics Institute May 2017 - August 2017/Summer 2018
Post-Baccalaureate Researcher, Fluid Dynamics and Fire Science

- Advisors: Kevin Speer and Bryan Quaife
- Developed a cellular automata model for simulating fire spread across various terrains
- Ran heat flux experiments on location at prescribed burns
- Analyzed IR timeseries data to extract probabilities that dictate how a fire spreads (see publications)
- Used dynamic mode decomposition to decompose IR timeseries images of forest fires for determining fire spread timescales

SETI Institute/NASA Ames Research Center June 2016 - May 2017
REU Student/Undergraduate Researcher, Planetary Science and Astrophysics

- Advisors: Fergal Mullally and Susan Mullally
- Employed principal component analysis (PCA) at a pixel level to detrend K2 lightcurves
- Built new detrending method into the Discovery And Vetting of Exoplanets (DAVE) pipeline
- https://github.com/barentsen/dave

Department of Physics, Florida State University August 2014 - May 2016
Undergraduate Research Assistant, Astrophysics

· Advisor: David Rubin
· Compiled a set of SN observations with the Hubble Space Telescope, wrote a data analysis pipeline to obtain calibrated images, and investigated their host-galaxy properties (see publications)
· Used SNe from HST to estimate exposure times for WFIRST (see publications)

Applied Research Associates June 2014 - August 2014
Technical Intern

· Supervisor: Mary Ward
· Modeled air-based weapons systems in a 3D CAD environment (classified)
· Simulated the effects of fragmenting air-based weapons systems (classified)

Department of Physics, Florida State University August 2013 - May 2014
Undergraduate Research Assistant, High Energy Physics

· Advisor: Todd Adams
· Ran and analyzed particle collision simulations using ROOT to test the robustness of a proposed electromagnetic calorimeter for the Compact Muon Solenoid experiment at CERN

TEACHING EXPERIENCE

University of Washington Winter 2019
Astronomy 150: The Planets, Teaching Assistant

· Responsible for teaching and grading five sections of 20 students each
· Designed and implemented quizzes and exams

University of Washington Fall 2018
Astronomy 101, Teaching Assistant

· Responsible for teaching and grading three sections of 30 students each

Tall Timbers Research Station June 2017
Workshop Instructor

· Introduction to Image Analysis in Python

Florida State University Department of Physics Spring 2017
Teaching Assistant

· PHY2048C: General Physics I

PUBLICATIONS

- "X-CALIBUR: Improving the Calibration of the SN Ia Anchor Datasets with a Bayesian Hierarchical Model", Currie et al., submitted 2019
- "Characterization of Unstable Pixels Using a Mixture Model: Application to HST WFC3 IR", Currie et al., accepted to AAS Research Notes 2018
- "Pixels-To-Cosmology Studies of *WFIRST* Supernova Surveys: A Novel Simultaneous Treatment of Statistics, Systematic Uncertainties, and Distances", Rubin et al., submited to ApJ, in peer review 2018
- "Pixel-Level Statistical Analyses of Prescribed Fire Spread", Currie et al., submitted to Environmental Modeling and Software 2017 (arXiv:1712.04498)

- "The Proposed US Tax Plan and What It Means for Graduate Students", Currie, M., 2017, Astrobites (see Outreach)
- "UNITY: Confronting Supernova Cosmology's Statistical and Systematic Uncertainties in a Unified Bayesian Framework", Rubin et al., 2016, ApJ (arXiv:1507.01602)

GRANTS, HONORS, & AWARDS

- SETI Institute travel grant to present at AAS 229, January 2017
- REU at the SETI Institute/NASA Ames Research Center, Summer 2016
- Sigma Pi Sigma Physics Honor Society, 2016
- Florida State University Mentored Research and Creative Endeavor Award, 2015
- Phi Beta Kappa Honor Society, 2014
- Florida State University Academic Scholarship, 2013-2017
- Various FSU travel grants to present research

PRESENTATIONS

- "Detecting Oxygen False Positives: A Feasibility Study", Poster and POP talk, 2019 Sagan Summer Science Workshop, Caltech, July 2019
- "Detecting Oxygen False Positives: A Feasibility Study", Poster and eLightning talk, 2019 Astrobiology Science Conference, Bellevue, WA, June 2019
- "Automated Recognition of Transients with a Convolutional Neural Network", Poster, American Astronomical Society 233rd meeting, January 2019
- "X-CALIBUR: Improving the Calibration of the SN Ia Anchor Datasets with a Bayesian Hierarchical Model", Poster, American Astronomical Society 231st meeting, January 2018
- "Pixel-Level Principal Component Analyses on K2 Lightcurves", Poster, Annual Society of Physics Students Zone 6 Meeting, Emory University, April 2017
- "Pixel-Level Principal Component Analyses on K2 Lightcurves", Poster, The 17th Annual Undergraduate Research Symposium, Florida State University, March 2017
- "Pixel-Level Principal Component Analyses on K2 Lightcurves", Poster, Florida Undergraduate Research Conference, Florida Atlantic University, February 2017
- "Finding Planets in K2: A New Method of Cleaning the Data", Poster, American Astronomical Society 229th meeting, January 2017
- "Finding Planets in K2: A New Method of Cleaning the Data", Talk, SETI Institute REU Final Talk, August 2016
- "Finding Planets in K2: A New Method of Cleaning the Data", Talk, SETI Talks at Microsoft Headquarters, August 2016
- "A Disintegrating Minor Planet Transiting a White Dwarf", Talk, SETI Institute Journal Club, July 2016
- "Host-Galaxy Light Analysis in Support of the WFIRST Supernova Survey", Poster, The 7th Annual Undergraduate Research Poster Session, FSU Department of Physics, April 2016
- "Host-Galaxy Light Analyses in Support of the WFIRST Supernova Survey", Poster, 2016 ACC Meeting of the Minds Conference, Syracuse University, April 2016

- "Host-Galaxy Light Analysis in Support of the WFIRST Supernova Survey", Poster, The 16th Annual Undergraduate Research Symposium, Florida State University, March 2016
- "Analyses in Support of the WFIRST Supernova Survey, Poster, The Florida Undergraduate Research Conference, University of Tampa, February 2016
- "Estimating the Supernova Cosmological Constraints Possible With the Wide-Field Infrared Survey Telescope", Poster, The 227th American Astronomical Society Meeting, Kissimmee, FL, January 2016
- "A Compilation and Analysis on Confirmed Type Ia Supernovae Using Data from the Hubble Space Telescope", Poster, President's Showcase of Undergraduate Research Excellence, Florida State University, September 2015
- "Simulating Type Ia Supernova Datasets for WFIRST", Poster, The 6th Annual Undergraduate Research Poster Session, FSU Department of Physics, April 2015
- "Simulating Type Ia Supernova Datasets for WFIRST", Poster, Tallahassee, FL, The 15th Annual Undergraduate Research Symposium, Florida State University, March 2015
- "3D Modeling of Air-Based Weapons Systems", Talk, Applied Research Associates, August 2014 Niceville, FL

TECHNICAL SKILLS

Computer Languages	Python, C/C++, MATLAB, Arduino, Mathematica, LaTeX, HTML, Stan
Software & Tools	AstroPy, Git, ROOT, CAD, Unix/Linux, Mac OS, Microsoft OS/Suite

OUTREACH

Astrobites November 2017
Guest Writer

· Showed that graduate students' federal taxes owed can quadruple under the tax law proposed by congress on November 2, 2017
· astrobites.org/2017/11/11/the-proposed-us-tax-plan/

Maryland Science Center September 2017 - Present
Volunteer, Observatory Assistant

· Facilitates monthly observing programs for the public (directed towards kids)
· Responsible for operating a 1927 Clark refracting telescope
· Engages the public with basic astronomy lectures and answers questions

#popscope: Baltimore September 2017 - Present
Volunteer

· Facilitates planned and impromptu observing nights for the public in the city of Baltimore
· Mission statement: A telescope for every neighborhood
· Focuses on bringing astronomy to underrepresented socioeconomic and ethnic groups

Astronomy Club of FSU August 2016 - August 2017
Founder and President

· Founded Florida State University's astronomy club
· Planned and facilitated monthly observing for students both on and off campus
· Planned weekly meetings

Tallahassee Astronomical Society August 2015 - August 2017
Member, Volunteer

· Volunteered at public observing nights in the city of Tallahassee
· Responsible for setting up telescopes for the public
· Answered astronomy questions from the public

PROFESSIONAL AFFILIATIONS

- American Geophysical Union, Student Member
- American Astronomical Society, Junior Member
- American Physical Society, Junior Member
- Phi Beta Kappa
- Sigma Pi Sigma Physics Honor Society