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EDUCATION

August 2018 – Present **Boston University, Boston, MA**
Ph.D. Student, Astronomy.

August 2014 – May 2018 **University of South Florida, Tampa, FL**
B.S. in Physics, B.A. in Pure Mathematics, minor in Astronomy
USF Honors College
Graduated Summa Cum Laude

RESEARCH INTERESTS

Cosmology, Computational Astrophysics, Clusters of Galaxies, Dark Matter Distributions, Numerical Relativity, and Black Hole Thermodynamics Theories. Specifically implementing machine learning to observational surveys.

GRADUATE RESEARCH PROJECTS

August 2019 – Present **Astrofake: Generating N-body Cosmological Simulations**, BU Department of Astronomy
Research Mentor: Dr. Tereasa Brainerd
Implementing Generative Adversarial Networks to create mock catalogs of galaxy distributions from large-scale N-body simulations.

May 2019 – August 2019 **Resolved Magnetic Field Mapping of a Molecular Cloud**, BU Department of Astronomy
Research Mentor: Dr. Dan Clemens
Wrote MCMC code to get distances to molecular clouds from Gaia parallaxes and GPIPEs stellar polarizations. Used distances to make high resolution magnetic field maps.

May 2018 – May 2019 **Weak Lensing by redMaPPer Clusters**, BU Department of Astronomy
Research Mentor: Dr. Tereasa Brainerd
Investigation of most massive galaxies in redMaPPer at $z \sim 0.4$, focusing on the weak lensing effects, satellite galaxies, and intracluster luminosity.

UNDERGRADUATE RESEARCH PROJECTS

January 2018 – August 2018 **Algebraic Knot Theory**, *USF Department of Mathematics and Statistics*
Research Mentor: Dr. Mohamed Elhamdadi
Apply modern principles of group theory to algebraic structures of knots: quandles and keis.

August 2017 – May 2018 **Correlating Comet Gas/Dust ratios and Heliocentric Distance**, *USF Department of Physics*
Research Mentor: Dr. Maria Womack
Compiling CO-based gas/dust ratios for comets out to 8 au to probe if there is a change in cometary behavior over the range that water-ice sublimation starts.

June 2017 –
August 2017

Search for Activity in Main-Belt Asteroids, *Northern Arizona University Department of Astronomy*
Research Mentor: Dr. Chadwick Trujillo
Creating a pipeline to search for new main-belt comets in Dark Energy Camera survey data.

August 2016 –
October 2017

Deriving Cometary Secular Lightcurves, *USF Department of Physics*
Research Mentor: Dr. Maria Womack
Analyzing error in amateur astronomer reported visual magnitudes for comet C/1995 O1 Hale-Bopp for use in compiling a lightcurve and estimating dust production rates.

RESEARCH PUBLICATIONS & PAPERS

- [1] **“The Visual Secular Lightcurve of Comet C/1995 O1 (Hale-Bopp) from 1995-1999.”** M. Womack, O. Curtis, D. A. Rabson, O. Harrington Pinto, K. Wierzchos, C. Mentzer, S. Cruz-Gonzalez, N. Lastra, N. Pichette, T. Cox, N. Ruffini, I. Rivera, A. Micchiche, C. J. Jackson, A. Tollison, A. Homichi, J. Zilka, B. Henning, S. Reed, M. Spinar, F. Deglman, and M. Goldschen-Ohm. (Manuscript in Preparation).
- [2] **“Searching Asteroids for Activity Revealing Indicators (SAFARI).”** C. Chandler, A. Curtis, C. Trujillo, 2018. Publications of the Astronomical Society of the Pacific.
- [3] **“The Secular Lightcurve of C/1995 O1 (Hale-Bopp).”** M. Womack, A. Curtis, N. Lastra, O. Harrington Pinto, D. A. Rabson, K. Wierzchos, T. Cox, I. Rivera, C. Mentzer, N. Ruffini, C. J. Jackson, A. Micchiche, 2017. Nasa Planetary Data System.

CONFERENCES, PRESENTATIONS & TALKS

Searching Asteroids for Activity Revealing Indicators (SAFARI), A. Curtis, C. Chandler, C. Trujillo. 232nd AAS Meeting, Denver, Colorado, June 3rd – 7th, 2018. Interactive Poster Presentation.

Best Secular Lightcurve for comet Hale-Bopp and Implications for Dust Production Rates, N. Lastra, A. Curtis, M. Womack, O. Harrington, K. Wierzchos, C. Mentzer, A. Micchiche, N. Ruffini, D. Rabson, T. Cox, I. Rivera. APS March Meeting, Los Angeles, California, March 5th – 9th, 2018. Poster Presentation.

The Secular Lightcurve and Photometric Evolution of C/1995 O1 (Hale-Bopp), M. Womack, N. Lastra, A. Curtis, O. Harrington, K. Wierzchos, C. Mentzer, A. Micchiche, N. Ruffini, D. Rabson, T. Cox, I. Rivera. AAS 49th Annual Division of Planetary Science Meeting, Provo, Utah, October 15th-20th, 2017. Interactive Poster Presentation.

Correlation Between Cometary Gas/Dust Ratios and Heliocentric Distance, O. Harrington, M. Womack, A. Curtis, N. Lastra. AAS 49th Annual Division of Planetary Science Meeting, Provo, Utah, October 15th-20th, 2017. Poster Presentation.

Search for Activity in Main-Belt Asteroids, A. Curtis, C. Trujillo. 2017 Northern Arizona University Astronomy Intern Symposium, August 8th, 2017. Oral Presentation.

EMPLOYMENT HISTORY

- September 2018 - Present* **Boston University, Boston, Massachusetts**
Teaching Fellow
Teaching Fellow for AS 101: The Solar System for three semesters.
- August 2017 – August 2018* **University of South Florida, Tampa, Florida**
Research Intern/Collaborator
Research assistant for the department of physics. Reduced astrophysical data and prepared it for publication.
- June 2017 – August 2017* **Northern Arizona University Department of Astronomy, Flagstaff, Arizona**
REU Intern
Reduction of astrophysical data, writing scripts, documenting results, and presenting research at home institution and/or an AAS conference.
- January 2017 – May 2017* **University of South Florida Department of Physics, Tampa, Florida**
Teaching Assistant
Student Assistant for astrophysics laboratory course.

AWARDS AND ACCOMPLISHMENTS

2018 AAS Chambliss Astronomy Student Achievement Award
2017 Barry M. Goldwater Scholar Honorable Mention
2017 NSF REU: Northern Arizona University
Society of Physics Students National Travel Grant
USF Travel Grant
2017 USF Undergraduate Research Conference's Excellence in Research Award
USF Undergraduate Research Scholar
USF Honors Scholarship
USF Directors Award
Bright Futures Florida Academic Scholar
Dean's List of Scholars: Fall 2014 – Spring 2018.

OBSERVING EXPERIENCE

One night in November 2019 at 72-inch Perkins Telescope
Two nights in June 2018 at Lowell Observatory's 31-inch Reflecting Telescope

COMPUTER SKILLS

Python, C++, Maple, IDL, and Mathematica for error analysis, numerical integration and differentiation, tensor analysis, solving linear systems and differential equations, Markov Chain Monte Carlo applications, statistical analysis, data fitting, approximations, and more.

TensorFlow and PyTorch for deep learning and differentiable programming.

IRAF/PyRAF, SAOImage/ds9, Source Extractor, Scamp, and Swarp for handling of FITS images and generating astrometric and photometric solutions.

SLURM for submitting jobs and managing resources on USF's CIRCE and Northern Arizona University's Monsoon high performance computing clusters.

Comfortable navigating and extracting information from databases such as Gaia Data Release 2, Sloan Digital Sky Survey Release 15, Panoramic Survey Telescope and Rapid Response System Data Release 1 , NASA's Planetary Data System, and JPL HORIZONS

PUBLIC OUTREACH

Skype a Scientist – Since Spring 2019 I have participated in the Skype a Scientist program. I have talked with three classrooms at Maude Trevett Elementary in Laurel, Virginia about life as an astronomer.

Public Observing Nights – I volunteer at Boston University's Judson B. Coit Observatory's public open night about 10 clear nights a year. I help setup telescopes and answer any space-based questions guests have.

USF Engineering EXPO – Led USF's Society of Physics Students to perform multiple 45-minute shows to thousands of Tampa Bay public school students at USF's annual Engineering EXPO. Years performed: 2016, 2017, and 2018.