
EDUCATION

University of Idaho	Moscow, ID	Aug. 2018 – Present
<ul style="list-style-type: none">• PhD Student, Department of Physics		

University of Florida (UF)	Gainesville, FL	Aug. 2013 – May 2017
<ul style="list-style-type: none">• Bachelor of Science in Astrophysics, <i>summa cum laude</i>• Minor in Geology Certificate in Meteorology & Climatology• Cumulative GPA: 3.57/4.00		

Honors Thesis

Title: "Laboratory Simulations Of Titan Lakes: Potential Ethylene-Based Evaporite Deposits"

- Conducted laboratory experiments on the possibility of ethylene-based evaporites being present under Titan surface conditions by examining the evolution of near-infrared bands of ethylene and methane/ethane.

Awards and Honors

- UF Astronomy Senior Thesis Award (2017)
- Machen Florida Opportunity Scholar (2013-2017)
 - Awarded a full-ride, need-based scholarship as a first-generation student
- Dean's List Honors (Spring 2015, Fall 2016)
- UF Learning Without Borders Scholarship (2015)
 - Awarded as a first-generation student to study environmental sustainability abroad in New Zealand

RESEARCH EXPERIENCE

Research Assistant	UIdaho Department of Physics	Sept. 2018 – Present
<i>Project: Waves on the Seas of Titan</i> Advisor: Dr. Jason Barnes		
<ul style="list-style-type: none">• Creating an survey to systemically identify and characterize specular reflections seen by the Cassini VIMS instrument and deduce the current state of wave activity on Titan's larger hydrocarbon seas and lakes.		

Research Assistant	UF Department of Geography	April 2015 – June 2018
<i>Project: Characterization of Rain Events of U.S. Landfalling Hurricanes</i> Advisor: Dr. Corene Matyas		
<ul style="list-style-type: none">• Utilized tropical cyclone wind and precipitation (radar) datasets to measure the spatiotemporal properties of rain events and to develop a regression model for predicting the timing of hurricane rain events along the U.S. coast.		
<i>Project: Causes of the 2015 Drought in Puerto Rico</i> Advisor: Dr. Jose Javier Hernandez Ayala		
<ul style="list-style-type: none">• Collected and analyzed archival CHIRPS precipitation anomaly data of the 1994 and 2015 mid-summer droughts to determine if droughts are becoming more severe in the western Caribbean and the potential environmental causes.• Helped write and summarize the results in a publication to <i>Climate Research</i>.		
<i>Project: Impacts of Distance on Tropical Cyclone Rainfall Contribution</i> Advisor: Dr. Corene Matyas		
<ul style="list-style-type: none">• Utilized the Tropical Rainfall Measurement Mission satellite rainfall datasets and spatial statistics with a Geographic Information Systems (GIS) to study the effects of distance of 37 hurricanes passing Puerto Rico on ratios of ocean vs land-based rainfall.		

REU Intern	University of Arkansas, Fayetteville	May – July 2016
<i>Project: Laboratory Investigation of Potential Evaporites on the Surface of Titan</i> Advisor: Dr. Vincent Chevrier		
<ul style="list-style-type: none">• Conducted laboratory experiments of Titan's surface processes (evaporation of its lakes) by volatilizing liquid methane or ethane mixtures saturated with hydrocarbons in a Titan simulation chamber.• Collected time-series Fourier Transform IR spectra and investigated the spectral properties of the mixtures.		

Research Assistant	UF Department of Astronomy	Oct. 2013 – Feb. 2016
<i>Project: Eclipsing Binaries in the MARVELS Survey</i> Advisors: Dr. Neil Thomas, Dr. Jian Ge		
<ul style="list-style-type: none">• Analyzed and refitted spectroscopic data of hundreds of radial velocity curves of binary star candidates to determine their binary status and orbital solutions.• Cross-referenced radial velocity data of the applicable binary candidates with Kepler eclipsing binary transit data.		

TEACHING EXPERIENCE

Teaching Assistant	UIdaho Department of Physics	Aug. 2018 – Jan. 2020
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- Instructing an introductory astronomy lab where I designed and conducted weekly indoor/outdoor labs on various topics in astronomy, telescope observing, and astrophotography.

Astronomy Teaching Assistant **JHU Center for Talented Youth** **June – Aug. 2018, 2019**

- Tutored advanced 7th-10th grade students in lab activities, taught class demonstrations, prepared lesson plans with the instructor, and graded assignments and tests for a college level astronomy course.

Observatory & Teaching Assistant **UF Department of Astronomy** **Aug. 2016 – May 2018**

- Set up telescopes and answered astronomy questions to visitors for weekly Public Nights at the campus observatory.
- Held office hours and graded assignments as a TA for AST2037 (*Life in the Universe*) in Spring 2018.
- Guided observing sessions for AST3018 *Astrophysics 1* students learning to use observatory telescopes and CCD cameras with CCDOPS and tutored them on the CCD image processing with AIP4WIN.

Data Carpentry Instructor & Helper **UF Informatics Institute** **Aug. 2017 – May 2018**

- Participated in a two-day workshop for Software Carpentry Instructor Training in May 2017 to learn how to teach programming lessons in R, Python, SQL, and Unix.
- Served as a helper for multiple workshops and assisted students with technical difficulties or programming questions.
- Taught about data structures and visualization in Python/R at UF workshops.

Class Assistant **UF Department of Geography** **Aug. 2017 – Dec. 2017**

- Helped redesign the final project of Dr. Corene Maytas' class, MET4532 (*Hurricanes*), to compare the sizes of wind and rainfall fields of tropical cyclones.

TECHNICAL SKILLS

Computer

- Intermediate skills in Python, R, GIS with ArcGIS and R, LaTeX, and CCDOPS
- Basic skills and familiarity in SQL, Unix, Github/GitFlow, LabView, AstrolmageJ, AIP4Win, and JMARS

Laboratory

- Basic skill with Nicolet 6700 Fourier Transform IR Spectrometer and OMNIC software

PUBLICATIONS

Accepted Publications

1. **M.F. Heslar**, J.W. Barnes, J.M. Soderblom, B. Seignovert, R.D. Dhingra, C. Sotin. "Tidal Currents Detected in Kraken Mare Straits from Cassini VIMS Sun Glitter Observations". *Planetary Science Journal*, August 2020.
2. R.D. Dhingra, J.W. Barnes, **M.F. Heslar**, ..., R. Jaumann. "Spatio-Temporal variation of Bright Ephemeral Features on Titan's north pole". *Planetary Science Journal*, June 2020.
3. J.J. Hernandez Ayala & **M.F. Heslar**. "Spatial characteristics of rainfall during droughts in The Caribbean using the standardized precipitation index (SPI)". *Climate Research*, July 2019.
4. J.W. Barnes, A.G. Hayes, ... **M.F. Heslar (21st author of 73)**. "New Frontiers Titan Orbiter". *Planetary Science and Astrobiology Decadal Survey 2023-2032 white paper*, May 2021.

Pending Publications

1. **M. Heslar** & J. Barnes. "Oceanographic activity on the coasts of Punga Mare, Titan". *Planetary Science Journal*, December 2021. (submitted)

Conference Proceedings (*Oral)

1. *"Simulations of Titan Lakes: Potential Methane-Ethylene Evaporitic Deposits". **M. Heslar**, K. Farnsworth, V. Chevrier, D. Laxton, E. Czaplinski; *Lunar & Planetary Science Conference (2017)*
2. "Improving rainfall predictions through the spatial analysis of tropical cyclone rainfall rates over Puerto Rico using TRMM". **M. Heslar**, C. Matyas, J.J. Hernandez Ayala; *Florida Undergraduate Research Conference (2017)* and *South-eastern Division of the Association of American Geographers Meeting (2016)*.
3. "Detectability of Hydrocarbons and Potential Evaporite Deposits in Simulations of Titan Lakes". **M. Heslar**, K. Farnsworth, V. Chevrier, D. Laxton; *UF CURBS 2016 Fall Undergraduate Research Symposium*
4. "MARVELS Radial Velocity Solutions to Seven Kepler Eclipsing Binaries". **M. Heslar**, N. Thomas, J. Ge, B. Ma, A. Herczeg, A. Reyes; *American Astronomical Society Meeting 227 (2016)*
5. "The possible false-detection of a transiting brown dwarf candidate in the overlapping fields of Kepler and MARVELS". A. Reyes, J. Ge, N. Thomas, B. Ma, **M. Heslar**; *American Astronomical Society Meeting 227 (2016)*
6. "Giant Planet Candidates, Brown Dwarfs, and Binaries from the SDSS-III MARVELS Planet Survey". N. Thomas, J. Ge, R. Li, **M. Heslar**, B. Ma; *American Astronomical Society Meeting 225 (2015)*

OUTREACH & AFFILIATIONS

Outreach Events

- Astro[[sound](#)]bites Interview about sun glitter on Titan (Dec 12, 2020)

Community Outreach

- Demonstrated and explained the transit method to the public by the use of a NASA orrery at UF's annual Starry Night and 2016 Star Party at Kennedy Space Center.
- Volunteered in special observing sessions at UF Campus Teaching Observatory that included the 2017 solar eclipse viewing and various lunar events.
- Presented interactive lessons about constellations in the night sky at local schools with StarLab™.

Vice President

UF Astronomy & Astrophysics Society

Sept. 2013 – May 2017

- Coordinated several outreach and exploratory activities including a semesterly visit to UF Rosemary Hill Observatory, an astronomy undergraduate research session for new astronomy students, and Astro Jeopardy for meetings.
- Organized fund-raising efforts with Trivia Nights at local restaurants.

Citizen Scientist/Museum Volunteer

Feb. 2018 – June 2018

- Digitize and edit high-quality images of the North American Lepidoptera (butterflies & moths) Collection for LepNet as a volunteer for the Florida Museum of Natural History.
- Participate in various Zooniverse projects to classify features on Mars' ice caps, identify potential exoplanet signals in Kepler light curves, or characterize the structure of tropical cyclone in IR satellite images.

Amateur Observer

AAVSO

Oct. 2017 – June 2018

- Completed an AAVSO (American Association of Variable Star Observers) course on *Exoplanet Observing* in October to learn the procedures needed to collect quality exoplanet transit data for AAVSO.
- Currently running observing sessions to acquire high-quality visual light curves of select exoplanets.

ADDITIONAL EXPERIENCE

Test Administrator

Prometric Testing Services

Jan. – June 2018

- Proctored various computer-based graduate school and professional exams for students
- Checked in clients based on Prometric's guidelines, performed security checks, and monitored students to identify any signs of cheating.

Energy Coach

Community Weatherization Coalition

Apr. – June 2018

- Completed three-day certified training program to perform energy audits designed to reduce the utility bills of low-income homes and promote sustainable energy practices to the residents.

Sustainability Student

GREEN Program – Iceland

March 2017

- Participated in an intensive student abroad program learning about sustainability and various renewable energy sources (geothermal, hydroelectric, biomass, wind) in lessons taught by experts at the Iceland School of Energy and visiting relevant power plants.
- Designed and presented a capstone project to renewable energy scholars on the potential design of a dual geothermal energy and desalination plant in the East African Rift Valley.