

# O. Grace Telford, PhD

## Postdoctoral Researcher

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## SUMMARY

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- Astrophysicist with interests in massive stars, feedback from star formation, and galactic outflows and how those processes shape galaxies over cosmic time.
- Research experience in both observations and modeling spanning a wide range of spatial scales, from individual stars to large galaxy survey datasets.
- Interdisciplinary background including training in data science and bioengineering. Integrating data management and visualization techniques into astrophysical analyses.
- Experienced instructor and research mentor committed to outreach and inclusion.

## EDUCATION

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### University of Washington

Ph.D. in Astronomy with Specialization in Advanced Data Science 2019

*Thesis: "Using Metals and Stars to Constrain Galaxies' Past Gaseous Inflows and Outflows"*

*Advisors: Julianne Dalcanton and Jessica Werk*

*Data science coursework: machine learning, database management, data visualization*

M.S. in Astronomy 2014

### University of Pittsburgh

B.S. in Physics and Astronomy 2013

*Advisor: Jeffrey Newman*

B.S.E. in Bioengineering with Signals & Imaging Concentration 2013

*Senior Design project: "TissueTouch Pressure Sensor for Medical Training Simulators"*

*Advisor: Joseph Samosky*

## ACADEMIC POSITIONS

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### Rutgers University

Postdoctoral Researcher 2019 –

*Advisor: Kristen McQuinn*

### University of Washington

NSF Graduate Research Fellow 2016 – 2019

NSF Big Data IGERT Fellow 2014 – 2016

Teaching Assistant 2013 – 2014

## University of Pittsburgh

Undergraduate Researcher in Physics & Astronomy 2010 – 2013

Undergraduate Researcher at the Simulation & Medical Technology Center 2009 – 2012

## National Solar Observatory

NSF REU Student (Sunspot, NM) 2010

*Advisor: Stephen Keil*

## AWARDED GRANTS

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### PI & CO-I FUNDING:

PI of *Hubble Space Telescope* Cycle 28 AR Proposal 16155 2020

“Do Starbursts Form Cored Density Profiles in Dwarf Galaxies?”

Approved funding: \$158k

Co-I of *Hubble Space Telescope* Cycle 28 AR Proposal 16144 2020

“A Census of Metals in Low-Mass Galaxies: Quantifying the Metal Retention as a Function of Mass”

PI: K. McQuinn

Co-I of *Hubble Space Telescope* Cycle 27 GO Proposal 16048 2019

“Extremely Metal Poor Galaxies: Understanding the Boundaries of Galaxy Evolution”

PI: K. McQuinn

## SUCCESSFUL GROUND-BASED OBSERVING PROPOSALS

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PI of NASA Keck Observatory Proposal 2021

“Metal-Poor Massive Stars in Nearby Galaxies: a Rosetta Stone for Interpreting Observations in the Epoch of Reionization”

1 night

Co-I of NASA Keck Observatory Proposal 2020

“Constraining the stellar astrophysics that powered cosmic reionization with KCWI”

1 night; PI: J. Chisholm

Co-I of Gemini Observatory Proposal 2020

“Jumping Off the Upper-End: Constraining the mass-loss rates of the most massive stars in the universe with infrared spectroscopy”

13.7 hours; PI: J. Chisholm

Co-I of McDonald Observatory Proposal 2020

“What powered cosmic reionization? A sample of low-metallicity Local Group massive stars to test the source of reionization”

3 nights; PI: J. Chisholm

## REFEREED PUBLICATIONS

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**Summary statistics from ADS (June 2021):**

**8 astrophysics papers with an h-index of 6 and 2734 total citations**

**FIRST-AUTHOR PAPERS (3):**

“Mass-to-Light Ratios of Spatially Resolved Stellar Populations in M31”

**Telford, O. G.**, Dalcanton, J., Williams, B., Bell, E., Dolphin, A., Durbin, M., and Choi, Y. 2020, ApJ, 891, 32

“Spatially Resolved Metal Loss from M31”

**Telford, O. G.**, Werk, J., Dalcanton, J., and Williams, B. 2019, ApJ, 877, 120

“Exploring Systematic Effects in the Relation between Stellar Mass, Gas Phase Metallicity, and Star Formation Rate”

**Telford, O. G.**, Dalcanton, J., Skillman, E., and Conroy, C. 2016, ApJ, 827, 35

**CONTRIBUTING-AUTHOR PAPERS (6):**

“Star Formation Histories from Spectral Energy Distributions and Color-magnitude Diagrams Agree: Evidence for Synchronized Star Formation in Local Volume Dwarf Galaxies over the Past 3 Gyr”

Olsen, C., Gawiser, E., Iyer, K., McQuinn, K., Johnson, B., **Telford, O. G.**, Wright, A., Broussard, A., and Kurczynski, P. 2021, ApJ, 913, 45

“Gaussian Mixture Models Use-Case: In-Memory Analysis with Myria”

Maas, R., Hyrkas, J., **Telford, O. G.**, Balazinska, M., Connolly, A., and Howe, B. 2015 *Proceedings of the 3rd Very Large Databases Workshop on In-Memory Data Management* (Not reflected in ADS statistics. 11 total citations.)

“CANDELS Visual Classifications: Scheme, Data Release, and First Results”

Kartaltepe, J. *et al.* 2015, ApJS, 221, 11

“The host galaxies of X-ray selected active galactic nuclei to  $z = 2.5$ : Structure, star formation, and their relationships from CANDELS and Herschel/PACS”

Rosario, D., *et al.* 2015, A&A, 573, A85

“CANDELS: The Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey – The Hubble Space Telescope Observations, Imaging Data Products, and Mosaics”

Koekemoer, A., *et al.* 2013, ApJS, 197, 36

“CANDELS: The Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey”

Grogin, N., *et al.* 2013, ApJS, 197, 35

## TEACHING & MENTORING

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- Research Advisor to Rutgers University Undergraduate 2019 – 2021
- Graduate of the *James Webb Space Telescope* Proposal Tools Master Class 2019 – 2020
- Attended intensive training on *JWST* observing modes and proposal tools
  - Organized workshop at Rutgers attended by 30 participants from 3 institutions
- Research Advisor to University of Washington Undergraduates 2017 – 2018
- Mentored two students in the Pre-Major in Astronomy Program (Pre-MAP)
- Instructor and Assistant at Software Carpentry Workshops 2017 – 2018
- Taught Python, Linux, Git, and GitHub
- Guest Lecturer for the Pre-MAP Seminar at University of Washington 2015 – 2017
- Overview of undergraduate research opportunities and how to apply for REUs
- Teaching Assistant at University of Washington 2013 – 2014
- Astronomy 101 (Introduction to Astronomy) – Instructor: Bruce Balick
  - Astronomy 150 (The Planets) – Instructor: Toby Smith

## SELECTED TALKS

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### INVITED TALKS:

- “Mass-to-Light Ratios of Spatially Resolved Stellar Populations in M31,” Galread Seminar March 2021  
Princeton University
- “The Andromeda Galaxy as a Benchmark for Interpretation of Distant Galaxy Observations,” Cosmology-Galaxy-IGM Seminar November 2020  
UC Santa Cruz
- “Stellar Mass-to-Light Ratios in the Andromeda Galaxy” Galaxy Crawl Talk April 2020  
University of Arizona
- “The Andromeda Galaxy as a Benchmark for Interpretation of Distant Galaxy Observations,” Astrophysics Seminar April 2020  
McMaster University
- “Using Metals and Stars to Constrain Galaxies’ Past Gaseous Inflows and Outflows,” Astrophysics Seminar October 2019  
Rutgers University
- “Spatially Resolved Metal Loss from M31” Extragalactic Seminar February 2019  
UT Austin
- “Spatially Resolved Metal Loss from M31” Astronomy Tea Talk December 2018  
Caltech
- “Spatially Resolved Metal Loss from M31” Journal Club Seminar December 2018  
UC San Diego

“Using Metals to Constrain the History of Gas Flows in Galaxies” Friday Lunch Time Astrophysics Seminar	November 2018 UC Santa Cruz
“The History of Metal Production and Loss in the M31 Disk” Astronomy Seminar	October 2018 Columbia University

CONTRIBUTED CONFERENCE TALKS:

“FUV Spectra of Main-Sequence O Stars at Extremely Low Metallicity” IAUS 361 Virtual Preview: Massive Stars Near and Far	May 2021 Ballyconnell, Ireland
“The History of Metal Production and Ejection in the Spiral Galaxy M31” The Rise of Metals and Dust in Galaxies	October 2020 Marseille, France
“Using Metals to Constrain the History of Gas Flows in Galaxies” American Astronomical Society # 233	January 2019 Seattle, WA
“The Spatially Resolved Metal Production and Ejection History in M31” Astrophysical Frontiers in the Next Decade and Beyond	June 2018 Portland, OR

PROFESSIONAL SERVICE & INCLUSION WORK 

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External Panelist for <i>Hubble Space Telescope</i>	2020
Active member of Rutgers Minorities in Physics & Astronomy (MiPA) group • Founding co-organizer of Equity & Inclusion Journal Club	2019 – 2020
Referee for Astronomy & Astrophysics	2016
Organizer of Prospective Graduate Student Visits at University of Washington	2015 – 2016
Active member of University of Washington EquiTea group	2014 – 2018
Organizer of Lab Tours for the Pre-Major in Astronomy Program • Cohort-building activity with the aim of exposing students from underrepresented backgrounds to research opportunities on the University of Washington campus.	2014 – 2017

OUTREACH 

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Interview for <i>Radio Physics</i> for KDNK radio and the Aspen Center for Physics • Spoke with a local high school student about my research and career path	2021
Public Lecturer at Amateur Astronomers, Inc. • “How Starbursts Shape Dwarf Galaxies”	2021
Public Speaker at Astronomy on Tap Seattle • Gave two public talks on my galaxy evolution research	2017 – 2019

Presenter at the University of Washington Planetarium	2014 – 2017
<ul style="list-style-type: none"> <li>• Developed and presented shows for groups between ages <math>\sim 5</math> and 13</li> </ul>	
Activity Leader for the University of Washington Mobile Planetarium	2014 – 2017
<ul style="list-style-type: none"> <li>• Developed and led planetarium shows and hands-on educational activities</li> <li>• Gave a public lecture on the Sloan Digital Sky Survey</li> </ul>	

## AWARDS & FELLOWSHIPS

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NSF Graduate Research Fellowship	2015
<i>“Constraining the Gas Flow Histories of Galaxies using Chemical Evolution”</i>	
NSF Integrative Graduate Education and Research Traineeship for Data Science	2014
<i>“Systematic Effects in High-Dimensional Galaxy Datasets”</i>	
Achievement Rewards for College Scientists Fellowship	2013
NASA Pennsylvania Space Grant Consortium Research Scholarship	2012
<i>“Morphological Galaxy Classification and Flux Calibration of a New Spectrograph”</i>	
Swanson School of Engineering Research Fellowship	2011
<i>“Development of Learner-Adaptive Capabilities for a Dialysis Training Simulator”</i>	
Swanson School of Engineering Honors Scholarship	2008
University of Pittsburgh Full Tuition Honors Scholarship	2008