

# Ashley D. Baker

51 PEG B POSTDOCTORAL FELLOW

California Institute of Technology  
Department of Astronomy

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## Education

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### University of Pennsylvania

PHD IN PHYSICS & ASTRONOMY

Philadelphia, PA

May 2020

- Thesis Advisor: Cullen Blake
- Dissertation Title: "Pushing the Limits of Ground-Based Exoplanet Characterization Surveys"

### University of North Carolina at Chapel Hill

B.S. IN PHYSICS, HIGHEST HONORS, GPA 3.7

Chapel Hill, NC

Aug. 2010 - May 2014

- Research Advisor: Sheila Kannappan
- Honors Thesis Title: "Exploring the Dependence of Galaxy Properties on Group Halo Environment in the ECO Catalog"
- Minors in Math and Arabic

## Fellowships & Awards

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Troesh Prize Postdoctoral Fellowship	2020
51 Peg b Fellowship in Planetary Astronomy	2020
The Zaccheus Daniel Graduate Fellowship	2019
The Arnold M. Denenstien Prize - <i>for most promising experimental physics graduate student</i>	2018
National Science Foundation Graduate Research Fellowship	2016
Sigma Xi Grant-in-Aid of Research	2014
University Merit Scholarship	2010

## Refereed Publications

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<b>GPS Measurements of Precipitable Water Vapor Can Improve Survey Calibration: A Demonstration from KPNO and the Mayall z-band Legacy Survey</b>	<i>AJ, Submitted</i>
W. M. WOOD-VASEY, DANIEL PERREFORT, <b>ASHLEY D. BAKER</b>	2020
<b>The IAG Solar Flux Atlas: Telluric Correction with a Semi-Empirical Model</b>	<i>ApJS, 247, 1</i>
<b>ASHLEY D. BAKER</b> , CULLEN H. BLAKE, ANSGAR REINERS	2020
<b>First radial velocity results from the MINiature Exoplanet Radial Velocity Array (MINERVA)</b>	<i>PASP, 131, 1005</i>
MAURICE L. WILSON, JASON EASTMAN ET AL. INCLUDING <b>ASHLEY D. BAKER</b>	2019
<b>The Oxyometer: A Novel Instrument for Exoplanetary Atmospheric Characterization</b>	<i>PASP, 131, 1000</i>
<b>ASHLEY D. BAKER</b> , CULLEN H. BLAKE, SAM HALVERSON	2019
<b>Monitoring Telluric Absorption with CAMAL</b>	<i>PASP, 129, 978</i>
<b>ASHLEY D. BAKER</b> , CULLEN H. BLAKE, DAVID SLISKI	2017
<b>The Baryonic Collapse Efficiency of Galaxy Groups in the RESOLVE and ECO Surveys</b>	<i>ApJ, 849, 1</i>
KATHLEEN D. ECKERT, SHEILA J. KANNAPPAN, CLAUDIA DEL P. LAGOS, <b>ASHLEY D. BAKER</b> , ET AL.	2017
<b>The RESOLVE Survey: Atomic Gas Census and Environmental Influence on Galaxy Gas Reservoirs</b>	<i>ApJ, 849, 20</i>
DAVID V. STARK, SHEILA J. KANNAPPAN, KATHLEEN D. ECKERT, ET AL. INCLUDING <b>ASHLEY D. BAKER</b>	2017

## Research Positions

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### Postdoctoral Fellow

Pasadena, CA

POSTDOC ADVISORS: DIMITRI MAWET &amp; ANDREW HOWARD

July 2020 - Present

- Keck Planet Finder (KPF) team member; lead of KPF's Ca H&K spectrometer; lead of KPF detector characterization
- Team member of PALomar Radial Velocity Instrument (PARVI); aiding in telluric correction of NIR RV spectra
- KPIC team member

### Graduate Research Assistant

Philadelphia, PA

ADVISOR: CULLEN BLAKE

Dec. 2014 - May 2020

- Developed a unique telluric removal process for solar spectra in application to making a telluric-free optical solar atlas
- Designed and tested a simultaneous multi narrowband photometer in lab and on-sky tests
- Built, programmed, installed, and coded the data reduction pipeline for an automated precipitable water vapor monitoring instrument called CAMAL
- Aided in the maintenance of MINERVA telescopes and electronics at Whipple Observatory

### Kavli Summer Program in Astrophysics: Exoplanetary Atmospheres

Santa Cruz, CA

MENTOR: JASMINA BLECIC

Summer 2016

- Implemented a self-consistent parameterized cloud model into the exoplanet atmospheric retrieval code, Pyrat Bay

### UNC Chapel Hill Undergraduate Research Assistant

Chapel Hill, NC

ADVISOR: SHEILA KANNAPPAN

Nov. 2011 - May. 2014

- RESOLVE team member; assisted in conducting an astronomical survey of 1500 nearby galaxies; determined masses of galaxy groups and studied cluster environmental effects on galaxy properties

### Condensed Matter Undergraduate Research

Chapel Hill, NC

ADVISOR: RENE LOPEZ

Jan. 2014 - May. 2014

- Designed photolithography masks to fabricate FETs in order to measure the electrical properties of PbS nanocrystals and ultimately improve quantum dot solar cell efficiencies

## Select Presentations

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### Chesapeake Bay Area Exoplanet Conference (CHEXO)

Washington, D.C.

ORAL PRESENTATION

January 24th, 2020

- The IAG Solar Flux Atlas: Telluric Correction with a Semi-Empirical Model

### Caltech Seminar

Pasadena, CA

INVITED SPEAKER

November 26th, 2019

- Pushing the Limits of Ground-Based Exoplanet Characterization Surveys

### University of the Sciences Colloquium

Philadelphia, PA

INVITED SPEAKER

January 31st, 2019

- The Oxyometer: A Novel Instrument Concept for Exoplanetary Atmospheric Characterization

### American Astronomical Society 233rd Meeting

Seattle, WA

ORAL PRESENTATION

January 9th, 2019

- The Oxyometer: A Novel Instrument Concept for Characterizing Exoplanet Atmospheres

### Exoplanet Science with Small Telescopes: Precise Radial Velocities

Philadelphia, PA

ORAL PRESENTATION

April 25th, 2017

- The Camera for the Automatic Monitoring of Atmospheric Lines

### Kavli Summer Program in Astrophysics: Exoplanetary Atmospheres

Santa Cruz, CA

ORAL PRESENTATION FOR SUMMER PROJECT

Summer 2016

- Assessing Cloud Structure Using Parametrized and Self-Consistent Models in Retrieval

## Teaching and Outreach

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### Astronomy on Tap

Philadelphia, PA

PUBLIC TALK

August 19th, 2019

### UPenn Physics & Astronomy Outreach Coordinator

Philadelphia, PA

LED AND ORGANIZED DEPARTMENT OUTREACH ACTIVITIES

May 2015 - Dec 2018

## Upward Bound Tutor

WEEKLY MATH TUTORING FOR VETERANS RETURNING TO SCHOOL

*Philadelphia, PA*

*May 2015 - May 2019*

## Physics TA

TEACHING ASSISTANT

*UPenn*

*Aug. 2014 - May 2019*

## Observing Experience

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### Tillinghast 1.5m Reflector Telescope

TRES

- Two nights observing with the TRES instrument at Whipple Observatory.

*Whipple Observatory*

*Fall 2017*

### Camera for the Automatic Monitoring of Atmospheric Lines

CAMAL

- Over 15 nights of observing to test filters, CCD capabilities, and optimize the instrument setup
- Wrote code to automate telescope slewing, CCD operation, target selection, and data reduction

*Philadelphia, PA*

*Jun 2015 - Present*

### SOAR Telescope (Goodman Spectrograph)

FOR THE RESOLVE SURVEY

- Over 15 full nights of remote observing requiring real-time analysis and target selection

*UNC Chapel Hill*

*March 2012 - May 2014*

### Green Bank Telescope

FOR THE RESOLVE SURVEY

- On site and remote observing and data reduction ofGBT galaxy spectra

*UNC Chapel Hill*

*2013*

## For Fun

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- Riding one of my three bikes.
- Crocheting the latest trends.
- Keeping my plants alive.
- Improving my ability to speak Arabic.