

# Ashley D. Baker

GRADUATE STUDENT

University of Pennsylvania

209 S. 33rd St Physics & Astronomy Dpt. Philadelphia, PA 19104

☎ (704)-678-6831 | ✉ ashbaker@sas.upenn.edu | 🏠 <http://web.sas.upenn.edu/ashbaker/> | 📱 ashbake | 📺 ashbake

## Education

---

### University of Pennsylvania

PHD CANDIDATE IN PHYSICS & ASTRONOMY

- Thesis Advisor: Cullen Blake
- Dissertation Title: "Pushing the Limits of Ground-Based Exoplanet Characterization Surveys"
- Expected Graduation: May 2020

Philadelphia, PA

Aug. 2014 - Present

### University of North Carolina at Chapel Hill

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

- 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

Chapel Hill, NC

Aug. 2010 - May 2014

## Fellowships & Awards

---

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

## Publications

---

<b>The IAG Solar Flux Atlas: Telluric Correction with a Semi-Empirical Model</b>	<i>ApJS</i> , 247, 1
ASHLEY D. BAKER, CULLEN H. BLAKE, ANSGAR REINERS	2020
<b>First radial velocity results from the MINiature Exoplanet Radial Velocity Array (MINERVA)</b>	<i>PASP</i> , 131, 1005
MAURICE L. WILSON, JASON EASTMAN ET AL. INCLUDING ASHLEY D. BAKER	2019
<b>The Oxyometer: A Novel Instrument for Exoplanetary Atmospheric Characterization</b>	<i>PASP</i> , 131, 1000
ASHLEY D. BAKER, CULLEN H. BLAKE, SAM HALVERSON	2019
<b>Monitoring Telluric Absorption with CAMAL</b>	<i>PASP</i> , 129, 978
ASHLEY D. BAKER, CULLEN H. BLAKE, DAVID SLISKI	2017
<b>The Baryonic Collapse Efficiency of Galaxy Groups in the RESOLVE and ECO Surveys</b>	<i>ApJ</i> , 849, 1
KATHLEEN D. ECKERT, SHEILA J. KANNAPPAN, CLAUDIA DEL P. LAGOS, ASHLEY D. BAKER, ET AL.	2017
<b>The RESOLVE Survey: Atomic Gas Census and Environmental Influence on Galaxy Gas Reservoirs</b>	<i>ApJ</i> , 849, 20
DAVID V. STARK, SHEILA J. KANNAPPAN, KATHLEEN D. ECKERT, ET AL. INCLUDING ASHLEY D. BAKER	2017
<b>A Search for Star Formation in the Smith Cloud</b>	<i>MNRAS</i> , 446, 1855
STARK, D. V., BAKER, A. D., & KANNAPPAN, S. J.	2015

## Research Experience

---

## Graduate Research Assistant

Philadelphia, PA

ADVISOR: CULLEN BLAKE

Dec. 2014 - Present

- Development of a unique telluric removal process for solar spectra in application to making a telluric-free optical solar atlas
- Design and testing of a simultaneous multi narrowband photometer including lab and on-sky tests
- Use of transmission spectral modeling to calculate the SNR per transit of a molecular detection in an exoplanet atmosphere assuming various instrument specifications and exoplanet-host star properties
- Instrumentation, programming, installation, and development of the data reduction pipeline for an automated precipitable water vapor monitoring instrument called CAMAL that now serves Whipple Observatory
- Aid 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

- Modified the exoplanet atmospheric retrieval code, Pyrat Bay, to include a parameterized, realistic cloud model and demonstrated its validity.

## UNC Chapel Hill Undergraduate Research Assistant

Chapel Hill, NC

ADVISOR: SHEILA KANNAPPAN

Nov. 2011 - May, 2014

- Assisted in conducting an astronomical survey of 1500 nearby galaxies called RESOLVE including helping with observing runs, data reduction, and pipeline development
- Determined masses of galaxy groups in RESOLVE and studied the environmental effects on galaxy properties
- Researched on the likelihood of star formation in the Smith cloud

## 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

---

### 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

---

### Astronomy on Tap

Philadelphia, PA

PUBLIC TALK

August 19th, 2019

- Gave a discussion based talk titled 'Searching for the Signatures of Life' to a public audience

### UPenn Physics & Astronomy Outreach Coordinator

Philadelphia, PA

LED AND ORGANIZED DEPARTMENT OUTREACH ACTIVITIES

May 2015 - Dec 2018

- Organized monthly outreach meetings where we planned our involvement in upcoming community events
- Applied for and acquired \$5,000 of funding from the University of Pennsylvania over two years for the purchase of outreach expenses
- Led the involvement in the Philadelphia Science Festival, a Total Eclipse 2017 event at the Franklin Institute, and multiple career days and high school visits
- Led the development of multiple new science demonstrations, activities, and handouts
- Organized the outreach group's online presence and recruited new participants

## **Upward Bound Tutor**

*Philadelphia, PA*

WEEKLY MATH TUTORING FOR VETERANS RETURNING TO SCHOOL

*May 2015 - May 2019*

- Helped veterans from a variety of backgrounds relearn math so they can pass entrance exams to attend local colleges

## **Physics TA**

*UPenn*

TEACHING ASSISTANT

*Aug. 2014 - May 2019*

- Worked with lab coordinators to develop and test-run a new research-style format for calculus-based physics lab sections. (6 semesters)
- Helped with the first edition of a computational physics course for majors. (1 semester)

## **Observing Experience**

---

### **Tillinghast 1.5m Reflector Telescope**

*Whipple Observatory*

TRES

*Fall 2017*

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

### **Camera for the Automatic Monitoring of Atmospheric Lines**

*Philadelphia, PA*

CAMAL

*Jun 2015 - Present*

- 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

### **SOAR Telescope (Goodman Spectrograph)**

*UNC Chapel Hill*

FOR THE RESOLVE SURVEY

*March 2012 - May 2014*

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

### **Green Bank Telescope**

*UNC Chapel Hill*

FOR THE RESOLVE SURVEY

*2013*

- On site and remote observing and data reduction of GBT galaxy spectra