

Ashley D. Baker

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Education

University of Pennsylvania

PHD CANDIDATE IN PHYSICS & ASTRONOMY

- Thesis Advisor: Cullen Blake
- Dissertation Title: "Characterizing Atmospheres Near and Far"

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

The Zaccheus Daniel Graduate Fellowship	2019-2020
The Arnold M. Denenstien Prize	2018
National Science Foundation Graduate Research Fellowship	2016-2019
NASA Earth and Space Science Fellowship (declined)	2016
Sigma Xi Grant-in-Aid of Research	2014
University Merit Scholarship	2010-14

First Authored & Co Authored Publications

The Telluric Corrected IAG Solar Flux Atlas

ASHLEY D. BAKER, CULLEN H. BLAKE, ANSGAR REINERS

AAP, In Prep

2019

The Oxyometer: A Novel Instrument for Exoplanetary Atmospheric Characterization

ASHLEY D. BAKER, CULLEN H. BLAKE, SAM HALVERSON

PASP, 131, 1000

2019

Self Consistent Cloud Models in the Pyrat-Bay Atmospheric Retrieval Code

JASMINA BLECIC, ASHLEY D. BAKER, MARK MARLEY, PATRICIO CUBILLOS, IAN DOBBS-DIXON

In Prep

2019

Monitoring Telluric Absorption with CAMAL

ASHLEY D. BAKER, CULLEN H. BLAKE, DAVID SLISKI

PASP, 129, 5002

2017

A Search for Star Formation in the Smith Cloud

STARK, D. V., BAKER, A. D., & KANNAPPAN, S. J.

MNRAS, 446, 1855

2015

Other Publications

First radial velocity results from the MINIature Exoplanet Radial Velocity Array (MINERVA)

MAURICE L. WILSON, JASON EASTMON ET AL. INCLUDING ASHLEY D. BAKER

PASP, In Review

2019

The Baryonic Collapse Efficiency of Galaxy Groups in the RESOLVE and ECO Surveys

KATHLEEN D. ECKERT, SHEILA J. KANNAPPAN, CLAUDIA DEL P. LAGOS, ASHLEY D. BAKER, ET AL.

ApJ, 849, 1

2017

The RESOLVE Survey: Atomic Gas Census and Environmental Influence on Galaxy Gas Reservoirs

ApJ, 849, 20

DAVID V. STARK, SHEILA J. KANNAPPAN, KATHLEEN D. ECKERT, ET AL. INCLUDING **ASHLEY D. BAKER**

2017

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)

Newark, DE

ORAL PRESENTATION

September 6th, 2019

- A Novel Multiband Photometer for Exoplanet Atmospheric Characterization

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

PUBLIC TALK

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

Philadelphia, PA

August 19th, 2019

UPenn Physics & Astronomy Outreach Coordinator

LED AND ORGANIZED DEPARTMENT OUTREACH ACTIVITIES

- 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

Philadelphia, PA

May 2015 - Dec 2018

Upward Bound Tutor

WEEKLY MATH TUTORING FOR VETERANS RETURNING TO SCHOOL

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

Philadelphia, PA

May 2015 - May 2019

Physics TA

TEACHING ASSISTANT

- 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)

UPenn

Aug. 2014 - May 2019

Observing Experience

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 of GBT galaxy spectra

UNC Chapel Hill

2013