

# Will Barnes | CV

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## Personal Information

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**Birthdate:** 15 October 1990

**Citizenship:** USA

## Education

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**Rice University**

**Houston, TX USA**

*Ph.D. Physics*

*2016-present (expected 2018)*

◦ Thesis: Modeling Hot Plasma in the Solar Corona (working title)

◦ Advisor: Stephen Bradshaw, Ph.D.

**Rice University**

**Houston, TX USA**

*M.S. Physics, GPA: 3.88/4.00*

*2013-2016*

**Baylor University**

**Waco, TX USA**

*B.S. Astrophysics, GPA: 3.89/4.00*

*2009-2013*

◦ Thesis: Astrophysical Applications of Dusty Plasma Physics, Advisor: Lorin Matthews, Ph.D.

◦ University Honors Program, Magna Cum Laude, Phi Beta Kappa

◦ Minors: Mathematics, Great Texts of the Western Tradition

## Computing Skills

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**Languages:** Bash, C, C++, Python

**Scientific Computing:** IDL, Mathematica, MATLAB, NumPy, SciPy, SLURM, TORQUE

**Markup:** CSS, HTML, LaTeX, markdown, reStructuredText

**DevOps:** git/GitHub, Travis CI, Sphinx

## Publications

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◦ W.T. Barnes, P.J. Cargill, and S.J. Bradshaw, *Inference of Heating Properties from Hot Non-flaring Plasmas in Active Region Cores II. Nanoflare Trains*, ApJ, 2016, 2016ApJ...833..217B

◦ W.T. Barnes, P.J. Cargill, and S.J. Bradshaw, *Inference of Heating Properties from Hot Non-flaring Plasmas in Active Region Cores I. Single Nanoflares*, ApJ, 2016, 2016ApJ...829...31B

## Talks and Posters

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**Rice Data Science Conference**

**Houston, TX**

*Rice University*

*9-10 October 2017*

Poster title: *Timelag Analysis of Global Hydrodynamic Simulations of Active Regions in the Solar Corona*

**SHINE Workshop**

**Saint-Sauveur, Quebec, CA**

*National Science Foundation*

*24-28 July 2017*

Poster title: *Modeling Observable Signatures of Nanoflare Heating Frequency in Active Region Cores*

**SciPy: Scientific Computing in Python**

**Austin, TX**

*SciPy, Enthought*

*10-16 July 2017*

Talk title: *ChiantiPy: a Python package for Astrophysical Spectroscopy*

**Coronal Loops Workshop VIII**

**Palermo, Italy**

*INAF IASF Palermo*

*27-30 June 2017*

Talk title: *Constraining Nanoflare Heating Frequency with a Global Active Region Model*

**Space Physics Seminar Series**

*Rice University*

**Houston, TX**  
27 February 2017

Talk title: *A Framework for Forward Modeling Solar Active Regions*

**Solar Heliospheric and Interplanetary Environment (SHINE) Workshop**

*National Science Foundation*

**Santa Fe, NM**  
11-15 July 2016

Poster title: *Understanding the Impact of Nanoflare Heating Frequency on the Observed Emission Measure Distribution*

**47th Annual Solar Physics Division Meeting**

*American Astronomical Society*

**Boulder, CO**  
31 May-3 June 2016

Talk title: *Hot Non-flaring Plasmas in Active Region Cores Heated by Single Nanoflares*

**Space Physics Seminar Series**

*Rice University*

**Houston, TX**  
9 November 2015

Talk title: *Impacts of Two-fluid Effects on Emission from Impulsively Heated Coronal Loops*

**Coronal Loop Workshop VII**

*University of Cambridge*

**Cambridge, UK**  
21-23 July 2015

Poster title: *Effects of Ion Heating on Emission Measure of Coronal Loops in Active Region Cores*

**Triennial Earth-Sun Summit**

*American Astronomical Society*

**Indianapolis, IN**  
26-30 April 2015

Poster title: *Nonnegative Matrix Factorization as a Method for Studying Coronal Heating*

**44th Annual Lunar and Planetary Science Conference**

*Lunar and Planetary Science Institute*

**The Woodlands, TX**  
18-22 March 2013

Poster title: *Dust Grain Growth in a Protoplanetary Disk: Effects of Location on Charge and Size*

**Texas Undergraduate Astronomy Research Symposium**

*Texas A&M University*

**College Station, TX**  
14 September 2012

Talk title: *Dust Grain Charging in a Protoplanetary Disk*

## Research Positions

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**Rice University**

*Graduate Research Assistant*

**Houston, TX USA**

2013–present

Research assistant in space physics division of the Department of Physics and Astronomy, Rice University. Research duties concentrated in computational solar physics. Teaching duties include, but are not limited to, a minimum of four semesters of leading lab sections of introductory physics.

**CASPER, Baylor University**

*NSF REU Research Fellow*

**Waco, TX USA**

June 2012–August 2012

Accepted to National Science Foundation Research Experience for Undergraduates program in the Center for Astrophysics, Space Physics, and Engineering Research, Baylor University. Studied the effects of dust grain charging on aggregate size in a protoplanetary disk. Numerical work in extending kinetic model of grain growth to examine effect of disk location on grain charging.

**Baylor University**

*Summer Undergraduate Research Assistant*

**Waco, TX USA**

June 2011–August 2011

Awarded a Summer Undergraduate Research in Physics (SURPh) grant from Department of Physics, Baylor University. Conducted research on anomalies in Saturn's F Ring by improving numerical models that simulate perturbed orbits of charged dust grains in a plasma environment.

## Research Interests

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Broadly, my research interests are in solar physics, specifically in the numerical modeling of plasma dynamics in the solar corona. I am interested in using hydrodynamic models to study nanoflare heating in the corona and how these modeled results can be compared to observations from instruments. Additionally, I am interested in using forward modeling to explore how novel machine learning techniques might be used to extract heating properties from active region core emission.

## Honors and Awards

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- o Outstanding Student Poster Award, SHINE Workshop, July 2017
- o William and Elva Gordon Fellowship, Rice University, May 2016
- o Chuoke Award for Second- and Third-year Graduate Students, Rice University, May 2016
- o Studentship Travel Award for 2015,2016 SPD Annual Meetings, Solar Physics Division of the AAS
- o URSA Scholars Week Outstanding Research Poster in Physics, Baylor University, 2013
- o Dean's List, Baylor University, 7 of 8 semesters
- o President's Gold Scholarship (GPA of at least 3.0, 12 semester hours), Baylor University, all semesters
- o Gordon K. Teal Scholarship, Dept. of Physics, Baylor University, 2 academic years
- o Herbert D. Schwetman Scholarship, Dept. of Physics, Baylor University, 2 academic years

## Teaching/Mentoring Experience

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### **ASTR 201: Stars, Galaxies, and the Universe**

*Guest Lecturer*

*Spring 2017*

Gave two guest lectures for non-majors astronomy course of approximately 70 undergraduate students. Topics covered included eclipses, phases of the moon, and the celestial sphere.

### **Google Summer of Code, Open Astronomy**

*Mentor, The SunPy Project*

*May-August 2016*

Mentored an undergraduate student to develop a module in SunPy to calculate the temperature response functions for the AIA instrument on the Solar Dynamics Observatory. SunPy is a community-developed, free and open-source solar data analysis environment for Python.

### **PHYS 102: Electricity and Magnetism**

*Lab Teaching Assistant*

*Spring 2014, Spring 2015*

Instructed lab sections of 40+ undergraduate students on topics including electrostatic interactions, magnetic induction, and basic circuits.

### **PHYS 101: Mechanics**

*Lab Teaching Assistant*

*Fall 2014, Fall 2015*

Instructed lab sections of 40+ undergraduate students on topics including kinematics, collisions, and simple harmonic motion.

## Societies and Associations

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### **Alpha Lambda Delta**

*National Honors Society*

*April 2009-May 2013*

Completed 10 hours of service per semester.

### **Alpha Phi Omega**

*National Service Fraternity, Zeta Omega chapter*

*September 2010-May 2013*

Served as historian and treasurer. Completed 35 hours of service per semester. Managed finances for the organization. Organized a fundraiser.

### **Sigma Pi Sigma**

*National Physics Honors Society*

*April 2012-present*

Requirements for entry include being in upper-third of the class and completion of at least three semester of college course work in physics.

### **Society of Physics Students**

*President*

*September 2009-May 2013*

As president, initiated rechartering of university chapter. Scheduled and presided over meetings. Organized end of the year luncheon and design and printing of t-shirts.

## Employment Experience

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### **Department of Physics, Baylor University**

*Office Assistant*

*January 2010-May 2013*

Assisted with examinations and attendance for introductory astronomy class of approximately 300 students. Helped with departmental events and mailing as well as other miscellaneous duties.