

# Will Barnes

GRADUATE RESEARCH ASSISTANT

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## Education

### Rice University

PH.D. PHYSICS

- Thesis: Modeling Impulsive Heating in the Solar Corona (working title)
- Advisor: Stephen Bradshaw, Ph.D.

Houston, TX USA

2016-present (expected May 2019)

### Rice University

M.S. PHYSICS

Houston, TX USA

2013-2016

### Baylor University

B.S. ASTROPHYSICS

- Thesis: Astrophysical Applications of Dusty Plasma Physics, Advisor: Lorin Matthews, Ph.D.
- University Honors Program, Magna Cum Laude, Phi Beta Kappa, Dean's List
- Minors: Mathematics, Great Texts of the Western Tradition

Waco, TX USA

2009-2013

## Papers

### REFEREED PUBLICATIONS

#### W.T. Barnes, P.J. Cargill, S.J. Bradshaw

INFERENCE OF HEATING PROPERTIES FROM HOT NON-FLARING PLASMAS IN ACTIVE REGION CORES II. NANOFLARE TRAINS

ApJ, 2016

doi: 10.3847/1538-4357/833/2/217

#### W.T. Barnes, P.J. Cargill, S.J. Bradshaw

INFERENCE OF HEATING PROPERTIES FROM HOT NON-FLARING PLASMAS IN ACTIVE REGION CORES I. SINGLE NANOFLARES

ApJ, 2016

doi: 10.3847/0004-637X/829/1/31

### CONFERENCE PROCEEDINGS

#### W.T. Barnes, K.P. Dere

CHIANTI-PY: A PYTHON PACKAGE FOR ASTROPHYSICAL SPECTROSCOPY

16th SciPy Conference, 2017

doi: 10.25080/shinma-7f4c6e7-011

## Professional Service

### SHINE Workshop

DISCUSSION SESSION CO-ORGANIZER AND CO-CHAIR (WITH S. BRADSHAW AND N. VIALI)

30 July-3 August 2018

Topic: Signatures of Time-dependent Heating in Active Regions and the Slow Solar Wind

### SPD/AAS Congressional Visit Day

STUDENT REPRESENTATIVE

25 May 2018

Visited senators and representatives to lobby for increase in NASA heliophysics budget

## Presentations

### CONFERENCE TALKS

#### Triennial Earth-Sun Summit

AMERICAN GEOPHYSICAL UNION

Timelag Analysis of Simulated Active Region Cores Heated by Nanoflares

Leesburg, VA

21-24 May 2018

#### Python in Astronomy 2018

CENTER FOR COMPUTATIONAL ASTROPHYSICS, THE FLATIRON INSTITUTE

A Complete fiasco - The Difficulties of Dealing with Atomic Data and a Possible Pythonic Solution

New York City, NY

30 April-4 May 2018

#### 16th Python in Science Conference

SCI-PY, ENTHOUGHT

ChiantiPy: a Python package for Astrophysical Spectroscopy

Austin, TX

10-16 July 2017

## Coronal Loops Workshop VIII

INAF IASF PALERMO

Constraining Nanoflare Heating Frequency with a Global Active Region Model

Palermo, Italy

27-30 June 2017

## 47th Annual Solar Physics Division Meeting

AMERICAN ASTRONOMICAL SOCIETY

Hot Non-flaring Plasmas in Active Region Cores Heated by Single Nanoflares

Boulder, CO

31 May-3 June 2016

## Texas Undergraduate Astronomy Research Symposium

TEXAS A&M UNIVERSITY

Dust Grain Charging in a Protoplanetary Disk

College Station, TX

14 September 2012

## SEMINARS

### NRL Solar and Heliospheric Physics Branch Seminar (Invited)

NAVAL RESEARCH LABORATORY

Investigating Heating Frequency in Active Region Cores through Timelag Analysis of Forward Modeled Emission

Washington, D.C.

11 July 2018

### Space Physics Seminar Series

RICE UNIVERSITY

A Framework for Forward Modeling Solar Active Regions

Houston, TX

27 February 2017

### Space Physics Seminar Series

RICE UNIVERSITY

Impacts of Two-fluid Effects on Emission from Impulsively Heated Coronal Loops

Houston, TX

9 November 2015

## OUTREACH

### North Houston Astronomy Club Late Summer Gathering

LONE STAR COLLEGE-MONTGOMERY CAMPUS

Why is the Sun So Hot? A Current Perspective on Coronal Heating

Conroe, TX

24 August 2018

## POSTERS

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

NATIONAL SCIENCE FOUNDATION

Using Synthetic and Observed Timelags to Constrain Nanoflare Heating Frequency in Active Region Cores

Cocoa Beach, FL

30 July-3 August 2018

### Rice Data Science Conference

RICE UNIVERSITY

Timelag Analysis of Global Hydrodynamic Simulations of Active Regions in the Solar Corona

Houston, TX

9-10 October 2017

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

NATIONAL SCIENCE FOUNDATION

Modeling Observable Signatures of Nanoflare Heating Frequency in Active Region Cores

Saint-Sauveur, Quebec, CA

24-28 July 2017

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

NATIONAL SCIENCE FOUNDATION

Understanding the Impact of Nanoflare Heating Frequency on the Observed Emission Measure Distribution

Santa Fe, NM

11-15 July 2016

### Coronal Loops Workshop VII

UNIVERSITY OF CAMBRIDGE

Effects of Ion Heating on Emission Measure of Coronal Loops in Active Region Cores

Cambridge, UK

21-23 July 2015

### Triennial Earth-Sun Summit

AMERICAN ASTRONOMICAL SOCIETY

Nonnegative Matrix Factorization as a Method for Studying Coronal Heating

Indianapolis, IN

26-30 April 2015

### 44th Annual Lunar and Planetary Science Conference

LUNAR AND PLANETARY SCIENCE INSTITUTE

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

The Woodlands, TX

18-22 March 2013

## Software and Computing Skills

<b>Languages</b>	Bash, C, C++, Python
<b>Scientific Computing</b>	IDL, Mathematica, MATLAB, NumPy, SciPy, SLURM, TORQUE
<b>Markup</b>	CSS, HTML, LaTeX, markdown, reStructuredText
<b>Other</b>	continuous integration, documentation, testing, version control

## Research Fellowships

## NSF REU Research Fellowship

BAYLOR UNIVERSITY, CASPER

Received NSF REU fellowship to study dust grain charging and growth in protoplanetary disks.

Waco, TX USA  
June 2012–August 2012

## Summer Undergraduate Research Fellowship

BAYLOR UNIVERSITY, DEPT. OF PHYSICS

Awarded summer research funding to investigate plasma physics of charged dust grains in Saturn's F Ring.

Waco, TX USA  
June 2011–August 2011

## Students Mentored

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**Lily Han**, Undergraduate (Rice), assisted in advising undergraduate thesis work

Oct. 2017–Apr. 2018

**Brandon Wang**, High school intern, advisor for STEM research course

Apr. 2017–May 2018

**Tessa Wilkinson**, Undergraduate, Google Summer of Code mentor (the SunPy project)

May–Aug. 2016

## Teaching Experience

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

GUEST LECTURER

Rice University

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.

### PHYS 102: Electricity and Magnetism

LAB TEACHING ASSISTANT

Rice University

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

Rice University

Fall 2014, Fall 2015

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

## Honors and Awards

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Nov. 2018 **Metcalf Travel Award to the SDO Workshop**, Solar physics Division of the AAS

Nov. 2017 **Scientific Image Contest (Second Place)**, Wiess School of Natural Sciences, Rice University

July 2017 **Outstanding Student Poster Award**, SHINE Workshop

May 2016 **William and Elva Gordon Fellowship**, Department of Physics and Astronomy, Rice University

May 2016 **Chuo Graduate Student Award**, Department of Physics and Astronomy, Rice University

2015, 2016, 2018 **Studentship Travel Award for SPD Annual Meetings**, Solar Physics Division of the AAS

April 2013 **URSA Scholars Week Outstanding Research Poster in Physics**, Baylor University

2009–2013 **President's Gold Scholarship**, Baylor University

2011, 2012 **Gordon K. Teal Scholarship**, Department of Physics, Baylor University

2010, 2011 **Herbert D. Schwetman Scholarship**, Department of Physics, Baylor University

## Employment Experience

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### Office Assistant

DEPARTMENT OF PHYSICS, BAYLOR UNIVERSITY

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.

## Memberships

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- Sigma Pi Sigma
- Phi Beta Kappa