

Will Barnes | CV

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Personal Information

Birthdate: 15 October 1990

Citizenship: USA

Education

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

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

◦ 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

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

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

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

- 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

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

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

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.