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

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   **Houston, TX**
Rice University   *27 February 2017*

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

Solar Heliospheric and Interplanetary Environment (SHINE) Workshop Santa Fe, NM
National Science Foundation *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 Boulder, CO
American Astronomical Society *31 May-3 June 2016*
Talk title: *Hot Non-flaring Plasmas in Active Region Cores Heated by Single Nanoflares*

Space Physics Seminar Series Houston, TX
Rice University *9 November 2015*
Talk title: *Impacts of Two-fluid Effects on Emission from Impulsively Heated Coronal Loops*

Coronal Loop Workshop VII Cambridge, UK
Unversity of Cambridge *21-23 July 2015*
Poster title: *Effects of Ion Heating on Emission Measure of Coronal Loops in Active Region Cores*

Triennial Earth-Sun Summit Indianapolis, IN
American Astronomical Society *26-30 April 2015*
Poster title: *Nonnegative Matrix Factorization as a Method for Studying Coronal Heating*

44th Annual Lunar and Planetary Science Conference The Woodlands, TX
Lunar and Planetary Science Institute *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 College Station, TX
Texas A&M University *14 September 2012*
Talk title: *Dust Grain Charging in a Protoplanetary Disk*

Research Positions

Rice University Houston, TX USA
Graduate Research Assistant *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 Waco, TX USA
NSF REU Research Fellow *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 Waco, TX USA
Summer Undergraduate Research Assistant *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

○ Outstanding Student Poster Award, SHINE Workshop, July 2017

○ William and Elva Gordon Fellowship, Rice University, May 2016

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