

Alicia Nicole Aarnio

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EDUCATION	<p>Vanderbilt University Ph.D., Physics (expected graduation date: May 2010). Advisor: K. G. Stassun Thesis: The Application of Solar Physics to Mass Loss and Angular Momentum Evolution of Solar-type Pre-Main Sequence Stars</p> <ul style="list-style-type: none">• Chambliss Astronomy Achievement Student Award Honorable Mention, 2008• Vanderbilt University Prize for Undergraduate Research Finalist, 2005 <p>Smith College, B.A., Physics and Astronomy, May 2005. Advisor: S. Edwards</p> <ul style="list-style-type: none">• Adelaide W. Bull Paganelli '30 Prize for Outstanding Work in Physics and High Potential for Further Study, 2005
AREAS OF INTEREST	<p><i>stellar kinematics, pre-main sequence stellar evolution, solar flares and coronal mass ejections, stellar X-ray emission, stellar angular momentum evolution, circumstellar disks, stellar magnetic fields</i></p>
GRANTS	<p>Graduate School Dissertation Enhancement Grant, 2008 NSF AST-0808072, Astronomy and Astrophysics Grant, \$190,142. Co-authored with P. I., Keivan Stassun.</p>
PUBLICATIONS	<p>Aarnio, A. N., Stassun, K. G. and Matt, S. P. “A Search for Star-Disk Interaction Among the Strongest X-ray Flaring Stars in the Orion Nebula Cluster” <i>submitted to ApJ, 2009</i></p> <p>Aarnio, A. N., Weinberger, A. J., Stassun, K. G., Mamajek, E. E., and James, D. J. “A Survey for a Coeval, Comoving Group Associated With HD 141569” 2008 AJ 136 2483</p> <p>Aarnio, A. N., Stassun, K. G., and Matt, S. P. 2008. “T Tauri Angular Momentum Loss via Large Scale Eruptive Flaring Events” The Proceedings of the 15th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun.</p> <p>Stassun, K. G., Mathieu, R. D., Cargile, P. A., Aarnio, A. N., Stempels, E., and Geller, A. “Surprising Dissimilarities in a Newly Formed Pair of ‘Identical Twin’ Stars” 2008 Nature 453 1079S</p>
PUBLICATIONS IN PREPARATION	<p>Aarnio, A. N., Stassun, K. G., Hughes, J. W. and McGregor, S. “Statistical Correlations of Solar Flares and CMEs” (<i>to be submitted to Solar Physics, fall 2009</i>)</p> <p>Aarnio, A. N., Gregory, S. G., Matt, S. P. and Stassun, K. G. “Mechanical Equilibrium of Large-Scale Magnetic Loops and the Consequences of Loop Disruption” (<i>to be submitted to the ApJ</i>)</p> <p>Haynes, S. J., Aarnio, A. N. and Stassun, K. G. “Energetic Processes in T Tauri Stars: Examining Contemporaneous Narrowband Hα and X-ray Time-Series Photometry” (<i>to be submitted to the AJ</i>)</p>
INVITED TALKS	<p><i>Investigating Magnetic Field-Circumstellar Disk Interaction in T Tauri Stars of the Orion Nebula Cluster</i>, Harvard-Smithsonian Center for Astrophysics, April 27 2007</p> <p><i>A Search for Star-Disk Interaction Among the Strongest X-ray Flaring Stars in the Orion Nebula Cluster</i>, St. Andrews University, May 12 2009</p>

OBSERVATION &
DATA ANALYSIS
EXPERIENCE

X-ray

- X-ray light curves; Chandra Orion Ultradeep Project and Carina Vela Large Project
- Spatially resolved solar X-ray image processing; RHESSI data

Optical

- High and low resolution echelle spectroscopic analysis
- KPNO observing run; 7 nights with MOSAIC imager on 0.9m telescope to obtain time-series photometry of young stars in Orion, Rosette
- Time series photometric analysis; narrowband H α

Near- to Mid-Infrared

- Gemini observing run; *Michelle* spectrograph, N-band circumstellar disk observations
- *Spitzer* aperture photometry, all IRAC bands and MIPS 24 μ m

Submillimeter to Radio

- None (yet)

RESEARCH
TRAINING

Schools and Workshops Attended

- National Solar Observatory summer school, Sunspot, NM, June 2009
- Constellation School on Numerical Astrophysics, Cardiff, Wales, January 2009

Solar Physics

Spatially resolved X-ray image reconstruction of RHESSI data. Resulting publication: Schmahl & Hurford, *Solar Physics*, 2002, 210, 273. Statistical analysis of flare, coronal mass ejection properties.

Optical Spectroscopy

Identification young, co-moving stars with echelle spectra from Lick Observatory, Hamilton Observatory. Resulting publication: Aarnio et al., 2008.

Optical and Infrared Photometry

Construction and modeling of spectral energy distributions for young stars with disks using archival HST ACS and ESO WFI data (see Aarnio et al., 2009). *Spitzer* IRAC and MIPS aperture photometry performed on archival data (Stassun et al., 2008).

Time Series Analysis

Analyzing the light curve of δ -Scuti variable VZ Cancri; data obtained using 16" telescope at Smith College. Construction of light curves to identify eclipsing binary candidates in Orion's belt region, Rosette Nebula. Comparison of X-ray, narrow-band H α light curves in energetically flaring young stars of the Orion Nebula Cluster

Numerical Approaches

Monte Carlo Radiative Transfer modeling utilizing TTSRE code of B. Whitney (2003). Modeling the effects of angular momentum loss via large-scale stellar coronal mass ejections.

Stellar Kinematics

UVW space motions as a tool to determine local group membership of nearby field stars. Data used in undergraduate honors thesis of Christopher Saling, 2008. Utilized moving cluster parallax method to ascertain association membership (results found in Aarnio et al., 2008).

Magnetic Structure Modeling

Calculating mechanical equilibrium for a large magnetic loop embedded in a hot corona, analyzing stability of magnetic loop.

ADVISING

Vanderbilt Physics REU Program

Summer student co-mentor with Professor Keivan Stassun. Students: Natalia Alzate (FIT) and India Anderson (SU). Summer 2007. Project: construct light curves in order to identify eclipsing binary systems in Orion's belt region and Rosette Nebula.

Fisk-Vanderbilt Masters-Ph.D. Bridge Program is a diversity initiative, PI: Keivan Stassun. My role is to help direct students' M. A. thesis work.

Co-mentor, Sharina Haynes, January 2009-present

Thesis topic: comparison of contemporaneous narrow-band H α and COUP X-ray light curves.

Co-mentor, Erica Morgan, February 2009-present

Thesis topic: tracing solar energetic particle events at Earth back to the active regions whence they originated.

TEACHING

Smith College

Astronomy laboratory teaching assistant, telescopes course for both non-majors and majors (introductory astronomy course pre-requisite). Classroom assistant for daytime lecture and one of two student instructors of nighttime lab section. Supervisor: M. Thacher. Fall semester 2002-Spring 2005.

Vanderbilt University

Astronomy teaching assistant for introductory course lab section; course for both astronomy majors and non-majors. Responsibilities included set up and instruction of lab sections, grading of labs, providing individual assistance outside of class. Also performed maintenance on the University's 8-inch Celestron and Meade telescopes. Supervisor: Dr. Robert Knop. 2005-2006 academic year.

OUTREACH

Smith College Department of Astronomy

Astronomy open house assistant, 2002-2005 academic years. Set up telescopes, described object being viewed, answered guests' questions.

Vanderbilt Dyer Observatory

Volunteer, Bluebird on the Mountain, teacher workshop, summer space camp, kids' night. September 2006-present. Set up/take-down of materials, guided attendees through flight simulator usage, bottle rocket construction, radio antenna setup for Jovian observations.

Speaker, kids' night, August 2009. Gave hour long presentation on the Moon with interactive exercises; event targets children ages 6-15.

Fisk-Vanderbilt NASA Roadshow

Planetarium assistant, May 2006-February 2007. Helped to set up and take down inflatable planetarium, answer childrens' questions, maintain order.

Vanderbilt Summer Academy

Assistant Instructor, astronomy class, June, 2007. Week-long summer course for 7th and 8th grade students; curriculum similar to Dyer summer space camp.

TWISTER

TN Women in Science, Technology, Engineering and Research is an organization with the goal of making high school aged females aware of potential careers in the STEM disciplines. Volunteer, February 2009, presenter, February 2010.