

Ashley Pagnotta

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Research Expertise

Observations of transient phenomena, multi-wavelength (IR to X-ray) photometry, time-domain astronomy

Academic Background

Postdoctoral Fellow, American Museum of Natural History, September 2012 – Present

Postdoctoral Researcher, Louisiana State University, May 2012 – August 2012

Ph.D., Physics, Louisiana State University, May 2012

Dissertation Title: Recurrent Novae and Type Ia Supernova Progenitors

Advisor: Bradley E. Schaefer

M.S., Physics, Louisiana State University, May 2010

B.A., Physics, Texas A&M University, May 2007

B.A., Mathematics, Texas A&M University, May 2007

Research Experience & Skills

Recurrent Nova (RN) Demographics: The current set of known galactic recurrent novae is incomplete. I use a collection of outburst and quiescence system criteria to identify strong RN candidates and then search for previous eruptions of these systems using the archival plates at Harvard College Observatory and the Sonneberg Observatory in Germany. I have found one new RN thus far, V2487 Ophiuchi, and subsequently used the 30" and 82" telescopes at McDonald Observatory to do follow-up CCD photometry on the system. I also use the plate archives in combination with modern measurements (from telescopes such as Hubble) to look at the long-term behavior of novae. More precise demographics knowledge allows us to determine part of the answer to the question of whether RNe are the dominant Type Ia supernova progenitor, specifically whether the RN death rate matches the observed Type Ia supernova rate.

The 2010 Eruption of U Scorpii: I helped coordinate a worldwide collaboration to obtain multi-wavelength (X-Ray+UV+UVBRIJHK+IR+Radio) photometry and spectroscopy of the 2010 U Sco eruption. I am specifically looking at correlations among the near-IR to X-ray light curves, new phenomena seen in the optical light curve (such as early, fast flares and late, aperiodic dips), and methods of using our data to calculate the total mass ejected during the eruption. The majority of my data come from the SMARTS 1.3-m telescope in Chile, small telescope observers worldwide, and the Swift satellite's UVOT and XRT instruments. I am proficient in IRAF and PyRAF photometry routines and the HEASoft Swift tools, including Xspec.

Supernova Remnant Ex-Companion Search: Using archival HST (ACS, WFPC2, WFC3) images and our own Gemini GMOS data, my group at LSU is conducting a search in historical LMC Type Ia supernova remnants for ex-companion stars left behind after the supernova eruption hundreds to thousands of years ago. The imagery allows us to locate the remnant center and identify potential former companion stars; the spectroscopy (once it is taken--this is a currently-active proposal) will allow us to look for characteristics of those possible ex-companions that indicate they were previously in a tight binary, such as high rotation velocity.

Observing Experience

- Cerro Tololo Inter-American Observatory, La Serena, Chile, 1.0-m telescope (PI, 14 nights, solo observing), CCD photometric survey of galactic classical novae
- Cerro Tololo Inter-American Observatory, La Serena, Chile, 0.9-m telescope (PI 3 nights, Co-I 7 nights, solo observing), CCD photometry of novae and old nova shells
- Kitt Peak National Observatory, Tucson, AZ, WIYN 0.9-m telescope (PI, 13 nights (6 observed by Co-PI), solo observing), CCD photometric survey of galactic classical novae
- McDonald Observatory, Ft. Davis, TX, 30" (Co-PI, 7 nights) and 82" (PI, 7 nights) telescopes, CCD photometry measuring the orbital periods of classical and recurrent novae
- Highland Road Park Observatory, Baton Rouge, LA, 16" and 20" telescopes (semester-long observing techniques class including an individual project), visual observations for sketches, CCD photometry of two eclipsing Algol systems
- Harvard College Observatory, Cambridge, MA, archival plate work
- Sonneberg Observatory, Sonneberg, Germany, archival plate work

Publications

Refereed Journal Articles

- Pagnotta, A.**, & Schaefer, B. E. "Identifying and Quantifying Recurrent Novae Masquerading as Classical Novae" 2013, ApJ, Submitted
- Edwards, Z. I., **Pagnotta, A.**, & Schaefer, B. E. "The Progenitor of the Type Ia supernova SNR0519-69.0" 2012, ApJLett, 747, 19
- Schaefer, B. E., & **Pagnotta, A.** "An absence of ex-companion stars in the Type Ia supernova remnant SNR 0509-67.5" 2012, Nature, 481, 164
- Kijbunchoo, N., Clayton, G. C., Vieux, T. C., Dickerman, N., Hillwig, T. C., Welch, D. L., **Pagnotta, A.**, Tang, S., Grindlay, J. E., Henden, A. "NSV 11154 Is a New R Coronae Borealis Star" 2011, PASP, 123, 1149
- Schaefer, B. E., **Pagnotta, A.**, et al. "Eclipses During the 2010 Eruption of the Recurrent Nova U Scorpii" 2011, ApJ, 742, 113
- Schaefer, B. E., **Pagnotta, A.**, et al. "Discovery of the Predicted 2010 Eruption and the Pre-eruption Light Curve for Recurrent Nova U Scorpii" 2010, AJ, 140, 925
- Schaefer, B. E., **Pagnotta, A.**, & Shara, M. M. "The Nova Shell and Evolution of the Recurrent Nova T Pyxidis" 2010, ApJ, 708, 381
- Collazzi, A. C., Schaefer, B. E., Xiao, L., **Pagnotta, A.**, Kroll, P., Löchel, K., & Henden, A. A. "The Behavior of Nova Light Curves Before Eruption" 2009, AJ, 138, 1846
- Pagnotta, A.**, Schaefer, B. E., Xiao, L., Collazzi, A., & Kroll, P. "Discovery of a Second Nova Eruption of V2487 Ophiuchi" 2009, AJ, 138, 1230

Non-refereed Circulars, Proceedings, etc.

- Pagnotta, A.**, & Schaefer, B. E. "On the Progenitor of SNR 0509-67.5" 2011, IAU 281 Proceedings
- Pagnotta, A.**, et al. 2010, ATel 2507
- Schaefer, B. E., **Pagnotta, A.**, et al. 2010, ATel 2477
- Schaefer, B. E., **Pagnotta, A.**, et al. 2010, ATel 2452
- Osborne, J. P., et al. 2010, ATel 2442
- Schlegel, E. M., Schaefer, B. E., **Pagnotta, A.**, et al. 2010, ATel 2430
- Schlegel, E. M., Schaefer, B. E., **Pagnotta, A.**, et al. 2010, ATel 2419
- Pagnotta, A.**, Schaefer, B. E., & Xiao, L. 2008, IAUCirc 8951

Popular Articles

- "Astronomy Picture of the Day" Leads to a Research Breakthrough, Feature Article, *The Society of Physics Students Observer*, Spring-Summer 2012
- "Ask Astro", Column Answer, *Astronomy Magazine*, August 2012

Presentations

“On the Progenitors of Local Type Ia Supernovae”

Seminar at Rutgers University, New Brunswick, NY, September 2012

Talk at Texas A&M University, College Station, TX, February 2012

Dissertation Talk at the 219th American Astronomical Society Meeting, Austin, TX, January 2012

Talk at European Southern Observatory, Santiago, Chile, December 2011

Colloquium at the American Museum of Natural History, New York, NY, October 2011

Talk at the University of Massachusetts, Amherst, MA, October 2011

Talk at the Center for Astrophysics, Harvard University, Cambridge, MA, October 2011

“SNR 0509-67.5: Site of a Type Ia Supernova with a Double Degenerate Progenitor”, talk at IAU Symposium 281 (Binary Paths to Type Ia Supernova Explosions), Padua, Italy, July 2011

“The 2010 Eruption of U Scorpii”

Talk at Cerro Tololo Inter-American Observatory headquarters, La Serena, Chile, May 2011

Poster at the 217th American Astronomical Society Meeting, Seattle, WA, January 2011

Poster at the Evolution of Cataclysmic and Compact Binaries Workshop, Columbia University, New York, NY, November 2010

Invited talk at State University of New York, Stony Brook, NY, November 2010

Talk at the 99th Fall Meeting of the American Association of Variable Star Observers, Woburn, MA, October 2010

Poster at the 4th Meeting of the 3rd Coast Astronomical Society, Tallahassee, FL, May 2010

“The USCO2010 Eruption”, talk at Baton Rouge Astronomical Society, Baton Rouge, LA, March 2010

“T Pyxidis: A Recurrent Nova that is NOT a Type Ia Supernova Progenitor”

Invited talk at Texas A&M University, College Station, TX, December 2009

Poster at the 3rd Meeting of the 3rd Coast Astronomical Society, Huntsville, AL, August 2009

“V2487 Oph: A Test of Recurrent Nova Identification Criteria”, talk at the 14th North American Workshop on Cataclysmic Variables and Related Objects (Wild Stars in the Old West II), Tucson, AZ, March 2009

“Identifying Recurrent Novae in the Set of Classical Novae”, poster at the 14th North American Workshop on Cataclysmic Variables and Related Objects (Wild Stars in the Old West II), Tucson, AZ, March 2009

Education & Public Outreach

AMNH Masters of Arts in Teaching program, Fall 2012 – Present, develop and teach the astronomy practicum curriculum to a cohort of Earth Science teacher candidates

AMNH After School Program, Fall 2012 – Spring 2013, teach high school after school enrichment courses in beginning astrophysics and observational astronomy

Public talks at assorted venues, including recent ones at Columbia University and Astronomy on Tap NASA Center for Astronomy Education/Collaboration of Astronomy Teaching Scholars “Astro 101:

Improving the College Introductory Astronomy General Education Course Through Active Engagement” Workshop, Austin, TX, January 2012

National Science Foundation “Science: Becoming the Messenger” Workshop (Days 1 & 2), Baton Rouge, LA, November 2011

Public Astronomy Nights, Landolt Astronomical Observatory at LSU, Spring 2008 – Summer 2012, operate reflecting and refracting telescopes to show LSU students and the general public objects of interest throughout the year while explaining basic astronomy concepts

Saturday Science at LSU, Fall 2007 – Spring 2011, coordinate grad student involvement in the Saturday Science program, assist various science professors as they give talks for local high school students

Grants, Fellowships, & Awards

Coates Outstanding Dissertation Award, Louisiana State University, September 2012

Rodger Doxsey Travel Prize, American Astronomical Society, January 2012

Dissertation Year Fellowship, Louisiana State University, August 2011 – Present

Board of Regents Graduate Fellowship, Louisiana State University, August 2007 – July 2011

Coates Conference Travel Award, Louisiana State University, January 2011

LaSPACE Graduate Student Research Assistance Grant, May 2010
Graduate Student Travel Award, Louisiana State University, March 2009, May 2010
Women in Astronomy & Space Sciences Meeting Travel Grant, October 2009

Academic Service

AMNH Speaker Committee, September 2012 – Present
AMNH Postdoc Fellowship Group, co-founder, September 2012 – Present
LSU College of Science Dean's Executive Committee
 Communications Subcommittee, April 2010 – April 2012
 Outreach Subcommittee, April 2012 – Present

Society Memberships

American Astronomical Society, Member