

Emily L. Rice

CONTACT INFORMATION

Department of Astrophysics
Division of of Physical Sciences
American Museum of Natural History
Central Park West at 79th Street
New York, NY 10024-5192

Voice: (212) 313-7631
Fax: (212) 769-5007
E-Mail: erice@amnh.org

RESEARCH INTERESTS

Star formation and circumstellar disk evolution, very low mass star and brown dwarf atmospheres, stellar and substellar multiplicity

TECHNIQUES

Infrared spectroscopy, high-resolution spectroscopy, adaptive optics, and stellar atmosphere models

EDUCATION

University of California, Los Angeles, Los Angeles, California USA

Ph.D., Astrophysics, 2009

- Advisor: Professor Ian S. McLean
- Collaborators: Dr. Travis Barman & Dr. Lisa Prato (Lowell Observatory), Dr. J. Davy Kirkpatrick (IPAC/Caltech)
- Title: Physical Properties of Young Brown Dwarfs: High-Resolution Near-Infrared Spectroscopy of Young M and L Dwarfs
- Advanced to Candidacy: March 2007

M.S., Astrophysics, 2005

- Advisor: Professor Ian S. McLean
- Collaborator: Dr. Lisa Prato (Lowell Observatory)
- Title: An Association in the Aquila Star-Forming Region: High Resolution Infrared Spectroscopy of T Tauri Stars
- Comprehensive Exam: August 2005

University of Pittsburgh, Pittsburgh, Pennsylvania USA

B.S., Honors Physics and Astronomy, *summa cum laude*, 2002

B.A., German Language and Literature, *summa cum laude*, 2002

HONORS AND AWARDS

2003-2007: Eugene Cota Robles Fellowship, UC Office of the President/UCLA Graduate Division

2006: Outstanding TA Award, UCLA Department of Physics & Astronomy

2003-2005: Graduate Fellowship, UCLA Center for the Study of Evolution and the Origin of Life

2002: Phi Beta Kappa Honor Society

2001: Sigma Pi Sigma Physics Honor Society

1998-2002: Chancellor's Scholarship, University of Pittsburgh Honors College

RESEARCH EXPERIENCE

American Museum of Natural History (Exoplanet group)

Postdoctoral Researcher

9/2009 - present

Study the physical, chemical, and atmospheric properties of brown dwarfs and exoplanets

University of California, Los Angeles

Graduate Student Researcher

7/2003 - 8/2009

Study the physical, chemical, and atmospheric properties of young and field brown dwarfs

- Awarded 15 nights on NIRSPEC & Keck II, fall 2006 to fall 2008
- Obtain and reduce high-resolution near-infrared spectra of young and field brown dwarfs
- Calculate temperature-pressure structures and high-resolution synthetic spectra with the PHOENIX model atmosphere code for a range of effective temperatures and surface gravities
- Write IDL code to converge low-temperature model atmosphere structures and systematically analyze model structures and synthetic spectra
- Develop statistical methods for determining the best-fit model parameters and uncertainties

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RESEARCH EXPERIENCE, CONTINUED

Search for brown dwarf spectroscopic binaries

- Obtained and reduced multiple epochs of high-resolution near-infrared spectra
- Implemented cross-correlation techniques to measure relative and absolute radial velocities

Characterize a young stellar association in Aquila

- Reduced and analyzed high-resolution near-infrared spectra of seven class II objects
- Determined spectral types and measured radial and rotational velocities via comparison with template spectra
- Analyzed circumstellar properties, accretion indicators, and multiplicity of objects
- Awarded five nights on the Hall 42-inch telescope at Lowell Observatory to search for additional young stars in the region
- Obtained broad- and narrow-band images covering nearly one square degree with SITe CCD camera on the Hall telescope

Determine the photometric zeropoint of FLITECAM (First Light TEST CAMERA for SOFIA)

- Analyzed near-infrared calibration images using aperture photometry

REFEREED PUBLICATIONS

Emily L. Rice, Travis Barman, Ian S. McLean, Lisa Prato, & J. Davy Kirkpatrick, *Physical Properties of Young Brown Dwarfs and Very Low-Mass Stars Inferred from High-Resolution Model Spectra*, 2009, Astrophysical Journal Supplement Series, in press (astro-ph/0911.3844)

J.R. Barnes, Travis S. Barman, H.R.A. Jones, R.J. Barber, Brad M.S. Hansen, L. Prato, **Emily L. Rice**, C.J. Leigh, A. Collier Cameron, D.J. Pinfield *A Search for molecules in the atmosphere of HD 189733b*, 2009, MNRAS, in press (astro-ph/0909.2510)

Lisa Prato, **Emily L. Rice** & Tom Dame, *Where are all the Young Stars in Aquila?*, 2008, in Handbook of Star Forming Regions Volume I: the Northern Sky, Bo Reipurth, ed.

Dagny L.Looper, J. Davy Kirkpatrick, Roc M. Cutri, Travis Barman, Adam J. Burgasser, Michael C. Cushing, Thomas Roellig, Mark R. McGovern, Ian S. McLean, **Emily L. Rice**, Brandon J. Swift, Steven D. Schurr, *Discovery of Two Nearby, Peculiar L Dwarfs from the 2MASS Proper Motion Survey: Young or Metal-Rich?*, 2008, Astrophysical Journal, 686, 528

Quinn M. Konopacky, Andrea M. Ghez, **Emily L. Rice** & Gaspard Duchêne, *New Very Low Mass Binaries in the Taurus Star-Forming Region*, 2007, Astrophysical Journal, 663, 394

Laird M. Close, Ben Zuckerman, Inseok Song, Travis Barman, Christian Marois, **Emily L. Rice**, Nick Siegler, Bruce Macintosh, Eric E. Becklin, Randy Campbell, James E. Lyke, Al Conrad, & David Le Mignant, *The Wide Brown Dwarf Binary Oph 1622-2405 and Discovery of a Wide, Low-Mass Binary in Ophiuchus (Oph 1623-2402): A New Class of Young Evaporating Wide Binaries?*, 2007, Astrophysical Journal, 660, 1492

Ian S. McLean, Lisa Prato, Mark R. McGovern, Adam Burgasser, J. Davy Kirkpatrick, **Emily L. Rice**, & Sungsoo S. Kim *The NIRSPEC Brown Dwarf Spectroscopic Survey II: High-Resolution J-Band Spectra of M, L, and T dwarfs*, 2007, Astrophysical Journal, 658, 1217

Emily L. Rice, Lisa Prato, & Ian S. McLean, *An Association in the Aquila Star-Forming Region: High Resolution Infrared Spectroscopy of T Tauri Stars*, 2006, Astrophysical Journal, 647, 432

Emily L. Rice & Nate McCrady, *The Interactive Planetarium: Student-led Investigations of Naked-Eye Astronomy and Planetary Motion*, 2009, submitted to the Astronomy Education Review

Nate McCrady & **Emily L. Rice**, *Development and Implementation of a Lab Course for Introductory Astronomy*, 2008, Astronomy Education Review, Volume 1, Issue 7

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TEACHING EXPERIENCE

University of California, Los Angeles

Graduate Student Researcher 2/2006 - 7/2009

- Collaborate with NSF postdoc on redesigning the ASTR 3 (Nature of the Universe) labs
- Design, develop, and implement lab activity on the structure and motion of spiral galaxies

Teaching Assistant Coordinator 9/2006 - 12/2006

- Trained first-year graduate students as teaching assistants for physics and astronomy courses
- Organized TA orientation and weekly meetings of PHYS 495 (Teaching College Physics)

Lead Teaching Assistant 9/2005 - 6/2006

- Taught weekly lab sessions for ASTR 3, an introductory astronomy course for non-majors
- Coordinated lab sessions and materials for twelve lab sections of ASTR 3
- Oversaw six graduate student TAs and three undergraduate student graders
- Received Department of Physics & Astronomy Outstanding TA Award, June 2006

Teaching Assistant 4/2004 - 6/2004

- Taught weekly lab sessions for ASTR 3, an introductory astronomy course for non-majors

Teaching Assistant 1/2004 - 3/2004

- Taught weekly discussion sessions for ASTR 81, an introductory course for astrophysics majors

Center for Adaptive Optics, UC Santa Cruz

Instructor, Akamai Observatory Internship Program Short Course 3-6/2007 & 3-6/2008

- Designed and implemented a light and telescopes inquiry-based lab activity for college interns
- Prepared and presented a lecture on astronomy, telescopes, and instrumentation
- Led star-gazing activity at the Mauna Kea Visitor Information Station

Supervisor, Mainland Internship Program 6/2006 - 8/2006

- Mentored undergraduate intern at the UCLA Infrared Laboratory
- Designed project, provided tutorials, and assisted intern with abstracts and presentations

California Science Center, Los Angeles

Science Education Fellow 9/2007 - 4/2008

- Designed and implemented curriculum for middle school students in the Curator Kids Club
- Supervised and mentored high school students working as Learn to Earn interns

PUBLIC OUTREACH EXPERIENCE

American Museum of Natural History, New York City

Content Adviser for Astronomy Bulletins 9/2009 - present

Griffith Observatory, Los Angeles

Museum Guide 7/2007 - 8/2009

- Interpret exhibits and answer astronomy-related questions for visitors

University of California, Los Angeles

Presenter, UCLA Planetarium 2/2004 - 6/2009

- Present planetarium and telescope shows for school groups and the public

Co-Director, UCLA Planetarium 9/2004 - 9/2006

- Coordinated planetarium and telescope shows for school groups and the public
- Oversaw projector refurbishing, control system upgrade, and theater renovation

Maryland Science Center, Baltimore

Console Operator, Davis Planetarium 7/2002 - 6/2003

- Presented live and automated planetarium shows
- Assisted with equipment maintenance and show installation

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CONFERENCES AND WORKSHOPS

Sagan Exoplanet Summer Workshop: Exoplanetary Atmospheres, July 2009
American Astronomical Society Winter Meeting, January 2009
Dissertation Talk: Determining the Physical Properties of Very-Low-Mass Stars and Brown Dwarfs in the Near-Infrared

Keck Science Meeting, September 2008
Talk: Determining the Physical Properties of Brown Dwarfs with NIRSPEC

Cool Stars XV, July 2008
Talk and Conference Proceeding: Determining the Physical Properties of Very-Low-Mass Stars and Brown Dwarfs in the Near-Infrared

Science in the Era of the Thirty Meter Telescope Workshop, July 2007

Multiplicity in Star Formation Workshop, May 2007
Talk: Multiplicity in the Aquila Star-Forming Region

American Astronomical Society Winter Meeting, January 2007
Poster: Recent Results of the NIRSPEC Brown Dwarf Spectroscopic Survey

Cool Stars XIV, November 2006

Keck Science Meeting, September 2006
Poster: Recent Results of the NIRSPEC Brown Dwarf Spectroscopic Survey

Protostars and Planets V, October 2005
Poster and Conference Proceeding: Unusual Young Stars Toward the Galactic Plane: High Resolution Infrared Spectroscopy of T Tauri Systems in Aquila

Keck Science Meeting, September 2005
Poster: Unusual T Tauri Stars in Aquila: High Resolution Near-Infrared Spectra from NIRSPEC

Center for Adaptive Optics Fall Retreat, November 2004

Center for Adaptive Optics Summer School, August 2004

EDUCATION CONFERENCES AND WORKSHOPS

Center for Adaptive Optics Experience Science Learning & Teaching Workshop, March 2008
Design Team Leader: Akamai Observatory Internship Short Course Light & Telescopes Inquiry Shadower: Inquiry Facilitation Presenter: Past Design Panel

American Astronomical Society Winter Meeting, January 2008
Poster: The Interactive Planetarium: Student-led Investigations of Naked-Eye Astronomy and Planetary Motion

Center for Adaptive Optics Re-Thinking Science Learning & Teaching Workshop, November 2007
Discussion Leader: "Comparing Approaches: Three Kinds of Hands-On Science" Presenter: Past Participants Panel

Astronomical Society of the Pacific Cosmos in the Classroom, August 2007
Poster: The Interactive Planetarium: Student-led Investigations of Naked-Eye Astronomy and Planetary Motion
Poster: Development and Implementation of a Lab Suite for Introductory Astronomy Workshop: Hands-On Lab Exercises to Develop Student Conceptual Understanding of Introductory Astronomy

Center for Adaptive Optics Professional Development Workshop, March 2007
Activity and Discussion Leader: "Comparing Approaches: Three Kinds of Hands-On Science"

NASA Center for Astronomy Education Teaching Workshop (Tier II), January 2007

Center for Adaptive Optics Professional Development Workshop, February 2006