

Emily L. Rice

CONTACT Department of Engineering Science & Physics *Phone:* (718) 982-2800
College of Staten Island *Fax:* (718) 982-2830
City University of New York *E-Mail:* Emily.Rice@csi.cuny.edu
2800 Victory Boulevard *Website:*
Staten Island, NY 10314 <http://research.amnh.org/astrophysics/staff/erice>

EDUCATION **University of California, Los Angeles**, Los Angeles, California USA

Ph.D., Astrophysics, 2009

Physical Properties of Young Brown Dwarfs: High-Resolution Near-Infrared Spectroscopy of Young M and L Dwarfs

- Advisor: Professor Ian S. McLean
- Collaborators: Dr. Travis Barman & Dr. Lisa Prato (Lowell Observatory), Dr. J. Davy Kirkpatrick (IPAC/Caltech)

M.S., Astrophysics, 2005

An Association in the Aquila Star-Forming Region: High Resolution Infrared Spectroscopy of T Tauri Stars

- Advisor: Professor Ian S. McLean
- Collaborator: Dr. Lisa Prato (Lowell Observatory)

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

GRANTS,
HONORS
& AWARDS 2010: Certificate in Teaching Innovative Laboratory Experiences awarded by the Institute for Scientist & Engineer Educators, UC Santa Cruz
2010: Small Research Grant, American Astronomical Society
Improving the PHOENIX Atmosphere Models at Ultracool Temperatures
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 **American Museum of Natural History (Exoplanet group)**

Postdoctoral Research Scientist

9/2009 - 8/2011

Spectroscopic studies of young low-mass stars, brown dwarfs, and extrasolar planets

- Analyze low-resolution spectra of low-mass companions detected by Project 1640 (P1640), an apodized-pupil Lyot coronagraph (APLC) with integral field unit (IFU) installed on the Palomar Observatory Hale 200-inch telescope
- Calculate simulated spectra for the Gemini Planet Imager (GPI), an APAC+IFU instrument to be commissioned on Gemini-South in late 2011
- Calculate model atmosphere structures and synthetic spectra with the PHOENIX code
- Develop fitting procedure for low-resolution spectra of companions detected by P1640
- Measure radial velocities of candidate low-mass members of nearby young moving groups
- Characterize low-mass members of nearby young moving groups using near-infrared spectra
- Organize day-long meetings of astronomers from regional institutions with shared research interests in young low-mass stars, brown dwarfs, and exoplanets

Astrophysics content adviser for Science Bulletins (see PUBLIC OUTREACH, page 4)

Produce astronomy visualizations for NASA's WISE mission using the Digital Universe Atlas

RESEARCH,
CONTINUED

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 17 nights on NIRSPEC/Keck II, fall 2006 to fall 2009
- Obtained and reduced high-resolution near-infrared spectra of young and field brown dwarfs
- Calculated temperature-pressure structures and high-resolution synthetic spectra with the PHOENIX model atmosphere code for a range of effective temperatures and surface gravities
- Wrote IDL code to converge low-temperature model atmosphere structures and systematically analyze model structures and synthetic spectra
- Developed statistical methods for determining the best-fit model parameters and uncertainties
- Supervised two undergraduate students in data reduction and analysis (now attending graduate school at UT Austin and UW Madison)
- Maintain the NIRSPEC Brown Dwarf Spectroscopic Survey online public archive (bdssarchive.org)

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 T Tauri stars
- Determined spectral types and measured radial and rotational velocities of T Tauri stars via comparison with template spectra
- Analyzed circumstellar properties, accretion indicators, and multiplicity of T Tauri stars
- 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**, Jacqueline Faherty, & Kelle Cruz, *The Lowest-mass Member of the β Pictoris Moving Group*, 2010, ApJL, 715, 165J. Davy Kirkpatrick, Dagny L. Looper, Adam J. Burgasser, Steven D. Schurr, Roc M. Cutri, Michael C. Cushing, Kelle L. Cruz, Anne C. Sweet, Gillian R. Knapp, Travis S. Barman, John J. Bochanski, Thomas L. Roellig, Ian S. McLean, Mark R. McGovern, & **Emily L. Rice**, *Discoveries from a Near-infrared Proper Motion Survey Using Multi-epoch Two Micron All-Sky Survey Data* 2010, ApJS, 190, 100Quinn M. Konopacky, Andrea M. Ghez, Travis S. Barman, **Emily L. Rice**, John I. Bailey, Russel J. White, Ian S. McLean & Gaspard Duchêne, *High-precision Dynamical Masses of Very Low Mass Binaries*, 2010, ApJ, 711, 1087**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*, 2010, ApJS, 186, 63J. R. Barnes, Travis S. Barman, H. R. A. Jones, R. J. Barber, Brad M. S. Hansen, Lisa Prato, **Emily L. Rice**, C. J. Leigh, A. Collier Cameron, D. J. Pinfield *A Search for molecules in the atmosphere of HD 189733b*, 2010, MNRAS, 491, 445Lisa 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, B. Reipurth, ed., ASP Monograph Publications, 4, 18

REFEREED
PUBLICATIONS,
CONTINUED

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 DvSchurr, *Discovery of Two Nearby, Peculiar L Dwarfs from the 2MASS Proper Motion Survey: Young or Metal-Rich?*, 2008, ApJ, 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, ApJ, 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, ApJ, 660, 1492

Ian S. McLean, Lisa Prato, Mark R. McGovern, Adam J. 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, ApJ, 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, ApJ, 647, 432

Emily L. Rice, 2010, in ASP Conf. Series 436, Learning from Inquiry in Practice, eds. L. Hunter & A. J. Metevier (San Francisco, CA: ASP), 547, *The 'Comparing Approaches' Workshop as an Introduction to Inquiry-Based Learning, Curriculum Design, and the Professional Development Program*

Emily L. Rice, Michael McElwain, Sarah Sonnet, & Marc Rafelski, 2010, in ASP Conf. Series 436, Learning from Inquiry in Practice, eds. L. Hunter & A. J. Metevier (San Francisco, CA: ASP), 355 *Evolution of Inquiry Activities in the Akamai Observatory Short Course: 2004-2009*

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

INVITED
TALKS

University of Rochester, April 2011
SUNY Stony Brook, February 2010
UC Berkeley, January 2010
American Museum of Natural History, October 2009
Dublin Institute for Advanced Studies, November 2008
Lowell Observatory, August 2008

TEACHING

CUNY College of Staten Island

Assistant Professor **9/2011 - present**
- Fall 2011 Courses: Contemporary Theories of the Universe, Galactic Laboratory

American Museum of Natural History, New York City

Guest Lecturer **3/2010 - 3/2011**
- Present lectures on current research (brown dwarfs and/or exoplanets), general astronomy, and science as a career for extracurricular middle and high school classes

University of California, Los Angeles

Graduate Student Researcher **2/2006 - 7/2009**
- Redesign lab component of Nature of the Universe (undergraduate introductory astronomy for non-majors), with NSF postdoc N. McCrady (now asst. professor at Univ. of Montana)
- 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 Teaching College Physics (graduate course)

TEACHING,
CONTINUED

University of California, Los Angeles

Lead Teaching Assistant

9/2005 - 6/2006

- Taught weekly lab sessions for Nature of the Universe course
- Coordinated lab sessions and materials for twelve lab sections
- Supervised 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 and graded homework for Nature of the Universe course

Teaching Assistant

1/2004 - 3/2004

- Taught weekly discussion sessions and graded homework for Astrophysics I: Stars and Nebulae course (introductory astrophysics for 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

American Museum of Natural History, New York City

Contributing Writer for Cosmic Discoveries

8/2010 - present

- Write ~3,000-word chapters for AMNH's *Cosmic Discoveries* iPhone App
- Select 8-10 images to accompany each chapter and write captions
- Coordinate content management with AMNH Digital Media staff and consultants

Public Talks (various venues)

2/2010 - present

- World Astronomy (Hayden Planetarium)
- Exoplanets Revealed (Hayden Planetarium)
- How to Become an Astronomer (Urban Assembly Institute of Math and Science for Young Women, Brooklyn)
- What is a Planet? Discoveries and Definitions (SUNY Stony Brook Open House)
- Astronomy and Vision (Hayden Planetarium)
- Tiniest Objects in the Universe (Hayden Planetarium)
- Women in Astronomy (Jamaica, Queens office of the Food & Drug Administration)
- How to Become an Astronomer (Brooklyn Public School 209)
- Brown Dwarfs: Cooler than the Coolest Stars (Columbia University Open House)

Astrophysics Content Adviser for Science Bulletins

9/2009 - 8/2011

- Select news stories to be covered in digital productions and decide how to frame each story
- Ensure the accuracy, clarity, and relevance of each production
- Work with production team, including writers, graphic designers, directors, and producers

Strasenburgh Planetarium, Rochester, NY

Consultant

6/2011

- Provide background information and review script of *Alien Worlds* planetarium show

PUBLIC
OUTREACH,
CONTINUED

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
- Supervised 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

CONFERENCES
& WORKSHOPS

Mike Simon SUNY Stony Brook Alumni Conference, June 2011

Talk: Unusual Near-Infrared Spectra of Low-Mass Objects

Exploring Strange New Worlds: From Giant Planets to Super Earths, May 2011

Poster: Characterizing Extra-Solar Planets with Low Resolution Spectroscopy

Astronomical Society of New York meeting, April 2011

Talk: Characterizing Exoplanets with Low Resolution Spectra

In the Spirit of Lyot 2010: Direct Detection of Exoplanets and Circumstellar Disks, October 2010

Cool Stars XVI, August 2010

Organized Splinter Session: Juvenile Ultracool Dwarfs (with K. Cruz and J. Faherty)

Co-author on three posters (First authors: Q. Konopacky, G. Mace, and J. Schlieder)

Exploring the Universe Bit by Bit (Astronomy visualization workshop sponsored by the Kavli Institute for Cosmological Physics, University of Chicago), April 2010

Learning from Inquiry in Practice Conference (Sponsored by the Institute for Scientist & Engineer Educators, UC Santa Cruz), January 2010

American Astronomical Society Winter Meeting, January 2010

Poster: Physical Properties of T Dwarfs Inferred from High-Resolution Near-Infrared Spectra

NSF Center for Adaptive Optics (CfAO) Fall Retreat, November 2009

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

NSF CfAO Experience Science Learning & Teaching Workshop, March 2008

Presenter and Design Team Leader

American Astronomical Society Winter Meeting, January 2008

Poster: The Interactive Planetarium: Student-led Investigations of Naked-Eye Astronomy and Planetary Motion

NSF CfAO Re-Thinking Science Learning & Teaching Workshop, November 2007

Presenter and Discussion Leader

CONFERENCES
& WORKSHOPS,
CONTINUED

- Astronomical Society of the Pacific Cosmos in the Classroom, August 2007
Presented a workshop and two posters on Astro 101 labs
- 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
- NSF CfAO Professional Development Workshop, March 2007
Activity and Discussion Leader
- American Astronomical Society Winter Meeting, January 2007
Poster: Recent Results of the NIRSPEC Brown Dwarf Spectroscopic Survey
- NASA Center for Astronomy Education Teaching Workshop (Tier II), January 2007
- Cool Stars XIV, November 2006
- Keck Science Meeting, September 2006
Poster: Recent Results of the NIRSPEC Brown Dwarf Spectroscopic Survey
- NSF CfAO Professional Development Workshop, February 2006
- 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