EMILY C. MARTIN

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EDUCATION

University of California, Los Angeles September 2018
Ph.D. in Astronomy

Dissertation: *Characterizing Low-Mass Stars and Brown Dwarfs and Upgrading NIRSPEC*
Advisors: Prof. Ian S. McLean, Prof. Michael P. Fitzgerald

University of California, Los Angeles June 2014
M.S. in Astronomy

Masters Thesis: *Surface Gravity Studies of Brown Dwarfs*
Advisors: Prof. Ian S. McLean, Prof. Michael P. Fitzgerald

Texas A&M University May 2012
B.S. in Physics
B.A. in French

Senior Thesis: *Optical Design of a Red Sensitive Spectrograph*
Advisors: Prof. Darren L. DePoy, Prof. Jennifer L. Marshall

Magna Cum Laude, Undergraduate Research Scholar

RESEARCH INTERESTS

Astronomical Instrumentation; Infrared Instrumentation; Optical and mechanical design; Low-mass stars and Brown Dwarfs; Infrared Spectroscopy; Astrometry

RESEARCH EXPERIENCE

UCSC September 2018 – current
NSF Postdoctoral Scholar, UC Chancellor's Fellow *Mentor: Prof. Andy Skemer*

Science: Near-infrared spectroscopy of the coldest brown dwarfs. Doppler Imaging of brown dwarfs. Infrared spectroscopy.

Instrumentation: Development of a novel instrument to observe solar system planets as exoplanets.

W. M. Keck Observatory August 2018 – October 2018
Keck Visiting Scholar *Mentor: Greg Doppmann*

Instrumentation: Instrument Scientist for the NIRSPEC upgrade for the Keck II telescope. Oversaw the integration and testing of the upgrade on the summit of Maunakea.

UCLA September 2012 – June 2018
Graduate Research Assistant *Advisors: Ian McLean & Michael Fitzgerald*

Science: Near-infrared spectroscopy of low-mass stars and brown dwarfs. Member of the Brown Dwarf Spectroscopic Survey. Characterizing brown dwarf atmospheres. Measuring brown dwarf surface gravities.

Instrumentation: Instrument Scientist for the NIRSPEC upgrade for the Keck II telescope. Optical design of a new slit-viewing camera for NIRSPEC, using ZEMAX. Mechanical prototyping and testing for the NIRSPEC upgrade. Teledyne H2RG HgCdTe Infrared Detector characterization and testing. Electronics design. NIRSPEC laser frequency comb tests for a precision radial velocity calibration technique: data taking, reduction, and analysis.

IPAC/Caltech January 2016 – July 2016
Visiting Graduate Fellow *Advisors: Chas Beichman & Davy Kirkpatrick*

Science: Finding the coolest, closest brown dwarfs with the *Spitzer Space Telescope*. Calculated astrometric fits to 21 of the coldest brown dwarfs in the Solar Neighborhood. Spectroscopic follow-up of late-type brown dwarf candidates to discover 1 new Y dwarf and confirm 6 new T dwarfs. Developed a new method for determining distortion on the IRAC channel 2 camera aboard *Spitzer*.

Texas A&M May 2011 – August 2012
Undergraduate Research Assistant *Advisors: Darren DePoy & Jennifer Marshall*

Instrumentation: Optical Design of a Red-Sensitive Spectrograph. Designed a method to optically align the spectrographs for the HETDEX: VIRUS project. Assisted in installation of new flat field screen for the Blanco 4-m telescope at CTIO.

OBSERVING EXPERIENCE

McDonald Observatory
Cassegrain Spectrometer (es2) on 82-inch — 1 Night

Lick Observatory
Hamilton Spectrograph on Shane 3-m — 1 Night
Direct Imaging Camera on Nickel 1-m — 8 Nights (5 Nights as PI)

W. M. Keck Observatory
NIRSPEC on Keck II — >20 Nights
MOSFIRE on Keck I — 8 Nights
NIRES on Keck II — 3 Nights

RECENT AWARDS AND HONORS

NSF Astronomy & Astrophysics Postdoctoral Fellowship — September 2018 – current
UC Chancellor's Fellow; UC Santa Cruz — September 2018 – current
Keck Visiting Scholar — August–October 2018
UCLA Dissertation Year Fellowship — Academic Year 2017 – 2018
NASA Group Achievement Award — September 2017
Charles E. and Sue K. Young Graduate Student Award — May 2017
IPAC Visiting Graduate Student Fellowship — January – July 2016
Bachmann Instrumentation Fellowship at UCLA — March – September 2015
NSF Graduate Fellowship Honorable Mention — April 2013

SELECTED TALKS

Invited: Lowell Observatory Colloquium, Flagstaff, AZ, May 2019
Characterizing Cold Brown Dwarf Atmospheres and Developing Infrared Instrumentation

Invited: UC President's Postdoctoral Fellow Spring Retreat, Lake Arrowhead, CA, April 2019
Characterizing Cold Brown Dwarf Atmospheres and Developing Infrared Instrumentation

Invited: NSF Astronomy & Astrophysics Postdoctoral Fellow Symposium, Seattle, WA, January 2019
The NIRSPEC Upgrade for Keck II

Invited: Tech Talk Seminar, UH Hilo, Hilo, HI, December 2018
The NIRSPEC Upgrade for Keck II

Keck Visiting Scholar Final Talk, W. M. Keck Observatory, Waimea, HI, December 2018
The NIRSPEC Upgrade for Keck II: Installation and Characterization of the New Slit Viewing Camera

SPIE Astronomical Telescopes and Instrumentation Conference, Austin, TX, June 2018
Overview of the NIRSPEC Upgrade for the Keck II Telescope

Rising Stars in Physics Workshop, MIT, Cambridge, MA, April 2018
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Seminar, Texas A & M University, College Station, TX, April 2018
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Seminar, iREx Exoplanet Institute, Université de Montreal, February 2018
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Seminar, Gemini Observatory (North), Hilo, HI, February 2018
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Dissertation Talk: American Astronomical Society Meeting, National Harbor, MD, January 2018
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Planet Lunch Seminar, UC Santa Cruz, Santa Cruz, CA, November 2017
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Seminar, American Museum of Natural History, New York, NY, October 2017
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

Invited: Brown Dwarf to Exoplanet Connection Conference, University of Delaware, October 2017
Late-T and Y Dwarf Trigonometric Parallaxes from the Spitzer Space Telescope

Invited: Seminar, Carnegie DTM, Washington, DC, October 2017
Brown Dwarf Distances and Atmospheres: Spitzer Parallaxes and the Keck/NIRSPEC upgrade

American Astronomical Society Meeting, Grapevine, TX, January 2017
Parallaxes for 21 Late-T and Y dwarfs in the Spitzer Parallax Program

TEACHING EXPERIENCE

UCLA Teaching Assistant

Astronomy 286, *Graduate Level Exoplanets*	Winter 2015
Astronomy 180, *Upper Division Astronomy Lab*	Fall 2014
Astronomy 3, *Introduction to Astronomy Lab*	Winter 2013, Spring 2013
Astronomy 4, *Black Holes and Cosmic Catastrophes*	Fall 2012

Other Teaching Experience

Institute for Scientist and Engineer Educators Professional Development Program *Design Team Leader for AstroTech Lab Activity*	Summer 2019
UCLA Astronomy Live! Summer High School Workshop *Instructor*	Summers 2014–2017
Private Tutor for High School and College Physics and Math *Instructor for >10 students*	2013–2018
Institute for Scientist and Engineer Educators Professional Development Program	Spring 2015

PUBLIC OUTREACH EXPERIENCE

Science Judge for Waimea Country School Science Fair	Fall 2018
AWiSE STEM Day *Astronomy Demo Coordinator*	2016–2017
Impostor Syndrome Workshops *Co-Leader, 5 workshops*	2014–2017

Exploring Your Universe *Rockets Booth Leader*	2014–2016
UCLA Astronomy Live! Summer High School Workshop *Co-Organizer*	2014–2018
UCLA Planetarium Show Presenter	2012–2018
UCLA Astronomy Live! Outreach Visits to Local Schools	2012–2018

DEPARTMENTAL SERVICE

UCSC Colloquium Committee member	2019 – current
UCSC Equity & Inclusion Committee member	2018 – current
UCLA Planetarium Coordinator	2013–2018
UCLA Astronomy Graduate Student Mentor	2014–2018
Women in Physics & Astronomy (WIPA) Outreach Coordinator	2015–2018
WIPA Mentor to Undergraduate Students	2015–2018
Coordinator, WIPA Meetings with Female Colloquium Speakers	2016–2018
UCLA Astronomy Diversity Committee Member	2016–2018

CONFERENCE PROCEEDINGS AND POSTERS

Conference Proceedings

Martin, E. C., Fitzgerald, M. P., McLean, I. S., Doppmann, G., Kassis, M., Aliado, T., Canfield, J., Johnson, C., Kress, E., Lanclos, K. Magnone, K.; Sohn, J. M., Wang, E., Weiss, J. "An Overview of the NIRSPEC Upgrade for the Keck II Telescope." 2018 SPIE Proceedings

E. C. Martin, M. P. Fitzgerald, I. S. McLean, E. Kress, E. Wang. "Optical Design of the Slit-Viewing Camera for the NIRSPEC Upgrade." 2016 Proceedings SPIE.

J. L. Marshall, J. P. Rheault, D. L. DePoy, T. Prochaska, R. Allen, T. W. Behm, **E. C. Martin**, B. Veal, S. Villanueva, Jr., P. Williams, J. Wise. "DECal: A Spectrophotometric Calibration System for DECam." 2016 Proceedings Astronomical Society of the Pacific, The Science of Calibration.

E. C. Martin, M. P. Fitzgerald, I. S. McLean, S. M. Adkins, T. Aliado, G. Brims, C. Johnson, K. Magnone, E. Wang, J. Weiss. "Performance Modeling of an Upgraded NIRSPEC on Keck." 2014 Proceedings SPIE.

J. L. Marshall, D. L. DePoy, T. Prochaska, R. D. Allen, P. Williams, J. P. Rheault, T. Li, D. Nagasawa, C. Akers, D. Baker, E. Boster, C. Campbell, E. Cook, A. Elder, A. Gary, J. Glover, M. James, **E. C. Martin**, W. Meador, N. Mondrik, M. Rodriguez-Patino, S. Villanueva, Jr., G. J. Hill, S. Tuttle, B. Vattiat, H. Lee, T. S. Chonis, G. B. Dalton, M. Tacon. "VIRUS Instrument Collimator Assembly." 2014 Proceedings SPIE.

E. C. Martin, G. N. Mace, I. S. McLean, S. E. Logsdon, E. L. Rice. "Preliminary Analysis of M and L Dwarf Surface Gravities in the NIRSPEC Brown Dwarf Spectroscopic Survey." 2014 Cool Stars 18 Proceedings.

M. K. Alam, S. Camnasio, E. L. Rice, G. N. Mace, I. S. McLean, **E. C. Martin**, S. E. Logsdon."Photometric and Spectral Analysis of Blue and Red L Dwarfs." 2014 Cool Stars 18 Proceedings.

J. L. Marshall, J. P. Rheault, D. L. DePoy, T. Prochaska, R. Allen, T. W. Behm, **E. C. Martin**, B. Veal, S. Villanueva, Jr., P. Williams, J. Wise. "DECal: A Spectrophotometric Calibration System for DECam." 2013 Proceedings, Calibration and Standardization of Large Surveys and Missions in Astronomy and Astrophysics.

E. C. Martin, D. L. DePoy, J. L. Marshall. "Optical Design of a Red Sensitive Spectrograph." 2012 Proceedings SPIE.

First-Author Posters:

E. C. Martin, R. L. Smart, J. D. Kirkpatrick, C. A. Beichman, P. J. Lowrance, C. R. Gelino, E. L. Wright, J. K. Faherty, C. G. Tinney, M. C. Cushing. "Spitzer Parallax Program: A Novel Technique for Determining Distortion." 2016 Cool Stars 19 Poster Presentation.

E. C. Martin, I. S. McLean, G. N. Mace, S. E. Logsdon, E. L. Rice, J. D. Kirkpatrick, A. J. Burgasser, M. R. McGovern, L. Prato. "Surface Gravities for 227 M, L, and T Dwarfs in the NIRSPEC Brown Dwarf Spectroscopic Survey." 2016 Cool Stars 19 Poster Presentation.

E. C. Martin, I. S. McLean, G. N. Mace, S. E. Logsdon, E. L. Rice, J. D. Kirkpatrick, A. J. Burgasser, M. R. McGovern, L. Prato. "Surface Gravity Analysis of 227 M, L, and T Dwarfs in the NIRSPEC Brown Dwarf Spectroscopic Survey." 2015 Keck Science Meeting Poster Presentation.

E. C. Martin, J. L. Marshall., J. P. Rheault, D. L. DePoy, T. Prochaska, R. Allen, G. Hill, HETDEX Collaboration. "HETDEX: Optical Alignment of the VIRUS Spectrograph." 2012 AAS Winter Meeting.

REFEREED PUBLICATIONS

In preparation:

S. Lindgren, C. R. Gelino, **E. C. Martin**, et al. "Looking for Close, Faint Binary Companions Among the Coldest Brown Dwarfs With HST/WFC3, Using PSF Modeling With Tiny Tim."

Published:

M.-G. Suh, X. Yi, Y.-H. Lai, S. Leifer, I. S. Grudinin, G. Vasisht, **E. C. Martin**, M. P. Fitzgerald, G. Doppmann, J. Wang, D. Mawet, S. B. Papp, S. A. Diddams, C. A. Beichman, K. Vahala, "Searching for Exoplanets Using a Microresonator Astrocomb.", 2019, Nature Photonics, 13, 25-30.

J. D. Kirkpatrick, **E. C. Martin**, R. L. Smart, et al., "Preliminary Trigonometric Parallaxes of 184 Late-T and Y Dwarfs and an Analysis of the Field Substellar Mass Function into the "Planetary" Mass Regime.", ApJ, in press.

E. C. Martin, J. D. Kirkpatrick, C. A. Beichman, R. L. Smart, J. K. Faherty, C. R. Gelino, M. C. Cushing, A. C. Schneider, E. L. Wright, P. J. Lowrance, J. Ingalls, C. G. Tinney, I. S. McLean, S. E. Logsdon, J. Lebreton. "Y Dwarf Trigonometric Parallaxes from the Spitzer Space Telescope." 2018, ApJ, 867, 109

S. E. Logsdon, G. N. Mace, I. S. McLean, **E. C. Martin**. "Probing Late-type T dwarf $J - H$ Color Outliers for Signs of Age." 2018, ApJ, 867, 96

E. C. Martin, G. N. Mace, I. S. McLean, S. E. Logsdon, E. L. Rice, J. D. Kirkpatrick, A. J. Burgasser, M. R. McGovern, L. Prato. "Surface Gravities for 228 M, L, and T dwarfs in the NIRSPEC Brown Dwarf Spectroscopic Survey." 2017, ApJ, 838, 73.

J. D. Kirkpatrick, K. Kellogg, A. C. Schneider, S. Fajardo-Acosta, M. C. Cushing, J. Greco, G. N. Mace, C. R. Gelino, E. L. Wright, P. R. M. Eisenhardt, D. Stern, J. K. Faherty, S. S. Sheppard, G. B. Lansbury, S. E. Logsdon, **E. C. Martin**, I. S. McLean, S. D. Schurr, R. M. Cutri, T. Conrow. "The AllWISE Motion Survey, Part 2." 2016, ApJS, 224, 36.

X. Yi, K. Vahala, J. Li, S. Diddams, G. Ycas, P. Plavchan, S. Leifer, J. Sandhu, G. Vasisht, P. Chen, P. Gao, J. Gagné, E. Furlan, M. Bottom, **E. C. Martin**, M. P. Fitzgerald, G. Doppmann, C. A. Beichman. "Demonstration of a Near-IR Line-Referenced Electro-Optical Laser Frequency Comb for Precision Radial Velocity Measurements in Astronomy." 2016, Nature Communications, 7, 10436.