

Emily C. Martin

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EDUCATION

University of California, Los Angeles

Ph.D. in Astronomy September 2018
Dissertation: *Characterizing Low-Mass Stars and Brown Dwarfs and Upgrading NIRSPEC*

M.S. in Astronomy June 2014
Masters Thesis: *Surface Gravity Studies of Brown Dwarfs*
Advisors: Ian McLean and Michael Fitzgerald

Texas A&M University

B.S. in Physics, B.A. in French May 2012
magna cum laude, Undergraduate Research Scholar
Senior Thesis: *Optical Design of a Red Sensitive Spectrograph*
Advisors: Darren DePoy and Jennifer Marshall

RESEARCH INTERESTS

Astronomical Instrumentation (Optical and Infrared); Exoplanet Atmospheres; Solar System and Exoplanet Synergies; Low-mass stars and Brown Dwarfs

POSITIONS HELD

University of California, Santa Cruz

51 Pegasi b Fellow September 2021 – Current
NSF Postdoctoral Scholar, UC Chancellor's Fellow September 2018 – August 2021

W. M. Keck Observatory

Keck Visiting Scholar August – October 2018

University of California, Los Angeles

Graduate Research Assistant September 2012 – July 2018

IPAC/Caltech

Visiting Graduate Fellow January – July 2016

Texas A&M University

Undergraduate Research Assistant May 2011 – August 2012

GRANTS AWARDED

Keck Science Steering Committee White Paper Funding *\$20,000 (Co-PI)* 2020
Heising Simons Foundation Award *\$400,000 (PI)* 2020–2022
UCO Mini Grant *\$34,000 (Co-I)* 2020
Keck Science Steering Committee White Paper Funding *\$10,000 (Co-PI)* 2019

AWARDS AND HONORS

51 Pegasi b Fellow (*\$355,589*) 2021
Kavli Frontiers of Science Fellow 2020
NSF Astronomy & Astrophysics Postdoctoral Fellowship (*\$300,000*) 2018–2021

UC Chancellor's Fellow; UC Santa Cruz (\$11,000)	2018–2020
Keck Visiting Scholar	2018
UCLA Dissertation Year Fellowship	2017–2018
NASA Group Achievement Award	2017
Charles E. and Sue K. Young Graduate Student Award	2017
IPAC Visiting Graduate Student Fellowship	2016
Bachmann Instrumentation Fellowship at UCLA	2015
UCLA Physics & Astronomy Outstanding Teaching Award	2013
Texas A & M Undergraduate Research Scholar	2012
Texas A & M Undergraduate Physics Scholarship	2011
Texas A & M University President's Endowed Scholar	2007–2011
National Merit Scholar	2007

INSTRUMENTATION EXPERIENCE

PEAS: The Planet as Exoplanet Analog Spectrograph	2019 – current
<i>PI</i> ; optical design, mechanical assembly, project management	
IGNIS: Immersion Grating Near Infrared Spectrograph for Keck	2019 – current
<i>Co-PI</i> ; instrument design and planning	
NIRSPEC Upgrade for the Keck II Telescope	2012–2018
<i>Instrument Scientist</i> ; optical design, mechanical assembly and cryogenic testing, project management, Teledyne H2RG HgCdTe detector testing and characterization, electronics design	
Laser Comb Testing for NIRSPEC/Keck	2013–2017
<i>Co-I</i> ; observations and analysis of data from two different laser frequency combs to test new technologies for radial velocity calibrations	
Optical Design of a Red Sensitive Spectrograph	2011–2012
<i>Undergraduate Researcher</i> ; optical design	
DECAL: Dark Energy Survey Camera Calibration	2011
<i>Undergraduate Researcher</i> ; assembly of calibration flat-field screen on Blanco 4-m at CTIO	
HETDEX/VIRUS: Visible Integral Field Replicable Unit Spectrograph	2011–2012
<i>Undergraduate Researcher</i> ; optical design of a method to align >150 spectrographs	

OBSERVING EXPERIENCE AND TELESCOPE TIME

Lick Observatory	
PEAS Instrument	> 20 nights
Nickel 1-m Imager	> 5 nights
W. M. Keck Observatory	
NIRSPEC on Keck II	>20 nights
MOSFIRE on Keck I	8 nights
NIRES on Keck II	3 nights
Spitzer Space Telescope	
Cycle 14 DDT (Co-I)	21.5 hours
Cycle 14 (Co-I)	230 hours
Cycle 13 (Co-I)	276 hours
Gemini Observatory	
IGRINS on Gemini South (Co-I)	20.2 hours
IGRINS on Gemini South (Co-I)	10.8 hours
McDonald Observatory	
Cassegrain Spectrometer (es2) on 82-inch	1 night

TEACHING EXPERIENCE

UCLA Teaching Assistant

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

Other Teaching Experience

AstroTech Lead Instructor	2021
<i>Led activities on gratings and spectral resolution, science case development, and spectrograph conceptual design</i>	
AstroTech Core Development Team	2020-current
<i>Curriculum Development, Workshop planning, Instructor</i>	
Institute for Scientist and Engineer Educators Professional Development Program	Summer 2019
<i>Design Team Leader for AstroTech Lab Activity</i>	
UCLA Astronomy Live! Summer High School Workshop	Summers 2013–2017
<i>Instructor and Mentor</i>	
Private Tutor for High School and College Physics and Math	2013–2018
<i>Instructor for >10 students</i>	
Institute for Scientist and Engineer Educators Professional Development Program	Spring 2015

STUDENT ADVISING AND MENTORING

Current Students

José Colón Cancel (Undergraduate Research) Development of a quick-look data reduction tool for PEAS
Judah Luberto (Undergraduate Research) Searching for microlensing events of cold brown dwarfs in the Solar Neighborhood
Alexandra Mannings (thesis chapter) Commissioning, observations, and instrument development for PEAS
Brittany Miles (thesis chapter) Testing 8-13 μm detector at UCO shops, Infrared spectroscopy of cold brown dwarfs
Evan Morris (two thesis chapters) KPIC/NIRSPEC fiber fed observations of brown dwarfs and exoplanets; PEAS data reduction pipeline, observations, and data analysis

Former Students

Julissa Villalobos (Undergraduate Research) Development of observing planning tool for PEAS
Bade Sayki (Undergraduate Research) Infrared instrumentation and spectroscopy of brown dwarfs
Hayley Bricker (Undergraduate Mentoring) UCLA Women in Physics and Astronomy Mentoring Program

SERVICE

Reviewer for MIRMOS Instrument Conceptual Design Review	2021
Kavli Frontiers of Science Organizing Committee Member	2021
Reviewer for NSF panel	2021
Reviewer for NASA panel	2020
ExoPAG SIG 3 Member	2020 – current
UCSC Astronomy & Astrophysics Postdoc Representative	2020 – current
UCSC Astronomy & Astrophysics Colloquium Committee member	2019 – 2021
Reviewer for AAS Journals	2018 – current
UCSC Equity & Inclusion Committee member	2018 – 2020

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

PUBLIC OUTREACH

UCO Living Room Talk	January 2021
Sequoyah High School Science Symposium panel	December 2020
Astronomy on Tap, Santa Cruz Online Talk	September 2020
Public Talk for Keck Observatory Online	August 2020
Public Talk at Institute for Astronomy, Honolulu, HI	October 2019
Public Talk at Kahala Nui Retirement Community, Honolulu, HI	October 2019
Science Judge for Waimea Country School Science Fair	Fall 2018
AWiSE STEM Day <i>Astronomy Demo Coordinator</i>	2016–2017
Impostor Syndrome Workshops <i>Co-Leader, 5 workshops</i>	2014–2017
Exploring Your Universe <i>Rockets Booth Leader</i>	2014–2016
UCLA Astronomy Live! Summer High School Workshop <i>Co-Organizer</i>	2013–2018
UCLA Planetarium Show Presenter	2012–2018
UCLA Astronomy Live! Outreach Visits to Local Schools	2012–2018

SELECTED TALKS

Invited Talks

University of Toronto/Dunlap Institute Colloquium (Virtual), March 2022
UT Austin Colloquium, Austin, TX, February 2022
Carnegie Observatories Colloquium, (Virtual), March 2021
Future Keck IR Spectroscopy Workshop, (Virtual), January 2021
Geophysical and Astrophysical Fluid Dynamics Seminar, UCSC (Virtual), December 2020
Engineering Coffee Seminar, Arizona State University (Virtual), November 2020
NSF Astronomy & Astrophysics Postdoctoral Fellow Symposium, Honolulu, HI, January 2020
Keck Science Meeting, Los Angeles, CA, September 2019
Lowell Observatory Colloquium, Flagstaff, AZ, May 2019
UC President's Postdoctoral Fellow Spring Retreat, Lake Arrowhead, CA, April 2019
NSF Astronomy & Astrophysics Postdoctoral Fellow Symposium, Seattle, WA, January 2019
Tech Talk Seminar, UH Hilo, Hilo, HI, December 2018
Keck Visiting Scholar Final Talk, W. M. Keck Observatory, Waimea, HI, December 2018

Contributed Talks

Space Telescope Science Symposium, April 2021
SPIE Astronomical Telescopes + Instrumentation Virtual Conference, December 2020
Bay Area Planetary Science Meeting, Virtual Meeting, July 2020
NASA ExoPAG 22, Virtual Meeting, June 2020
Bay Area Exoplanet Meeting, NASA Ames, December 2019
Keck Science Meeting, Los Angeles, CA, September 2019
SPIE Astronomical Telescopes and Instrumentation Conference, Austin, TX, June 2018
Rising Stars in Physics Workshop, MIT, Cambridge, MA, April 2018
<i>Dissertation Talk</i> : American Astronomical Society Meeting, National Harbor, MD, January 2018

Refereed Publications

- 14.) Mayorga, L. C. et al., (incl. **Martin E. C.**), “Transmission Spectroscopy of the Earth-Sun System to Inform the Search for Extrasolar Life“, 2021, PSJ, 2, 140.
- 13.) Delorme, J.-R., et al., (incl. **Martin E. C.**), “The Keck Planet Imager and Characterizer: A dedicated single-mode fiber injection unit for high resolution exoplanet spectroscopy“, 2021, JATIS, 7 (3), 035006
- 12.) Wang, J. J., et al.,(incl. **Martin E. C.**), “Detection and Bulk Properties of the HR 8799 Planets with High Resolution Spectroscopy“, 2021, AJ, 162, 148
- 11.) Kirkpatrick J. D., et al., (incl. **Martin E. C.**), “The Field Substellar Mass Function Based on the Full-sky 20-pc Census of 525 L, T, and Y Dwarfs“, 2021, ApJS, 253, 7.
- 10.) Bonev, B., et al., (incl. **Martin E. C.**), “First Comet Observations with NIRSPEC-2 at Keck: Outgassing Sources of Parent Volatiles and Abundances Based on Alternative Taxonomic Compositional Baselines in 46P/Wirtanen“, 2021, PSJ, 2, 45.
- 9.) Hood C. E., Fortney J. J., Line M. R., **Martin E. C.**, Morley C. V., Birkby J. L., Rustamkulov Z., et al., “Prospects for Characterizing the Haziest Sub-Neptune Exoplanets with High Resolution Spectroscopy.“, 2020, AJ, 160, 198.
- 8.) Suh M.-G., Yi X., Lai Y.-H., Leifer S., Grudinin I. S., Vasisht G., **Martin E. C.**, et al., ”Searching for Exoplanets Using a Microresonator Astrocomb.“ 2019, Nature Photonics, 13, 25-30.
- 7.) Kirkpatrick J. D., **Martin E. C.**, Smart R. L., Cayago A. J., Beichman C. A., Marocco F., Gelino C. R., 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.“ 2019, ApJS, 240, 19
- 6.) **Martin E. C.**, Kirkpatrick J. D., Beichman C. A., Smart R. L., Faherty J. K., Gelino C. R., Cushing M. C., et al. “Y Dwarf Trigonometric Parallaxes from the Spitzer Space Telescope.“ 2018, ApJ, 867, 109
- 5.) Logsdon S. E., Mace G. N., McLean I. S., **Martin E. C.** “Probing Late-type T dwarf $J - H$ Color Outliers for Signs of Age.“ 2018, ApJ, 867, 96
- 4.) Cohen D. P., Turner J. L., Consiglio S. M., **Martin E. C.**, Beck S. C., “Ionized Gas Motions and the Structure of Feedback near a Forming Globular Cluster in NGC 5253.“ 2018, ApJ, 860, 47
- 3.) **Martin E. C.**, Mace G. N., McLean I. S., Logsdon S. E., Rice E. L., Kirkpatrick J. D., Burgasser A. J., et al., “Surface Gravities for 228 M, L, and T dwarfs in the NIRSPEC Brown Dwarf Spectroscopic Survey.“ 2017, ApJ, 838, 73.
- 2.) Kirkpatrick J. D., Kellogg K., Schneider A. C., Fajardo-Acosta S., Cushing M. C., Greco J., Mace G. N., et al. (incl **Martin E. C.**), “The AllWISE Motion Survey, Part 2.“ 2016, ApJS, 224, 36.
- 1.) Yi X., Vahala K., Li J., Diddams S., Ycas G., Plavchan P., Leifer S., et al. (incl. **Martin E. C.**), “Demonstration of a Near-IR Line-Referenced Electro-Optical Laser Frequency Comb for Precision Radial Velocity Measurements in Astronomy.“ 2016, Nature Communications, 7, 10436.

Instrumentation Conference Proceedings

- 12.) Miles B. E., Hinz P., Skemer A., **Martin E. C.**, Stelter D., “Testing a 10 micron HgCdTe detector for ground-based exoplanet science“, 2021 SPIE Proceedings.
- 11.) **Martin E. C.**, Skemer, A. J., Radovan, M. V., et al. “The Planet as Exoplanet Analog Spectrograph (PEAS): design and first-light.“ 2020 SPIE Proceedings.

- 10.) López, R. A., Hoffman, E. B., Doppmann, G., et al., (incl **Martin E. C.**), “Characterization and performance of the upgraded NIRSPEC on the W. M. Keck Telescope.” 2020 SPIE Proceedings.
- 9.) **Martin E. C.**, Fitzgerald M. P., McLean I. S., Doppmann G., Kassis M., Aliado T., Canfield J., et al. “An Overview of the NIRSPEC Upgrade for the Keck II Telescope.” 2018 SPIE Proceedings
- 8.) **Martin E. C.**, Fitzgerald M. P., McLean I. S., Kress E., Wang E., “Optical Design of the Slit-Viewing Camera for the NIRSPEC Upgrade.” 2016 SPIE Proceedings.
- 7.) 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.
- 6.) **Martin E. C.**, Fitzgerald M. P., McLean I. S., Adkins S. M., Aliado T., Brims G., Johnson C., et al., “Performance Modeling of an Upgraded NIRSPEC on Keck.” 2014 SPIE Proceedings.
- 5.) Marshall J. L., DePoy D. L., Prochaska T., Allen R. D., Williams P., Rheault J.-P., Li T., et al., (incl **Martin E. C.**), “VIRUS Instrument Collimator Assembly.” 2014 SPIE Proceedings.
- 4.) Marshall J. L., Rheault J.-P., DePoy D. L., Prochaska T., Allen R., Behm T. W., **Martin E. C.**, et al. “DECAL: A Spectrophotometric Calibration System for DECam.” 2013 Proceedings, Calibration and Standardization of Large Surveys and Missions in Astronomy and Astrophysics.
- 3.) Rheault J.-P., DePoy D. L., Marshall J. L., Prochaska T., Allen R., Wise J., **Martin E. C.**, et al. “Spectrophotometric calibration system for DECam” 2012 SPIE Proceedings.
- 2.) Prochaska T., Allen R. D., Boster E., DePoy D. L., Herbig B., Hill G. J., Lee H., et al., (incl **Martin E. C.**), “VIRUS Spectrograph assembly and alignment procedures.” 2012 SPIE Proceedings.
- 1.) **Martin E. C.**, DePoy D. L., Marshall J. L., “Optical Design of a Red Sensitive Spectrograph.” 2012 SPIE Proceedings.