

REBECCA R. HERNANDEZ

UC President's Postdoctoral Fellow
Energy and Resources Group, UC Berkeley
Climate and Carbon Science Program,
Lawrence Berkeley National Lab
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RESEARCH INTERESTS

My work examines processes where human and natural systems interact and those that elucidate the functioning of the Earth system. I support my studies with computational programming, advanced geographic technologies, and experimental field, greenhouse, and laboratory methods. My research quantifies and informs exigent environmental issues in water-limited environments, including global environmental change, soil and microbial ecology, and renewable energy development.

EDUCATION

Ph.D. Stanford University 2010-2014

Earth System Science, Advisor: Christopher B. Field

M.S. California State University, Fullerton 2006-2009

Biological Science, Advisor: Darren R. Sandquist

B.A. University of California, Los Angeles 2003-2004

Geography, Emphasis: Geographic Technologies, Advisor: Thomas W. Gillespie

Study Abroad, Environment and Conservation of O'ahu and the Big Island

A.S. Saddleback Valley Community College 2000-2003

Biology, Geography

PROFESSIONAL EXPERIENCE

Scientist, Mount St. Helens Science Pulse 2015, July 26 – Aug 1, 2015, U.S. Forest Service Pacific Northwest Research Station, Portland, OR / Center for Conservation Biology, University of California at Riverside, CA

Assisted in 35-year post-eruption microbial soil sampling on Pumice Plain and surrounding National Volcanic Monument

UC President's Postdoctoral Fellow, September 2014 – present, Advisors: Margaret Torn and Daniel Kammen, Energy and Resources Group, UC Berkeley, Climate and Carbon Sciences Division, Lawrence Berkeley National Laboratory

Scientist (Trainee), MicroTrop Dakar, Senegal: Microbial Interactions and Sustainable Soil Management, 24 June – 21 July ISRA-IRD Center at Bel Air, Dakar, Senegal (West Africa), Advanced training in tropical ecology and agroecosystems

Scientist, Mount St. Helens Science Pulse 2010, 17-25 July 2010, U.S. Forest Service Pacific Northwest Research Station, Portland, OR / Center for Conservation Biology, University of California at Riverside, CA

Assisted in 30-year post-eruption microbial soil sampling on Pumice Plain and surrounding National Volcanic Monument

Scientist, Ecosystem Ecology, August 2009-August 2010, Center for Conservation Biology, Center for Embedded Networked Sensing (CENS), University of California, Riverside (P.I. Michael F. Allen)

Analysis of data from Soil Ecosystem Observatories and arrayed soil sensors to measure carbon flux and mycorrhizal fungi dynamics in a mixed conifer forest

Mentoring Summer Research Internship Program, (2009), Biodiversity of Biological Soil Crusts, January 2009 - August 2009 Department of Botany and Plant Sciences, University of California, Riverside (P.I. Edith B. Allen)

Designed and executed a biodiversity study of biological soil crusts along a southern Californian climatic gradient

Biologist, Oak Woodland Ecology, January 2007 – August 2007, Harmsworth Associates, Irvine, CA

Performed botanical surveys of oak species (*Quercus sp.*) in Gorman, California and wrote technical environmental reports

Lead Biologist, Plant Ecology and Endangered Species Conservation, January 2006 – August 2006, Department of Biology, California State University, Fullerton, CA (P.I. Darren R. Sandquist)

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Field team leader; conducted floristic surveys in habitat renewal plots containing endangered Santa Ana Woolly Star (*Eriastrum densifolium* spp. *sanctorum*) and Riversidian alluvial scrub species, Redlands, CA

Geographic Information Systems Analyst, June 2004 – August 2005, Saddleback Church, Lake Forest, CA.
Managed geodatabases, GIS training, and cartographic production for second largest church in United States
Established volunteer corps of 17 GIS professionals and lay researchers (The P.E.A.C.E. Mapping Team)
Created transportation scheme utilizing ArcGIS for truck routing to and from grocery stores for *40 Days of Community* initiative to feed homeless of Orange County in cooperation with Second Harvest Food Bank

Study Abroad, Environment and Conservation of O’ahu and the Big Island, Fall Quarter 2004, Wildlands Studies Program
University of California, Santa Barbara
Measured coral reef degradation and effects on reef fish populations under ReefCheck.org on both islands
Removed exotic invasive plants from a tropical Hawaiian dry forest

Undergraduate Research Assistant, Remote Sensing and Tropical Forest Ecology, January 2004 - May 2004, Center for Tropical Research, UCLA/Jet Propulsion Laboratory, Pasadena, CA (P.I. Sasaan Saatchi)
Performed supervised and unsupervised classifications from satellite imagery of the Tapajós National Forest vegetation in Pará, Brazil in a carbon-cycle study monitoring effects of deforestation

Undergraduate Honors Research, Biological Invasions and Plant Ecology, January 2004-July 2004, Department of Geography, UCLA, Advisor: Thomas W. Gillespie
Studied invasion of *Cynara cardunculus* (artichoke thistle) in southern California semiarid shrublands

AWARDS, FELLOWSHIPS, & SCHOLARSHIPS

- 2014 **UC President’s Postdoctoral Fellowship Program**, 2014-2016 (\$130,000)
- 2014 **Certificate for Outstanding Achievement in Mentoring**, School of Earth Sciences, Stanford University, \$300
- 2013 **Environmental Protection Agency, EPA STARS Fellowship**, \$126,000, (declined, in part)
- 2013 **DARE Doctoral Fellowship** (declined, in part), Stanford University, \$148,200
- 2012 **Ford Foundation Fellow** (declined, in part), The National Academies, \$66,000
- 2011 Hispanic Scholarship Fund’s William Randolph Hearst Fund Scholarship, \$2,000
- 2011 **William W. Orcutt Memorial Fellowship** (declined, in part), School of Earth Sciences, Stanford University, \$240,000
- 2010 **National Science Foundation C-Change IGERT Program Fellow** (declined)
- 2009 Microbial Ecology Section, Ecological Society of America Travel Award, \$250
- 2009 Soil Ecology Section, Ecological Society of America Travel Award, \$200
- 2009 **First Place MS/MA Oral Paper**, Sigma Chapter, Graduate Women in Science, OCGWIS, (March 7, 2009), Chapman University, Orange, CA, \$300
- 2008 **CSU Sally Casanova Pre-doctoral Scholar**, California State Universities, \$3,000
- 2008 California Garden Clubs, Lake Forest Scholarship, \$1,000
- 2008 California Garden Clubs Scholarship, \$2,000
- 2007 **First Place Poster Presenter** (Ecology and Evolution), Southern California Academy of Sciences (May 2 – 3, 2007), California State University, Dominguez Hills, CA, \$200
- 2007 Dr. David L. Walkington Memorial Scholarship, CSU Fullerton, \$800
- 2006 **Graduate Equity Fellow**, CSU Fullerton, \$2,500
- 2006 **Evelyn L. Pruitt National Minority Fellowship**, Society of Women Geographers, *sole recipient in the United States*, \$5,000
- 2006 James A. Diefenderfer Memorial Scholarship, College of Natural Sciences and Mathematics, CSUF, \$500
- 2002 **Saddleback College Biological Sciences Award**, Saddleback Community College, \$200
- 2002 Phi Theta Kappa Society, Saddleback Community College

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GRANTS

- 2015 Bureau of Land Management, \$494,696.00, Restoration of Ecological Functions of Soils and Vegetation Abella S (with Co-PIs: Allen EB, Belnap J, and Hernandez RR)
- 2013 Jean Langenheim Research Fellowship, Graduate Women in Science, \$3,000
- 2013 McGee Research Grant, School of Earth Sciences, Stanford University, \$4,000
- 2013 African Studies Graduate Summer Research Fellowship, Center for African Studies, Stanford University, \$5,000
- 2012 Desert Legacy Fund, The Community Foundation, \$4,000
- 2011 McKee Research Grant, School of Earth Sciences, Stanford University, \$2,000
- 2009 Mentoring Summer Research Internship Program Grant, UC Riverside, \$500
- 2009 Charlie O'Neill Grant, California Native Plant Society, \$1,000
- 2007 ASI Student Research Grant, CSU Fullerton, \$300

PEER-REVIEWED PUBLICATIONS

h-index = 6, i10-index 4, RG Score = 20.52 (70th percentile for all ResearchGate.com members)

Underlined co-authors are student advisees

10. **Hernandez RR**, Hoffacker M, Murphy-Mariscal ML, Wu G, and Allen MF (expected December 2015) Solar energy development impacts on terrestrial ecosystems and protected areas. *Proceedings of the National Academy of Sciences*.
9. **Hernandez RR**, Hoffacker M, Field CB (2015) Efficient use of land to meet sustainable energy needs. *Nature Climate Change*. doi:10.1038/NCLIMATE2556.
Featured in: The Washington Post, Grist.org, Gizmodo.com, GreenTechMedia.com, ComputerWorld.com, BuildingGreen.com, ECNmag.com, KCET.org, FierceEnergy.com, EnergyMatters.com, BusinessSpectator.com, ScienceDaily.com, Kurzweilai.net, TrinColl.edu, GreenBiz.com, EcoBuddism.org, and AuroraProClean.com
8. **Hernandez RR**, Debenport SJ, Gueye M, Leewis MCE, Soumare A, Ndoye F, Nkenmogne K. IE, Thuita M, Miambi E, Lardie L, Diedhioiu I, and Dick RP (2015) The native shrub *Pilostigma reticulatum*, as an ecological "resource island" for mango trees in the Sahel. *Agriculture, Ecosystems, and the Environment* 204: 51-61.
7. **Hernandez RR**, Hoffacker M, Field CB (2014) The land-use efficiency of big solar. *Environmental Science and Technology*. doi: 10.1021/es4043726.
6. **Hernandez RR**, Easter S, Murphy-Mariscal M, Maestre F, Allen E, Barrows C, Belnap J, Ochoa-Hueso R, Ravi S, Tavassoli M, Allen M (2014) Environmental impacts of utility-scale solar energy. *Renewable and Sustainable Energy Reviews* 29: 766-779.
5. **Hernandez RR**, MF Allen (2013) Diurnal patterns of productivity of arbuscular mycorrhizal fungi revealed using the Soil Ecosystem Observatory. *New Phytologist* 200: 547-557.
4. **Hernandez RR**, Mayernik MS, Murphy ML, and M Allen (2012) Advanced technologies and data management practices in environmental science: lessons from academia. *BioScience* 62: 1067-1076.
3. **Hernandez RR** and K Knudsen (2012). Late successional biological soil crusts in a biodiversity hotspot: an example of congruency in species richness. *Biodiversity and Conservation* 21: 1015-1031, doi:10.1007/s10531-012-0236-z.
2. **Hernandez RR** and DR Sandquist (2011) Disturbance of biological soil crusts increases emergence of exotic vascular plants in California sage scrub. *Plant Ecology* 212: 1709-1721, doi:10.1007/s11258-011-9943-x.
Featured In: The Orange County Register

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1. Ochoa-Hueso CR, **Hernandez RR**, Pueyo JJ and EM Reol (2011) Spatial distribution and physiology of biological soil crusts from semi-arid central Spain are related to soil chemistry and shrub cover. *Journal of Soil Biology and Biochemistry* 43: 1894-1901, doi:10.1016/j.soilbio.2011.05.010.

PUBLISHED DATASETS

1. **Hernandez RR**, Mayernik MS, Murphy-Mariscal ML, and Allen MF (2012). Data from: Advanced Technologies and Data Management Practices in Environmental Science: Lessons from Academia. Dryad Data Repository. <http://dx.doi.org/10.5061/dryad.cv86385c>.

REPORTS AND BOOK CHAPTERS

3. Root T, Ackerly D, Cohen E, Davis S, Hamilton H, **Hernandez RR**, Levine J, Moyle P, Pairis A, Pittiglio S, Rundel P, Zavalata E (2012) Plants and Animals. In California Climate Extremes Workshop Report, Pierce DW (ed), Scripps Institution of Oceanography, 32 pp.
2. **Hernandez RR** (2010) Biodiversity under a magnifying glass: exploring biological soil crusts in southern California shrublands. California Native Plant Society, Orange County Chapter, Newsletter (March/April).
1. Allen MF, Kitajima K, **Hernandez RR** (2014) Mycorrhizae and Global Change, In: Trees in a Changing Environment (Eds. Tausz M, Grulke N), Springer, Netherlands, pp 37-59.

PEER-REVIEWED PUBLICATIONS (*In final preparation*)

13. **Hernandez RR**, Sandquist DR (*in prep*) Reversing the dam downstream: Ecosystem restoration of the Santa Ana River floodplain and the endangered woolly star (*Eriastrum densifolium* spp. *sanctorum*).
12. Barrows CW, Murphy-Mariscal ML, **Hernandez RR** (*in prep*) More than a museum: Natural history is relevant in 21st century ecological science.
11. **Hernandez RR**, Burney J, Easter SB, Hoffacker M, Moore K, Armstrong A (*in prep*) Environmental co-benefit opportunities of solar energy.

SYNERGISTIC AND SERVICE ACTIVITIES

Co-Organizer, The Ecology of Renewable Energy, Organized Oral Session, Ecological Society of America, August 2015
Expert Reviewer, The Intergovernmental Panel on Climate Change, Working Group II, Fifth Assessment Report, 2014
Reviewer, Ecology Letters, Environmental Science and Technology, Soil Biology and Biochemistry, Ecosphere, Energy Policy
Member, American Association for the Advancement of Science, American Geophysical Union, Ecological Society of America, Society of Women Geographers, Southern California Academy of Sciences
Mentor, Stanford Summer Undergraduate Research Program, Stanford University, CA, 2012, June – August 2013
Trainee, Stanford University School of Earth Science, Mentoring in Research Workshop 2013
Mentor, Stanford Summer Undergraduate Research Program, Stanford University, CA, 2012, June – August 2012
Trainee, Vice Provost for Graduate Education, Management Matters Workshop 2012
Volunteer, The Intergovernmental Panel on Climate Change, Working Group II, Lead Authors' Meeting, San Francisco, CA, December 2012
Graduate Student Advisory Committee Co-Chair, School of Earth Science, Stanford University, May 2011 – May 2012, student liaison and event organizer for entire school
Graduate Student Advisory Committee Department Representative, Department of Environmental Earth System Science, Stanford University, May 2011 – May 2012, student liaison and event organizer for entire department
Volunteer Instructor for Stanford Splash, A weekend educational extravaganza for high school and middle school students, Stanford University, Stanford, CA, 2013

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Chair and Founder, The First Annual Women of the Department of Global Ecology Luncheon, 27 May 2011, Stanford University, designed, planned, and executed the first women in science meeting for the department

Co-Chair/Co-Coordinator, The Science of Climate Change (SCC): Trends, Perspectives and Projections. Interdepartmental Graduate Symposium; designed, planned, and executed the first SCC Graduate Symposium, UC Riverside, California (24 April 2010, 9 – 5 pm)

TEACHING

Teaching Associate, Earth System Dynamics (EESS 215), Spring 2012 (1 section)

Stanford University, Stanford, Dept. of Environmental Earth System Science

Instructed a graduate level course that examines the dynamics of the Earth System from an integrated perspective. Lectures introduced the physical, biogeochemical, ecological, and human dimensions of the Earth System, with emphasis on feedbacks, thresholds and tipping points. Human interactions with climate and land systems were emphasized in order to enable in-depth exploration of Earth System dynamics. Lab projects focused on a region of the globe for which rich coordinated data sources exist and complex Earth System dynamics dominate the environment

Teaching Associate, Ecology and Physiology Laboratory (BIOL 274L), Fall 2008 - Spring 2009 (4 sections)

California State University, Fullerton, Dept. of Biological Science

Instructed biology major core laboratory (6 h/week/section); lectured on ecology, environmental physiology, principles of scientific writing and oral presentation, experimental design, and statistics; directed all laboratory procedures and three weekend research-based field-trips; developed, wrote, and implemented scientific writing curriculum to be included in subsequent courses

Teaching Associate, Elements of Biology Laboratory (BIOL 101L), Fall 2006 - Spring 2008 (7 sections)

California State University, Fullerton, Dept. of Biological Science

Instructed non-major biological laboratory (3 h/week/section); lectured on foundational biological principles (biochemistry, cells, genetics, physiology, ecology, evolution); directed all laboratory procedures and one weekend field-trip; wrote administrated weekly retention enhancement exercises

Undergraduate Teaching Associate, Invertebrates (EBE 104), Spring 2004

University of California, Los Angeles, Dept. of Ecology and Evolutionary Biology

Assisted in the set-up of laboratory equipment; lectured on bivalve anatomy and physiology; created class set of tardigrada slides (*Hypsibius sp.*) from live specimens; awarded "Most Enthusiastic" by EBE 104 Teaching Associates

Community College "Math Lab" Mathematics Tutor

Diablo Valley Community College, Pleasant Hill, CA. (October 2000 - May 2001)

Completed Mathematics Tutor Program and tutored community college students in mathematics

PUBLISHED ABSTRACTS and PRESENTATIONS

number=25; student advisees are marked with an asterisk ()*

Hernandez RR, Hoffacker MK, and Allen MF (Oral Talk) Efficient use of land to meet sustainable energy needs: How are we doing? Ecological Society of America Conference, Sacramento (10 – 14 August 2015)

Hoffacker MK*, Hernandez RR, and Allen MF (Oral Talk) Solar energy within the Central Valley, CA: Current practices and potential. Ecological Society of America Conference, Sacramento (10 – 14 August 2015)

Hernandez RR (Invited Talk) Efficient use of land to meet sustainable energy needs. Department of Environmental Science, UC Riverside (1 May 2015)

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Hernandez RR (Invited Talk) Efficient use of land to meet sustainable energy needs. Bren School of Environmental Science and Management, UC Santa Barbara (27 April 2015)

Hernandez RR (Invited Talk) Efficient use of land to meet sustainable energy needs. Green Chemistry and Sustainable Design Seminar, UC Berkeley (23 February 2015)

Hernandez RR, Hoffacker MK* and Field CB (Oral Talk) Global solar energy hotspots: Achieving land, energy, and environmental compatibility. Ecological Society of America Conference, Sacramento (10 – 14 August 2014)

Hoffacker MK*, Hernandez RR and Field CB (Oral Talk) Land-use efficiency of big solar. Ecological Society of America Conference, Sacramento (10 – 15 August 2014)

Hernandez RR (Invited Talk) The California Solar Energy Hotspot: Achieving Land, Energy, and Environmental Compatibility. Environmental Studies and Sciences Departmental Seminar, Santa Clara University (30 May 2014)

Hernandez RR, Hoffacker MK* and Field CB (Poster) Land-use efficiency of big solar. Third Conference on the Physics of Sustainable Energy, Berkeley (9 – 13 December 2014)

Hernandez RR, Hoffacker MK* and Field CB (Poster) The land-use efficiency of big solar. American Geophysical Union Fall Meeting, San Francisco (9 – 13 December 2013)

Hoffacker MK*, Hernandez RR and Field CB (Poster) Achieving land, energy, and environmental compatibility: Utility-scale solar energy potential and land-use in California. American Geophysical Union Fall Meeting, San Francisco (9 – 13 December 2013)

Tavassoli M*, RR Hernandez, MF Allen, CB Field (Poster) Multivariable approach to determining CO₂ flux variation in a desert ecosystem. Society for Advancement of Chicanos and Native Americans in Science National Conference, Seattle, Washington (11-14 October 2012), Awarded First Place, Environmental Science

Hernandez RR and K Knudsen (Oral Talk) Late successional biological soil crusts in a biodiversity hotspot: an example of congruency in species richness. Ecological Society of America Conference, Portland, Oregon (5-10 August 2012)

Hernandez RR, Mayernik MS, Murphy ML and M Allen (Poster) Advanced technologies and data management practices in environmental science: lessons from academia. Ecological Society of America Conference, Portland, Oregon (5-10 August 2012)

K Dahlin, WRL Anderegg, RR Hernandez, N Hiza, JE Johnson, G Maltais-Landry, A Wolf and NB Zimmerman (Poster) Prospects for integrating utility-scale solar photovoltaics and industrial agriculture in the U.S. American Geophysical Union Fall Meeting, Biogeosciences (5-9 December 2011)

RR Hernandez and MF Allen (Poster) Mycorrhizal hyphae spatiotemporal dynamics: implications for climate change. ThermAdapt: Adaptation to Climate Change from a spatial perspective, Lammi Biological Station, Finland (11-14 September 2011)

RR Hernandez and MF Allen (Poster) High-resolution mycorrhizal hyphae dynamics: temporal variation, biophysical controls, and global environmental change. American Geophysical Union Fall Meeting, Biogeosciences (13-17 December 2010)

RR Hernandez and MF Allen (Oral Talk) Mycorrhizal fungi dynamics: temporal variation, temperature thresholds, and global environmental change. The Science of Climate Change: Trends, Perspectives and Projections. Interdepartmental Graduate Symposium, UC Riverside, California (24 April 2010)

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R R Hernandez (Oral Talk) Mycorrhizal hyphae dynamics and biophysical controls: implications for global climate change. Western Mycorrhiza Meeting, White Mountain Research Station (15-18 April 2010).

K Kitajima, RR Hernandez, M Taggart and MF Allen (Poster) Effects of environmental variables on production and mortality of fine roots, rhizomorphs, and hyphae. Center for Embedded Networked Sensing 7th Annual Research Review, University of California, Los Angeles (28 October 2009)

Hernandez RR, Knudsen K and EB. Allen (Poster) Macroscopic biodiversity of late-successional biological soil crusts in southern California shrublands. Mentoring Summer Research Internship Program, Summer Research Symposium, University of California, Riverside (13 August 2009)

Hernandez RR and DR Sandquist (Oral Talk) Effects of disturbance of biological soil crust on emergence of exotic plants in California sage scrub. Ecological Society of America Conference, Albuquerque, New Mexico (2-7 August 2009)

RR Hernandez (Invited Talk) What is an ecologist? Career Week, Trabuco Hills High School, Mission Viejo, California (11 June 2009)

Hernandez RR and DR Sandquist (Oral Talk)** Effects of disturbance of biological soil crust on the emergence of exotic plants in California sage scrub. Sigma Chapter, Graduate Women in Science, Chapman University, Orange, California (1 March 2008), Awarded First Place, MA/MS

Hernandez RR and DR Sandquist (Poster) The effects of disturbance of biological soil crust on the germination of exotic plants in coastal sage scrub. Southern California Academy of Sciences California State University, Dominguez Hills, CA (2-3 May 2007), Awarded First Place, Ecology and Evolution