

Leander D.L. Anderegg

NOAA and NSF Postdoctoral Fellow
UC Berkeley, Dept. of Integrative Biology
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RESEARCH INTERESTS:

Forest ecosystems of California; ecological responses to climate change; tree ecophysiology; forest stress and proactive forest management

POSITIONS:

Postdoctoral Fellow, University of California, Berkeley & Carnegie Institution 2017-present
for Science. Adaptation and acclimation of California oaks to drought and CO₂
*Funded by: NSF Biological Collections Postdoctoral Fellowship; NOAA Climate and Global Change
Postdoctoral Fellowship*
(Starting as an Assistant Professor, University of California, Santa Barbara in 2020 or 2021)

Visiting Researcher, Carnegie Institution for Science. Extracting global 2015-2017
photosynthesis from canopy structure
Funded by: WRF Hall Graduate Research Fellowship, NSF Graduate Research Fellowship

Research Technician, Carnegie Institution for Science. Ecohydrology of *Populus* 2011-2012
tremuloides and Sudden Aspen Decline

EDUCATION:

University of Washington - PhD in Biology, 2012 – 2017
(GPA 3.93/4.0) Advisor: Dr. Janneke Hille Ris Lambers
Visiting Scholar: University of Queensland (2014), UC Berkeley (2015-2017)

Stanford University – BA in Human Biology with Honors and Distinction, 2007 – 2011
(GPA 4.05/4.0) Honors Thesis advisor: Dr. Joseph Berry (Carnegie Institute for Science)

SCIENTIFIC PUBLICATIONS: ('+' indicates relevant to forest health and forest management)

+ **Anderegg LDL**, HilleRisLambers. (2019) Local range boundaries versus large-scale tradeoffs:
Climatic and competitive constraints on tree growth. *Ecology Letters*. doi: 10.1111/ele.13236
Open Access Link: doi.org/10.1029/2018GL081108

+ Brodrick P, **Anderegg LDL**, Asner GA (2019). Forest drought resistance at large geographic scales.
Geophysical Research Letters. doi: 10.1029/2018GL081108
Open Access Link: doi.org/10.1029/2018GL081108

+ Anderegg WRL, **Anderegg LDL**, Huang CY. (2019) An early warning system for drought-induced
tree mortality. *Global Change Biology*. Online
preprint: <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14655>

+ Trugman A, **Anderegg LDL**, Wolfe BT, Birmi B, Ruehr NK, Detto M, Bartlett MK, Anderegg WRL. (accepted) Climate and plant trait strategies determine tree carbon allocation to leaves and mediate future forest productivity. *Global Change Biology*

Anderegg LDL, Berner L, Badgley G, Sethi ML, Law BE, HilleRisLambers J. (2018) Within-species patterns challenge our understanding of the Leaf Economics Spectrum. *Ecology Letters*. 21:734-744 doi: 10.1111/ele.12945

+ Fontes CG, Dawson TE, Jardine K, McDowell N, Gimenez B, **Anderegg LDL**, Negron-Juarez R, Higuchi N, Fine P, Araújo AC, Chambers JQ (2018) Dry and hot: the hydraulic consequences of a climate change-type drought for Amazonian trees. *Proceedings of the Royal Society, Biology*. 373: 20180209. <http://dx.doi.org/10.1098/rstb.2018.0209>

+ Legendre-Fixx M, **Anderegg LDL**, Ettinger AK, HilleRisLambers J. (2018) Influences of climatic context and species identity on sub-alpine conifer growth. *Forests*. 9:1 doi:10.3390/f9010001

+ Reynolds VE, **Anderegg LDL**, Loy X, HilleRisLambers J, Mayfield MM. (2017) Unexpected drought resilience strategies of four *Brachychiton* species. *Tree Physiology*. doi: 10.1093/treephys/tpx143

Baird A, **Anderegg LDL**, Lacey M, HilleRisLambers J, Van Volkenburgh E. (2017) Comparative leaf growth strategies in response to water stress and shade: Uncovering an ecophysiological role for leaf mass per area (LMA) in *Populus tremuloides*. *Tree Physiology*. doi: 10.1093/treephys/tpx035

+ Adams, H.D., et al. (62 more authors including **LDL Anderegg**). (2017) A multi-species synthesis of physiological mechanisms in drought-induced tree mortality. *Nature Ecology and Evolution*. doi:10.1038/s41559-017-0248-x

+ **Anderegg LDL**, HilleRisLambers J. (2016) Drought stress causes range limits in two tree species via different physiological mechanisms. *Global Change Biology*. 22:1029-1045. doi: 10.1111/gcb.13148

+ HilleRisLambers J, **Anderegg LDL**, Breckheimer I, Burns K, Ettinger A, Franklin J, Freund J, Ford KR, Kroiss SJ. (2015) Implications of climate change for turnover in forest composition: a case study from Mt. Rainier National Park. *Northwest Science*. 89(3):201-218. doi:10.3955/046.089.0304

+ Anderegg WRL, **Anderegg LDL**, Berry JA, Field CB. (2014) Whole-tree hydraulic conductance and assimilation during drought-induced aspen forest die-off. *Oecologia*. 175:11-23. doi:10.1007/s00442-013-2875-5

+ **Anderegg LDL***, Anderegg WRL*, Abatzoglou J, Hausladen AM, Berry JA (2013) Drought characteristics' role in widespread aspen forest mortality across Colorado, USA. *Global Change Biology* 19:1526–1537. doi: 10.1111/gcb.12146. * these authors contributed equally

+ **Anderegg LDL**, Anderegg WRL, Berry JA. (2013) Not all droughts are created equal: translating meteorological drought into woody plant mortality. *Tree physiology* 33(7): 672-683. doi:10.1093/treephys/tpt044.

+ Anderegg WRL, Kane JM, **Anderegg LDL**. (2013) Consequences of widespread tree mortality triggered by drought and temperature stress. *Nature Climate Change*. 3:30-37. doi:10.1038/nclimate1635

+ Anderegg WRL, Plavcova L, **Anderegg LDL**, Hacke U, Berry JA. (2013) Drought's legacy: Hydraulic deterioration underlies widespread aspen forest die-off and portends increased future risk. *Global Change Biology*. 19:1188-1196. doi: 10.1111/gcb.12100

+ Anderegg WRL, **Anderegg LDL**. (2013) Carbon and hydraulic changes in experimental drought-induced mortality of two contrasting conifer species. *Tree Physiology*. 33:252-260. doi:10.1093/treephys/tpt016.

+ Anderegg WRL, Berry JA, Smith DD, Sperry JS, **Anderegg LDL**, Field CB. (2012) The roles of hydraulic and carbon stress in a wide spread climate-induced forest die-off. *Proceedings of the National Academy of Science US*. 109:233-237. doi:10.1073/pnas.1107891109

+ Anderegg WRL, **Anderegg LDL**, Sherman C, Karpe DS. (2012) Effects of widespread drought-induced aspen mortality on understory plants. *Conservation Biology*. 26(7):1082-1090. doi: 10.1111/j.1523-1739.2012.01913.x

In submission (manuscript available upon request):

Badgley GM*, **Anderegg LDL***, Field CB, Berry JA. An ecologically-based approach to terrestrial primary productivity. *In submission*. Preprinted posted to EarthArXive July 2018: <https://doi.org/10.31223/osf.io/s6t3z> * these authors contributed equally

Anderegg LDL, Loy X, Markham IP, Elmer C, Hovenden MJ, HilleRisLambers J, Mayfield MM. Aridity drives coordinated trait shifts but not decreased trait variance across the geographic range of eight Australian trees. *In submission*

Zeng Y, Badgley GM, Kornfeld A, **Anderegg LDL**, Liu Q, Xu B, Yang B, Yan K, Berry JA. A radiative transfer model for solar induced fluorescence using spectral invariants theory *In submission*

INVITED SEMINARS TO CALIFORNIA LAND MANAGERS

Anderegg, LDL et al. (June 2019) Forests, water and the rapidly changing West. WESTCAS annual meeting, San Diego.

Anderegg, LDL et al. (Oct 2016) How drought characteristics interact with tree physiology to kill trees (or not): A case study from Colorado. Natural Areas Conference, UC Davis.

Anderegg, LDL, Anderegg, WRL, Berry, JA, Field, CB. (Nov 2013) From Drought to Death: The ecohydrology and physiology of sudden aspen decline. Annual California Forest Pest Council Meeting, Sacramento, CA.

GRANTS & AWARDS

Thomas Jefferson Fund with endorsement from the Make Our Plant Great Again Initiative (PI with L Lamarque at U Bordeaux, \$20,000) 2018

France-Berkeley Fund collaborative grant (with R Skelton & TE Dawson, UC Berkeley and S Delzon, U Bordeaux, \$10,000) 2018

NSF Biological Collections Postdoctoral Fellowship	2017
NOAA Climate and Global Change Postdoctoral Fellowship	2017
Billings Award Honorable Mention for oral presentation at ESA Annual Meeting	2017
Decagon Harris Award (\$5,000)	2016
NSF Doctoral Dissertation Improvement Grant (\$13,000)	2015
WRF Hall Research Fellowship, University of Washington	2015
WRF Hall Research Grant, University of Washington (\$4,425)	2015
ESA Physiological Ecology Travel Award (\$500)	2015
National Geographic Society Young Explorers Grant (\$5,000)	2014
NSF Graduate Research Opportunities Worldwide (GROW - \$8,000)	2014
Dean's Visualization Prize: awarded to two top data visualization portfolios from "Beautiful Graphics in R" seminar. Figure retweeted by Edward Tufte	2014
Charles Redd Center for Western Studies, Brigham Young University (\$1500)	2014
Edwards Award, UW Department of Biology (\$1250)	2014
American Alpine Club Research Grant (\$800)	2014
Sigma Xi Research Grant in Aid (\$600)	2014
Wingfield/Ramenofsky Research Award, UW Department of Biology: (\$700)	2013
National Science Foundation (NSF) Graduate Research Fellowship	2012
Achievement Rewards for College Scientists (ARCS) Foundation Fellowship: (\$17,500)	2012
David M. Kennedy Honors Thesis Prize: awarded to top four honors theses at Stanford University: top honors thesis in the School of Humanities and Sciences	2011
Deans' Award for Academic Accomplishment: awarded to 10 Stanford undergraduates for academic, research, or intellectual accomplishments	2011
Firestone Medal for Excellence in Undergraduate Achievement: awarded to ~top 10% of Stanford undergraduate honors theses in social science, science and engineering	2011
J.E. Wallace Sterling Award for Scholastic Achievement: awarded to top 25 Stanford undergraduate GPAs in School of Humanities and Sciences	2011

TEACHING & MENTORING

Honors student mentor (Australian equivalent to U.S. masters):

- Christina Elmer, University of Queensland, AU. *Investigating interspecific trade-offs between drought tolerance and competitive ability in eight Tasmanian Eucalypt species* 2015-2016
- Victoria Reynolds, University of Queensland, AU. *Assessing the prevalence of trade-offs between drought tolerance and competitive ability in six tree species of the Bunya Mountains* (see Reynolds et al. 2017) 2014-2015

Undergraduate mentor:

- Monica Lee, University of California, Berkeley. *Aging xylem and blue oak hydraulics* 2018-present
 - Becca Nelson, Stanford University. *Predicting stem wood density from branch density and plant characteristics* 2016-present
 - Myesa Legendre-Fixx, University of Washington. *Influences of climatic context and species identity on sub-alpine conifer growth* (see Legendre-Fixx et al. 2018) 2016-2017
 - Alec Baird, University of Washington. *Uncovering an ecophysiological role for leaf mass per area (LMA) in Populus tremuloides* (see Baird et al. 2017) Recipient of the Fry-Hoston-Rigg Research Award, Prof Franco Award, Mary Gates Research Grant, Garden Club of America Research Grant, ASPB Travel Grant 2014-2017
 - Deneiges Murrey, University of Washington, *Within-species variation in resistance to freeze-thaw embolism in a montane gymnosperm and angiosperm* Recipient of the Fry-Hoston-Rigg Research Award 2014
 - June Landenburger, University of Washington, *Ecotypic variation and plasticity in seedling morphology and physiology of two conifers* Recipient of Mary Gates Research Grant 2013-2014
 - Kimberly Pham, Stanford University, *The aspens are coming: aspens invade meadows faster at high elevations than low elevations* Woods Institute Mentoring Undergraduates in Interdisciplinary Research (MUIR) summer project 2011
 - supervised 21 undergraduate lab assistants to date 2013-present
- Teaching Assistant, University of Washington, BIOL 200 Introductory Biology Winter 2013
- Teaching Assistant, University of Washington, BIOL 433 Marine Ecology Spring 2013

Guest Lecturer:

- Stanford University, Continuing Studies: Climate Change Solutions 2019
- Stanford University, Biosphere-Atmosphere Interactions 2018, 2019
- UC Berkeley, Plant Ecophysiology 2018
- Stanford Summer Institute, Environmental Studies 2017
- University of Washington, Plant Ecophysiology 2015

K-12 guest teaching: tested climate change ecology curricula at MCHS High School, 2009-present

Cortez, CO (2009); Corbett High School, Corbett, OR (2012); Alkai Elementary School, Seattle, WA (2014); Stanford Pre-collegiate Summer Institute, Stanford, CA (2016)

SERVICE & OUTREACH

Professional Society member: Society of American Foresters, Ecological Society of America, Sigma Xi Scientific Society, American Geophysical Union

Peer Reviewer: Proceedings of the National Academy of Sciences USA, Science Advances, Global Change Biology, Ecology Letters, New Phytologist, Geophysical Research Letters, Nature Ecology & Evolution, Ecology, Global Ecology and Biogeography, Conservation Biology, PLOS One, BioScience, Science of the Total Environment, Tree Physiology, Forest Ecology and Management, Functional Ecology, Forests, Agricultural and Forest Meteorology, WIREs, Oecologia, Remote Sensing of Environment, Austral Ecology

Grant Reviewer: National Science Foundation (ad hoc), Hawaii SeaGrant, Chilean National Science and Technology Commission, BARD - The US-Israel Agricultural Research & Development Fund

Representative to the President, Carnegie Dept. of Global Ecology Collaborative Workplace Initiative (co-founder, 2018-present)

Departmental Representative, Carnegie Institution Postdoctoral Association (2018-present)

Member, Carnegie Global Ecology Seminar Committee (2017-present)

Guest lecture on forestry science, East Palo Alto CANOPY highschool forestry club (2017-present)

Mentor in the Strategies for Ecology Education, Diversity and Sustainability (SEEDS) program of the Ecological Society of America (2016-present)

Mentor in the Undergraduate Mentoring Program of the American Geophysical Union (2017-present)

Educurious Biology Expert (2015-present)

Faculty meeting graduate student representative (2013-2015)

Botanical Greenhouse Docent, University of Washington (2013-2016)

Botmobile UW Botanical Greenhouse mobile outreach member (2015)

Developed ½ day science module for 4th-5th grade titled “Trees: Nature’s time machine” (2014)

Developed ½ day science module for 10th-12th grade titled “The Ecology of Climate Change” (2016)

Non-scientific writing and Research In the News

- interview about forest die-off and why I'm a biologist on Generation Anthropocene podcast (<https://www.genanthro.com/2017/06/22/telltale-signs/>)
- Writing featured on UW Biology SciPos blog (e.g. on inspiring women in science: <http://scipos.blogspot.com/2015/10/ada-lovelace-day.html>, or on recent publications: <http://scipos.blogspot.com/2015/12/grad-publication-leander-anderegg.html>)
- Paper cited in xkcd webcomic (Anderegg & Anderegg 2013 in <http://what-if.xkcd.com/103/>)
- Tree core data visualization figure retweeted by Edward Tufte (@EdwardTufte, 3/24/14)

Coverage of Anderegg & HilleRisLambers 2019:

- ScienceDaily, EurekaAlert by AAAS, Phys.org, "Predicting how forests in the western US will respond to changing climate" (<https://www.sciencedaily.com/releases/2019/02/190225123550.htm>)

Coverage of Anderegg & HilleRisLambers 2016:

- Discovery Channel: "How trees try to cope with climate change" (<http://news.discovery.com/earth/plants/how-trees-try-to-cope-with-climate-change-151214.htm>)
- Environmental Monitor: "With drought, some western trees hunker down while others give up" (<http://www.fondriest.com/news/with-drought-some-western-trees-hunker-down-while-others-give-up.htm>)
- UW Today "Trees either hunker down or press on in a drying and warming western U.S. climate" (<http://www.washington.edu/news/2015/12/10/trees-either-hunker-down-or-press-on-in-a-drying-and-warming-western-u-s-climate/>)
- Futurity: "Trees take divergent paths to beat the heat" (<http://www.futurity.org/trees-coping-climate-change-1081502/>)
- Skogr Aektin (if you read Icelandic: <http://www.skogur.is/um-skograekt-rikisins/frettir/nr/2742>)

Coverage of Sudden Aspen Decline research (2011-2014)

- New Scientist: "Dying aspen trees sound alarm for world's forests"
- Huffington Post: "Climate change stress killing forests, and why it matters"
- United Press International: "Drought blamed for Colorado tree die-off"
- Summit County Citizen Voice: "Colorado aspen woes linked to extreme summer heat"
- RedOrbit: "Majestic Colorado aspens devastated by hotter temperatures"
- Durango Herald: "Shrubs winning race"

PROFESSIONAL REFERENCES:

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Department of Global Ecology
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