



July 2, 2019

Matt Dias
Executive Officer
Board of Forestry and Fire Protection

Subject: Statement of Interest to Co-Chair Effectiveness Monitoring Committee

Dear Mr. Dias,

Please accept this letter as a statement of my interest to serve as co-chair, along with Sue Husari, on the Board of Forestry's Effectiveness Monitoring Committee (EMC). Presently, I am leading the development of ecological performance measures for statewide monitoring and assessment of timberland ecosystems. There is a strong linkage between the focus of statewide monitoring and on-the-ground monitoring and research in timberland ecosystems. I seek to support the ongoing efforts of the EMC, as well as explore how to develop the two efforts with stronger synergies, linking research questions more closely where this may strengthen the two monitoring efforts.

I would be pleased to respond to questions that may arise. I look forward to the prospect of serving on the EMC.

Sincerely,

Loretta Moreno
Sr. Environmental Scientist, Specialist
Timber Regulation and Forest Restoration Program
CA Natural Resources Agency

[REDACTED]
[REDACTED]

Loretta Moreno

EDUCATION

- University of Montana**, Montana, USA December 2011
M.Sc. Resource Conservation, International Conservation and Development
College of Forestry and Conservation
- Master's Thesis: [Modeling risk of hunting pressure on large mammals in northwestern Argentina.](#)
- University of California at Santa Barbara**, California, USA June 2003
B.A. in Environmental Studies
Department of Environmental Studies

PROFESSIONAL EXPERIENCE

- California Natural Resources Agency** July 2018-Present
Senior Environmental Scientist, Timber Regulation and Forest Restoration Program
- Leading development of ecological performance measures under AB 1492 for [statewide monitoring and assessment of timberland ecosystems](#). This work focuses on identifying linkages between State-led forest management activities/programs/regulations and forest ecosystem condition.
 - Co-Chair of Governor's Forest Management Task Force [Regulations Working Group](#)
 - Co-chair AB 1492 Leadership Team
- County of Santa Cruz, CAO, Cannabis Licensing Division** January 2017-June 2018
Resource Planner IV (Interim Manager)
- Designed and drafted 2 [County ordinances and Best Management and Operational Practices](#) to regulate cannabis supply chain (cultivation, manufacture, distribution). Included supporting preparation of Program Environmental Impact Report.
 - Developed revisions to Cannabis Business Tax rates to temporarily reduce tax burden on emerging industry, as adopted by the Board of Supervisors.
 - Collaborated with County of Santa Cruz department leadership, elected officials, State regulatory agencies, cannabis industry leaders and general public.
 - Represented the County in the media (television, radio, news press) covering sensitive program content.
 - Initiated and ran public outreach workshops for cannabis industry with invited State and local officials.
 - Oversaw 3 staff members in Interim Cannabis Licensing role.
- Worldwide Fund for Nature**, Vienna, Austria March 2013- October 2016
Land Use Consultant
- Land use specialist for the Forest and Climate Program supporting project coordination, research, and document preparation for international landscape conservation initiatives.
 - Facilitated finance procurement including development of the design-phase document for the Democratic Republic of Congo's Emissions Reductions Program submitted to the World Bank.
 - Developed and led international environmental exchange program for Indonesian governmental delegation visiting Austria and the Czech Republic, including leading meetings with national and international government agencies (including the United Nations) and private business.
 - Conceptualized, drafted, and coordinated a WWF Danube-Carpathian Program MAVA grant proposal for a renewable energy planning project in Serbia, Bulgaria, and Austria.
- Freelance Editor**, Vienna, Austria January 2013-October 2016
Scientific Publication Reviewer
- Reviewer for forestry and climate scientific publications and PhD dissertations for scientists at the University of Natural Resources and Life Sciences, Vienna, Austria (see Scientific Publication Acknowledgements, below).

- University of Natural Resources and Life Sciences (BOKU)**, Vienna, Austria July-August 2014
Institutes of Wildlife Biology and Game Management, and Silviculture
- Obtained measurements for long-term forest inventory of forest competition and regeneration.
 - Collected data for study on space use, diet preferences and genetic integrity of European hares (*Lepus europaeus*) and mountain hares (*Lepus timidus*) including establishing over sixty 20 m² study plots in Austrian Alps and collecting hare fecal samples for botanical, genetic, and pathological laboratory analyses.
- Worldwide Fund for Nature**, Berlin, Germany/Asuncion, Paraguay November 2013-April 2014
Land Use Management Expert
- Advisor to WWF Paraguay Land Use (ParLu) project (funded by German Federal Environment Ministry, International Climate Initiative) on application of forest management and biodiversity conservation incentive programs in select pilot sites in the Atlantic Forest ecoregion.
 - Analyzed potential programs for the ParLu project, including reforestation and the application of a national Payment for Ecosystem Services program for forest conservation activities.
 - Developed pre-feasibility criteria for assessing eligibility of potential forest carbon activities within ParLu pilot sites.
 - Traveled to rural communities in eastern Paraguay to discuss prospective forest management program with community members.
- Fulbright-Hays Grantee**, Salta, Argentina March 2012-December 2012
Researcher/Project Developer
- Independently led land use planning and conservation outreach with private farming and ranching community to achieve forest management and conservation outcomes in the deforestation frontier.
 - Investigated approaches to incentivize private land conservation and landscape connectivity.
 - Originated and performed prefeasibility study for a voluntary forest carbon payment program intended to reduce emissions from deforestation and forest degradation (REDD) project on approximately 12,000 ha of private forest land.
 - Developed and presented climate change and forest conservation/REDD+ seminar for government employees, university researchers, and private consultants (Spanish).
- ClearSky Climate Solutions, LLC**, Montana, USA July 2011-March 2012
Development Associate
- Researched forest carbon project development opportunities involving REDD and reforestation projects in Argentina, Colombia, Brazil, Madagascar, and Kenya.
 - Carried out feasibility assessments of forest carbon/reforestation projects.
 - Assisted with brokering carbon offsets, project marketing, and website redevelopment/redesign.
- University of Montana**, Montana, USA/Salta, Argentina August 2008-June 2011
Research Assistant/M.Sc. Researcher
- Academic liaison between the Catholic University of Salta (UCASAL), Argentina, and the University of Montana, USA in support of development of a Forestry program at the UCASAL (funding: U.S. Forest Service International Programs).
 - Landscape conservation and management master's research based in USA and Argentina.
- South Coast Wildlands Missing Linkages Project** April-May 2007
Field Technician
- Supported field reconnaissance operations for a non-profit organization dedicated to ensuring functional habitat connectivity across the South Coast Ecoregion of California.
 - Evaluated road conditions along the 29 Palms-Joshua Tree highway corridor, including checking surrounding land uses and bridge and culvert crossings to determine level of landscape resistance and obstructions to wildlife movement using GPS data and photo surveys; identified wildlife sign including scat and tracks.

County of Ventura Planning Division, California, USA

October 2006-April 2008

Land Use Planner II

- Performed all duties as described directly below under Santa Barbara County Planning and Development- Land Use Planner II.

Santa Barbara County Planning and Development, California, USA

December 2004-October 2006

Land Use Planner II

- Managed ministerial and discretionary land development proposals; environmental review of rural residential and agriculture infrastructure development, subdivisions, lot-line adjustments, conditional use permits (30+ cases at a time).
- Ensured compliance with: zoning ordinances; General Plans; State of California Environmental Quality Act (CEQA); and federal laws including the Endangered Species Act and Clean Water Act.
- Coordinated regularly with state and federal agencies on project review including California Department of Fish and Game, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service.
- Reviewed biological and geological studies pertaining to proposed projects.
- Managed and responded to public and legal counsel concerns related to proposed project.
- Conducted detailed field surveys of project sites.
- Presented project recommendations for Planning Commission and Planning Director public hearings.
- Served as liaison to the Natural Resources Conservation Service (NRCS) to coordinate County's planning efforts with local ranching and agricultural community.

West Coast Environmental and Engineering, California, USA

June 2003 – November 2004

Assistant Land Use Planner

- Assisted in private sector land development permitting and permit compliance at city, county, and state levels including industrial mining development projects and general commercial operations.
- Provided support in preparation of Environmental Impact Reports and Reclamation Plans.
- Coordinated ESA and ACOE compliance permits.

VOLUNTEER WORK

Refugee Shelter Volunteer, Vienna, Austria

2015

- Received and assisted refugees in obtaining adequate food, clothing, sanitation and shelter.

Northern Divide Bear Project, Field Technician, Glacier N.P., Montana, USA

2009-2010

- Collected bear hair samples for genetic analyses for demographic parameter estimation.

Ojai Raptor Center, Volunteer, California, USA

2007-2008

- Handled, fed and medicated injured and recovering raptors

Ventura County Election Official, California, USA

2006-2008

- Presided over polling precinct to ensure compliance with county, state and federal elections.
- Managed election staff, equipment, and response to public questions.

Habitat for Hollywood Beach Co-founder, California, USA

2004–2008

- Co-founded grassroots conservation organization focused on protection of threatened shorebirds.
- Delineated and monitored breeding and nesting habitat
- Coordinated with U.S. Fish and Wildlife Service and the Ventura County Harbor Department.
- Led meetings regarding short and long-term management for habitat protection and enhancement.

GRANT FUNDING RECEIVED

- **2012 U.S. Fulbright-Hays Grantee (United States Department of Education)** — Argentina: 9 month in-country grant awarded to initiate planning and implementation of a forest conservation

Page 3 of 4

Loretta Moreno
Curriculum Vitae
July 2019

incentive program involving private lands within the deforestation frontier of northwestern Argentina.

- **2012 Conservation Leadership Programme (CLP) Award** — Argentina: One of six member team on project to further biodiversity conservation studies in an endangered wetland area located within the Chaco forest of northwestern Argentina – Bañados del Quirquincho-which is home to various threatened species.
- **2006 Patagonia Environmental Grants Program Recipient**— California, USA: Funding designated to support delineation and protection of nesting habitat for threatened and endangered avian species along Hollywood Beach Peninsula (see Volunteer Work above for more information).

SCIENTIFIC PUBLICATION ACKNOWLEDGEMENTS

Contributions to scientific publications:

- Neumann, M., et. al. 2016. Comparison of carbon estimation methods for European forests. For. Ecol. Manage. 361, 397–420.
- Moreno, A., Neumann, M., & Hasenauer, H. (2016). The State of Forest Resources across Europe. For. Ecol. Manage (Submitted).
- Moreno, A., Neumann, M., & Hasenauer, H. (2016). Optimal Resolution for Linking Remotely Sensed and Forest Inventory Data in Europe. Remote Sensing of Environment (Submitted).
- Moreno, A., & Hasenauer, H. (2015). Spatial downscaling of European climate data. International Journal of Climatology.
- Pötzelsberger, E. and Hasenauer, H. (2015). Forest–water dynamics within a mountainous catchment in Austria. Natural Hazards.
- Pötzelsberger, E. 2015. Management of Dynamic Forest Functions Based on Carbon, Nitrogen, and Water Cycles. PhD Dissertation. University of Natural Resources and Life Sciences, Vienna.

LANGUAGES

- English- Native
- Spanish- Fluent
- German- Basic



Department of
Natural Resources and Environmental Science
University of Nevada, Reno

May 7, 2019

Effectiveness Monitoring Review Panel
Board of Forestry, State of California
California Board of Forestry and Fire Protection
P.O. Box 944246
Sacramento, CA 94244-2460

CC: Brandi Goss, Environmental Scientist

Dear Member of the Review Panel:

I am writing to submit my application for membership as an academic advisor to the State of California Board of Forestry, filling an open vacancy for the next two-year term. I am currently an Assistant Professor of Forest Ecosystem Science in the Department of Natural Resources & Environmental Science (NRES) at The University of Nevada – Reno (UNR). Prior to my current position, I was an Assistant Professor of Forest Ecology & Silviculture at California Polytechnic State University (Cal Poly). I earned my PhD in Ecology from Colorado State University in August 2013 and hold a B.S. and M.S. in Forestry from the University of Montana. My primary areas of specialization are forest ecology and silviculture, and my research evaluates forest compositional and structural responses to silvicultural treatment, interacting disturbances, and ongoing climate change. I am particularly interested in how species' adaptations shape the forest community, stand dynamics, and associated ecosystem services.

I am a qualified candidate due to not only my academic background but also my familiarity with the California Forest Practices Rules and my position as a PI on a Sierra Nevada-wide adaptive management experiment. My familiarity with the California Forest Practices Rules comes from my tenure as a forestry professor at Cal Poly. During that time, I taught the Forest Practices class, which was an in-depth look at both forest operations and the California Forest Practice Rules. This course provided students with the knowledge essential for development of forest management plans, silvicultural prescriptions, and timber harvest plans in the state of California and beyond. Upon my departure from Cal Poly, my position shifted toward a research focus, providing the time and resources to build a silvicultural research program. Networking across the California silviculture community led to the development of a large-scale, interagency silvicultural experiment that is a collaboration with the University of California - Berkeley, CAL FIRE, and the USDA Pacific Southwest Research Station. As part of this experiment, we are developing timber harvest plans and making sure that all participating agencies are in environmental compliance.

Finally, I am trained as an ecologist and forester, but I have experience in wetland ecology, hydrology, forest genetics, and long-term monitoring programs. I believe I am well suited to serve as an academic advisor to the Effectiveness Monitoring Review Panel.

Sincerely,

Dr. Sarah M. Bisbing



Dept. of Natural Resources & Environmental Science



www.cabnr.unr.edu/nres

SARAH M. BISBING*

University of Nevada - Reno
Reno, NV 89557

PROFESSIONAL APPOINTMENTS

Assistant Professor, Forest Science University of Nevada - Reno Natural Resources & Environmental Sciences	2017 – present
Affiliated Faculty University of Nevada - Reno Graduate Program in Ecology, Evolution, & Conservation Biology	2017 – present
Assistant Professor, Forest Ecology & Silviculture California Polytechnic State University Natural Resources Management & Environmental Sciences	2013 - 2017

EDUCATION

Ph.D. Ecology Colorado State University, Fort Collins, CO	2013
M.S. Forestry University of Montana, Missoula, MT	2008
B.S. Forest Resource Management University of Montana, Missoula, MT	2005

PROFESSIONAL EXPERIENCE

Graduate Research Assistant Forest & Rangeland Stewardship, Colorado State University	2009 - 2013
Associate Director, Nevada Conservation Corps Great Basin Institute, Las Vegas, NV	2008 – 2009
The Wilderness Society (TWS) Research Associate Condon and Bozeman, MT	2007 - 2008
National Science Foundation Teaching Fellow (GK-12) University of Montana, Missoula	2006 - 2007

* Updated: April 20th, 2018

- Bisbing, S.M.**, B.J. Buma, L.E. Oakes, J. Krapek, and A.L. Bidlack. 2019. From canopy to seed: loss of snow drives directional changes in forest composition. *Ecology & Evolution*. *Accepted*.
- Buma, B., E. Batllori, **S. Bisbing**, A. Holz, S.C. Saunders, A.L. Bidlack, M.K. Creutzburg, D.A. DellaSala, D. Gregovich, P. Hennon, and J. Krapek. 2019. Emergent freeze and fire disturbance dynamics in temperate rainforests. *Austral Ecology*.
- Bisbing, S. M.** and D. V. D'Amore. 2018. Nitrogen dynamics vary across hydrologic gradients and by forest community composition in the perhumid coastal temperate rainforest of southeast Alaska. *Canadian Journal of Forest Research*. 48: 180-191. *Published online Dec 2017*: doi: 10.1139/cjfr-2017-0178
- Bidlack, A. **S. Bisbing**, B. Buma, D. D'Amore, P. Hennon, J. Krapek, R. Mulvey, and L. Oakes. 2017. Alternative interpretation and scale-based context for *No evidence of recent (1995-2013) decrease in yellow-cedar in Alaska* (Barrett and Pattison 2016). *Canadian Journal of Forest Research*. 47(8): 1145-1151.
- Buma, B, **S. Bisbing**, J. Krapek, and G. Wright. 2017. A foundation of ecology re-discovered: 100 years of succession on 100 William S. Cooper plots in Glacier Bay, Alaska. *Ecology*. 98(6): 1513-1523.
- Brousil, M.* and **S. Bisbing**. 2017. Influence of fire history on coast redwood regeneration and stand structure. In Standiford and Valachovic. *Proceedings of the Coast Redwood Science Symposium*. Gen. Tech. Rep. PSW-GTR-258.
- Petrasova, M., I. Matecny, I., E. Uhercikova, P. Pisut, S. Kubalova, M. Valachovic, I. Hodalova, P. Mered'a Jr., **S.M. Bisbing**, and J. Medvecká. 2017. Effect of the Gabčíkovo waterworks (Slovakia) on riparian floodplain forest ecosystems the Danube inland delta: vegetation dynamics and trends. *Biologia*. 72 (7): 722-734.
- Mulvey, R. and **S. Bisbing**. 2016. Complex interactions among agents affect shore pine health in southeast Alaska. *Northwest Science* 90 (2): 176 – 194.
- Bisbing, S.M.**, D.J. Cooper, D.V. D'Amore, and K.M. Marshall. 2016. Determinants of conifer species distributions across peatland to forest gradients in the coastal temperate rainforest of southeast Alaska. *Ecohydrology*. *Published online Dec 2015*: doi: 10.1002/eco.1640
- Budzakova, M., I. Hodalova, P. Mered'a Jr., L. Somlyay, **S.M. Bisbing**, and J. Sibik. 2014. Karyological, morphological, and ecological differentiation of *Sesleria caerulea* and *Sesleria tatrae* (Poaceae) in the Western Carpathians and adjacent regions. *Preslia* 86: 245 - 277.

Cooper, D.J., **S Bisbing**, D. Millar, and E. Gage. 2013. The biology of freshwater wetlands by Arnold G. van der Valk. *The Quarterly Review of Biology* 88 (2): 133.

Bothwell, H., **S. Bisbing**, L. Crawford, N. Therkildsen, N. Alvarez, R. Holderegger, and S. Manel. 2013. Identifying genetic signatures of selection in a non-model species: a case study of the alpine gentian (*Gentiana nivalis* L.). *Conservation Genetics* 14 (2): 476-481.

Bisbing, S.M., P.B. Alaback, and T.H. DeLuca. 2010. Carbon storage of old-growth and second growth fire-dependent western larch (*Larix occidentalis* Nutt.) forests of the Inland Northwest, USA. *Forest Ecology and Management* 259 (5): 1041-1049.

PUBLICATIONS - SUBMITTED & IN PREP

Nelson, K.*, **S. Bisbing**, M. Ritter, and J. Yost. Testing an invasion mechanism for *Eucalyptus globulus*: is there evidence of allelopathy? *American Journal of Botany*. *In Review*.

Bisbing, S. M., A. Urza, D.J. Cooper, and A.L. Angert. Subspecies designations reflect genetic, geographic, & morphologic variation in *Pinus contorta*. *Journal of Biogeography*. *In Revision for new submission*.

Bisbing, S.M., B.J. Buma, T.S. Davis, D. Canestro, K. Hurt*, and M. Terzes*. Compounding disturbance from drought and disease shape forest demographic processes. *Journal of Ecology*. *In Prep*.

Brousil, M.*, T.S. Davis, and **S.M. Bisbing**. Adaptive traits determine regeneration dynamics and post-fire community composition in coast redwood forests. *Ecosphere*. *In Prep*.

FUNDING

Bisbing, S.M. Silviculture for climate change: Sierra Nevada-wide treatments to promote resistance, resilience, and adaptation to altered climate and disturbance regimes. California Department of Forestry & Fire Protection Forest Health California Climate Investments Grant Program, \$2,697,153 (2018 – 2021)

Bisbing, S.M. Impacts of genetics, local environment, and stand history on quaking aspen susceptibility to the emerging white satin moth defoliation event. Tahoe License Plate Program, \$120,953 (2018 – 2021)

Bisbing, S.M. Whitebark pine survival potential: tracking demographic patterns in the Interior West & Great Basin. Region 4 Forest Health Protection, \$44,523 (2018 – 2019)

Bisbing, S.M. Climate change disruption in Sierra Nevada forests: treatments to promote resistance, resilience, and adaptation under future climate and disturbance regimes. Cal Fire, \$155,183 (2018 – 2021)

Bisbing, S.M. Quantifying thresholds and predicting changes in Great Basin forest community stability under drought and ongoing climate change. USDA NIFA Hatch Funding, \$90,000 (2017-2020)

Bisbing, S.M. Forest health and demography of Cambria’s Monterey pine forest. Fire Safe Council - SLO, \$76,480 (2016 – 2017)

Bisbing, S.M. Effects of variable density thinning and prescribed fire on forest resilience and stand dynamics in Sierra Nevada forests. California Agricultural Research Initiative (ARI), \$218,904 (2015 – 2018)

Bisbing, S.M. Treatment effects on the regeneration environment: the influence of soil legacies and microclimate on germination and success of Sierra mixed-conifer species. USDA Forest Service, Pacific Southwest Research Station, \$15,000 (2015 – 2017)

Bisbing, S.M. Establishment and survival of yellow-cedar, a climate-change impacted species in southeast Alaska. California Polytechnic State University: Research, Scholarly, and Creative Activities Grant Program, \$13,947 (2015 – 2016)

Bisbing, S.M. Treatment effects on the regeneration environment: the influence of soil legacies and microclimate on germination and success of pines and understory vegetation. USDA McIntire-Stennis, \$45,000 (2015 – 2018)

Bisbing, S.M. Interacting effects of wildfire and salvage logging on forest regeneration following the Rim Fire. California Polytechnic State University: Research, Scholarly, and Creative Activities Grant Program, \$13,500 (2014 – 2015)

Bisbing, S.M. Coast redwood regeneration and forest resilience under multiple, interacting disturbances. USDA McIntire-Stennis, \$45,000 (2014 – 2017)

Bisbing, S.M. Coastal forests under a changing climate: identifying the regeneration niche of coast redwood. California ARI New Investigator, \$40,000 (2014 – 2016)

Bisbing, S.M. Pacific Coast tree species’ distributions across a gradient of spatial scales. California ARI SEED, \$5,000 (2014 – 2015)

Bisbing, S.M., K. Corella, H. Mehl, and Z. Heath. Monitoring, extension, management, and mitigation of Sudden Oak Death on the Central Coast. USDA Forest Service, \$69,456 (2014 – 2016)

Bisbing, S.M. Quantifying local adaptation of *Pinus contorta* to support forest conservation under a changing climate. California Polytechnic State University: Extramural Funding Initiative, \$10,000 (2014 – 2015)

Bisbing, S.M. and K. Corella. Southern Area Sudden Oak Death Monitoring. USDA Forest Service, \$49,456 (2013 – 2015)

Mark, W., K. Corella, and **S.M. Bisbing**. Forest Health Research and Development. Cal Department of Forestry, \$402,029 (2013 – 2015)

Mulvey, R., T. Barrett, **S. Bisbing**, and E. Graham. Investigation of factors contributing to shore pine (*Pinus contorta* ssp. *contorta*) mortality and damage in southeast Alaska. USDA Forest Service, National Forest Health & Monitoring, \$57,000 (2011 – 2013)

Bisbing, S.M. Conserving the adaptive potential of western forests: Using range-wide patterns of genetic structure & niche modeling to predict the response of *Pinus contorta* to climate change. Gloria Barron Wilderness Society Fellowship, \$10,000 (2012 – 2013)

Bisbing, S.M. Discrete Populations? Examining the role of genetic variation and landscape heterogeneity in the phenotypic divergence of *Pinus contorta*. National Park Service George Melendez-Wright Climate Change Fellowship, \$19,196 (2011 – 2013)

Cooper, D.J. and **S. Bisbing**. Hydrophyte status assessment of southeast Alaska wetland plants. USDA Forest Service Pacific Northwest Research Station, \$20,000 (2009 – 2012)

Cooper, D.J. and **S.M. Bisbing**. What is a hydrophyte? How plant species grow in upland and wetland environments. U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, \$180,000 (2008 – 2012)

CONTRACTS & COLLABORATIONS

Bidlack, A[†], B. Buma[†], D. Butman[†], **S. Bisbing***, D. D'Amore,* B. Hunt,* and S. Tank*. RCN: Coastal Rainforest Margins Research Network - understanding materials flux in linked terrestrial and marine ecosystems in the face of climate change. National Science Foundation, \$498,970 (2016 – 2020) [†] Project Investigators, *Steering Committee

Turner, D., **S.M. Bisbing***, C. Dicus*, and R. Thompson*. Forest health and demography of Cambria's Monterey pine forest. Cal Fire Greenhouse Gas Reductions Fund, \$498,736 (2015 – 2020). *Project Contractors

Bisbing, S.M. and D. Canestro. Evaluating effects of local climate, climate fluctuations, and compounding disturbance on distributional and demographic patterns of Monterey pine (*Pinus radiata*). Private Donation to UC Ranch Marino, \$25,000 (2016 – 2018)

Bisbing, S.M. Cambria Monterey Pine (*Pinus radiata*) Forest Health & Carbon Stocks Assessment. California Fire Safe Council, \$40,000 (2015 – 2016)

FELLOWSHIPS AND AWARDS

Outstanding New Faculty Teaching (Cal Poly, \$750)	2016 - 2017
GDPE Travel Award (\$600)	2013
George Melendez-Wright Student Travel Award (\$2,500)	2012
Gloria Barron Wilderness Society Fellow	2012 - 2013
Global Sustainability Leadership Fellow, Colorado State University	2012 - 2013
National Park Service George Melendez-Wright Climate Change Fellow	2011 - 2012
The Wilderness Society, Graduate Research Funding (\$25,000)	2007 - 2008
National Science Foundation Gk-12 Fellowship (\$35,000)	2006 - 2007
Robert Morgan Forestry Scholarship (\$2,000)	2005 - 2006
Bonhomme General Scholarship (\$1,000)	2005 - 2006
Irene Evers Undergraduate Research Grant (\$2,500)	2005
Dean's List, University of Montana	2003 - 2005
Illinois House of Representatives Scholarship (Full Tuition Waiver)	2000 – 2002

SELECTED PRESENTATIONS

Bisbing, S., A. Urza, A. Angert, and D.J. Cooper. Support for subspecies designations in a widespread conifer: the influence of geographic barriers and climate on *Pinus contorta*. Annual Meeting of the US International Association for Landscape Ecology, Fort Collins, CO, April 2019.

Bisbing, S., B. Buma, J. Krapek, L. Oakes, A. Bidlack, and M. Brousil. Multi-scale climatic and topographic characteristics of low snow mortality and regeneration in yellow-cedar suggest directional changes in forest composition. Annual Meeting of the US International Association for Landscape Ecology, Chicago, IL, April 2018.

Bisbing, S.M., B. Buma, and J. Krapek. Microclimate drivers of decline and forest compositional shifts in yellow-cedar forests of southeast Alaska. Annual Meeting of the US International Association for Landscape Ecology, Asheville, NC, April 2016.

Bisbing, S.M., D.J. Cooper, D.V. D'Amore, and K.M. Marshall. Determinants of conifer distributions in the coastal temperate rainforest of southeast Alaska. Annual Meeting of the International Association of Landscape Ecology, Portland, OR, July 2015.

Bisbing, S.M., D.J. Cooper, and D.V. D'Amore. Physiological stress and interspecies competition determine tree species distributions along an environmental gradient in southeast Alaska. Annual Meeting of the Ecological Society of America, Sacramento, CA, August 2014.

Bothwell, HM, **S Bisbing**, N Therkildsen, L Crawford, N Alvarez, R Holderegger, & S Manel. Identifying genetic signatures of selection in a non-model species, alpine gentian (*Gentiana nivalis* L.) using a landscape genetic approach. US-International Association for Landscape Ecology Annual Symposium, April 2013.

Bisbing, S.M., D.J. Cooper, and A.L. Angert. Genetic and geographic distributions of the west's most widespread conifer, *Pinus contorta*. George Wright Society Conference on Parks, Protected Areas, and Cultural Sites, Denver, CO, March 2013.

Bisbing, S.M., D.J. Cooper, and A.L. Angert. Assessing the evolutionary history and potential geographic distributions of *Pinus contorta*: conservation and management implications for western North America's most widespread conifer. Front Range Student Ecology Symposium, Fort Collins, CO, February 2013.

Bisbing, S.M., D.J. Cooper, and A.L. Angert. Range-wide patterns of genetic population structure and potential geographical range shifts of *Pinus contorta* (ssp. *latifolia*, *murrayana*, *contorta*, and *bolanderi*). Annual Meeting of the Ecological Society of America, Portland, OR, August 2012.

Bisbing, S.M. and D.J. Cooper. Discrete Populations? Examining the role of genetic variation & landscape heterogeneity in the phenotypic divergence of *Pinus contorta*. Front Range Student Ecology Symposium, Fort Collins, CO, February 2011.

Bothwell, HM, **S Bisbing**, L Crawford, N Therkildsen, J Bregy, R Holderegger, & S Manel. *Gentiana nivalis* L.: Identifying genetic variation of adaptive relevance in an alpine plant species. NCEAS International Landscape Genetics Symposium, Santa Barbara, CA, May 2010.

Bisbing, S., T. DeLuca, and P. Alaback. Carbon Storage in Old-Growth Western Larch (*Larix occidentalis*) Forests of Western Montana. Annual Meeting of the Ecological Society of America, Milwaukee, WI, August 2008.

INVITED SEMINARS

- UNR, ASUN Sustainability Earth Day Seminar Series, April 2019
- Wild & Scenic Film Festival, Forest Health & Carbon Panel, January 2019
- Alpine Biomass Collaborative Meeting, Alpine County, California, April 2018
- Cambria Forest Committee Meeting, Cambria, CA, January 2018
- University of California – Davis, Forest Biology Research Center, December 2017.
- University of Montana – Missoula, September 2017.
- High Sierra - California Society of America Foresters Chapter Meeting, May 2017.
- University of Nevada – Reno, March 2017.
- University of Wisconsin - Madison, February 2017.
- University of California Naturalist Program, August 2016 & February 2017.
- California Silviculture Working Group Meeting, Blodgett Forest, November 2016.
- Cambria Forest Committee Meeting, August 2016.
- California Polytechnic State University, Biology Department Seminar, June 2016.

- Friends of Fiscalini Ranch Preserve, February 2016.
- University of California – Davis, Forest Biology Research Center, December 2015.
- University of California – Merced, School of Natural Sciences, September 2015.
- California State University – Dominguez Hills, Department of Biology, Feb 2015.
- University of Washington, School of Environmental and Forest Sciences, Nov 2014.
- Alaska Coastal Rainforest Center, Juneau, AK, July 2014.

ADDITIONAL RESEARCH EXPERIENCE

Research Assistant, Aspen Decline on Colorado’s Western Slope Colorado State University	2012
Research Assistant, Carbon Budgets of Rocky Mountain Fens Colorado State University	2012
Research Assistant, Willow Decline in Yellowstone National Park Colorado State University	2010
Research Assistant, Stable Oxygen Isotope Analysis Colorado State University	2009 - 2010
Research Assistant, San Juan Fen Restoration Colorado State University	2009
Research Assistant, Forest Restoration in the Bitterroot Valley, MT University of Montana, Missoula	2006 - 2007
Biological Technician, Amphibian Decline Research USGS, Glacier National Park, Montana	2005 - 2006
Biological Technician, Bark Beetle Research University of Montana, Missoula	2005

TEACHING & MENTORING

Assistant Professor, California Polytechnic State University

- Intro to Forest Ecosystems, Fall & Winter 2013 - 2015
- Silviculture, Fall & Spring 2013 – 2017
- Natural Resource Ecology, Winter & Spring 2014 – 2017
- Sierra Nevada Forest Ecology, Spring 2016
- Forest Practices, Winter 2014 - 2016
- Logging Team Practices, Spring 2014 – 2017
- Ecosystem Management (capstone), Spring 2014 – 2017
- Sustainable Forest Management, Winter 2015 – 2016
- Current Topics in Environmental Science & Management, Fall & Winter 2015 - 2016
- Ecosystem Modeling (graduate course), Winter 2016
- Graduate Research Seminar (graduate course), Spring 2016

Instructor, Colorado State University

- Silviculture, Spring 2013
- Forest Stand Management (capstone), Fall 2012
- Silviculture (graduate level), Spring 2011 & 2012

Instructor, Field Courses

Fire Ecology, University of Montana, Summer 2015
 Colorado Ecosystem Field Studies, Summer 2013
 Landscape & Livelihood Program, Northwest Connections, Fall 2006 & 2007

Teaching Assistantships

Forest Ecology, Colorado State University, Fall 2010 & 2011
 Forest Ecology, University of Montana, Spring 2007

Guest Lecturer, Colorado State University

Watershed Hydrology, Fall 2009 & 2010
 Physical Geography, Spring 2010 & 2011
 The Institute of Learning & Teaching, Undergraduate Learning Program, 2010 – 2011

ADVISING & MENTORING

Postdoctoral Advisor, UNR	2018 - Present
Kellen Nelson (2019 – Present), Alexandra Urza (2018)	
Graduate Advisor, UNR	2018 - Present
Lacey Hankin (PhD, EECB), Tessa Putz (MS, NRES)	
Graduate Studies Committee Member, UNR	2018 - Present
Christopher Halsch (PhD, EECB), Adriana Parra (PhD, EECB), Ryan Kasten (MS, NRES)	
Graduate Advisor, Cal Poly, MS in Forestry	2015 - 2018
Matthew Brousil, Tori Norville, Emily O’Dean, Matthew Terzes, Marissa Vossmer	
Research Mentor, Undergraduate Senior Thesis	2013 – 2017
Forest Ecology Research (16 students) California Polytechnic State University	
Research Mentor, Undergraduate Senior Thesis	2011 - 2013
Forest Restoration Research (1 student) Colorado State University	
Undergraduate Research Mentorship Program (TiLT)	2010
Colorado State University	

UNIVERSITY AND PROFESSIONAL SERVICE

Gloria Barron Graduate Fellowship Reviewer	2019
The Wilderness Society	
Great Basin Institute Board of Directors	2019 - Present
University of Nevada - Reno	
Whittell Forest Advisory Board	2019 - Present
University of Nevada - Reno	
NRES Faculty Search Committee Member	2017
Fire Ecology Position University of Nevada – Reno	

Forest Management & Ecology Curriculum Committee University of Nevada - Reno	2017 - Present
Faculty Advisor Society of American Foresters Logging Team University of Nevada - Reno	2017 - Present
NRES Faculty Search Committee Member Forest Health Position California Polytechnic State University	2017
NRES Faculty Search Committee Member Department Head Position California Polytechnic State University	2016
NRES Faculty Search Committee Member Soil Ecologist Position California Polytechnic State University	2015
NRES Faculty Search Committee Chair Forest Disturbance Ecologist Position California Polytechnic State University	2014
Campus Landscape Committee Member California Polytechnic State University	2015 - 2017
Academic Senate Sustainability Advisory Committee Member California Polytechnic State University	2014 - 2017
College Sustainability Advisory Committee Member California Polytechnic State University	2014 - 2017
Faculty Advisor Society of American Foresters Student Association for Fire Ecology Logging Team California Polytechnic State University	2013 - 2017
Recruitment & Diversity Committee Member College of Agriculture, Food, & Environmental Sciences California Polytechnic State University	2013 - 2017
California Cooperative Ecosystem Studies Unit Representative California Polytechnic State University	2013 - 2015
Employment Equity Facilitator California Polytechnic State University	2013 - 2017
Curriculum Committee Member Forestry and Natural Resources Major, NRES California Polytechnic State University	2013 - 2017
Ad hoc Reviewer USDA Forest Service General Technical Reports (2), Biologia (1), Biological Conservation (1), Biological Invasions (1), Canadian Journal of Forest Research (2), Ecological Applications (1), Ecology (1), Forest Ecology & Management (6), Forest Science (1), Journal of Undergraduate Research (2), Northwest Science (1), Plant Ecology & Diversity (1)	2010 - present

Student Committee Organizer, GDPE Faculty Search Colorado State University	2011
Graduate Student Representative, GDPE Executive Committee Colorado State University	2010 - 2011
Front Range Student Ecology Symposium President, Executive Committee (2010-2011) Day-of Committee Chair (2009-2010) Fundraising Committee Member (2009-2010) Graduate Degree Program in Ecology, Colorado State University	2009 - 2011
National Center for Ecological Analysis and Synthesis Participant Landscape Genetics Working Group NCEAS, Santa Barbara, California	2010
College of Forestry Faculty Search Committee Member University of Montana, Missoula	2006 – 2007

PROFESSIONAL SOCIETIES

Ecological Society of America, International Association for Landscape Ecologists,
Society of American Foresters

ADDITIONAL EDUCATION AND TRAINING

- California Polytechnic State University, Office of Research & Economic Development, Grants Academy, 2014 - 2015
- California Polytechnic State University, Center for Learning & Teaching, Getting a Good Launch New(-ish) Faculty Learning Community, Academic Year 2014-2015
- California Polytechnic State University, College of Agriculture, Food, & Environmental Sciences Grant Writing Seminar, Winter Quarter 2014
- Bureau of Land Management Grant Writing for Conservation Course, January 2009
- **Computer Software:** R, S+, SPSS, PC-Ord, GenAlEx, Geneland, GenePop, Fragstats, Structure, Arlequin, MaxEnt, DIVA GIS (EcoCrop), ArcGIS, Sigma Plot, Delta Graph, Filemaker



DEPARTMENT OF ENVIRONMENTAL SCIENCE AND POLICY

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-5270**Letter of interest – Academic Applicant for the Board of Forestry and Fire Protection – Effectiveness Monitoring Committee.**

To: Brandi Goss,
Environmental Scientist
California Board of Forestry and Fire Protection

May 7 2019

Dear Brandi Goss

I write in response to the recent call for Academic Applicants for The Board of Forestry and Fire Protection – Effectiveness Monitoring Committee and I attach here my full résumé. I have extensive experience of forestry research and practical forestry both in Europe and other parts of the world. I have been at UC Davis as an academic for two years now and I am very keen to have a closer engagement with the forestry industry in California.

You will see from my résumé that I became interested in forestry during my PhD and that, after working in two research positions and as a university lecturer, I joined the UK Forestry Department – The Forestry Commission. My work in the Forestry Commission was mainly but not exclusively research; I ran a number of advisory committees and also had very close links with the forest industry. I was a member of the UK Institute of Chartered Foresters (The Professional Body) from 2013 to 2018. I was closely involved in forest monitoring across Europe and I reviewed forest monitoring regulations for the European Commission (2004 to 2006). I have also published reviews of forest certification and undertaken consultancies for the Dutch, Swedish, French and New Zealand Governments and for the World Health Organization, UN FAO and the International Union of Forest Research Organizations (IUFRO). While in the UK I worked on the development of a number of forest practice guides and during the time that I was Chief Scientific Adviser to the UK Government on forestry (2010 – 2017) the issue of invasive pests and pathogens and an associated review of regulation were high priorities. I was closely involved in policy advice and in interactions with politicians and the public.

In recent years my closest partnerships have been with the European Forest Institute (EFI) and the global forestry partnership – New Generation Plantations. I will be the co Chair of a new IUFRO Task Force on *Resilient Planted Forests Serving Society and the Bio economy*. I have a current research contract from the California Air Resources Board looking at the best use of biomass to meet air quality and climate objectives. With forestry providing the largest category of California's biomass resources and the critical interaction between wildfires, forest carbon dynamics and air quality, forest and fire management are a significant consideration in this project. I also have current EFI funding to develop a *From Science to Policy* publication on the future role of forests in timber supply, provision to the developing bio economy and in climate mitigation.

I feel that I could bring significant relevant experience to the Effectiveness Monitoring Committee and I would very much welcome an opportunity to become more closely involved in forestry in California and contribute to it. I have some understanding of California's Forest Practice Rules and the related laws but I would like to become more familiar with their implementation and effectiveness.

Thank you for considering this application.

Yours sincerely

Peter Freer-Smith

P H Freer-Smith Professor,
Department of Environmental Science and Policy,
University of California, Davis.

[REDACTED]
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Peter H Freer-Smith B.Sc., Ph.D., D.Sc,

Professional experience

Professor Department of Environmental Science and Policy, University of California at Davis	July 2017 - present	Research (Forestry & climate change, air pollution and plant health) and teaching (3 Classes: The Botany and Physiology of Cultivated Plants, Urban Forestry, Restoration Ecology and a Masters degree in Environmental Management)
GB Forestry Commission's Chief Scientific Adviser	2010 – 2017	To advise the Forestry Commissioners, Government Ministers and senior officials and implement the national forestry research strategy.
Chief Scientist in The FC's research agency - Forest Research - and Head of the Scientific and Engineering Profession for the Forestry Commission	2009 - 2017	To lead the science and business development, including to develop new funding opportunities from government departments, the forestry and charitable sectors. To provide leadership and management to the FC's science staff.
Visiting Professor in The School of Biological Sciences, University of Southampton	2005 – present	To advise the School and to develop interactions with the UK forestry industry.
Forestry Commission Research Director	2004 – 2009	The staffing and budgetary responsibility for 5 research divisions in (Forest Inventory and Production Forecasting, Environmental and Social Science, Tree Protection, Ecology and Forest Management and the Technical Support Group), leading the winning of funding and delivery of research and science related services.
Chief Research Officer, Forest Research	Oct.1998 – March 2004	Organisational development of the new agency – Forest Research. The establishment of new partnership and customer relations.
Forestry Commission, Chief Research Officer and Head of Station, Alice Holt Lodge	March 1997 – Oct. 1998	To direct and manage the research at Alice Holt Lodge Research Station
Head of Environmental Research, Forestry Commission Research Division	Sept 1987 – March 1997	To deliver research and knowledge exchange on air, soil and water pollution, site nutrition, forest hydrology, climate change and land reclamation. The group was responsible for a number of international partnerships and for the direct technical support to the UK forest industry.
Lecturer in Plant Biology at The University of Ulster	June 1985 – August 1987	University teaching and leading an active research group working on O ₃ damage to forests and on the uptake of particulate pollution (PM ₁₀) by trees.
Post-doctoral Research Associate on European Commission	Oct. 1984 – May 1985	<i>'The physiology and biochemistry of resistance and susceptibility to SO₂, NO₂ and O₃ pollution'</i> . Lancaster University & Institute of Terrestrial Ecology, Edinburgh (now the Centre for Ecology and Hydrology).
Post-doctoral Research Assistant on European Commission Grant No. 599-UK	Oct. 1982 – Sept. 1984	<i>'The influence of environmental factors on the responses of plants to SO₂ and NO₂ pollution'</i> . Lancaster University

Address:

[REDACTED]

Academic record:

Doctor of Science in Biological Sciences – D.Sc. (awarded July 2002):

Awarded by Lancaster University in acknowledgement of a record of published work and research on The Sustainability of Forest Ecosystems showing conspicuous ability and originality and constituting a distinguished and sustained achievement.

Doctor of Philosophy - Ph.D. (awarded 2 December 1983):

Chronic pollution injury to some tree species in response to SO₂ and NO₂
NERC/CASE studentship jointly between the University of Lancaster and the Institute of Terrestrial Ecology, Bush Estate, Edinburgh.

First degree Bachelor of Science - B.Sc. (awarded 20 June 1979):

University of Stirling Scotland.

1st Class Honours Degree in Biology

Part I Biology prize 1977.

A broad-based Biology Degree where I specialised in Plant Sciences Ecology, Soil Science and Genetics.

School: Milton Abbey, Dorset.

10 O levels, 1 S level and 3 A levels (Biology, Chemistry & Physics).

Professional achievements:

After two EU postdoctoral posts and two years as a university lecturer, I was appointed as Principal Site Studies South in the Forestry Commission's Research Division. I quickly refocused this group to form a much needed, Environmental Research Branch to conduct research and offer advice on climate change, air pollution, forest hydrology and land reclamation. I was subsequently promoted and undertook the roles of Head of Station, Alice Holt Lodge; Chief Research Officer; Research director; Chief Scientist and Chief scientific adviser for the

Forestry Commission. In these roles I provided scientific leadership setting a personal example on the winning of external funding, delivery and communication of results and effective interaction with partners, in international forestry, in the forestry sector and with policy makers. I continue to be active in research having authored over 125 publications in a mixture of good quality science journals and as forestry practice/policy guidance.

In my current post I have recently won funding to look at the use of biomass from forestry and other sources in the State in order to mitigate climate change (to minimize greenhouse gas emissions) and for a strategic review of the potential impact of afforestation in Europe (funded by the European Forest Institute). I am co chair of the International Union of Forest Research Organisation's (IUFRO) working Group on Plantation Forestry, am on the Board of the European Institute of Cultivated Forests and have been funded by the European Forestry Institute to attend and run a session at the 4th International Congress on Plantation forestry in Beijing in October 2018. I am also working closely with the New generation Plantations Partnership on a current initiative on global forestry data. I thus have considerable experience of UK forestry and am closely involved internationally in forestry research and communication to policy makers.

Regularly requested to contribute to international forest science/policy interface work e.g.

- 2018 – present Forestry Commission Research Fellow (Forest Research)
- 2000 – 2017 UK representative on the International Union of Forest Research Organisations International Council
- 2015 – 2017 UK Representative on the SUMFOREST EU ERANET Steering Committee. (Sustainable Forest Management & European Forest Policy)
- 2012 – present Board member of the European Institute for Cultivated Forests
- 2009 – present Board member of the European Forest Institute Atlantic Regional Centre.
- 2007 High level visit to China as part of UK/China bilateral forestry programme – initiating co funding of Giant Panda and landscape projects.
- 2003 – 2008 UK rep on the EU / European Science Foundation technical committee - Forests and Forest Products of COST.

- 1990 – 1996 Consultancy for UN FAO to prepare submission for the International Commission on Sustainable Development and for the Intergovernmental Panel on Climate Change.
- 1996 – 2002 Member of the UK UNESCO/MAB Man and Biosphere Committee.
- 1995 Evaluator for the EU Framework Programme 5
- 1987 – 1997 UK rep on the International Programme Forests of the UN/ECE Convention on Longrange Transboundary Air Pollution
- 1987 – 1997 UK rep of the Air Pollution working group of the EU Standing Forestry Committee (EEC regulations 3528/86 and 5339/92).
- 1987 – 1992 Co-chairman of the IUFRO Working Group on soils and pollution.

Substantial publication record (please see separate list) covering peer-reviewed journals of high impact, a number of major national and international reports, technical papers & guidelines, books and book chapters.

International reputation reflected in requests to review research programmes e.g.

- 2012 External evaluator for New Zealand Ministry of Business Innovation & Employment.
- 2010 Evaluator for French National Research Agency EQUIPEX call 2010.
- 2007 – 2008 External evaluator for UK Research Assessment Exercise to evaluate the quality of research in UK higher education institutes (i.e the universities).
- 2004 External Review of the Forest Research Institute of Sweden (Skogforsk) on behalf of the Swedish Research Council for the Environment Agricultural Sciences and Spatial Planning.
- 1999 – 2002 Member of Natural Environment Research Council Terrestrial Life Sciences Peer Review Committee.
- 1996 World Health Organisation advisor on Air Quality Guidelines.
- 1990 Forestry member for the second review of the Dutch Priority Programme on Acidification.

1988 Forestry member for the first review of the Dutch Priority Programme on Acidification

Invited conference and seminar presentations e.g.

2019 Invited presentation at the European Forest Institute Annual meeting, Aberdeen, Scotland.

2018 Invited presentation at the 5 th International Congress on Planted Forests, Beijing China

2017 Invited Congress presentation “The assessment of risk from introduced tree pests and pathogens and mitigation actions” Swedish University of Agriculture Uppsala.

2016 Invited talk at New Generations Plantations Encounter 2016 Sao Paulo Brazil “IUFRO Task Force on sustainable Plantations for a greener Future”

2015 Invited talk Our Common Future Under Climate Change ISC Session 2216 – Paris Framework Convention of the Parties preparatory meeting. “Achieving th Potential Contribution of Planted Forests to Adaptation and Mitigation of Climate Change”.

2015 Aberdeen University Borthwick-Stevens Annual Lecture “Forest Science / policy linkages in the UK”

2014 IUFRO World Congress invited talk session SP 05 “Biodiversity and Ecosystem Services in Planted Forests”.

2012 Institute of Chartered Foresters Annual Conference invited keynote talk “Research Agendas in a Changing Climate”.

Science Journal editorial work:

1986 – 1995 Environmental Pollution

1985 – 2008 Forest Ecology and Management

2001 – 2017 Forestry, An International Journal of Forest Research

Membership of societies, committees etc.

2016 – 2017	Organising Committee for the 2017 New Generations Plantations Encounter 2017 – Chatham House London and Edinburgh.
2016 – 2017	Organising Committee for the 2017 Annual Conference of the European Forest Institute Atlantic Regional Centre, West Coast of Scotland.
2015 – present	Deputy Coordinator of IUFRO Task Force “Sustainable Planted Forests for a Greener Future”
2015 – 2017	Member of the advisory board of the Birmingham University Institute for Forest Research.
2014 – 2017	Member of the advisory board of the University of Southampton Department of Biological Sciences
2012 – 2017	Member of the UK Expert Committee on Forest Science.
2013 – 2018	Member of the UK Institute of Chartered Foresters
2012 – 2016	Technical adviser to the UK Government Taskforce on Tree Health and Plant Biosecurity
2012 -2014	Member of the UK Government Chief Scientist’s oversight group on the outbreak of Chalara (<i>Hymenoscyphus fraxineus</i>) on ash.
2013	Member of the organising and scientific committee for the Third International Congress on Planted Forests, Estoril.
2012	Member of the organising Committee for the EU Congress of Forestry and Climate Change, Tours, 2012.
2010 – 2017	Membership of Government Science & Engineering (GSE) network
2008 – 2011	Scientific Advisory Group member for the EU FORFLUX project.
2008 – 2009	Lead of science input to the UK Assessment of the Potential of the UK’s Trees and Woodlands to Mitigate and Adapt to Climate Change (1 st National report)

2008 – 2011	Chair Forestry Commission Innovation and new markets committee
1997 – 2011	Secretary to the Forestry Commission’s Advisory Committee on Forestry Research
1997 – 2008	Secretary to the interdepartmental Forestry Research Co-ordination Committee which was established as part of the Government’s response to a Select Committee
2000	External review of the Oxford Forestry Institute.
1989 – 1998	Member of the UK Department of the Environment Critical Loads Advisory Group
1989 – 2001	External Examiner in Forestry at University College Worcester and at the University of Brighton.
1984 – 1992	Forestry expert of UK first Terrestrial Effects Review Group.
1991	Organising committee for Royal Soc. of Edinburgh International Symposium: Acidification its Nature and Impacts
1987 – 1988	UK rep on COST/EU project on Effects of wet and dry deposition on Forest Ecosystems
1979 – 1987	Member of the Society of Experimental Biology.

Personal research grants and consultancies

2019 – 2020	The best use of biomass for climate and air quality objectives. Contract for California Air Resource Board
2018 – 2020	Afforestation and plantation forests: potential and impacts in Europe contract for the European Forest Institute.
2016 - 2017	UK Ministry of Defence Forestry contract
2013 - 2017	EU era-net SUMForest programme “Sustainable and Multifunctional Forestry through Enhanced Research Coordination for Policy Decisions”.

2013 - 2014	Funding to host international workshop Forest landscape Restoration, REDD Plus and Ecosystem Services, Dublin May 2013 from UK Department For International Development.
2009 - 2013	EU Framework Programme 7 TRANZFOR Project “Forestry and Climate Change”
2008 - 2011	EU Framework Programme 7 BRIDGE Project “Sustainable Urban Planning Decision Support”
2007	Civil Service funding to participate in the Windsor Leadership Trust
2006	Organisation for Economic Development workshop funding; Forestry & Climate Change, Wilton Park, Sussex, UK
2006	Organisation For Economic Development Fellowship “The Development of an integrated approach to achieve sustainable management practice, efficient use and protection of forest resources” Theme 1 The Natural Resource Challenge.
2004- 2006	EC Review of Forest Focus Regulations. (as Project Coordinator)
2001	NERC funding for Centre for Terrestrial Carbon Dynamics (Sheffield Univ)
1998	Biological and Biomedical Research Council /CASE PhD studentship (Sussex Univ.) “Particulate pollutants and trees”
1997	Natural Environment Research Council PhD studentship “Beech and oak water relations and CO ₂ ”
1995 –1996	European Union PHARE Programme – consultancy on the commercial development of forestry in Romania.
1992	Department for the Environment and /FC PhD studentship (Lancaster Univ) Elevated CO ₂ , water relations and nutrition of Sitka spruce
1993	EU/FC studentship (Lancaster Univ.) Effects of air pollution on hybrid poplar.
1993 – 1994	CEC Env Programme; Effects of CO ₂ on trees – ECO-CRAFT
1991	DoE/FC PhD studentship (University of Ulster
1990 – 1993	CEC STEP grant; Interacting effects of drought and pollution

1994	EU Forest Monitoring funding under regulation 3528/86 and 2158/92
1993	EU Forest Monitoring funding under regulation 3528/86 and 2158/92
1992	EU Forest Monitoring funding under regulation 3528/86 and 2158/92
1991	EU Forest Monitoring funding under regulation 3528/86 and 2158/92
1990	EU Forest Monitoring funding under regulation 3528/86
1989	EU Forest Monitoring funding under regulation 3528/86
1988	EU Forest Monitoring funding under regulation 3528/86
1987	EU Forest Monitoring funding under regulation 3528/86
1986 – 1989	Department of the Environment grant on O ₃ and SO ₂ impacts
1987 - 1990	CEC; Early diagnosis of forest decline
1987 - 1991	NERC/CASE studentship (Lancaster Univ.)
1986	Northern Ireland Forest Service; Survey of Forest Decline
1985	Mandops UK Ltd (Agrochemical Specialists)

Publication list P. H. FREER-SMITH

- FREER-SMITH P, BOZANO M, DRÖSSLER L, FARRELLY N, JACTEL H, KORHONEN J, MIJNIK M, MINOTTA G, MUYS B, CHRISTOPHE O
Afforestation and plantation forests: potential and impacts in Europe In preparation for publication Nov 2019 **From Science to Policy – series report No X** European Forest Institute.
<https://www.efi.int/policysupport/publications>
- FREER-SMITH P H The Story of Forest Science. Chapter 15 of the Forestry Commission Centenary Book to be launched in Sept. 2019 at The House of Commons, London. In press Third Millennium/Profile Editions
<http://profileeditions.com>
- FREER-SMITH P H and PEACE S 2019 100 years of Forestry Research.
The Quarterly Journal of Forestry Vol 113 (1) 21-27 www.rfs.org.uk
- SILVA L N, FREER-SMITH P H and MADSEN P 2018 Over 10 years, the NGP concept has demonstrated ways to address some of the biggest global challenges. NGP Review 2018 pages 6- 11 <https://newgenerationplantations.org/multimedia/file/fa03cc28-c6ef-11e8-b1d8-005056986313>
- SILVA L N, FREER-SMITH P H and MADSEN P 2018 Production, Restoration, Mitigation: a new generation of plantations. **New Forests** DOI 10.1007/s11056-018-9644-6 <https://link.springer.com/article/10.1007/s11056-018-9644-6>
- JEFFRIES, B, FREER-SMITH P H and others. 2017 10 years of the New Generation Plantations Platform. E book launched in June 2017 at the NGP annual event **www.newgenerationplantations.org**.
- FREER-SMITH P H and WEBBER, J F. 2015. Tree pests and diseases: the threat to biodiversity and the delivery of ecosystem services. **Biodiversity and Conservation** DOI: 10.1007/s10531-015-1019-0
- WHITEMAN et al 2015 Carbon benefits by changing management practice of trees/forests. Chapter 5 of FAO Paper The Economics of Climate Change Mitigation Options in the Forest Sector. To be launched at the Framework Convention on Climate Change COP 21 in Paris Nov 2015.
- TALLIS J T, AMORIM J, CALFAPIETRA C, FREER-SMITH P H, GRIMMOND S, KOTTHAUA S, LEMES DE OLIVEIRA F, MIRANDA A I & TOSCANO P 2015 The impacts of green infrastructure on air quality and temperature. Chapter 2 in Handbook on Green Infrastructure Planning, Design and Implementation, Ed Sinnott D, Smith N and Burgess S. Edward Elgar Publishing.
- PAYN T, CARNUS J-M, FREER-SMITH P H, KOLLET W, LIU SHIRONG, ORAZIO C, RODRIGUEZ L, SILVA L N and WINGFIELD M 2015 Changes in Planted

Forests and Future Global Implications **Forest Ecology and Management**. 352, 57-67.

FREER-SMITH P H and ORAZIO C 2015 (Sept) Integrating mitigation and adaptation into sustainable development. Session 2216 report to Our Common Future Under Climate Change submitted for briefing papers of COP 21 Paris Nov/Dec 2015. <http://www.commonfuture-paris2015.org>

FREER-SMITH P H, ORAZIO C, MORISON J-, CARTNUS J-M, TOME M and PAYN T 2015 Achieving the Potential Contribution of Planted Forests to Adaptation and Mitigation of Climate Change. Paper presented to session 2216 of Our Common Future Under Climate Change ISC preparation for FCC COP 21 July 2015. Published online at <http://www.commonfuture-paris2015.org/programme/parallel-sessions/>

FREER-SMITH P H 2015 Global Forest Resources and Management. Paper presented to the Cambridge Forum on Sustainability. published online at <http://www.cfse.cam.ac.uk/directory/forum> April 2015

FREER-SMITH P H 2014 Ecosystem Services provided by Planted Forests Paper presented at IUFRO World Congress, Salt Lake City, October 2014 in side event "Towards Strengthened International Collaboration on Planted Forests". Published on line at www.iufro.org/science/task-forces/planted-forests/.

BORREGO C, LOPES M, CASCAO P, AMORIM J, MARTINS H, TAVAROS R, MIRANDA A, TALLIS M and FREER-SMITH P 2014 Urban air quality models. Chapter 8 of Understanding Urban Metabolism; A tool for urban planning. Edited by Chrysoulakis N, de Castro E A and Morris E J. Published by Routledge, 2 Park Square Abingdon OX14 4RM and 711 Third Avenue NY 10017. ISBN:978-0-415-83511-4

CARNUS J-M, FREER-SMITH P H, TOME M and PAYN T 2014 Adaptation of Planted Forests to Climate Change; from Global to Local Approaches. Paper presented at IUFRO World Congress, Salt Lake City, October 2014 and **The International Forest Review** Vol 16 (5) 221 ISBN (print) 1465-5498 and ISBN (online) 2053-7778 at www.iufro2014.com

CARNUS J-M, FREER-SMITH P H and ORAZIO C 2014 Main Issues and Research Needs for Planted Forests. Paper presented at IUFRO World Congress, Salt Lake City, October 2014 **The International Forest Review** Vol 16 (5) 151 ISBN (print) 1465-5498 and ISBN (online) 2053-7778 at www.iufro2014.com

FREER-SMITH P H and WEBBER J 2014 The Impacts of Pests and Diseases on Future Delivery of Ecosystem Services. Paper presented at IUFRO World Congress, Salt Lake City, October 2014 **The International Forest Review** Vol 16 (5) 5 ISBN (print) 1465-5498 and ISBN (online) 2053-7778 at www.iufro2014.com

PAYN T, CARNUS J-M, FREER-SMITH P H, ORAZIO C, and NABUURS 2014 Planted Forests on the Globe – Renewable Resources for the Future. **New Zealand**

Journal of Forestry Science. 44 (Suppl 1):S1 DOI:10:1186/1179-5395-44-S1-S1 and online at www.nzforestryscience.com/supplements/44/S1

BOYD I L, FREER-SMITH P.H, GODFRAY H.C.J. and GILLIGAN C.A. 2013. The global importance of tree pests and diseases. **Science** 342 2013 DOI: 10:1126/science 1235773

FREER-SMITH P H 2013 Ash dieback – The biology and spread of *Chalara fraxinea/Hymenoscyphus pseudoalbidus*. **Science in Parliament** 70 (1) 23 – 25

MENDES A, MASON B, ORAZIO C, NABUURS G-J JACTEL H, MARTINEZ I, CARNUS J-M TOME M, FREER-SMITH P H, KOLLERT W (in alphabetic order) 2013 Summary Report of the 3 rd International Congress on Planted forests. Published by FAO at www.fao.int and also available at http://www.efiatlantic.efi.int/portal/events/past_events/2013/icpf/.

CHRYSOULAKIS N., BORREGO C., SAN JOSE R., GRIMMOND C.S.B., JONES M., MAGIULO E., KLOSTERMANN J., SANTAMOURIS M., MITRAKA Z., CASTRO E., GONZALES A., VOGT R., VESALA T., SPANO D., PIGEON G., FREER-SMITH P. H., STASZEWSKI T., HODGES N., MILLS G. AND CARTALIS C., 2013 Sustainable urban metabolism as link between bio-physical sciences and urban planning, **Landscape and Urban Planning** 112, 100-117

FREER-SMITH P. H. and WEBBER J. 2012 Tree Health and Plant Biosecurity – Known and likely threats Paper presented to Defra Task force on tree Health and Plant Biosecurity.

CHRYSOULAKIS N., BORREGO C., SAN JOSE R., GRIMMOND C.S.B., JONES M. MAGIULO E., KLOSTERMANN J., SANTAMOURIS M., MITRAKA Z., CASTRO E., GONZALES A., VOGT R., VESALA T., SPANO D., PIGEON G., FREER-SMITH P. H., STASZEWSKI T., HODGES N., MILLS G. AND CARTALIS C., 2011 Sustainable urban metabolism as link between bio-physical sciences and urban planning. The BRIDGE Final Contract Report to CEC

ROWE R., WHITTAKER J., FREER-SMITH P.H., HOWARD D. and TAYLOR G. 2012 Good or bad biofuels? Counting the cost of carbon reveals limitations in LCA approach for bioenergy comparisons. **Biofuels.** 2 (6) 693-707

TALLIS, M., TAYLOR Gail, SINNETT, D. AND FREER-SMITH P H. 2011 Estimating the removal of atmospheric particulate pollution by the urban tree canopy of London, under current and future environments. **Landscape and Urban Planning** 103 129-138.

CARNUS J-M, TOME M., BATTAGLIA M., PAYN T, and FREER-SMITH P.H. 2011 TRANZFOR Transferring research between EU and Australia – New Zealand on forestry and climate change. International innovation, Disseminating science research and technology. 1 – 8 Research Media Ltd

- COPPOCK, R. and FREER-SMITH, P.H. 2010 Forest Resilience and the Use of Species Mixtures. Paper presented to the UK Forestry Commissioners, November 2010.
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Brandi Goss
Environmental Scientist
California Board of Forestry and Fire Protection
P.O. Box 944246 Sacramento,
CA 94244-2460

08 May 2019

Dear Brandi Goss,

I am writing to apply to be an Academic Representative on the Board of Forestry and Fire Protection's Effectiveness Monitoring Committee. I am a professional forest ecologist, and my background in forest assessment and monitoring, my research on the responses of California trees to climate, disturbance and land use and my experience interacting with public and private land managers are directly relevant to the work of the Committee. I received a B.A. from Stanford and a Ph.D. in Biology from the University of Washington. I am currently an NSF and NOAA postdoctoral fellow at UC Berkeley and Carnegie Institution for Science, and I will soon be starting a tenure-track faculty position as an Assistant Professor at UC Santa Barbara (start date likely 2020).

My research focuses on the response of forests in the western U.S. to climate change, with a particular emphasis on drought-induced forest mortality and California ecosystems, and I have written 20 peer reviewed scientific papers on these topics. For example, I have recently helped develop methods for identifying areas of California forests that are particularly resilient or particularly vulnerability to drought-induced stress using satellite data (Broderick, Anderegg & Asner, 2019), as well as early warning methods to identify forests that will soon succumb to drought-induced forest mortality (Anderegg, Anderegg & Huang, 2019). Both of these projects are explicitly management focused, aiming to provide useful deliverables to help both public and private land managers identify sensitive areas before trees start dying. Through my extensive fieldwork across California and the Western U.S., I have also developed strong working relationships with both private and public land managers and have developed a working knowledge of various forest management operations on forestlands of a variety of land tenure.

Thanks to my postgraduate training and research experience, I have intimate familiarity with forest monitoring efforts (plot-level inventories such as the Forest Inventory and Analysis, timber cruising methods, forest health flight surveys). I am also familiar with fundamental forestry principles drawn on in the California Forest Practice Rules such as the individual and stand growth determinants of Adequate Site Occupancy used to assess the Maximum Sustained Production of High Quality Timber Products requirements for THPs (Chapter 4; Subchapters 4,5,6; Article 3, Sections 913.11, 933.11, 953.11). I have a working knowledge of the silvicultural techniques (regeneration methods, prescriptions and intermediate treatments) references in the California Forest Practice Rules and an understanding of how these techniques can help meet the objectives of the 1973 Forest Practice Act (PRC 4512 and 4513), and I am a member of the Society of American Foresters. I also have a strong understanding of the scientific basis behind the guidelines around Biological Resources, Soil Productivity, Greenhouse Gas Impacts, and Watershed Resources that must be addressed in THPs (for example in Cumulative Impacts Assessments, Chapter 4; Subchapters 4,5,6; Technical Rule Addendum No. 2). Finally, I have general knowledge of the listing process and management mandates associated with rare, threatened and endangered species listed under the State or Federal Endangered Species Acts.

As a research scientist, I routinely work in collaborative groups, often including members from government agencies such as the USFS and USGS. I have also demonstrated my collaborative capacity as a Representative to the President for the Collaborative Workplace Initiative (CWI), a group designed to assess and improve the work environment at the Carnegie Institution for Science. In addition, I have a strong record of producing work products in a timely manner, as mandated by multiple grants that I have received from federal granting agencies such as the National Science Foundation and National Oceanic and Atmospheric Administration.

In summary, I meet all of the requirements for an Academic Representative to the EMC. I am passionate about the health and continued productivity of California's forestland, and have a strong understanding of the ecological and land-management challenges that face Californian ecosystems. I would be excited to lend my scientific knowledge and expertise to the Board of Forestry and Fire Protection through service on the Effectiveness Monitoring Committee. I have also attached my Curriculum Vitae for your reference. Thank you for your consideration.

Sincerely,



Leander D.L. Anderegg
Postdoctoral Fellow
University of California, Berkeley
and Carnegie Inst. for Science



Leander D.L. Anderegg

NOAA and NSF Postdoctoral Fellow
UC Berkeley, Dept. of Integrative Biology
Carnegie Institution for Science, Dept. of Global Ecology

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:

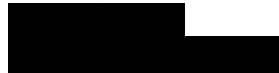
- Discovery Channel: "How trees try to cope with climate change" (<http://news.discovery.com/earth/plants/how-trees-try-to-cope-with-climate-change-151214.htm>)
- Environmental Monitor: "With drought, some western trees hunker down while others give up" (<http://www.fondriest.com/news/with-drought-some-western-trees-hunker-down-while-others-give-up.htm>)
- 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:

Dr. Todd Dawson
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 Department of Environmental Science, Policy and Management
 University of California, Berkeley
 Berkeley, CA



Dr. Janneke Hille Ris Lambers (Dissertation advisor)
 Walker Endowed Professor of Natural History
 Biology Department
 University of Washington, Seattle

[REDACTED]

Dr. Joseph Berry
Staff Scientist
Department of Global Ecology
Carnegie Institute for Science

[REDACTED]

Dr. Thomas Hinckley
Professor Emeritus
School of Environmental and Forest Sciences
University of Washington, Seattle

[REDACTED]