

Lora Richards

Lora Robinson

Biology Department, University of Nevada, Reno
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ACADEMIC QUALIFICATIONS

Ph.D. Biology

University of Utah, Salt Lake City UT 2006

B.S. Evolution and Ecology

University of California, Davis, CA 2000

PROFESSIONAL APPOINTMENTS

Associate Professor 2024 – present

Biology Department, University of Nevada, Reno

Assistant Professor 2018 – 2024

Biology Department, University of Nevada, Reno

Research Assistant Professor 2013 – 2018

Biology Department, University of Nevada, Reno

Postdoctoral Fellow 2009 – 2013

Biology Department, University of Nevada, Reno

NSF International Postdoctoral Fellow 2006 – 2008

Macquarie University, Sydney Australia

PUBLICATIONS

ORCID [0000-0002-8052-4378](https://orcid.org/0000-0002-8052-4378)

[NCBI bibliography](#)

39. Massad, TJ, Nascimento AR, Campos Moreno DF, Simbaña W, Garcia Lopez H, Sulca L, Lapesqueur C, **Richards LA**, Forister ML, Stireman JO, Tepe EJ, Uckele KA, Braga L, Walla TR, Smilanich AM, Grele A, Dyer LA. 2023. Variation in the strength of local and regional determinants of herbivory across the Neotropics. *Oikos* e10218. <https://doi.org/10.1111/oik.10218>
38. Dole HE, Villamarin-Cortez S, **Richards LA**. 2023. Facing the flames: insect responses to megafires and changing fire regimes. *Current Opinion in Insect Science*. 60:e101129 doi.org/10.1016/j.cois.2023.101129
37. Glassmire AE, Carson WP, Smilanich AM, **Richards LA**, Jeffrey CS, Dodson CD, Philbin CS, Humberto GL, Dyer LA. 2023. Multiple and contrasting pressures determine intraspecific phytochemical variation in a tropical shrub. *Oecologia* 201:991-1003
36. Rosa GM, Perez R, **Richards LA**, Richards-Zawacki CL, Smilanich AM, Reinert LK, Rollins-Smith LA, Wetzel DP, Voyles J. 2022. Seasonality of host immunity in a tropical disease system. *Ecosphere* 13 (7): e4158

35. Massad TJ, **Richards LA**, Philbin C, Yamaguchi LF, Kato MJ, Jeffrey CS, Oliveira Jr C, Ocsenrider K, de Moraes MM, Tepe EJ, Torrejon GC, Sandivo M, LA Dyer. 2022. The chemical ecology of tropical forest diversity: Environmental variation, chemical similarity, herbivory, and richness. *Ecology* 103(9): e3762
34. Philbin CS, Dyer LA, Jefferey CS, Glassmire AE, **Richards LA**. 2022. Structural and compositional dimensions of phytochemical diversity in the genus *Piper* reflect distinct ecological modes of action. *Journal of Ecology* 110 (1):57-67
33. Philbin CS, Paulsen M, **Richards LA**. 2021. Opposing Effects of *Ceanothus velutinus* Phytochemistry on Herbivore Communities at Multiple Scales. *Metabolites* 11(6): 361
32. Uckele KA, Jahner JP, Tepe EJ, **Richards LA**, Dyer LA, Ochsenrider KM, Philbin CS, Kato MJ, Yamaguchi LF, Forister ML, Smilanich AM, Dodson CD, Jeffrey CS, Parchman TL. 2021. Phytochemistry reflects different evolutionary history in traditional classes versus specialized structural motifs. *Scientific Reports* 11(1):1-14
31. Hudon S, Zaiats A, Roser A, Roopsind A, Barber C, Robb B, Pendleton B, Camp M, Clark P, Davidson M, Frankel-Bricker J, Fremgen-Tarantino M, Forbey J, Hayden E, **Richards L**, Rodriguez O, Caughlin T. 2021. Unifying community detection across scales from genomes to landscapes. *Oikos* 130(6): 831-843
30. Matocq MD, Ochsenrider KM, Jeffrey CS, Nielsen DP, **Richards LA**. 2020. Fine-scale differentiation in diet and metabolomics of small mammals across a sharp ecological transition. *Frontiers in Ecology and Evolution* 8: 282-291
29. Forister ML, Yoon S, Philbin CS, Dodson CD, Hart B, Harrison JG, Shelef O, Fordyce JA, Marion ZH, Nice CC, **Richards LA**, Buerkle CA, Gompert Z. 2020. Caterpillars on a phytochemical landscape: The case of alfalfa and the Melissa blue butterfly. *Ecology and Evolution* 10: 4366-4374
28. Murphy SM, **Richards LA**, Wimp GM. 2020. Editorial: Arthropod Interactions and Responses to Disturbance in a Changing World. *Front. Ecol. Evol.* 8:93.
27. Glassmire AE, Philbin CS, **Richards LA**, Jeffrey CS, Snook JS, Dyer LA. 2019. Proximity to canopy mediates changes in the defensive chemistry and herbivore loads of an understory tropical shrub, *Piper kelleyi*. *Ecology Letters* 22: 332-341
26. Dell JE, Salcido DM, Lumpkin W, **Richards LA**, Pokswinski SM, Loudermilk EL, et al. 2019. Interaction Diversity Maintains Resiliency in a Frequently Disturbed Ecosystem. *Frontiers in Ecology and Evolution* 7, 145
25. Dell JE, Pokswinski SM, **Richards LA**, Hiers JK, Williams BW, O'Brien JJ, Loudermilk EL, Hudak AT, Dyer LA. 2019. Maximizing the monitoring of diversity for management activities: Additive partitioning of plant species diversity across a frequently burned ecosystem. *Forest Ecology and Management* 432:409-414.
24. Loudermilk EL, Dyer LA, Pokswinski S, Hudak AT, Hornsby B, **Richards LA**, et al. 2019. Simulating Groundcover Community Assembly in a Frequently Burned Ecosystem Using a Simple Neutral Model. *Frontiers of Plant Science* 10, 1107
23. **Richards LA**, Oliveira C, Dyer LA, Rumbaugh A, Urbano-Munoz F, Wallace IS, Dodson CD, Jeffrey CS. 2018. Shedding Light on Chemically Mediated Tri-Trophic Interactions: A ¹H-NMR Network Approach to Identify Compound Structural Features and Associated Biological Activity. *Frontiers of Plant Science* 9, 1155

22. Dyer LA, Philbin CS, Ochsensrider KM, **Richards LA**, Massad TJ, Smilanich AM, Forister ML, Parchman TL, Galland L, Hurtado PJ, Espeset AE, Glassmire AE, Harrison JG, Mo C, Yoon S, Pardikes NA, Muchoney ND, Jahner JP, Slinn HL, Shelef O, Dodson CD, Kato MJ, Yamaguchi LF, Jeffrey CS. 2018. Modern Approaches for Studies of Chemical Ecology with a Focus on Plant-Insect Interactions. *Nature Reviews Chemistry* 2: 50-64.
21. Slinn HL, **Richards LA**, Dyer LA, Hurtado PJ, Smilanich AM. 2018. Across multiple species, phytochemical diversity and herbivore diet breadth have cascading effects on herbivore immunity and parasitism in a tropical model system. *Frontiers of Plant Science* 9, 656
20. Koltz AM, Burkle LA, Pressler Y, Dell JE, Vidal MC, **Richards LA**, Murphy SM. 2018. Global change and the importance of fire for the ecology and evolution of insects. *Current Opinion in Insect Science* 29: 110-116
19. Jahner JP, Forister ML, Smilanich AM, Parchman TL, Wilson JS, Tepe EJ, **Richards LA**, Quijano-Abril MA, Glassmire AE, Dyer LA. 2017. Host conservatism, geography, and elevation in the evolution of a Neotropical moth radiation. *Evolution* 71: 2885-2900
18. Dell JE, **Richards LA**, O'Brien JJ, Loudermilk EL, Hudak AT, Pokswinski SM, Bright BC, Hiers JK, Williams BW, Dyer LA. 2017. Overstory-derived surface fuels mediate plant species diversity in frequently burned longleaf pine forests. *Ecosphere* 8(10):e01964.
17. Dell JE, O'Brien JJ, Doan L, **Richards LA**, Dyer LA. 2017. An arthropod survival strategy in a frequently burned forest. *Ecology*. doi:10.1002/ecy.1939
16. Massad TJ, de Moraes MM, Philbin C, Oliveira Jr C, Torrejon GC, Yamaguchi LF, Jeffrey CS, LA Dyer, **Richards LA**, Kato MJ. 2017. Similarity in volatile communities leads to increased herbivory and greater tropical forest diversity. *Ecology* 98: 1750-1756.
15. **Richards LA**, Glassmire AE, Ochsensrider KM, Dodson CD, Jeffrey CS, Dyer LA. 2016. Phytochemical diversity and synergistic effects on herbivores *Phytochemistry Reviews* 15: 1153–1166.
14. Glassmire AE, Jeffrey CS et al 2016. Intraspecific phytochemical variation shapes community and population structure for specialist caterpillars *New Phytologist* 212: 208 – 219.
13. **Richards LA**, Dyer LA, Forister ML, Smilanich AM, Dodson CD, Leonard MD, Jeffrey CS. 2015. Phytochemical diversity drives plant-insect community diversity. *Proceedings of the National Academy of Sciences USA* 112:10973-10978.
12. Dyer LA, Parchman TL, Jeffrey CS, **Richards LA**. 2014. New dimensions of tropical diversity: an inordinate fondness for insect molecules, taxa, and trophic interactions. *Current Opinion in Insect Science* 2:1-6.
11. Turcotte MM, Thomsen CJM, Broadhead GT, Fine PVA, Godfrey GM, Lamarre GPA, Meyer ST, **Richards LA**, Johnson MJT 2014. Percentage leaf herbivory across vascular plant species. *Ecology* 95:788
10. Jeffrey CS, Leonard MD, Glassmire AE, Dodson CD, **Richards LA**, Kato MJ and LA Dyer. 2014. Antiherbivore Prenylated Benzoic Acid Derivatives from *Piper kelleyi*. *Journal of Natural Products* 77: 148-153.
9. Dyer LA, **Richards LA**, Short S, Dodson CD. 2013. Synergistic and interacting effects of CO₂ and temperature on tritrophic interactions *PLOS One* 8: e62528.
8. **Richards LA**, Lampert EC, Bowers MD, Dodson CD, Smilanich AM, Dyer LA. 2012. Synergistic effects of iridoid glycosides on the specialist buckeye caterpillars. *Journal of Chemical Ecology* 38:1276 – 1284

7. Onoda Y, **Richards LA**, Westoby M. 2012. The importance of leaf cuticle for carbon economy and mechanical strength. *New Phytologist* 196:441-447.
6. **Richards LA**, Coley PD. 2012. Domatia morphology and mite occupancy of *Psychotria horizontalis* (Rubiaceae) across the Isthmus of Panama. *Arthropod – Plant Interactions* 6:129-136
5. Onoda Y, Westoby M, Adler PB, Choong AMF, Clissold FJ, Cornelissen JHC, Díaz S, Dominy NJ, Elgart A, Enrico L, Fine PVA, Howard JJ, Jalili A, Kitajima K, Kurokawa H, McArthur C, Lucas PW, Markesteijn L, Pérez-Harguindeguy N, Poorter L, **Richards LA**, Santiago LS, Sosinski EE, Van Bael SA, Warton DI, Wright IJ, Wright JS and Yamashita N. 2011. Global patterns of leaf mechanical properties. *Ecology Letters* 14:1-12.
4. **Richards LA**, Dyer LA, Smilanich AM, Dodson CD. 2010. Synergistic effects of amides from two *Piper* species on generalist and specialist herbivores. *Journal of Chemical Ecology* 36:1105-1113.
3. **Richards LA**, Coley PD. 2008. Combined effects of host plant quality and predation on a Tropical Lepidopteran: A comparison between tropical treefall gaps and the understory. *Biotropica* 40: 736-741.
2. **Richards LA**, Coley PD. 2007. Seasonal and habitat differences affect the impact of food and predation on herbivores: a comparison between gaps and understory of a tropical forest. *Oikos* 116: 31-40.
1. **Richards LA**, Windsor D. 2007. Seasonal variation of arthropods in gaps and understory of a lowland moist forest in Panama. *Journal of Tropical Ecology* 23: 169-176.

GRANTS AND FELLOWSHIPS

Awarded

- | | |
|---|-------------|
| NRT-URoL: - \$3,000,000 | 2023 - 2028 |
| “Chemically-mediated biotic interactions in the age of metabolomics, genomics and enhanced macroecological data” | |
| PI: M Matocq; coPIs: LA Richards , LA Dyer, CS Jeffrey, CS Philbin | |
| NSF- URoL Emerging Networks - \$2,999,552 | 2022 – 2027 |
| “Quantifying the phytochemical landscape through Indigenous Knowledge, interaction diversity, genomics and network dynamics.” | |
| PI: LA Richards ; coPIs: TD Swanson, LA Dyer, DR Schmidt, CS Jeffrey, | |
| NSF- OIA-EPSCoR Research Infrastructure - \$2,078,112 | 2018 – 2022 |
| “RII Track-2 FEC: Genomics Underlying Toxin Tolerance (GUTT): Identifying molecular innovations that predict phenotypes of toxin tolerance in wild vertebrate herbivores” | |
| PI: M Matocq; coPIs: LA Richards | |
| USFS - The Role of Host Chemical Defense and Natural Enemies on White Satin Moth Dynamics - \$6000 | 2020 |
| PIs: LA Richards , P Maloney | |
| USFS - "USFS Region 8 Monitoring Data Analysis" - \$94,000 | 2018 – 2019 |
| PI: LA Richards | |
| NSF- IOS, Integrative Ecological Physiology - \$646,787 | 2015 – 2019 |

- “Differential adaptation to plant toxins: the role of chemically -mediated selection in reproductive isolation between mammalian herbivores.”
 PI: M Matocq; coPIs: **LA Richards**, CS Jeffrey, J Hayes
 NSF- DEB, Dimensions of Biodiversity - \$1,502,447 2014 – 2019
- “Collaborative Research: Dimensions US-Biota Sao Paulo: Chemically mediated multi-trophic interaction diversity across tropical gradients”
 PI: LA Dyer; coPIs: **LA Richards**, T Parchman, CS Jeffrey, AM Smilanich
 Earthwatch Institute - \$600,000 2016 – 2021
- “Climate change and caterpillars in diverse ecosystems”
 PI: LA Dyer; coPIs: **LA Richards**, TL Parchman, CS Jeffrey, AM Smilanich
 NSF International Postdoctoral Fellowship - \$238,232 2006 – 2008
- “Interactions between plants, herbivores and natural enemies along a latitudinal gradient of Australian rainforests”
 PI: **LA Richards**
- Other grant contributions**
- Dept. of Defense, SERDP - \$756,954 2012 – 2017
 “Patterns and Processes: Monitoring and Understanding Plant Diversity in Frequently Burned Longleaf Pine Landscapes”
 PIs: LA Dyer and JJ O’Brien
- NSF-DEB, Population & Community Ecology Program – \$382,045 2012 – 2015
 “Collaborative research: Phylogenetic and phytochemical cascades and the evolution of tropical diversity”
 PI: AM Smilanich; coPIs: ML Forister, CS Jeffrey, LA Dyer

TEACHING EXPERIENCE

University of Nevada, Reno

- Instructor – Natural Products: Origins, Analysis and Pharmacognosy Spring 2019- present
 Instructor – Population and Community Ecology Fall 2019- present
 Instructor - Introduction to Organic Chemistry 2014

Mentoring

Honors and Awards

2023 Jenkins Mentorship Award – This is a student selected award given to a faculty mentor in the Ecology Evolutionary Biology and Conservation (EECB) graduate program at the University of Nevada, Reno to recognize their dedication and engagement in academic mentoring.

Graduate advisor

Current: Ari Grele (PhD), Devon Picklum (PhD), Haley Dole (PhD), Ericka Kay (co-advised, PhD), Abigail Jarrett (co-advised, PhD),
Graduated: Matt Paulsen (Biotechnology, MS), Lilly Whitehead (Biology, MS)

Postdoctoral advisor:

Past: Jane Dell (2018 - 2019), Kaitlin Ochsenrider, (2019 – 2021),

Casey Philbin (2019 - 2022)

Visiting International Research Associate, Flavia Fogueira De Sa (2018 –2019)

Graduate Committee member:

EECB PhD

Current: Kelly Robinson, Stephanie Coronado, Claire Williams, Cas Carroll, Victoria Peechatt, Chloe Collier

Graduated: Chanchanok Sudta, Danielle Salcido, Danny Nielsen, Nadya Muchoney, Jane Dell, Andrea Glassmire

Chemistry PhD

Current: Supadach Prertprawnon, Zachary Ledvina, Tanzil Mahmud, Megan Burroughs, Katherine Graham, Cameron Locke, Alex English

Graduated: Hannah Anderson, Stephen George, Kaitlin Ochsenrider, Dustin Patterson, William Thompson, Arjun Acharya

Other:

Current: Elle Horwath (Boise State University, PhD)

Graduated: Natasha Lang (Mathematics & Statistics, MS), Tara Langus (Biology, MS)

Undergraduate mentoring

Young Explorer Program mentor – In collaboration with the Honors College I provide undergraduates research experience in Ecuador.

2024: Simone Jacot, Clair Johnson, Audrey Will

2023: Paola Miramontes, Isabella Dalla, Rayan Laique

Nevada Undergraduate Research Award mentor: Elle Horwath, Isabel Piccinini

Independent study/research: Delaney Georgeson, Jade Magna, Connor Green (Senior thesis), Matt Paulsen, Paola Miramontes, Precious Fang, Rainier Pinili (Senior thesis)

Undergraduate research assistants: Patrick Voss, Camila Cardillo Moreno, Jasmine Lam, Alexander Arnold, Sneha Thomas, Precious Fang, Jade Magna, Chris Orosco

Nevada Promise: I mentor Truckee Meadows Community College first-generation community college students. Christian Hill, Jaime Montero Lopez, Raihan Stuart, Gilberto Guzman.

PRESENTATIONS

Invited Speaker

University of Wisconsin, Madison, Department of Entomology	2022
Boise State University, Department of Chemistry	2020
College of Idaho, Department of Chemistry	2019
University of Wyoming, Department of Botany	2019
University of Cincinnati, Department of Biological Sciences	2017

University of Georgia, Atlanta; Plant Biology Dept.	2017
University of Leiden, Netherlands; Metabolomics Workshop	2014
Conference oral presentations	
Plant-Herbivore Interactions: Gordon Research Conference	2023
International Congress of Entomology	2022
Ecological Society Meeting – invited organized oral session	2016, 2017, 2018, 2021
International Chemical Ecology Meeting	2016
Entomological Society of America – invited member symposium	2017, 2018, 2021
Conference Posters presentations	
International Chemical Ecology Meeting	2019
Symposium of insect-plant interactions, Tours France	2017
Plant-Herbivore Interactions: Gordon Research Conference	2007, 2013, 2017, 2019
Phytochemical Society of North America Meeting	2015
Bioorganic Chemistry short course by the São Paulo School of Advanced Science, Araraquara, Brazil	2013

SYNERGISTIC ACTIVITIES

Scientific Co-Director – Hitchcock Center for Chemical Ecology

K-12 outreach:

Co-advised three teachers through RET program

CoPI on grants to Earthwatch Institute which incorporates citizen scientists in data collection and field work. The most of the Earthwatch teams are comprised of K-12 teachers or high schools students.

Panel reviewer –

Nevada Undergraduate Research Award 2020 (NURA)

NIFA – USDA Pest and Beneficial Species ECO Program– December 2018

NSF – NRT Evolution, Ecology, UROL, Bio – December 2023

Special topics editor - *Frontiers in Ecology and Evolution*, “Arthropod interactions and Response to Disturbance in a Changing World”

Ad hoc reviewer -

<i>Acta Oecologia</i>	<i>Evolution</i>	<i>Journal of Insect</i>
<i>American Naturalist</i>	<i>Evolution and Systematics</i>	<i>Physiology</i>
<i>Annals of ESA</i>	<i>Functional Ecology</i>	<i>Journal of Plant Ecology</i>
<i>Biotropica</i>	<i>Int J Mol Sci</i>	<i>New Phytologist</i>
<i>Chemecology</i>	<i>Int J Trop Bio</i>	<i>Oecologia</i>
<i>Ecography</i>	<i>Journal of Animal Ecology</i>	<i>Plant-Arthropod</i>
<i>Ecology</i>	<i>Journal of Chemical</i>	<i>Interactions</i>
<i>Ecology Letters</i>	<i>Ecology</i>	<i>Perspectives in Plant</i>
<i>Ecological Entomology</i>	<i>Journal of Ecology</i>	<i>Ecology</i>
<i>Ecological Monographs</i>	<i>Journal of Environmental</i>	<i>Scientific Reports</i>
<i>Ecosphere</i>	<i>Entomology</i>	