

Alec S. Baird

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Research

Comparative and phylogenetic leaf development, anatomy and ecophysiology:

- Physiological mechanisms underlying species adaptation to climate
- Allometry of leaves from cells to tissues, from tissues to morphologies
- Modeling expansive cell and leaf growth physiology with anatomy, hydraulics, and metabolism
- Anatomical mechanisms underlying physiological differences and thresholds (C_3 vs. C_4 grasses, intra-versus inter-specific trait variation (stress tolerance traits), species coexistence)
- Developmental constraints to leaf level adaptation
- Experimental investigation of leaf level developmental plasticity

Employment

Graduate student researcher , Dept. of Ecology & Evolutionary Biology, UCLA	Jan. 2022 – July 2023
Teaching assistant , Dept. of Ecology & Evolutionary Biology, UCLA	Mar. 2018 – Sept. 2022
Research biologist , Adaptive Symbiotic Technologies, Seattle, U.S.	Apr. 2016 – Sept. 2017
Post-baccalaureate researcher , Dept. of Biology, UW, Seattle, U.S.	June 2016 – Sept. 2017
Data technician , Dr. Jerry Franklin Lab, SEFS, UW, Seattle, U.S.	Sept. 2015 – March 2016
Undergraduate researcher , Dr. Janneke HilleRisLambers Lab, Dr. Elizabeth Van Volkenburgh Lab, Dept. of Biology, UW, Seattle, U.S.	Jan. 2014 – June 2016

Education

University of California, Los Angeles , PhD, Advisor: Dr. Lawren Sack Dissertation: Integrating leaf development processes with leaf structure and function to clarify mechanisms of environmental adaptation of leaves	Sept. 2017 – Sept. 2023
University of Washington, Seattle , BS, Plant biology; Minor, French	Sept. 2012 – June 2016

Publications * = equal contribution, † = undergraduate researcher

11. Liu C, Sack L, Li Y, Zhang J, Xu L, Li M, **Baird AS**, Yu G, He N. Stomatal dimensions and allometries: testing association with functional group and climate. *In preparation*
10. **Baird AS**, Ma Z, Buckley TN, Sack L. Integrating leaf expansion kinematics into the leaf economic spectrum: a meta-analysis across species. *In preparation*
8. **Baird AS**, Taylor SH, Pasquet-Kok J, Vuong C, Zhang Y, Watcharamongkol T, Scoffoni C, Edwards EJ, Osborne C, Sack L. Leaf hydraulic adaptation in C_3 and C_4 grasses. *In preparation*.
7. **Baird AS**, Medeiros CD, Bowers J†, Hii M†, Liang J†, Matsuda J†, Pisipati K†, Pohl C†, Simon B†, Tagaryen S†, Buckley TN, Sack L. Why do diverse species break a developmental trade-off? Elucidating the association of trichomes and stomata. *Submitted. American Journal of Botany*
6. **Baird AS**, Reddi S†, Pasquet-Kok J, Vuong C, Zhang Y, Watcharamongkol T, John GP, Scoffoni C, Osborne C, Sack L. Allometries of cell and tissue anatomy and photosynthetic rate across leaves of C_3 and C_4 grasses. *In Press. Plant, Cell & Environment*
5. **Baird AS**, Taylor SH, Pasquet-Kok J, Vuong C, Zhang Y, Watcharamongkol T, Scoffoni C, Edwards EJ, Christin P-A, Osborne C, Sack L. (2021) Developmental and biophysical determinants of grass leaf size worldwide. *Nature*. doi: <https://dx.doi.org/10.1038/s41586-021-03370-0>

- Featured by UCLA Newsroom: <https://newsroom.ucla.edu/releases/grass-blades-climate-change>

4. Liu C, Li Y, Zhang J, **Baird AS**, He N. (2020) Optimal community assembly related to leaf economic-hydraulic-anatomical traits. *Frontiers in Plant Science*. doi: <https://doi.org/10.3389/fpls.2020.00341>
3. Rodriguez R, **Baird AS**, Cho S, Gray Z, Groover E, Harto R, Hsieh M, Malmberg K, Manglona R, Mercer M, Nasman N, Nicklason T, Rienstra M, Van Inwegen A, VanHooser A, Redman R. (2019) Mitigating climate impacts on crop production via symbiosis, in *Endophyte Biotechnology: potential for agriculture and pharmacology*, pp. 59-67. Cabi. doi: <https://doi.org/10.1079/9781786399427.0059>
2. Rodriguez R, **Baird AS**, Batson A, Cho S, Gray Z, Harto R, Hsieh M, Malmberg K, Manglona R, Mercer M, Nasman N, Nicklason T, Rienstra M, Van Inwegen A, VanHooser A, Redman R (2019) Programming plants for climate resilience through symbiogenics, in *Seed Endophytes*, pp. 127 – 137. Verma, S., White, Jr J. Springer, Cham. doi: https://doi.org/10.1007/978-3-030-10504-4_7
1. **Baird AS**, Anderegg LDL, Lacey ME, HilleRisLambers J, Van Volkenburgh E. (2017) Comparative leaf growth strategies in response to low-water and low-light availability: Variation in leaf physiology underlies variation in leaf mass per area (LMA) in *Populus tremuloides*. *Tree Physiology*. 37:1140-1150. doi: <https://doi.org/10.1093/treephys/tpx035>

Awards, Grants & Honors

Conference travel award (\$1,500), Dept. of Ecology & Evolutionary Biology, UCLA	2022
Dissertation year fellowship (3 quarters funding), The Graduate Division, UCLA	2022
Excellence in research, PhD Candidate , Life Sciences, UCLA (\$500)	2022
Conference award (\$200), Dept. of Ecology & Evolutionary Biology, UCLA	2021
1st Place best graduate research poster (\$250 amazon gift card), Dept. of Ecology & Evolutionary Biology, UCLA	2021
Quarter fellowship (\$7,500 + fees/tuition), Dept. of Ecology & Evolutionary Biology, UCLA	2021
Conference award (\$200), Dept. of Ecology & Evolutionary Biology, UCLA	2020
Research award (\$400), Dept. of Ecology & Evolutionary Biology, UCLA	2020
Quarter fellowship (\$7,000 + fees/tuition), Dept. of Ecology & Evolutionary Biology, UCLA	2019
Conference travel grant (\$1,000), The Graduate Division, UCLA	2018
Conference travel award (\$1,200), Dept. of Ecology & Evolutionary Biology, UCLA	2019
Research award (\$2,000), Dept. of Ecology & Evolutionary Biology, UCLA	2019
Honorable mention , National Science Foundation Graduate Research Fellowship	2019
Conference travel award (\$500), Dept. of Ecology & Evolutionary Biology, UCLA	2018
2nd Place best research poster (\$150), Dept. of Ecology & Evolutionary Biology, UCLA	2018
University fellowship (\$3,000), The Graduate Division, UCLA	2017
Edwin W. Pauley fellowship (\$30,000), College of Letters and Science, UCLA	2017
Franco award, best undergraduate research paper (\$3,000), Dept. of Biology, UW	2016
Conference travel grant (\$850), Undergraduate Research Program, UW	2015
Research grant (\$1000), Washington State Nursery and Landscape Association	2015
Travel grant (\$575), The American Society of Plant Biologists	2015
Summer grant in field botany (\$2,500), The Garden Club of America	2015
Academic scholarship (\$1,000), Washington State Nursery and Landscape Association	2015
Frye-Hotson-Rigg award (\$2,400), Dept. of Biology, UW	2015
Mary Gates research endowment (\$4,000), UW	2015

Presentations * = presenting author; † = undergraduate researcher

21. Pisipati K†*, **Baird AS**, Medeiros CD, Sack L. Association of trichome density and climatic aridity across California plant species. **Contributed Poster Presentation, May 2023:** Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.

20. Simon B†*, **Baird AS**, Medeiros CD, Sack L. Relating abaxial and adaxial trichome density to solar radiation, elevation and seed mass. **Contributed Poster Presentation, May 2023:** Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.

19. Liang J†*, **Baird AS**, Medeiros CD, Sack L. The association of leaf trichome density and climate across plant communities. **Contributed Poster Presentation, May 2023**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.
18. Hii M†*, **Baird AS**, Medeiros CD, Sack L. Determinants of leaf size and why trichome density is independent of leaf size. **Contributed Poster Presentation, May 2023**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.
17. Bowers J†*, **Baird AS**, Medeiros CD, Sack L. The coordination of trichome and stomatal densities and the importance of density and size trade-offs. **Contributed Poster Presentation, May 2023**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.
16. **Baird AS***. Integrating developmental processes with leaf structure and physiology: mechanisms of eco-evolutionary adaptation of leaves. **Invited Seminar Speaker, April 2023**: UMR Laboratoire d'Écophysiologie des Plantes sous Stres Environnementaux (LEPSE); Montpellier, France.
15. **Baird AS***, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Edwards EJ, Osborne CP, Sack L. The hydraulic adaptation of grasses with contrasting photosynthetic pathways. **Contributed Poster Presentation June 2022**: Gordon Research Conference: Multiscale Plant Vascular Biology, Sunday River, Maine
14. **Baird AS***, Medeiros C, Buckley T, Sack L. Developmental basis of leaf trichome density. **Contributed Poster Presentation, May 2021**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.
13. Reddi S*†, **Baird AS**, Sack L. Modeling the energy balance of angiosperm leaves. **Contributed Poster Presentation, May 2021**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S. **Contributed Oral Presentation, May 2021**: Undergraduate Research Week Showcase, UCLA, CA, U.S.
12. **Baird AS***, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Edwards EJ, Christin P-A, Osborne CP, Sack L. Developmental and biophysical determinants of grass leaf size worldwide. **September 2021**: UCLA Plant Biology Seminar Series
11. Reddi S*†, **Baird AS**, Sack L. Allometries underlying grass leaf size. **Contributed Poster Presentation, May 2021**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S. **Contributed Oral Presentation, May 2021**: Undergraduate Research Week Showcase, UCLA, CA, U.S.
10. **Baird AS***, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Edwards EJ, Osborne CP, Sack L. Resolving the paradox of leaf vasculature in C₄ grasses: does high vein density drive high hydraulic conductance and photosynthesis? **Contributed Poster Presentation, May 2021**: Department of Ecology and Evolutionary Biology Research Symposium, UCLA, CA, U.S.
9. **Baird AS***. Integrating leaf development, structure and physiology to unravel insights and mechanisms of eco-evolutionary adaptation of leaves. **Invited Guest Lecture, February 2021**: California State University Los Angeles (CSULA) Biol 4300: Fundamental Research in Plant Ecological Physiology.
8. **Baird AS***, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Edwards EJ, Christin P-A, Osborne CP, Sack L. Developmental basis for the worldwide climatic distribution of grass leaf size. **Contributed Poster Presentation, July 2020**: Botany 2020., **August 2020**: Ecological Society of America (ESA) Conference
7. **Baird AS***, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Edwards EJ, Christin P-A, Osborne CP, Sack L. Developmental scaling of venation architecture in grasses underlies worldwide leaf size distribution. **Contributed Oral Presentation, May 2019**: UCLA Department of Ecology and Evolution

Biology: EcoEvo Pub, UCLA, CA, U.S., **August 2019**: American Society of Plant Biologists: Plant Biology 2019, San Jose, CA, U.S., **January 2020**: UCLA Plant Biology Seminar Series

6. Baird AS*, Taylor SH, Pasquet-Kok J, Vuong C, Zhang T, Watcharamongkol T, Scoffoni C, Diener AC, Edwards EJ, Christin P-A, Osborne CP, Sack L. Size scaling of vein architecture across C₃ and C₄ grasses.

Contributed Poster Presentation, May 2018: Department of Ecology and Evolutionary Biology Research Symposium (awarded 2nd best poster, \$150 prize), UCLA, CA, U.S. **June 2018**: Gordon Research Conference: Multiscale Plant Vascular Biology, Mt. Snow, VT

5. Baird AS*, Anderegg LDL, Lacey ME, HilleRisLambers J, Van Volkenburgh E. Comparative Leaf Growth Strategies in Response to Low-Water versus Low-Light Availability: Variation in Leaf Physiology Underlies Variation in Leaf Mass per Area. **Contributed Poster Presentation, August 2017**: Ecological Society of America (ESA) Conference, Portland, U.S.

4. Van Volkenburgh E*, **Baird AS**, Lacey ME, Rininger A, Cantillo-Polo J. Mechanisms of Behavior in Plants. **Invited Oral Presentation, June 2017**: Plant Signaling and Behavior (PSB) Conference, Matsue, Japan

3. Baird AS*, Anderegg LDL, Lacey ME, HilleRisLambers J, Van Volkenburgh E. Comparative Leaf Growth Strategies in Response to Low-Water versus Low-Light Availability: How Form Influences Function in *Populus tremuloides*. **Contributed Oral Presentation, May 2016**: Undergraduate Research Symposium, UW, Seattle, U.S.

2. Baird AS*, Anderegg LDL, Lacey ME, HilleRisLambers J, Van Volkenburgh E. Climatic and Competitive Constraints Drive Clinal Variation in *Populus tremuloides* Leaf Morphology. **Contributed Poster Presentation, May 2015**: Undergraduate Research Symposium, UW, Seattle, U.S., **July 2015**: Plant Biology (ASPB) Conference, Minneapolis, U.S., **August 2015**: Ecological Society of America (ESA) Conference, Baltimore, U.S.

1. Baird AS*, Kroiss S, HilleRisLambers J. Sapling Growth Across an Elevational Gradient: Implications of Climate Change Responses. **Contributed Poster Presentation, April 2014**: National Conference of Undergraduate Research, Eastern Washington University (**Invited & Declined**), **May 2014**: Undergraduate Research Symposium, UW, Seattle, U.S.

Activities

Podcast Interviewee , Agriculture, GMOs and Plant physiology	2021
https://anchor.fm/dragonfruit/episodes/Alec-Baird-Agriculture--GMOs--and-Plant-Physiology-epuo14	
Mildred E. Mathias Botanic Garden Docent , UCLA	2019 – present
Quarterly Plant Biology Seminar: Drought and Plant Physiology , UW	2016 – 2017
Undergraduate Modeling Workshop , SAMSI, NCSU, Raleigh NC	2015
Biology 180 (1 Intro. Biology Course) Rebooting Concepts in Ecological Seminar , UW	2015
Quarterly Plant Biology Seminar: Photosynthesis , UW	2014 – 2015

Society Member (past and present)

British Ecological Society (BES)
 Society of Plant Signaling and Behavior (PSB)
 Cactus and Succulent Society of America (CSSA)
 Ecological Society of America (ESA)
 American Society of Plant Biologists (ASPB)
 Union of Concerned Scientists (UCS)

Peer Reviewer

Note: the # in “()” indicates the number of manuscripts reviewed per journal

Total Publications Reviewed: 14; Annals of Botany (1), AoB Plants (1), Ecography (1), Ecology and Evolution (1), Ecology Letters (1) Frontiers in Plant Science (1), Journal of Plant Ecology (1), Journal of Plant Physiology (1), Nature Scientific Reports (1), New Phytologist (2), Plant Biology (1), Plant Ecology (1), ScienceAsia (1)

Teaching

Teaching assistant, EEB 100L Ecology and Behavior Lab, UCLA	Winter 2021
EEB 116 Conservation Biology, UCLA	Fall 2020
	Fall 2019
EEB 162L Plant Physiology and Ecophysiology Lab, UCLA	Summer 2022
	Spring 2022
	Summer 2021
	Spring 2021
	Summer 2020
	Spring 2020
	Summer 2019
	Spring 2018

Mentoring

Julia Bowers (UCLA), Thomas Condon (UCLA), Michelle Hii (UCLA), John Liang (UCLA), Josh Matsuda (UCLA), Kirthana Pisipati (UCLA) Caroline Pohl (UCLA), Sachin Reddi (UCLA), Ben Simon (UCLA), Silva Tagaryen (UCLA), Emiliano Ybarra, (UW), Jason Zhao (UCLA)