

CHRISTOPHER P. KRIEG

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I. RESEARCH AREAS

Plant physiological ecology, polyploid ecology, species distribution modeling, abiotic stress, functional biogeography, hydraulic vulnerability, structure & function, conservation physiology

II. EDUCATION

2019 Ph.D., Botany, **University of Florida**, Gainesville FL; Advisor: Dr. Emily Sessa
 2014 B.A., Biology, **Colgate University**, Hamilton NY; Advisor: Dr. J. Eddie Watkins

III. PROFESSIONAL APPOINTMENTS

2020–2022 NSF Postdoctoral Research Fellow, **University of Wisconsin**, Madison, WI
 2021–2022 Courtesy Postdoctoral Associate, **Florida International University**, Miami, FL
 2015–2019 Grinter Graduate Research Fellow, **University of Florida**, Gainesville, FL
 2015 Research Technician, **University of California**, Davis, CA
 2014 Research Technician, **Florida International University**, Miami, FL
 2014 Summer Research Fellow, **Colgate University**, Hamilton, NY

IV. PUBLICATIONS (* mentored students, † equal contributions)

IN PREPARATION (manuscripts can be shared upon requested)

19. **Krieg C**, O’Keefe K, Salvi A, Kluender C*, McCulloh K. Hydroscares reveal underlying trait coordination in hydraulic responses to drought in seven fern species.
18. **Krieg C et al.** Evidence for Neogene aridification driving adaptive physiology and ecological radiation of Cycadales.
17. **Krieg C et al.** Polyploidy enhances coexistence through trait differentiation and niche partitioning in the gametophyte stage of a polyploid fern complex.
16. **Krieg C et al.** Linking spatial genetic, physiological, and environmental variation explains patterns of co-occurrence and novelty in an allopolyploid fern complex.
15. Karimi N, **Krieg C**, Spalink D, Eifler E, Hernandez A, Landis J, Rodríguez Contreras A, Lemmon E, Lemmon A, Specht C, Givnish T. Geographic patterns of species richness are driven by dispersal, environmental heterogeneity and chromosomal evolution in the Mariposa Lilies (*Calochortus*, Liliaceae). in prep for *PNAS*
14. **Krieg C**, Watts J, Smith A, Sessa E. Reconciling patterns of niche and trait evolution in polyploid plants. to be submitted to *PNAS* by Nov. 1, 2022

PEER-REVIEWED PAPERS

13. Smith D, Adams M, Buckley T, Salvi A, **Krieg C**, Ané C, McCulloh K, Givnish T. Adaptation, traits, and tree distributions along a climatic moisture gradient. in review *Nature*
12. **Krieg C**, L. Nikravesh N*, Smith D, Adams M, Berger J, Dacosta E, von Wettberg E. Geographic genetic variation predicts physiological variation and stress tolerance in genotypes of wild chickpea, *Cicer reticulatum*. in review at *Plant, Cell & Environment*
11. **Krieg C**, Seeger K*, Company C, Watkins J, Mclearn D, McCulloh K, Sessa E. Physiological traits that underlie leaf lifespan develop at different rates in a tropical fern species. in revision at *American Journal of Botany*.
10. **Krieg C**, Gosetti S*, Watkins J, Griffith P, McCulloh K. Reproductive phases coincide with changes in photosynthetic physiology in an endangered cycad species. in review at *Conservation Physiology*.



9. McCulloh K, Augustine S[‡], Goke A[‡], Jordan R[‡], **Krieg C[‡]**, O'Keefe K[‡], Smith D[‡]. (2022) At least it's a dry cold: the global distribution of freeze-thaw and drought stress and the hydraulic traits that impart tolerance in conifers. *Tree Physiology*, tpac102.
8. **Krieg C[‡]** & Chambers S[‡]. (2022) The Ecology and Physiology of Fern Gametophytes: a methodological synthesis. *Applications in Plant Sciences*, 10:2.
7. Marques E, **Krieg C**, Decosta E, Bueno E, Sessa E, Penmetsa RV, von Wettberg EJB. (2020) The impact of domestication on above-and below-ground trait responses to nitrogen fertilization in wild and cultivated genotypes of chickpea (*Cicer sp.*). *Frontiers in Genetics*, 11, doi: 10.3389/fgene.2020.576338.
6. Greenlon A *et al.* (#9/26 **Krieg C**). (2019) Global-level population genomics reveals differential effects of geography and phylogeny on horizontal gene transfer in soil bacteria. *PNAS*, 116:30.
5. **Krieg C**, Watkins JE, Jr., McCulloh K. (2019) A new protocol for psychrometric pressure-volume curves of fern gametophytes. *Applications in Plant Sciences*, 7:5.
4. **Krieg C**, Valls R*, Vatland S, Gordinier J, Porter S, von Wettberg EJB. (2019) Nitrogen fixation: fixing the gap between concept and evidence-based learning with legume biology. *American Biology Teacher*, 81:4.
3. von Wettberg EJB *et al.* (#27/49 **Krieg C**). (2018) Ecology and genomics of an important crop wild relative as a prelude to agricultural innovation. *Nature Communications*, 9:649.
2. **Krieg C**, Watkins JE, Jr., Chambers S, Husby C. (2017) Sex-specific differences in functional traits and resource acquisition in five cycad species. *AoB Plants*, 9:2.
1. Mulualem K, van der Maesen LJG, **Krieg C**, von Wettberg EJB. (2016) Historical and phylogenetic perspectives of pigeonpea. *Legume Perspectives*, 11.

BOOK CHAPTERS

1. **Krieg C**, Mulualem K, von Wettberg EJB. (2017) Germplasm characterization and trait discovery. In "*The Pigeonpea Genome*". p65-79, Springer, Cham.

GENERAL AUDIENCE

6. Zepeda N*, **Krieg C**. On the need to integrate ecophysiology into cycad conservation planning. in prep for *Cycads*.
5. Gosetti S*, **Krieg C**. (2022) Emerging insights into the ecophysiology of dioecy in cycads: a call for research. *Cycads* 5:1
4. Zeller Z*, **Krieg C**. (2019) Spoiled soils and the role of ferns in phytoremediation. *Fiddlehead Forum*, 45:5
3. Pinson J, **Krieg C**. (2017) Fern foray. *Fiddlehead Forum*, 44
2. **Krieg C**, Saunders S*. (2016) Ferns in space. *The Palmetto*, 33
1. **Krieg C**, Jimenez S*, Vargas D, Penmetsa RV, von Wettberg EJB. (2015) Green chickpeas: bringing Florida a new vegetable from the semi-arid tropics. *The Tropical Garden*, 36-37

V. MAJOR GRANTS

		\$ AMOUNT
<i>pending</i>	National Science Foundation, IOS PI Katherine McCulloh, co-I(s) Christopher Krieg (UW-Madison), Adam Roddy (FIU), Cécile Ané (UW-Madison)	1.2M
2020–2022	National Science Foundation, PRFB PI Christopher Krieg , co-I(s) Katherine McCulloh, Cécile Ané (UW-Madison), Adam West (U Cape Town)	207,000
2019–2020	National Geographic Society, Exploration Grant PI Katherine McCulloh, co-I(s) Christopher Krieg (UW-Madison), Adam West (U Cape Town), and Michele Pfab (South African National Biodiversity Institute)	50,087



VI. GRADUATE RESEARCH FUNDING & TRAVEL AWARDS	\$ AMOUNT
2018 NSF Graduate Research Opportunities Worldwide	5,000
2018 Graduate Student Research Award, Botanical Society of America	500
2018 Kelly Botanical Research Fellowship, Montgomery Botanical Center	3,000
2018 Student Travel Grant, Graduate Student Council, University of Florida	350
2018 Graduate Student Training Grant, Torrey Botanical Society	1,000
2018 Australia-Americas PhD Internship, Australia Academy of Sciences	3,500
2018 Carrie Lynn Yoder Scholarship, University of Florida	500
2016 NSF Graduate Research Fellowship	138,000
2016 Student Travel Award, Graduate Student Council, University of Florida	350
2016 Rosemary Graduate Research Grant, Society for the Study of Evolution	2,500
2016 Michael L. May Interdisciplinary Research Grant, University of Florida	1,000
2015 Grinter Graduate Research Fellowship, University of Florida	7,500
2015 Student Travel Award, American Fern Society	550
2015 Organization for Tropical Studies Scholarship	1,000
2014 Student Travel Grant, Picker Science Institute, Colgate University	1,000
2014 Research Fellowship, Picker Science Institute, Colgate University	3,500

VII. PROFESSIONAL PRESENTATIONS (|| indicates speaker)

INVITED TALKS

- 2023-*planned* **Krieg C**. Towards a unified theory of polyploid ecology. Department of Biology Seminar series, University of Minnesota-Duluth, planned for April 2023
- 2019 **Krieg C**^{||}, McCulloh K, Guralnick R, Soltis P, Sessa E. Transgressive physiological traits explain broad-scale niche novelty in an allopolyploid fern complex. Botany. Bot. Soc. of Am., Rochester MN
- 2018 **Krieg C**^{||}. New findings in cycad physiology. Montgomery Botanical Center: Mini-Symposium, Miami FL
- 2015 **Krieg C**^{||}. Ecology and Physiology of Florida Ferns. Audubon Society, Corkscrew Swamp Sanctuary, Immokalee FL

CONTRIBUTED TALKS

- 2022 **Krieg C**^{||}. Smith A, Watts J, Sessa E. Reconciling patterns niche trait and niche evolution in allopolyploid plants. Botany. Bot. Soc. Of Am., Anchorage AK
- 2020 **Krieg C**^{||}. From Genes to Distributions: physiological ecology as an integrator of polyploid biology. Botany. Bot. Soc. Of Am., virtual conference
- 2018 **Krieg C**^{||}, McCulloh K, Sessa E. Polyploidy, traits, and the niche: insights into coexistence mechanisms. Botany. Bot. Soc. of Am., Rochester MN
- 2018 **Krieg C**^{||}. The role of serpentine soils in the evolution of a polyploid fern complex. Northeast Natural History Conference. Burlington, VT
- 2017 **Krieg C**^{||}. Cycads are weird. PopBio series, Dept. of Biol., Univ. of Florida
- 2016 **Krieg C**^{||}. Evolution, and natural selection on ecophysiological traits in polyploid ferns. Whitney Laboratory for Marine Bioscience, St. Augustine FL.

VIII. ADVANCED RESEARCH TRAINING & FIELD COURSES

- 2018 Australian Plant Ecology, Victoria, Australia; UW-Madison field course
- 2017 Stable Isotope Biogeochemistry and Ecology (Isocamp), Salt Lake City, UT, USA
- 2016 Plant Environmental Physiology Group Techniques (PEPG), LIS, Portugal
- 2016 Taxonomy & Biology of Ferns & Lycophytes, Eagle Hill Institute, ME, USA
- 2016 PHYS-fest I, Konza Biological Field Station, KS, USA
- 2015 Desert Ecology & Evolutionary Biology, CA, USA; UW-Madison field course
- 2015 Ferns & Lycophytes, Organization for Tropical Studies, Costa Rica



IX. TEACHING & MENTORSHIP (Semesters taught: F = Fall, S = Spring, ## = Year)

COURSE DEVELOPMENT

- S17 **University of Florida**, Department of Biology, Co-developed with Dr. C. Davis
BSC 3911: Entering Research in Biology (offered every year since)

TEACHING ASSISTANT

- S17 **Organization for Tropical Studies (OTS)**, Costa Rica
Graduate level: Ferns & Lycophytes
- S16 **University of Florida**, Department of Biology
PCB 3601C: Plant Ecology
- F15 **University of Florida**, Department of Biology
BSC 211L: Integrative Principles of Biology 2

GUEST LECTURER

- F22 **University of Wisconsin**, Department of Botany
BIO 152: Intro. Plant Biology; Topic: plant cell water-relations
- S17 **University of Florida**, Department of Biology
BOT 3503: Phys. & Mol. Bio. of Plants; Topic: C3 vs C4 leaf physiology
- S16 **University of Florida**, Department of Biology
PCB 3601C: Plant Ecology; Topic: leaf acclimation/adaptation
- S16 **University of Florida**, Department of Biology
BOT 6935: Plant Phys.; Topic: leaf stress physiology

RESEARCH MENTORSHIP

20 undergraduate students and 2 high school students, 16 of whom are woman and/or from underrepresented group(s), resulting in 10 poster presentations, and 5 publications w/ mentee co-authorship

TEACHING METHODOLOGY & PEDEGOGY TRAINING

- F22 **University of Wisconsin**, DELTA program, CIRTL Network
The Inclusive STEM Teaching Project (6 wks)
- S21 **University of Wisconsin**, DELTA program, CIRTL Network
Developing an Evidence-Based Teaching Plan (4 wks)
- F20 **University of Wisconsin**, DELTA program, CIRTL Network
Equity in STEM for all genders (semester)
- F20 **University of Wisconsin**, DELTA program, CIRTL Network
Engaging Students through High-Impact Practices (4 wks)
- F15 **University of Florida**, Department of Biology
ZOO 6927: Biology Laboratory Instructional Methods (semester)

X. SERVICE & OUTREACH

SERVICE TO PROFESSION

Panelist reviewer: NSF standard grant proposals (DEB, PACSP)
Ad hoc reviewer: Scientific Reports, New Phytologist, Plant Physiology, American Journal of Botany, Annals of Botany, American Fern Journal, Applications in Plant Sciences, Plants People Planet, PeerJ, J of Agronomy, Plant Signaling & Behavior, American Biology Teacher

SERVICE TO SOCIETIES & ORGANIZATIONS

2023–*planned* **Co-organizer**, Symposium on conservation biology, annual Botany meeting
2022–*present* **Associate Editor**, Applications in Plant Sciences, physiology
2019–*present* **Counsel member**, IUCN Cycad Specialty Group
2020–2022 **Reviewing Editor**, Applications in Plant Sciences
2022 **Co-organizer**, Workshop on leaf gas-exchange, annual Botany meeting
2020–2021 **Panel member**, NSF GRFP workshop, Botanical Society of America
2021 **Instructor**, Phys-Fest III, methods in hydraulics, CSU Mountain Campus, CO
2020 **Co-organizer**, Symposium on polyploid ecology, annual Botany meeting



SERVICE TO UNIVERSITY

2021–*present* **DEI Climate Committee Member**, Botany Dept., UW-Madison

2020 **BIPOC Inclusion Committee Member**, Botany Dept., UW-Madison

2017–2018 **Green Initiatives**, Biology Graduate Student Association, University of Florida

2016–2017 **President**, Biology Graduate Student Association, University of Florida

XI. PROFESSIONAL AFFILIATIONS (not exhaustive)

American Fern Society (member)

Botanical Society of America (member)

Ecological Society of America (member)

Society for Conservation Biology (member)

National Association of Biology Teachers (member)

The Cycad Society (counsel member)

IUCN / SSG Cycad Specialist Group (counsel member)

Montgomery Botanical Center (research fellow)

Australia Academy of Science (research fellow alumnus)

