

# 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 biology

## II. EDUCATION

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

## III. PROFESSIONAL APPOINTMENTS

2023– Scientist (co-PI, NSF-IOS), **University of Wisconsin**, Madison, WI  
 2020–2022 NSF Postdoctoral Research Fellow, **University of Wisconsin**, Madison, WI  
 2015–2019 NSF 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 request)

16. **Krieg C**, Pelosi J, Sessa E. Linking spatial genetic, physiological, and environmental variation explains patterns of co-occurrence and novelty in an allopolyploid fern complex.
15. Watts J, **Krieg C**, Chambers S, Baxi A. Follow the leader: generational niche exploration as a novel mechanism underpinning fern biodiversity patterns
14. **Krieg C**, Smith A, Watts J, Sessa E. Reconciling patterns of niche and trait evolution in polyploid plants.
13. 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).

PEER-REVIEWED PAPERS

12. Smith D, Adams M, Buckley T, Salvi A, **Krieg C**, Ané C, McCulloh K, Givnish T. Adaptation, traits, and tree distributions along a moisture gradient. in review, *Nature Ecology & Evolution*.
11. **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 revision
10. **Krieg C**, Gosetti S\*, Watkins J, Griffith P, McCulloh K. (2023) Reproductive phases coincide with changes in photosynthetic physiology in an endangered cycad species. in press, *Conservation Physiology*.
9. **Krieg C**, Seeger K\*, Company C, Watkins J, Mclearn D, McCulloh K, Sessa E. (2023) Functional traits and trait co-ordination change over the life of a leaf in a tropical fern species. in press, *American Journal of Botany*.
8. 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.



7. **Krieg C<sup>‡</sup>** & Chambers S<sup>‡</sup>. (2022) The Ecology and Physiology of Fern Gametophytes: a methodological synthesis. *Applications in Plant Sciences*, 10:2.
6. 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.
5. 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. *Proceedings of the National Academy of Sciences*, 116:30.
4. **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.
3. **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.
2. 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.
1. **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.

## BOOK CHAPTERS

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

## SCIENCE COMMUNICATION / GENERAL AUDIENCE (\* mentored students)

7. Zepeda N\*, **Krieg C**. Ecophysiological perspectives in cycad conservation. in prep
6. Gosetti S\*, **Krieg C**. (2022) Emerging insights into the ecophysiology of dioecy in cycads: a call for research. *Cycads*, 5:1.
5. Zeller Z\*, **Krieg C**. (2019) Spoiled soils and the role of ferns in phytoremediation. *Fiddlehead Forum*, 45:5.
4. Pinson J, **Krieg C**. (2017) Fern foray. *Fiddlehead Forum*, 44.
3. Mulualem K, van der Maesen LJG, **Krieg C**, von Wettberg EJB. (2016) Historical and phylogenetic perspectives of pigeonpea. *Legume Perspectives*, 11.
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
2023–2026 National Science Foundation, IOS PI Katherine McCulloh, co-I(s) <b>Christopher Krieg</b> , Cécile Ané (UW-Madison), Adam Roddy (FIU)	901,475
2020–2022 National Science Foundation, DBI-PRFB PI <b>Christopher Krieg</b> , co-I(s) Katherine McCulloh, Cécile Ané (UW-Madison), Adam West (U Cape Town)	207,000
2019–2023 National Geographic Society, Exploration Grant PI Katherine McCulloh, co-I(s) <b>Christopher Krieg</b> (UW-Madison), Adam West (U Cape Town), and Michele Pfab (S. African Natl. Biodiv. Inst.)	50,087

## VI. GRADUATE RESEARCH FUNDING &amp; 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	Dept. of Biology, University of Minnesota-Duluth, MN USA (planned April 2023)
2022	Dept. of Biology, Kenyon College, Gambier OH USA
2019	Botany. Bot. Soc. of Am., Rochester MN USA
2018	Montgomery Botanical Center, Miami FL USA
2015	Audubon Society, Corkscrew Swamp Sanctuary, Immokalee FL USA

### CONTRIBUTED TALKS

2023	<b>Krieg C<sup>#</sup></b> . Multi-scale drivers of polyploid ecology. Botany. Bot. Soc. of Am., Boise ID USA (planned for July 2023)
2022	<b>Krieg C<sup>#</sup></b> . Smith A, Watts J, Sessa E. Reconciling patterns niche trait and niche evolution in allopolyploid plants. Botany Annual Meeting, Anchorage AK USA
2020	<b>Krieg C<sup>#</sup></b> . From Genes to Distributions: physiological ecology as an integrator of polyploid biology. Botany Annual Meeting, virtual conference
2018	<b>Krieg C<sup>#</sup></b> , McCulloh K, Sessa E. Polyploidy, traits, and the niche: insights into coexistence mechanisms. Botany Annual Meeting, Rochester MN USA
2018	<b>Krieg C<sup>#</sup></b> . The role of serpentine soils in the evolution of a polyploid fern complex. Northeast Natural History Conference. Burlington, VT USA
2017	<b>Krieg C<sup>#</sup></b> . Ecophysiological perspectives in cycad conservation. PopBio series, Dept. of Biology, University of Florida, USA
2016	<b>Krieg C<sup>#</sup></b> . Evolution, and natural selection on ecophysiological traits in polyploid ferns. Whitney Laboratory for Marine Bioscience, St. Augustine FL USA

## 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	<b>University of Florida</b> , Department of Biology, Co-developed with Dr. C. Davis BSC 3911: Entering Research in Biology (offered every year since)
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## TEACHING ASSISTANT

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

## GUEST LECTURER

- University of Wisconsin**, Department of Botany
- F22 BIO 152: Intro. Plant Biology; Topic: plant cell water-relations (×1)
- University of Florida**, Department of Biology
- S17 BOT 3503: Phys. & Mol. Bio. of Plants; Topic: C3 vs C4 leaf physiology (×2)
- S16 PCB 3601C: Plant Ecology; Topic: leaf acclimation/adaptation (×1)
- S16 BOT 6935: Plant Phys.; Topic: leaf stress physiology (×3)

## TEACHING METHODOLOGY &amp; PEDEGOGY TRAINING

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

## 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

**X. SERVICE & OUTREACH**

## SERVICE TO PROFESSION

**Grant Review Panelist:** NSF-DEB

**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, IUCN, NSF-DEB

## SERVICE TO SOCIETIES &amp; ORGANIZATIONS

2023–*present* **Guest Editor**, Special Issue on Conservation Bio, Applications in Plant Sciences

2023 **Co-organizer**, Symposium on conservation biology, annual Botany meeting

2022–*present* **Associate Editor**, Applications in Plant Sciences, physiological ecology

2019–*present* **Counsel member**, IUCN / SSG Cycad Specialist Group

2020–2022 **Reviewing Editor**, Applications in Plant Sciences

2020–2021 **Panel member**, NSF GRFP workshop, Botanical Society of America

2020 **Co-organizer**, Symposium on polyploid ecology, annual Botany meeting

## SERVICE TO UNIVERSITY &amp; DEI

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



## OUTREACH &amp; DEI

- 2023 **Guest Speaker**, The secret lives of ferns, Texas Gulf Coast Fern Society
- 2022 **Co-organizer**, Workshop on leaf gas-exchange, annual Botany meeting
- 2021 **Instructor**, Phys-Fest III, methods in hydraulics, CSU Mountain Campus, CO
- 2020 **Co-organizer**, WiSELI Anti-bias workshop, Dept. of Botany, UW-Madison
- 2018 **Survey co-leader**, ferns, Takayna BioBlitz, B. Brown Foundation, Tasmania, AU
- 2018 **Co-organizer**, Fern foray, annual Botany meeting, Rochester MN
- 2015 **Co-organizer/Classroom leader**, semester science project, Pinecrest school, Ft. Lauderdale FL USA
- 2015 **Co-organizer/Speaker**, fern biology seminar, Audubon Society, Corkscrew Swamp Sanctuary, Immokalee FL USA

**XI. PROFESSIONAL AFFILIATIONS** (not exhaustive)

- IUCN / SSG Cycad Specialist Group (counsel member)
- Global Consortium for Conservation–Cycads (affiliate member)
- Montgomery Botanical Center (research fellow)
- Australia Academy of Science (research fellow alumnus)
- Botanical Society of America (member)
- Ecological Society of America (member)
- Society for Conservation Biology (member)
- American Fern Society (member)
- National Association of Biology Teachers (member)

