Peter W. Schafran, PhD
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Curriculum Vitae

Positions

Duke University (Durham, NC) — 2026-present
- Research Scientist. PI: Fay-Wei Li
  - Project: Sex chromosome evolution in hornworts

Boyce Thompson Institute (Ithaca, NY) — 2020-2026
- NSF Plant Genome Research Program postdoctoral fellow. Advisor: Fay-Wei Li
  - Project: Evolution of hornwort genomes

National Museum of Natural History (Washington, DC) — 2015-2019
- Research associate. Advisor: Elizabeth Zimmer
  - Project: Systematics of polyploid *Isoetes* of eastern North America

Old Dominion University (Norfolk, VA)
- Asst. Manager, Blackwater Ecologic Preserve — 2016
  - Organized research and management activities between students, VA Dept. of Conservation, VA Dept. of Forestry, and Zuni Hunt Club. Oversaw tree inventory and establishment of permanent research plots
- Research assistant for Lytton Musselman — 2010-2014
  - Provided literature review, field work, and copyediting for books on wild edible plants of the eastern US and plants of the Bible and Quran

Education

Ph.D. Ecological Sciences (Old Dominion University) — 2014-2019
- Dissertation: Molecular systematics of *Isoëtes* (Isoëtaceae) in eastern North America

M.S. Biology (Old Dominion University) — 2010-2014
- Thesis: The ethnobotany of *Pistacia eurycarpa* Yalt. in Iraqi-Kurdistan: its uses, chemical composition, and anti-biotic activity of its resin

B.S. Biology with honors (Old Dominion University) — 2006-2010

Teaching and Mentorship

Boyce Thompson Institute — 2021, 2023-2025
- REU research mentor
  - Guided students in designing and completing 10-week research projects related to hornwort evolutionary genomics

Eremid Genomics & Catawba College (Salisbury, NC) — 2024, 2026
- Instructor, Illumina Next Generation Sequencing Workshop
  - Taught a week-long workshops for high school and undergraduate students on using next-generation/third-generation sequence data for genome assembly and phylogenomics

Eagle Hill Institute (Steuben, ME) — 2022, 2024, 2026
- Instructor, “An Introduction to Quillworts”
  - Taught week-long online courses about history, ecology, evolution, and identification of Isoetes

Murray State University (Murray, KY) and Ball State University (Muncie, IN) — 2021, 2022, 2024, 2025

Trained ca. 20 undergraduate students in DNA extraction, Illumina library preparation, and Oxford Nanopore sequencing	
Old Dominion University	
Instructor of record, BIOL 340 (Field Botany)	2014, 2019
Teaching assistant, BIOL 111 (Environmental Science)	2014
Teaching assistant, BIOL 308 (Botany)	2014
Teaching assistant, BIOL 115 (General Biology)	2013
SUNY-ESF Cranberry Lake Biological Station (Cranberry Lake, NY)	
Teaching assistant, EFB 327 (Adirondack Flora)	2012-2014
University of Iraq-Sulaimani (Sulaymaniyah, Iraq)	
Visiting professor, BOT 232 (Botany and the Environment) and BOT 233 (Introduction to Plant Identification)	2013
Visiting lecturer, BOT 233	2012

Mentees

Boyce Thompson Institute	
Kendall Villalobos (The College of New Jersey)	2025
Alexander Fenlon (Arizona State University Tempe)	2024
Isabel Smalley (University of Minnesota Duluth)	2023
Isa Johnson (Ohio Wesleyan University)	2021
National Museum of Natural History	
Patty Chan (Cornell University), Mikhaila Bennett (Howard University), and Destiny Waag (Old Dominion University)	2018
Jacob Suissa (Harvard University)	2017
Katherine Wu (Mount St. Mary's University)	2016
Old Dominion University	
Lauren Heyd	2016-2021
Isaiah Amos, Toni Dotterer, John Grocholl, and Elisabeth Kana-Huisa	2016
Ellie Rudasi	2015
Joe Keenan	2014

Publications

Schafran, P.W., T, Nishiyama, I. Smalley, K. Ezaki, E. Frangedakis, *et al*. Ancient origin and independent recruitment of sex genes in UV sex chromosome evolution. *Nature Plants*.	In review
Nuñez-Florentin, M., K. Claypool, N. Huda, K. Green, G. Monzel, S. Dessein, **P.W. Schafran**, S. Neupane. Resolving a large and taxonomically complex tribe: plastome phylogenomics and a global key to the genera of Spermacoceae (Rubiaceae). *Perspectives in Plant Ecology, Evolution and Systematics*.	In review
Suissa, J.S., **P.W. Schafran**, G. Jimenez Aleman, C. Webster, J. Wegrzyn, F.-W. Li. Co-option of stomata in the convergent evolution of fern nectaries. *Proceedings of the Royal Society B* 293 (2075): 20253016. doi: 10.1098/rspb.2025.3016	2026
Schafran, P.W., D.A. Hauser, J.M. Nelson, X. Xu, L.A. Mueller, *et al*. Pan-phylum genomes of hornworts revealed conserved autosomes but dynamic accessory and sex chromosomes. *Nature Plants*. doi: 10.1038/s41477-024-01883-w.	2025

Peñaloza-Bojacá G., J.G. Burleigh, A. Maciel-Silva, D.C. Cargill, D. Bell, E.B. Sessa, F.-W. Li, S.F. McDaniel, E.C. Davis, L. Endara, N.S. Allen, **P. Schafran**, S. Chantanaorrapint, J. Duckett, S. Pressel, C. Solís-Lemus, K. Renzaglia, J.C. Villarreal. Ancient reticulation and incomplete lineage sorting at the dawn of hornwort diversification and a Carboniferous origin of the pyrenoid. *Annals of Botany* 135: 1199-1214. 2025

Lafferty, D.J., T.A. Robison, A. Gunadi, **P.W. Schafran**, L.H. Gunn, *et al*. Biolistics-mediated transformation of hornworts and its application to study pyrenoid protein localization. *Journal of Experimental Botany* erae243. 2024

Lane, C., Y. Al Shoffe, **P. Schafran**, F.-W. Li, J. Kao-Kniffin, and C.B. Watkins. Amplicon sequencing and shotgun metagenomics reveal functional impacts of aminoethoxyvinylglycine-mediated ripening and cold storage on the microbiome of 'NY1' apples. *Postharvest Biology and Technology* 213: 112969. 2024

Schafran, P.W., F.-W. Li and C.J. Rothfels. PURC v2.0: a program for improved sequence inference for polyploid phylogenetics and other manifestations of the multiple-copy problem. In: Van de Peer, Y. (ed.) Polyploidy: Methods and Protocols. Methods in Molecular Biology. Springer, New York, NY. 2023

Hisanaga, T., S. Wu, **P.W. Schafran**, E. Axelsson, S. Akimcheva, *et al*. The ancestral chromatin landscape of land plants. *New Phytologist*. doi:10.1111/nph.19311 2023

Chatterjee, P., **P.W. Schafran**, F.-W. Li and J.C. Meeks. Nostoc Talks Back: Temporal Patterns of Differential Gene Expression During Establishment of Anthoceros-Nostoc Symbiosis. *Molecular Plant-Microbe Interactions* 35(10): 917–932. 2022

Marchant, D.B., G. Chen, S. Cai, F. Chen, **P.W. Schafran**, *et al*. Dynamic genome evolution in a model fern. *Nature Plants* 8: 1038–1051 2022

Suissa, J.S., S.P. Kinosian, **P.W. Schafran**, J.F. Bolin, W. Carl Taylor and E.A. Zimmer. Homoploid hybrids, allopolyploids, and high ploidy levels characterize the evolutionary history of a western North American quillwort (*Isoëtes*) complex. Molecular *Phylogenetics and Evolution* 166: 107332. 2021

Musselman, L.J. and **P.W. Schafran**. Edible Plants of the Carolinas: a Forager's Companion. UNC Press, Chapel Hill, NC. 2021

Schafran, P.W., L.J. Musselman, and A.S. Weakley. Isoetaceae. In: Weakley A.S. and Southeastern Flora Team (eds.): Flora of the Southeastern United States. University of North Carolina Herbarium, North Carolina Botanical Garden, Chapel Hill, NC. 2019

Schafran, P.W., E.A. Zimmer, W.C. Taylor and L.J. Musselman. A whole chloroplast genome phylogeny of the diploid species of *Isoëtes* (Isoëtaceae, Lycopodiophyta) in the southeastern United States. *Castanea* 83(2): 224–235. 2018

Bray, R.D., **P.W. Schafran** and L.J. Musselman. Interesting, provocative, and enigmatic: morphological observations on southeastern quillworts (*Isoetes*, Isoetaceae, Lycopodiophyta). *Castanea* 83(2): 263–269. 2018

Schafran, P.W., G. Johnson, W.C. Taylor, E.A. Zimmer and L.J. Musselman. Low-copy nuclear markers in *Isoëtes* L. (Isoëtaceae, Lycopodiophyta) identified with transcriptomes. *Applications in Plant Sciences* 6(4): e1142. 2018

Bolin, J.F., C.L. Hartwig, **P.W. Schafran** and S. Komarnytsky. Application of DNA flow cytometry to aid species delimitation in *Isoetes*. *Castanea* 83(1): 38–47. 2018

Schafran, P.W., S.W. Leonard, R.D. Bray, W.C. Taylor and L.J. Musselman. *Isoetes mississippiensis*: a new quillwort from Mississippi, USA. *Phytokeys* 74: 97–106. 2016

Invited Presentations

Hornwort genomes preserve clues about early land plant evolution. 2026
University of Tennessee-Knoxville, Dept. of Biological Sciences weekly seminar.

Genomic evidence for an ancient UV sex chromosome system in hornworts. 2026
International Plant and Animal Genomes Conference 33. San Diego, CA

Insights into early land plant evolution from 300 million years of hornwort genome evolution. 2025
Ball State University, Dept. of Biology weekly seminar.

Species concepts in *Isoetes*. 2025
QuillCon III symposium, Association of Southeastern Biologists annual meeting, Myrtle Beach, SC.

Repeated evolution of dioicy and sex chromosomes in hornworts (Anthocerotophyta). 2024
International Plant and Animal Genomes Conference 31. San Diego, CA

Hornworts: introduction and genomics.
Cornell Rubisco Workshop. Ithaca, NY 2023

Unraveling reticulate evolution of *Isoetes* in eastern North America. 2019
Plant Biology weekly seminar. Duke University, Durham, NC

Unrecognized genetic diversity in polyploid Isoetes revealed with PacBio DNA sequencing. 2018
Biology of Isoetales, a colloquium in honor of Dr. W. Carl Taylor. Botanical Society of America annual meeting. Rochester, MN

Towards a phylogeny of Isoetes in the southeastern United States. 2016
QuillCon II, a symposium on *Isoetes*. Association of Southeastern Biologists annual meeting. Concord, NC

Contributed Presentations

Finding the genetic basis of sex determination in hornworts. 2025
Botanical Society of America Annual Meeting. Palm Springs, CA.

Twelve high-quality genomes highlight genomic diversity across the hornworts. 2020
Botanical Society of America Annual Meeting. Virtual.

High-throughput flow cytometry and DNA sequencing identifies over 20 potential new *Isoetes* (Isoetaceae, Lycopodiophyta) species in the southeastern US. 2019
Association of Southeastern Biologists Annual Meeting. Memphis, TN.

The *Isoetes flaccida* complex in the southeastern United States: unrecognized species diversity in southern Georgia and northern Florida. 2018
Smithsonian Botanical Symposium. Washington, DC.

Restoration and maintenance of the Northernmost Longleaf Pine Community, Blackwater Ecological Preserve, Isle of Wight Co., VA. 2016
2016 Biennial Longleaf Conference. Savannah, GA.

Molecular phylogeny of diploid *Isoetes* (Isoetaceae, Lycophyta) in the southeastern United States based on low-copy nuclear markers and whole chloroplast genomes. 2016
Botanical Society of America Annual Meeting. Savannah, GA.

The ethnobotany of *Pistacia eurycarpa* in Iraqi-Kurdistan: its chemical composition and anti-microbial activity. 2014
Society of Economic Botany and Society of Ethnobiology Annual Meeting. Cherokee, NC.

Systematics of *Isoetes* (Isoetaceae, Lycophyta) in the southeastern United States. 2014

Association of Southeastern Biologists Annual Meeting. Spartanburg, SC.

The ethnobotany of *qazwan* (*Pistacia eurycarpa*) in Iraqi-Kurdistan. 2013

Plant Life of Southwest Asia Symposium. Edinburgh, Scotland, UK.

What is the true identity of Tuckahoe? 2012

Association of Southeastern Biologists Annual Meeting. Athens, Georgia.

External Funding and Awards

South Carolina Dept. of Natural Resources: *Isoetes* conservation (pending, $10,000)	2027-2028
Georgia Dept. of Natural Resources: *Isoetes melanospora* conservation ($30,000)	2026-2027
NSF Postdoctoral Research Fellowship ($240,000)	2021-2024
Smithsonian Institution Predoctoral Fellowship	2018
Washington Field Biologists' Club research grant	2017
Old Dominion University Nick Savage scholarship	2017
American Society of Plant Taxonomists W. Hardy Ashbaugh graduate student award	2017
Native Orchid Conference Fred Case grant	2016
Southern Appalachian Botanical Society Outstanding Student Presentation award	2016
Smithsonian Institution GRAD Fellowship	2015
Old Dominion University Kirk student research award	2015
Old Dominion University Howard and Vivian Marshall scholarship	2015
Association of Southeastern Biologists graduate student support award	2014
ODU Biology Graduate Student Organization Symposium, 1st place presentation	2014

Service

QuillCon III Symposium	2024-2025
Chair of organizing committee	
Southern Appalachian Botanical Society	2017-2019
Student representative to the executive committee	
Botanical Society of America, ODU Student Chapter	
President	2014-2016
Treasurer	2013-2014
Community Outreach	2013
Biology Graduate Student Organization (ODU)	
Vice President	2014-2015

Outreach

Various Locations	2021
Gave public lectures at bookstores across North Carolina supporting the publication of Edible Wild Plants of the Carolinas (Musselman & Schafran 2021)	
Blackwater Ecologic Preserve (Zuni, VA)	2010-2019
Led approximately 20 tours with a total of 200-300 participants, for members of the public to learn about ecology of the longleaf pine ecosystem, rare plants of southeastern Virginia, and conservation efforts of VA Dept. of Conservation and Recreation and Old Dominion University	
Mt. Cuba Center (Hockessin, DE)	2017
Co-led a workshop on making aperitifs and bitters from eastern North American plants	
Norfolk Botanical Garden (Norfolk, VA)	2013

Taught a workshop with about 12 participants on common edible plants of southeastern Virginia

Virginia Master Naturalists (Virginia Beach, VA) 2013

Lectured on mycology and common fungi identification

References

Dr. Lytton Musselman (PhD Advisor)

Professor Emeritus, Dept. of Biology, Old Dominion University

lmusselm@odu.edu

Dr. Fay-Wei Li (Postdoctoral Advisor)

Associate Professor, Dept. of Biology, Duke University

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Dr. Jay Bolin (Collaborator)

Associate Professor and Dean of Natural Sciences, Dept. of Biology, Catawba College

jfbolin@catawba.edu

Dr. Suman Neupane (Collaborator)

Assistant Professor of Biology, Dept. of Biology, Ball State University

suman.neupane@bsu.edu

Dr. Jacob Suissa (Collaborator)

Assistant Professor, Dept. of Biology, University of Tennessee-Knoxville

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Dr. Slavko Komarnytsky (Collaborator)

Associate Professor, Dept. of Food, Bioprocessing and Nutrition Sciences, North Carolina State University

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