

Stephanie Polutchko, Ph.D.
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Education

University of Colorado, Boulder

2020–2024	Ph.D. in Ecology & Evolutionary Biology; Thesis advisors: Professors Barbara Demmig-Adams & William W. Adams III Dissertation title: Leveraging Expertise in Functional Plant Biology for Innovative Education
2017–2018	Post-Baccalaureate Teacher Licensure Program in Secondary Science, School of Education
2016–2018	M.A. in Ecology & Evolutionary Biology; Thesis advisors: Professors Barbara Demmig-Adams & William W. Adams III
2012–2018	B.A. in Ecology & Evolutionary Biology, Integrative Physiology (double major)

Appointments

2025– <i>present</i>	Assistant Teaching Professor , Department of Ecology & Evolutionary Biology, University of Colorado, Boulder, CO
2024–2025	Science Teacher , Niwot High School, Niwot, CO; Employee of St. Vrain Valley School District, Longmont, CO
Fall 2023 Spring 2022 Summer 2023	Instructor of Record , Department of Ecology & Evolutionary Biology, University of Colorado, Boulder, CO
2021– <i>present</i>	Biological Science Technician , United States Department of Agriculture, Agricultural Research Service, Fort Collins, CO
2020–2024	Teaching Assistant , Department of Ecology & Evolutionary Biology, University of Colorado, Boulder, CO
2018–2020	Science Teacher , Erie High School, Erie, CO; Employee of St. Vrain Valley School District, Longmont, CO
2016–2018	Teaching Assistant , Department of Ecology & Evolutionary Biology, University of Colorado, Boulder, CO

Publications

Demmig-Adams B, Hodges AK, **Polutchko SK**, Adams WW III (2025). Zeaxanthin and other carotenoids: Roles in abiotic stress defense with implications for biotic defense. *Plants*, **14**, 2703.

Stewart JJ, Allen BS, **Polutchko SK**, Ocheltree TW, Gleason SM (2025). Xylem embolism refilling revealed in stems of a weedy grass. *Proceedings of the National Academy of Sciences*, **246**, e2420618122.

Cover Image for PNAS Volume 246

Gleason SM, Polutchko **Stephanie SK**, Allen BS, Ocheltree TW, Spitzer D, Li Z, Stewart JJ (2025). A 50-year look-back on the efficacy of limited transpiration traits: Does the evidence support the recent surge in interest? *New Phytologist*, **246**, 1439–1450.

Allen BS, Stewart JJ, **Polutchko SK**, Ocheltree TW, Gleason SM (2025). Long-term in vivo observation of maize leaf xylem embolism, transpiration and photosynthesis during drought and recovery. *Plant, Cell and Environment*, **48**, 4114–4125

Polutchko SK, Demmig-Adams B, Arbor RN, Stewart JJ, Davies KF, Adams WW III, Keyes AA, Gleason SM, Gonzalez-Pita H, Frank G, Corwin LA (2024). Space mission ecology: Making connections between sciences through the lens of duckweed. *CourseSource*, **11**.

Keyes AA, Dee LE, Wright JT, Davies KF, **Polutchko SK**, Bastias M, Corwin LA (2024). Marsh madness: Using video games and a case study to explore food webs and ecosystem services in Carpinteria Salt Marsh Reserve. *CourseSource*, **11**.

Gleason SM, Stewart JJ, Allen B, **Polutchko SK**, McMahon J, Spitzer D, Barnard DM (2024). Development and application of an inexpensive open-source dendrometer for detecting xylem water potential and radial stem growth at high spatial and temporal resolution. *AoB Plants*, **16**, plae009.

López-Pozo M, Adams WW III, **Polutchko SK**, Demmig-Adams B (2023). Terrestrial and aquatic floating plants differ in acclimation to environmental fluctuations. *Plants*, **12**, 1928.

Adams WW III, Stewart JJ, **Polutchko SK**, Cohu CM, Muller O, Demmig-Adams B (2023). Foliar phenotypic plasticity reflects adaptation to environmental variability. *Plants*, **12**, 2041.

Zenir MC, López-Pozo M, **Polutchko SK**, Stewart JJ, Adams WW III, Escobar A, Demmig-Adams B (2023). The plant microbiome mitigates adverse effects of elevated CO₂ on growth rate and nutritional quality in *Lemna minor*. *Stresses* **3**, 69–85.

Polutchko SK, Stewart JJ, McNamara M, Doherty Garcia N, López-Pozo M, Adams WW III, Demmig-Adams B (2022). *Lemna* as a Sustainable, Highly Nutritious Crop: Nutrient Production in Different Light Environments. *Nutraceuticals*, **2**, 350–364.

Demmig-Adams B, **Polutchko SK**, Stewart JJ, Adams WW III (2022). History of excess-light exposure modulates extent and kinetics of fast-acting non-photochemical energy dissipation. *Plant Physiology Reports*, **27**, 560–572.

- Polutchko SK**, Adams WW III, Escobar CM, Demmig-Adams B (2022). Conquering space with crops that produce ample oxygen and antioxidants. *Oxygen*, **2**, 211–226.
- Demmig-Adams B, **Polutchko SK**, Adams WW III (2022). Structure-function-environment relationship of the isomers zeaxanthin and lutein. *Photochem*, **2**, 308–325.
- Demmig-Adams B, **Polutchko SK**, Baker CR, Stewart JJ, Adams WW III (2022). Distinct cold acclimation of productivity traits in *Arabidopsis thaliana* ecotypes. *International Journal of Molecular Science*, **23**, 2129.
- Demmig-Adams B, Lopez-Pozo M, **Polutchko SK**, Fourounjian P, Stewart JJ, Zenir MC, Adams WW III (2022). Growth and nutritional quality of Lemnaceae viewed comparatively in an ecological and evolutionary context. *Plants*, **11**, 145
- Adams WW III, Stewart JJ, **Polutchko SK**, Demmig-Adams B (2021). Foliar sieve elements: Nexus of the leaf. *Journal of Plant Physiology*, **269**, 153601.
- Demmig-Adams B, **Polutchko SK**, Zenir MC, Fourounjian P, Stewart JJ, Lopez-Pozo M, Adams WW III (2021). Intersections: Photosynthesis, abiotic stress, and the plant microbiome. *Photosynthetica*, **60**, SI.
- Polutchko SK**, Stewart JJ, Adams WW III, Demmig-Adams B (2021). Photosynthesis and foliar vascular adjustments to growth light intensity in summer annual species with symplastic and apoplastic phloem loading. *Journal of Plant Physiology*, **267**, 153532.
- Polutchko SK**, Glime GN, Demmig-Adams B (2021). Synergistic action of membrane-bound and water-soluble antioxidants in neuroprotection. *Molecules*, **26**, 5385.
- Demmig-Adams B, Stewart JJ, López-Pozo M, **Polutchko SK**, Adams WW III (2020). Zeaxanthin, a molecule for photoprotection in many different environments. *Molecules*, **25**, 5825.
- Stewart JJ, Baker CR, Sharpes CS, Wong-Michalak ST, **Polutchko SK**, Adams WW III, Demmig-Adams B (2018). Effects of foliar redox status on leaf vascular organization suggest avenues for cooptimization of photosynthesis and heat tolerance. *International Journal of Molecular Sciences*, **19**, 2507.
- Stewart JJ, **Polutchko SK**, Demmig-Adams B, Adams WW III (2018). *Arabidopsis thaliana* Ei-5: Minor vein architecture adjustment compensates for low vein density in support of photosynthesis. *Frontiers in Plant Science*, **9**, 693.
- Polutchko SK**, Stewart JJ, Demmig-Adams B, Adams WW III (2018). Evaluating the link between photosynthetic capacity and leaf vascular organization with principal component analysis. *Photosynthetica*, **56**, 392–403.
- Adams WW III, Stewart JJ, **Polutchko SK**, Demmig-Adams B (2018). Leaf vasculature and the upper limit of photosynthesis. In: Adams WW III, Terashima I (Eds) *The Leaf: A Platform for Performing Photosynthesis and Feeding the Plant*. Advances in Photosynthesis and Respiration. Springer, Dordrecht, pp 27–54.
- Stewart JJ, **Polutchko SK**, Adams WW III, Demmig-Adams B (2017). Acclimation of Swedish and Italian ecotypes of *Arabidopsis thaliana* to light intensity. *Photosynthesis Research*, **134**, 215–229.

- Stewart JJ, **Polutchko SK**, Adams WW III, Cohu CM, Wenzl CA, Demmig-Adams B (2017). Light, temperature, and tocopherol status influence foliar vascular anatomy and leaf function in *Arabidopsis thaliana*. *Physiologia Plantarum*, **160**, 98–110.
- Turbek S, Chock T, Donahue K, Havrilla C, Oliverio A, **Polutchko SK**, Shoemaker L, Vimercati L (2016). Scientific writing made easy: a step-by-step guide to undergraduate writing in the biological sciences. *The Bulletin of the Ecological Society of America*, **97**, 417–426.
- Stewart JJ, Adams WW III, Cohu CM, **Polutchko SK**, Demmig-Adams B (2015). Differences in light-harvesting, acclimation to growth light environment, and leaf structural development between Swedish and Italian ecotypes of *Arabidopsis thaliana*. *Planta*, **242**, 1277–1290.
- Polutchko SK**, Stewart JJ, Demmig-Adams B (2015). Integrative view of the nutrition of the eye. In: Bagchi D, Preuss HG, Swaroop A (Eds) *Nutraceuticals and Functional Foods in Human Health and Disease Prevention*, CRC Press/Taylor & Francis, pp 407–420.
- Muller O, Stewart JJ, Cohu CM, **Polutchko SK**, Demmig-Adams B, Adams WW III (2014). Leaf architectural, vascular, and photosynthetic acclimation to temperature in two biennials. *Physiologia Plantarum*, **152**, 763–772.

Presentations

- Doherty Garcia N, **Polutchko SK**, Stewart JJ, Kane NC, Gleason SM “Sunflower Adaptations and Resilience to Embolism in Drought Conditions”, Colorado State University Hygrology Days, April 16th-17th, 2024.
- Allen BS, Stewart JJ, **Polutchko SK**, Ocheltree TW, Gleason SM “Point of No Return: Identifying Critical Thresholds for Plant Functioning and Recovery from Drought”, Colorado State University Hygrology Days, April 16th-17th, 2024.
- Demmig-Adams B, **Polutchko SK**, Stewart JJ, López-Pozo M, Adams WW III “*Lemna* – Rapidly Growing Zeaxanthin Hyperaccumulator” 2nd Virtual International Conference on Carotenoids, April 12th-14th, 2022
- Adams WW III, Stewart JJ, **Polutchko SK**, Demmig-Adams B. “Photosynthetic and Foliar Phenotypic Plasticity Reflects Adaptation to Different Levels of Environmental Variability”, 31st Western Photosynthesis Conference, March 24th-25th, 2022.
- Polutchko SK**, Stewart JJ, López-Pozo M, Adams WW III, Demmig-Adams B. “Attractive qualities of duckweed as a food source for space missions”, Oral Presentation, American Institute of Aeronautics and Astronautics Rocky Mountain Annual Technical Symposium, University of Colorado, Boulder, USA, September 29th, 2021.
- Glime G, Stewart JJ, **Polutchko SK**, Adams WW III, Demmig-Adams B. “From Xylem Anatomy Toward Xylem Function and Climate Resilience?”, Plant Science for Climate Emergency, June 7th-9th, 2021.
- Stewart JJ, **Polutchko SK**, Adams WW III, Demmig-Adams B. “Acclimation of photosynthesis and minor veins in *Arabidopsis thaliana*”, Oral Presentation, Front Range Student Ecology Symposium, Colorado State University, Fort Collins, CO, USA, February 23rd, 2017.

Adams WW III, Stewart JJ, **Polutchko SK**, Demmig-Adams B. "Acclimation of *Arabidopsis thaliana* foliar vasculature, photosynthesis, and transpiration dependent on environment", Oral Presentation, 26th Western Photosynthesis Conference, Marconi Conference Center, Marshall, CA, USA, January 7th, 2017.

Awards & Funding

- Spring 2023 - Finalist for Cogswell Award for Inspirational Instruction
- Spring 2022 - GPTI Teaching Excellence Award
- Spring 2022 - EBIO Excellence in Teaching Award
- Spring 2021 - EBIO Excellence in Teaching Award
- Summer 2020 - Graduate Hourly Assistant, Course Improvement Grant
- Spring 2018 - EBIO Excellence in Teaching Award

Teaching Experience

Assistant Teaching Professor - University of Colorado, Boulder

- Fall 2025 - EBIO 1210, General Biology, Lecture

Graduate Student Part-Time Instructor - University of Colorado, Boulder

- Fall 2023 - EBIO 2040, Principles of Ecology, Lecture
- Summer 2023 - EBIO 2040, Principles of Ecology, Lecture
- Spring 2022 - EBIO 2040, Principles of Ecology, Lecture

Graduate Student Teaching Assistant - University of Colorado, Boulder

- Spring 2023 - EBIO 2040 Principles of Ecology, Lecture TA
- Fall 2022 - EBIO 2040 Principles of Ecology, Lecture TA
- Fall 2021 - EBIO 2040 Principles of Ecology, Lab TA
- Spring 2021 - EBIO 2040 Principles of Ecology, Lecture TA
- Fall 2020 - EBIO 2040 Principles of Ecology, Lecture TA
- Fall 2017 - EBIO 3590 Plants and Society, Lab TA
- Summer 2017 - EBIO 2070 Principles of Genetics, Recitation TA
- Spring 2017 - EBIO 1240 General Biology Lab 2, Lab TA
- Fall 2016 - EBIO 1230 General Biology Lab 1, Lab TA
- Summer 2016 - EBIO 2070 Principles of Genetics, Recitation TA

Secondary Science

- August 2024 - May 2025 Niwot High School;
Honors Biology, Chemistry, and Anatomy & Physiology
- August 2018 - May 2020 Erie High School;
Biology, Honors Biology, and Chemistry

Popular Press Publications

López-Pozo M, Zenir MC, **Polutchko SK**, Stewart JJ, Adams WW III, Escobar A, Demmig-Adams B (2023) Effects of Growth Environment on *Lemna minor*. *E Scholarly Community Encyclopedia* <https://encyclopedia.pub/entry/40481>

Polutchko SK, Adams WW III, Demmig-Adams B (2022) Aquatic plants: Life support and nutrition in space. *E Scholarly Community Encyclopedia*
<https://encyclopedia.pub/entry/24136>

Demmig-Adams B, **Polutchko SK**, Adams WW III (2022) Zeaxanthin and lutein across life's taxa. *E Scholarly Community Encyclopedia* <https://encyclopedia.pub/entry/22396>

Polutchko SK, Demmig-Adams B, Adams WW III (2022) Differential climate resilience in *Arabidopsis thaliana* ecotypes. *E Scholarly Community Encyclopedia*
<https://encyclopedia.pub/entry/19952>

Polutchko SK, Demmig-Adams B, Stewart JJ, López-Pozo M, Adams WW III (2020) Zeaxanthin and photoprotection in plants. *E Scholarly Community Encyclopedia*
<https://encyclopedia.pub/entry/3586>

Demmig-Adams B, **Polutchko SK**, Adams WW III (2022, Sept.). Well-protected and Highly Functional through Carotenoids [Video – 5 minute video with take-home messages based on a publication I co-authored]. *E Scholarly Community Encyclopedia*.
https://encyclopedia.pub/video/video_detail/411a

Service & Outreach

- Grand Awards Judge**, Fort Collins
April 2024 2024 Colorado Science & Engineering Fair. Judged presentations in the behavioral science category.
- Panelist**, University of Colorado, Boulder
March 2024 Served on a panel in an undergraduate introductory biology class to discuss how to get started on research and apply to graduate school.
- Organizer & Volunteer**, USDA-ARS, Fort Collins
January 2024 STEAD School Outreach Event for approximately 300 students
- Panelist**, University of Colorado, Boulder
November 2023 Served on a panel in an undergraduate introductory biology class to discuss how to get started on research and apply to graduate school
- Panelist**, University of Colorado, Boulder
August 2023 Served on a panel to support new graduate student teaching assistants and provide mentoring on teaching techniques.
- Panelist**, University of Colorado, Boulder
November 2022 Served on a panel in an undergraduate introductory biology class to discuss how to get started in research and apply to graduate school
- Panelist**, University of Colorado, Boulder
August 2022 Served on a panel to support new graduate student teaching assistants and provide teaching techniques
- Guest Presenter**, USDA-ARS, Fort Collins
August 2022 Field day; lead discussions about current research being conducted at the USDA to other scientists and stakeholders

December 2025

- May 2022 **Guest Presenter**, Climate Summit, Garrison School, Garrison NY;
Lead discussions about the value of plants to support the future of space travel for groups of middle school students
- Guest Presenter**, Earth Day, Warner Elementary School, Fort Collins CO;
April 2022 Lead discussions about how plants move water and how plants support humans for groups of elementary students
- 2020–2021 **Graduate Peer Mentor**, University of Colorado, Boulder
school year Helped introduce a new student at CU to the university
- June 2021 **Guest Presenter**, Heart J-Center for Experiential Learning, Loveland;
Lead a wildflower hike for the non-profit Heart J
- February 2021 **Guest Presenter**, AP Research, Erie High School, Erie CO;
Assisted in the application of statistics to previously collected data
- February 2021 **Volunteer**, BVSD Corden Pharma Regional Science Fair Judge, Boulder;
Judged presentations of animal and plant sciences
- June 2020–
August 2024 **Volunteer**, Troop Leader, Girl Scouts of Colorado, Troop 76931;
Part of the leadership team for a special interest equestrian troop
- Fall 2020 **Guest Presenter**, EBIO 2040, University of Colorado, Boulder
Lead three case studies for students in Principles of Ecology
- 2020–2021 **Expert Research Advisor**, AP Research, Erie High School, Erie CO;
school year Consultation for two AP research student projects
- Guest Presenter**, Altona Middle School, Longmont CO;
December 2020 Presentation on photosynthesis and scientific research as a culmination to the photosynthesis unit
- October 2020 **Video presentation** on plant health and propagation as an asynchronous learning activity for students at Altona Middle School, Longmont, CO
- October 2020 **Guest Presenter**, IB Biology, Aspen High School, Aspen CO;
Discussed the methods and importance of using statistics in research
- September 2020 **Volunteer**, Heart J-Center for Experiential Learning, Loveland;
Part of the planning team for future directions of the non-profit
- Guest Presenter**, EBIO 4800, University of Colorado, Boulder;
January 2019 Discussed strategies for presentations and engaging an audience for students in Critical Thinking in Biology
- Volunteer**, Rocky Mountain Riding Therapy, Boulder CO;
2017–2019 Assisted individuals with a broad range of cognitive and physical challenges in riding therapy with horses
- Fall 2017 **Volunteer**, AVID Tutor, Centaurus High School, Boulder CO;
Helped lead a science section of the AVID tutoring program
- Volunteer**, Women in Science and Engineering Annual Science Communication Symposium (WiSE SciComm); Designed and introduced activities for the audience, and helped to select the final presentations
April 2017