ALECA M. BORSUK

Assistant Curator, New York Botanical Garden
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EDUCATION

Ph.D. 2024
Yale University, School of the Environment New Haven, CT

Master of Philosophy 2022
Yale University, School of the Environment New Haven, CT

Master of Environmental Science 2019
Yale University, School of the Environment New Haven, CT

B.S. Mechanical Engineering, Minor in Botany 2017
University of Hawaii at Manoa Honolulu, HI

PROFESSIONAL APPOINTMENTS

Assistant Curator 2024 - Present
New York Botanical Garden, Laboratory for Integrative Biodiversity Research Bronx, NY

Assistant Professor 2024 - Present
City University of New York, Graduate Center New York, NY

Adjunct Associate Research Scientist 2025 - Present
Columbia University, Department of Ecology, Evolution and Environmental Biology New York, NY

PUBLICATIONS

*Graduate student co-author supervised by Borsuk
**Undergraduate co-author supervised by Borsuk
***High school student co-author supervised by Borsuk

15. Moore, E.G.**, Dabydeen, L.C., Salha, R.***, Bichler, J.** and **Borsuk, A.M.**, 2025. Distinct NIR Reflectance Spectra Associated with Foliar Symptoms of Beech Leaf Disease. *bioRxiv*, https://doi.org/10.1101/2025.11.22.689946.

14. Fajardo, A., Olson, M., Heuret, P., Vetter, S., **Borsuk, A.**, Camps, G., ... & Enquist, B., 2026. The rules of leaf-stem coordination across the world's plants. *Research Square*, https://doi.org/10.21203/rs.3.rs-9306653/v1.

13. Andersen, M.O., Olsen, N.T.O., Bhola, D., **Borsuk, A.**, Brodersen, C., Geitmann, A. and Pezzulla, M., 2026. Self-buckling of pressurized cylindrical tubes. *Soft Matter*, 22 (29), pp.4918–4925.

12. **Borsuk, A.M.**, Randall, J.M., Richburg, J.**, Montes, K.G.**, Edwards, E.J. and Brodersen, C.R., 2025. Palisade cell geometry in relation to leaf optical and photosynthetic properties in *Viburnum*. *Plant Physiology*, p.kiae659.

11. Fletcher, L.R., **Borsuk, A.M.**, Fanton, A.C., Johnson, K.M., Richburg, J., Zailaa, J. and Brodersen, C.R., 2024. Anatomical and physiological consequences of beech leaf disease in *Fagus grandifolia* L. *Forest Pathology*, 54(1), p.e12842.

10. Procko, C., Lee, T., **Borsuk, A.**, Bargmann, B., Dabi, T., Nery, J., Estelle, M., Baird, L., Brodersen, C., Ecker, J., Chory, J. Leaf cell-specific and single-cell transcriptional profiling reveals a role for the palisade layer in UV light protection. *The Plant Cell*, 34 (9), pp.3261-3279

9. **Borsuk, A.M.**, Roddy, A.B., Théroux-Rancourt, G. and Brodersen, C.R., (2022). Structural organization of the spongy mesophyll. *New Phytologist*, 234(3), pp.946-960.

8. Momayyezi, M., **Borsuk, A.**, Brodersen, C., Gilbert, M., Theroux-Rancourt, G., McElrone, A. (2022). Desiccation of the leaf mesophyll and its implications for CO_2 diffusion and light processing. *Plant, Cell & Environment*, 45(5), pp.1362-1381.

7. Mankiewicz, P., **Borsuk, A.**, Ciardullo, C., Hénaff, E. and Dyson, A., (2022). Developing Design Criteria for Active Green Wall Bioremediation Performance: Growth Media Selection Shapes Plant Physiology, Water and Air Flow Patterns. *Energy and Buildings*, p.111913

6. **Borsuk, A.**, and Brodersen, C. (2019). The spatial distribution of chlorophyll in leaves. *Plant Physiology*, 180(3), pp.1406-1417.

5. Saive, R., **Borsuk, A.**, Emmer, H., Bukowsky, C., Lloyd, J., Yalamanchili, S. and Atwater, H. (2016). Effectively transparent front contacts for optoelectronic devices. *Advanced Optical Materials*, 4(10), pp.1470-1474.

4. Abplanalp, M.J., **Borsuk, A.M.**, Jones, B.M. and Kaiser, R.I. (2015). On the formation and isomer specific detection of propenal (C_2H_3CHO) and cyclopropanone (c-C_3H_4O) in interstellar model ices—a combined FTIR and reflectron time-of-flight mass spectroscopic study. *The Astrophysical Journal*, 814(1), p.45.

3. Ureña, E.B., **Borsuk, A.**, Clark, H., Fosbury, R., Godinho, M.H., Hardy, M., Holt, A., Kolle, M., Kuttner, C., Lopez-Garcia, M. and McDougal, A. (2020). The role of composition: natural materials vs. synthetic composites: general discussion. *Faraday Discussions*, 223, pp.295-306.

2. Arwin, H., Barla, P., Blake, A.J., **Borsuk, A.**, Brien, M., Burg, S., Chang, Y., Freyer, P., Hardy, M., Holt, A. and Kallepalli, A. (2020). Optics and photonics in nature: general discussion. *Faraday Discussions*, 223, pp.107-124.

1. Saive, R., Bukowsky, C.R., Yalamanchili, S., Boccard, M., Saenz, T., **Borsuk, A.M.**, Holman, Z. and Atwater, H.A. (2016). Effectively transparent contacts (ETCs) for solar cells. *In Photovoltaic Specialists Conference (PVSC), IEEE 43rd* (pp. 3612-3615). IEEE.

PATENTS

U.S. Provisional Patent
Effectively Transparent Solar Cell Front Contacts.
CIT File No. CIT-7176-P2; Filed 9/25/15

PRESENTATIONS

*Graduate student co-author supervised by Borsuk
**Undergraduate co-author supervised by Borsuk
***High school student co-author supervised by Borsuk

Invited Talks & Panels

Light into Life: The Optical Architecture of the Leaf. New York Botanical Garden Science Webinar. 2025

The Landscape of the Leaf: Cellular Architectures for Enhanced Carbon Assimilation. UConn Department of Natural Resources and the Environment Research Seminar. 2025

The Landscape of the Leaf: Cellular Architectures for Enhanced Carbon Assimilation. CUNY Undergraduate Research Seminar. 2025

Illuminating Photosynthesis: The Optical Properties of Lobed Palisade Cells. New York University Plant Labs Seminar. 2025

The Landscape of the Leaf: Cellular Architectures for Enhanced Carbon Assimilation. Columbia University E3B Seminar. 2025

Challenges and Opportunities of Using Plant-based Solutions for Addressing the Climate and Biodiversity Crises (Panelist), NYBG Event at COP16. 2025

The Landscape of the Leaf: Botanical Form & Function at the Microscale. Oak Spring Garden Foundation. 2021

Contributed Talks

Bichler, J.** and **Borsuk, A.** Hydrochromism of orchid aerial roots in relation to non-foliar photosynthesis. Botanical Society of America, Tucson AZ. 2026

Borsuk, A., Quartuccia, G., Talpins, C., Angert, G.**, Warner, R., Vega, L., Leahy, M., Mittal, R., Daybydeen, L., Grippo, I., Bichler, J.**, Moore, E.**, Salha1, R.***, Ivanovski, K., Ellingboe, A., Mattalia, G., Mabry, M., Diazgranados, M., Franks, S., and McAlvay, A. Drought Response and Recovery in Wild, Feral, and Domesticated Brassica rapa: Implications for Crop Climate Resilience. Botanical Society of America, Tucson AZ. 2026

Borsuk, A., E. Edwards, and C. Brodersen. Morphological variation in leaf photosynthetic cells and functional implications for leaf-light interaction. Early Career Researcher Living Light Virtual Conference. 2021

Borsuk, A., A. Roddy, G. Théroux-Rancourt, and C. Brodersen. Structural organization of the spongy mesophyll in laminar leaves with reticulate venation. Society of Integrative and Comparative Biology Virtual Conference. 2021

Borsuk, A., A. Roddy, G. Théroux-Rancourt, and C. Brodersen. Structural organization of the spongy mesophyll in laminar leaves with reticulate venation. Botanical Society of America Virtual Conference. 2020 **Maynard Moseley Award*

Borsuk, A. and C. Brodersen. The spatial distribution of chlorophyll in leaves. Yale School of the Environment Research Conference, New Haven CT. 2019 **Award for Best Oral Presentation by a Master's Student*

Saive, R., **Borsuk, A.**, Emmer, H., Bukowsky, C., Lloyd, J., Yalamanchili, S. and Atwater, H. Effectively transparent front contacts for solar cells. C3E Women in Clean Energy Symposium, Cambridge MA. 2015

Posters

V. Barrow*, Oberle B., Bichler J., Heyduk K., and **Borsuk A.** Probing the origins of CAM photosynthesis via machine learning 3D image analysis. Botanical Society of America, Tucson AZ. 2026

Borsuk, A., A. Roddy, G. Théroux-Rancourt, and C. Brodersen. Structural organization of the spongy mesophyll. Plant Biology Initiative Symposium, Boston MA. 2022

Borsuk, A. and C. Brodersen. The spatial distribution of chlorophyll in leaves. Gordon Research Conference: CO_2 Assimilation in Plants from Genome to Biome, Newry ME. 2019

Borsuk, A. and C. Brodersen. The spatial distribution of chlorophyll in leaves. Botanical Society of America, Rochester MN. 2018 **Physiological Section Student Poster Award*

Borsuk, A. and K. Kobayashi. Effects of LED lighting spatial configuration on spaceflight analog *Amaranthus tricolor*. American Society for Horticultural Science Annual Conference, Atlanta GA. 2016

Borsuk, A. and O. Semonin. Nickel oxide hole transport layer for methylammonium lead triiodide perovskite solar cells. Emory University STEM Research and Career Symposium, Atlanta GA. 2015

Borsuk, A. and O. Semonin. Nickel oxide hole transport layer for methylammonium lead triiodide perovskite solar cells. National Collegiate Research Conference, Cambridge, MA. 2015

Borsuk, A., A. Turner, R. Kaiser. Experimental investigation of the formation routes of carbonyl-bearing molecules in the interstellar medium. KAUST International Undergraduate Poster Competition, Thuwal, Saudi Arabia. 2014

FUNDING & AWARDS

Funded Grants

Human Frontier Science Program (HFSP; $900,000), 2026 – 2029
Light-harvesting strategies from the forest floor: mapping the photonic morphospace of shade plants
PI: **Aleca Borsuk**, New York Botanical Garden
Co-PI: Valentina Bello, University of Pavia

New York Botanical Garden Pilot Projects Initiative ($5,000), 2026
Promoting urban forest climate resilience by measuring fine scale impacts of beech leaf disease in the Thain Family Forest.
PI: Brad Oberle, New York Botanical Garden
Co-PIs: **Aleca Borsuk**, New York Botanical Garden; John Zeiger, New York Botanical Garden

Interstellar Initiative Early Career Pilot Grant ($13,000), 2025 – 2026
Leveraging 3D imaging, AI, and molecular approaches to predict outcomes in rare tumors
PI: Rei Noguchi, Tokyo Women's Medical University
Co-PIs: **Aleca Borsuk**, New York Botanical Garden; Nan Chen, University of Wisconsin-Madison

Yale Institute for Biospheric Studies Doctoral Student Pilot Grant, 2020
Yale Institute for Biospheric Studies Graduate Student Small Grant, 2018
Carpenter-Sperry Research Fund Graduate Student Award, 2018

Awards

Maynard Moseley Award, *Botanical Society of America*, 2020
Best Oral Presentation by a Master's Student, *YSE Research Conference*, 2019
Physiological Section Student Poster Award, *Botanical Society of America*, 2018

Fellowships & Scholarships

Plant Science Research Fellow, *Oak Spring Garden Foundation*, 2021
Lewis B. Cullman Fellow, *The New York Botanical Garden*, 2019
Merit Research Scholarship, *Yale School of the Environment*, 2017
NSF Graduate Research Fellow (NSF GRFP), *National Science Foundation*, 2017
Undergraduate Research Fellow, *NASA Hawaii Space Grant Consortium*, 2017
Summer Undergraduate Research Fellow, *California Institute of Technology*, 2015
Research Experience for Undergraduates, *Columbia University EFRC*, 2015
Presidential Scholar, *University of Hawaii*, 2013

TEACHING

Instructor

General Botany Lab, Southern Connecticut State University	Fall 2020

Guest Lecturer

Evolution of Plant Diversity: Leaves; BIOL 79304, CUNY Grad Center	Spring 2026
Perspectives on becoming a doctoral student; ENV 550a, Yale University	Spring 2019
Plant structure from the inside out with X-ray imaging; PHYS 991, Yale University	Spring 2019

Teaching Assistant

Plant Ecophysiology, Yale University	Fall 2020
Trees: Environmental Biology and Global Significance (Lead), Yale University	Spring 2019
Trees: Environmental Biology and Global Significance, Yale University	Spring 2018, 2021
Algal Diversity and Evolution (Teaching Intern), University of Hawaii	Spring 2017

SERVICE, OUTREACH, & PROFESSIONAL ACTIVITIES

Editorial Positions

Associate Editor, *The Botanical Review*	2025-Present

Journal Reviewer

Scientific Reports, *Plant Direct*, *The Botanical Review*, *Annals of Botany*, *Planta*

Service to the Profession

Secretary; Division of Botany, Society of Integrative and Comparative Biology	2024-Present

Institutional Service

Co-chair, NYBG Branch Out Week Science Cafe	2026
Volunteer, NYBG Fall Forest Weekend Meet the Scientists	2024, 2025
NYBG Science Delegate; United Nations Biodiversity Conference (COP16)	2024
Organizer, LICOR Photosynthesis Workshop at NYBG	2024
Co-Treasurer & Information Officer; YSE Doctoral Student Government	2021-2022

Public Outreach

Volunteer, NYBG Summer Field Science Camp, 'Moss Workshp'	2026
Media interview, NYBG Media Team, 'Orchid Day 2026'	2026
Media interview, Associated Press, How to grow a giant pumpkin, with help from science	2025
Media interview, NPR Short Wave Podcast, 'How do trees prepare for winter'	2025
Media interview, NPR Short Wave Podcast, Science questions 5-year-olds asked us	2024
Media interview, That's What I Call Science Podcast, 'Episode 163'	2022
Volunteer, Yale Pathways to Science Flipped Science Fair, New Haven, CT	2020
Volunteer Judge, New Haven Science Fair, New Haven, CT	2018
Volunteer Chair, Expanding Your Horizons Hawaii, Honolulu, HI	2014-2017

Advising & Mentorship

Kenyon Moore, CUNY-NYBG Master's Student	2025-2027
Taylor McNamee, Columbia E3B-NYBG Master's Student	2025-2027
Victoria Barrow, CUNY-NYBG Doctoral Student (Lab Rotation)	2025-2026
Shirley Zhuang, NYBG Science Intern	2026
Caterina Simi, NYBG Science Intern	2026
Sally Kramer, NYBG Science Intern	2026
Julie Bichler, NYBG Science Intern	2025-2026
Grace Angert, NYBG Science Intern	2025-2026
Reem Salha, NYBG Science Intern	2025-2026
Nailla Thompson, NYBG Science Intern	2025
Elis Moore, NYBG Science Intern	2025

K.G. Montes, Yale College Undergraduate 2020-2022
Jenn Richburg, Yale College Undergraduate 2022
Women in Science at Yale (WISAY) Program Mentor 2020-2021

Doctoral Committee Service

Peyton Redinger (Advisor JD Lewis), Fordham University
Victoria Barrow (Advisor Brad Oberle), City University of New York-NYBG
Shashika Himandi (Advisor Chandi Witharana), University of Connecticut
Corina Vernon (Advisor Andy Reinmann), City University of New York
Evonne Aguirre (Advisor Andy Reinmann), City University of New York