

Shayla Salzman, Ph.D.

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I study the effects of species interactions on evolutionary trajectories utilizing the coevolved brood site pollination mutualism between endangered cycads and their pollinators. My research integrates across scientific disciplines to answer fundamental questions about the evolution of biodiversity and conservation biology.



Current Position

Cornell University, National Science Foundation (NSF) Postdoctoral Research Fellow in Biology
Advisors: Profs. Chelsea Specht & Robert Raguso
School for Integrative Plant Sciences and
Department of Neurobiology and Behavior 2019-present

Education

Harvard University, NSF Graduate Research Fellowship 2019
Ph.D. in Organismic and Evolutionary Biology (OEB)
Advisors: Profs. Naomi Pierce & Robin Hopkins
Ecology and evolution of cycads and their symbionts

University of California, Berkeley 2012
B.S. in Genetics and Plant Biology
Honors, High Distinction, Major Citation Award

Professional Experience

Laboratory Technician Pierce Lab, Department of OEB, Harvard, 2013
Staff Research Associate & Lab Manager Specht Lab, Department of Plant and Microbial Biology, University of California, Berkeley, 2012-2013
Undergraduate Study Manager Altieri Lab under Dr. Albie Miles, Department of Environmental Science, Policy, and Management, University of California, Berkeley, 2010-2011
Senior Agriculture Research Assistant with Dr. Lucia Varella, Sonoma County University of California Cooperative Extension, 2006-2008

Honors and Awards

Distinction in Teaching Award, Derek Bok Center for Teaching at Harvard University 2018
Arthur K. Bell Award, Brain Chemistry Labs at the Institute for EthnoMedicine 2017
Grady L. Webster Plant Systematics Publication Award, American Society of Plant Taxonomist 2016
Major Citation Award, University of California Berkeley Genetics and Plant Biology 2012

Publications

(17 total, 5 first author - 1 co-first authored, Google Scholar total citations: 290, h-index: 9)

*Mentee, ^ΩCover article, ^ΠEqual contribution, [‡]Corresponding authorship, [∇]Award

de Jesus DA, Batista DM, Monteiro EF, **Salzman S**, Carvalho LM, Santana K, André T. (2022). Structural changes and adaptive evolutionary constraints in FLOWERING LOCUS T and TERMINAL FLOWER1-like genes of flowering plants. *Frontiers in Genetics* 13:954015.

- Glos RAE*, **Salzman S**, Calonje M, Vovides AP, Coiro M, Gandolfo MA, Specht CD. (2022). Leaflet anatomical diversity in *Zamia* (Cycadales: Zamiaceae) shows little correlation with phylogeny and climate. *The Botanical Review* <https://doi.org/10.1007/s12229-021-09272-0>
- Salzman S**[‡], Crook D, Calonje M, Stevenson DW, Pierce NE, Hopkins R. (2021). Cycad-weevil pollination symbiosis is characterized by rapidly evolving and highly specific plant-insect chemical communication. *Frontiers in Plant Sciences* 12:639368.
- Valencia-Montoya WA, Quental TB, Tonini JFR, Talvera G, Crall JD, Lamas G, Busby RC, Carvalho APS, Morais AB, Mega NO, Romanowski HP, Liénard MA, **Salzman S**, Whitaker MRL, Kawahara AY, Lohman DJ, Robbins RK, Pierce NE. (2021). Evolutionary tradeoffs between male secondary sexual traits revealed by a phylogeny of the hyperdiverse tribe Eumaeini (Lepidoptera: Lycaenidae). *Proceedings of the Royal Society B* 288:20202512.
- Liénard MA, Bernard, GD, Allen, AA, Lassance JM, Song S, Childers RR, Yu N, Ye D, Stephenson A, Valencia-Montoya WA, **Salzman S**, Whitaker MRL, Calonje M, Zhang F, Pierce NE. (2021). The evolution of red color vision is linked to coordinated rhodopsin tuning in lycaenid butterflies. *PNAS*. 118:e2008986118.
- Whitaker MRL, **Salzman S**, Gratacos X, Tucker Lima J. (2020). Localized overabundance of an otherwise rare butterfly threatens endangered cycads. *Florida Entomologist* ^Ω 103:519-522.
- Whitaker MRL^Π, **Salzman S**^Π. (2020). Ecology and Evolution of cycad-feeding Lepidoptera. *Ecology Letters* ^Ω 23:1862-1877.
- Salzman S**[‡], Crook D, Crall J, Hopkins R, Pierce NE. (2020). An ancient push-pull pollination mechanism in cycads. *Science Advances* 6:eaay6169.
- Whitaker MRL, Baker CCM, **Salzman S**, Martins DJ, Pierce NE. (2019). Combining stable isotope analysis with DNA metabarcoding improves inferences of trophic ecology. *PloS One* 14:e0219070.
- Hua C*, **Salzman S**[‡], Pierce NE. (2018). A first record of *Anatrachyntis badia* (Hodges1962) (Lepidoptera: Cosmopterigidae) on *Zamia integrifolia* (Zamiaceae). *Florida Entomologist* 101:335-338.
- Salzman S**[‡], Whitaker MRL, Pierce NE. (2018). Cycad-feeding insects share a core gut microbiome. *Biological Journal of the Linnean Society* 123:728-738.
- Bruenn R, Lavenburg V, **Salzman S**. (2017). Don't judge a plant by its flowers. *Frontiers for Young Minds* 5:31.
- Whitaker MRL, **Salzman S**, Sanders J, Kaltenpoth M, Pierce N. (2016). Microbial communities of Lycaenid butterflies do not correlate with larval diet. *Frontiers in Microbiology* 7:1920.
- André T, **Salzman S**, Wendt T, Specht CD. (2016). Speciation dynamics and biogeography of Neotropical spiral gingers (Costaceae). *Molecular Phylogenetics and Evolution* 103:55-63.
- André T, Specht CD, **Salzman S**, Palma-Silva C, Wendt T. (2015). Evolution of species diversity in the genus *Chamaecostus* (Costaceae): molecular phylogenetics and morphometric approaches *Phytotaxa* 204:265-276.
- Salzman S**, Driscoll HE, Renner T, André T, Shen S, Specht CD. (2015). Spiraling into History: a molecular phylogeny and investigation of biogeographic origins and floral evolution for the genus *Costus*. *Systematic Botany*[∇] 40:104-115.
- [∇]Winner Grady L. Webster Award for best plant systematics publication for 2014-2015
- Espeland M, Hall JPW, DeVries PJ, Lees DC, Cornwall M, Hsu YF, Wu LW, Campbell DL, Talavera G, Vila R, **Salzman S**, Ruehr S*, Lohman DJ, Pierce NE. (2015). Ancient Neotropical origin and recent recolonization: Phylogeny, biogeography and diversification of the *Riodinidae* (Lepidoptera: Papilionoidea). *Molecular Phylogenetics and Evolution* 93:296-306.

Publications Submitted or in Review

- Salzman S[‡]**, Dahake A, Valencia-Montoya W, Calonje M, Chelsea S, Raguso R. Cone humidity acts as a strong host signal in an obligate cycad pollination system. *Functional Ecology*.
- Gutiérrez-García K[¶], Whitaker MRL[¶], Bustos-Díaz ED, **Salzman S**, Ramos-Aboites HE, Garfias-Gallegos D, Contreras-González MF, Pierce NE, Cibrián-Jaramillo A, Barona-Gomez F. Functional metabolic convergence in the gut microbiomes of cycad-feeding insects. *ISME*.
- Batista D, Carvalho L de, **Salzman S**, André T. Concealed strategies: differential gene expression reveals functions of tuberous roots in a ground-herb from seasonally dry understories of Southern Amazonia. *Plant Direct*.

Invited Seminars

- University of Georgia** Entomology Department Seminar 2022
- Cornell University** Department of Ecology and Evolution EvoDay 2022
- Pennsylvania State University** Entomology Department Seminar 2021
- National Museum of Natural History** Botany Department Seminar 2021
- Laval University** Biology Department Seminar 2021
- Stonehill College** Biology Department Seminar 2020
- Cornell University** Plant Biology Department Seminar 201.
- Harvard University** Organismic and Evolutionary Biology Symposium 2017
- National Institute of Amazonian Research (INPA) Brazil** Herbarium Seminar 2015
- Federal University of Pará State Santarém (UFOPA) Brazil** Evolution Seminar 2015
- University of California, Berkeley** College of Natural Resources Honor's Symposium 2012

Conference Presentations

*Mentee, [∇]Award

- Glos R*, **Salzman S**, Calonje M, Vovides A, Specht CD. 2020 *A phylogenetic and geographic analysis of leaflet anatomy in Zamia (Cycadales: Zamiaceae)* International Botany Conference (poster)
- Salzman S**, Whitaker M, Pierce NE. 2018 *Cycad-feeding insects share a core gut microbiome* Plant Biology Initiative at Harvard University 9¹³th Annual Plant Biology Symposium (poster)
- Salzman S[∇]**, Whitaker M, Pierce NE. 2017 *Assessing the potential for bacterial degradation of BMAA in the guts of cycad feeding insects* International BMAA Conference (poster)
- [∇]Winner Arthur K. Bell Award
- Hua C*, **Salzman S**, Pierce NE. 2017 *Is Anatrachyntis another insect radiation onto cycads?* Harvard College's Undergraduate Research Spotlight (poster)
- Salzman S**. 2015 *Mechanisms of a Neotropical coevolution: plant-insect communication and specificity of Zamia pollination* Cycad X: 10th International Conference on Cycad Biology
- Salzman S**. 2015 *Plant-insect communication and Rhopalotria-Zamia mutualism* International Evolution Conference
- Salzman S**, Yockteng R, Terry I, Specht CD. 2014 *Varying alternative oxidase gene expression during Macrozamia lucida thermogenesis suggests transcriptional regulation* Plant Biology Initiative at Harvard University 9th Annual Plant Biology Symposium (poster)
- Salzman S**, André T, Specht CD. 2013 *Spiraling into History: A Molecular phylogeny, biogeography, and ancestral character state reconstruction of distribution and pollination syndrome for Costus*

(*Costaceae*) Monocots V: 5th International Conference on Comparative Biology of Monocotyledons (poster)

Salzman S. 2009 *Bioremediation of Nitrate in Wastewater* MESA (Math, Engineering, and Science Achievement) poster session Santa Rosa Junior College (poster)

Teaching Experience

Guest Lectures

Biology Sacramento Met Highschool 2021
Plant-animal interactions Colorado Mesa University 2020
Model-based phylogenetics Cornell University 2020

Harvard University

Evolution *Teaching Fellow* 2017
Science and shaping policy *Course Designer and Instructor* 2015
Writing fellowship and grant proposals for the biological sciences *Teaching Fellow* 2014
Certificate for Distinction in Teaching Derek Bok Center for Teaching 2017

High School and Inmate

Math, Science *Teaching Assistant* Connelly Detention Center, Juvenile Justice, Department of Youth Services Boston 2014-2015
Chemistry, Biology *Teaching Assistant* California College Preparatory Academy 2010

Pedagogical Training

Online Learning Institute Cornell Center for Teaching Innovation 2021
Inclusive Teaching Workshop Series Cornell Project Biodiversify 2021
Teaching & Learning in the Diverse Classroom Certificate Cornell Center for Teaching Innovation 2020
Teaching Certificate Derek Bok Center for Teaching at Harvard University 2019

Mentoring Experience

*Resulted in publication for mentee

Cornell University

Undergraduate laboratory mentoring Avi Simon 2021-present, Will Kandalajt 2021-present, Rosy Glos* 2019-2021

Harvard University

Undergraduate laboratory mentoring Catherine Hua* 2015-2019
High school student laboratory mentoring Sophie Reuhr* 2013-2014

University of California, Berkeley

Undergraduate laboratory mentoring Rose Radford 2010-2011, Anabel Rivas 2010-2011, Camila Torres 2010-2011, Olivia Cope 2011-2013, Colin Hill 2011-2013

Mentor Training

Building Mentoring Skills for an Academic Career Certificate Cornell Center for the Integration of Research, Teaching, and Learning 2020
Mentor Training Certificate Harvard University Science Education 2019

Service and Outreach

Board Service

The Cycad Society Board of Directors 2014-present, Newsletter Editor 2021-present

Cambridge Entomological Club Elected Vice-president 2014-2015, President 2015-2016, Executive Board 2016-2017, Treasurer 2017-2019

Harvard Science Policy Group Executive Board 2014-2016

Professional Service

Reviewer Communications Biology, Communicative and Integrative Biology, Integrative and Comparative Biology

Guest Edit Reducing the Darwinian shortfall in biodiversity knowledge through botanical gardens and herbaria resources *Journal of Zoological and Botanical Gardens*

Public Presentations

Cycad Day 2021 Presentation *Pollination mutualism in the genus Zamia*

Cambridge Entomological Club 2016 Presentation *The President's Address: Mechanisms of a Neotropical Coevolution: Plant-Insect Communication in a Cycad-Weevil Symbiosis*

Frontiers for Young Minds 2016 Live Review Presentation *Don't Judge a Plant by its Flowers*

Redwood Empire Nursery Growers Association 2008 Presentation *Light Brown Apple Moth*

Popular Science Publications

The Cycad Society 2018 Article *Interview with Dennis Stevenson*

The Cycad Society 2014 Article *Our New Board Member, Shayla Salzman Describes her Research*

Hobby Farms Magazine Online Edition 2009 Article *Soil Contamination: A Farm Buyer's Primer*

Outreach

Cornell Write a Researcher 2022

Grants, Fellowships and Scholarships

National Science Foundation Postdoctoral Research Fellowship in Biology	\$276,000
Harvard Museum of Comparative Zoology Barbour Fund 2015	\$2,500
Society for the Study of Evolution 2015	\$500
Cycad Society 2015	\$500
National Science Foundation Graduate Research Fellowship 2014	\$96,000
Berkeley Scholarship 2012	\$14,212
Harry L. Wollenberg scholarship 2010	\$7072
Federal Smart Grant 2010	\$4000
Esta M. Rodkey Scholarship 2010	\$500
Rotary Club of Santa Rosa Foundation Scholarship 2010	\$1,500
American Association of University Women Scholarship 2010	\$2,500
Cal Alumni Club of Oakmont Scholarship 2010	\$1,500
SRJC Alumni and Friends Honoring Dr. Roy G. Mikalson Scholarship 2010	\$1,500
Paul Mancini Memorial Agriculture Scholarship 2010	\$600
Luther Burbank Botany Scholarship 2010	\$800
Clark Nattkemper Science Education Scholarship 2010	\$500
American Business Women's Association 2009	\$750
Luther Burbank Botany Scholarship 2009	\$450
Doyle Scholarship 2008	\$1,600
Dr. Pearl Konttas Continuing Student Scholarship 2008	\$500
Luther Burbank Botany Scholarship 2008	\$600
Doyle Scholarship 2007	\$1,600
Dr. Pearl Konttas Continuing Student Scholarship 2007	\$450
Doyle Scholarship 2006	\$1,600
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	\$417,734

Cycad-Related Collaborators

Thiago André, Federal University of Pará, Brazil
Francisco Barona-Gomez, National Laboratory of Genomics for Biodiversity, Mexico
Michael Calonje, Montgomery Botanical Center, Florida
Angélica Cibrián-Jaramillo, National Laboratory of Genomics for Biodiversity, Mexico
Paul Cox, Brain Chemistry Labs at the Institute for EthnoMedicine
Damon Crook, United States Department of Agriculture
Dennis Stevenson, New York Botanical Garden
William Tang, United States Department of Agriculture
Alberto Taylor, University of Panama
Irene Terry, University of Utah
Melissa Whitaker, Swiss Federal Institute of Technology, Zurich

Cycad-Related Field Work

Florida, USA	Biannually 2014-2019, 2022
Mexico	2017
Panama	2015
Colombia	2015
Brazil	2015