Dr. Shayla Salzman

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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

National Science Foundation Postdoctoral Research Fellow in Biology Specht and Raguso Labs, School for Integrative Plant Sciences and the Department of Neurobiology and Behavior, Cornell, 2019-present

Education

Harvard University 2019
Ph.D. in Organismic and Evolutionary Biology
Ecology and evolution of cycads and their symbionts
Advisors: Prof. Naomi Pierce and Prof. Robin Hopkins
Funding: National Science Foundation Graduate Research Fellowship

University of California, Berkeley 2012
B.S. in Genetics and Plant Biology
Alternative oxidase gene expression during Macrozamia lucida thermogenesis
Advisor: Prof. Chelsea Specht
Honors, High Distinction, Major Citation Award

Professional Experience

Laboratory Technician Pierce Lab, Department of Organismic and Evolutionary Biology, Harvard, 2013

Staff Research Associate & Lab Manager Specht Lab, Department of Plant and Microbial Biology, University of California, Berkeley, 2012-2013

Undergraduate Laboratory Assistant Specht Lab under Dr. Tanya Renner, Department of Plant and Microbial Biology, University of California, Berkeley, 2011

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 under Dr. Lucia Varella, Sonoma County University of California Cooperative Extension, 2006-2008

Honors and Awards

Schmidt Science Fellowship Finalist 2018
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
Udall Scholar Honorable Mention, Udall Foundation 2011

Publications

Salzman S, Crook D, Calonje M, Stevenson DW, Pierce NE, Hopkins R. Cycad-weevil pollination symbiosis is characterized by rapidly evolving and highly specific plant-insect chemical communication. *Frontiers in Plant Sciences.* 12:639368.

Whitaker MRL, **Salzman S**, Gratacos X. Tucker Lima J. Localized overabundance of an otherwise rare butterfly threatens endangered cycads. *Florida Entomologist.* 103:519-522. *Cover article.

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. The evolution of red color vision is linked to coordinated rhodopsin tuning in lycaenid butterflies. *PNAS.* 118: e2008986118.

Whitaker MRL*, **Salzman S***. 2020. Ecology and Evolution of cycad-feeding Lepidoptera. *Ecology Letters* 23: 1862-1877 *Authors contributed equally to this work. Cover article.

Salzman S, Crook D, Crall J, Hopkins R, Pierce NE. 2020. An ancient push-pull pollination mechanism in cycads. *Science Advances* 6: eeay6169

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 Doi: 10.3389/frym.2017.00031

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. Doi: 10.3389/fmicb.2016.01920

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

Andre 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 in Review

Glos RAE, **Salzman S**, Calonje M, Vovides AP, Tomlinson PB, Gandolfo MA, Specht CD. A phylogenetic and geographis analysis of leaflet anatomy in *Zamia* (Cycadales: Zamiaceae). *The Botanical Review.*

Almeida de Jesus D, Batista DM, **Salzman S**, Carvalho LM, Santana K, André T. Structural changes and adaptive evolutionary constraints in the FLOWERING LOCUS T and TERMINAL FLOWER1-like genes of flowering plants. *Plant Molecular Biology.*

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. Evolutionary tradeoffs between male secondary sexual traits revealed by a phylogeny of the hyperdiverse tribe Eumaeini (Lepidoptera: Lycaenidae). *Proceedings of the Royal Society B.*

Teaching Experience

Guest Lectures

Plant-animal interactions *Guest Lecturer* Colorado Mesa University, 2020

Model-based phylogenetics *Guest Lecturer* 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* Harvard, 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

Cornell University

Undergraduate laboratory mentoring* 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, Anabel Rivas, and Camila Torres 2010-2011

Undergraduate laboratory mentoring Olivia Cope, Colin Hill 2011-2013

*Resulted in publication for mentee

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

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

Public Presentations

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*

Invited Seminars

National Museum of Natural History Smithsonian Botany Department Seminar 2021. *The ecology and evolution of a cycad-weevil pollination mutualism*

Laval University Biology Department Seminar 2021. *The ecology and evolution of a cycad-weevil pollination mutualism*

Stonehill College Biology Department Seminar 2020. *Ecology and evolution of a cycad-weevil pollination mutualism*

Cornell University Plant Biology Department Seminar 2019. *Ecology and evolution of a cycad-weevil pollination mutualism*

Harvard University Organismic and Evolutionary Biology Symposium 2017. *Mechanisms of a gymnosperm pollinator coevolution: plant-insect communication in a cycad-weevil symbiosis*

National Institute of Amazonian Research (INPA) Brazil Herbarium Seminar 2015 *Mechanisms of a Neotropical coevolution: plant-insect communication and specificity of Zamia pollination*

Federal University of Pará State Santarém (UFOPA) Brazil Evolution Seminar 2015 *Coevolution in a Neotropical pollination mutualism*

University of California, Berkeley College of Natural Resources Honor's Symposium 2012. *Gene expression during Macrozamia lucida thermogenesis*

Conference Presentations

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 9[13h] 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 insets* 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)

Grants, Fellowships and Scholarships

National Science Foundation Postdoctoral Research Fellowship in Biology	$207,000
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
	$348,734

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
Mexico	2017
Panama	2015
Colombia	2015
Brazil	2015