CURRICULUM VITAE

Katia Silvera

Assistant Project Scientist Step II
Postdoctoral Researcher, Smithsonian Tropical Research Institute (STRI), Panama
Dept. Botany and Plant Sciences,
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Education

2010 PhD in Biochemistry, University of Nevada Reno
2002 MS in Botany, University of Florida
1998 Postbaccalaureate, Organization for Tropical Studies & University of Costa Rica
1997 BS in Plant Biology, University of Panama

Professional Experience

- Assistant Project Scientist, Step II, Department of Botany and Plant Sciences, University of California Riverside, 7/2018 – present
- Assistant Project Scientist, Step I, Department of Botany and Plant Sciences, University of California Riverside, 9/2017 – 7/2018
- Postdoctoral Researcher, Department of Botany and Plant Sciences, University of California Riverside, 10/2014 – 9/2017
- Postdoctoral Fellow, Smithsonian Tropical Research Institute (STRI), Panama, Republic of Panama, and Center for Conservation Biology, University of California Riverside, Ellstrand Lab, 10/2011 – 9/2014
- Assistant Specialist, Center for Conservation Biology, University of California Riverside (UCR), 2010 – 2011
- Environmental Protection Agency (EPA) -Research Fellow, University of Nevada Reno, Department of Biochemistry and Molecular Biology, 2007 – 2010
- Graduate Research Assistant, University of Nevada Reno, Department of Biochemistry and Molecular Biology, 2005 – 2007
- Visiting Scientist, Center for Scientific Investigation of the Yucatan, Mexico (CICY), 2004 – 2005
- Research Assistant, Toolik Research Station, University of Alaska at Fairbank, 2003
- Predoctoral Fellow, Smithsonian Tropical Research Institute, Panama, 2003 – 2004
- Graduate Teaching Assistant, University of Florida, Department of Botany and Biological Science Program, 1999 – 2002
- Field Biology Course Coordinator, Smithsonian Tropical Research Institute, Panama, 1998 – 2000
- Field Research Assistant, Smithsonian Tropical Research Institute, Panama, 1995 – 1999

Peer-Review Publications

18. Heyduk K, Hwang M, Albert V, **Silvera K,** Lan T, Farr K, Chang T-H, Chan M-T, Winter K, Leebens-Mack J. (2018) Altered gene regulatory networks are associated with the origin of Crassulacean Acid Metabolism in *Erycina* (Oncidiinae). Frontiers in Plant Science. https://doi.org/10.3389/fpls.2018.02000.

17. Santiago L, **Silvera K**, Andrade J, Dawson TE (2017) Functional strategies of tropical dry forest plants in relation to growth form and isotopic composition. Environmental Research Letters 12(11), 115006.

16. **Silvera K**, Silvera G (2016) Diversidad, evolución y distribución de orquídeas milimétricas panameñas. In Orquídeas milimétricas de Panamá. Vitalmedic, Ciudad de Panama. Amaral Editores SAS, Bogotá, Colombia.

15. **Silvera K**, Lasso E (2016) Ecophysiology and Crassulacean Acid Metabolism of Tropical Epiphytes. In Tropical Tree Physiology, Editors Guillermo Goldstein and Santiago Louis. Springer International Publishing, Switzerland.

14. Xiaohan Y, Cushman JC, Borland AM, Edwards EJ, Wullschleger SD, Tuskan GA, Owen NA, Griffiths H, Smith JAC, De Paoli HC, Weston DJ, Cottingham R, Hartwell J, Davis SC, **Silvera K**, Ming R, Schlauch K, Abraham P, Stewart JR, Guo H-B, Albion R, Ha J, Lim SD, Wone BWM, Yim WC, Garcia T, Mayer JA, Petereit J, Nair SS, Casey E, Hettich RL, Ceusters J, Ranjan P, Palla KJ, Yin H, Reyes-Garcia C, Andrade JL, Freschi L, Beltran JD, Dever LV, Boxall SF, Waller J, Davies J, Bupphada P, Kadu N, Winter K, Sage RF, Aguilar CN, Schmutz J, Jenkins J, Holtum JAM (2015) A roadmap for research on crassulacean acid metabolism (CAM) to enhance sustainable food and bioenergy production in a hotter, drier world. *New Phytologist* 207(3):491-504

13. **Silvera K,** Winter K, Rodriguez BL, Albion RL, Cushman JC (2014). Multiple isoforms of phospho*enol*pyruvate carboxylase in the Orchidaceae (subtribe Oncidiinae): implications for the evolution of Crassulacean Acid Metabolism. *Journal of Experimental Botany* 65(13):3623-3636.

12. Holt JS, Welles SR, **Silvera K,** Heap IM, Heredia SM, Martinez-Berdeja A, Palenscar KT, Sweet LC, Ellstrand NC (2013) Taxonomic and life history bias in herbicide resistant weeds: Implications for deployment of resistant crops. *Plos One* 8(9): e71916.

11. **Silvera K**, Silvera GA (2012) *Encyclia chloroleuca* (Orchidaceae: Laeliinae) reported for Panama. *Kew Bulletin* 67:499-501.

10. Neubig KM, Whitten WM, Williams NH, Blanco MA, Endara L, Burleigh G, **Silvera K,** Cushman JC, Chase MW (2012) Generic recircumscription of Oncidiinae (Orchidaceae: Cymbidieae) based on maximum likelihood analysis of combined DNA dataset. *Botanical Journal of the Linnean Society* 168:117-146.

9. **Silvera K**, Whitten WM, Williams NH, Winter K, Cushman JC (2010) Evolution along the crassulacean acid metabolism continuum. *Functional Plant Biology* 37:995-1010.

8. **Silvera K**, Santiago LS, Cushman JC, Winter K (2010) The incidence of crassulacean acid metabolism in the Orchidaceae derived from carbon isotope ratios: a checklist of the flora of Panama and Costa Rica. *Botanical Journal of the Linnean Society* 163:194-222.

7. **Silvera K**, Santiago LS, Cushman JC, Winter K (2009) Crassulacean acid metabolism and epiphytism linked to adaptive radiations in the Orchidaceae. *Plant Physiology* 149(4):1838-1847.

6. Santiago LS, **Silvera K**, Andrade JL, Dawson TE (2005) The use of stable isotopes in tropical biology. *Interciencia* 30(9):536-541 (published in Spanish).

5. **Silvera K**, Santiago LS, Winter K (2005) Distribution of crassulacean acid metabolism in orchids of Panama: evidence of selection for weak and strong modes. *Functional Plant Biology* 32:397-407.

4. Santiago LS, Schuur EAG, **Silvera K** (2005) Nutrient cycling and plant-soil feedbacks along a precipitation gradient in lowland Panama. *Journal of Tropical Ecology* 21:461-470.

3. **Silvera K**, Skillman JB, Dalling JW (2003) Seed germination, seedling growth and habitat partitioning in two morphotypes of the pioneer tree *Trema micrantha* in a seasonal forest in Panama. *Journal of Tropical Ecology* 19:27-34.

2. Dalling JW, Hubbell SP, **Silvera K** (1998) Seed dispersal, seedling establishment and gap partitioning among tropical pioneer trees. *Journal of Ecology* 86:674-698.

1. Andrade JL, Meinzer FC, Goldstein G, Holbrook NM, Cavalier J, Jackson P, **Silvera K** (1998) Regulation of water flux through trunks, branches and leaves in trees of a lowland tropical forest. *Oecologia* 115:463-471.

Fellowships and Awards

- Postdoctoral Researcher. 2015-2018 National Science Foundation (NSF) Dimensions of Biodiversity Collaborative Proposal: Molecular, Ecological and Evolutionary Dynamics of Carbon Fixation and Diversification in Agavoideae (Asparagaceae) and Oncidiinae (Orchidaceae).

- 2013-2015 Awarded Member of the National Investigation System (SNI) Level I by the Panamanian Government's National Secretariat for Science, Technology and Innovation (SENACYT). Panama.

- 2011-2014 Earl S. Tupper 3-Year Postdoctoral Fellowship at the Smithsonian Tropical Research Institute. Panama.

- Environmental Protection Agency (EPA) Greater Research Opportunities (GRO) Fellowship for Environmental Study. 2007 – 2010.

- National Science Foundation (NSF) "More Graduate Education at the Mountain State Alliance" MGE@MSA. Stipend support for minority doctoral students in Science, Technology, Engineering and Medical fields. 2007 – 2010.

- Outstanding Graduate Student Award. College of Agriculture, Biotechnology and Natural Resources. Department of Biochemistry and Molecular Biology. University of Nevada Reno, April 2010.

- American Society of Plant Biologist (ASPB) Poster Presentation Award. Project entitled: Evolutionary mechanisms of Crassulacean Acid Metabolism (CAM) in Neotropical orchids. University of California, Davis, February 2002.

- National Science Foundation (NSF) Graduate Research Fellowship Honorable Mention. Project entitled: Evolution of Crassulacean Acid Metabolism in Neotropical orchids: linking stable isotopes and gene expression. April 2006.

- American Orchid Society (AOS) 11th World Orchid Conference Scholarship Fund. Project entitled: Variation in floral oil compositions within Neotropical orchids (Oncidiinae). University of Florida, 2001 – 2002.

- Organization for Tropical Studies (OTS) Ecology and Conservation Biology Course Scholarship. Costa Rica, 1998.

- World Wildlife Foundation (WWF) Project Building Conservation Infrastructure: Training in Latin America and the Caribbean. Assistance to attend OTS field course. Costa Rica, 2008.

Invited Seminars

12. Silvera (2016) Crassulacean Acid Metabolism in Neotropical Orchid Species. April 2016. Rancho Santa Ana Botanical Gardens, California, United States.

11. Silvera K (2011) Evolution of Crassulacean Acid Metabolism in tropical orchids. November 2, 2011. Instituto de Investigaciones Científicas y Servicios de Alta Tecnología (INDICASAT), Panama City, Panama.

10. Silvera K (2011) Fotosíntesis y el metabolismo ácido de crasuláceas en orquídeas tropicales. November 2, 2011. Curso de campo para estudiantes de America Central: Curso de Gigante, Smithsonian Tropical Research Institute, Gamboa, Panama.

9. Silvera K (2011) The contribution of epiphytes to biodiversity of tropical forests. September 2011. Guandong Academy of Forestry, Guangzhou, South China, People's Republic of China.

8. Silvera K (2011) Evolution of CAM in tropical orchids. September 2011. South China Botanical Gardens, Guangzhou, South China, People's Republic of China.

7. Silvera K, Whitten MW, Willimas NH, Neubig KM, Albion RL, Santiago LS, Winter K, Cushman JC (2010) Evolution of Crassulacean Acid Metabolism in tropical orchids: Integrating phylogenetic, ecophysiological and molecular genetic approaches. March 2010. Workshop on CAM. STRI, Panama City, Panama.

6. Silvera K (2008) Evolution of crassulacaean acid metabolism (CAM) in Neotropical orchids (given in Spanish). September 2008. Seminar Series for the Ecology Institute, Autonomous University of Mexico (UNAM), Mexico City, Mexico.

5. Silvera K (2003) Variation in the chemistry of oil reward compounds in Neotropical orchid flowers of the Subtribe Oncidiinae (given in Spanish). June 2003. State University of Campinas UNICAMP, Chemistry Department, Sao Paulo, Brasil.

4. Silvera K (2000) Pollination biology in orchids of the subtribe Oncidiinae (given in Spanish). August 2000. Introduction to Field Methodologies Course. STRI, Panama City, Panama.

3. Silvera K (1999) Use of molecular biology in orchid classification (given in Spanish). August 1999. Panamanian Orchid Association monthly meeting. Panama City, Panama.

2. Silvera K (1998) Distribution, germination and seedling growth of the two morphotypes of *Trema micrantha* at the Barro Colorado Nature Monument. September 1998. Barro Colorado Research Station. STRI, Panama.

1. Silvera K (1997) Native orchids of Panama. September 1997. Hawaiian Botanical Society monthly meeting, University of Hawaii at Manoa, Oahu, Hawaii, USA.

Coverage by Popular Press

"Lophiaris silverarum: New species of orchid discovered in Panama"
http://www.sci-news.com/biology/science-lophiaris-silverarum-new-species-orchid-panama-01862.html

"UCR Researcher discovers new species of orchid"
http://www.highlandernews.org/13770/ucr-researcher-discovers-new-species-of-orchid/

"New orchid species named for STRI's Silvera"
https://www.stri.si.edu/sites/strinews/PDFs/STRINews_May_2_2014.pdf

"Orchid named after UC Riverside Researcher"
http://ucrtoday.ucr.edu/21707

"Functional biodiversity of photosynthesis in tropical orchids" *STRI news.* 2 July 2010. http://www.stri.si.edu/english/about_stri/headline_news/news/article.php?id=1170

"Smithsonian hosts 2010 International CAM Workshop in Panama" Public release for EurekAlert! 17 March 2010. http://www.eurekalert.org/pub_releases/2010-03/stri-sh2031710.php

"Tropical orchids: Enjoying the Panamanian nightlife" *STRI news*. 12 September 2008. http://www.stri.si.edu/english/about_stri/headline_news/scientific_advances/article.php?id=872

"Interest in tropical plant research leads to Ph.D" University of Nevada Graduate School Newsletter. Fall 2007, Vol 2, Issue 2, p. 3 http://www.unr.edu/grad/forms/newsletter/fall2007newsletter2.pdf

"Discover how orchid families learned to conserve water" Smithsonian Tropical Research Institute Strategic Plan 2008-2013. p. 26 http://striweb.si.edu/PDFs/strategicplan_2008-2013.pdf

"The secret science of orchids: using biotechnology to understand the flower's evolutionary roots" RLife magazine, Nevada. October 2006, p. 74-75

Presentations at Professional Meetings

33. Silvera K, Winter K. Ellstrand N, Heyduk K and Leebens-Mack J. (2018) Evolution and comparative ecophysiology of Crassulacean Acid Metabolism in tropical orchids. Invited speaker for symposium entitled: The next generation of research on the evolution of Crassulaean Acid Metabolism: integrating physiology, ecology and genomics. The 6th International Conference on Comparative Biology of Monocotyledons. Natal, Brazil.

32. Silvera K, Winter K, Ellstrand NC, Heyduk K, Albert V and Leebens-Mack J. (2018) Crassulacean Acid Metabolism expression in the Orchidaceae: Insights from the Subtribe Oncidiinae. The Biology of CAM Plants 2018 Meeting. The Desert Botanical Garden, Phoenix, Arizona, USA.

31. Organized Symposium: Bridging conservation, ecology and genomics in the study of species with Crassulacean Acid Metabolism (CAM). 2017. Association for Tropical Biology and Conservation (ATBC). Merida, Yucatán, México. Organizers: **Katia Silvera** (University of California, Riverside, USA), Casandra Reyes (Centro de Investigación Científica de Yucatán, CICY, Mexico), and Eloisa Lasso (Universidad de Los Andes, Bogotá, Colombia).
The role of this symposium was to bridge current research on Crassulacean Acid Metabolism, one of three photosynthetic pathways found in plants, with ecophysiology, biochemistry and genomics, and apply knowledge to conservation efforts to better predict the effects of climate change on CAM epiphytic and succulent species.

30. **Silvera K**, Winter K, Ellstrand NC, Heyduk K, Albert V and Leebens-Mack J. (2017) Evolution and diversification of CAM in tropical epiphytic orchid species. Meeting of the Association for Tropical Biology and Conservation (ATBC), Merida, Mexico.

29. Torres-Morales G, Lasso E, **Silvera K**, Turner B and Winter K. (2017) Evaluating the occurrence of CAM photosynthesis in orchids from Colombia's contrasting habitats. Meeting of the Association for Tropical Biology and Conservation (ATBC), Merida, Mexico.

28. **Silvera K**, Winter K, Ellstrand N, Albert V, Leebens-Mack J (2016) Functional diversification of Crassulacean Acid Metabolism in tropical orchids. Meeting of the Association for Tropical Biology and Conservation (ATBC), Montpellier, France.

27. Rojas J, **Silvera K**, Ellstrand N (2016) Functional leaf anatomy of neotropical orchids with contrasting photosynthetic pathways. Meeting of the Association for Tropical Biology and Conservation (ATBC), Montpellier, France.

26. **Silvera K,** Winter K, Ellstrand N, Leebens-Mack J (2015) Evolution of Crassulacean Acid Metabolism in neotropical orchid species. Evolution Joint Meeting of the Society for the Study of Evolution (SSE) and the Society of Systemic Biologists (SSB) and the American Society of Naturalists (ASN). Guarujá, Brazil.

25. **Silvera K,** Cushman JC, Winter K. (2014) Oral presentation by invitation: "Functional diversification of CAM in tropical orchids" 34th New Phytologist Symposium -Systems biology and ecology of CAM. Lake Tahoe, Tahoe City, CA, USA.

24. **Silvera K,** Cushman JC, Winter K. (2013) Oral presentation by invitation: "Crassulacean Acid Metabolism in epiphytic orchids" C4 + CAM Plant Biology 2013 Symposium. University of Illinois, Champaign Urbana, USA.

23. **Silvera K,** Winter K (2012) Flexibility of Crassulacean Acid Metabolism in epiphytic orchids. Oral presentation. Workshop on Crassulacean Acid Metabolism: Ethnobotany, Evolution, Physiological Ecology, Biofuels and Climate Change. Merida, Yucatan, Mexico.

22. **Silvera K** (2012) Crassulacean Acid Metabolism in tropical orchids revealed from stable isotopic analysis and phylogenetic analysis. Oral Presentation. Fellows and Interns Symposium. Smithsonian Tropical Research Institute. Panama City, Panama

21. Gulle B, Albion RL, **Silvera K**, Cushman JC (2011) Molecular basis of Crassulacean Acid Metabolism (CAM) evolution inferred from gene family structures in neotropical orchids (Subtribe Oncidiinae). Oral Presentation. XVIII International Botanical Congress, Melbourne, Australia.

20. Neubig KM, Whitten WM, Williams NH, Chase M, Blanco M, Endara L, Burleigh G, **Silvera K**, Cushman JC (2011) Generic recircumscription of Oncidiinae (Orchidaceae: Cymbidieae) based on combined molecular data sets. Poster presentation. Botanical Society of America, St. Louis, Missouri.

19. **Silvera K**, Whitten MW, Williams NH, Neubig KM, Albion RL, Santiago LS, Winter K, Cushman JC (2010) Evolution of Crassulacean Acid Metabolism (CAM) in tropical orchids: integrating phylogenetic, ecophysiological and molecular genetic approaches. Oral presentation. Workshop on CAM: Evolution, Metabolic Control, Ecophysiology, Climate Change and Biofuels, Panama City, Panama.

18. **Silvera K**, Whitten MW, Williams NH, Neubig KM, Winter K, Cushman JC (2009) Evolution of Crassulacean Acid Metabolism in tropical orchids: Integrating ecophysiological, phylogenetic, and molecular genetic approaches. Oral presentation. 94th Ecological Society of America, Albuquerque, New Mexico.

17. Gulle B, Albion RL, **Silvera K**, Cushman JC (2009) Molecular marker development for the analysis of Crassulacean acid metabolism evolution in neotropical orchids (subtribe Oncidiinae). Poster presentation. Joint Annual Meeting of the American Society of Plant Biologists and the Phycological Society of America, Hawaii Convention Center, Honolulu, Hawaii.

16. **Silvera K**, Santiago LS, Winter K, Cushman JC (2008) Distribution of photosynthetic pathways and crassulacean acid metabolism in neotropical orchids (given in Spanish). Oral presentation. Mexican Scientific Society of Ecology (SCME), Merida, Mexico.

15. Santiago LS, Cornwell W, Wright I, Martinelli L, Reich P, Cernusak L, Dawson T, **Silvera K**, Griffiths H, Farquhar G (2008) Regulation of carbon isotope discrimination during photosynthesis: Results from a global database. Oral presentation. Mexican Scientific Society of Ecology (SCME), Merida, Mexico.

14. Neubig KM, Whitten WM, Williams, NH, **Silvera K**, Cushman JC, Dalstrom S (2008) Systematics of Oncidiinae (Orchidaceae) and the evolution of crassulacean acid metabolism. Poster presentation. Botanical Society of America. University of British Columbia, Vancouver, Canada.

13. **Silvera K**, Santiago LS, Rodriguez L, Whitten WM, Williams NH, Neubig K, Winter K, Cushman JC (2008) Crassulacean acid metabolism in tropical orchids: integrating isotopes, habitat preference and gene expression. Oral presentation. Joint Meeting of the American Society of Plant Biologists and Biochemistry Mexican Society, Merida, Mexico.

12. **Silvera K** (2008) Evolution of Crassulacean Acid Metabolism in Neotropical Orchids: Linking Gene Expression with Susceptibility to Extinction by Drought. Poster presentation. EPA/AAAS Graduate Fellowship Program Expo Meeting, Washington DC.

11. **Silvera K**, Santiago LS, Whitten WM, Williams NH, Neubig K, Winter K, Cushman JC (2007) Evolution of crassulacean acid metabolism in neotropical orchids. Poster presentation. C4 and CAM: From molecular diversity to ecological convergence. Symposium and satellite meeting associated with the International Photosynthesis Congress, 2007. Department of Plant Sciences, University of Cambridge, UK.

10. **Silvera K**, Whitten WM, Williams NH, Neubig KM, Winter K, Cushman JC (2007) Evolution of crassulacean acid metabolism in neotropical orchids. Oral presentation. Botany & Plant Biology Joint Congress, Hilton Chicago, IL.

9. **Silvera K**, Williams NH, Whitten WM, Winter K, Cushman JC (2007) Evolutionary mechanisms of crassulacean acid metabolism (CAM) expression in neotropical orchids. Oral Presentation. Western Section of the American Society of Plant Biologist (ASPB), University of California Davis, CA.

8. **Silvera K**, Williams NH, Whitten WM, Winter K, Cushman JC (2006) Evolution of crassulacean acid metabolism in neotropical orchids: linking isotopes, genetic expression and habitat preference. Poster Presentation. Botanical Society of America, Chico, CA.

7. **Silvera K**, Santiago LS, Winter K (2005) Strongly and weakly expressed crassulacean acid metabolism in orchids of Panama. Poster Presentation. XVII International Botanical Congress, Vienna, Austria.

6. **Silvera K**, Santiago LS, Winter K (2004) $\delta^{13}C$ values and the incidence of CAM in orchids of Panama. Poster presentation. IVth International Congress of Crassulacean Acid Metabolism, Tahoe City, CA.

5. **Silvera K**, Santiago LS, Winter K (2004) Incidence of CAM in orchids of Panama and Costa Rica. Poster presentation. XVI Botanical Mexican Congress, Oaxaca, Mexico.

4. **Silvera K**, Santiago LS, Schuur EAG, Williams NH, Whitten WM, Winter K (2003) Evolution of photosynthetic pathways in the Orchidaceae: Evidence from stable isotopes and phylogenetic analysis. Oral presentation. Ecological Society of America, Savannah, GA.

3. **Silvera K**, Whitten WM, Williams NH (2002) Variation of oil compositions among neotropical orchid species. Oral presentation. Association for Tropical Biology, Panama City, Panama.

2. **Silvera K**, Whitten WM, Williams NH (2002) Variation of oil compositions among neotropical orchid species. Oral presentation. Botanical Society of America, Madison, WI.

1. **Silvera K**, Dalling JW (1997) Distribution, germination and seedling growth of two morphotypes of *Trema micrantha* at the Barro Colorado Nature Monument, Panama. Poster presentation. Association for Tropical Biology, San Jose, Costa Rica.