Kolby J. Jardine
Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division
One Cyclotron Road – 84-0155, Berkeley, California 94720, +55-92-9200-7280, kjjardine@lbl.gov

Education

Colorado School of Mines (Chemistry) transferred to New York University (Biochemistry), B.S. 1999

NSF fellow in Optical Biomolecular Devices, Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ

South Dakota School of Mines and Technology (Atmospheric Chemistry), M.S., 2004

Stony Brook University, NSF fellow in Biosphere-Atmosphere Interactions (Atmospheric and Marine Sciences), Ph.D., 2008

University of Arizona and the National Center for Atmospheric Research (Biosphere-Atmosphere Interactions), Post-Doctoral fellow, 2008-2009

Experience

Aug 2017-Present:	Career Research Scientist, Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division.
June 2015-Present:	Adjunct faculty and professor, Departments of Climate and Environment (CLIAMB) and Tropical Forest Sciences (CFT), National Institute for Amazon Research
June 2014-Aug 2017:	Term Research Scientist, Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division, Next Generation Ecosystem Experiments Tropics (NGEE Tropics).
June 2012-June 2014:	Project Scientist, Green Ocean Amazon (GoAmazon) Terrestrial Ecosystem Project, Lawrence Berkeley National Laboratory (Berkeley, CA, USA) and Instituto Nacional de Pesquisas da Amazônia (Manaus, Brazil)
April 2012-June 2012:	Visiting Scientist, University of Bielefeld, Bielefeld, Germany
July 2009–April 2012:	Assistant Research Professor, Biosphere 2, University of Arizona, Tucson, AZ
July 2010–Nov 2010:	Visiting scholar, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
July 2008–July 2009:	Postdoctoral Research Fellow, National Center for Atmospheric Research, Boulder, CO and Biosphere 2, University of Arizona, Tucson, AZ
Aug 2004–May 2008:	Biosphere-Atmosphere Research and Training (BART) Doctoral Research Fellowship; University of Michigan Biological Station
Jan 2001–Dec 2002:	Instructor, Chemistry I/II, Microbiology, Math for Electronics, and Algebra I, San Juan College, Farmington New Mexico
Jan 1997–May 1999:	Undergraduate Research Assistant, DNA Nanotechnology, Department of Chemistry, New York University, New York City, NY
Jan 1994–June 1996:	Research Internship, Fruit Fly Molecular Genetics, Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, MA

Peer Reviewed Publications

1. **Jardine K**, Piva L, Cobello L, Gimenez B, Durgante F., Higuchi N, Chambers J (2017). Demonstration of a strict molecular oxygen requirement of yellow latex oxidation in the Amazônia Ocidental canopy tree Muiratinga (*Maquira sclerophylla* (Ducke) C.C. Berg), *Journal of the Brazilian Chemical Society* (in review).

2. **Jardine K**, Rodrigues T, Cobello L, Oliveira D, Pooran S, Spanner G, Rodrigues J, Menezes V, Sampaio I, Gimenez B, Piva L, Higuchi N, Chambers J (2017) Volatiles Defenses of Amazon *Azteca* Ants (Repellent Ants) *Insects* (in review).
3. Christianson D, Varadharajan C, Christoffersen B, Detto M, Faybishenko B, Hendrix V, **Jardine K**, Negron-Juarez R, Gimenez B, Pastorello G and Powell T (2017). A metadata reporting framework (FRAMES) for synthesis of ecohydrological observations, *Ecological Informatics*. http://dx.doi.org/10.1016/j.ecoinf.2017.06.002
4. **Jardine K**, Chambers J, Oikawa P, Fernandez de Souza V, Higuchi N, Bill M, Porras R, Niinemets U (2017) Integration of C_1 and $C_{2,3}$ metabolism in trees, *International Journal of Molecular Sciences*, *18*(10), 2045. http://dx.doi.org/10.3390/ijms18102045
5. Garcia S, **Jardine K**, Souza F, Manzi A, Higuchi N, Chambers J, Gonçalves J (2017) Leaf isoprene emission from de novo assimilation of leaf internal CO_2 sources, *Plant Biology*, in review.
6. **Jardine K**, Jardine A, Holm J., Lombardozzi D, Negron-Juarez R, Martin S, Chambers J, Higuchi N (2016) Monoterpene 'thermometer' of tropical forest response to climate warming, *Plant Cell and Environment*, 40: 441–452. http://dx.doi.org/10.1111/pce.12879
7. Jardine A, Barden D, **Jardine K.** (2016) Measuring carbon tetrachloride atmospheric mixing ratios in the central Amazon rainforest, *Chromatography Online*, *12*(17), 14-20.
8. **Jardine K**, Gimenez B, Araújo A, Cunha R, Felizzola J, Piva L, Chambers J, and Higuchi N (2016) Diurnal Pattern of Leaf, Flower and Fruit Specific Ambient Volatiles above an Oil Palm Plantation in Pará State, Brazil, *Journal of the Brazilian Chemical Society*., 0(0), 1-9. http://dx.doi.org/10.5935/0103-5053.20160194
9. S.T. Martin, P. Artaxo, **K. Jardine**, et al. (2016) The Green Ocean Amazon Experiment (GoAmazon2014/5) Observes Pollution Affecting Gases, Aerosols, Clouds, and Rainfall over the Rain Forest. *Bulletin of the American Meteorological Society (BAMS)*, early view. http://dx.doi.org/10.1175/BAMS-D-15-00221.1
10. **Jardine K** and Jardine A, Biogenic volatile organic compounds in Amazonian forest ecosystems (2016) Chapter 4, in "Interactions Between Biosphere, Atmosphere and Human Land Use in the Amazon Basin", Springer, Ecological Studies, Editors: Nagy L., Forsberg B., Artaxo P. http://dx.doi.org/10.1007/978-3-662-49902-3
11. **Jardine K**, Jardine A, Souza V, Carneiro V, Ceron J, Gimenez B, Soares C, Durgante F, Higuchi N, Manzi A, Gonçalves J., Garcia S, Martin S., Zorzanelli R., Piva L., Chambers J (2016) Methanol and Isoprene Emissions from the Fast Growing Tropical Pioneer Species *Vismia guianensis* (Aubl.) Pers. (Hypericaceae) in the Amazon Basin, *Atmospheric Chemistry and Physics*, 16, 6441-6452. http://dx.doi.org/10.5194/acp-16-6441-2016
12. **Jardine K**, Chambers J., Holm J., Jardine A., Fontes C., Piva L., Zorzanelli R., Souza V., Garcia S., Meyers K, Gimenez B, Higuchi N, Artaxo P, Martin S, Manzi A (2015) Green leaf volatile emissions during high temperature and drought stress in a central Amazon rainforest, *MDPI Plants*, Plant senescence special issue *4*(3), 678-690. http://dx.doi.org/10.3390/plants4030678
13. Alves E, **Jardine K**, Tota J, Jardine A, Yáñez-Serrano A, Karl T, Tavares J, Nelson B, *et al.* (2015) Seasonality of isoprenoid emissions from a primary rainforest in central Amazonia. *Atmospheric Chemistry and Physics*, 16, 3903-3925. http://dx.doi.org/10.5194/acp-16-3903-2016
14. Misztal P., Hewitt C., Wildt J., Blande J., Eller A., Fares S., Gentner D., Gilman J., Graus M., Greenberg J., Guenther A., Hansel A., Harley P., Huang M., **Jardine K**., Karl T., Kaser L., Keutsch F., Kiendler-Scharr A., Kleist E., Lerner B., Li T., Mak J., Nolscher A., Scnitzhofer R., Sinha V., Thorton B., Warneke C., Wegener F., Werner C., Willisams J., Worton D., Yassaa N., Goldstein A. (2015) Atmospheric benzenoid emissions from plants rival those from fossil fuels. *Scientific reports*, *5*. http://dx.doi.org/10.1038/srep12064
15. Jardine A, **Jardine K**, Fuentes J, Martin S, Martins G, Durgante F, Carneiro V, Higuchi N, Manzi A, Chambers J (2015) Highly-reactive light-dependent monoterpenes in the Amazon Basin, *Geophysical Research Letters*, *42*. http://dx.doi.org/1010002/2014GL062573

16. **Jardine K**, Yañez-Serrano A, Williams J, Kunert N, Jardine A, Taylor T, Abrell L, Artaxo P, Guenther A, Hewitt C.N., House E., Florentino A P, Manzi A, Kesselmeier J, Behrendt T, Veres P R, Derstroff B, Fuentes J, Martin S, Andreae M O (2015) Dimethyl Sulfide in the Amazon Forest**,** *Global Biogeochemical Cycles*, 29(1) 19-32. http://dx.doi.org/10.1002/2014GB004969
17. Yañez-Serrano A, Nölscher A, Williams J, Wolff S, Alves E, Martins G, Bourtsoukidis E, Brito J, **Jardine K**., Artaxo P, and Kesselmeier J. (2015) Diel and seasonal changes of biogenic volatile organic compounds within and above an Amazonian Rainforest site. *Atmospheric Chemistry and Physics*, 15, 3359-3378. http://dx.doi.org/10.5194/acp-15-3359-2015
18. **Jardine K**, Chambers J, Alves E, Tiexiera A, Garcia S, Holm J, Higuchi N, Manzi A, Abrell L, Fuentes J, Nielsen L, Torn M, Vickers C (2014). Dynamic balancing of isoprenoid intermediates reflect leaf photosynthetic and photorespiratory responses to temperature stress. *Plant Physiology*, 166: 1-14. http://dx.doi.org/10.1104/pp.114.247494
19. Holm J, **Jardine K**, Guenther A, Chambers J, Tribuzy E (2014) Evaluation of MEGAN-CLM parameter sensitivity to predictions of isoprene emissions from an Amazonian rainforest. *Atmospheric Chemistry and Physics Discussions*, 14: 23995-24041. http://dx.doi.org/10.5194/acpd-14-23995-2014
20. Niinemets U, Fares S, Harley P, **Jardine K** (2014) Bidirectional exchange of biogenic volatiles with vegetation. *Plant Cell and Environment*, 37(8): 1790-1809. http://dx.doi.org/10.1111/pce.12322
21. Alves E., Harley P., Gonçalves F., & **Jardine K** (2014). Effects of temperature on isoprene emission of the tropical tree species *Eschweilera coriacea* during leaf phenology in the central Amazon. *Acta Amazonica*, 44(1): 9-18. http://dx.doi.org/10.1590/S0044-59672014000100002
22. **Jardine K**, Wegener F, Abrell L, van Haren J, Werner C (2014) Phytogenic biosynthesis and emission of methyl acetate. *Plant Cell and Environment*, 37: 414-424. http://dx.doi.org/10.1111/pce.12164
23. **Jardine K**, Meyers K, Abrell L, Alves E, Yanez Serrano A, Kesselmeier J., Karl T, Guenther A, Vickers C, Chambers J (2013) Emissions of putative isoprene oxidation products from mango under abiotic stress. *Journal of Experimental Botany*, 64: 3669-3679. http://dx.doi.org/10.1093/jxb/ert202
24. **Jardine K**, Norman J, Abrell L, Monson R, Barron-Gafford G, Meyers K, Pavao-Zuckerman M, Dontsova K, Kleist E, Werner C, and Huxman T (2012) Green leaf volatiles and oxygenated metabolite emission bursts from mesquite branches following light-dark transitions. Photosynthesis Research, 113:321-333. http://dx.doi.org/10.1007/s11120-012-9746-5
25. **Jardine K**, Abrell L, Jardine A, Saleska S, Arneth A, Monson R, Karl T, Goldstein A, Fares S, Loreto F, & Huxman T (2012) Within-plant isoprene oxidation confirmed by direct emissions of oxidation products methyl vinyl ketone and methacrolein. Global Change Biology 18(3):973-984. http://dx.doi.org/10.1111/j.1365-2486.2011.02610.x
26. **Jardine K**, Abrell, L, Yanez Serrano, A, Arneth A, Alves E, Kesselmeier J., Huxman T., Saleska S., Jardine A., Taylor T., and Artaxo P (2011) Ecosystem-scale compensation points of formic and acetic acid in the central Amazon. Biogeosciences 8: 3709-3720. http://www.biogeosciences.net/8/3709/2011/bg-8-3709-2011.pdf
27. **Jardine, K.**, Abrell, L., Yanez Serrano, A. M., Arneth, A., Yoko Ishida, F., Huxman, T., Saleska, S., Jardine, A., Karl, T., and Artaxo, P. (2011) Within-Canopy Sesquiterpene Ozonolysis in Amazonia. *J.* Geophys. Res., 116, D19301. http://dx.doi.org/10.1029/2011JD016243
28. Karl T, Harley P, Emmons L, Thornton B, Guenther A, Basu C, Turnipseed A & **Jardine K** (2010) Efficient atmospheric cleansing of oxidized organic trace gases by vegetation. Science 330: 816-819. http://dx.doi.org/10.1126/science.1192534
29. **Jardine K**, Sommer E, Saleska S, Huxman T, Harley P & Abrell L (2010) Gas-phase measurements of pyruvic acid and its volatile metabolites. Environmental Science & Technology 44: 2454-2460. http://dx.doi.org/10.1021/es903544p
30. **Jardine K**, Abrell L, Kurc SA, Huxman T, Ortega J & Guenther A (2010) Volatile organic compound emissions from *Larrea tridentata* (creosotebush). Atmospheric Chemistry and Physics 10: 12191-12206. http://www.atmos-chem-phys.net/10/12191/2010/acp-10-12191-2010.pdf

31. **Jardine K**, Karl T, Lerdau M, Harley P, Guenther A & Mak JE (2009) Carbon isotope analysis of acetaldehyde emitted from leaves following mechanical stress and anoxia. Plant Biology 11: 591-597. http://onlinelibrary.wiley.com/doi/10.1111/j.1438-8677.2008.00155.x/abstract
32. **Jardine K**, Henderson W, Huxman T & Abrell L (2010) Dynamic Solution Injection: a new method for preparing pptv & ppbv standard atmospheres of volatile organic compounds. Atmospheric Measurement Techniques 3: 1569-1576. http://www.atmos-meas-tech.net/3/1569/2010/amt-3-1569-2010.pdf
33. **Jardine K**, Harley P, Karl T, Guenther A, Lerdau M & Mak JE (2008) Plant physiological and environmental controls over the exchange of acetaldehyde between forest canopies and the atmosphere. Biogeosciences 5: 1559-1572. http://www.biogeosciences.net/5/1559/2008/bg-5-1559-2008.pdf
34. Karl T, Guenther A, Turnipseed A, Patton EG & **Jardine K** (2008) Chemical sensing of plant stress at the ecosystem scale. Biogeosciences 5: 1287-1294. http://www.biogeosciences.net/5/1287/2008/bg-5-1287-2008.pdf
35. Karl T, Harley P, Guenther A, Rasmussen R, Baker B, **Jardine K** & Nemitz E (2005) The bi-directional exchange of oxygenated VOCs between a loblolly pine (*Pinus taeda*) plantation and the atmosphere. Atmospheric Chemistry and Physics 5: 3015-3031. http://hal.archives-ouvertes.fr/docs/00/29/57/81/PDF/acp-5-3015-2005.pdf

Other publications

Invention of dynamic ^{13}C-pulse tracing (patent pending): http://www.lbl.gov/TT/techs/lbnl2013-110.html
LBNL personal page: http://esd.lbl.gov/profiles/kolby-jeremiah-jardine/
Amazon VOCs wiki page: https://voc-amazon.wikispaces.com/home
Jardine K & Jardine A (2010) In Person: How Our Adventures Led to Careers in Science. Science Careers.
http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2010_09_03/caredit.a1000086
Arizona Public Media interview: https://www.azpm.org/s/3681-biosphere-2-air-quality-research/
Kolby and Angie's Environmental Science and Adventure Page: http://kolbala.livejournal.com/

Synergetic Activities

1. Reviewer Austrian Science Foundation, Environmental Protection Agency (EPA), NSF Atmospheric Chemistry, DOE Terrestrial Ecosystem Science; Editor Biogeosciences: May 2013 – Dec 2015; Reviewer Analytical Chemistry, Atmospheric Measurement Techniques, Biogeosciences, Atmospheric Chemistry and Physics, Global Change Biology, Oecology, New Phytologist, Phytochemistry, Atmospheric Environment.
2. Invited talks including Stanford University (2016), University of California Irvine (2016), GoAmazon Joint Principal Investigators Meeting (2014, Washington D.C.), American Geophysical Union (2014-2016, San Francisco, CA), GoAmazon 2014/5 Science Conference (2015, Cambridge, MA), Environmental System Science PI Meeting (2015, Potomac, MD), DOE Terrestrial Ecosystem Science focus area review (2014, Gaithersburg, MD), Gordon Research Conference on Plant Volatiles (2014, Ventura, CA), Gordon Research Conference on Biogenic Hydrocarbon in the Atmosphere (2014, Spain), Whittier College Capstone Program 2014 (Manaus, Brazil), GoAmazon meeting on seasonality of photosynthesis 2014 (Manaus, Brazil)**,** and EMRAPA collaborations meeting (2015, Belem, Brazil).
3. Organizer of GoAmazon 2014/5 graduate student training meetings. Three 2-day research training meetings were held at the Park Suites hotel in Manaus, Brazil with the primary goal of practicing

scientific presentations, initiating collaborations, and training in data analysis tools and analytical chemistry instrumentation methods.

4. AGU 2011-2012 session Co-Chair B31: Exchange Dynamics of Volatile Organic Compounds between Plant Ecosystems and the Atmosphere (San Francisco, CA). AGU 2017 session Co-Chair
5. Research Mentor for: Amazon-PIRE and INPA Forest Management program (Brazil, July 2015-2017), MC^2 High School Program (Ohio, 2010-2011), high school teacher science curriculum educator (AZ STEM program, 2010-2011), high school science instruction with MC^2 (Cleveland, OH) and GEAR UP (Tucson) 2010-2011, Brazil Undergraduate Research program (Brazil, 1 month 2014/5).

Graduate and postdoctoral Advisors

John E. Mak: School of Marine and Atmospheric Sciences; SUNY Stony Brook	Scott Saleska: Department of Evolution and Ecology; University of Arizona, Tucson	Travis Huxman: School of Biological Sciences, University of California, Irvine

Graduate and Postdoctoral Advisees

Eliane Alves (PhD), INPA	Vinicius Fernandes de Souza (PhD), INPA	Clarissa Fontes (PhD), UC Berkeley	Sabrina Garcia (PhD), INPA
Bruno Gimenez (PhD), INPA	Giordani Martins (PhD), INPA	Kimberly Meyers (MS), University of Arizona	Luani Piva (MS), INPA
Ana Maria Serrano (PhD), INPA	Andrea Teixeira (MS), INPA	Tyeen Tyson (PhD), University of Arizona	Raquel Zorzanelli (MS), INPA
Israel Sampaio (MS), INPA	Angela Jardine (PhD), INPA	Leticia Cobella (MS), INPA	Eliane Pires (MS) INPA
Tayana Barrozo (MS), INPA	Bruna Oliveira (MS), INPA		

Laboratory Technician Advisees

Kimberley Meyers (PhD candidate, Univ. of Arizona)	Andrea Teixeira (MS graduate, INPA)	Daniela Coelho Oliveira (INPA)	Cilene Palheta (INPA)