

PAUL F. GUGGER

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Education

- 2010 Ph.D., Ecology, Evolution and Behavior, University of Minnesota
 Advisors: Jeannine Cavender-Bares and Shinya Sugita
 Dissertation: Phylogeography of Douglas-fir: testing hypotheses from the fossil record
- 2003 B.S., Biology with Distinction, Duke University

Professional Appointments

- 2015 – Assistant Professor, University of Maryland Center for Environmental Science, Appalachian Laboratory, Frostburg, MD
- 2016 – Graduate Faculty, Marine, Estuarine & Environmental Sciences, University of Maryland, College Park, MD
- 2016 – Adjunct Assistant Professor, Department of Biology, Frostburg State University, MD
- 2014 – 2015 Assistant Researcher, Ecology and Evolutionary Biology, U. California, Los Angeles
- 2010 – 2014 Postdoctoral Scholar, Ecology and Evolutionary Biology, U. California, Los Angeles
 Advisor: Victoria L. Sork

Publications (Researcher ID: A-4005-2010)

43. Shi T, **Gugger PF**, Wang M-H, Li H, Li Z-Z, Liu Y-L, Wang Q-F, Chen J-M (Submitted) Genomic relics from ancestral angiosperm and lineage-specific genome duplications in the conserved lotus genome. *Molecular Biology and Evolution*.
42. Meng H-H, Zhou S-S, Jiang X-L, **Gugger PF**, Li L, Tan H-T, Li J (Submitted) Are mountaintops climate refugia for plants under global warming? A lesson from high-mountain oaks in tropical rainforest. *Journal of Systematics and Evolution*.
41. Butler-Leopold PR, Iverson LR, Thompson III FR, Brandt LA, Handler SD, Janowiak MK, Shannon PD, Swanston C, Bearer S, Bryan AM, Clark KL, Czarnecki G, DeSenze P, Dijak WD, Fraser J, **Gugger PF**, et al. (In press) *Mid-Atlantic Forest Ecosystem Vulnerability Assessment and Synthesis: a report from the Mid-Atlantic Climate Change Response Framework*. General Technical Report NRS-GTR-XX. Newtown Square, PA; U.S. Department of Agriculture, Forest Service, Northern Research Station.
40. Martins K, **Gugger PF**, Llanderal-Mendoza J, González-Rodríguez A, Fitz-Gibbon S, Zhao J-L, Oyama K, Sork VL (In press) Landscape genomics provides evidence of climate-associated adaptive genetic variation in Mexican populations of *Quercus rugosa*. *Evolutionary Applications*, doi:10.1111/eva.12684.
39. Kim BY, Wei X-Z, Fitz-Gibbon ST, Lohmueller KE, Ortego J, **Gugger PF**, Sork VL (In press) RADseq data reveal ancient, but not pervasive, introgression among Californian tree and scrub oak species (*Quercus*: Fagaceae). *Molecular Ecology*, doi:10.1111/mec.14869.
38. Zhao J-L, Werth S, Ikegami M, **Gugger PF**, Sork VL (In press) Historical interactions are predicted to be disrupted under future climate change: the case of lace lichen and valley oak. *Journal of Biogeography*, doi: 10.1111/jbi.13442.
37. Albarrán-Lara AL, Petit RJ, Kremer A, Caron H, Peñaloza-Ramírez JM, **Gugger PF**, Dávila-Aranda PD, Oyama K (Accepted) Limited genetic differentiation between two morphologically and ecologically distinct giant-leaved Mexican oaks. *Plant Systematics and Evolution*.
36. **Gugger PF**, Liang CT, Sork VL, Hodgskiss P, Wright JW (2018) Applying landscape genomic tools to forest management and restoration of Hawaiian koa (*Acacia koa*) in a changing environment. *Evolutionary Applications*, 11(2):231–242.
35. Ortego J, **Gugger PF**, Sork VL (2018) Genomic data reveal cryptic lineage diversification and introgression in Californian golden cup oaks (section *Protobalanus*). *New Phytologist*, 218(2):804–818.
34. Evans MEK, **Gugger PF**, Lynch AM, Guiterman CH, Fowler JC, Klesse S, Riordin EC (2018)

- Dendroecology meets genomics in the common garden: new insights into climate adaptation. *New Phytologist*, 218(2):401–403.
33. Öney-Birol S, Fitz-Gibbon ST, Chen J-M, **Gugger PF**, Sork VL (2018) Assessment of shared alleles in drought-associated candidate genes among southern California white oak species (*Quercus* sect. *Quercus*). *BMC Genetics*, 19:88.
 32. Nelson DM, Nagel J, Trott R, Campbell CJ, Pruitt L, Good RE, Iskali G, **Gugger PF** (2018) Carcass age and searcher identity affect morphological assessment of the sex of bats. *Journal of Wildlife Management*, 82(8):1582–1587.
 31. He D, Guo P, **Gugger PF**, Guo Y, Liu X, Chen J-M (2018) Investigating the molecular basis for heterophylly in the aquatic plant *Potamogeton octandrus* (Potamogetonaceae) with comparative transcriptomics. *PeerJ*, 6:e4448.
 30. **Gugger PF***, Peñaloza-Ramírez JM*, Wright JW, Sork VL (2017) Whole-transcriptome response to water stress in a California endemic oak, *Quercus lobata*. *Tree Physiology*, 37(5):632–644. *equal contributors
 29. Ortego J, **Gugger PF**, Sork VL (2017) Impacts of human-induced environmental disturbances on hybridization between two ecologically differentiated Californian oak species. *New Phytologist*, 213(2):942–955.
 28. Llanderal-Mendoza J, **Gugger PF**, Oyama K, Uribe-Salas D, González-Rodríguez A (2017) Climatic determinants of acorn size and germination rate of *Quercus rugosa* (Fagaceae) along a latitudinal gradient. *Botanical Sciences*, 95(1):37–45.
 27. Fetter K, **Gugger PF**, Keller SR (2017) Landscape genomics of angiosperm trees: from historic roots to discovering new branches of adaptive evolution. In: Groover A, Cronk Q (Eds.) *Comparative and Evolutionary Genomics of Angiosperm Trees* (pp. 303-333). Springer, Cham, Switzerland, doi:10.1007/7397_2016_19.
 26. Dudley N, Jones T, James R, Sniezko R, Wright J, Liang C, **Gugger PF**, Cannon P (2017) Applied genetic conservation of Hawaiian *Acacia koa*: an eco-regional approach. In: Sniezko RA, Man G, Hipkins V, Woeste K, Gwaze D, Kliejunas JT, McTeague BA (Tech. cords.), *Gene conservation of tree species—banking on the future. Proceedings of a workshop* (pp. 78-91). General Technical Report PNW-GTR-963. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
 25. **Gugger PF**, Fitz-Gibbon S, Pellegrini M, Sork VL (2016) Species-wide patterns of DNA methylation variation in *Quercus lobata* and their association with climate gradients. *Molecular Ecology*, 25(8):1665–1680.
 24. **Gugger PF**, Cokus SJ, Sork VL (2016) Association of transcriptome-wide sequence variation with climate gradients in valley oak (*Quercus lobata*). *Tree Genetics & Genomes*, 12(2):15.
 23. Sork VL, **Gugger PF**, Chen J-M, Werth S (2016) Evolutionary lessons from California plant phylogeography. *Proceedings of the National Academy of Sciences*, 113(29):8064–8071.
 22. Sork VL, Fitz-Gibbon ST, Puiu D, Crepau MW, **Gugger PF**, Sherman R, Stevens K, Langley CH, Pellegrini M, Salzberg SL (2016) First draft assembly and annotation of the genome of a California endemic oak, *Quercus lobata* Née (Fagaceae). *G3: Genes, Genetics, Genomes*, 6(11):3485–3495.
 21. Sork VL, Squire K, **Gugger PF**, Levy E, Steele S, Eckert AJ (2016) Landscape genomic analysis of candidate genes for climate adaptation in a California endemic oak, *Quercus lobata* Née (Fagaceae). *American Journal of Botany*, 103(1):33–46.
 20. Riordan EC, **Gugger PF**, Ortego J, Smith C, Gaddis K, Thompson P, Sork VL (2016) Association of genetic and phenotypic variability with geography and climate in three southern California oaks. *American Journal of Botany*, 103(1):73–85.
 19. Zhao J-L, **Gugger PF**, Xia Y-M, Li Q-J (2016) Ecological divergence of two closely related *Roscoea* species associated with late Quaternary climate change. *Journal of Biogeography*, 43(10):1990–2001.
 18. Sun S-S, **Gugger PF**, Wang Q-F, Chen J-M (2016) Identification of a R2R3-MYB gene regulating anthocyanin biosynthesis and relationships between its variation and flower color difference in lotus (*Nelumbo Adans.*). *PeerJ*, e2369.
 17. Sork VL, Riordan E, **Gugger PF**, Fitz-Gibbon S, Wei X, Ortego J (2016) Phylogeny and introgression of California scrub white oaks (*Quercus* section *Quercus*). *International Oaks*,

- 27:61–74.
16. Cokus SJ*, **Gugger PF***, Sork VL (2015) Evolutionary insights from *de novo* transcriptome assembly and SNP discovery in California white oaks. *BMC Genomics*, 16:552. *equal contributors
 15. Platt A, **Gugger PF**, Pellegrini M, Sork VL (2015) Genome-wide signature of local adaptation linked to variable CpG methylation in valley oaks. *Molecular Ecology*, 24(15):3823–3830.
Highlighted in News and Views section of that issue (Robertson & Richards 2015 Mol Ecol 24(15):3799-3801)
 14. Ortego J, **Gugger PF**, Sork VL (2015) Climatically stable landscapes predict patterns of genetic structure and admixture in the Californian canyon live oak. *Journal of Biogeography*, 42(2):328–338.
 13. Ortego J, Noguerales V, **Gugger PF**, Sork VL (2015) Evolutionary and demographic history of the Californian scrub white oak species complex: an integrative approach. *Molecular Ecology*, 24: 6188–6208.
 12. Delfino-Mix A, Wright JW, **Gugger PF**, Liang CF, Sork VL (2015) Establishing a range-wide provenance test in valley oak (*Quercus lobata* Née) at two California sites. In: *Proceedings of the seventh oak symposium: managing oak woodlands in a dynamic world*. USDA Forest Service General Technical Report PSW-GTR-251, 413–424.
 11. Albarrán-Lara AL, Wright JW, **Gugger PF**, Delfino-Mix A, Peñaloza-Ramírez JM, Sork VL (2015) Phenotypic variation in California populations of valley oak (*Quercus lobata* Née) sampled along elevational gradients. In: *Proceedings of the seventh oak symposium: managing oak woodlands in a dynamic world*. USDA Forest Service General Technical Report PSW-GTR-251, 433–445.
 10. Gavin DG, Fitzpatrick MC, **Gugger PF**, et al. (2014) Climate refugia: joint inference from fossil records, species distribution models, and phylogeography. *New Phytologist*, 204(1):37–54.
 9. Ortego J, **Gugger PF**, Riordan EC, Sork VL (2014) Influence of climatic niche suitability and geographic overlap on hybridization patterns among southern Californian oaks. *Journal of Biogeography*, 41(10):1895–1908.
 8. **Gugger PF**, Ikegami M, Sork VL (2013) Influence of late Quaternary climate change on present patterns of genetic variation in valley oak, *Quercus lobata* Née. *Molecular Ecology*, 22(13):3598–3612.
 7. **Gugger PF**, Cavender-Bares J (2013) Molecular and morphological evidence for a Florida origin of the Cuban oak. *Journal of Biogeography*, 40(4):632–645.
 6. Ortego J, Riordan EC, **Gugger PF**, Sork VL (2012) Influence of environmental heterogeneity on genetic diversity and structure in an endemic southern Californian oak. *Molecular Ecology*, 21(13):3210–3223.
 5. **Gugger PF**, González-Rodríguez A, Rodríguez-Correa H, Sugita S, Cavender-Bares J (2011) Southward Pleistocene migration of Douglas-fir into Mexico: phylogeography, ecological niche modeling and conservation of ‘rear edge’ populations. *New Phytologist*, 189(4):1185–1199.
Highlighted in Commentary section of that issue (Eckert 2011 New Phytol 189(4):894–897)
 4. **Gugger PF**, Sugita S, Cavender-Bares J (2010) Phylogeography of Douglas-fir based on mitochondrial and chloroplast DNA sequences: testing hypotheses from the fossil record. *Molecular Ecology*, 19(9):1877–1897.
 3. **Gugger PF**, Sugita S (2010) Glacial populations and postglacial migration of Douglas-fir based on fossil pollen and macrofossil evidence. *Quaternary Science Reviews*, 29(17-18):2052–2070.
 2. Arnold AE, Miadlikowska J, Higgins KL, Sarvate SD, **Gugger P**, Way A, Hofstetter V, Kauff F, Lutzoni F (2009) A phylogenetic estimation of trophic transition networks for Ascomycetous fungi: are lichens cradles of symbiotrophic fungal diversification? *Systematic Biology*, 58(3):283–297.
 1. **Gugger PF**, McLachlan JS, Manos PS, Clark JS (2008) Inferring long-distance dispersal and topographic barriers during postglacial colonization from the genetic structure of red maple (*Acer rubrum* L.) in New England. *Journal of Biogeography*, 35(9):1665–1673.

Grants

Awarded

Gugger PF (2018) National Park Service, Regional Block Grant, *Assess cost-efficiency of DNA metabarcoding to identify bulk insect samples*, \$19,988.

Gugger PF, Nelson DM, Gates JE (2018–2021) US Fish and Wildlife Service Competitive State Wildlife

- Grant, *Using novel biomarkers to assess geographic scale and demographic impacts on three species of tree-roosting bats killed at wind turbines*, \$246,407 of \$437,555 (with Gibbs HL, Carstens BC, Ohio State University, MD DNR, OH DNR).
- Öney-Birol S, **Gugger PF**, Ozel N, Ozkan K (2018–2020) TUBITAK (Turkish Scientific and Research Council), *Understanding threats to one of the rarest oaks in the world (Quercus vulcanica): developing genomic tools and testing drivers of past population decline*, \$60k (~\$15k to UMCES).
- Martins KM, **Gugger PF**, de Oliveira-Wadt LH, Kenji Kimura R (2017–2019) Fundação de Amparo à Pesquisa do Estado de São Paulo, *Reference genome of Brazil nut tree (Bertholletia excelsa Bonpl., Lecythydaceae)*, ~\$59,000 (\$4,000 to UMCES).
- Gugger PF**, Nelson DM, Fitzpatrick MC, Gates JE (2016–2019) Maryland Department of Natural Resources, *Population genomics and isotopic analysis of bats killed by wind turbines in the central Appalachians: continuation to enhance sampling*, \$40,000.
- Sork VL, **Gugger PF**, Pellegrini M, Salzberg S (2015–2018) National Science Foundation, Plant Genome Research Program, *Sequencing and annotating the valley oak genome*, \$1,976,532 (UMCES Subaward: \$92,769).
- Gugger PF**, Nelson DM, Fitzpatrick MC, Gates JE (2015–2018) Maryland Department of Natural Resources, *Population genomics of bats killed by wind turbines in the central Appalachians*, \$40,000.
- Nelson DM, **Gugger PF** (2015–2019) US Fish and Wildlife Service, *Geographic origins and population genetics and genomics of bats killed at wind-energy facilities in the Midwest*, \$20,786.
- Martins KM, de Oliveira-Wadt LH, Rennó-Azevedo VC, **Gugger PF**, Thomas E *et al.* (2016–2019), Empresa Brasileira de Pesquisa Agropecuária, *Ecology and genetics of the Brazil nut tree (Bertholletia excelsa Bonpl.) as a tool to support its conservation and sustainable use*, ~\$64,000 (\$0 to UMCES; Role: Investigator).
- Small grants (before 2015), American Philosophical Society, UC-MEXUS/CONACyT, University of Minnesota, Travel grants, Sigma Xi, \$56,724.

In review

- Gugger PF**, Brosi SL (2019–2022) US Forest Service, Forest Health Monitoring Program, *Invasive disease and invasive genes: Invasive disease and invasive genes: Screening for canker-resistant butternut and identifying genetic markers for resistance in the Potomac Basin*, \$160,723.
- Gugger PF**, Elmore AJ, Fitzpatrick MC (2019–2022) National Park Service, Natural Resources – Cooperative Landscape Conservation, *Comprehensive assessment and evaluation of forest biodiversity vulnerability to environmental change in National Capital Region parks*, \$307,983.
- Gugger PF** (2019-2022) National Park Service, Natural Resources Grant, *Analyzing changes in forest invertebrate communities using DNA metabarcoding*, \$375,540.

Unfunded (selected)

- Gugger PF**, Cavender-Bares J, May G, Hipp A, Manos PS, McCarthy (2018–2023) National Science Foundation, Dimensions of Biodiversity, *Collaborative Research: Consequences of multispecies introgression for adaptation and community biodiversity*, \$831,110 of \$1.99 M. [First submission recommended for funding at “Low Priority”]
- Hilderbrand RH, **Gugger PF** (2018–2020) Maryland Sea Grant College Program, *Preproposal: Efficacy of eDNA for stream biodiversity inventory, monitoring and assessment using benthic macroinvertebrates*, \$138,000. [Full proposal invited]
- Gugger PF**, Nelson DM, Flockhart DTT, Gates JE (2017–2019) US Fish and Wildlife Service, White-nose Syndrome Program, *Assessing a potentially overlooked mechanism of white-nose syndrome spread and bat population vulnerability: migratory tree-roosting bats as long-term vectors of Pseudogymnoascus destructans*, \$249,967.
- Fitzpatrick MC, Elmore AJ, **Gugger PF** (2016) Department of Defense, Strategic Environmental Research and Development Program, *Genomic and environmental controls on phenology in a foundational tree species: understanding current trends and predicting future responses*, \$1,987,019. [Full proposal invited]

Fellowships and Awards

- 2011 Best Dissertation Award in Biological and Medical Sciences, University of Minnesota

2010	Hamm Memorial Scholarship, Monsanto Agricultural Company (\$1,500)
2008 – 2009	Doctoral Dissertation Fellowship, University of Minnesota (\$22,000)
2005 – 2008	Graduate Research Fellowship, National Science Foundation (\$121,500)
2004 – 2005	Graduate Student Fellowship, University of Minnesota (\$16,000)

Teaching and Training

Courses and workshops

2018	Instructor	MEES 663: <i>Ecological Genomics</i> , 3 credits, graduate, UMCES Co-taught with Louis Plough (enrollment = 8) <i>Bioinformatics for Landscape Genomics</i> , graduate workshop, Yunnan University, Kunming, China (enrollment = 32)
2017	Instructor	MEES 663: <i>Ecological Genomics</i> , 3 credits, graduate, UMCES Co-taught with Louis Plough (enrollment = 10) MEES 699: <i>Conservation Genetics</i> , 1 credit, graduate, UMCES (enr. = 1)
2016	Guest Lecture Guest Lectures	MEES 680: <i>Cell and Molecular Biology for the Environmental Scientist</i> MEES 660: <i>Ecological Systems</i> , graduate, UMCES MEES 680: <i>Cell and Molecular Biology for the Environmental Scientist</i> <i>Molecular Ecology</i> , undergraduate, UNAM-Morelia, Mexico
2015 – 2017	Instructor	<i>Bioinformatics for Landscape Genomics</i> , graduate workshop, UNAM-Morelia, Mexico (enrollment, 2015 = 16, 2016 = 22, 2017 = 12)
2014 & 2015	Co-instructor	<i>Conservation Genomics</i> , graduate workshop, UCLA
2013	Instructor	<i>Methods in Molecular Ecology/Genomics</i> , undergrad. lab seminar, UCLA
2010	Invited Lecture	<i>Ecology</i> , undergraduate, University of Minnesota
2009	Teaching Assistant	<i>Ecology</i> , writing-intensive undergraduate course with lab, U. Minnesota
2008	Teaching Assistant	<i>Evolution</i> , undergraduate course with lab, University of Minnesota
2007	Co-organizer	<i>Phenology and Seasonality</i> short course, University of Minnesota
2006	Teaching Assistant Invited Lectures (2)	<i>Ecology: Theory and Concepts</i> , graduate with recitation, U. Minnesota <i>Ecology of Vegetation</i> , undergraduate, University of Minnesota
2005	Co-organizer Invited Lectures (2)	<i>Phylogeography</i> , graduate seminar, University of Minnesota <i>Ecological Biogeography</i> , undergraduate, University of Minnesota

Mentorship

Advisor	Juliet Nagel (Ph.D., MEES); Sofia Zorrilla Azcué (Visiting Scholar)
Committee Member	Caitlin Campbell (M.S., FSU), Zoë Díaz-Martin (Ph.D., Tulane University), Erica Duda (M.S., FSU), Andy Gougherty (Ph.D., MEES), Alexandra McCarty (Ph.D., MEES), Víctor Noguerales (external reviewer; Ph.D., Universidad de Castilla-La Mancha), Bryan Whitmore (M.S., FSU)
Mentor	International student and lab volunteers, UCLA (2012–2015)
Mentor	<i>Directed Research</i> of undergraduate student, U. Minnesota (2010)

Presentations/Abstracts (*Invited)

Conference (as presenter/lead)

Gugger PF, Fitz-Gibbon ST, Wright JW, Sork VL. Landscape genomics of valley oak (*Quercus lobata*) reveals genes involved in local climate adaptation at multiple spatial scales [Poster]. *2nd Joint Congress on Evolutionary Biology*, Montpellier, France, 19 August 2018.

***Gugger PF**. Evolutionary responses of tree populations to climate change: genomic insights into environmental controls on gene flow and adaptation [Keynote]. *7th Annual Plant Reproductive Biology and Evolutionary Ecology Conference*, Yunnan University, Kunming, China, 25 June 2018.

***Gugger PF**, Martins K, Llanderal Mendoza J, González Rodríguez A, Fitz-Gibbon S, Albarrán Lara AL, Wright JW, Sork VL. Comparative landscape genomics of *Quercus rugosa* (Mexico) and *Q. lobata* (California), *54th Annual Meeting of the Association of Tropical Biology and Conservation*, Mérida, Mexico, 10 July 2017.

Gugger PF, Fitz-Gibbon ST, Wright JW, Sork VL. Landscape genomics of valley oak: how climate

- shapes genetic variation [Poster]. *Biodiversity Genomics Conference*, Smithsonian Museum of Natural History, Washington, DC, 22 February 2017.
- Gugger PF**, Fitz-Gibbon S, Wright JW, Sork VL. Landscape genomics of California valley oak (*Quercus lobata*). *International Plant and Animal Genome Conference XXV*, San Diego, CA, 16 January 2017.
- ***Gugger PF**. What can Maryland's big trees tell us about responses to environmental change? *Maryland Association of Forest Conservancy District Boards Fall Meeting*, Hanover, MD, 5 November 2016.
- Gugger PF**, Martins K, Fitz-Gibbon ST, Sork VL. Benefits of a draft genome sequence for landscape genomics studies. *International Biogeography Society Special Meeting*, Beijing, China, 6 May 2016.
- Gugger PF**, Cokus SJ, Peñalosa Ramírez JM, Sork VL. High diversity in candidate genes underlying local adaptation to climate: evidence from whole-transcriptome sequencing. *Evolution Annual Meeting*, Raleigh, NC, 23 June 2014.
- Gugger PF**, Cokus SJ, Sork VL. Identifying genetic variation under selection by climate in valley oak (*Quercus lobata*). *Evolution Annual Meeting*, Snowbird, UT, 22 June 2013.
- ***Gugger PF**, Ikegami M, Sork VL. Late Quaternary demography and selection shape modern genetic structure of valley oak. *Ecological Society of America 97th Annual Meeting*, Portland, OR, 8 August 2012.
- Gugger PF**, Ikegami M, Sork VL. Evolutionary history of a California endemic oak, *Quercus lobata*. *MEDECOS XII: Linking Science with Resource Management*, University of California, Los Angeles, CA, 6 September 2011.
- ***Gugger PF**, Ikegami M, Sork VL. Evolutionary response of California valley oak to late Quaternary climate change. *International Union for Quaternary Research (INQUA) Congress*, Bern, Switzerland, 23 July 2011.
- ***Gugger PF**, Sork VL. Ecological genomics of California valley oak: implications of climate-associated adaptive variation for conservation. *Linking Molecular Information to Environmental Sciences*, Tallinn University, Tallinn, Estonia, 25 October 2010.
- ***Gugger PF**. Phylogeography of Douglas-fir: testing hypotheses from the fossil record. *Linking Molecular Information to Environmental Sciences*, Tallinn University, Tallinn, Estonia, 25 October 2010.
- Gugger PF**. Synergy of fossil and molecular data for understanding late Quaternary history of Douglas-fir. *Ecological Society of America 95th Annual Meeting*, Pittsburgh, PA, 3 August 2010.
- Gugger PF**. Comparing range-wide phylogeography of Douglas-fir to the fossil record. *Evolution Annual Meeting*, Moscow, ID, 13 June 2009.
- Gugger PF**. Postglacial migration of Douglas-fir: paleoecological and phylogeographic evidence [Poster]. *Doctoral Dissertation Fellows Research Symposium*, University of Minnesota, Minneapolis, MN, 2009.
- Gugger PF**. Phylogeography of Douglas-fir based on mitochondrial and chloroplast DNA sequences [Poster]. *American Institute of Biological Sciences Annual Meeting*, Washington, DC, 14 May 2007.
- Gugger PF**. Phylogeography of Douglas-fir based on mitochondrial and chloroplast DNA sequences [Poster]. *Ecological Society of America 91st Annual Meeting*, Memphis, TN, 8 August 2006.
- Conference (as co-author)**
- Nelson DM, Nagel J, Trott R, Campbell C, Pruitt L, Good R, Iskali G, **Gugger PF**. Carcass age and searcher identity affect morphological assessment of sex of bats. 12th NWCC Wind Wildlife Research Meeting, St. Paul, MN, November 2018.
- Sork VL, Zimin A, Puiu D, Fitz-Gibbon S, Cokus S, **Gugger PF**, Lohmueller K, Zhen Y, Pellegrini M, Salzberg AL. Sequencing, annotating, and analyzing the genome of a California endemic oak, *Quercus lobata* [Poster]. *NSF Plant Genome Research Annual PI Meeting*, Arlington, VA, September 2018.
- Sork VL, Fitz-Gibbon S, Burge D, **Gugger PF**, Wright JW, Pellegrini M. Does genetically-based and environmentally induced DNA-methylation affect gene expression and phenotypic plasticity in valley oak (*Quercus lobata*)?. *Joint Congress of the European Society of Evolutionary Biology and Society for the Study of Evolution*, Montpellier, France, August 2018.
- Browne L, Wright JW, **Gugger PF**, Sork VL. Predicting the growth of Valley oak (*Quercus lobata*) in a

- changing climate using common garden and genomic approaches. *Ecological Society of America 103rd Annual Meeting*, New Orleans, LA, August 2018.
- Sork VL, Fitz-Gibbon S, Burge D, **Gugger PF**, Wright JW, Pellegrini M. Climate associations and transgenerational inheritance of DNA methylation in oak populations. *International Union of Forest Research Organization, Genetics and Genomics of Fagaceae and Nothofagaceae*, Shanghai Chenshan Plant Science Research Center, Chinese Academy of Sciences, Shanghai, China, 1 November 2017.
- Sork VL, Zimin A, Puiu D, Fitz-Gibbon S, **Gugger PF**, Pellegrini M, Salzberg S. High-quality genome assembly of a California endemic oak, *Quercus lobata* [Poster]. *International Union of Forest Research Organization, Genetics and Genomics of Fagaceae and Nothofagaceae*, Shanghai Chenshan Plant Science Research Center, Chinese Academy of Sciences, Shanghai, China, 1 November 2017.
- Sork VL, Fitz-Gibbon ST, Burge D, **Gugger PF**, Wright JW, Pellegrini M. Heritability of climate-associated DNA methylation measured in progeny of naturally occurring adults of *Quercus lobata* and grown in two gardens. Plant epigenetics: from mechanisms to ecological relevance, *40th New Phytologist Symposium*, Vienna, Austria, 12 September 2017.
- Sork VL, Zimin A, Puiu D, Fitz-Gibbon S, **Gugger PF**, Pellegrini M, Salzberg SL. Sequencing and annotating the genome of valley oak, *Quercus lobata* Née (Fagaceae), genome [Poster]. *NSF Plant Genome Research Annual PI Meeting*, Arlington, VA, September 2017.
- MacDonald BWS, Wright JW, **Gugger PF**, Sork VL. Valley oak seedlings show phenotypic plasticity in growth and architecture across two common gardens [Poster]. *Botany*, Fort Worth, TX, 28 June 2017.
- Mead A, Peñaloza Ramírez JM, Bartlett M, **Gugger PF**, Wright JW, Sack L, Sork VL. Variation in gene expression and ecophysiological response to water stress in valley oak seedling populations [Poster]. *Botany*, Fort Worth, TX, 27 June 2017.
- Puiu D, Fitz-Gibbon ST, Sork VL, **Gugger PF**, Pellegrini M, Salzberg SL. Preliminary studies of a genome assembly of the California endemic oak, *Quercus lobata* Née (Fagaceae) using Pacific Biosciences and Illumina sequencing data. *International Plant and Animal Genome Conference XXV*, San Diego, CA, 15 January 2017.
- Liang, CT, Wright JW, Dudley N, **Gugger PF**. Koa seed zones: What do we know? What do we need to know? *Acacia koa in Hawaii: Facing the Future Symposium*, Hilo, HI, October 2016. See also *Proceedings*, pp. 43–46.
- Sork VL, Fitz-Gibbon S, Puiu D, **Gugger PF**, Pellegrini M, Salzberg SL. Sequencing and annotating the genome of valley oak, *Quercus lobata* Née (Fagaceae) [Poster]. *NSF Plant Genome Research Annual PI Meeting*, Arlington, VA, September 2016.
- Sork VL, **Gugger PF**. Towards an understanding of the evolution of local adaptation in plants: old practices and new tools. [Wilhelmine Key Lecture] *American Genetic Association President's Symposium*, Asilomar, CA, 15 July 2016.
- Steele SE, Sweet LC, Davis FW, **Gugger PF**, Sork VL (2016) Transcriptomic drought response exhibits general and variable gene expression strategies within a seedling population of California blue oak (*Quercus douglasii*) [Poster]. *American Genetic Association President's Symposium*, Asilomar, CA, July 2016.
- Martins K, **Gugger PF**, Llanderal-Mendoza J, González-Rodríguez A, Fitz-Gibbon S, Zhao JL, Oyama K, Sork VL. Detecting selection by climate in Mexican populations of *Quercus rugosa*. *International Union of Forest Research Organization, Genomics and Forest Tree Genetics Conference*, Arcachon, France, 1 June 2016.
- Campbell CJ, **Gugger PF**, Nelson DM. A continent-wide approach to link movement ecology and genetic structure of migratory foliage-roosting bats [Poster]. *Northeast Bat Working Group*, Baltimore, MD, January 2016.
- Wei X-Z, Ortego J, **Gugger PF**, Fitz-Gibbon S, Sork VL. Phylogeny of California white oak species in section *Quercus* (Fagaceae). *8th International Oak Society Conference*, The Morton Arboretum, Lisle, IL, 19 October 2015.
- Sork VL, Salzberg SL, Pellegrini M, **Gugger PF**, Fitz-Gibbon S, Cokus SJ, Puiu D, Perteau G, Sack L, Wright JW. Sequencing and annotating the valley oak genome [Poster]. *NSF Plant Genome Research Annual PI Meeting*, Arlington, VA, September 2015.

- Sork VL, **Gugger PF**. Associations of climate with DNA methylation polymorphisms provide evidence of local response to environment in a California oak, *Quercus lobata*. *European Society for Evolutionary Biology*, Lausanne, Switzerland, 14 August 2015.
- Steele SE, Sweet LC, Davis FW, **Gugger PF**, Sork VL (2015) Differential gene expression in response to drought treatment in California blue oak (*Quercus douglasii*) seedlings [Poster]. *Ecological Society of America*, Baltimore, MD, 13 August 2015.
- Martins K, **Gugger PF**, Llanderal Mendoza J, González Rodríguez A, Oyama K, Sork VL. Using a landscape genomic analysis to detect selection by climate in natural populations of a Mexican endemic oak, *Quercus rugosa* [Poster]. *European Society for Evolutionary Biology*, Lausanne, Switzerland, 10 August 2015.
- Sork VL, **Gugger PF**, Wright JW. Using genomic data to delineate valley oak seed transfer guidelines for valley oak. *7th California Oak Symposium: Managing Oak Woodlands in a Dynamic World*, Visalia, CA, 5 November 2014.
- Delfino-Mix A, Wright JW, Gugger PF, Liang C, Sork VL. Establishing a range-wide provenance test in valley oak (*Quercus lobata* Née) at two California sites. *7th California Oak Symposium: Managing Oak Woodlands in a Dynamic World*, Visalia, CA 5 November 2014.
- Sork VL, **Gugger PF**. Landscape genomics and ecological genomics of a California foundation oak, *Quercus lobata*. *Symposium on Evolutionary Genomics*, Taipei, Taiwan, October 2014.
- Wright JW, Liang CT, **Gugger PF**, Dudley N, Jones T, Yeh A, Rai H, Hodgskiss P, Sork VL. Landscape genomic analysis of single-nucleotide polymorphisms (SNPs) associated with geographic and climate variables in Hawaiian koa (*Acacia koa*) [Poster]. *Ecological Society of America Annual Meeting*, Sacramento, CA, August 2014.
- Sork VL, **Gugger PF**, Liang CT, Rai H, Mix AD, Wright JW. Genetic differentiation for morphological and DNA sequence polymorphisms among species-wide seedling populations of a foundation California oak, *Quercus lobata*, grown in a common garden. *Ecological Society of America Annual Meeting*, Sacramento, CA, August 2014.
- Platt A, **Gugger PF**, Pellegrini M, Sork VL. Genome-wide signature of local adaptation linked to variable CpG methylation in valley oaks. *Society for Molecular Biology and Evolution Annual Meeting*, San Juan, Puerto Rico, 9 June 2014.
- Wright JW, Liang CT, **Gugger PF**, Dudley N, Jones T, Yeh A, Rai H, Hodgskiss P, Sork VL. Associations between environment and genetics in Hawaiian koa, *Acacia koa*, and valley oak, *Quercus lobata*, in California. *Pacific Southwest Science Seminar Series*, 15 May 2014.
- Liang CT, Wright JW, **Gugger PF**, Dudley N, Jones T, Yeh A, Hodgskiss P, Rai H, Sork VL. Associations between environment and genetics in Hawaiian koa, *Acacia koa* [Poster]. *IUFRO Sustaining the Future of Acacia Plantation Forestry Meeting*, Hue, Vietnam, March 2014.
- Liang CT, Wright JW, Rai H, Dudley N, Jones T, Yeh T, **Gugger PF**, Sork VL. Associating genetic variation with climate variables in Hawaiian koa (*Acacia koa*) [Poster]. *21st Annual Hawaii Conservation Conference*, Honolulu, HI, 16–18 July 2013.
- Liang CT, Wright JW, Rai H, Dudley N, Jones T, Yeh T, **Gugger PF**, Sork VL. Landscape genomics of (*Acacia koa*) in Hawaii. *Hawaii Ecosystems Meeting*, Hilo, HI, July 2013.
- Sork VL, **Gugger PF**, Cokus SJ. Genome-wide associations with climate and geography in valley oak (*Quercus lobata*). *Evolution Annual Meeting*, Snowbird, UT, 22 June 2013.
- Platt A, **Gugger PF**, Sork VL. Population epigenomics of valley oaks. *Evolution Annual Meeting*, Snowbird, UT, 22 June 2013.
- Sork VL, **Gugger PF**, Cokus SJ, Squire K, Eckert AJ. Landscape genomics of adaptive genetic variation in long-lived populations of a California oak, *Quercus lobata*. *Forest Genetics*, Western Forest Genetics Society and IUFRO group on Population, Ecological and Conservation Genetics, Whistler, British Columbia, Canada, 22–25 July 2013.
- Sork VL, Squire K, **Gugger PF**, Cokus SJ, Platt A, Eckert AJ. Inferring gene flow and natural selection from landscape genetic and genomic studies in *Quercus lobata*. *IUFRO International Congress on the Genetics of Fagaceae and Nothofagaceae*, University of Bordeaux, Talence, France, 9–12 October 2012.
- Wright JW, Liang CT, Dudley N, Jones T, Rai H, **Gugger PF**, Eckert AJ, Sork VL. Using landscape genomics to evaluate population responses to climate change in two ecologically important tree species in California and Hawaii [Poster]. *Western International Forest Disease Work*

Conference, Lake Tahoe, CA, 8–12 October 2012.

Ortego J, **Gugger PF**, Riordan E, Smith C, Sork VL. Landscape genetics of *Quercus engelmannii* and two sympatric hybridizing shrub oaks. *MEDECOS XII: Linking Science with Resource Management*, Los Angeles, CA, 6 September 2011.

Miadlikowska J, Arnold AE, Higgins KL, Sarvate S, **Gugger P**, Way A, Hofstetter V, Lutzoni F. Endolichenic fungi: random inhabitants or symbiotic partners. *Proceedings of the Annual Meeting of the Mycological Society of Japan*, 2005.

Seminars

*Evolutionary responses of tree populations to climate change: insights from ecological genomics, *Department of Biology Colloquium*, West Virginia University, Morgantown, WV, 6 November 2017.

*Evolutionary responses of tree populations to climate change, *Escuela Nacional de Estudios Superiores, Universidad Nacional Autónoma de México*, Morelia, Michoacán, México, 27 October 2017.

*Understanding responses of tree populations to climate change with ecological genomics, *Biological Science on a Changing Planet Symposium*, Department of Biology, George Washington University, Washington, DC, 21 April 2017.

Geographic origins and population genetics of bats killed at wind-energy facilities in North America, *Advanced Topics in Conservation Genetics Webinar Series*, US Fish & Wildlife Service, 26 May 2016. [<http://nctc.fws.gov/topic/online-training/webinars/advanced-conservation-genetics.html>]

*Ecological genomics of *Quercus*, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Yunnan, China, 28 April 2016.

Ecological genomics of oaks, Center for Computational Genetics and Genomics, Temple University, Philadelphia, PA, 18 April 2016.

Evolutionary response of tree populations to climate change, Horn Point Laboratory, University of Maryland, Cambridge, MD, 30 March 2016.

Evolutionary response of tree populations to climate change, Chesapeake Biological Laboratory, University of Maryland, Solomons, MD, 9 December 2015.

Evolutionary response of tree populations to climate change, Institute of Marine and Environmental Technology, University of Maryland, Baltimore, MD, 18 November 2015.

*Evolutionary response of tree populations to climate change, Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, MD, 9 March 2015.

*Evolutionary response of tree populations to climate change, Department of Ecology, Evolution, and Environmental Biology, Columbia University, New York, NY, 20 January 2015.

*How can tree populations survive rapid climate change? Biology Department, Pace University, New York, NY, 18 February 2014.

*Response of tree populations to past, large-scale climate change inferred from molecular, fossil, and climate data. *Department of Plant Biology Colloquium*, University of Illinois, Urbana, IL, 15 November 2012.

Phylogeography of Douglas-fir: testing hypotheses from the fossil record. *Ph.D. Defense Seminar*, University of Minnesota, St. Paul, MN, 8 June 2010.

Geographic and adaptive consequences of past climate warming for Douglas-fir. *Prethesis Seminar*, University of Minnesota, St. Paul, MN, 19 February 2007.

Other Conferences and Workshops

Forest Resilience Workshop, The Nature Conservancy, UMCES Appalachian Laboratory, 31 May 2017.

Central Appalachians Fire Learning Network Workshop, Frostburg State University, Frostburg, MD, 24 January 2017.

Expert Panel Member, *Mid-Atlantic Forest Ecosystem Vulnerability Assessment*, Climate Change Response Framework, USDA Forest Service, Awbury Arboretum, Philadelphia, PA, 17 November 2015.

Systems Biology Analysis Methods for Genomic Data, University of California, Los Angeles, CA, 7 October 2014.

Active Learning Workshops, Center for Education Innovation in Life Sciences, University of California, Los Angeles, CA, February and June 2014.

Computational Biosciences Initiative Collaboratory Workshop Series, University of California, Los Angeles, CA, 2011 – 2014. <http://collaboratory.lifesci.ucla.edu/workshops>

PAGES: Climate Refugia: Joint Inference from Fossils, Genetics, and Models, University of Oregon, Eugene, OR, 1–3 August 2012.

Plant and Animal Genome Conference XIX, San Diego, CA, 14–19 January 2011.

Co-organizer, *North American Oak Genome Workshop*, Sedgwick Reserve, CA, 20–22 November 2010.

Professional Service

Reviewer (<http://publons.com/author/613879>)

Journals: *Ecology Letters*, *Proceedings of the National Academy of Sciences*, *Global Change Biology*, *New Phytologist*, *Molecular Ecology* (Top 300 Reviewer), *Ecography*, *Proceedings of the Royal Society B: Biological Sciences*, *Ecology*, *Frontiers in Plant Science*, *Molecular Phylogenetics and Evolution*, *Evolution*, *Journal of Biogeography*, *Heredity*, *BMC Plant Biology*, *Molecular Ecology Resources*, *PLoS ONE*, *Annals of Botany*, *Frontiers in Genetics*, *Landscape Ecology*, *Forest Ecology and Management*, *Organisms Diversity & Evolution*, *American Journal of Botany*, *Botanical Journal of the Linnean Society*, *Biological Journal of the Linnean Society*, *Tree Genetics & Genomes*, *Plant Biology*, *BMC Genetics*, *Journal of Plant Research*, *AoB PLANTS*, *Ecology and Evolution*, *Journal of Heredity*, *Journal of Plant Ecology*, *Canadian Journal of Forest Research*, *Plant Systematics and Evolution*, *Genome*, *Biochemical Systematics and Ecology*, *American Midland Naturalist*, *Silvae Genetica*, *African Journal of Biotechnology*, *Frontiers in Genetics*, *Axiom Review*, *Forestry Ideas*

Funding agencies: National Science Foundation, German Research Foundation (DFG), Fonds de Recherche du Québec, Minnesota Environment and Natural Resources Trust Fund, NPS George Wright Climate Change Youth Initiative Fellowships

Professional Societies

Member of *Ecological Society of America*, *Society for the Study of Evolution*, *International Biogeography Society*, *Association for Tropical Biology and Conservation*, *Society of Systematic Biologists* (2009)

UMCES

Member, Faculty Search Committee, 2018
 Steering Committee, Junior Faculty Retreat, 2017 – 2018
 Member, AL Security Policy Working Group, 2017
 Chair, AL seminar series, Spring 2016
 Member, Promotion Committee for FRA, 2016
 Member, Computational Infrastructure Committee, 2015 – 2016
 Member, Web Redesign Committee, 2015 – 2017
 Steward, Molecular Ecology Lab and Greenhouse, 2016 –

Public Outreach

- Panel member at *Watershed Moments Community Learning Series* on conserving seed and genetic diversity, February 2016
- Presentation to informal educators on “Considering intraspecific variation in climate change management,” MadeClear ICCE, New Germany State Park, MD, September 2015
- Organizer for departmental visit of local high school students, UCLA, December 2014
- Presentation of oak genetics research to Laytonville High School *Biology* class, CA, April 2011
- Wikipedia (six articles on various tree taxa) and iNaturalist contributor
- Interviewed for Hawkmoth Magazine, <http://hawkmoth.us/oaks>

Language

- English, native
- Spanish, intermediate written and spoken fluency
- Greek, basic
- Computer: UNIX/Linux bash shell, R statistical environment, HTML