

Michiel Pillet

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Summary

Conservation ecologist and Ph.D. candidate (ABD) at the University of Arizona, specializing in climate change impacts on biodiversity, with a focus on cacti. My interdisciplinary research integrates ecological theory, species distribution modeling, and quantitative methods to inform conservation planning and policy. I've published extensively, including first-author work in *Nature Plants*, and collaborate widely through the IUCN, Conservation International, and USFWS. My academic experience spans research, teaching, and mentorship, supported by strong public engagement and science communication. I bring a data-driven, collaborative, and applied approach to biodiversity research.

Education

- **University of Arizona** Tucson, AZ
Ph.D. candidate in Ecology and Evolutionary Biology (ABD) 2016 - 2025
- **Montana State University** Bozeman, MT
BSc Biology (highest honors; GPA: 4.0 upper division/graduate coursework) 2008 - 2014

Certificates

- **IUCN CPSG Ex Situ Conservation Assessment Training** ConservationTraining.org
Certificate of Achievement 2023
- **IUCN Red List Assessor Training** ConservationTraining.org
Certificate of Achievement 2023
- **Key Biodiversity Areas Advanced Practitioner** ConservationTraining.org
Certificate of Completion with Distinction 2023
- **Planning for Conservation: Using the Conservation Standards** ConservationTraining.org
Certificate of Completion 2023
- **Johns Hopkins University** Coursera
Data Science Specialization (with honors) 2015

Skills

- **Ecology and evolution:** ecosystem & climate modeling, population, community & landscape ecology, taxonomy, physiological ecology, conservation genetics, conservation ecology, conservation planning, trait ecology, phylogenetic comparative methods
- **Statistics:** theoretical and practical experience in topics ranging from spatial statistics to machine learning and Bayesian methods
- **Programming and IT:** R, Python, Matlab, Java/C++, web development, databases (SQL/XML), Git, Linux, high-performance computing

- **Field techniques:** species identification and surveys, experience with common technology (e.g. GPS)
- **Design:** Adobe InDesign
- **Wide knowledge of supporting sciences:** GIS (R/ArcGIS/QGIS), biogeochemistry, physics, soil science, hydrology, remote sensing, physiology
- **Mathematics:** strong background in numerical analysis, dynamical systems, traditional calculus, algorithms, with an emphasis on the use of mathematical models in ecology
- **Languages:** English, Dutch, French, Spanish

Work experience

Program Officer for the IUCN SSC Cactus and Succulent Plants Specialist Group . . . 2023-2025
 Researcher in the Department of Research, Conservation and Collections 2023-2025
 Desert Botanical Garden, Phoenix, AZ
 Field instructor for the Science Research Initiative at University of Utah 2023
 Owner of Prickly Prospects Cactus Nursery (ex-situ conservation nursery) 2021-
 Instructor at University of Arizona 2020-2023
 Nursery worker at Arid Lands Greenhouses 2019-2021
 Researcher in Enquist Lab at University of Arizona 2017-2025
 Researcher in Evans Lab at University of Arizona 2016-2018
 Research scientist in Poulter Ecosystem Dynamics Lab at Montana State University . . 2015-2016
 Research scientist in Hansen Landscape Biodiversity Lab at Montana State University . . . 2014
 University & private tutor in sciences 2012-
 Researcher and crew chief at Museum of the Rockies Paleontology Department 2008-2014

Volunteer experience

Conservation Committee Chair for the Tucson Cactus and Succulent Society, Tucson, AZ . 2024-
 Member of the IUCN Climate Crisis Commission 2024-
 Member of the IUCN SSC Succulent Plant Illegal Trade Task Force 2024-
 Cactus and Succulent Society of America Affiliate Representative 2024-
 for the Tucson Cactus and Succulent Society, Tucson, AZ
 Conservation Committee Member of Cactus and Succulent Society of America 2023-
 Member of the IUCN SSC Cactus and Succulent Plants Specialist Group 2022-
 Workshop assistant for Software Carpentry 2016
 Volunteer for Red Cross Disaster Action Team 2015-2016
 Volunteer greenhouse manager for succulent plants at Montana State Univ. 2014

Workshops

- **Planning Workshop for the Integrated Conservation of the Genus *Copiapoa*** Zoom
Participant and coauthor for species assessments 2022-2023

- **Integral Projection Modeling Workshop** Barcelona, Spain
Participant 2016
- **State-and-Transition Modeling Workshop** Fort Collins, CO
Participant 2014

Awards, Grants & Honors

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| San Antonio Cactus and Xerophyte Society Legacy Project Award (conservation award) | 2024 |
| William A. Calder III Memorial Scholarship (Ph.D.) | 2023 |
| College of Science Galileo Circle Scholarship (Ph.D.) | 2023 |
| Faculty Opinions - top 20 influential conservation papers of 2022 | 2023 |
| College of Science Galileo Circle Scholarship (Ph.D.) | 2022 |
| William A. Calder III Memorial Scholarship (Ph.D.) | 2022 |
| NSF Graduate Research Fellowship (NSF GRFP; Ph.D.) | 2017-2022 |
| Graduate Access Fellowship (Ph.D.) | 2016-2017 |
| GPSC Travel Grant (Ph.D.) | 2016 |
| Presidential Scholarship (BSc) | 2008-2014 |
| Undergraduate Scholars Program (BSc) | 2009-2010 |
| Dean's & President's List (BSc): 6 times | 2008-2014 |

Publications and reviews

- Pillet, M., et al., in prep. **Evolutionary relatedness fails to predict range size changes for cacti under climate change.**
- Mendoza, E., et al., in prep. **The decline of our icon: genomic vulnerability of saguaro cactus (*Carnegiea gigantea*) under different climate change scenarios.**
- Reichenbacher, F. and Pillet, M., in prep. **Tumamoc Globeberry Surveys - 2024.** Report for *USDI Fish and Wildlife Service, Arizona Ecological Services.*
- Andrade, P., et al., in prep. **Saguaro Initiatives at Desert Botanical Garden: generating tools and resources to save threatened cactus species.**
- Pillet, M., et al., in review. **Accounting for severe droughts increases the extinction risk for cacti.** Submitted to *Nature*.
- Enquist, M., et al., in review. **BIEN: A biodiversity informatics ecosystem advancing open and reproducible workflows for plant observation, plot, and trait data.** Submitted to *Methods in Ecology and Evolution*.
- Goettsch, B., et al., 2025. **Plan de Acción para la Conservación Integrada del Género *Copiapoa*.** Chile. 66 pp.
https://iucn-cssg.org/assets/copiapoa/copiapoa_action_plan_en.pdf.
- Villalobo-Lopez, A., Pena, C., Varas-Myrik, A., Pillet, M., Jahnsen, P., Pliscoff, P., Goettsch, B., Guerrero, P., 2024. **Effects of trade and poaching pressure on extinction risk for cacti in the Atacama Desert.** *Conservation Biology*. <https://doi.org/10.1111/cobi.14353>.
- Pillet, M., 2024. **Het behoud van cactussen in een veranderende wereld - wat kunnen we doen?** *Succulenta*. 103(1), 13-17.

- Davis, T. and Pillet, M., 2023. **Don't tell me, show me: the importance of maintaining data in cultivated plants.** *Cactus and Succulent Journal*. <https://doi.org/10.2985/015.095.0313>.
- Villalobo, A., Pena, C., Varas-Myrik, Goettsch, B., Pillet, M., Jahnsen, P., Pliscoff, P., Guerrero, P., 2023. **Impulsores antropogenicos y abioticos del aumento del riesgo de extinción de *Copiapoa* (Cactaceae).** *Master's thesis, Universidad de Concepción, Chile*.
- Pillet, M., 2023. **Prickly prospects for cacti under climate change.** *TheScienceBreaker*. <https://doi.org/10.25250/thescbr.brk715>.
- Pillet, M., 2022. **Prickly prospects for cacti under climate change.** *British Cactus and Succulent Society December 2022 eNews*.
- Pillet, M., Goettsch, B., Merow, C., Maitner, B., Feng, X., Roehrdanz, P., Enquist, B., 2022. **Elevated extinction risk of cacti under climate change.** *Nature Plants*. <https://doi.org/10.1038/s41477-022-01130-0>.
- Feng, X., et al., 2022. **A review of the heterogeneous landscape of biodiversity databases: opportunities and challenges for a synthesized biodiversity knowledge base.** *Global Ecology and Biogeography*. <https://doi.org/10.1111/geb.13497>.
- Schultz, E., Hulsmann, L., Pillet, M., Hartig, F., Breshears, D., Record, S., Shaw, J., DeRose, J., Zuidema, P., Evans, M., 2021. **Climate-driven, but dynamic and complex? A reconciliation of competing hypotheses for species' distributions.** *Ecology Letters*. <https://doi.org/10.1111/ele.13902>.
- Enquist, B., et al., 2019. **The commonness of rarity: Global and future distribution of rarity across land plants.** *Science Advances*. <https://doi.org/doi:10.1126/sciadv.aaz0414>.
- Pillet, M., Joetzjer, E., Belmin, C., Chave, J., Ciais, P., Dourdain, A., Evans, M., Herault, B., Luyssaert, S., Poulter, B., 2018. **Disentangling competitive versus climatic effects on tropical forest mortality.** *Journal of Ecology*. <https://doi.org/10.1111/1365-2745.12876>.
- Joetzjer, E., Pillet, M., Ciais, P., Barbier, N., Chave, J., Schlund, M., Maignan, F., Barichivich, J., Luyssaert, S., Herault, B., von Poncet, F., Poulter, B., 2017. **Assimilating satellite-based canopy height within an ecosystem model to derive above ground forest biomass.** *Geophysical Research Letters*. <https://doi.org/10.1002/2017GL074150>.
- Hansen, A., Ireland, K., Legg, K., Keane, R., Barge, E., Jenkins, M., Pillet, M., 2016. **Complex challenges of maintaining whitebark pine in Greater Yellowstone under climate change: A call for innovative research, management, and policy approaches.** *Forests*. <https://doi.org/10.3390/f7030054>.
- **Reviewer for:** Acta Botanica Brasilica, American Journal of Botany, Journal of Arid Environments, Journal of Biogeography, Plant Ecology, PLOS ONE

Abstracts and posters

- Mendoza Galindo, E., et al. **Genomic vulnerability of the Saguaro cactus under climate change.** Abstract at *Botany 2025*.

- Foncerrada-Elizondo, P., et al. **Genomic insights into the evolutionary history and population structure of the Saguaro cactus across its natural range.** Abstract at *Botany 2025*.
- Enquist, B., et al. **The commonness of rarity: Global and future distribution of rarity across land plants.** Abstract at *Ecological Society of America 2020 Annual Meeting*.
- Enquist, B., Merow, C., Hannah, L., et al. **Forecasting future global biodiversity: Predicting current and future global plant distributions, community structure, and ecosystem function.** Abstract at *American Geophysical Union 2019 Fall Meeting*.
- Schultz, E., Huelsmann, L., Pillet, M., Breshears, D., Zuidema, P., Hartig, F., DeRose, J., Shaw, J., Evans, M. **Demographic range modeling reveals that climate and competition are insufficient to explain a species distribution.** Abstract at *Ecological Society of America 2019 Annual Meeting*.
- Evans, M., Huelsmann, L., Pillet, M., Breshears, D., Hartig, F., Record, S., Shaw, J., Zuidema, P., DeRose, J., 2018. **A demographic perspective on the ecological niche and the geographic distribution: a range-wide analysis of climate and competition as factors limiting vital rates of *Pinus edulis*.** Abstract at *MtnClim 2018*.
- Pillet, M., DeRose, J., Record, S., Shaw, J., Evans, M., 2018. **Demographic range modeling reveals that climate is insufficient to explain species distributions.** Abstract at *Ecological Society of America 2018 Annual Meeting*.
- Poulter, B., Pederson, N., Ciais, P., Pillet, M., Joetzjer, E., Calle, L., Luyssaert, S., 2017. **Implementing forest age- and size-structured dynamics within Earth system models.** Abstract at *Ecological Society of America 2017 Annual Meeting*.
- Evans, M., DeRose, J., Arizpe, A., Aragon, J., Grey, A., Pillet, M., Shaw, J., Klesse, S., Dietze, M., 2017. **Assimilation of FIA tree-ring and remeasurement data to quantify multiple influences on tree growth - an analysis of *Pinus ponderosa* in northern Arizona.** Abstract at *2017 FIA Stakeholder Science Meeting*.
- Evans, M., DeRose, J., Arizpe, A., Aragon, J., Grey, A., Pillet, M., Shaw, J., Klesse, S., Dietze, M., 2017. **Assimilation of tree-ring and forest inventory data to understand the influences of climate, tree size, and stand density on tree growth - a regional analysis of *Pinus ponderosa* in northern Arizona.** Abstract at *Ecological Society of America 2017 Annual Meeting*.
- Poulter, B., Ballantyne, A., Bastos, A., Calle, L., Chatterjee, A., Canadell, P., Ciais, P., Frank, D., Ott, L., Pillet, M., Sitch, S., 2017. **Enabling teleconnection-based seasonal forecasts of global terrestrial carbon cycle dynamics.** Poster at *10th International Carbon Dioxide Conference*.
- Poulter, B., Ciais, P., Joetzjer, E., Luyssaert, S., Maignan, F., Pillet, M., 2015. **Reducing uncertainty for estimating forest carbon stocks and dynamics using integrated remote sensing, forest inventory and process-based modeling.** Poster at *American Geophysical Union 2015 Fall Meeting*.

- **Conservation through propagation.** Presented for *Central Arizona Cactus and Succulent Society Propagation Education Group*, November 2024.
- **Combating the illegal trade in cacti and succulents through stakeholder participation.** Presented for *IrisBG Coffee Chat*, November 2024.
- **The illegal trade in cacti from the Americas.** Presented for *A guide to monitoring the illegal plant trade on eBay*, September 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Gates Cactus and Succulent Society*, July 2024.
- **Learning from cacti: a field course through southern Utah and northern Arizona.** Presented for *San Francisco Succulent and Cactus Society*, May 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Monterey Bay Area Cactus and Succulent Society*, May 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *San Diego Cactus and Succulent Society*, April 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Michigan Cactus and Succulent Society*, March 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Austin Cactus and Xerophyte Society*, January 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Fort Worth Cactus and Succulent Society*, January 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *San Antonio Cactus and Xerophyte Society*, January 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Central Texas Cactus and Succulent Society*, January 2024.
- **Common-sense cactus conservation in the 21st century.** Presented for *Desert Garden Club*, January 2024.
- **Climate Change Conversations: Common Sense Cactus Conservation in the 21st Century.** Presented for *Tucson Botanical Gardens*, December 2023.
- **Prickly Prospects for Cacti in the 21st Century.** Presented for *The University of Arizona Galileo Circle Scholars Celebration*, October 2023.
- **Assessing Climate Change Impacts on Cacti: Challenges and Opportunities.** Presented for *U.S. Fish and Wildlife Service Southwest Region*, October 2023.
- **Assessing Climate Change Impacts on Cacti: Challenges and Opportunities.** Presented for *The Huntington Library, Art Museum, and Botanical Gardens*, September 2023.
- **Common-sense cactus conservation in the 21st century.** Presented for *Maricopa County Master Naturalists*, August 2023.
- **Common-sense cactus conservation in the 21st century.** Presented for *Tucson Cactus and Succulent Society*, July 2023.

- **Common-sense cactus conservation in the 21st century.** Presented for *Central Arizona Cactus and Succulent Society*, June 2023.
- **Common-sense cactus conservation in the 21st century.** Presented for *Cactus and Succulent Society of America*, May 2023.
- **Elevated extinction risk of cacti under climate change.** Presented for *International Cactaceae Academic Network*, September 2022.
- **Species distribution models for *Copiapoa* spp. under climate change.** Presented for *Planning Workshop for the Integrated Conservation of the Genus *Copiapoa**, August 2022.
- **Planning for Uncertainty: Conserving Cacti in a World of Change.** Presented for *Tucson Cactus and Succulent Society*, August 2022.
- **Prickly prospects for cacti under climate change.** Presented for *Arizona Senior Academy*, August 2022.
- **Elevated extinction risk of cacti under climate change.** Interviewed for various media outlets, including *The New York Times*, *CBS*, *ABC*, *NBC*, *Swedish Television*, *TRT World*, *Yale Climate Connections*, April 2022-.
- **Prickly prospects for cacti under climate change: An analysis of uncertainty in range forecasts.** Presented for *Ecological Society of America Annual Meeting*, August 2020.
- **Sowing Cacti: where Art and Science meet.** Presented for *Tucson Cactus and Succulent Society*, June 2018.
- **Prickly prospects for cacti under climate change.** Presented for *Tucson Chapter of Arizona Native Plant Society*, May 2018.
- **Prickly prospects for cacti under climate change.** Presented for *Tucson Cactus and Succulent Society*, May 2017.

References

- **Dr. Brian Enquist**, University of Arizona and Santa Fe Institute: benquist@arizona.edu
- **Dr. Lucas Majure**, IUCN SSC Cactus and Succulent Plants Specialist Group and University of Florida: lmajure@floridamuseum.ufl.edu
- **Dr. Barbara Goettsch**, IUCN SSC Cactus and Succulent Plants Specialist Group: cssg.barbara@gmail.com
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