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

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. **Assessing phylogenetic conservatism of niche and range traits under climate change in cacti**.
- 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*.
- 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`.

- Villlalobo, 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*.

Presentations and media

- **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 Succulenty 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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