

Trace Martyn

· PLANT COMMUNITY ECOLOGIST ·

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Education

University of Queensland (UQ)

Brisbane, QLD, AUS

PH.D. IN ECOLOGY

Jan. 2016 - Jun. 2020

- Advisor: Margaret M. Mayfield
- Thesis: Understanding the role of direct and indirect interactions in mediating local plant diversity.

University of Wyoming (UWyo)

Laramie, WY, USA

M.Sc. IN BOTANY

Aug. 2013 - Jul. 2015

- Advisor: William K. Lauenroth
- Thesis: The leading edge of the big sagebrush distribution: Characterization of the structure and dynamics of the big sagebrush plant communities in northeastern Montana, USA.

Colorado State University

Fort Collins, CO, USA

B.Sc. IN WILDLIFE BIOLOGY & FISHERIES

Aug. 2006 - Dec. 2008

Grants & Awards

GRANTS

2021	University of Arizona Research, Innovation & Impact and the Arizona Institutes of Resilience Grant (\$39,314 USD; CoPI). Internal grant awarded for research into Arizona's environmental resilience to climate change. "Testing media lunas—a cheap and technologically simple approach to enhancing soil health and resilience on Arizona rangelands."	UofA
2021	Postdoctoral Research Fellowship (\$1,972 USD; CoPI). Internal grant awarded to examine the impacts of spatial arrangement and diversity in restoration seeding in dryland ecosystems. "Impacts of seeding spatial arrangement and diversity on dryland ecosystem restoration."	UofA
2019	Candidate Travel Award (\$2,500 AUD). Awarded for research exchange with UQ partner institutions. I visited Assoc. Prof. Jonathan Myers at Washington University St. Louis in May-June 2019	UQ
2018	Research Award (\$1,200). Award for up to thirty root-simulator probes and processing for student research	Western AG
2017	School of Biological Sciences Travel Award (\$500 AUD). Awarded to present at and attend the Ecological Society of Australia Annual Meeting	UQ
2017	Grant to attend Western Australia Threatened Species Forum (\$100 AUD). Awarded to members of the Western Australia community to attend the forum	Northern Agricultural Catchments Council
2015	International Postgraduate Research Scholarship (c. \$34,000 AUD per year for 4 years). Awarded by the Australian government to select incoming international PhD research student applicants to cover tuition	UQ
2015	University of Queensland Centennial Scholarship (\$26,288 AUD per year for 3.5 years). Awarded to select incoming international PhD research students to cover living expenses in Australia	UQ
2015	Solheim Scholarship (\$500 USD). Awarded to outstanding graduate student in the Department of Botany	UWyo
2015	Travel grant (\$500 USD). Awarded to attend Ecological Society of America Annual Meeting. Grant provided by EPSCoR and the Wyoming Women in Science and Engineering Program funded by NSF Grant # EPS 120890	UWyo

AWARDS

2015	Outstanding Teaching Assistant Awarded to an outstanding teaching assistant in the Department of Botany	UWyo
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Publications

PEER-REVIEWED PUBLICATIONS

(7) Rock structures improve seedling establishment, litter catchment, fungal richness, and soil moisture in the first year after installation.

Environmental Management

MARTYN, TE, A BARBERAN, JC BLANKINSHIP, M. MILLER, B YANG, A KLINE, & ES GORNISH

2022

DOI: <https://doi.org/10.1007/s00267-022-01651-6>

(6) Determining an ideal sampling density for microbial community analyses of farm fields.

Agrosystems, Geosciences, & Environment

CAITLIN ROTTLER & TE MARTYN

2021

DOI: <https://doi.org/10.1002/agg2.20156>

(5) Identifying “useful” fitness models: balancing the benefits of added complexity with realistic data requirements in models of individual plant fitness.

The American Naturalist

MARTYN, TE, DB STOUFFER, OB GODOY, I BARTOMEUS, AI PASTORE, & MM MAYFIELD

2021

DOI: <https://doi.org/10.1086/713082>

(4) STEPWAT2- an individual-based model for exploring the impact of climate and disturbance on dryland plant communities.

Ecosphere

PALMQUIST, KA, JB BRADFORD, TE MARTYN, DR SCHLAEPFER, & WK LAUENROTH

2018

DOI: <https://doi.org/10.1002/ecs2.2394>

(3) Seed bank does not reflect range margin community composition.

Ecosphere

MARTYN, TE, JB BRADFORD, DR SCHLAEPFER, WK LAUENROTH, & IC BURKE

2016

DOI: <http://dx.doi.org/10.1002/ecs2.1453>

(2) Daubenmire versus line-point intercept: A response to Thacker et al. (2015).

Rangelands

MARTYN, TE, CW BELTZ, KA PALMQUIST, VE PENNINGTON, CM ROTTLER, & WK LAUENROTH

2015

DOI: <http://dx.doi.org/10.1016/j.j.rala.2015.05.004>

(1) Simulated big sagebrush regeneration supports predicted changes at the trailing and leading edges of distribution shifts.

Ecosphere

SCHLAEPFER, DR, KA TAYLOR, VE PENNINGTON, KN NELSON, TE MARTYN, CM ROTTLER, WK LAUENROTH, & JB BRADFORD

2015

DOI: <http://dx.doi.org/10.1890/ES14-00208.1>

IN REVIEW

Ants prefer small and unprotected seeds - Implications for restoration in arid ecosystems.

Restoration Ecology

MARTYN, TE, C KWAPICH, A KLINE, & ES GORNISH

Estimating interaction matrices from performance data for diverse systems.

Methods in Ecology and Evolution

BIMLER, MD, DB STOUFFER, TE MARTYN, & MM MAYFIELD

Plant community predictions support the potential for big sagebrush range expansion adjacent to the leading edge.

Climatic Change

MARTYN, TE, KA PALMQUIST, JB BRADFORD, DR SCHLAEPFER, & WK LAUENROTH

Sagebrush Climate Change Vulnerability Assessment: Effects of climate change on sagebrush regeneration at the leading and trailing edge of its distribution.

PENNINGTON, VE, TE **MARTYN**, KA TAYLOR, CM ROTTLE, KN NELSON, DR SCHLAEPFER, & WK LAUENROTH

2014

<https://www.scribd.com/lists/16610170/>

Selected Presentations

Restoration challenges and opportunities in the Southwest

Tucson, AZ, USA (Virtual)

MARTYN, TE & E GORNISH. UARIZONA VIRTUAL AGDISCOVERY PROGRAM

Jun. 2021

- Oral presentation

Plant functional traits can inform restoration outcomes for multiple management goals

Tucson, AZ, USA (Virtual)

MARTYN, TE, L ROCHE, & E GORNISH. SOCIETY FOR ECOSYSTEM RESTORATION

Jun. 2021

- Oral presentation

Seed traits impact ant-seed predation rates on rangelands in the US southwest

Tucson, AZ, USA (Virtual)

MARTYN, TE, C KWAPICH, & E GORNISH. SEED ENHANCEMENT TECHNOLOGIES AND DRYLAND RESTORATION WEBINAR SERIES

Apr. 2021

- Oral presentation

Seed traits impact ant-seed predation rates on rangelands in the US southwest

Tucson, AZ, USA (Virtual)

MARTYN, TE, C KWAPICH, & E GORNISH. SOCIETY FOR RANGE MANAGEMENT

Mar. 2021

- Oral presentation

Plant functional traits can inform restoration outcomes for multiple management goals

Tucson, AZ (Virtual)

MARTYN, TE, & E GORNISH. SOCIETY FOR RANGE MANAGEMENT, ARIZONA SECTION

Sept. 2020

- Oral presentation

The road is circuitous, the end unknown... my journey to the University of Arizona

Tucson, AZ (Virtual)

MARTYN, TE, & E GORNISH. RESTORATION CLUB AT UNIVERSITY OF ARIZONA

Sept. 2020

- Invited talk by undergraduate students

Spatial dynamics of plant coexistence: Adding spatial context to complex interactions in annual plant communities

Brisbane, QLD, AUS

MARTYN, TE, DB STOFFER, & MM MAYFIELD. ECOLOGICAL SOCIETY OF AUSTRALIA ANNUAL MEETING

Nov. 2018

- Oral presentation
- Speed talk in the Quantitative Ecology Showcase

The spatial dynamics of higher-order interactions: Complex interactions in Western Australian annual plant communities

New Orleans, LA, USA

MARTYN, TE, DB STOFFER, & MM MAYFIELD. ECOLOGICAL SOCIETY OF AMERICA 103rd ANNUAL MEETING

Aug. 2018

- Oral presentation
- Invited to present in organized session

Equitable gender ration in biology graduate students is not upheld in publication output

New Orleans, LA, USA

REYNOLDS, VA, TE **MARTYN**, CH BOWLER, SM CREER, CM ELMER, S LOPEZ-CUBILLOS, ML RAYMUNDO, & MM MAYFIELD.

Aug. 2018

ECOLOGICAL SOCIETY OF AMERICA, 103rd ANNUAL MEETING

- Oral presentation
- Presented by VA Reynolds

Assessing how microclimate impacts coexistence dynamics: a case study of Western Australian annual plants

Asilomar, CA, USA

BIMLER, M, DB STOFFER, TE **MARTYN**, & MM MAYFIELD. AMERICAN SOCIETY OF NATURALISTS, 150 YEARS OF THE AMERICAN SOCIETY OF NATURALISTS

Jan. 2018

- Oral presentation
- Presented by M Bimler

Higher order interactions regulated by drought result in selection in semi-arid annual plants

Asilomar, CA, USA

PASTORE, AI, TE MARTYN, & MM MAYFIELD. AMERICAN SOCIETY OF NATURALISTS, 150 YEARS OF THE AMERICAN SOCIETY OF NATURALISTS

Jan. 2018

- Oral presentation
- Presented by AI Pastore

The importance of neighbour identity in modelling higher-order interactions in annual plant communities

Hunter Valley, NSW, USA

MARTYN, TE, DB STOUFFER, & MM MAYFIELD. ECOLOGICAL SOCIETY OF AUSTRALIA AND THE NEW ZEALAND ECOLOGICAL SOCIETY, 77th ANNUAL MEETING

Nov. 2017

- Oral presentation

Research of the Mayfield Plant Community Ecology Lab in Western Australia

Perenjori, WA, AUS

MARTYN, TE, VA REYNOLDS, & ML RAYMUNDO. COUNCIL OF THE SHIRE OF PERENJORI

Sep. 2017

- Oral presentation
- Co-presented by TE Martyn & VA Reynolds

The importance of species identity and functional traits for the outcomes of higher-order interactions

Portland, OR, USA

MAYFIELD, MM, DB STOUFFER, & TE MARTYN. ECOLOGICAL SOCIETY OF AMERICA, 102nd ANNUAL MEETING

Aug. 2017

- Oral presentation
- Presented by MM Mayfield

Seed bank and existing plant community mismatch: Potential impacts on climate change induced species range shifts

Baltimore, MD, USA

MARTYN, TE, JB BRADFORD, DR SCHLAEPFER, & WK LAUENROTH. ECOLOGICAL SOCIETY OF AMERICA, 100TH ANNUAL MEETING

Aug. 2015

- Poster

Past trends in snow accumulation in the Rocky Mountain US and implications of future decreasing snow accumulation on the big sagebrush (*Artemisia tridentata*) distribution.

Fort Collins, CO, USA

MARTYN, TE. NORTH CENTRAL CLIMATE SCIENCE CENTER - OPEN SCIENCE CONFERENCE

May 2015

- Oral presentation

Experience

WORK & FIELD EXPERIENCE

Postdoctoral Researcher

New Haven, CT, USA

YALE UNIVERSITY

May. 2022 - present

- Worked with land managers on large private ranch to design and implement long-term monitoring protocols in forest, sagebrush, and riparian areas.
- Hired and managed field crews of 5-7 students over the summer.
- Mentored Masters and undergraduate students in their research.

Postdoctoral Researcher

Tucson, AZ, USA

UNIVERSITY OF ARIZONA

Jul. 2020 - Apr. 2022

- Designed and implemented projects to understand impacts of functional traits, demography, and ecosystem services on vegetation dynamics and restoration outcomes for multiple management goals.
- Implemented seed-ant predation study.
- Mentored undergraduate senior for semester independent study on functional traits and environmental impacts.

Research Assistant

Brisbane, QLD & Perenjori, WA, AUS

UNIVERSITY OF QUEENSLAND

Jun. 2019 - Mar. 2020

- Collated data for all completed projects in the lab.
- Created a master germination and seed viability dataset from all previous studies in the Mayfield Lab.
- Helped to create a functional trait database of all trait measurements from past projects.
- Built a species guide of Western Australian plants.

Western Australia Field Researcher

Brisbane, QLD & Perenjori, WA, AUS

UNIVERSITY OF QUEENSLAND - FOR COMPLETION OF PHD RESEARCH

Jul. - Oct. 2016 & 2017

- Worked with lab manager to handle booking and finances associated with hiring cars, campervans, and accommodation for 3 months each year. Liaised with the Shire of Perenjori for accommodation for 2017 field crew to meet budget requirements.
- Spatially mapped 170 vegetative plots and collected seed from at least 12,000 individual plants within plots to better understand outcomes of plant interactions.
- Counted over 850,000 seeds that were collected from plots (see above). Trained research assistants to assist with seed counting and weighing.

Data Technician

Laramie, WY, USA

UNIVERSITY OF WYOMING

Aug. 2015 - Dec. 2015

- Prepared and tested statistical model, STEPWAT, to run on supercomputer. Extracted weather data from global weather rasters or weather station records.
- Created a program wrapper in R for a C/C++ coded model to allow for multiple scenario runs with limited active user time.

Research Assistant

Laramie, WY, USA

UNIVERSITY OF WYOMING - FOR COMPLETION OF MSc RESEARCH

May 2013 - Aug. 2013

- Created and implemented a sampling protocol to explore the current structure of the leading edge of the sagebrush distribution in Montana.
- Explored vegetation dynamics of the leading edge under various climate change scenarios using a simulation model, STEPWAT.

Field Crew Manager

Fort Collins, CO, USA

SHORTGRASS LONG TERM ECOLOGICAL RESEARCH (SGS-LTER)

Feb. 2012 - May 2013

- Hired, managed, and instructed crew of 7-10 members in various protocols.
- Became plant identification specialist for LTER crew as well as other crews working on Central Plants Experimental Range (CPER).

Lab Technician

Fort Collins, CO, USA

COLORADO PARKS AND WILDLIFE

Oct. - Apr. 2009/2010/2011/2012

- Extracted DNA from over 1000 bear and mountain lion teeth samples and 500 flea sample pools.
- Identified over 6000 fleas using dichotomous key.
- Assisted with diagnostic and forensic wildlife necropsies.

Assistant Field Crew Manager

Fort Collins, CO, USA

SHORTGRASS LONG TERM ECOLOGICAL RESEARCH (SGS-LTER)

Apr. - Oct. 2009/2010/2011

- Led and instructed teams of 2-5 crew members in various vegetation/arthropod/mammal data collection protocols.
- Performed vegetation and small mammal surveys along with crew in various weather conditions.

TEACHING EXPERIENCE

Tutor - Field Ecology

Brisbane, QLD, AUS

UNIVERSITY OF QUEENSLAND

Feb. - Jun. 2019

- 16-30 students
- Taught field techniques during on-campus workshops.
- Led two, one-week field trips on K'Gari (Fraser) Island to practice field sampling and data analyses.

Tutor - Biostatistics

Brisbane, QLD, AUS

UNIVERSITY OF QUEENSLAND

Feb. - Jun. 2016 & 2019

- 12-16 students
- Lead two, twice a week labs in understanding complex statistics and debugging code in R Software.

Tutor - General Ecology

Brisbane, QLD, AUS

UNIVERSITY OF QUEENSLAND

Feb. - Jun. 2016 & 2019

- 12-16 students
- Met weekly with students to discuss and critically evaluate general ecological literature.

Teaching Assistant - General Biology

Laramie, WY, USA

UNIVERSITY OF WYOMING

Sep. 2013 - Dec. 2015

- 25-35 students per lab
- Weekly taught two, 3-hr labs where I lead students through the lab exercises and discussed concepts presented in lecture and lab.
- Held weekly office hours for students.
- Head TA in Fall 2014 & Fall 2015.
- Helped design and trial a new experiment with the lab coordinator.
- Prepared equipment and materials weekly for all labs.
- Guest lectured for a main lecture section (Cells II - The Endomembrane System) for 200+ students.

Teaching Assistant - Biogeochemistry

Laramie, WY, USA

UNIVERSITY OF WYOMING

Jan. 2015 - May 2015

- 12 students
- Aided in leading lab exercises, study sessions, and discussions.
- Held weekly office hours for students.

Professional Development

Noxious Weed Course

Tucson, AZ, USA

UNIVERSITY OF ARIZONA

Jul. 2020

- A 3-day online course disseminating information on preventing, identifying, and managing noxious weeds in the US southwest.

Desert Southwest Soil Health Webinar

Tucson, AZ, USA

UNIVERSITY OF ARIZONA

Jul. 2020

- An online webinar discussing soil health characteristics, indicators, and soil amendments in the US desert southwest.

Plant Functional Trait Course

Cusco, Peru

WAYQECHA CLOUD FOREST RESEARCH STATION

Mar. 2018

- A competitive entry course organized by Prof. Vandvik (Uni. Bergen) and Prof Enquist (Uni. Arizona) for graduate students on plant functional trait collection and analysis.

Hands-On Primer for Working with Big Data in R: Introduction to Hierarchical Data Formats, Lidar Data & Efficient Data Visualization Workshop

Baltimore, MD, USA

ECOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING

Aug. 2015

- Gained experience in reading and manipulating ecological spatial data in R using National Ecological Observation Network (NEON) datasets.

Graduate Workshop on Environmental Data Analytics

Boulder, CO, USA

NCAR (NATIONAL CENTER FOR ATMOSPHERIC RESEARCH)

Jul. 2015

- A competitive application workshop sponsored by NCAR for graduate students on environmental statistics and modeling.

Communicating Science Workshop.

Laramie, WY, USA

UNIVERSITY OF WYOMING

Mar. - Apr. 2015

- A workshop sponsored by Wyoming EPSCoR where researchers learned how to communicate their research to a general audience.

Mentorship

UNIVERSITY OF QUEENSLAND

- Undergraduate research assistant (2017-2018) - Jeff Ikin, mentored in project and data design and implementation of various lab projects

UNIVERSITY OF ARIZONA

- Undergraduate independent study (2020) - Christopher Melton, mentored in literature review project on response and effect traits in plants
- Research Assistant (2020) - Albert Kline, mentored in field project design and collection

Outreach & Workshops

Seedball Making Table

SUSTAINABLE LANDSCAPES EXPO

Tucson, AZ, USA

Mar. 2022

- Hosted table for seedball making representing University of Arizona School of the Environment and Natural Resources.

Seedball Making Workshop

UNIVERSITY OF ARIZONA VIRTUAL AGDISCOVERY PROGRAM

Tucson, AZ, USA

Jun. 2021

- Lead a seedball making workshop for 16 high school students.

Postgraduate workshop on seed science

KINGS PARK BOTANICAL GARDENS

Perth, WA, AUS

Aug. 2018

- Co-organized and led one-day workshop and collaborative discussion on seed science in Western Australia.

Importance of Pollinators in Western Australia

PERENJORI PRIMARY SCHOOL

Perenjori, WA, AUS

Sept. 2017

- Presented pollination research done by the Mayfield Lab at University of Queensland to a mixed classroom of 5 - 7 year students.

Perenjori Agricultural Fair - Mayfield Lab Booth

SHIRE OF PERENJORI

Perenjori, WA, AUS

Aug. 2016 & 2017

- Held a booth at the Fair to present the research of the Mayfield Lab in the local area.

Service

REVIEWER

- Journal of Arid Environments (1)
- New Phytologist (1)
- Journal of Ecology (1)
- Western North American Naturalist (2)
- The American Naturalist (1)
- Ecology (1)
- Plant Ecology (1)
- Plant Ecology & Diversity (1)

REVIEWER & BETA-TESTER

- University of Arizona's EcoRestore Portal - website that provides site-specific restoration plant species lists for managers

JUDGE

- Ecological Society of America - Early Career Outstanding Restoration Paper Award (2020, 2021)
- Ecological Society of America - Early Career Ecologists Outstanding Paper Award (2021)

Professional Membership

Ecological Society of America	2014 - Present
International Association for Vegetation Science	2014 - Present
Botanical Society of America	2014 - Present
British Ecological Society	2014 - Present