MEGHAN HAYDEN
Dept. of Ecology & Evolutionary Biology
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EDUCATION

Bachelor of Arts in Ecology and Evolutionary Biology May 2019
Cornell University**,** College of Arts and Sciences, Ithaca, NY

- Minor in Middle Eastern Studies
- GPA: 3.88
- Advised by Dr. Monica Geber
- ***Relevant Courses:*** Advanced Ecology, Physiological Ecology, Conservation Field Ecology, Biochemistry, Statistics, GIS, and Python.

Doctor of Philosophy in Ecology and Evolutionary Biology Aug. 2020 - present
University of Colorado at Boulder, Boulder, CO

- Advised by Dr. Laura Dee
- ***Relevant Courses:*** Remote Sensing of the Environment (I/II), Landscape Ecology, Data Science, Community Ecology, Plant Functional Traits Course, and Diversity & Inclusion Seminar.
- ***Interests:*** Remote sensing of biodiversity and plant functional traits, ecosystem services, and global change impacts to the resilience and stability of socio-ecological systems.

RESEARCH EXPERIENCE

Earth Lab, Univ. of Colorado at Boulder, Cooperative Institute of Research in the Environment

- *Research Assistant* Jan. 2023 – present
  - Integrating remote sensing and eDNA to map biodiversity in the Cape Floristic Region of South Africa.
  - Developing Python package for computation of spectral diversity metrics from hyperspectral airborne and satellite imagery.
  - Funded by NASA's BioSCape.

Miller Lab, Univ. of Colorado at Boulder, Dept. of Environmental Science Aug. – Dec. 2021

- *Research Assistant*
  - Compiled data on telecoupled shocks to environmental systems, resulting from increased global connectivity.
  - Created a framework for incorporating uncertainty into telecoupling centered analyses in collaborations with Dr.'s Steve Miller and Laura Dee.

National Center for Atmospheric Research, Boulder, CO Jan. – May 2021

- *Research Assistant*

- Ran Community Land Model point simulations for the alpine Niwot LTER site outside of Boulder, CO under the direction of Dr. Will Weider.
- Hindcast soil moisture variability and used model to predict future changes in soil with global climate conditions.
- Compiled measures of stomatal conductance for use in updating model parameters relating to land-atmosphere gas exchanges (NPP, etc.).

Dee Lab, University of Colorado at Boulder, Department of Ecology and Evolutionary Biology

- *PhD Student* Aug. 2020 – current
  - Studying the impacts of community change on ecosystem functioning, and subsequent ecosystem services.
  - Focus on large-scale ecological observations through remote sensing, socio-ecological networks and uncertainty of ecosystem service provisioning under climate change and biodiversity loss.

Agrawal Lab, Cornell University, Department of Ecology and Evolutionary Biology

- *Independent Project* Aug. 2018- May 2019
  - Formulated and executed an independent research project involving milkweed species *Asclepias syriaca* and aphid species *Aphis nerii*.
  - The goal of the project was to determine whether plasticity in this clonal organism can mitigate the expected impacts of body size variability on fecundity in individuals.
- *Research Assistant* Summer 2017-2018
  - Collaborated with two PhD candidates and Dr. Anurag Agrawal in a study of the evolution of plants in response to insect herbivory.
  - Conducted field surveys and managed insect rearing for common garden experiments.

Lovette Lab, Cornell University, Department of Ecology and Evolutionary Biology Jan. 2019

- *Field Course (Conservation of Wildlife in the Neotropics)*
  - Monitored the foraging of three oystercatcher species in coastal Patagonia (Argentina) in order to investigate the validity of optimal foraging theory and ecological niche theory for the behavior of individuals.
  - Work primarily included orchestrating field surveys and categorizing oystercatcher behavior.

RESEARCH GRANTS *Total: $37,500*

EBIO Research Award: $2,500, $2,500 2022, 2023

- Awarded for research on use of hyperspectral imagery to detect differences in grassland plant communities following extreme drought.

CU Boulder Graduate Student Travel Grant: $500 2022

- Awarded for attendance to Plant Functional Trait Course (PFTC) in Norway with University of Bergen, where I conducted field research using drones to map plant functional traits across an elevational gradient.

Open Space Mountain & Parks Research Grant: $10,000 2022

- Awarded for research on utility of airborne and proximal hyperspectral sensors to detect plant biodiversity and functional characteristics across a landscape. *Co-PI: Dr. Elisa Van Cleemput*

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2022 Beverly Sears Research Grant: $1,000 2022

- Awarded as funding for summer fieldwork relating to measurement of plant functional traits using hyperspectral imagery and PLSR modeling.

City of Boulder – Summer Fellowship: $8,000, $500, $800 2021, 2022, 2023

- Awarded for research on capability of Boulder's urban landscape to provide essential ecosystem services, such as heat and flood mitigation.
- Conducted a stakeholder engagement campaign as part of this effort, and compiled database of available data, in addition to modeling service provisioning.
- Worked with NASA JPL in effort to validate downscaled ECOSTRESS satellite land surface temperature data using air temperature sensors and proximal thermal imagery.

2021 Beverly Sears Research Grant: $5,000 2021

- Awarded as funding for summer fieldwork relating to quantifying ecosystem functioning in a drought x grazing grassland study.
- See *Dean's Award*

Betty Miller Francis Grant: $6,000 2017, 2018

- Awarded across two summer field seasons to fund my work as a research assistant in the Agrawal lab.

Einhorn Discovery Grant: $2,000 2018

- Awarded as funding for independent research project, particularly the greenhouse experiments conducted in fall 2018.

AWARDS

Nature & Health Conference Scholarship 2021

ESA Opportunity Fund Award 2021

NSF GRFP Honorable Mention 2021

University of Colorado Boulder - Dean's Award 2021

- Awarded for outstanding research proposal to University of Colorado, Boulder's Beverly Sears Research Grant. Evaluated across all departments and hundreds of proposals.

PUBLICATIONS

Peer-reviewed manuscripts

1. **Hayden, M.T.**, Van Cleemput, E., Suding, K.N., Lezberg, A., Anacker, B., and Dee, L.E. (2024). High resolution spectral data predicts grassland biodiversity at low richness sites. *Ecological Solutions and Evidence.*

2. Ramachandran, A., Dee, L., **Hayden, M.T.**, & Suding, K. (2024). Leveraging plant functional traits in the design of nature-based solutions: a research agenda. *Journal of Ecology.*

3. Lopresti, A., **Hayden, M.T.,** Poulter, B., & Dee, L. (2024). Remote Sensing Applications for Analyzing Prescribed Fire: A Global Synthesis. *International Journal of Wildland Fire*.

4. Miller, S., Dee, L.E., **Hayden, M.T.**, Jarrett, U., Carrico, A.R., Brauman, K.A., & Aceves-Bueno, E. (2024). Risks Rewire Telecoupled Systems. *Nature Sustainability.*

5. Van Kleunen, L., Peterson, K., **Hayden, M.T.**, Schwartz, A., Keyes, A., & Dee, L. (2023). Predicting novel species interactions and the consequences for ecosystem management. *Ecology Letters*.

6. **Hayden, M.T**, Holmes, K.D, & Arcila Hernandez, L.M. (2021). Multigenerational consequences of aphid size on offspring phenotype and reproduction. *Entomologia Experimentalis et Applicata*.

7. Etard, A., **Hayden, M.T.**, Dee, L., & Newbold, T. (in review). Energetic constraints and trophic levels explain species persistence in disturbed land uses. *Functional Ecology.*

Book chapters

Dee, L.E., Kimmel, K., **Hayden, M.** 2022. Ch 10. Relationships between biodiversity and ecosystem function in observational data. *The Ecological and Society Consequences of Biodiversity Loss. Editors: Michel Loreau, Andy Hector, and Forest Isbell.*

PRESENTATIONS

1. Biodiversity Across Scales: Mapping Functional Diversity With Remote Sensing to Assess Scale Dependencies in Biodiversity Monitoring. *2023 AGU Annual Meeting. December 11-15, 2023.*
2. Remote sensing of biodiversity in grassland ecosystems: exploring context dependencies in the spectral variance hypothesis. *2023 ESA Annual Meeting. August 11-15, 2023.*

3. Biodiversity in a flash: monitoring impacts of disturbance for grassland biodiversity and ecosystem functioning using hyperspectral imagery. *2022 AGU Annual Meeting. December 12-16, 2022.*
4. Understanding urban heat islands by combining high resolution land surface temperature observations with in-situ air temperature measurements. *2022 AGU Annual Meeting. December 12-16, 2022.*
5. Harnessing light in biodiversity science: a clear look on remote sensing for ecological monitoring. *Lunch & Learn Seminar, CU Boulder, November 9, 2022.*
6. Quantifying impacts of drought and grazing on ecosystem multifunctionality through response and effect trait relationships. *2021 ESA Annual Meeting (Virtual). August 2 – 6, 2021.*
7. Role of urban trees in mitigating heat island effects: comparing InVEST model outputs with land surface temperature (LST) hotspots. *2021 Nature & Health Conference. October 12-14, 2021*

TEACHING EXPERIENCE

Teaching Assistant Aug. 2020 - current

University of Colorado at Boulder

- Taught three semesters of Field Ecology to undergraduate sophomores-seniors.
- Designed lesson-material to cover key themes of ecological research, including observation, hypothesis-forming, data analysis, and communication.
- Responsible for teaching students to code in R.

Guest Lecturer Sept. 2021 & 2022

University of Colorado at Boulder

- Taught a guest lecture for a Conservation Planning course for undergraduate juniors-seniors in ecosystem service modeling across two semesters.
- Developed lab materials to teach students coding in Google Earth Engine and how to interpret spatially explicit carbon storage model outputs from InVEST.

Center for Learning & Teaching Workshops

- Accessibility in STEM & Science Communication – 2-day workshop
- Equitable Teaching Conference – August 16-20, 2021
- Building community in the classroom – January 14, 2021
- Just and Equitable Teaching Micro-credential – Jan. 2024 - current

RELEVANT WORK EXPERIENCE

Impact Analyst Nov. 2019- July 2020

The Malibu Foundation, Malibu, CA

- Responsible for data analysis for the Malibu Foundation, a non-profit which addresses climate change related disasters through a three-step protocol of emergency response, recovery, and resiliency.
- Created reports and materials that could be digested by our team, our board, and our public audience and develops programming to address pressing environmental concerns in Southern California (i.e. increased wildfire frequency, rising sea levels, and disparities in climate change effects).

Naturalist June- Sep. 2019

Catalina Island Conservancy, Avalon, CA

- Acted as an outdoor instructor and interpreter on Catalina Island in order to fulfill the Conservancy's mission of conservation, education, and recreation.
- Work included leading nature hikes, creating interactive programs and educating island guests.
- Additionally assisted with collecting data for conservation initiatives involving several of Catalina Island's endemic species, including the fox and shrew, as well as establishing exclosures to protect vegetative areas under restoration from herbivore feeding.

RELEVANT LEADERSHIP EXPERIENCE

Youth Mentor May 2023 – Current

NASA Invests in the Futures of Tomorrow's Youth

- Engages with youth groups to encourage excitement around and participation in STEM for underrepresented youth.
- Specifically, participated in a weekend event with Rose City Women in Aviation to encourage young women to explore paths in STEM.

Coordinator May 2022 – Current

500 Women Scientists, Boulder Pod

- Participates in leadership of Boulder pod for the national 500 Women Scientists organization to increase inclusivity and accessibility in STEM.
- Organized a career panel for early career womxn scientists, launched pod initiatives to discuss problem solving in the workplace, and contributed to pod outreach to local elementary schools.

President Jan. - May 2019

Mapping Society of Cornell, Cornell University

- Assisted with the establishment of Cornell's Mapping Society, an organization aimed at broadening students' access to GIS, remote sensing and mapping.
- Specifically planned GIS-related events such as a map-a-thon and a forum featuring GIS industry professionals.

SPECIALIZED SKILLS

Programming: R, Python (Google Collabs & Jupyter Notebooks), ENVI + IDL, Google Earth Engine, GitHub, GIS (ArcGIS Pro, QGIS), Amazon Web Services & Excel.
Field Skills: Operation of airborne (drone) and handheld (proximal) remote sensing technologies including visible, NIR, & SWIR camera systems; working knowledge of plant species of the great plains & rocky mountains.
Foreign Languages: Turkish (fluent); French (proficient).