Megan (Megs) Seeley, Ph.D.
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Remote Sensing | *Conservation* | *Forest Ecology*

Education

Arizona State University | Graduation Date: December 2023
PhD Geography | Advisors: Drs. B. L. Turner II & Gregory Asner

Arizona State University | Graduation Date: May 2021
M.A. Geography | Advisors: Drs. B. L. Turner II & Gregory Asner

University of Wisconsin - Madison | Graduation Date: May 2017
B.S. Forest Science & Botany | GPA: 4.0

Research Interests

I am a spectral ecologist interested in developing insights, data products, and tools using remote sensing data that support conservation. To this end, my work has focused on applying spectroscopy (or hyperspectral) data and tools in forest ecosystems. My focal species include the keystone and endemic 'ōhi'a lehua in Hawai'i and Fremont cottonwood, a foundational riparian cottonwood species in the southwest US. Broadly, my work with these species has focused on forest health and resilience in the face of anthropogenic threats such as introduced forest pathogens, drought, and extreme temperatures.

Research/Fieldwork Experiences

Postdoctoral Research Scholar Winter 2024 - Present
Center for Global Discovery and Conservation Science, Arizona State University, Hilo, HI
Advisors: Drs. Gregory Asner, Christopher Doughty

- Investigated the plastic versus heritable response of cottonwood (*Populus fremontii*) leaf reflectance to temperature
- Investigated the inter and intraspecific spectral variation in drought response of cottonwood (*P. fremontii* and *P. angustifolia*)
- Classifying cottonwood in National Ecological Observatory Network (NEON) imaging spectroscopy data across multiple riparian areas in Arizona and Utah
- Understanding the role of adaptation, hybridization, and *Tamarix* invasion on the resilience of cottonwood at the landscape scale

Graduate Research Assistant Fall 2019 – Winter 2023
School of Geographic Sciences and Urban Planning, Arizona State University, Hilo, HI
Advisors: Drs. B. L. Turner II & Gregory Asner

- Classified 'ōhi'a lehua (*Metrosideros polymorpha*) across the Island of Hawai'i using over 10,000 km^2 of 2m x 2m imaging spectroscopy data
- Investigated the feasibility of large-scale mapping efforts across biomes and developed novel spatial validation techniques
- Identified landscape-scale patterns in 'ōhi'a leaf traits with respect the leaf economic spectrum
- Investigated the separability of 'ōhi'a variety spectra and assessed spectral hybridization patterns
- Assessed the potential of spectroscopy in identifying *Ceratocystis* wilt-resistant 'ōhi'a individuals

Research Sprint Team Member Summer 2020

SETI Institute, Frontier Development Lab, Virtual
Advisor: Anirudh Koul

- Develop a computer vision algorithm to identify hurricanes in remote sensing imagery

Remote Sensing Technician Summer 2020

Arizona State University SHADE Research Lab, Virtual
Advisor: Dr. Kelly Turner

- Delineate urban tree canopies in LiDAR data

Geoinformatics Fellow & Assistant Center Lead Fall 2018 - Fall 2019

NASA DEVELOP, Tempe AZ
Advisors: Drs. Kent Ross & David Hondula

- Develop research sprint projects in partnership with decision-making organizations
- Build and advise research sprint teams
- Assist research teams with any technical (coding, GIS, methodological) questions
- Teach research teams necessary coding or remote sensing skills
- Projects Included: Tempe Urban Development, Ohio Energy, Lake Ontario Disasters

Project Lead Spring - Summer 2018

NASA DEVELOP, Ames Research Center, Mountain View, CA
Advisor: Dr. Juan Torres-Pérez

- Develop remote sensing data products for project end users
- Investigate socioeconomic disparities in air quality (California Health and Air Quality)
- Assess hurricane impacts on water quality (US Virgin Islands Water Resources)

Physical Science Technician Spring - Fall 2017

Yosemite National Park Service, El Portal, CA

- Monitor air and water quality across Yosemite National Park
- Repair and maintain air quality monitoring equipment
- Organize the California air quality database

Student Researcher Fall 2016 - Spring 2017

University of Wisconsin-Madison Paleoecology Lab, Madison, WI
Advisor: Dr. John (Jack) Williams

- Assess drivers of American beech (*Fagus grandifolia*) distribution pre-EuroAmerican settlement in the Great Lakes Region using multiple machine learning algorithms

Student Researcher Fall 2013 - Spring 2017

University of Wisconsin-Madison Biogeography Lab, Madison, WI
Advisor: Dr. Erika Marín-Spiotta

- Conduct a literature review on soil microbial community response to land use change
- Prepare soil samples for analysis
- Collect field soil samples across Puerto Rico
- Collect soil respiration samples

Field Technician Summer 2016

Institute for Bird Populations, Westwood, CA

- Survey forest stands and wood-boring beetle activity in northern California
- Deploy and monitor beetle traps

Research Experience for Undergraduates Intern Summer 2015

Sierra Nevada Research Institute, Wawona, CA

Advisor: Stephen Hart

- Investigate the response of leaf microbiomes to forest fire regimes across Yosemite

Teaching Interests

My teaching philosophy involves fostering curiosity through experiential learning. I aim to provide applicable, hands-on experience at all levels of education that will advance their critical thinking and prepare students for real-world careers and decision-making. My teaching interests broadly involve spatial science and ecology, with my specific interests being functional coding for geospatial analysis, remote sensing for conservation applications, spectroscopy, and scientific writing.

Teaching Experience

Courses Instructed as a Teaching Assistant

Global Change – GPH (Physical Geography) 314
Landform Processes – GPH (Physical Geography) 211
Cartography and Georepresentation – GIS (Geographic Information Science) 314

Tutorials Developed as a Geoinformatics Fellow at NASA DEVELOP

Remote Sensing Crash Course
Working with Synthetic Aperture Radar Data
Introduction to Python
Introduction to R
Introduction to Google Earth Engine
Data Manipulation/Modeling in Google Earth Engine
Data Visualization in Google Earth Engine

Publications

Peer-Reviewed Publications

1. **Seeley, M. M**., Vaughn, N. R., & Asner, G. A. (2024). Evaluating individual tree species classification performance across diverse environments. Environmental Research: Ecology, 3(1), 011001.
2. **Seeley, M. M.**, & Asner, G. P. (2023). Large-Scale Controls on the Leaf Economic Spectrum of the Overstory Tree Species Metrosideros polymorpha. *Remote Sensing*, *15*(19), 4707.
3. **Seeley, M. M.**, Vaughn, N. R., Shanks, B. L., Martin, R. E., König, M., & Asner, G. P. (2023). Classifying a highly polymorphic tree species across landscapes using airborne imaging spectroscopy. *Remote Sensing*, *15*(18), 4365.
4. **Seeley, M.,** Martin, R., Giardina, C., Luiz, B., Francisco, K., Cook, Z., Hughes, M.A., Asner, G.P. (2023). Leaf spectroscopy of resistance to Ceratocystis wilt of ‘Ōhi’a. *PLOS One, 18*(6), e0287144.
5. **Seeley, M.,** Stacy, E. A. Martin, R., Asner, G. (2023). Foliar functional and genetic variation in a keystone Hawaiian tree species estimated through spectroscopy. *Oecologia.*
6. **Seeley, M.,** Martin, R., Vaughn, N., Thompson, D., Dai, J, Asner, G. (2023). Quantifying the variation in reflectance spectra of *Metrosideros polymorpha* canopies across environmental gradients. *Remote Sensing.* 15(*6*), 1614.
7. Kedron, P., Bardin, S., Holler, J., Gilman, J., Grady, B., **Seeley, M.**, ... & Yang, W. (2023). A Framework for Moving Beyond Computational Reproducibility: Lessons from Three Reproductions of Geographical Analyses of COVID-19.
8. Dai, J., Vaughn, N., **Seeley, M**., Heckler, J., Thompson, D. R., & Asner, G. P. (2022). Spectral dimensionality of imaging spectroscopy data over diverse landscapes and spatial resolutions. *Journal of Applied Remote Sensing.* 16(*4*), 044518.

9. Turner, K. V., Rogers, M. L., Zhang, Y., Middel, A., Schneider, F. A., Ocón, J. P., **Seeley, M.,** Dialesandro, J. (2022). More than surface temperature: mitigating thermal exposure in hyper-local land system. *Journal of Land Use Science*, 1-21.
10. Carlson, R., Evans, L., Foo, S., Grady, B., Li, J., **Seeley, M.**, Xu, Y., & Asner, G. (2021). Synergistic benefits of conserving land-sea ecosystems. *Global Ecology and Conservation.*
11. Diaz-Vallejo, E., **Seeley, M.**, Smith, P., & Marin-Spiotta, E. (2021). A meta-analysis of tropical land change effects on the soil microbiome: Emerging patterns and knowledge gaps. *Biotropica.* doi:10.1111/btp.12931
12. **Seeley, M.**, & Asner, G. P. (2021). Imaging Spectroscopy for Conservation Applications. *Remote Sensing*, *13*(2), 292.
13. **Seeley, M.**, Goring, S., & Williams, J. W. (2019). Assessing the environmental and dispersal controls on *Fagus grandifolia* distributions in the Great Lakes region. *Journal of Biogeography*, *46*(2), 405-419.

In Prep

1. **Seeley, M. M.**, Wiebe, B. C., Cooper, H. F., Hultine, K. R., Gehring, C. G., Abraham, A. J., Posch, B. C., Moran, E. M., Allan, G. J., Whitham, T. G., Martin, R. M., Asner, G. P., Doughty, C. E. (in prep) Remote sensing reveals inter and intraspecific variation in riparian cottonwood (*Populus* spp) response to drought.
2. **Seeley, M. M.**, Thomson, E., Allan, G. J., Gehring, C. A., Whitham, T. G., Hultine, K. R., Cooper, H. F., Wiebe, B. C., Asner, G. P., Corbin, J. P., Best, R. J.; Doughty, C.E. Heritability plus phenotypic plasticity shape leaf spectra in a widely distributed, foundation tree species

Management Plans

2016: The Nature Conservancy Baraboo Hills, WI Management Plan

2014: Cross Plains, WI Vegetation Management Plan 2014

Research Funding and Grants

2023: National Science Foundation Doctoral Dissertation Research Improvement Award, *$20,000,* Predicting the spread of Rapid Ohia Death and detecting resistant varieties of Metrosideros polymorpha

2021: Arizona State University Melvin G. Marcus Fellowship, *$1,750,* "Quantifying Metrosideros polymorpha Phenotypes and Disease Resilience using Imaging Spectroscopy"

2020: Arizona State University Pat Gober Water Prize, *$1,500*, "Tracking Short-Term Forest Resilience to Drought"

2016: University of Wisconsin-Madison Holstrom Environmental Scholarship, *$4,000*, "Shifting Landscapes: An analysis of post-European impacts on forest composition along rivers in the upper Midwest"

Fellowships and Awards

2023: Outstanding Research Award Graduate and Professional Student Association

2019, 2020: Gilbert F. White Fellowship

2020: Arizona State University Graduate Excellence Award

2020: Smithsonian Tropical Research Institute Tropical Field Course Scholarship

2019: School of Geographical Sciences and Urban Planning Nexus Research Fellowship

2017: University Book Store Academic Excellence Award

2016: Udall Scholarship

2014, 2016: Stone Forestry Scholarship

2015: Departmental Forestry Scholarship

2015: Hellen Miller Forestry Scholarship

Travel Awards

2023: Graduate and Professional Student Association Travel Award
2019: NASA-MSU Professional Enhancement Award
2017: King Abdullah University of Science and Technology International *2016:* American Geophysical Union Student Travel Grant

Presentations

Plasticity versus heritability of *Populus* leaf reflectance spectra: Implications for large-scale remote sensing efforts
Seeley, M. Thompson, E., Asner, G., Doughty, C., Wiebe, B., Cooper, C., Hultin, K., Allan, G., Gehring, C., Grady, K., Posch, B. C., Moran, E. M., Abraham, A. J., Martin, R. M., Whitham, T.
2024: Ecological Society of America, Long Beach, CA

Applying spectral ecology concepts to Rapid 'Ōhi'a Death management
Seeley, M., Asner, G.
2024: Hawaii Conservation Conference, Honolulu, HI
2024: Hawaii Ecosystems Meeting, Hilo, HI

Using spectral ecology to map and explore forest genetic diversity: case studies from the subtropics and the desert
Seeley, M.; Vaughn, N., Stacy, E., Thompson, E., Doughty, C., Wiebe, B., Cooper, H., Shanks, B., König, M., Allan, G., Gehring, C., Grady, K., Whitham, T., Hultin, K.
2024: American Association of Geographers, Honolulu, HI

Classifying a highly polymorphic tree species across landscapes using airborne imaging spectroscopy
Seeley, M.; Vaughn, N.; Shanks, B.; Martin, R.; König, M.; Asner, G.
2023: Hawaii Conservation Conference, Honolulu, HI
2023: Hawaii Ecosystems Meeting, Hilo, HI
2023: Ecological Society of America, Portland, OR

Knowledge Discovery Framework: An Eye in the Sky with AI
Seeley, M., Civilini, F., Praveen, S., Srihankar, N., Kohl, A., El-Askary, H., Berea, A.
2020: American Geophysical Union Conference, Virtual
2020: FDL US Space Science and AI Showcase, Virtual

NASA DEVELOP: Applications of Earth Observations for Addressing Health and Air Quality Concerns
Seeley, M.
2019: NASA Health and Air Quality Applied Sciences Team Meeting, Phoenix, AZ

Analyzing Historical Hurricane Influences on Coastal Water Quality and their Impact to Marine Ecosystems
Seeley, M., Bouhedda, F., Lum, B., Anderson, T.
2018: Annual Earth Sciences and Applications Showcase, NASA Headquarters, Washington, D.C.
2018: NASA DEVELOP Summer Closeout, Moffett Field, CA

Measuring California Air Quality through the Use of Nasa Earth Observations to Identify Spatial, Temporal, and Social Disparities in Particulate Matter Pollution
Wasserman, A., Nickmeyer, A., Seeley, M.
2018: NASA DEVELOP Spring Closeout, Moffett Field, CA

Physical Science in Yosemite National Park - Air Quality, Hydrology, and Geology
Seeley, M.
2017: Yosemite Facelift, Yosemite Valley, CA

Environmental and historical controls on *Fagus grandifolia* settlement-era distributions
Seeley, M., Goring, S., Williams, J.
2017: Ecological Society of America, Portland, OR
2017: University of Wisconsin Undergraduate Research Symposium, Madison, WI

Tropical land-use conversion effects on soil microbial community structure and function: Emerging patterns and knowledge gaps
Seeley, M., Smith, P., Marin-Spiotta, E.
2017: King Abdullah University of Science and Technology International Poster Competition, Thuwal, Saudi Arabia
2016: American Geophysical Union Conference, San Francisco, CA
2016: University of Wisconsin Undergraduate Research Symposium, Madison, WI

Short and long-term responses of nitrogen-fixing microbial organisms to fire
Seeley, M., Hart, S.
2014: Yosemite National Park REU Symposium, El Portal, CA

Methods of analyzing soil carbon turnover rates and pool sizes as a result of biofuel crop treatment
Seeley, M., Szymanski, L., Marin-Spiotta, E.
2014: Nelson Earth Day Conference, Madison, WI
2014: University of Wisconsin Undergraduate Research Symposium, Madison, WI

Workshops
Accessing and Manipulating Planet Labs Data *2019: Arizona State University, Tempe, AZ*
Geospatial Modeling with NASA Earth Observations using Google Earth Engine and R
2019: International Association for Landscape Ecology-North America Conference, Fort Collins, CO

Service

Rapid Ohia Death Strategic Response Plan
Invited Speaker, Steering Committee | 2024

Manuscript Reviewer
PNAS
Remote Sensing

Arizona State University Graduate and Professional Student Assembly
Social Science Representative | 2020-2021

Arizona Science Policy Network
Environmental Task Force Co-lead | 2019-2020

Prison Education Program – Arizona State University School of Earth and Space Exploration
Geoscience Instructor | 2019-2020

Software Carpentries
Instructor | 2020

University of Wisconsin Forestry Club
President, Secretary 2015 | 2017

Media

2022: Uncharted Geography (Podcast): What does it take to save our forests? – with Megs Seeley
2022: ASU News: This Imaginative Tech is Transforming Conservation

Professional Affiliations

Ecological Society of America
American Association of Geographers

Coding Languages

Python
R
Google Earth Engine
Linux