Jacob Nesslage

PhD Candidate | Remote Sensing Scientist
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EDUCATION

Environmental Systems, PhD — Merced, CA
Emphasis: Ecology and Ecosystem Science — Anticipated 2026
University of California, Merced

Dissertation: *Remote sensing of biodiversity at the terrestrial-aquatic interface: Spatial analysis and multimodal surveys across vernal pool, floodplain, and riverine ecosystems*
Advisor: Dr. Erin L. Hestir
Committee Members: Dr. Joshua H. Viers, Dr. Rachel S. Meyer, Dr. Teamrat A. Ghezzehei

Environmental Engineering, B.S. — Merced, CA
Magna cum laude — 2021
University of California, Merced

Physics, A.S. — Modesto, CA
Modesto Junior College — 2018

GRANTS, FELLOWSHIPS, AND AWARDS

University of California President's Pre-Professoriate Fellowship (UC-PPFP) University of California Office of the President	$37,000 + $10,000 stipend	2024-2025
National Science Foundation Graduate Research Fellowship (NSF-GRFP) U.S. National Science Foundation	$132,000	2021-2024
Environmental Systems Summer Fellowship University of California, Merced	$8,500	2025
Environmental Systems Travel Award University of California, Merced	$1,000	2022
Calvin E. Bright Engineering Scholarship University of California, Merced	$3,000	2021

UC Merced Renewable Energy Scholarship University of California, Merced	$1,500	2019, 2020
John Elia Veterans Scholarship University of California, Merced	$2,000	2019, 2020
Francis E. Benton Scholarship University of California, Merced	$1,000	2019, 2020
Peter & Rochelle Koch Scholarship Valley Land Alliance (VLA)	$500	2018

PUBLICATIONS

Nesslage, J.., Hestir, E. and Viers, J.H., 2025. Hydrologically informed modelling of plant species richness across a vernal pool complex using UAV-LiDAR. *(In review)* — 2025

Cardoso, A.W., Hestir, E.L., Slingsby, J.A., Forbes, C.J., Moncrieff, G.R., Turner, W., Skowno, A.L., **Nesslage, J**., Brodrick, P.G., Gaddis, K.D. and Wilson, A.M., 2025. The biodiversity survey of the Cape (BioSCape), integrating remote sensing with biodiversity science. *npj Biodiversity*, *4*(1), p.2. — 2025

Cardoso, A.W., Hestir, E.L., Slingsby, J.A., Forbes, C.J., Moncrieff, G.R., Turner, W., Skowno, A.L., **Nesslage, J**., Brodrick, P.G., Gaddis, K.D. and Wilson, A.M., 2025. BioSCape combines local knowledge and remote-sensing technology for inclusive biodiversity science. *Nature Reviews Biodiversity*, *1*(1), pp.2-4. — 2025

SOFTWARE

Nesslage J, Hestir E. OpenRES (Open Riverine Ecosystem Synthesis): A QGIS plugin for automated extraction of hydrogeomorphic features to support functional process zone classification of river networks. Zenodo; 2025. — 2025

CONFERENCE PAPERS

Nesslage, J., Barreto, B.L., Weingram, A. and Hestir, E., 2023. A machine learning approach for high resolution fractional vegetation cover estimation using planet cubesat and RGB drone data fusion. In *IGARSS 2023-2023 IEEE International Geoscience and Remote Sensing Symposium* (pp. 4879-4882). IEEE. (Conference Proceeding) — 2023

Cardoso, A., Hestir, E., Slingsby, J., **Nesslage, J**., Forbes, C. and Wilson, A., 2023. Bioscape: Combining Airborne Hyperspectral and Laser Altimeter with Field Data to Advance Remote Sensing of Biodiversity. In *IGARSS 2023-2023 IEEE International Geoscience and Remote Sensing Symposium* (pp. 499-502). IEEE. (Conference Proceeding) — 2023

CONFERENCE PRESENTATIONS

Nesslage, J., Devarasetty, A., Adepoju, S., Dilmurat, K., Hestir, E. Parameterization of Unmixing and Weighting-based Spatiotemporal Fusion Methods using PlanetScope and UAV Imagery — 2025

Nesslage, J., Hestir, E.L., Rossi, M.W., Meyer, R. and Stavros, E.N., 2024. Functional Process Zone Delineation for Riverine Biodiversity Assessment: QGIS Plugin — 2024

Development and Case Studies across Two Continents. AGU24. Washington, D.C. (Oral)

Nesslage, J., Quick-Cleveland, J., Meyer, R.S., Hestir, E.L., Viers, J.H., 2024. Riparian Patches as Refugia within Floodplain Agroecosystems: Insights from Two Central Valley Case Studies. Labor and Automation in California Agriculture Annual Meeting, University of California, Davis. (Poster) 2024

Nesslage, J., and Hestir, E.L., 2024. Estimating plant species richness in an ephemeral wetland using UAV-LiDAR derived hydrologic and topographic data and machine learning. Ecological Society of America Annual Meeting, Long Beach, CA. (Poster) 2024

Nesslage, J., Quick-Cleveland, J., Meyer, R.S., Hestir, E.L., Viers, J.H., 2023. Monitoring Mediterranean Floodplain Restoration Using Multi-Sensor Fusion And Environmental DNA. NASA Carbon Cycle and Ecosystems Joint Science Workshop, University of Maryland. (Poster) 2023

Nesslage, J., Hestir, E., Quick-Cleveland, J. and Meyer, R., 2022, December. Monitoring Taxonomic and Functional (Agro) biodiversity along the Agricultural-Riparian Matrix of California's San Joaquin River using Remote Sensing and Environmental DNA. In AGU Fall Meeting Abstracts (Vol. 2022, pp. B22D-1468), Chicago, IL. (Poster) 2022

Nesslage, J., Quick-Cleveland, J., Meyer, R.S., Hestir, E.L., Viers, J.H., 2022. Using eDNA and Remote Sensing to Quantify Species Diversity, Functional Diversity, and their Environmental Drivers along an Agricultural-Riparian Gradient. Ecological Society of America Annual Meeting, Montreal, QC. 2022

Nesslage, J., Quick-Cleveland, J., Meyer, R.S., Hestir, E.L., Viers, J.H., 2022. Functional Agrobiodiversity Monitoring using Environmental DNA and Remote Sensing Data Fusion. FIRA 2022, Fresno, CA. (Poster) 2022

Nesslage, J., Fortier, M., and Hestir, E. 2022. A Life Cycle Assessment of UAV Remote Sensing Platforms. Internet of Things for Precision Agriculture Annual Meeting, Purdue University, West Lafeyette, IN. 2022

Nesslage, J., Arizpe Arroyo, D., and Hestir, E. 2022. Sensor Fusion for Multiscale Applications: Case Studies and Future Directions. Internet of Things for Precision Agriculture Annual Meeting, Purdue University, West Lafeyette, IN. (Third Place in Poster Competition) 2022

Nesslage, J., Hestir, E., and Burmistrova, J. 2020. Using Sentinel-2 to Detect and Predict Biodiversity Hotspots in a Vernal Pools and Grasslands Ecosystem. American Geophysical Union Annual Symposium, San Francisco, CA. (Poster) 2020

TEACHING EXPERIENCE

Teaching Assistant, ENGR 180: Spatial Analysis and Modeling Fall 2025
University of California, Merced (Instructor of Record: Dr. Crystal Kolden)

- Topics: GIS fundamentals, spatial modeling, and ArcGIS proficiency

Instructor, Generalized Dissimilarity Modeling Workshop Summer 2023
University of California, Merced

- Topic: 1-week long intensive workshop on generalized dissimilarity modeling using R

Guest Lecturer, Bobcat Summer Academy Summer 2022
University of California, Merced

- Topic: Use of remote sensing to study environmental problems, tailored to a 5th grade audience

Guest Lecturer, ME 190: Novel Technologies in Agriculture Fall 2021
University of California, Merced (Instructor of Record: Dr. Reza Ehsani)

- Topic: Use of UAV remote sensing to study agricultural problems

RESEARCH EXPERIENCE

Graduate Student Researcher 2021-2025
University of California, Merced
Advisor: Dr. Erin L. Hestir

- Collected RGB, multispectral, and hyperspectral data in terrestrial and aquatic environments using field spectrometers and UAVs
- Conducted field surveys and analysis of eDNA samples, soil samples, water samples, and plant samples
- Utilized GIS software (ArcGIS, QGIS) to create maps and developed a QGIS plugin to test
- Developed scripts using R, Python, Javascript, and Bash to process large volumes of remote sensing data, perform statistical analyses and modeling, and develop algorithms for sensor fusion

Undergraduate Remote Sensing and GIS Research Assistant 2020-2021
University of California, Merced
Advisor: Dr. Erin L. Hestir

- Assisted with the field collection of hyperspectral remote sensed data and LiDAR via UAV, as well as spectral profiles via field spectroradiometers and water sampling techniques
- Developed scripts for remote sensed data processing using R and Python
- Performed laboratory tasks using ArcGIS, QGIS, ENVI, and other software as required

Natural Resources Specialist 2019
USDA - Natural Resources Conservation Service
Advisor: Ted Strauss, State Air Quality Conservationist

- Assisted in the implementation of voluntary incentives-based programs to support private landowners in reducing air emissions of ozone precursors, particulate matter, odors, and greenhouse gasses.
- Monitored and quantified effects of air quality programs in reducing emissions in accordance with the State Implementation Plan (SIP) and reported these results to Cal EPA
- Engaged with federal, state, and local agencies and private stakeholders to work to proactively address air quality concerns in the San Joaquin Valley

Instructional Laboratory Assistant 2019
University of California, Merced
Advisor: Dr. Luke Reed, Instructional Lab Coordinator

- Performed 3D printing, laser cutting, CNC, vinyl cutting and injection molding to support graduate student researchers and engineering Capstone design projects
- Assisted in the setup, implementation, and maintenance of various engineering laboratory experiments and equipment related to circuit theory, fluid mechanics, strength of materials, sensors and actuators, and mechatronics
- Used CAD software to design products for the School of Engineering and created these products using 3D printing (SLA, PLA, ABS)

LEADERSHIP EXPERIENCE

Healthcare Specialist 2011-2014
US Army, 3d Calvary Regiment, Ft. Hood, TX

- Provided medical care in acute and non-acute settings to military personnel in both clinical and field settings.
- Engaged in medical training, teaching Combat Lifesaver courses to deploying personnel.
- Led a team of three in evacuation operations, providing first responder support for training exercises, range operations, and other events as required.

CERTIFICATIONS

NASA Open Science 101	National Aeronautics and Space Administration	2025
Motorboat Operator	Scientific Boating Safety Association, UC Davis Bodega Marine Lab	2021
Part 107 sUAS Remote Pilot	Federal Aviation Administration	2021

PROFESSIONAL MEMBERSHIPS

Member, IEEE Geoscience and Remote Sensing Society
Member, American Geophysical Union
Member, Ecological Society of America