

Postdoctoral Research Associate

Deep Learning for Ecological Remote Sensing

Boise State University

Boise, Idaho or Burns, Oregon

The Department of Biological Sciences at Boise State University invites applications for a **Postdoctoral Research Associate** to lead the development of next-generation deep learning methods for identifying plant species from drone imagery. The successful candidate will join an interdisciplinary team developing an open-source artificial intelligence platform for mapping rangeland plant communities from unoccupied aerial systems (UAS). The project combines deep learning, transfer learning, and web-based tools to make high-resolution ecological mapping broadly accessible to researchers and land managers.

Responsibilities

The successful applicant will play a leading role in developing deep learning algorithms capable of identifying plants to species in UAS imagery. Primary responsibilities include:

- Developing convolutional neural networks (CNNs), object detection models, transfer learning approaches, and multi-temporal image analysis workflows.
- Building open-source software and web applications that enable researchers and land managers to generate species maps from UAS imagery.
- Publishing results in high-impact peer-reviewed journals.
- Collaborating closely with ecologists, statisticians, federal scientists, and stakeholder organizations.

Required Qualifications

- Ph.D. in Computer Science, Data Science, Artificial Intelligence, Remote Sensing, Engineering, Ecology, or a closely related discipline (completed by the start date).
- Demonstrated expertise in **deep learning and computer vision**.
- Strong programming skills in **Python**.
- Experience developing or implementing convolutional neural networks and modern deep learning frameworks (e.g., PyTorch or TensorFlow).
- Experience working with large image datasets.
- Strong publication record and excellent written and verbal communication skills.
- Ability to work both independently and as part of an interdisciplinary research team.

Preferred Qualifications

Preference will be given to applicants with experience in one or more of the following areas:

- Species classification, object detection, semantic segmentation, or transfer learning
- Drone (UAS) image acquisition and processing
- Structure-from-motion photogrammetry
- Geospatial analyses
- Development of interactive web applications or scientific software
- Dryland, rangeland, or plant ecology

Applicants are not expected to have expertise in every area. We encourage candidates with strong machine learning backgrounds who are excited about applying their skills to ecological and environmental problems.

Salary and Appointment

- **Salary: \$78,000 per year** plus benefits.
- Initial appointment is for two years, with extension possible based on satisfactory performance and continued funding.
- Preferred start date is September 2026.

Location

The successful applicant may choose to be based in either:

- **Boise, Idaho**, at Boise State University, or
- **Burns, Oregon**, at the Eastern Oregon Agricultural Research Center.

Both locations provide opportunities for close interaction with project collaborators. Periodic travel between Boise and Burns, as well as occasional travel to meetings, conferences, workshops, and collaborator institutions, will be expected.

About the Project

The successful candidate will join an interdisciplinary team using deep learning and drone imagery to better understand plant communities in dryland ecosystems of western North America. The project builds on an extensive existing dataset consisting of tens of thousands of georeferenced individual plants paired with high-resolution UAS imagery collected across multiple landscapes in Idaho and Oregon, providing an exceptional foundation for developing and testing new computer vision algorithms.

The primary objective is to develop robust deep learning approaches for identifying individual plant species from drone imagery that generalize across landscapes, sensors, and environmental conditions. These methods will enable researchers to address a range of scientific questions, including how grazing influences plant community composition, which plant species are detectable using drone imagery, and how uncertainty in AI predictions

affects ecological inference. The project will combine advances in computer vision, transfer learning, and statistical modeling to produce open, reproducible tools that support both ecological research and rangeland management.

The postdoctoral researcher will collaborate with scientists from Boise State University, the USDA Agricultural Research Service, and the Sevilleta Long-Term Ecological Research (LTER) program. The postdoctoral researcher will be co-supervised by Dr. Trevor Caughlin (Boise State University), Dr. Peter Olsoy (USDA ARS), and Dr. Stella Copeland (USDA ARS).

To Apply

Applicants should submit via email to trevorcaughlin@boisestate.edu with the subject line: "Deep learning postdoctoral position"

- Cover letter describing research interests and relevant experience
- Curriculum vitae
- Contact information for three references
- Up to three representative publications or software projects

Review of applications will begin immediately and continue until the position is filled.

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Trevor Caughlin, PhD

Associate Professor

Coordinator of Ecology, Evolution, and Behavior PhD Program

Boise State University

Department of Biological Sciences

Personal zoom room: <https://boisestate.zoom.us/my/trevorcaughlin>

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