

Postdoctoral Fellow

Developing machine-learning solutions for evaluating the status and distributions of bats in WNS-free areas using standardized acoustic monitoring data from the North American Bat Monitoring Program (NABat)

Colorado Cooperative Fish and Wildlife Research Unit in the Department of Fish, Wildlife, and Conservation Biology, Colorado State University,

North American Bat Monitoring Program, USGS Fort Collins Science Center,

and

Northern Rocky Mountain Science Center

POSITION TITLE: Post-doctoral Fellow

SALARY: \$58,500 per year, benefits included.

PERFORMANCE PERIOD: 24 months after start date, anticipate August 2020-July 2022, with additional years possible

APPLICATION DEADLINE: 24 May 2020, or until suitable candidate is found

POSITION SUMMARY:

Colorado State University is seeking candidates for a postdoctoral position to develop machine learning solutions in support of bat monitoring efforts based on the North American Bat Monitoring Program (NABat). The postdoc will develop machine learning algorithms to be used for species classification of bioacoustics and can be deployed through automated procedures on large holdings of acoustic data stored and accessed via cloud infrastructure. Results of classifications (species presence/absence) and estimates of uncertainty will be used in status and trends population models with environmental covariates that account for large-scale system changes. These models will be used to generate maps of species distributions and evaluate changes in of bat species in White-Nose Syndrome (WNS)-free regions. The outcome of this work will be to (1) establish baseline information to better understand the impacts of WNS and (2) improve efficiencies and scalability of acoustic data processing for NABat.

Top priorities include developing machine-learning algorithms capable of accurately classifying NABat acoustic recordings to species and model comparison statistics to assess competing

algorithms. The postdoc will work closely with the Project Leads and the NABat web application development team at the Fort Collins Science Center (FORT) to integrate with existing web applications <https://sciencebase.usgs.gov/nabat/#/home/logout>. There will also be opportunities to work with the Project Leads on a variety of related projects of interest, including constructing and programming multi-sensor detection networks with remote ultrasonic recording and near-infrared image capture capabilities for the purposes of monitoring bats.

The primary objectives for this post-doctoral position are:

- 1) use ultrasonic recordings from NABat monitoring data collected across North America to develop species classification algorithms using machine learning approaches;
- 2) develop and implement generalizable statistical procedures for measuring uncertainty in species classifications;
- 3) develop tools and metrics for model comparison that can be deployed via cloud infrastructure; and
- 4) develop statistical procedures for propagating uncertainty from machine learning species classification algorithms into occupancy models for the use of evaluating species distributions in WNS-free areas.

DUTIES:

The post-doctoral fellow will be primarily supervised by Dr. Bill Kendall at the USGS Colorado Cooperative Fish and Wildlife Research Unit, at Colorado State University. The incumbent will also work closely with Drs. Brian Reichert (NABat Coordinator, USGS Fort Collins Science Center), Kathi Irvine (USGS Northern Rocky Mountain Research Center), Wayne Thogmartin (USGS Upper Midwest Environmental Science Center), Thomas Rodhouse (NPS, OSU-Cascades), and NABat contributing data partners including Colorado Natural Heritage Program. The postdoc position will be co-located at Colorado State University and USGS Fort Collins Science Center in Fort Collins, Colorado with significant travel to Northern Rocky Mountain Science Center in Bozeman, Montana.

MINIMUM REQUIREMENTS:

Ph.D. in computer science, conservation science, ecology, natural resources, statistics, or a related discipline.

1. Demonstrated experience developing machine learning solutions, specifically related to classification of bioacoustics recordings, or other similar applied problems.
2. Demonstrated expertise with technologies including Python, Pytorch, TensorFlow, or Keras; and GIT, GitHub or GitLab.

3. Strong oral communication skills with demonstrated experience presenting information to the scientific and/or conservation community.
4. Demonstrated ability to work as part of a team on developing IT solutions for process big data.
5. Demonstrated evidence of excellent written and oral communication skills.
6. Desire and proficiency to publish in the peer-reviewed literature.

DESIRED ABILITIES:

Competitive candidates will have a background in machine learning, including expertise in digital signal processing, feature extraction, unsupervised clustering, convolutional neural networks and using weakly labeled audio recordings; and experience developing in a cloud-based computational environment. Experience synthesizing and extending existing research leveraging open source projects such as BatDetective or OpenSoundscape are desirable. The successful candidate should also have experience working collaboratively in groups. In addition, highly competitive candidates will have a background in demographic estimation and population modeling, spatial modeling, knowledge of bat population biology, knowledge of bat acoustic monitoring methods, and/or knowledge of analysis of acoustic monitoring data.

TO APPLY:

To apply and view a full position announcement please visit:

<https://jobs.colostate.edu/postings/77089> by May 24, 2020, 11:59 pm (MT) for full consideration.

CSU is an EO/EA/AA employer and conducts background checks on all final candidates.

For further information, contact:

Bill Kendall (William.Kendall@colostate.edu), Brian Reichert (breichert@usgs.gov), or Kathi Irvine (kirvine@usgs.gov).