

## USGS 2023 STUDENT INTERNSHIP OPPORTUNITIES

The USGS has the following positions available for summer student internships in Golden, Colorado, through the [Pathways Internship Program](#). Project opportunities cover a range of hazard science and engineering topics.

Applications will be accepted from **January 30, 2023, to February 13, 2023**.

To apply for these job opportunities, go to <https://www.usajobs.gov/> and search for the announcement number listed below which best matches your student status. If you are in doubt which one applies to you, we recommend applying to both. Eligible applicants must be U.S. citizens and current or continuing university students.

- **USGS-PATH-23-11816555-DE-MW** Physical Science Student Trainee GS-03/04 (for students seeking an undergraduate degree)
- **USGS-PATH-23-11816975-DE-MW** Physical Science Student Trainee GS-05/07 (for students seeking a graduate degree)

Required documents that *must* be uploaded to USAJOBS.gov and submitted with your application by the deadline include:

- **Current transcripts** showing proof of enrollment. Unofficial transcripts are acceptable.
- **Resume** showing relevant education and experience and indicating project preferences (see below).

In addition, as part of the application you will be required to answer a set of questions to indicate your interest in the available internship project opportunities. This will help the USGS better match applicants to projects. For your reference, the numbers, descriptions, and points-of-contact (POC) for each project are listed below. We also recommend highlighting your project preferences in your resume.

Interviews will take place starting in late February, with selections anticipated by late March. All internships will be in person in Golden, Colorado, starting on either May 22 or June 20, 2023, depending on which date better suits each student's schedule. We may be able to accommodate other start dates on a case-by-case basis. End dates are flexible and expected to be during August 2023 for most interns. Most internships will be full-time during the summer, but some may have the option to continue part-time through the academic year.

Project opportunities listed below are grouped by discipline. These positions provide direct exposure to high-visibility research and are ideal for learning new skills. Many opportunities request but **do not require** programming experience; those willing to learn programming are encouraged to apply. These project opportunities are also listed at: [https://earthquake.usgs.gov/static/lfs/internships/USGS\\_internships\\_2023.pdf](https://earthquake.usgs.gov/static/lfs/internships/USGS_internships_2023.pdf)

### Seismic Hazard, Engineering, & Risk projects

1. Collaborate with a multi-disciplinary team to develop web tools that help civil engineers (structural and geotechnical) use forecasts of earthquake ground shaking from the USGS National Seismic Hazard Model. Keywords: earthquake engineering, computer programming, hazard forecasting. (POCs: Nicolas Luco and Andrew Makdisi)
2. Work with scientists to support the development of scientific tools for data analysis in loss/risk modeling, earthquake hazard calculations, data analysis/uncertainty propagation, and data access tools. Required skills: MATLAB and Python programming. Desired skills: experience with Git, NumPy, SciPy, Matplotlib, statistical packages, and Tableau. Keywords: earthquake engineering, computer programming, hazard forecasting. (POC: Kishor Jaiswal)
3. Assist with stakeholder and user engagement for more usable, accessible, and equitable hazards products in the Landslide Hazards Program and Earthquake Hazards Program. Projects may include K12 outreach, community engagement, user-centered design, and website content management. Experience with geologic

hazards science, science and risk communication, community-based research, and qualitative research methods preferred. Keywords: risk, equity, earthquake information, landslides information, landslides information. (POC: Lisa Wald)

4. Work with earthquake scientists and engineers to organize, describe, and archive the many maps and geospatial data that have been derived from the USGS National Seismic Hazard Model, and explore developing new maps. Keywords: earthquake hazard/risk forecasting, Geographic Information Systems (GIS), technical writing. (POC: Ken Rukstales and Nicolas Luco)

### Seismic Source & Ground Motion Characterization projects

5. Process earthquake ground motions and analyze seismic waveforms to model site response. Student will carry out seismic data processing and fit theoretical models to ground-motion amplitude spectra. Experience with Python, ObsPy, seismic data processing, and computing within a Linux environment is preferred. Keywords: seismology, earthquakes, data analysis. (POCs: Morgan Moschetti and Steve Hartzell)
6. Gaussian Process regressions of earthquake ground-motion data for predictive models of spatial variation in earthquake shaking. Experience in spatial statistics, programming (Python, R, other) preferred. Keywords: geostatistics, earthquakes, statistical model development. (POC: Morgan Moschetti)
7. Improve site characterization and site response models for earthquake hazards applications. The student may perform literature reviews, compile data for public databases, and analyze seismic data (inversions for shallow site characterization, ambient seismic noise analyses) to support earthquake ground-motion prediction and hazards applications for multiple regions including Cascadia, California, Alaska, Hawaii, Puerto Rico. Requirements vary by project and include coding experience (Python), database management (e.g., SQL), good communication skills. Keywords: earthquakes, geophysical site characterization, data analysis, statistical modeling, programming. (POC: Sean Ahdi)
8. Assist in aggregating earthquake info and processing empirical and simulated ground motion data for multiple end-use cases, including earthquake source analysis, machine learning applications, and ground motion comparisons. Programming skills are a plus (e.g., Python). Keywords: seismology, simulations, earthquakes, ground motions, data analysis, programming. (POC: Kyle Withers)

### Earthquake Monitoring & Data Analysis projects

9. Develop Machine Learning (ML) models aimed at improving the National Earthquake Information Center (NEIC) global seismic monitoring system. Topics can include event detection, association, or classifying event characteristics. Experience with python and developing ML models is preferred. Keywords: seismology, earthquakes, monitoring, machine-learning. (POC: William Yeck)
10. Explore earthquake-triggered deformation and ground failure using remote sensing products. Familiarity with remote sensing data (e.g., InSAR) and programming (e.g., Python) is a plus. Keywords: Ground Failure, Earthquake Source, Remote Sensing. (POCs: Paula Burgi and Dara Goldberg)
11. Assess magnitudes of small earthquakes and compare different magnitude types for these events in order to improve seismic catalogs and associated products (e.g., aftershock forecasts). Candidate may also be involved in magnitude computation and/or developing operational strategies for improving real-time magnitude characterization. Experience processing seismic waveforms and/or other coding for timeseries analysis is preferred. Keywords: seismology, earthquakes, magnitudes, data analysis. (POCs: David Shelly, Will Yeck, and Paul Earle)
12. Assist in the data analysis and validation of large, aggregated, scientific, global earthquake data sets spanning decades, different algorithms and approaches, and different sources along with the presentation of the results of the analysis and comparisons. Experience with Python and relational databases is preferred. Keywords: data analysis, data science, seismology, python, programming, earthquakes. (POCs: Michelle Guy and Paul Earle)

### Landslide Hazards projects

13. Assist in improving the USGS National Landslide Inventory by: (1) developing content for products that communicate the utility of the inventory to the general public, (2) contributing to efforts to prioritize national landslide mapping by integrating remotely sensed data and other geospatial datasets related to risk. Other tasks may involve compiling and organizing data to be added to the inventory. Familiarity with GIS and remotely sensed

data is necessary. Keywords: Landslides, Risk, Remote Sensing, Science Communication. (POCs: Gina Belair and Sabrina Martinez)

14. Assist in the development of warning criteria, or “thresholds,” which identify the predisposing and triggering conditions for landslide activity in burn areas soon after, and several years following wildfire. Fieldwork opportunities may also be available for candidates who are interested. Experience with Geographic Information Systems and Python is preferred. Keywords: wildfire, landslides, warning. (POCs: Matthew Thomas, Francis Rengers, and Jason Kean)
15. Assist with the rapid assessment of large, highly mobile landslides and widespread landslide-triggering events (e.g., earthquakes, hurricanes) for situational awareness, primarily using remote sensing and seismic techniques. This project will involve working with the team to streamline our image processing pipelines, generate templates for maps and reports, and develop static explanatory content for webpages, all of which will enable us to respond more quickly and effectively to events when they occur. Candidates should have experience with GIS, geospatial analysis, and strong scientific writing & communication skills. Remote sensing experience and basic computer programming skills would be beneficial. Keywords: Landslides, Remote Sensing, Seismology, Rapid Response. (POCs: Kate Allstadt and Lauren Schaefer)
16. Assist in mapping landslides from historic remote imagery to develop a landslide inventory from past storms for the Federate States of Micronesia. The landslide inventory will then be compared to landslide hazard maps to help improve map accuracy. This work is part of a project funded by the USGS-USAID Landslide Disaster Assistance Team. Familiarity with GIS and remotely sensed data is preferred. Keywords: landslide, imagery, hazards, risk. (POC: Corina Cerovski-Darriau)

### Software Development projects

17. Work with Geographic Information System (GIS) professionals on file and data organization and quality management for geographic set sets. Create data pages for published projects using USGS tools. Background should include basic knowledge of GIS and advanced personal computer skills. Some scripting helpful. Keywords: GIS, data management, scripting. (POCs: Eric Jones and Lynda Lastowka)
18. Work with software development team on a variety of projects for the USGS Earthquake Hazards Program and/or Geologic Hazards Science Center. Work will be centered on web applications or cloud infrastructure using amazon web services. Most projects will be implementing or modifying operational production systems. Required Skills: GitHub, advanced student level knowledge of at least one programming language (Python, Angular, Javascript). Keywords: Software development, python, cloud, programming. (POC: Lynda Lastowka)
19. Work with scientists to support development of scientific software for loss modeling, earthquake hazard calculations, and data access tools. Work will be centered on back-end/desktop applications using mostly Python. Required skills: Python programming, Linux/Mac command line experience. Desired skills: Git, experience with NumPy, SciPy, Matplotlib, and pandas Python libraries. Keywords: Python, hazards, earthquake, signal processing, databases, data processing, software development. (POCs: Mike Hearne and Michelle Guy)
20. Work with Web Content Manager in support of USGS Earthquake Hazards Program, Landslide Hazards Program, and Geomagnetism websites. Potential projects include creating webpages for a few significant earthquakes highlighting the information and research, overhauling the earthquake glossary, adding GIS location metadata to webpages, and routine maintenance of the websites. The websites use a Drupal 9 content management system (CMS) platform, and you will take a short online training course to learn the admin interface. Desired skills: background in science, some knowledge of web design and CMS, well-organized, and attention to detail. Keywords: hazards, web content. (POC: Lisa Wald)
21. Work with the National Earthquake Information Center (NEIC) and software development teams for maintaining and updating the USGS Slab2 code and models. Slab2 provides three-dimensional models of subducting plate geometries for global subduction zones. The models are commonly used in seismic, geodynamic, and tsunami modeling as well in several USGS hazard products. The primary task is to update the Slab2 web service and back-end cloud infrastructure to allow users to contribute new seismic data for creating new models. Some experience in coding with Python, Javascript, and/or TypeScript, as well as basic geophysical knowledge would be helpful. Keywords: Slab2, geophysics, software development. (POCs: Kirstie Haynie and Lynda Lastowka)