

USGS 2024 STUDENT INTERNSHIP OPPORTUNITIES

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

Applications will be accepted from **January 29, 2024, to February 12, 2024**.

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-24-12259204-TI-DH** Physical Science Student Trainee GS-03/04
(for students seeking an undergraduate degree)
- **USGS-PATH-24-12259205-TI-DH** 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 either Golden, Colorado, or Albuquerque, New Mexico, starting on either May 20 or June 17, 2024, 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 2024 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_2024.pdf

Earthquake Monitoring & Data Analysis projects

1. Advance global earthquake monitoring using satellite observations. This work will include refactoring and optimizing existing code from MATLAB to Python and requires experience with those programming languages. Experience in seismology, geophysics, or remote sensing is a plus. Keywords: Python, MATLAB, earthquakes (POCs: Bill Barnhart, Will Yeck, Dara Goldberg, Kirstie Haynie)
2. Production of post-earthquake and informational videos. This position will focus on making educational earthquake videos using the USGS-NEIC's new recording studio. Applicants with science education, video editing, filming, and graphics production experience are preferred. (POCs: Paul Earle, Paul Caruso, Steven Sobiesczyk)
3. Assist in the data analysis and validation of large, aggregated 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)

4. 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 primary task is to gather new seismic data for updating the models and making improvements to the code and model output. Some experience in coding with Python, Git, as well as basic geophysical knowledge would be helpful. Keywords: Slab2, geophysics, software development. (POCs: Kirstie Haynie and Lynda Lastowka)

Seismic Source & Ground Motion Characterization projects

5. Assist in aggregating earthquake information 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, machine learning, programming. (POC: Kyle Withers)
6. Work with scientists to explore earthquake and ground-motion characterization through use of novel earthquake magnitude analyses. Student will develop familiarity with earthquake ground motion processing and earthquake magnitude calculations to explore new approaches to characterizing earthquakes and their ground motions. Experience with geophysics and basic programming skills are required. Keywords: earthquakes, ground-motion, magnitude, earthquake monitoring, ground-motion prediction. (POCs: Morgan Moschetti, Dave Shelly, Eric Thompson)
7. Use horizontal-to-vertical spectral ratio (HVSr) data to support site characterization and seismic hazard analyses. Student will use existing HVSr-derived parameters (e.g., fundamental frequency and amplitude) obtained in Puerto Rico and the U.S. Virgin Islands to develop site response models or determine shallow subsurface structure. Programming experience and knowledge of related geophysical methods are desired. Keywords: seismology, earthquakes, seismic hazard, site effects. (POCs: Haiyang Kehoe, Morgan Moschetti, Brad Aagaard)
8. Assess ground-motion variability arising from earthquake source processes (e.g., rupture speed and direction). Student will gain experience processing ground-motion records and investigating their relationship with existing earthquake source models. Programming experience and knowledge of related geophysical methods are desired. Keywords: seismology, earthquakes, seismic hazard, source effects. (POCs: Haiyang Kehoe, Morgan Moschetti, Kyle Withers)
9. Develop spatially varying ground-motion models that account for spatial correlations in site, source, and path effects. Programming experience and familiarity with spatial statistics are desired. Keywords: ground motion, spatial statistics, statistical regressions (POC: Morgan Moschetti)

Seismic Hazard, Engineering, & Risk projects

10. Contribute to the USGS National Seismic Hazard Model (NSHM), which forecasts the chances of ground shaking throughout the United States and its territories, for earthquake safety applications. NSHM research, development, and delivery involves multiple disciplines; the points of contact for this internship have degrees in geology, geophysics, statistics, computer science, and civil engineering. (POCs: Nicolas Luco and Peter Powers)
11. 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. (POC: Sanaz Rezaeian)
12. Collaborate with civil engineering researchers and computer scientists to develop and implement computational resources for forecasting earthquake-induced ground failure (e.g., liquefaction, co-seismic landsliding, and surface fault rupture) and other engineering infrastructure impacts. Programming skills (Python) are preferred. Keywords: ground failure, geotechnical earthquake engineering, computer programming, risk assessment. (POCs: Andrew Makdisi and Ben Mason)

Seismic Instrumentation Projects (in Albuquerque, NM)

13. Work with scientists at the Albuquerque Seismological Laboratory to understand differences in shallow velocity structure around the station ANMO (Albuquerque, New Mexico). This work will require both computer skills such as Python, Git, and Linux, as well as fieldwork and an understanding of basic physics and math. Keywords: seismology, programming, seismic instrumentation, fieldwork. (POC: Adam Ringler)

14. Assist with fieldwork to install new satellite communication systems at seismic monitoring stations across the US, based from the Albuquerque Seismological Laboratory. You will gain experience operating the seismic instrumentation, communications systems, and power systems that are used for earthquake monitoring in the US and around the world. Requirements: driver's license, ability to work in remote environments, and enthusiasm for learning new skills. Keywords: seismic monitoring, electronics, seismic instrumentation, fieldwork. (POC: Mairi Litherland)
15. Work with scientists at the Albuquerque Seismological Laboratory and Caltech to understand spatial and temporal variations in noise across the Community Seismic Network (CSN) of accelerometers located around Los Angeles, CA. This work will include looking at instrument noise levels of CSN Sensors, as well as the seismic signals generated by cultural sources such as traffic and concerts. This work will require computer skills such as Python, Git, and Linux as well as lab work installing sensors and characterizing their response on shake tables and other tests. Keywords: seismology, signal analysis, seismic instrumentation, fieldwork. (POC: Rob Anthony)

Landslide Hazards projects

16. Work with scientists to develop scientific software used to setup and analyze simulations of landslide runoff. Required skills: Python, Git, Linux/Mac/Windows command line. Desired skills: Python, Numpy, Scipy, Matplotlib. Keywords: landslides, programming, software development. (POC: Katy Barnhart)
17. Work with scientists to create and refine historical rock avalanche inventories in Alaska using remote sensing datasets. This project will involve mapping landslides from Landsat imagery and other remote sensing platforms, refining detection methods, and identifying landslide timing to help answer questions about seasonal patterns of slope failure in Alaska. Candidates should have experience with GIS and geospatial analysis. Experience with remote sensing and basic computer programming skills would be beneficial. Keywords: landslides, rock avalanches, remote sensing, GIS. (POCs: Lauren Schaefer, Erin Jensen, Jeff Coe)
18. Rainfall intensification and increased wildfire activity will amplify the exposure of Americans to postfire debris flows. However, long-term hazard planning requires a baseline understanding of the damages that debris flows have already caused. We seek a motivated individual to develop a comprehensive register of the economic and human losses stemming from historical postfire debris-flow activity in the United States, including those in underserved communities. Familiarity with GIS is a plus. Keywords: landslides, debris flows, wildfire, GIS. (POC: Matthew A. Thomas)
19. Assist in the flood and debris flow research after wildfire. The primary activity will be processing time series data from instruments such as geophones and rain gages. Fieldwork opportunities may also be available for candidates who are interested. Experience with Python is preferred. Keywords: wildfire, flood, debris flow, fieldwork, data processing. (POCs: Francis Rengers, Jason Kean, Matthew Thomas, Katherine Barnhart)
20. Work with scientists to conduct consistent and objective topographic analysis of high-resolution digital elevation data for landslide hazard assessments across the nation. Keywords: digital elevation data, geographic information systems, high performance computing, programming, landslides. (POCs: Ben Mirus, Jacob Woodard, Gina Belair)
21. Assist in developing a user needs assessment (such as surveys or focus groups) to determine what landslide hazard information, approaches, products and delivery mechanisms are most useful and easily integrated into users' systems. Experience with qualitative research methods preferred. Keywords: landslides, user needs, stakeholder engagement, qualitative research, social science. (POCs: Marisa Macias and Lauren Schaefer)
22. Work with the Landslides Hazards Program outreach team on various communication products. Projects may include updating educational web pages, developing social media content, creating materials for and organizing K-12 outreach events, contributing to new landslide fact sheets, and more. Skills: science communication, experience with graphic design a plus. Key words: social media, outreach, web design, graphic design, geologic hazards, science communication. (POCs: Jaime Kostelnik, Marisa Macias)

Geomagnetism Hazards projects

23. Assist the USGS Geomagnetism Group with vector and scalar magnetometer development and testing. This research mainly focuses on experimenting with magnetometer spatial geometry for noise reduction and signal enhancement for static and dynamic gradient and tensor fields. The preferred skills include MATLAB, vector/scalar magnetometer knowledge, and single-board computer development. Keywords: geomagnetism, instrumentation, signal analysis, programming, mathematics. (POCs: John Spritzer and Krissy Lewis)

Software Development projects

24. Work with the hazards development team (HazDev) on systems that support the dissemination of important scientific software and earthquake information. This work will require software development skills including version control (Git), Python, and TypeScript. In this position you will have the opportunity to build skills in cloud development including but not limited to: Amazon Web Services (AWS), infrastructure as code (IaC), and cloud development kit (CDK). Keywords: programming, software development, cloud computing. (POC: Heather Hunsinger and Lynda Lastowka)
25. 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)
26. We are looking for 1-2 interns to help build a web database of Fiber Optic Seismology experiments related to earthquake science. This is part of a USGS Powell Center project and will involve interacting with a number of scientists within and outside USGS. It is a great opportunity to learn about a new and rapidly evolving branch of seismology that has applications in both basic science and industry. The database is intended to facilitate discovery of linkages between specific experiments and the USGS earthquake, geological, and fault catalogs. Familiarity with python, GIS, and/or JSON a plus (POCs: Adam Ringler, Jeff McGuire, Clara Yoon, Andrew Barbour).