

**IRIS Education and Public Outreach Program
Seismology Skill Building Workshop - Summer 2020**

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Please Note: *Slack* is the preferred method of contact for this workshop as the scale of enrollment will prevent us from returning emails or phone calls in a timely manner. You will receive an email from *Slack*.

Workshop Description:

While the Coronavirus (COVID-19) pandemic has led to the suspension of the [2020 Undergraduate Internship Program](#), IRIS remains committed to the developing Next Generation of Seismologists. To this end, the IRIS Education and Outreach program is offering a FREE seismology skill building workshop for any undergraduate (e.g., computer Science, geophysics, geology, math, physics) student seeking to build skills in working with seismic data and scientific computing. The workshop will run every other week from June 1, 2020 through August 28, 2020. The goals of this workshop are to increase students'...

- interest in taking additional course work in seismology and scientific computing,
- self-efficacy in using seismic data, and
- competitiveness in the graduate school or summer REU application process.

This workshop will be offered as **fully online only**. Each module has been designed to develop a particular set of skills relevant for seismological research. New modules will be assigned every other week throughout the summer and we anticipate that students will spend roughly 5 to 6 hours per week. All of the learning activities are available 24 hours a day, seven days a week. However, each set of activities has an expected time frame which is listed in the workshop, so students will need to stay on schedule. **Modules will be introduced on Mondays via a webinar held at 3pm Eastern.** Participants will then work through each module at their own pace during

the remainder on the week. Students will be able to ask questions, provide feedback, and share their successes and challenges with other participants through the *Slack* discussion forum. Supplemental materials such as relevant papers, videos, and other resources will be made available for those who wish to extend their learning. **A follow-up webinar will be held on Fridays of the same week at 3pm to facilitate progress and support learning.** All webinars will be recorded to allow participants from across a variety of time zones to participate.

Workshop Requirements

- To participate, students will need to have access to a PC/Mac where they can install a virtual disk that will be provided, and *Slack* for communication. Chromebooks or tablets are unlikely to be sufficient.
- Since the workshop is online and will require downloading of data, reasonable internet access (e.g. DSL, LAN, or cable connection desirable) is expected.

Online Access & Technical Assistance

Workshop assignments: Each of you has been provided with an account on the workshop Moodle learning management system website: <https://bit.ly/SeismoSkills2020>. Use the login information you receive by email to login and follow the instructions to begin. The assignments were created to follow an interactive tutorial style. This means that they will be comprised of questions that typically have some instructions for completing a computing task or learning about a concept, followed by a multiple-choice question regarding the skill. Upon submitting an answer to the question, participants will receive feedback about whether the answer was correct or incorrect with some information about why. If the answer was incorrect, they will be able to answer again for partial credit. This cycle can be repeated several times for each question, designed to give students immediate feedback on their understanding, and revise it based on new information. Moodle saves your progress with each answer submission, so students can pick up where they left off if they need to logout. If students struggle with an assignment, they can complete the entire assignment a second time after a brief waiting period.

Workshop computing: Since the assignments in this workshop will require participants to utilize a variety of scientific computing software, each student will be given access to a “virtual machine” they can download and run from their computer. Virtual machines allow participants to run another operating system inside their existing operating system. If you have a PC, then you likely run a version of the Windows operating system, and if you have an Apple computer, then you likely run a version of the Mac OS. Participants will be asked to download the free VirtualBox software and install it so that you can run an additional operating system without having to give up your regular operating system. One of the real advantages of using virtual machines is that they can be personalized. We have prepared a virtual machine that runs the Linux operating system and has some key seismological software pre-installed on it. Some of this software requires an end-user agreement, so once you complete that at the beginning of the workshop, you will receive a link to download the Linux virtual machine.

Workshop discussions: While it would be great to get to meet everyone in person, the current pandemic requires that this workshop takes place remotely. This means an important component of our summer will be using a communication tool to staying connected. *Slack* will be the primary tool we use for this purpose. It provides a single space for asking questions about the workshop and its administration #syllabus, monitoring the modules assigned every other week, e.g. #module1, #module 2, etc. There will also be space for seeking help with coding, data wrangling, mapping, etc. #support. . Each of you will be provided with an invitation, via email, to join a *Slack* workspace for 2020 Seismology Skill Building Workshop. All participants are expected to accept this invitation and join us! *Slack* has both a desktop and mobile apps which are much easier to use than the web browser version. Thus, we suggest you consider downloading these so you can keep connected and be responsive to each other in a timely fashion.

Assistance: If you find that you have any trouble with assignments or other aspects of the workshop, your first action should be to post questions in the appropriate *Slack* channel. Remember, there are no dumb questions, and if you are having an issue, it is quite likely that others are as well. Each of you have valuable expertise and experiences that can benefit others. Thus, we expect participants to participate in exploring questions and challenges raised by their peers, especially if students have prior experience with some of the tools we are using. Of course, instructors will also be monitoring *Slack* channels and will participate in discussions as needed.

Workshop Participation

Students are expected to participate in the pair of webinars for each module, either live or by watching the webinar recordings, and to complete the interactive assignments. As the workshop progresses, participants are encouraged to build rapport with the workshop instructors and other participants through respectful communications on *Slack*. Specifically, we expect participants to support each other with challenges and questions that may arise as everyone works through the weekly assignments. As you will find, building rapport and effective relationships are key to becoming an effective professional.

Topic Outline/Schedule (Subject to revision):

June 1 - Module 1: Introduction to scientific computing and coding strategies. Applications will include Linux command line, shell scripting, and basic plot generation with Generic Mapping Tools (GMT), and discussion of general patterns of earthquakes in space, time, and magnitude.

June 15 - Module 2: Seismic recording and seismograms. Applications will include time series analysis, digitization, filtering, and Seismic Analysis Code (SAC).

June 29 - Module 3: Data access and IRIS Data Request Tools. Applications will include web services, data availability tools, Wilber, and Fetch scripts.

July 13 - Module 4: Event and waveform databases. Applications will include an introduction to strategies for organizing data, available catalogs, principles of earthquake location, and hypocentral location software.

July 27 - Module 5: Introduction into Python, how it works (calculating via a loop), and basic uses. Applications for seismology in ObsPy including data structures, retrieving data via the internet, seismogram plotting, and correlation detection.

August 10 - Module 6: Jupyter notebooks. Applications will include an introduction to notebooks and then some useful examples such as those demonstrating spectrograms and calculating background seismic noise reductions due to COVID19.

August 24 - Module 7: Wrap-up, review, and next steps for pursuing seismology.

Special sessions to be interspersed throughout the summer

- Networking
- The graduate school process
- Careers and career paths

Student Code of Conduct

Although our classroom environment is virtual (online), the standards of behavior are as important as they are in brick and mortar schools. In other words, our virtual classrooms are real classrooms with real teachers and real students; therefore, appropriate behavior is expected. To ensure that all participants understand how to behave in an online environment, we have developed the following code of conduct that all participants are required to follow. This code of conduct addresses student interaction with instructors and participants, as well as students' individual actions.

Interactions with instructors

1. Students should phrase communications with instructors in a polite and respectful manner appropriate for a classroom.
2. Since our online environment is a learning environment, students should not use excessive "slang" or language that they might use in other environments. Students are not to use obscene, profane, threatening, or disrespectful language or images in any workshop communications.
3. Students must use a screen name, email address, and Moodle profile picture that is appropriate for an educational environment. Email addresses that use profanity or may otherwise be construed as offensive, shall not be permitted. Moodle profile pictures should be a head-shot of the participant only and may not be offensive or inappropriate

in any manner. Workshop instructors reserves the right to determine if a student screen name, email address, and/or Moodle profile picture is inappropriate. Students using an inappropriate screen name, email address and/or Moodle profile picture will be required to update their user profiles in order to participate in the workshop.

Interactions with participants

1. All communications with other students must be of a workshop-related nature. Any sending of unsolicited email to other participants is prohibited.
2. All communications with other students in any forum, workshop-related email, discussion post, etc., must be polite, courteous and respectful. Students are not to use obscene, profane, threatening, or disrespectful language or images in any workshop communications.

Disciplinary Action

Violations to this Code of Conduct will initiate the following procedure. Upon receiving a report of a violation, workshop instructors will investigate the report and determine what, if any, disciplinary action must be taken. A violation of the Code of Conduct will result in a disciplinary action and may result in the expulsion of the student from the workshop.