# Software Carpentry – Summer 2020

## Introduction

Software Carpentry is a volunteer project dedicated to teaching basic computing skills to researchers. This document will walk you through some of the logistics of participating in DEVELOP's virtual carpentries.

You can find DEVELOP's Summer 2020 **Software Carpentry Website**, including all pertinent information pertaining to each lesson, at the following website:

https://kdottiemo.github.io/2020-06-04-DEVELOP/

This site includes an overview of the curriculum, agenda, and links to the required downloads for each lesson. Feel free to explore this site prior to the carpentries. We recommend keeping this website open throughout the lessons so you can follow along.

Your instructors will a lot time at the beginning and end of the workshop to fill out the Pre- and Post-**Workshop Surveys**. Please be sure to complete these- your feedback will have an impact on how we conduct future workshops!

# Rosters and Agenda

Look for your name in the rosters below to see which lessons you are signed up for, the times of these sessions, and the link to join each session. If you have any questions or concerns about the lessons you are currently enrolled in, please reach out to your Fellow.

| The Unix Shell (East Coast Session)<br>Thursday, 6/4/2020 \| 8 am - 12 pm ET<br>Instructors: Sean McCartney and Kenton Ross<br>Facilitator: Sydney Neugebauer<br>meet.google.com/jrk-vqhe-wso | | |
|---|---|---|
| **Node** | **Project** | **Participant Name** |
| NC | Cherokee Water Resources | Wilson Goode |
| NC | Cherokee Water Resources | Travis Newton |
| NC | Cherokee Water Resources | Richard Murray |
| NC | Cherokee Water Resources | Chloe Schneider |
| MA | Cambridge Urban Development | Nicole Ramberg-Pihl |
| MA | Cambridge Urban Development | Sophie Barrowman |
| MA | Cambridge Urban Development | Liam Bhajan |
| MA | Cambridge Urban Development | Olivia Cronin-Golomb |
| LaRC | South Carolina Water Resources | Jake Stid |
| LaRC | South Carolina Water Resources | Elspeth Gates |
| LaRC | Riley County Water Resources | Elizabeth Nguyen |
| LaRC | Riley County Water Resources | Trista Brophy |
| LaRC | Riley County Water Resources | Adelaide Schmidt |
| ID | Mark Twain Eco Forecasting | Madison Bradley |
| JPL | Alaska Transportation & Infrastructure | Joshua Green |
| JPL | Alaska Transportation & Infrastructure | Marissa Dudek |
| GA | Georgia Energy III | Samantha Trust |
| GA | Georgia Energy III | Alex Burke |
| JPL | Alaska Transportation & Infrastructure | Patrick Saylor |
| GSFC | Ellicott City Disasters | Erika Munshi |

| The Unix Shell (West Coast Session)<br>Thursday, 6/4/2020 \| 1 pm - 5 pm ET<br>Instructors: Brendan McAndrew and Callum Wayman<br>Facilitator: Zachary Bengtsson<br>meet.google.com/xzo-xwsr-uue | | |
|---|---|---|
| **Node** | **Project** | **Participant Name** |
| LaRC | South Carolina Water Resources | Derek Nguyen |
| LaRC | Riley County Water Resources | Ella Griffith |
| ARC | Pacific Northwest Health & Air Quality | Taylor Orcutt |
| ARC | Pacific Northwest Health & Air Quality | Ani Matevosian |
| ARC | Pacific Northwest Health & Air Quality | Liana Solis |
| ARC | Pacific Northwest Health & Air Quality | Dani Ruffe |
| ID | Mark Twain Eco Forecasting | Grant Verhulst |
| AZ | Satellite Beach Energy | Spencer Nelson |
| AZ | Satellite Beach Energy | Jake Dialesandro |
| AZ | Satellite Beach Energy | Julia Marturano |
| GA | Georgia Energy III | Jannatul Ferdush |

| | | |
|---|---|---|
| JPL | Alaska Transportation & Infrastructure | Katie Lange |
| MSFC | Huntsville Urban Development | Amanda Tomlinson |
| MSFC | Huntsville Urban Development | Thomas Quintero |
| MSFC | Huntsville Urban Development | Greta Paris |
| MSFC | Huntsville Urban Development | Sabine Nix |
| MSFC | Bhutan Water Resources | Kinley Dorji |
| MSFC | Bhutan Water Resources | Tashi Kaneko |
| MSFC | Bhutan Water Resources | Tenzin Wangmo |
| GSFC | Southern Bhutan Eco Forecasting | Palchen Wangchuck |
| GSFC | Southern Bhutan Eco Forecasting | Tashi Choden |
| GSFC | Southern Bhutan Eco Forecasting | Kuenley Dem |

| Version Control with Git (East Coast Session) | | |
|---|---|---|
| Monday, 6/8/2020 \| 8 am - 12 pm ET | | |
| Instructors: Sean McCartney and Brendan McAndrew | | |
| Facilitator: Sydney Neugebauer | | |
| meet.google.com/jrk-vqhe-wso | | |
| **Node** | **Project** | **Participant Name** |
| NC | Cherokee Water Resources | Wilson Goode |
| NC | Cherokee Water Resources | Travis Newton |
| NC | Cherokee Water Resources | Richard Murray |
| NC | Cherokee Water Resources | Chloe Schneider |
| MA | Cambridge Urban Development | Nicole Ramberg-Pihl |
| MA | Cambridge Urban Development | Sophie Barrowman |
| MA | Cambridge Urban Development | Liam Bhajan |
| MA | Cambridge Urban Development | Olivia Cronin-Golomb |
| LaRC | South Carolina Water Resources | Jake Stid |
| LaRC | South Carolina Water Resources | Elspeth Gates |
| LaRC | Riley County Water Resources | Elizabeth Nguyen |
| LaRC | Riley County Water Resources | Trista Brophy |
| LaRC | Riley County Water Resources | Adelaide Schmidt |
| ID | Mark Twain Eco Forecasting | Madison Bradley |
| JPL | Alaska Transportation & Infrastructure | Joshua Green |
| JPL | Alaska Transportation & Infrastructure | Marissa Dudek |
| GA | Georgia Energy III | Samantha Trust |
| JPL | Alaska Transportation & Infrastructure | Patrick Saylor |
| GSFC | Ellicott City Disasters III | Erika Munshi |

| Version Control with Git (West Coast Session) | | |
|---|---|---|
| Monday, 6/8/2020 \| 1 pm - 5 pm ET | | |
| Instructor: Katie Dejwakh | | |
| Facilitator: Zachary Bengtsson | | |
| meet.google.com/xzo-xwsr-uue | | |
| **Node** | **Project** | **Participant Name** |
| ARC | Pacific Northwest Health & Air Quality | Taylor Orcutt |
| ARC | Pacific Northwest Health & Air Quality | Ani Matevosian |
| ARC | Pacific Northwest Health & Air Quality | Liana Solis |
| ARC | Pacific Northwest Health & Air Quality | Dani Ruffe |
| LaRC | South Carolina Water Resources | Derek Nguyen |

| LaRC | Riley County Water Resources | Ella Griffith |
|------|------------------------------|---------------|
| ID | Mark Twain Eco Forecasting | Grant Verhulst |
| AZ | Satellite Beach Energy | Spencer Nelson |
| AZ | Satellite Beach Energy | Jake Dialesandro |
| AZ | Satellite Beach Energy | Julia Marturano |
| GA | Georgia Energy III | Jannatul Ferdush |
| JPL | Alaska Transportation and Infrastructure | Katie Lange |
| GSFC | Ellicott City Disasters III | Eli Orland |
| MSFC | Huntsville Urban Development | Amanda Tomlinson |
| MSFC | Huntsville Urban Development | Thomas Quintero |
| MSFC | Huntsville Urban Development | Greta Paris |
| MSFC | Huntsville Urban Development | Sabine Nix |
| MSFC | Bhutan Water Resources | Kinley Dorji |
| MSFC | Bhutan Water Resources | Tashi Kaneko |
| MSFC | Bhutan Water Resources | Tenzin Wangmo |
| GSFC | Southern Bhutan Eco Forecasting | Palchen Wangchuck |
| GSFC | Southern Bhutan Eco Forecasting | Tashi Choden |
| GSFC | Southern Bhutan Eco Forecasting | Kuenley Dem |
| GA | Georgia Energy III | Alex Burke |

| **Programming with Python I**<br>**Tuesday, 6/9/2020 \| 1 pm - 5 pm ET**<br>Instructors: John Dilger and Kenton Ross<br>Facilitator: Sydney Neugebauer<br>meet.google.com/jrk-vqhe-wso | | |
|------|---------|------------------|
| **Node** | **Project** | **Participant Name** |
| MA | Cambridge Urban Development | Nicole Ramberg-Pihl |
| MA | Cambridge Urban Development | Sophie Barrowman |
| MA | Cambridge Urban Development | Liam Bhajan |
| MA | Cambridge Urban Development | Olivia Cronin-Golomb |
| ID | Mark Twain Eco Forecasting | Madison Bradley |
| ID | Mark Twain Eco Forecasting | Kaitlyn Bretz |
| ID | Mark Twain Eco Forecasting | Grant Verhulst |
| LaRC | Riley County Water Resources | Trista Brophy |
| LaRC | Riley County Water Resources | Addy Schmidt |
| LaRC | South Carolina Water Resources | Jake Stid |
| LaRC | Riley County Water Resources | Ella Griffith |
| LaRC | South Carolina Water Resources | Elspeth Gates |
| LaRC | Riley County Water Resources | Elizabeth Nguyen |
| LaRC | South Carolina Water Resources | Derek Nguyen |
| GA | Georgia Energy III | Jannatul Ferdush |
| AZ | Satellite Beach Energy | Spencer Nelson |
| AZ | Satellite Beach Energy | Jake Dialesandro |
| AZ | Satellite Beach Energy | Julia Martuano |
| JPL | Alaska Transportation and Infrastructure | Katie Lange |
| JPL | Alaska Transportation and Infrastructure | Joshua Green |
| JPL | Alaska Transportation and Infrastructure | Marissa Dudek |
| GA | Georgia Energy III | Samantha Trust |
| GA | Georgia Energy III | Alex Burke |

| JPL | Alaska Transportation and Infrastructure | Patrick Saylor |
|------|------|------|
| GSFC | Ellicott City Disasters III | Ryan Hammock |
| GSFC | Ellicott City Disasters III | Erika Munshi |
| GSFC | Southern Bhutan Eco Forecasting | Palchen Wangchuck |
| GSFC | Southern Bhutan Eco Forecasting | Tashi Choden |
| CO | Fisher's Peak Eco Forecasting | Lauren Lad |
| CO | Rocky Mountain Disasters | Zackary Werner |

## Programming with R I
### Wednesday, 6/10/2020 | 1 pm - 5 pm ET
Instructors: Amber McCullum and Dan Carver
Facilitator: Zachary Bengtsson
meet.google.com/xzo-xwsr-uue

| Node | Project | Participant Name |
|------|---------|------------------|
| ARC | Pacific Northwest Health & Air Quality | Ani Matevosian |
| ARC | Pacific Northwest Health & Air Quality | Taylor Orcutt |
| ARC | Pacific Northwest Health & Air Quality | Liana Solis |
| ARC | Pacific Northwest Health & Air Quality | Dani Ruffe |
| NC | Cherokee Water Resources | Wilson Goode |
| NC | Cherokee Water Resources | Travis Newton |
| NC | Cherokee Water Resources | Richard Murray |
| NC | Cherokee Water Resources | Chloe Schneider |
| ID | Mark Twain Eco Forecasting | Sarah Hafer |
| GA | Georgia Energy III | Samantha Trust |
| JPL | Alaska Transportation and Infrastructure | Patrick Saylor |
| CO | Fisher's Peak Eco Forecasting | Lauren Lad |
| MSFC | Huntsville Urban Development | Amanda Tomlinson |
| MSFC | Huntsville Urban Development | Thomas Quintero |
| MSFC | Huntsville Urban Development | Sabine Nix |
| MSFC | Huntsville Urban Development | Greta Paris |

## Programming with Python II
### Monday, 6/15/2020 | 1 pm - 5 pm ET
Instructors: Callum Wayman and Brendan McAndrew
Facilitator: Sydney Neugebauer
meet.google.com/jrk-vqhe-wso

| Node | Project | Participant Name |
|------|---------|------------------|
| MA | Cambridge Urban Development | Nicole Ramberg-Pihl |
| MA | Cambridge Urban Development | Sophie Barrowman |
| MA | Cambridge Urban Development | Liam Bhajan |
| MA | Cambridge Urban Development | Olivia Cronin-Golomb |
| ID | Mark Twain Eco Forecasting | Madison Bradley |
| ID | Mark Twain Eco Forecasting | Kaitlyn Bretz |
| ID | Mark Twain Eco Forecasting | Grant Verhulst |
| GSFC | Ellicott City Disasters III | Alina Schulz |
| LaRC | Riley County Water Resources | Trista Brophy |
| LaRC | Riley County Water Resources | Addy Schmidt |
| LaRC | Riley County Water Resources | Ella Griffith |
| LaRC | South Carolina Water Resources | Elspeth Gates |

| LaRC | South Carolina Water Resources | Jake Stid |
|---|---|---|
| LaRC | Riley County Water Resources | Elizabeth Nguyen |
| LaRC | South Carolina Water Resources | Derek Nguyen |
| GA | Georgia Energy III | Jannatul Ferdush |
| GA | Georgia Energy III | Alex Burke |
| AZ | Satellite Beach Energy | Spencer Nelson |
| AZ | Satellite Beach Energy | Jake Dialesandro |
| AZ | Satellite Beach Energy | Julia Martuano |
| JPL | Alaska Transportation and Infrastructure | Katie Lange |
| JPL | Alaska Transportation and Infrastructure | Joshua Green |
| JPL | Alaska Transportation and Infrastructure | Marissa Dudek |
| GA | Georgia Energy III | Samantha Trust |
| GSFC | Ellicott City Disasters III | Ryan Hammock |
| GSFC | Ellicott City Disasters III | Erika Munshi |
| GSFC | Southern Bhutan Eco Forecasting | Palchen Wangchuck |
| GSFC | Southern Bhutan Eco Forecasting | Tashi Choden |
| CO | Rocky Mountain Disasters | Zackary Werner |
| CO | Fisher's Peak Eco Forecasting | Lauren Lad |

| Programming with R II |||
|---|---|---|
| Tuesday, 6/16/2020 \| 1 pm - 5 pm ET |||
| Instructors: Amber McCullum and Dan Carver |||
| Facilitator: Zachary Bengtsson |||
| meet.google.com/xzo-xwsr-uue |||
| **Node** | **Project** | **Participant Name** |
| NC | Cherokee Water Resources | Wilson Goode |
| NC | Cherokee Water Resources | Travis Newton |
| NC | Cherokee Water Resources | Richard Murray |
| NC | Cherokee Water Resources | Chloe Schneider |
| ARC | Pacific Northwest Health & Air Quality | Ani Matevosian |
| ARC | Pacific Northwest Health & Air Quality | Taylor Orcutt |
| ARC | Pacific Northwest Health & Air Quality | Liana Solis |
| ARC | Pacific Northwest Health & Air Quality | Dani Ruffe |
| ID | Mark Twain Eco Forecasting | Sarah Hafer |
| GA | Georgia Energy III | Samantha Trust |
| CO | Fisher's Peak Eco Forecasting | Lauren Lad |
| MSFC | Huntsville Urban Development | Thomas Quintero |
| MSFC | Huntsville Urban Development | Greta Paris |
| MSFC | Huntsville Urban Development | Amanda Tomlinson |
| MSFC | Huntsville Urban Development | Sabine Nix |

# Getting Started

1. **Accessing the Virtual Machine**

   This summer you will have access to a **virtual machine** that has all the software you may need for software carpentry and your projects. For software carpentry, you can either use your personal computer or sign into the virtual machine. If you have one screen, you may prefer using your personal computer so you have less windows to juggle. If your computer is older or not very powerful, you may prefer using the virtual machine. There will be office hours on June 1st at 3 pm ET for software carpentry installs for those using their personal computers. You will receive a "Getting Started with your Virtual Machine" document that will guide you step-by-step on logging into your virtual machine. This document will also show you how to connect to a shared drive to store your documents. During the Intro to Geoinformatics Webinar on June 2 at 12:30 pm ET, you will be able to ask any questions you have about the virtual machines.

2. **Accessing Teams**

   You will have access to SSAI's **Microsoft Teams** on the first day of the term, and the Project Coordination team will do an introduction to Teams on Tuesday, June 2 at 12 pm ET. Based on the rosters above, you will be added to a unique Team created for each carpentry lesson. In the General channel, feel free to ask questions and post helpful tips. Complicated or individualized questions will be moved to a Breakout Room channel by a facilitator to connect you with Helpers who can chat with you in more detail about your question. The General channel will also have a tab for the course document, where you can contribute to notes about what you learn.

3. **Log in to Google Meet**

   **Google Meet** is the platform instructors will use to share their screen with participants. You can join the Google Meet for each respective session and a facilitator will let you in.

   You can join the Google Meet audio from your computer or you can dial in from your phone. We recommend you dial in to this audio so that if you need to join a Breakout Room in Teams for individual assistance, you don't have to leave the Google Meet. You can either dial in with the number provided in the Meet, or you can have Meet call you (*recommended*) by clicking the vertical "…" more options button on the lower right of the meeting screen and choosing 'Use a phone for audio.' Then click 'Call me' and enter your phone number. *Note: this only works for phone numbers in the US and Canada. Remember to *mute your microphone* unless you have something to say!

   Your instructor will be sharing their screen through Meet. To make sure you are able to see their screen clearly, you may need to hide other participant videos and zoom in on the instructor's screen within Meet. For full screen, you can either hover over the shared screen and select the "Pin to Screen" button that appears, or you can click the more options button in the lower right, click change layout, and choose the spotlight option. To zoom in on the instructor's screen, simply hover your mouse over the screen and use the pinch motion on your trackpad to zoom in and out. You can also scroll around the screen using the trackpad.

4. **Configuring your screen**

We understand that real estate on the screen is valuable during Software Carpentry, and there is a lot to keep track of, including Teams, Google Meet, the course website, and the windows to interact with your code. Since the Virtual Machine does not have access to a microphone or camera, we recommend joining Teams and Google Meet in your regular desktop browser, and accessing your scripting interfaces and code through the VM. You should be able to toggle back and forth between the VM and your own desktop as needed, or even relegate your VM to share the screen with your own desktop using the 'Restore Down' button at the top right of the VM. We recommend keeping Teams and the course website open in the background in case you need help or get lost, and reserving your dominant screen space for the Google Meet instructor screenshare and your VM or coding windows.

5. **Tips and Tricks**
   - It will be helpful to use a second monitor if you have one available. Alternatively, if you have a tablet or smartphone, it could be helpful to pull up the course website or other resources on that screen to conserve screen space on your computer.
   - We will take breaks throughout, including a 10-minute "screen break" every hour when you should step away from your screen and stretch your legs!

# Basic Troubleshooting

### Installs

If you run into any trouble installing the VM or the software necessary for Software Carpentry, instructors Sean McCartney and Katie Dejwakh will be holding **Installation Office Hours** on **Monday, June 1** from 3-5 pm ET at this link: [Join Teams meeting](#)

Don't hesitate to join these office hours with any questions you may have about requirements, set up, or installation!

### Bandwidth Limitations

If you run into poor connection speeds or other limitations that inhibit your ability to participate in the carpentry effectively, try these tricks to help conserve precious bandwidth:

- Turn off your video and dial in using your phone
- Try opening Teams or the course website in the VM rather than your own desktop, and use the instant messaging function in Teams rather than the video call features if you need assistance
- Open your computer's task manager and close out of any extraneous applications or background tasks
- Download all the data you will need before the carpentry begins

### Troubleshooting Code During the Workshop

If you need help during a workshop or session, your Facilitators and Helpers are on deck to offer individualized support!

- If you have a question that may apply to everyone, post in the Teams General channel and a Helper or Instructor will respond directly.
- If you run into a problem with your code, post your question and a snippet of code or a screenshot in the Teams channel for assistance. A Facilitator will direct you to a Breakout Room channel if the question requires discussion or additional help.
- You can also feel free to message your Facilitator (Zach or Sydney) and they will place you in a Breakout Room for individualized attention from our awesome team of Helpers!

Don't be shy about asking questions or seeking additional support in a Breakout Room – the Helpers and Instructors are eager to answer your questions!