ENVIRONMENTAL DATA ANALYTICS

ENV 872L

Spring 2020

WELCOME TO ENVIRONMENTAL DATA ANALYTICS

Kateri Salk, PhD

Visiting Assistant Professor of Water Resources

kateri.salk@duke.edu

Grainger Hall 3115

Office hours: Thursdays 3:00-4:00, Fridays 10:30-11:30

WELCOME TO ENVIRONMENTAL DATA ANALYTICS

Teaching Assistant: Njeri Kara

2nd year MEM, Energy & Environment

ruth.kara@duke.edu

Office hours: TBD

WELCOME TO ENVIRONMENTAL DATA ANALYTICS

29 students

- 7 – Water Resources Management
- 6 – Coastal Environmental Management
- 6 – Environmental Science & Conservation
- 4 – International Development & Policy
- 3 – Environmental Economics & Policy
- 2 – Ecotoxicology & Environmental Health
- 2 – Energy & Environment
- 1 – Business & Environment
- 1 – PhD

What types of data are common in your field?

DATA PRACTICES ARE IN DEMAND

- Software skills are necessary prerequisites for employment
- Reproducible data pipelines are efficient and consistent → increased productivity
- Troubleshooting skills increase the capacity for independence
- Effective reporting → clear and efficient communication of outcomes/findings

COURSE OBJECTIVES

1. Gain proficiency in the language and application of R software
2. Synthesize information from datasets, working from start to finish in the “data pipeline”
3. Develop skills to identify and apply appropriate statistical and graphical approaches for environmental datasets
4. Integrate multiple technological applications involved in contemporary data analysis, workflow, and management

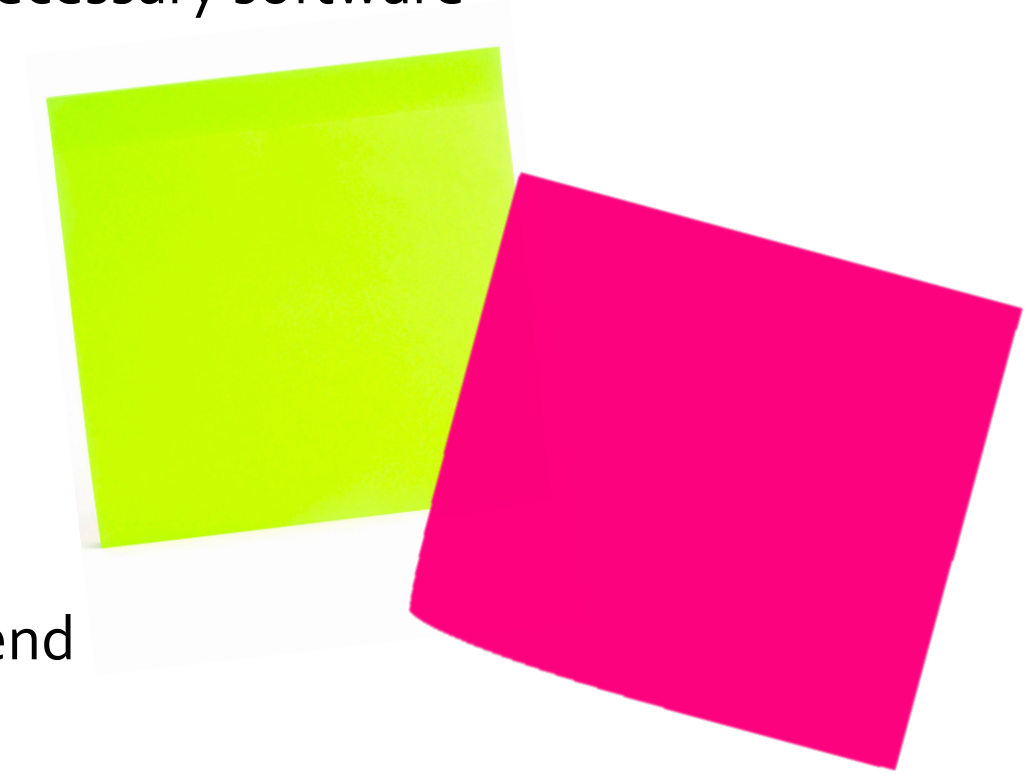
TECHNICAL LOGISTICS

Computers

- Option 1: Lab computer, mapped to CIFS server
- Option 2: Personal computer, download all necessary software
- Software installation guide provided

During class

- Green sticky note:
  - I am keeping up
  - I am ready to move on
- Pink sticky note:
  - I am stuck
  - my task is still in progress
- 1 % bonus if you keep your stickies until the end



COURSE LOGISTICS

- Course materials in Github repository
  - Pull updates each class
  - Save your own progress inside files
- Helpful tools
  - R for Data Science
  - Stack Overflow
  - Google
- Assignments submitted to Sakai

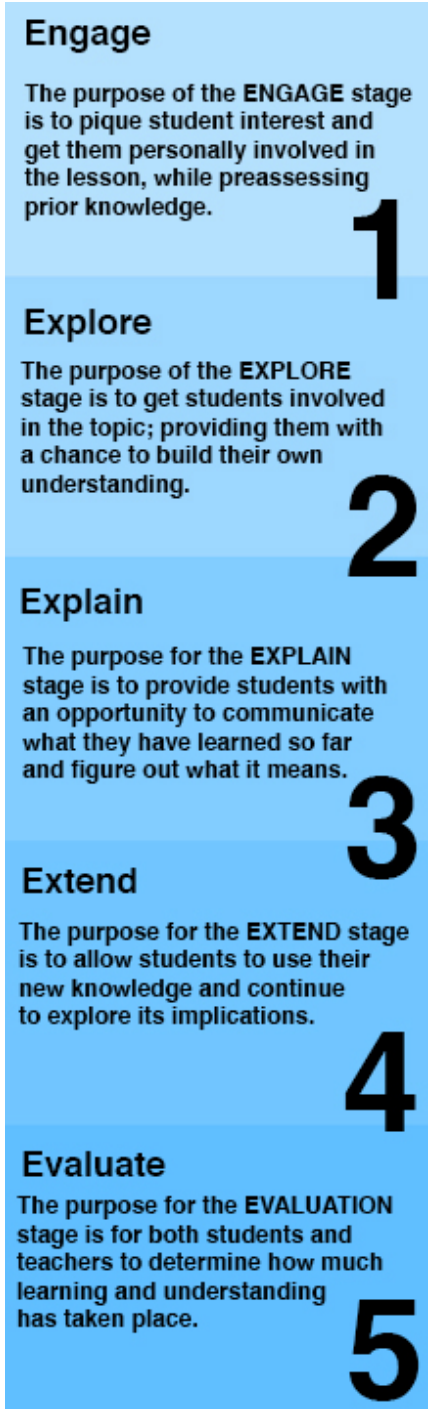
INQUIRY-BASED LEARNING

Construction of knowledge through scientific practices

Involves:

- Problem solving skills
- Active participation
- Knowledge discovery by the learner
- Inductive and/or deductive approach

Outcomes: inquiry based learning > traditional instruction



EXPECTATIONS

- Software up to date (outside class)
- Troubleshooting
- Missing class
- Cooperative learning

GRADING

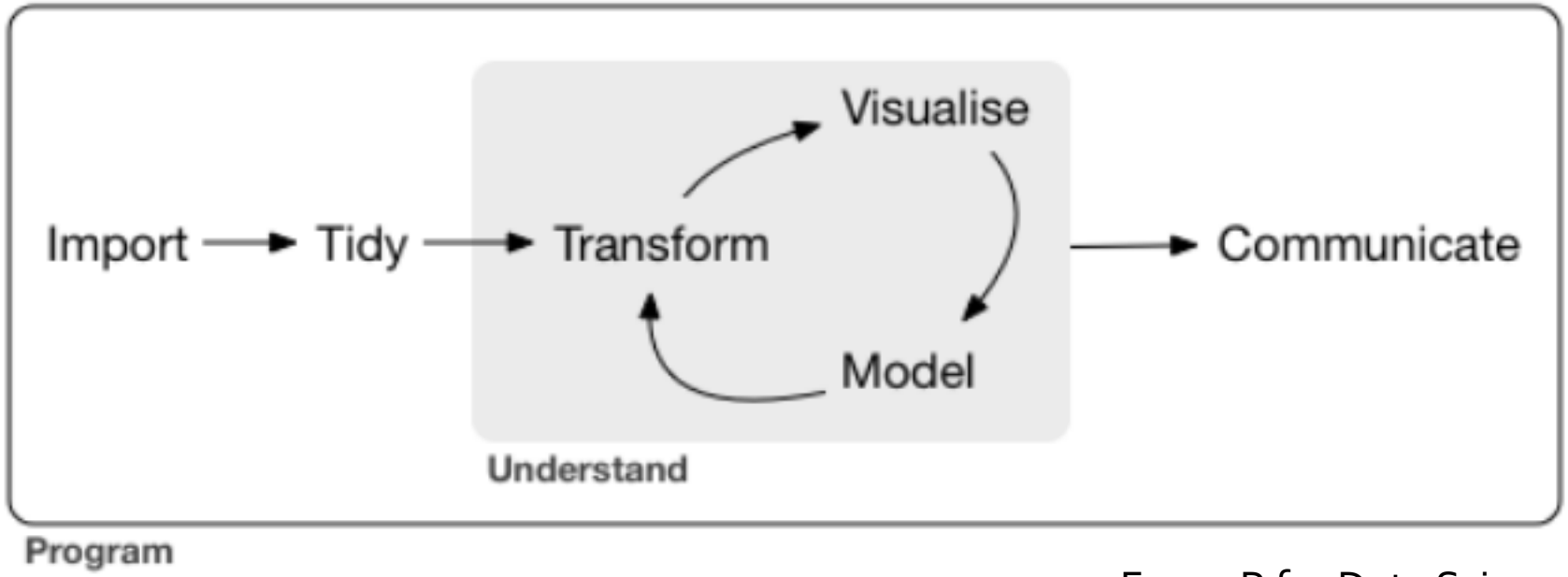
Assignments 75 %

- 11 assignments, 1 per unit
- Evaluated for completion, application of concepts/code, discussion

Project 25 %

- Choose example dataset and research question
- Run through data workflow
- Report

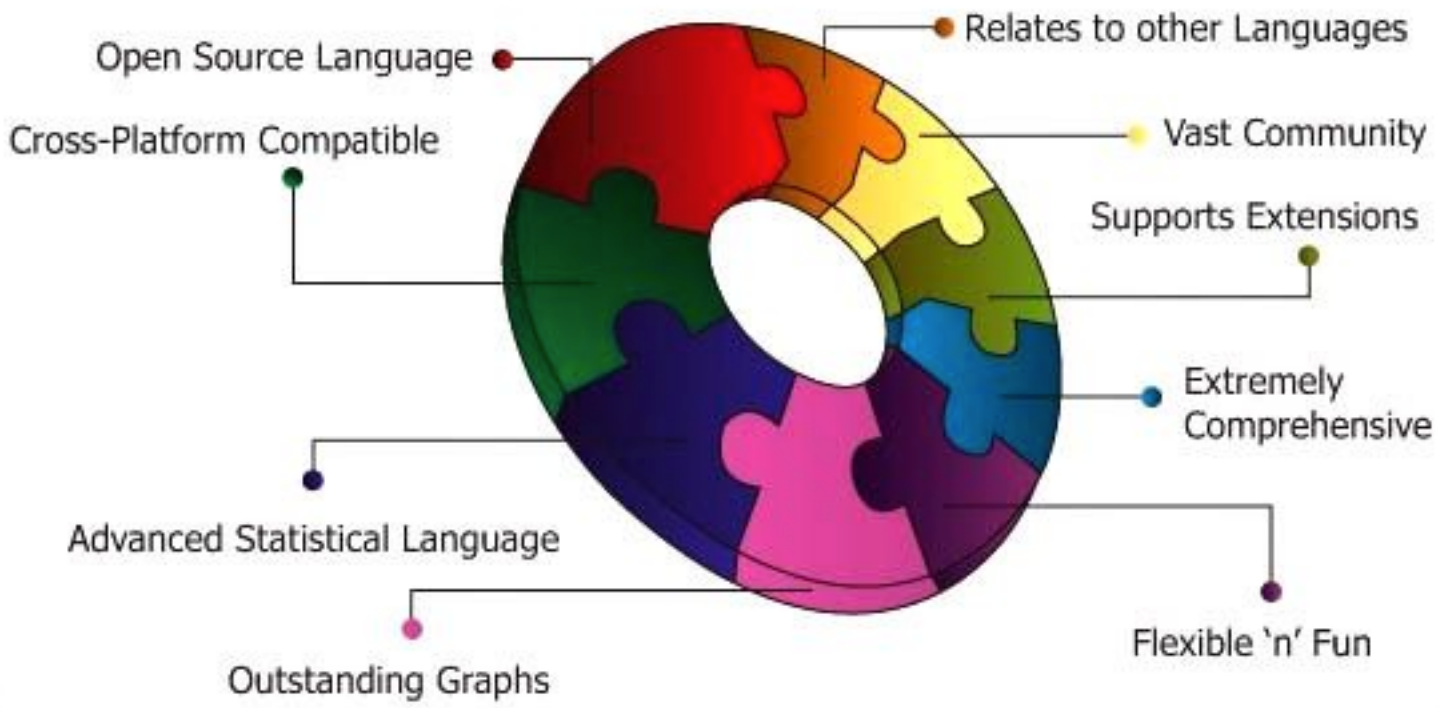
THE DATA SCIENCE PIPELINE



From: R for Data Science

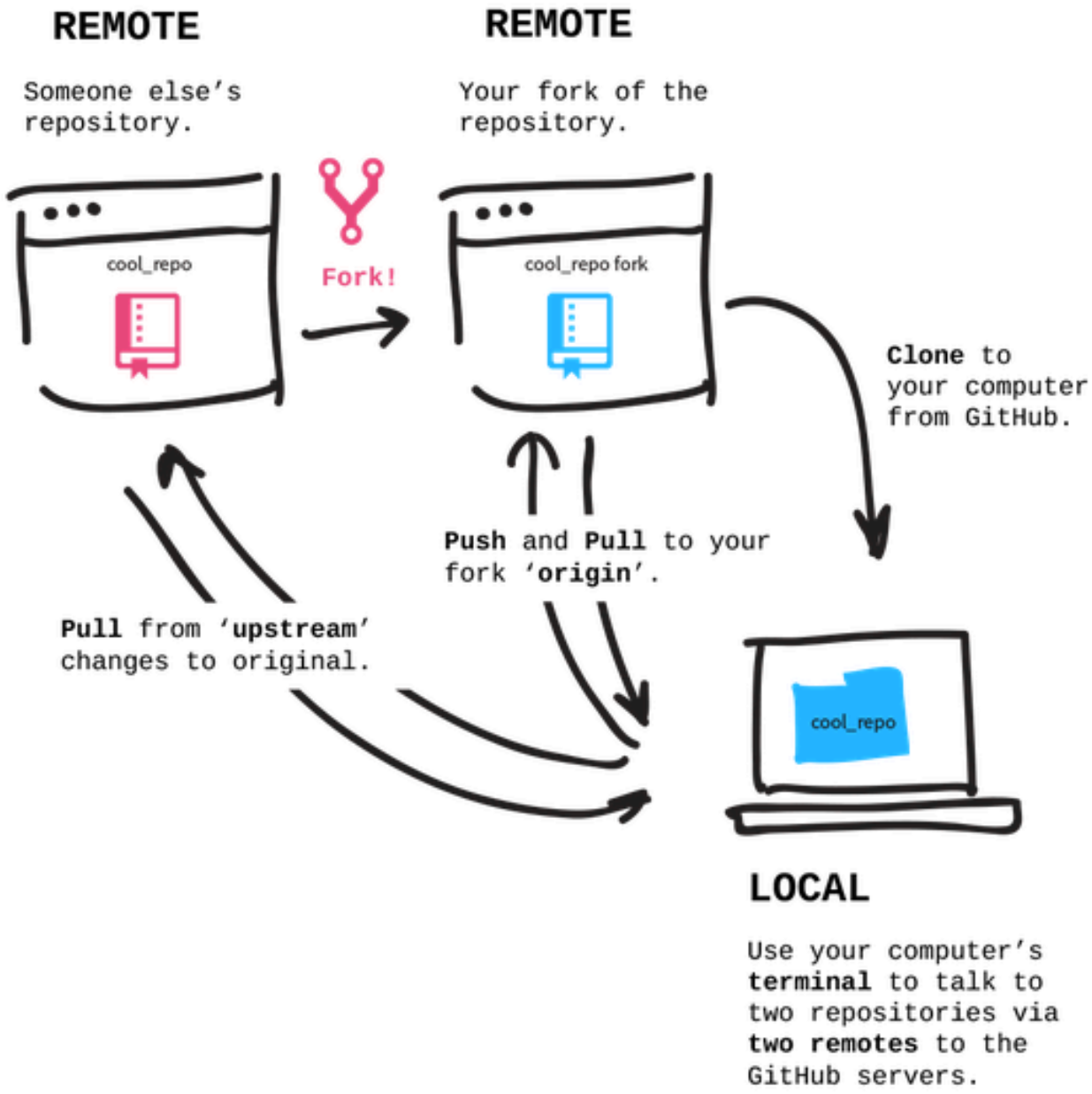
Which components of data science have you practiced before?

WHY R?



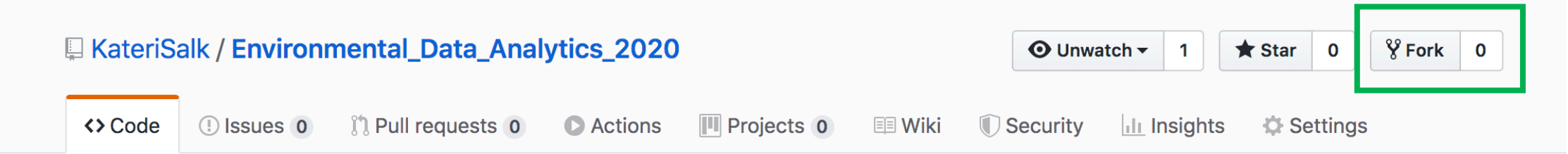
imarticus.org

GITHUB SETUP



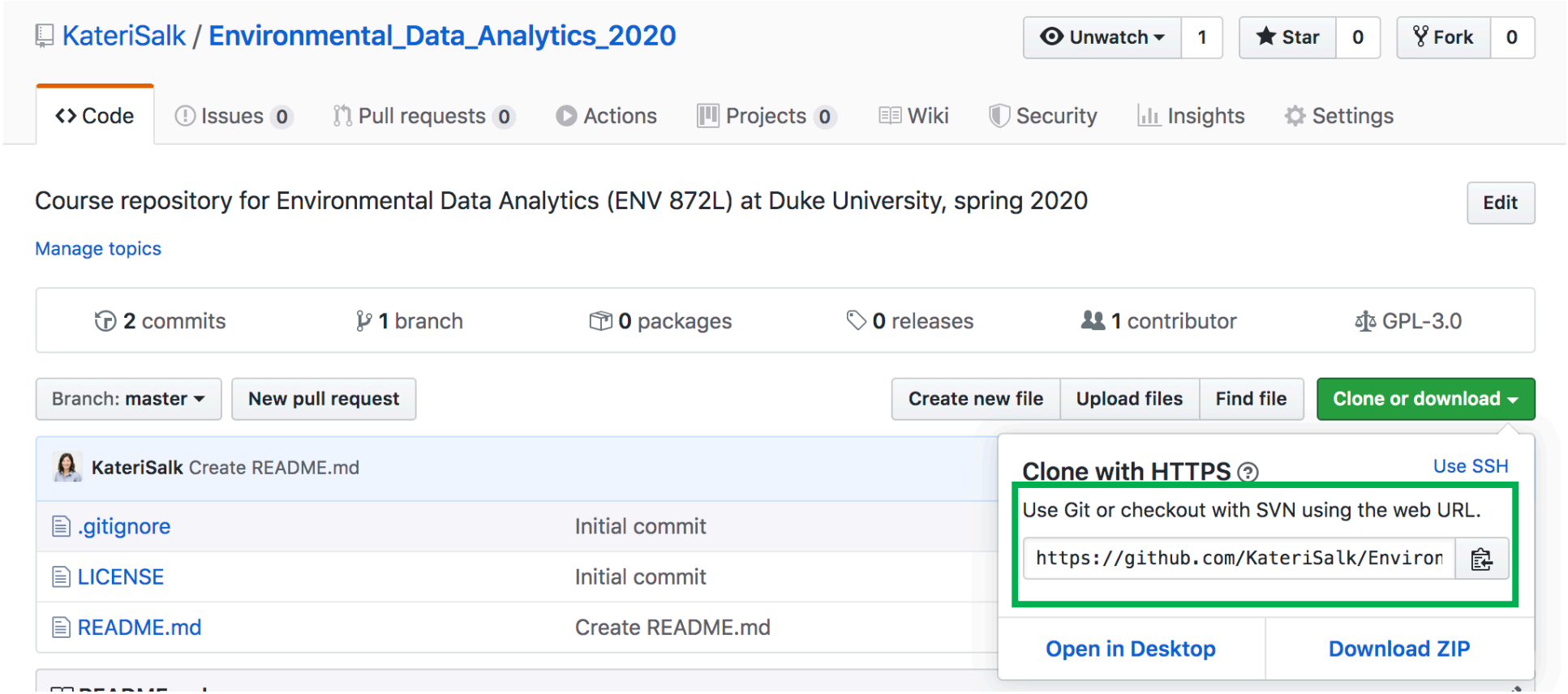
GITHUB SETUP: FORKING

1. Navigate to https://github.com/KateriSalk/Environmental_Data_Analytics_2020
2. Fork the repository to your GitHub account



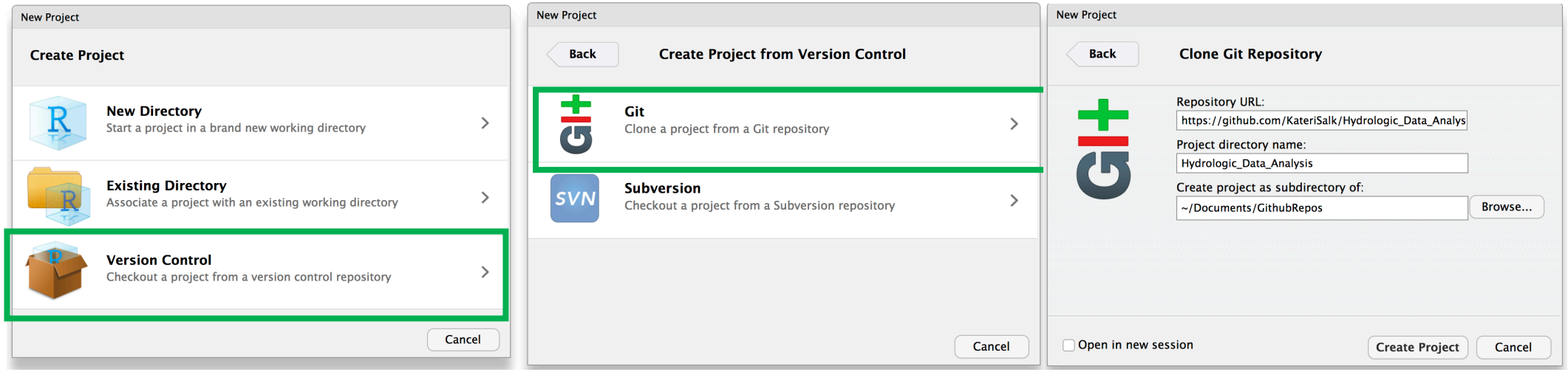
GITHUB SETUP: CLONING

3. Copy the link to your forked repository



GITHUB SETUP: CLONING

4. Open RStudio and go to File > New Project…
5. Select “Version Control”, then “Git”
6. Paste your forked repo URL and choose a folder where the local repo will be saved



GITHUB SETUP: COMMIT AND PUSH

Open the Git_Help file and follow the instructions in the Editing, Committing, Pushing section.

1. Navigate to the "README.md" file in the Files tab and open it.
2. Type your name after ”Student:" and save.
3. Now that you have edited a file, it should now appear in the Git tab. Click the box to the left of the file, where a check mark should now appear.
4. Press the "Commit" button. A new window should appear that shows the changes that have been made to the file.
5. Write a message detailing the edits you've made to the README file. You should always include a commit message to your commits so that your future self and/or your collaborators will know what changes were made. Click "Commit".
6. Click the green upward facing arrow: the "Push" button. Your remote repository is now up to date with your local repository.

GITHUB SETUP: ADD AND PULL FROM THE REMOTE

Follow the instructions in the "Pulling from the upstream remote" section of the Git_Help file:

1. In the Terminal tab, type: git remote add upstream https://github.com/KateriSalk/Environmental_Data_Analytics_2020

2. In the Terminal tab, type: git pull upstream master