

Modern Workflow

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Session goals

High-level introduction to three tools:

1. Git + GitHub
2. Latex / Overleaf / Markdown (Quarto)
3. Zotero for managing references

Why invest in improving your workflow?

- Can help you become a more efficient researcher
- Facilitates collaboration
- Open Science + improve replicability of findings

Git and GitHub

- Git: version-control system for tracking changes in code
- GitHub: web-based hosting service for version control using Git



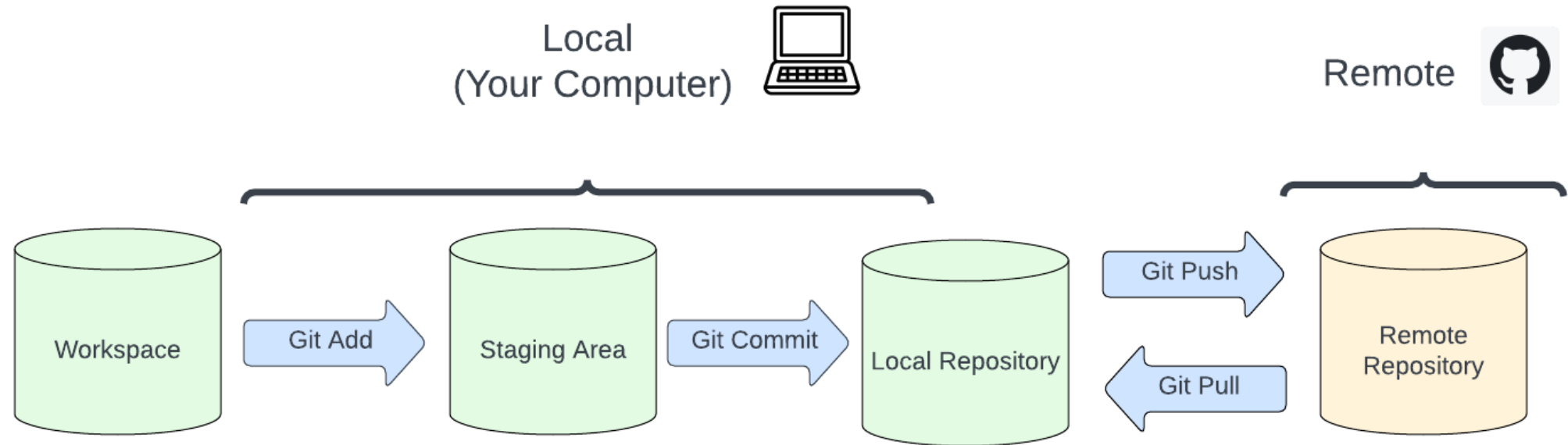
Key advantages of GitHub

- Version control helps track changes to code; easy to revert if you made a mistake
- Work across computers / servers
- Helpful for putting together replication packages

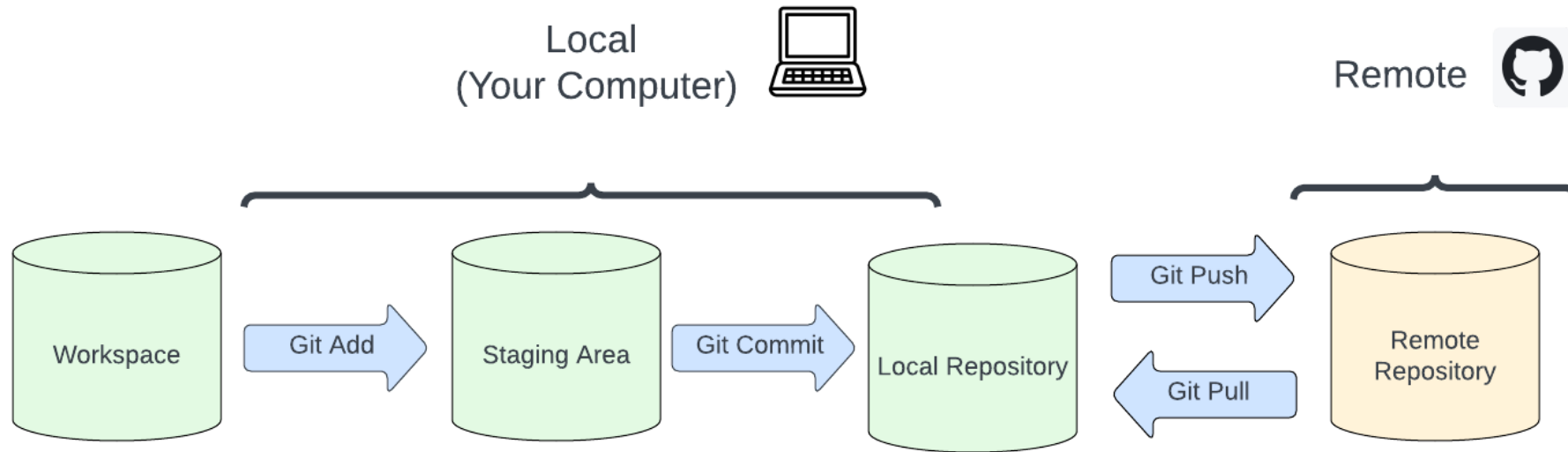
GitHub Project Management

- All files and code organized into a repository
- Repository can have have different files and subfolders
 - Readme file, code folder, survey instrument folder,
 - Not good for storing data!

GitHub Workflow



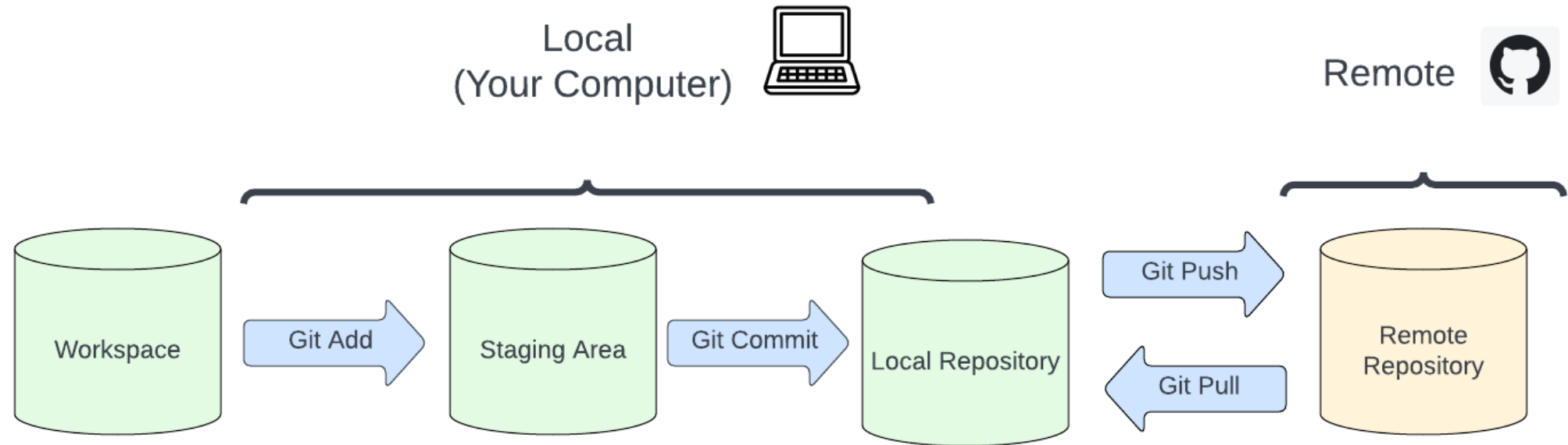
GitHub Workflow – Git Add



To add files to staging area:

```
1 ## add all changed files
2 git add -A
3
4 ## add specific file
5 git add /path/to/file/file.txt
```

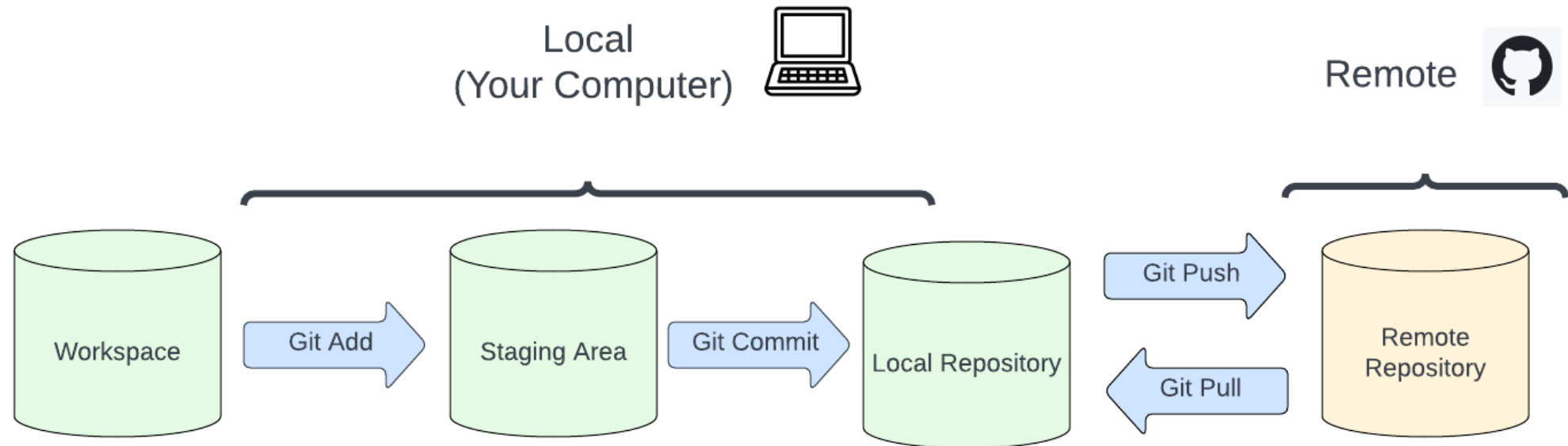
GitHub Workflow – Git Commit



Commit changes

```
1 ## commit changes
2 git commit -m "add an informative message here"
```

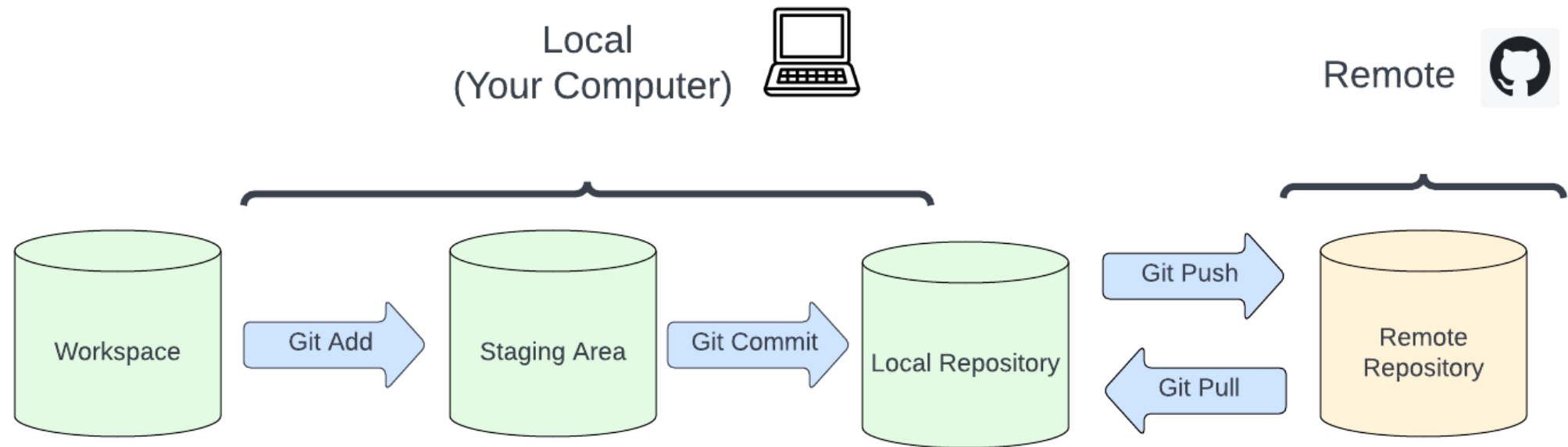
GitHub Workflow – Git Push



Send (“push”) your changes up to remote repository (where collaborators / public can see)

```
1 ## add all changed files
2 git push
```

GitHub Workflow – Git Pull



Pull down changes from repository (e.g., changes your collaborator made)

```
1 git pull
```

Other features

- **Git Clone:** Clone a remote repository to your local machine

```
1  ## general command
2  git clone https://github.com/username/repository-name.git
3
4  ## clone the repository for this class
5  git clone https://github.com/username/repository-name.git
```

- **Git fork:** Copy a (public) repository to have your own version
- **Branches:** Isolated environment for development, merge back in with main codebase when you're ready

Link to Open Science Framework repository

- Create public GitHub repository with replication code + instructions for a manuscript
- Link that repository to an Open Science Framework Repository
 - Upload data etc.
- Share DOI (permanent identifier) in paper

Live Demo

- Adding new file to GitHub repository
- OSF / GitHub replication package

Exercises (at home)

1. Create a new Github repository
2. Clone this GitHub repository to your local machine
3. 'Push' an R markdown script to your GitHub Repository

LaTeX/Overleaf

LaTeX

- LaTeX is a high-quality typesetting system for writing scientific documents
- Free, open source — customizable, extendable
- Learning curve!

Insert equations

- Use \$ or \begin{equation} to enter equation mode
- \$h(x) = e ^{x}\$

$$h(x) = \alpha e^{\beta x}$$

Nicely handle refereces

- Create a .bib file from list of reference
- Automatically write out reference list
 - bibtex, natbib
- In-text citations:
 - `\citep{citation_key} = (Gupta 2019)`
 - `\citet{citation_key} = Gupta (2019)`

Simplify tables + figures management

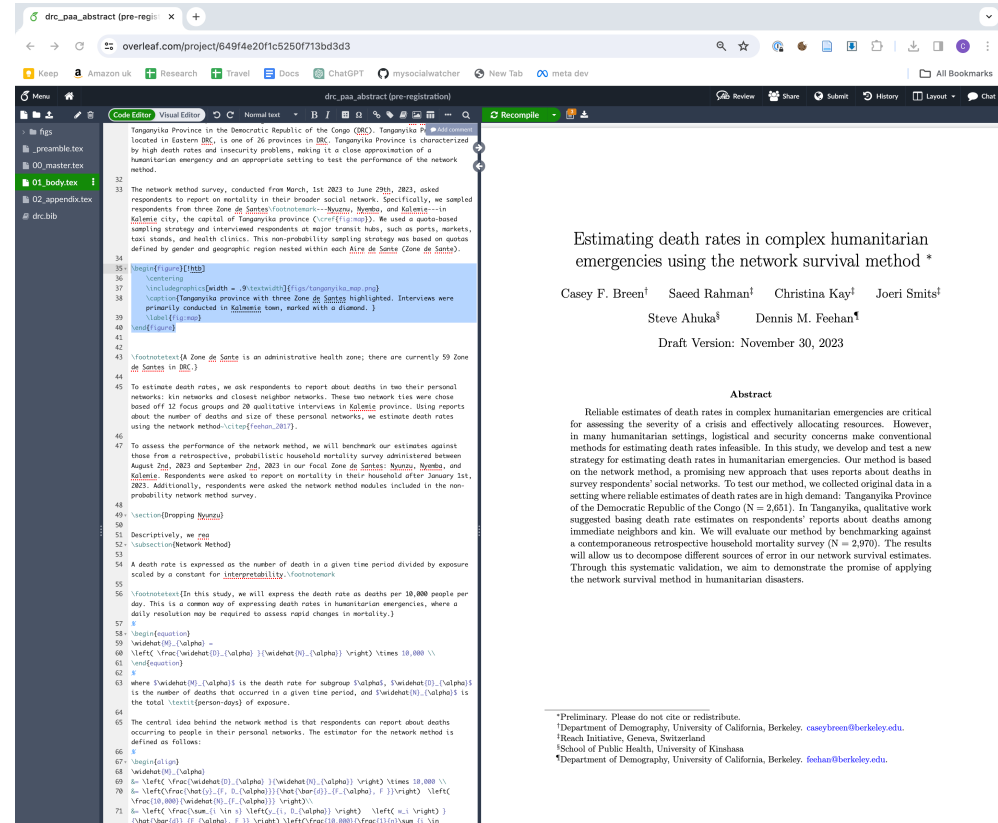
- Include figures in text

```
1 \begin{figure}[!htb]
2     \centering
3     \includegraphics[width = .9\textwidth]{figs/tanganyika_map.png}
4     \caption{Tanganyika province with three Zone de Santes highlighted.}
5     \label{fig:map}
6 \end{figure}
```

- Reference figures and tables in text using label
 - `\cref{fig:map}` will render “Figure 4”

Overleaf

- Google docs for LaTeX
- See .tex code and compiled PDF at same time
- Great for collaborating



Live Demo + Casey templates

- [Latex CV](#)
- [Beamer Slides](#)
- [Latex Manuscript](#)

Exercises (at home)

1. Create a new overleaf project
2. Upload and insert a new figure
3. Write out a mathematical equation
4. Share the overleaf document with a friend

R users: Quarto (markdown)

- Designed for writing code
 - Interwoven text and code chunks
- Can also write papers, take notes, make slides
- Markdown is simpler than Latex, but fewer features / less resources for help

Zotero for reference management

Zotero

- Free tool for simplifying reference management
- Organize, annotate, and track references across devices

Simple Zotero workflow

1. Add papers to Zotero to “collection”
 - Collection = set of references for one project
1. Generate .bibtex file (or individual citations)
1. Move .bibtex file to paper repository

Zotero tips

- [Zotero connector](#): browser plug-in that automatically adds and pdf paper to a collection
- [Better Bibtex](#): help customize the different citation keys
- Create shared libraries when working with collaborators

Zotero live demo

- Creating new library
- Adding paper using connector (or drag-and-drop pdf)
- Generating bibtex file

Exercises (at home)

1. Create a new Zotero collection
2. Add 3 papers to the new collection (use Zotero connector or drag in PDFs)
3. Export the .bibtex file to Overleaf

Takeaways

- Lots of exciting resources for improving workflow
 - Many resources not mentioned
- Pick workflow that works best for you
 - Definitely worth investing in your workflow!

More resources

- Github: [Happy Git with R](#)
- LaTeX: [Learn Latex in 30 Minutes, Not-so-short introduction to LaTeX](#)
- Zotero: [Getting Started with Zotero](#)

Questions?

- Thanks for your attendance and participation
- Best of luck with your first semester!