Modern Workflow

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Workflow and collaboration tools

- One-hour session
- Materials:
  - www.github.com/caseybreen/workflow

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

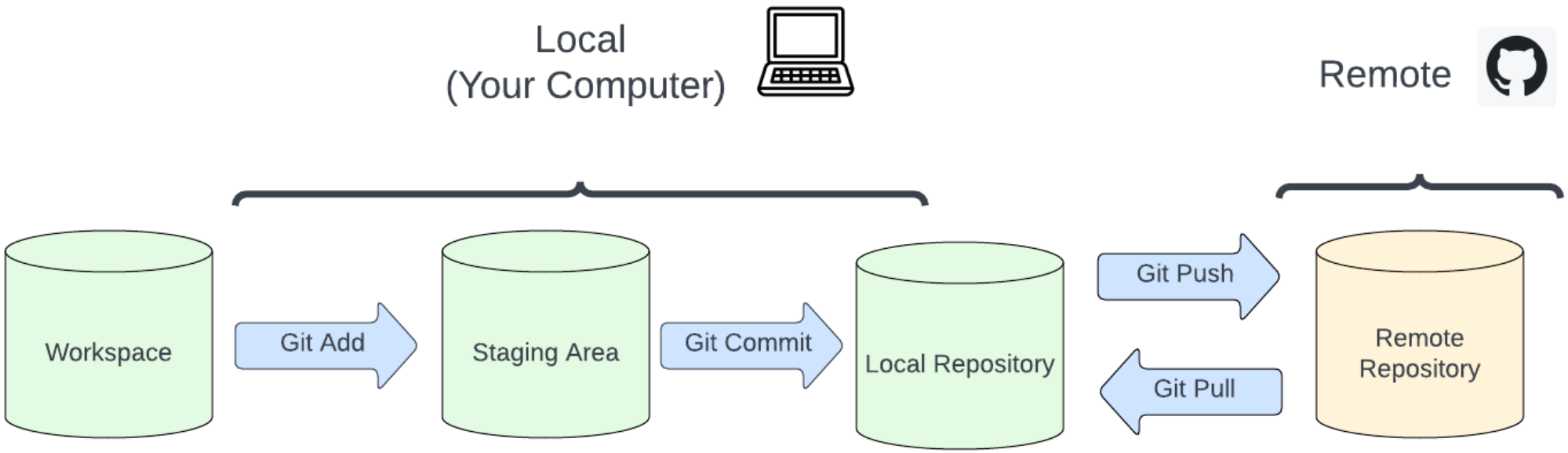
Key advantages of GitHub

- 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

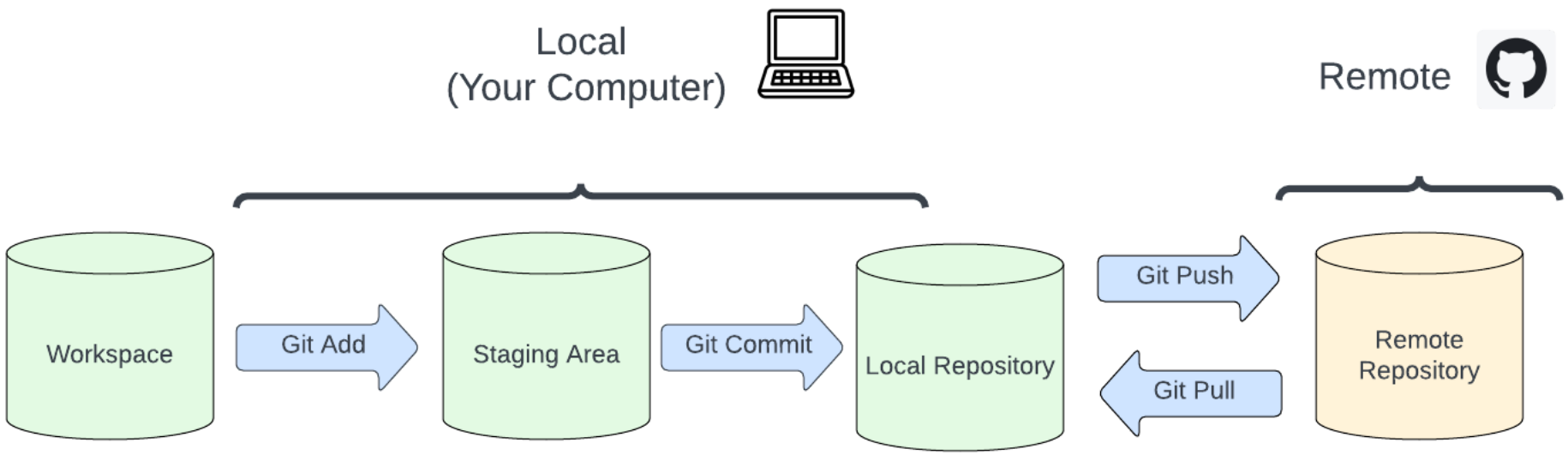
GitHub Project Management

- 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

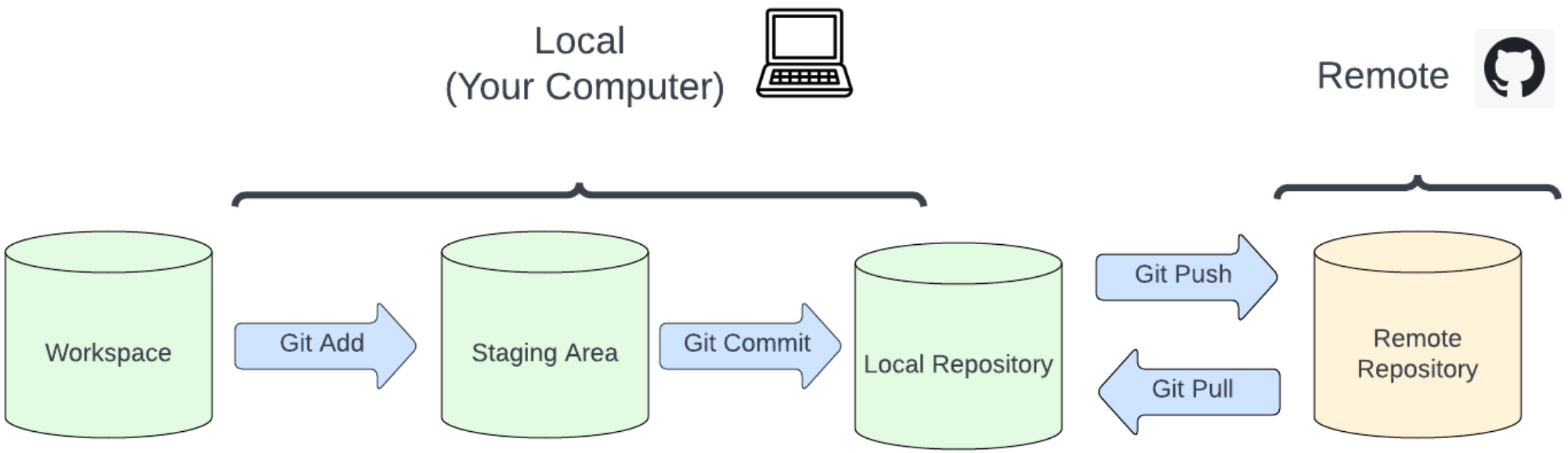


To add files to staging area:

```
## add all changed files
git add -A

## add specific file
git add /path/to/file/file.txt
```

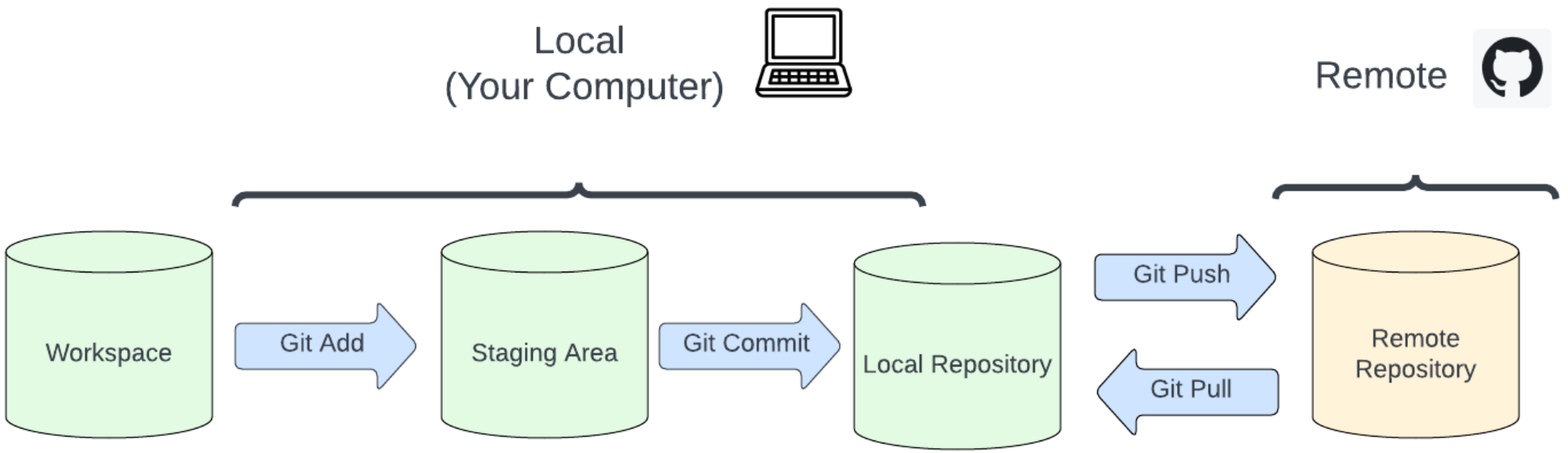
GitHub Workflow – Git Commit



Commit changes

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

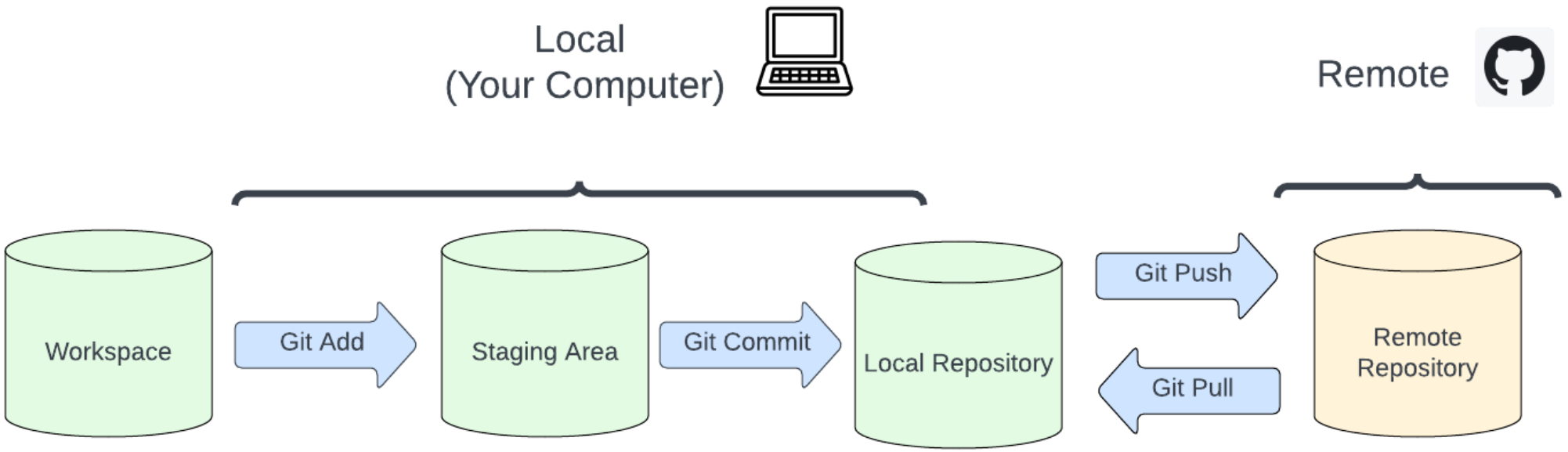
GitHub Workflow – Git Push



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

```
## add all changed files
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

```
## general command
git clone https://github.com/username/repository-name.git

## clone the repository for this class
git clone https://github.com/username/repository-name.git
```

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

Link to Open Science Framework repository

- Create public GitHub repository with replication code + instructions for a mansucript
- 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

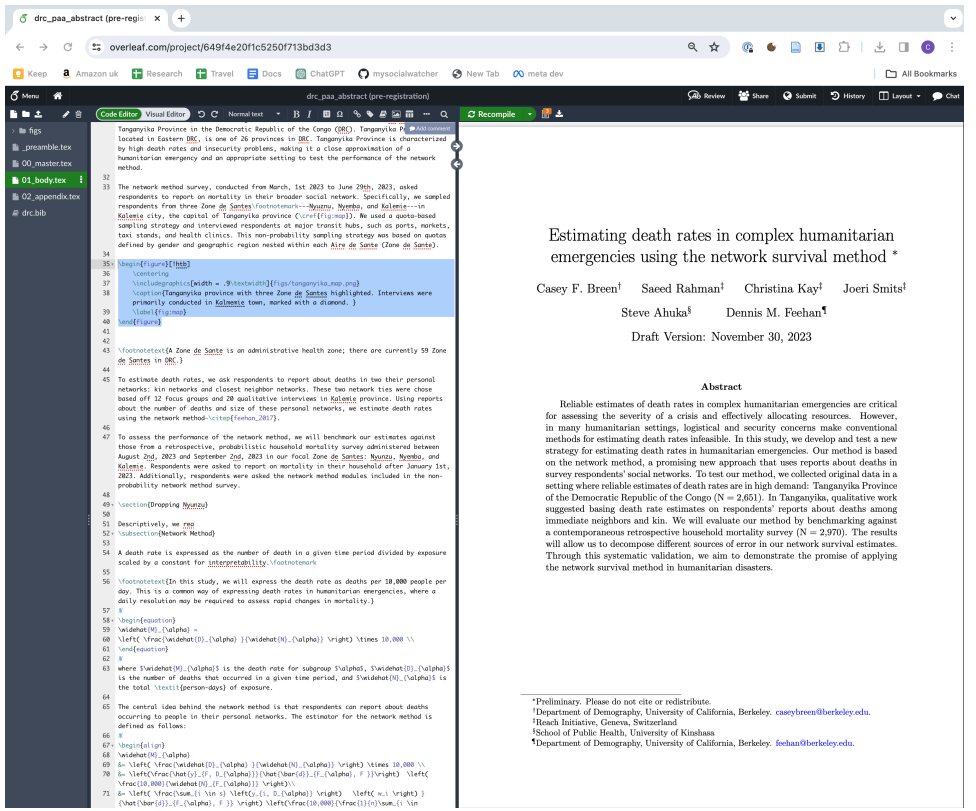
- Include figures in text

```
\begin{figure}[!htb]
    \centering
    \includegraphics[width = .9\textwidth]{figs/tanganyika_map.png}
    \caption{Tanganyika province with three Zone de Santes highlighted.}
    \label{fig:map}
\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 the automatically add 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
- Questions: casey.breen@demography.ox.ac.uk