

# Open Science and Data Management: Introducing Graduate Students to Research Workflows in a Local Context

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## Abstract

The Engineering & Physical Sciences Division of the UC Berkeley Library partners with researchers to support the entire research life cycle. Since 2016, the division's Science Data Librarian has offered Research Data Management training that covers data management, storage, documentation, and sharing. Based on this established work, division librarians piloted a series of open science workshops in 2019. The Earth & Planetary Sciences (EPS) Department was chosen as the target department for this work. Librarians began by replacing their traditional orientation session, focused on library procedures and resources, with an approach that highlighted local support for open research workflows. Scheduled throughout the fall semester of 2019, the sessions focus on trending methods and workflow tools relevant to students as they launch their research including: Introduction to Research Workflows and Literature Searching Dynamic data management, publishing and citation Citation Management Collaborative writing in LaTeX with Overleaf Jupyter Notebooks best practices Approaches to Github and reproducible code Publishing and authorship trends in the Earth Sciences The workshops draw together expertise from the EPS department and around campus, offering students a scaffolded introduction to local resources. Unlike a bootcamp or one-time workshop model, students learn material over the course of several months giving them the opportunity to attempt, adapt and develop new methods. The workshops also fill a need expressed by earlier graduate cohorts—domain specific sessions that take place within their building—making this an effective approach for reaching students and introducing foundational research methods. Trainers benefit by encountering a cohesive audience and creating content that will can be applied to other disciplines. Pilots such as this build communities of practice, test methodologies and provide an opportunity to scale trainings to a broader audience.



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## RESEARCH WORKFLOW SUPPORT

The Engineering & Physical Sciences Division of the **UC Berkeley Library** partners with researchers to support the entire research lifecycle.

Over the last five years, librarians have shifted their focus from traditional research help to support for **open research workflows** (Figure 1). This shift is seen in changes to three librarians' job duties:

- Science Data Librarian: offers Research Data Management training and guidance
- GIS and Map Librarian: supports spatial data accessibility and open source GIS
- Open Science Librarian: promotes and educates researchers on open science practices and tools

In 2019, the Open Science Librarian spearheaded an **Open Science Research Workflows Program** for new graduate students in the Earth & Planetary Sciences (EPS) Department.

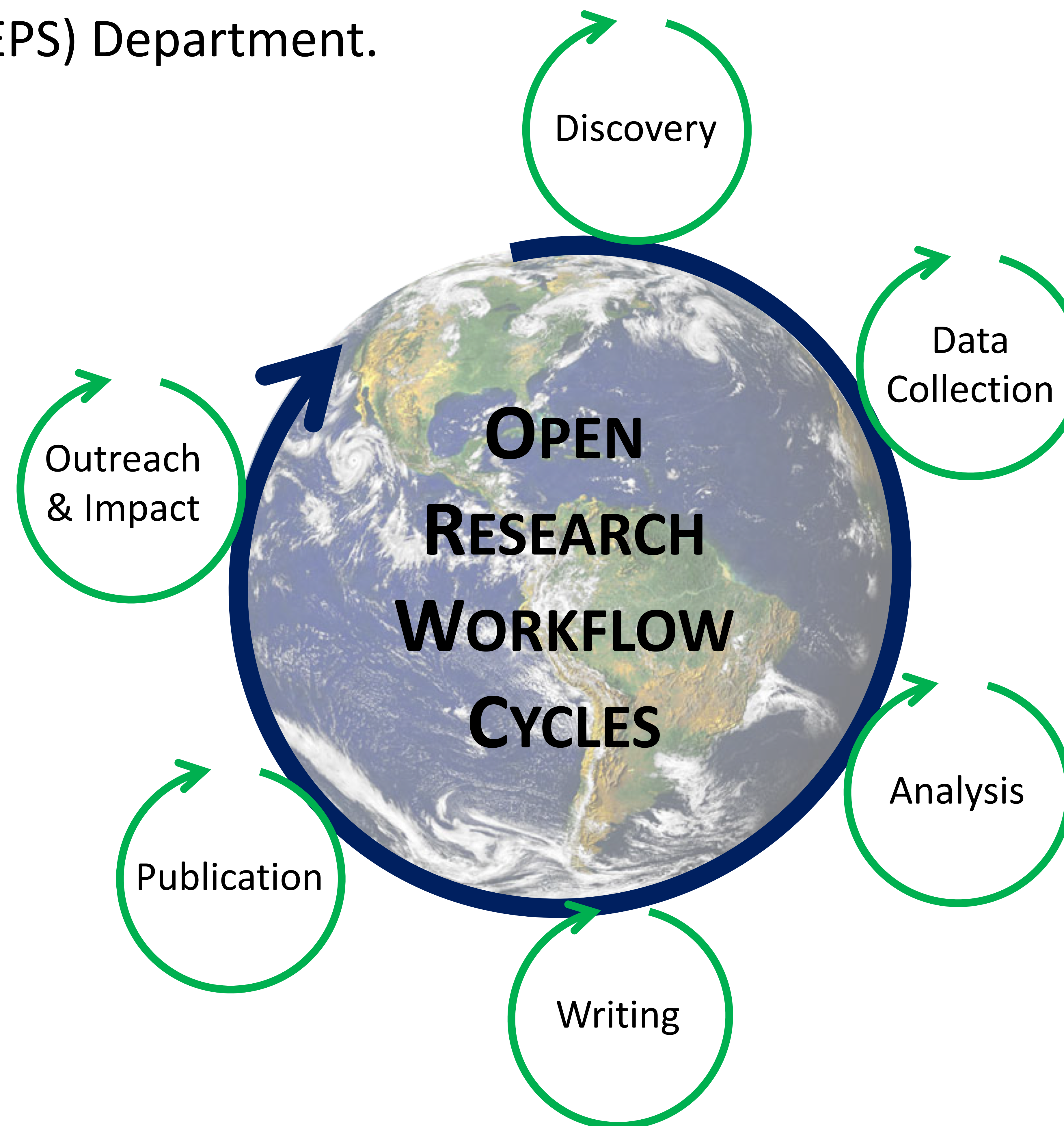


Figure 1: Library workshops align with research workflows

## 6 SESSIONS | MULTIPLE INSTRUCTORS

The sessions focus on trending methods and workflow tools relevant to Earth Sciences students as they launch their research.

### DISCOVERY

- Research Workflows and Literature Searching



### WRITING

- Citation Management with Zotero
- Collaborative writing in LaTeX



### ANALYSIS

- Jupyter Notebooks best practices



### ANALYSIS/DATA

- Approaches to reproducible code



### DATA

- Dynamic data management, publishing and citation



## NEXT STEPS

### DISCOVERY

- Jupyter Notebook open search "biblio" module via CrossRef API

### PUBLICATION

- Publishing and authorship trends in Earth Sciences

