

BISC 404: Ecology and Biodiversity



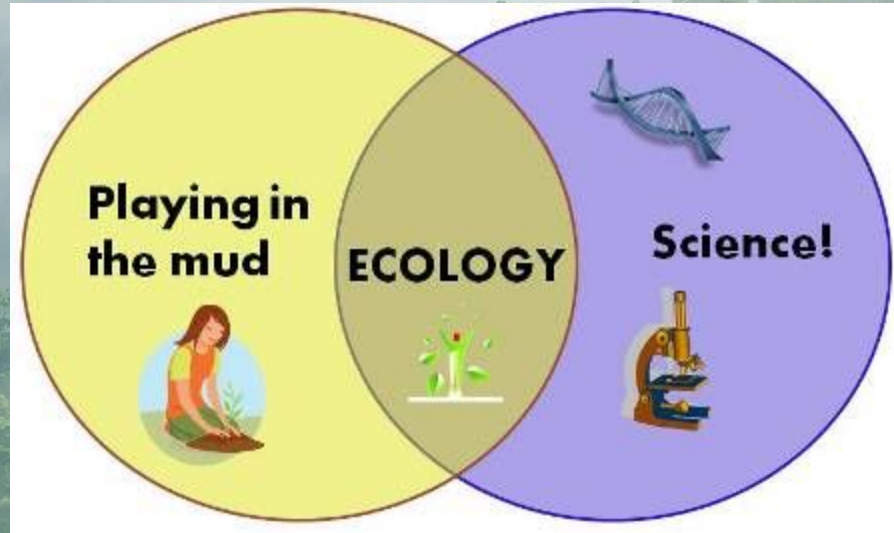
Ecology is a study of relationships:

- Between living organisms
- Between organisms and their environment



Ecology is studied across scales of space and time:

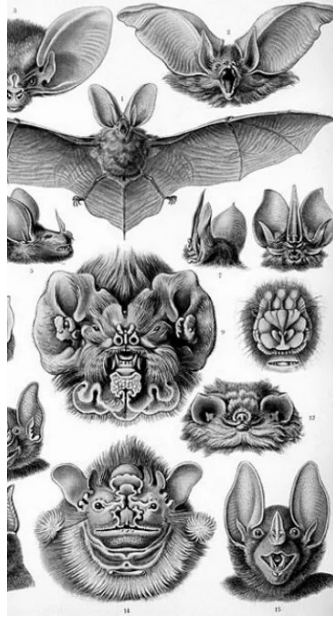
- Individual
- Population
- Community
- Ecosystem
- Biosphere



<https://girlsaregeeks.wordpress.com/2010/06/18/ecology-a-venn-diagram/>

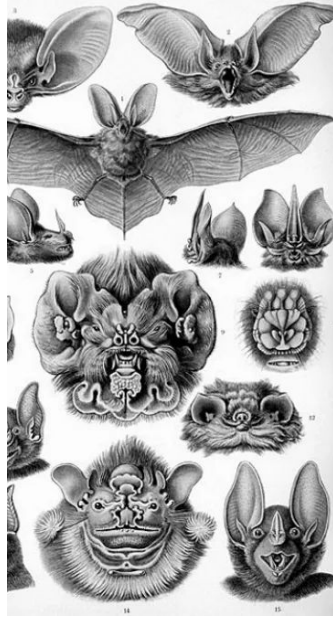
Agenda

- Introductions
- References
- How to read a scientific paper



Agenda

- **Introductions**
- Resources
- How to read a scientific paper



Charles Lehnen

(lay - nun)

he / him / his

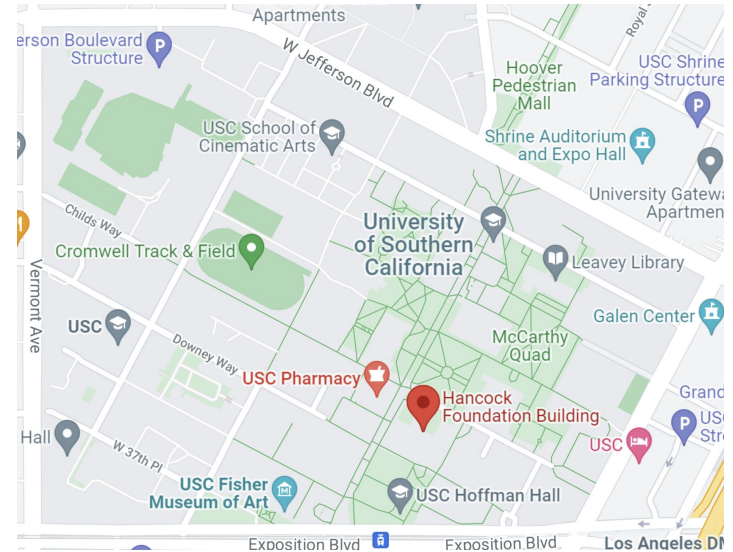
lehnen@usc.edu

[business hours within 5 hours]

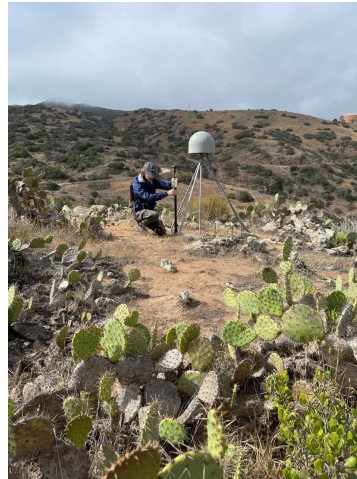
Integrative and Evolutionary Biology PhD Student

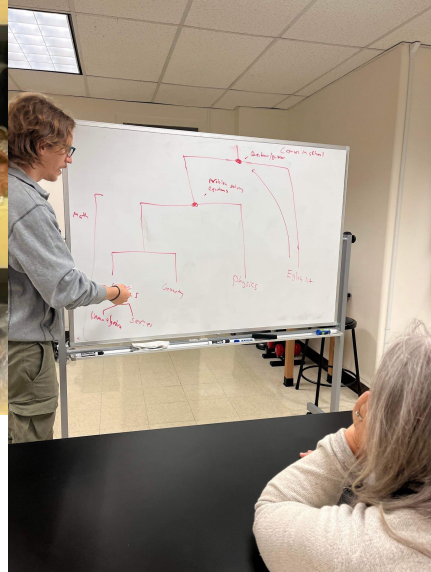
Office hours by appointment

Office: AHF B10









My goal this semester is to inspire students to:

- Get excited about ecology and biodiversity!
- Gain a stronger confidence in approaching scientific questions
- Gain practical computational skills that will be useful across fields of study

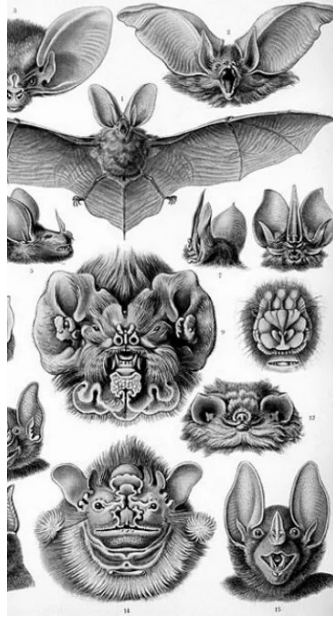
Introduce your neighbor!

1. What's your preferred name?
2. What year are you and what's your major?
3. What was the most recent biology course you took?
4. What do you hope to gain from this class? (no wrong answers)
5. Restaurant you recommend in LA?



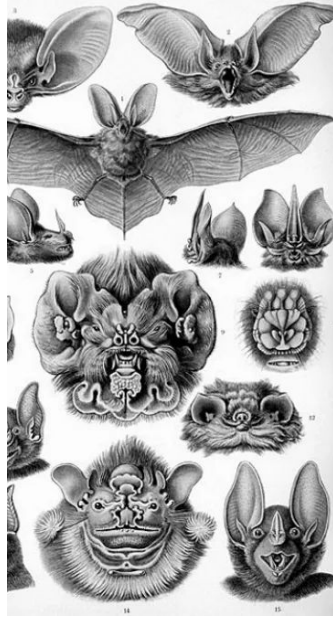
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- Introductions
- **Resources**
- How to read a scientific paper



Resources

- **Optional references**
- Discussion forum
- R/Rstudio and Github
- Course site and Google Sheet

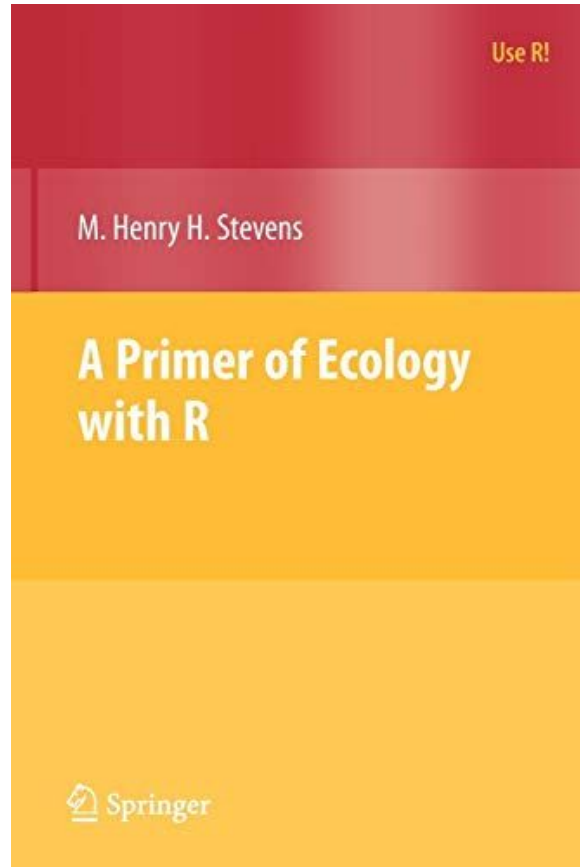


Optional Resource

A Primer of Ecology with R

Martin Henry H. Stevens

<http://www.cas.miamioh.edu/~stevenmh/stevens-2009-part.pdf>



Optional Resource

The screenshot shows the StackExchange website interface. At the top, there is a navigation bar with the StackExchange logo, links for "Tour", "About Us", and "Meta", a search bar labeled "Search all sites", and a "Log in" button. Below the navigation bar, the StackExchange logo is prominently displayed on the left, and links for "All Sites", "Top Users", and "Digests" are on the right. A large light blue banner is centered on the page with the heading "Stack Exchange Q&A communities are different. Here's how:". The banner contains three columns of text and icons: 1. "Expert communities." with an icon of speech bubbles and text: "Each of our 182 communities is built by people passionate about a focused topic." 2. "The right answer. Right on top." with an icon of a green up arrow and a blue down arrow next to a number "36" and horizontal lines, and text: "Experts like you can vote on posts, so the most helpful answers are easy to find." 3. "Share knowledge. Earn trust." with an icon of a green checkmark in a circle and a blue box with "+200", and text: "Earn reputation and additional privileges for posts others find helpful." Below the banner is an orange "Learn more" button. At the bottom of the page, there is a "hot" tag in red, a "real-time" tag, and a "Today's Featured Site" section showing the WordPress logo and the text "WordPress Development Stack".

StackExchange

All Sites Top Users Digests

Stack Exchange Q&A communities are different. Here's how:

Expert communities.
Each of our 182 communities is built by people passionate about a focused topic.

The right answer. Right on top.
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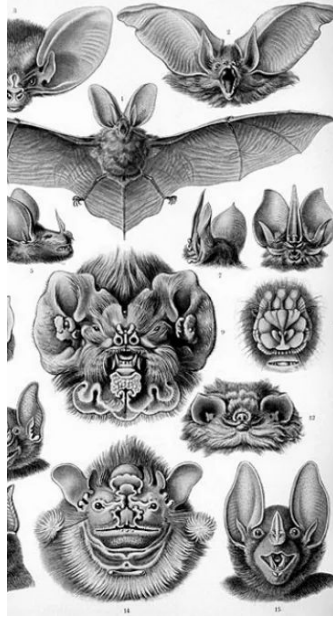
Learn more

hot real-time Today's Featured Site

WordPress Development Stack

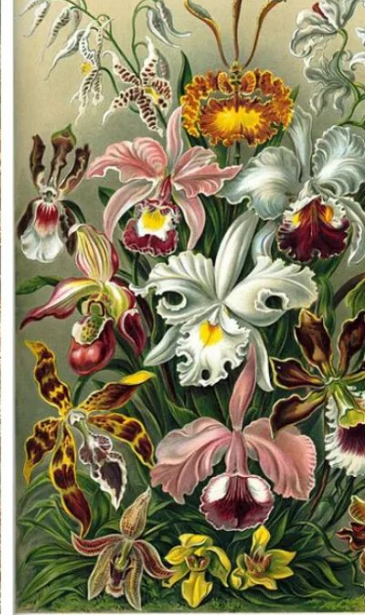
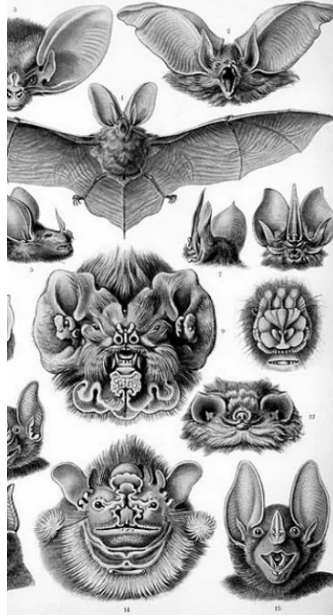
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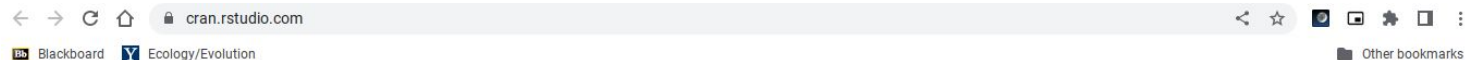


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R/Rstudio: *cran.rstudio.com*



CRAN

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About R

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[The R Journal](#)

Software

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[Other](#)

Documentation

[Manuals](#)

[FAQs](#)

[Contributed](#)

The Comprehensive R Archive Network

Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux \(Debian, Fedora/Redhat, Ubuntu\)](#)
- [Download R for macOS](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2022-10-31, Innocent and Trusting) [R-4.2.2.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

What are R and CRAN?

<https://posit.co/download/rstudio-desktop/>

1: Install R

RStudio requires R 3.3.0+. Choose a version of R that matches your computer's operating system.

[DOWNLOAD AND INSTALL R](#)

2: Install RStudio

[DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS](#)

Size: 215.66 MB | [SHA-256: 93C7F307](#) | Version: 2023.12.0+369 | Released: 2023-12-20

https://github.com/



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Let's build from here

The world's leading AI-powered developer platform.



Email address

Sign up for GitHub

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R/Rstudio: *GitHub* integration

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Required fields are marked with an asterisk (*).

Owner * CharlesLehnen / Repository name * YOUR_NAME_BISC_404_Ec

You new repository will be created as YOUR_NAME_BISC_404_Ecology - Biodiversity.
The repository name can only contain ASCII letters, digits, and the characters ., -, and _

Great repository names are short and memorable. Need inspiration? How about [fuzzy-octo-fiesta](#) ?

Description (optional)

Public
Anyone on the internet can see this repository. You choose who can commit.

Private
You choose who can see and commit to this repository.

Initialize this repository with:
 Add a README file
This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore

Choose which files not to track from a list of templates. [Learn more about ignoring files.](#)

Choose a license

A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

This will set `main` as the default branch. Change the default name in your [settings](#).

R/Rstudio: *GitHub integration*

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

General

Access

Collaborators

Moderation options

Code and automation

Branches

Tags

Rules

Actions

Webhooks

Environments

Codespaces

Pages

General

Repository name

BISC_404_Ecology_and_Biodiversi ✓

Rename

Template repository

Template repositories let users generate new repositories with the same directory structure and files. [Learn more about template repositories.](#)

Require contributors to sign off on web-based commits

Enabling this setting will require contributors to sign off on commits made through GitHub's web interface. Signing off is a way for contributors to affirm that their commit complies with the repository's terms, commonly the [Developer Certificate of Origin \(DCO\)](#). [Learn more about signing off on commits.](#)

Default branch

The default branch is considered the "base" branch in your repository, against which all pull requests and code commits are automatically made, unless you specify a different branch.

main



R/Rstudio: *GitHub integration*

The screenshot shows the GitHub repository settings page. On the left is a sidebar with navigation options: Collaborators, Code and automation, Branches, Tags, Rules, Actions, Webhooks, Environments, and Codespaces. The main content area is titled 'Manage access' and shows two repository types: 'PRIVATE REPOSITORY' and 'DIRECT ACCESS'. A red arrow points to a green 'Add people' button in the top right corner of the 'Manage access' section.

This close-up shows the search input field containing 'CharlesLehnen'. Below the input, a search result is displayed for 'CharlesLehnen' with a green checkmark icon and the text 'Already has access to this repository'. A green button at the bottom of the search results area says 'Select a collaborator above'.

This close-up shows the search input field containing 'Imguzman'. Below the input, a search result is displayed for 'Laura Melissa Guzman' with a profile picture icon and the text 'Imguzman • Already has access to this repository'. A green button at the bottom of the search results area says 'Select a collaborator above'.

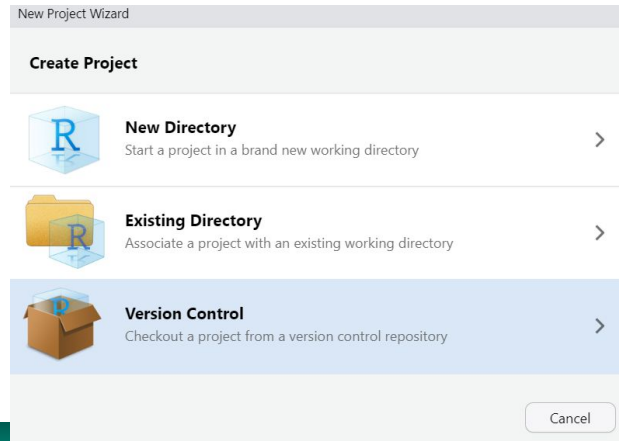
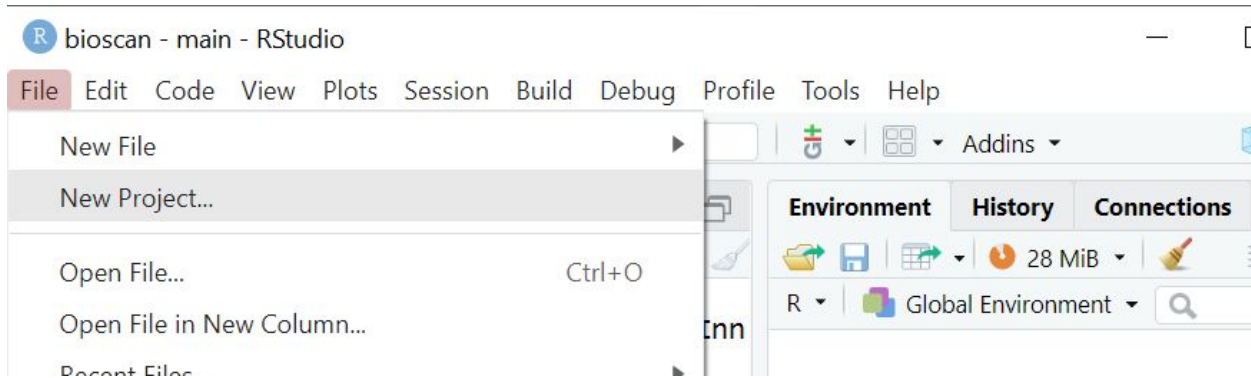
R/Rstudio: *GitHub integration*

Download and install Git with default settings

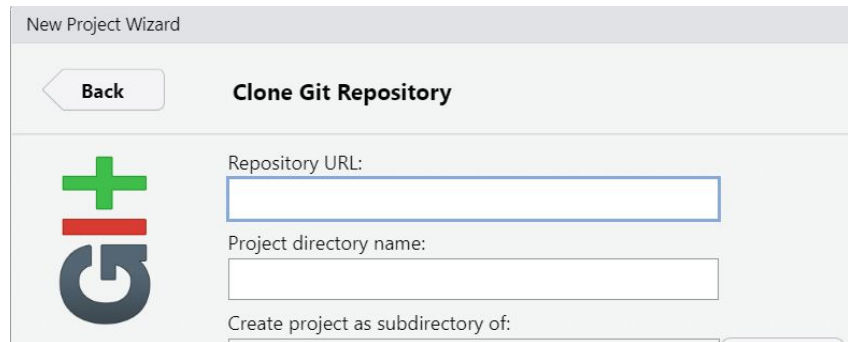
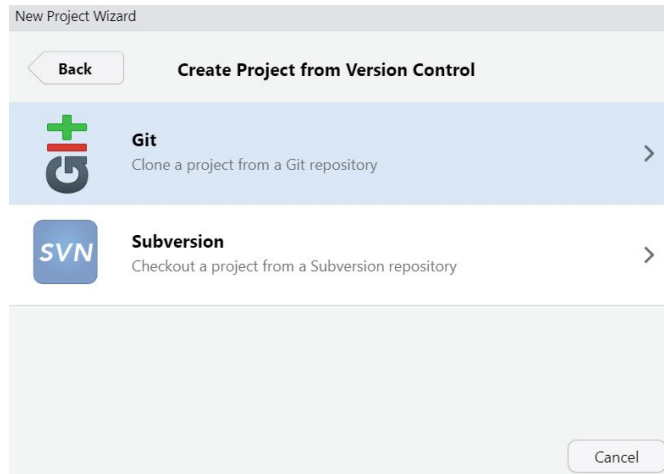
- Windows: <https://git-scm.com/download/win>
- Mac:
<https://central.github.com/deployments/desktop/desktop/latest/darwin>

(I also like Github Desktop too, but is optional)

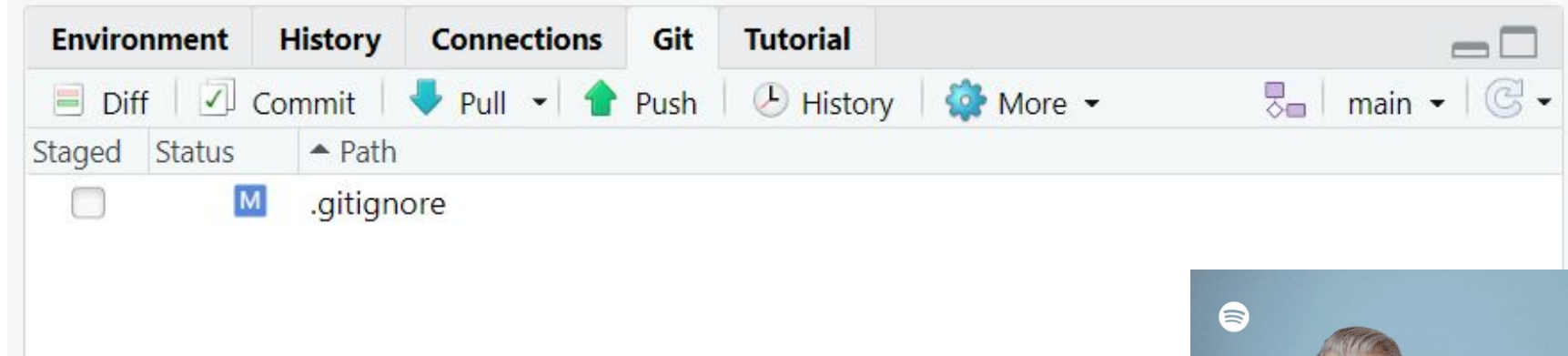
R/Rstudio: *GitHub integration*



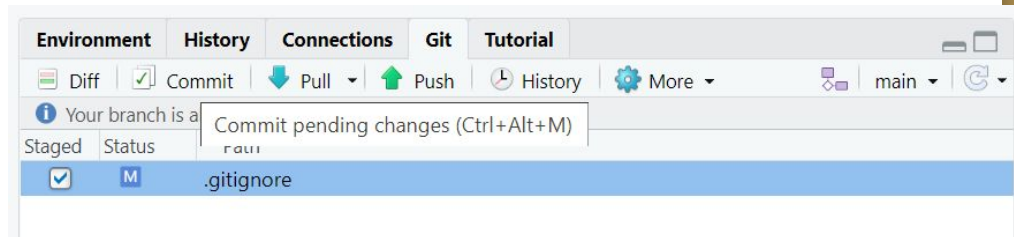
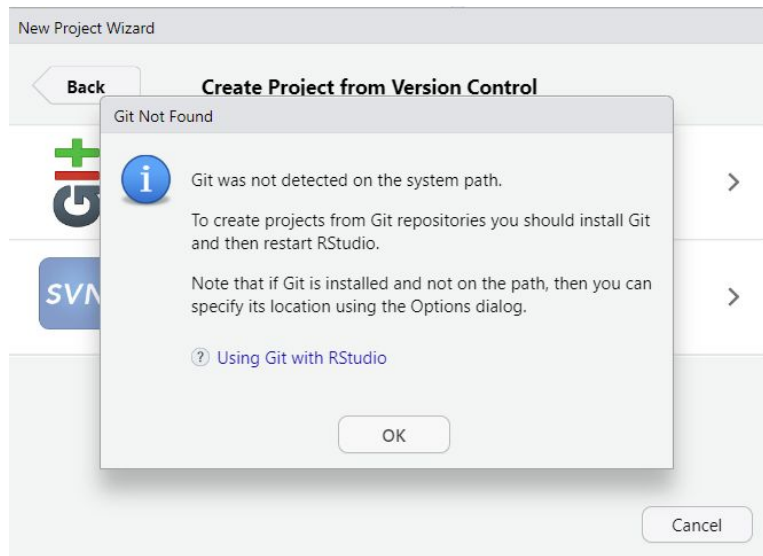
R/Rstudio: *GitHub* integration



R/Rstudio: *GitHub integration*



R/Rstudio: *GitHub* integration troubleshooting



- Then download git separately:
<https://github.com/git-guides/install-git>

R/Rstudio: *GitHub* integration troubleshooting

```
19:00:28: *** Please tell me who you are.
```

Run

```
git config --global user.email "you@example.com"  
git config --global user.name "Your Name"
```

- Then:
 - 1) Open your command line
 - 2) Copy/paste in: `git config --global user.email`
`"you@example.com"`
 - 3) Replace the text in quotes with the email you used to sign up for Github with
 - 4) Press enter
 - 5) Repeat with your username

R/Rstudio: *GitHub* integration troubleshooting

```
>>> /usr/bin/git push origin HEAD:refs/heads/main
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/en/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/amkaspar1/Bisc_404_Ecology_and_Biodiversity.git'
```



This is how I solved, step by step

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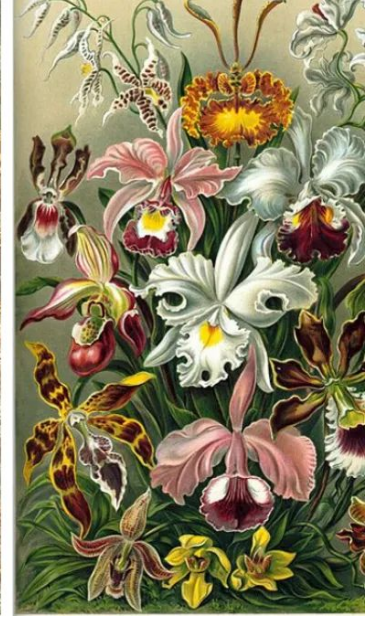
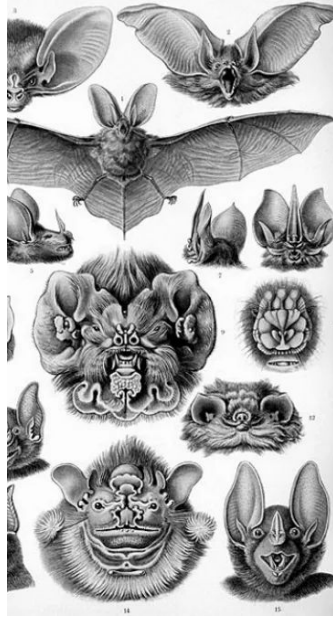


1. Click on your Profile Icon (top-right on Github website)
2. Settings
3. Developer settings (bottom-left)
4. Personal access tokens
5. fine-grained tokens
6. "Generate new token"
7. Write a Token name
8. Pick an expiration date from the menu or a custom one
9. Repository access> All repositories
10. Open "Repository permissions" menu
11. Look for the "Contents" row
12. From the menu at right select "Access> Read and Write"
13. "Generate token" (bottom-left)

Try to push in Rstudio. When prompted for your Github password, paste in this token instead

Resources

- Optional references
- Discussion forum
- R/Rstudio and Github
- **Course site and Google Sheet**



https://charleslehnen.github.io/BISC_404_Ecology_and_Biodiversity/

Welcome to BISC 499: Ecology and Biodiversity!

AUTHOR
Charles Lehnen and Melissa Guzman



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Lab Content

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Lab 3 - Population Growth

Lab 4 - Introduction to Interspecies Interactions

Lab 5 - Metapopulations and Biodiversity

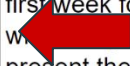
Lab 6 - Morphological Diversity and Diversification

Lab 7 - Introduction to Taxonomy and Phylogenies

Lab 8 - Lemur Phylogenies

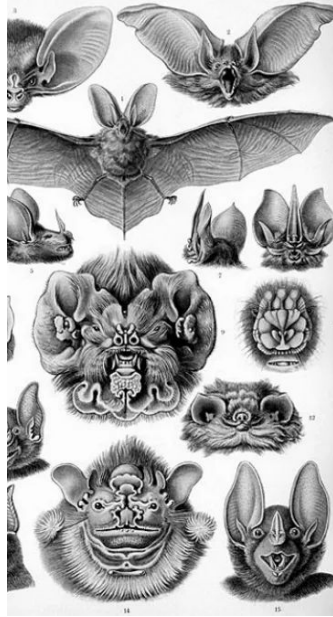
Additional Resources

<https://docs.google.com/spreadsheets/d/18BCc8ApQgtmC9Acz6XCzIB1pHc90SVMVrxfY95QJU10/edit#gid=0>

Instructor	Week	Topics/Daily Activities	Readings/Preparation	Papers	Lab	Deliverables	Notes
Melissa	Week 1 Jan 8, 10	Introduction to Ecology Ecology as a Science Scale in Ecology Patterns of Biological Diversity	Chapter 1, 2 Mittelbach 2019 Community Ecology	Background: Kingsland (1991) Levin (1992) McGill (2010) Hutchinson (1959) Mittelbach et al. (2007), Brown (2013) Wed discussion: Coelho et al (2023)	Lab 1: How to read a paper, Little, J and R. Parker (2010)	All students give a summary for scientific papers. Students will sign up on the first week for  present these papers	Homework this week is to download R and Rstudio as well as sign-up for Github
Melissa	Week 2 Jan 15 no class Jan 17	Diversity - Stability Biodiversity and Ecosystem functioning	Chapter 3 Mittelbach 2019 Community Ecology	Background: McCann (2000), Loreau et al (2001), Schindler et al. (2010) Wed discussion: Roslin et al (2017)	No Lab		
				Background: Woiwod and Hanski (1992), Kramer et al (2009), Monday Discussion:			

Agenda

- Introductions
- Resources
- **How to read a scientific paper**



What is a Scientific Paper?

Preclinical testing of anti-human CD28 Fab' antibody in a novel nonhuman primate (NHP) small animal rodent model of xenogenic graft-versus-host disease (GVHD)

Keli L. Hippen¹, Benjamin Watkins², Victor Tkachev³, Amanda M. Lemire¹, Charles Lehnen¹, Megan J. Riddle¹, Karnail Singh², Angela Panoskaltzis-Mortari¹, Bernard Vanhove^{4,5}, Jakub Tolar¹, Leslie S. Kean^{#3}, and Bruce R. Blazar^{#1}

¹Department of Pediatrics, Division of Hematology/Oncology and Blood and Marrow Transplantation, University of Minnesota; Minneapolis, MN USA 55455

²Aflac Cancer and Blood Disorders Center, Children's Healthcare of Atlanta, Emory University, Atlanta GA

³Ben Towne Center for Childhood Cancer Research, Seattle Children's Research Institute, Seattle WA, the University of Washington, Seattle WA, and the Fred Hutchinson Cancer Research Center, Seattle WA

⁴INSERM, UMR 1064-Center for Research in Transplantation and Immunology, Nantes, F44093 France; ITUN, CHU Nantes, Nantes, F44093 France; University of Nantes, Nantes, F44093 France

⁵Effimune SA, Nantes, France

⁶Department of Medicine, Division of Hematology/Oncology and Transplantation, University of Minnesota; Minneapolis, MN USA 55455

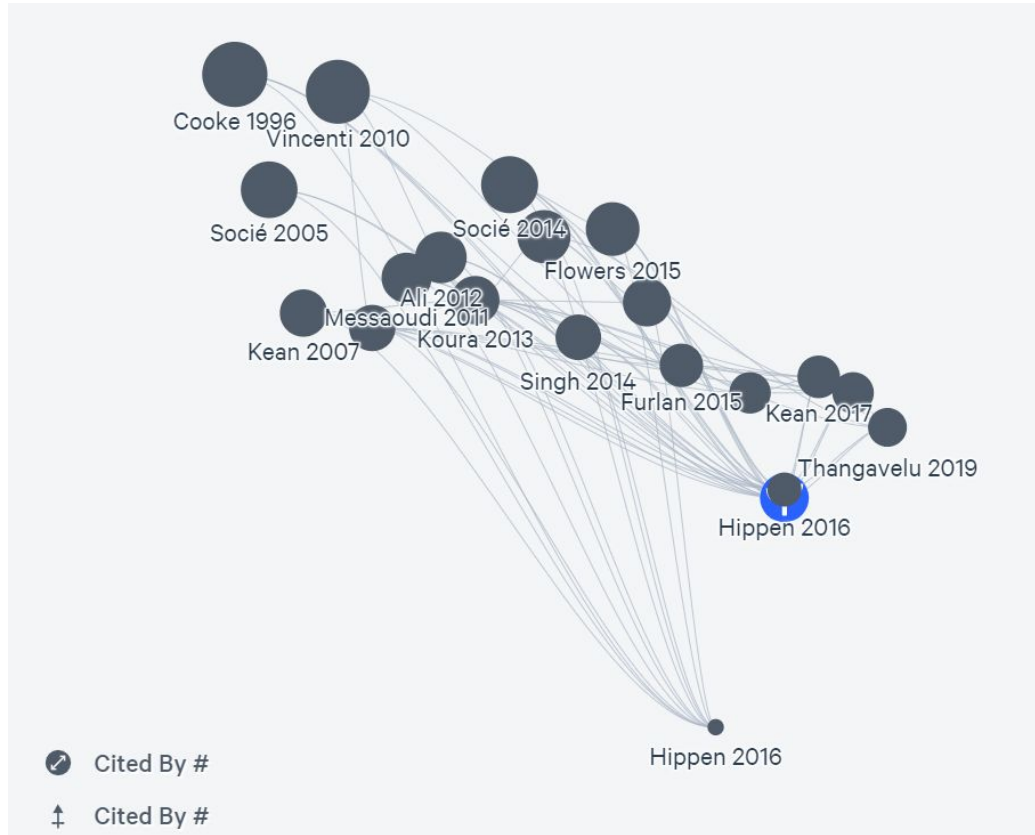
[#] These authors contributed equally to this work.

Abstract

Background—Graft-versus-host disease (GVHD) is a severe complication of hematopoietic stem cell transplantation. Current therapies to prevent alloreactive T cell activation largely cause generalized immunosuppression and may result in adverse drug, anti-leukemia and anti-pathogen responses. Recently, several immunomodulatory therapeutics have been developed that show efficacy in maintaining anti-leukemia responses while inhibiting GVHD in murine models. To analyze efficacy and better understand immunological tolerance, escape mechanisms, and side-

Hippen, Keli L., et al. "Preclinical testing of anti-human CD28 Fab antibody in a novel nonhuman primate (NHP) small animal rodent model of xenogenic graft-versus-host disease (GVHD)." Transplantation 100.12 (2016): 2630.

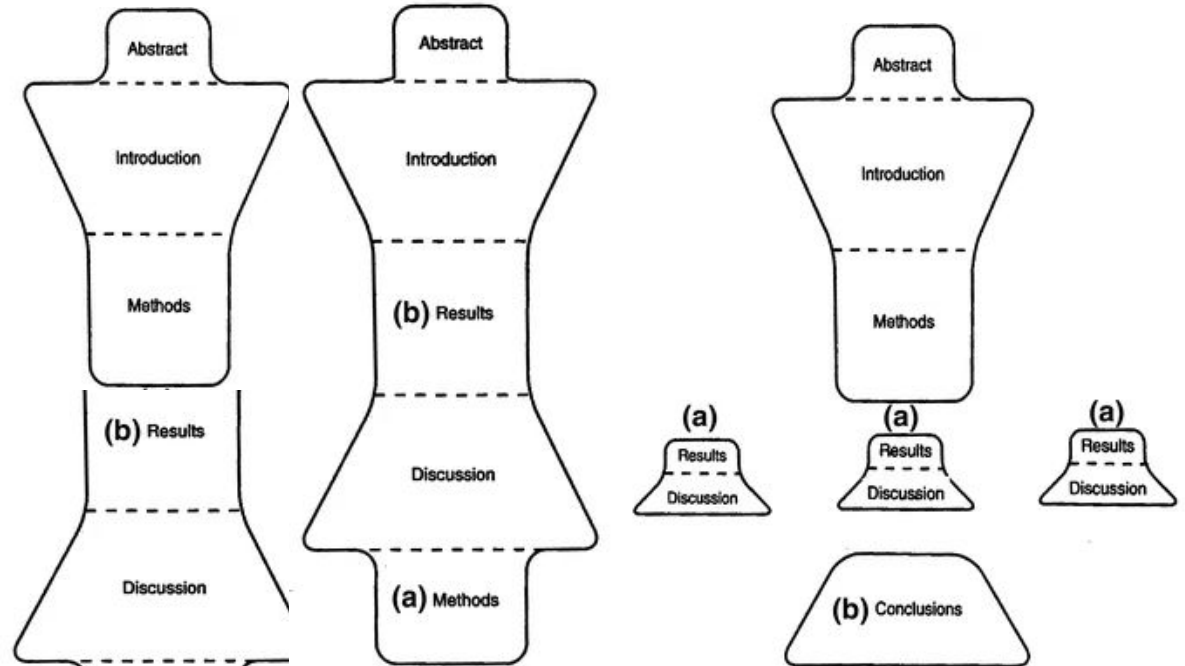
What is a Scientific Paper?



How to Read a Paper

1. How are papers organized?

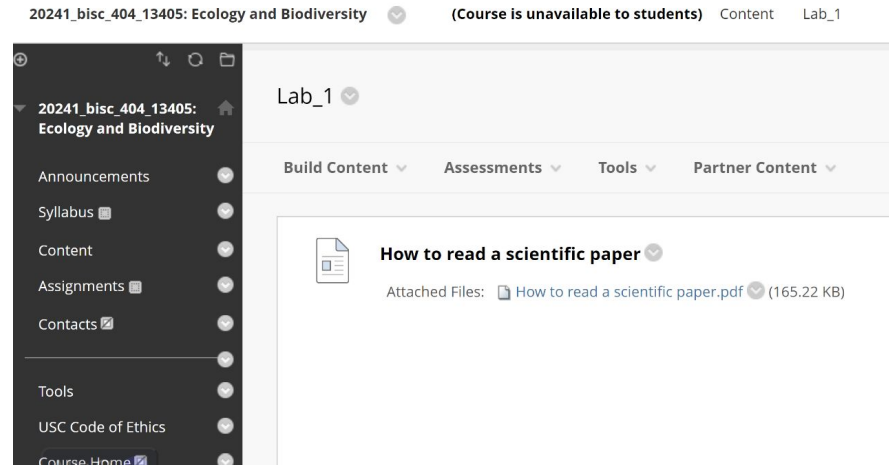
- Summary or Abstract
- Introduction
- Materials and Methods
- Results
- Discussion



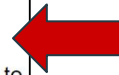
Englander, Karen. "Writing the Five Principal Sections: Abstract, Introduction, Methods, Results and Discussion." *Writing and Publishing Science Research Papers in English*. Springer, Dordrecht, 2014. 39-55.

How to Read a Paper

1. How are papers organized? Why are papers organized this way?
2. How do I prepare to read a paper, particularly in an area not so familiar to me?
3. What difficulties can I expect?
4. How do I understand and evaluate the contents of the paper?



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Melissa	Week 3 Jan 22, 24	Population growth and density dependence	Chapter 4 Mittelbach 2019 Community Ecology	Background: Woiwod and Hanski (1992), Kramer et al (2009), Monday Discussion: Johnson et al (2012), Wednesday discussion: Gotelli et al. (2017)	Lab 2: Introduction to R and Github		



CC

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CRASH COURSE HISTORY OF SCIENCE

ECOLOGY

