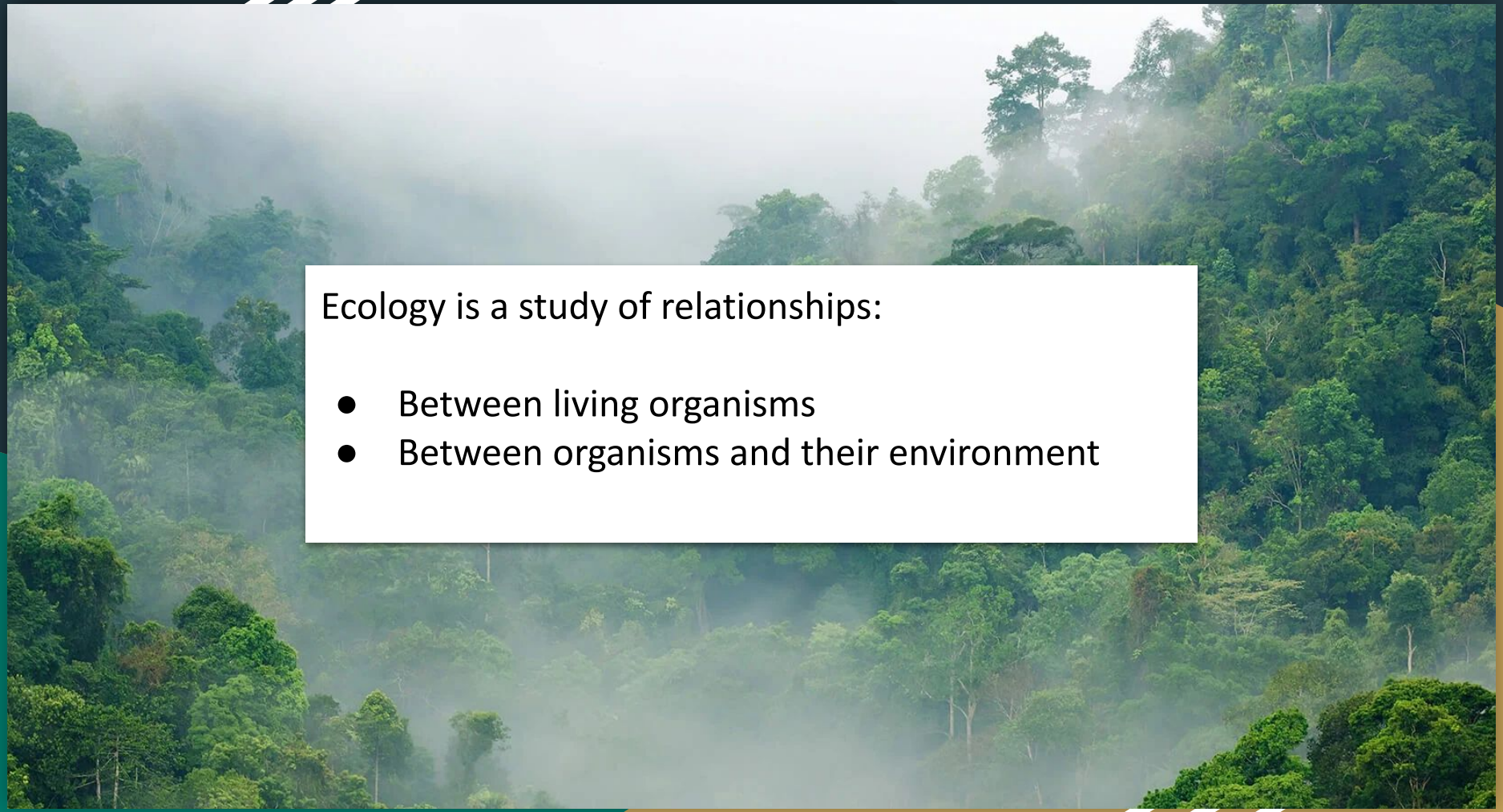
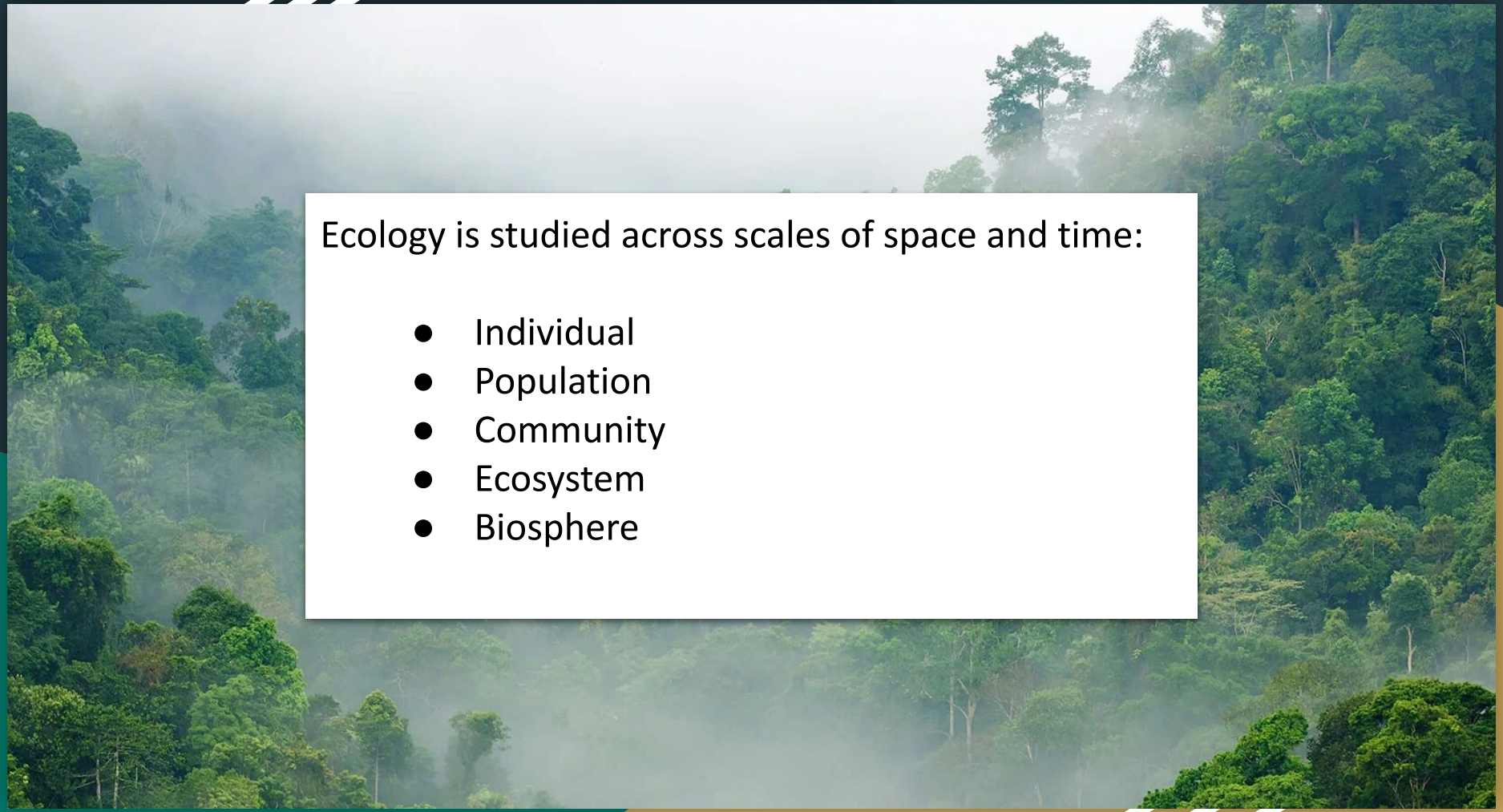
© Charles Lehnen 2023



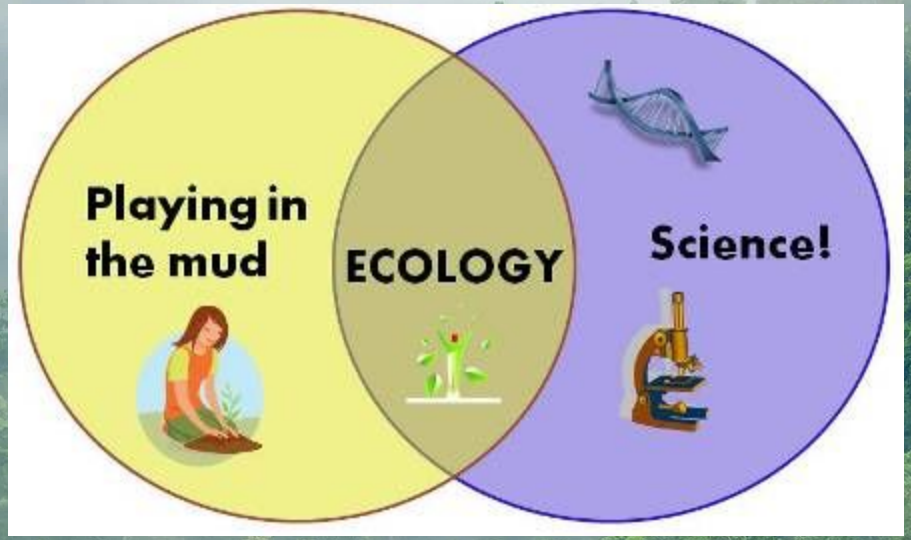
Ecology is a study of relationships:

- Between living organisms
- Between organisms and their environment



Ecology is studied across scales of space and time:

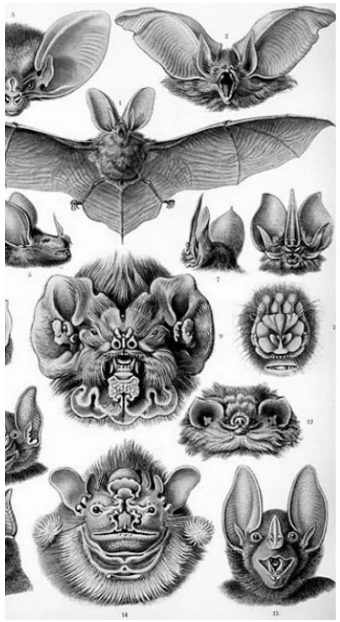
- Individual
- Population
- Community
- Ecosystem
- Biosphere



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

Agenda

- Introductions
- References
- How to read a scientific paper



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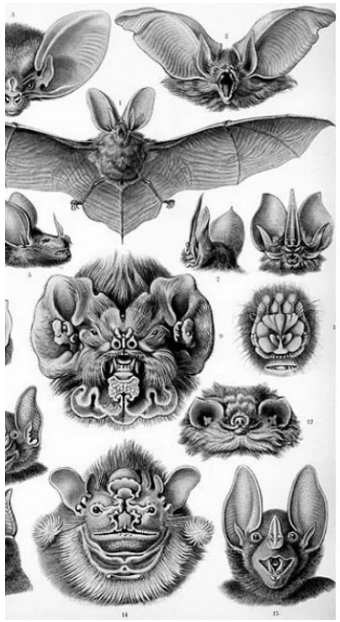
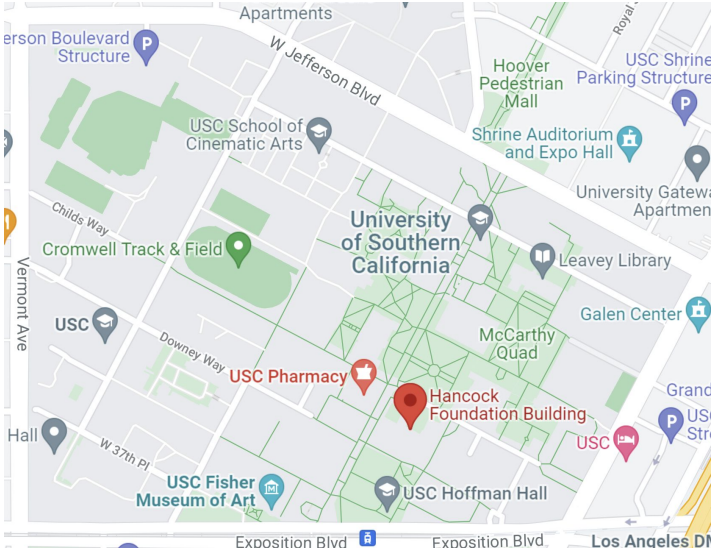
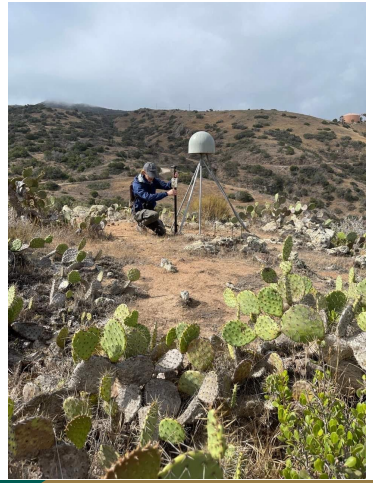


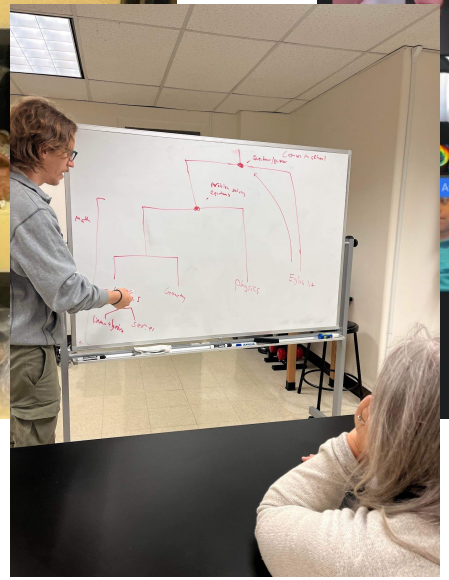
Charles Lehnen

(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







Andrea Morfin Valencia
Charles Lehnen
Luca
ferra
D'Kai's iPad
Ethan Garcia
shabaz
Ask to Unmute
Leonardo and sebastian
Mrs. Jess (she/her)
Chloee
Chloee

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?

Agenda

- Introductions
- **Resources**
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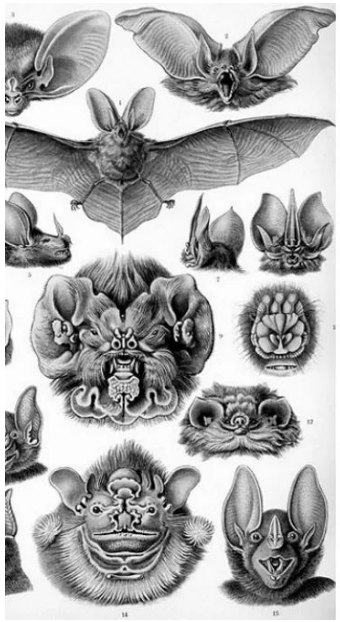

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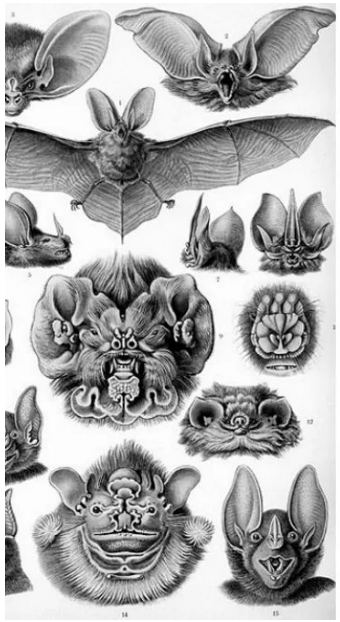
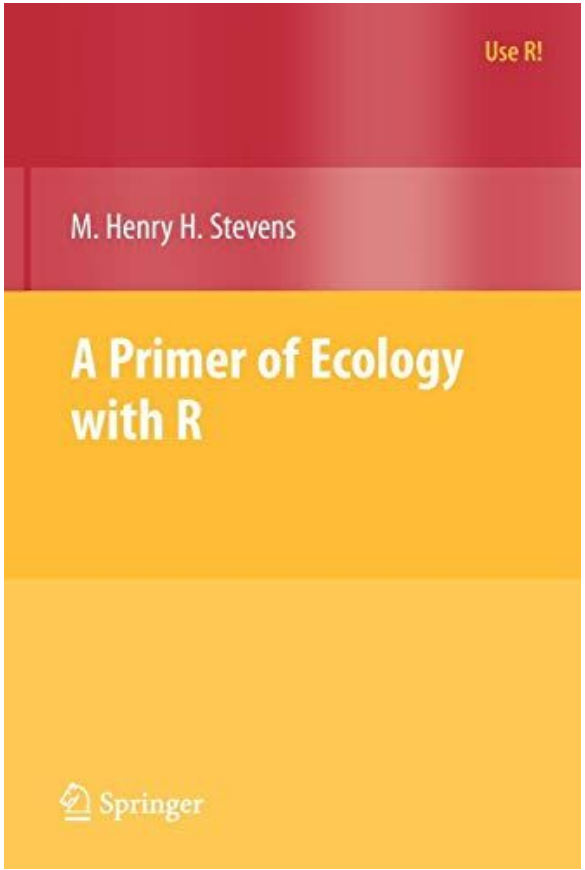


Optional Resource

A Primer of Ecology with R

Martin Henry H. Stevens

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



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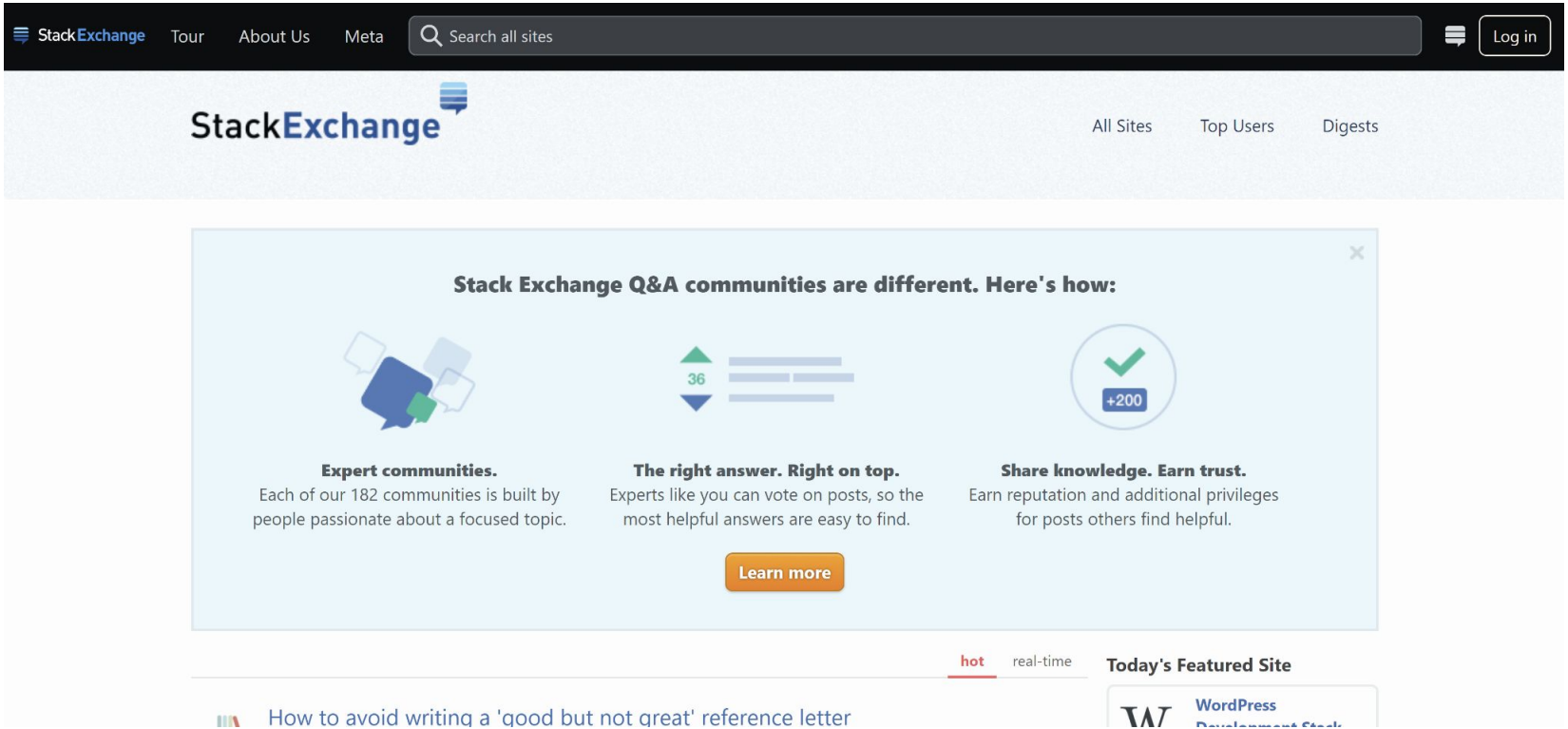

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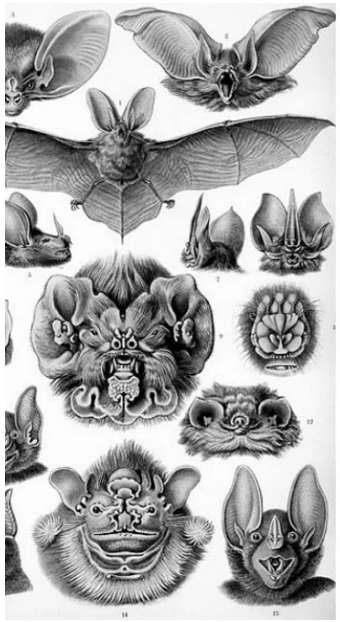

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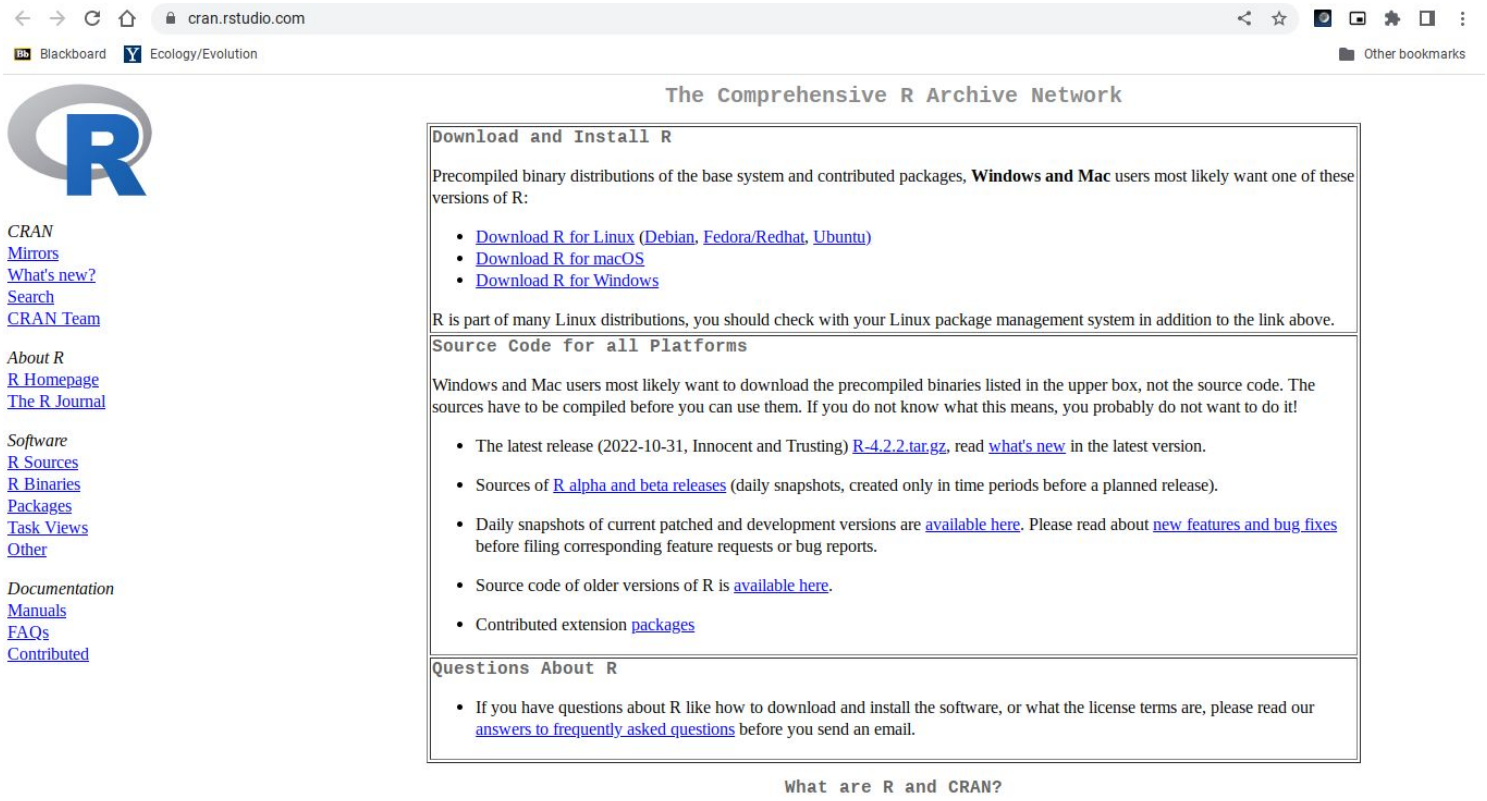
R/Rstudio: *cran.rstudio.com*



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.

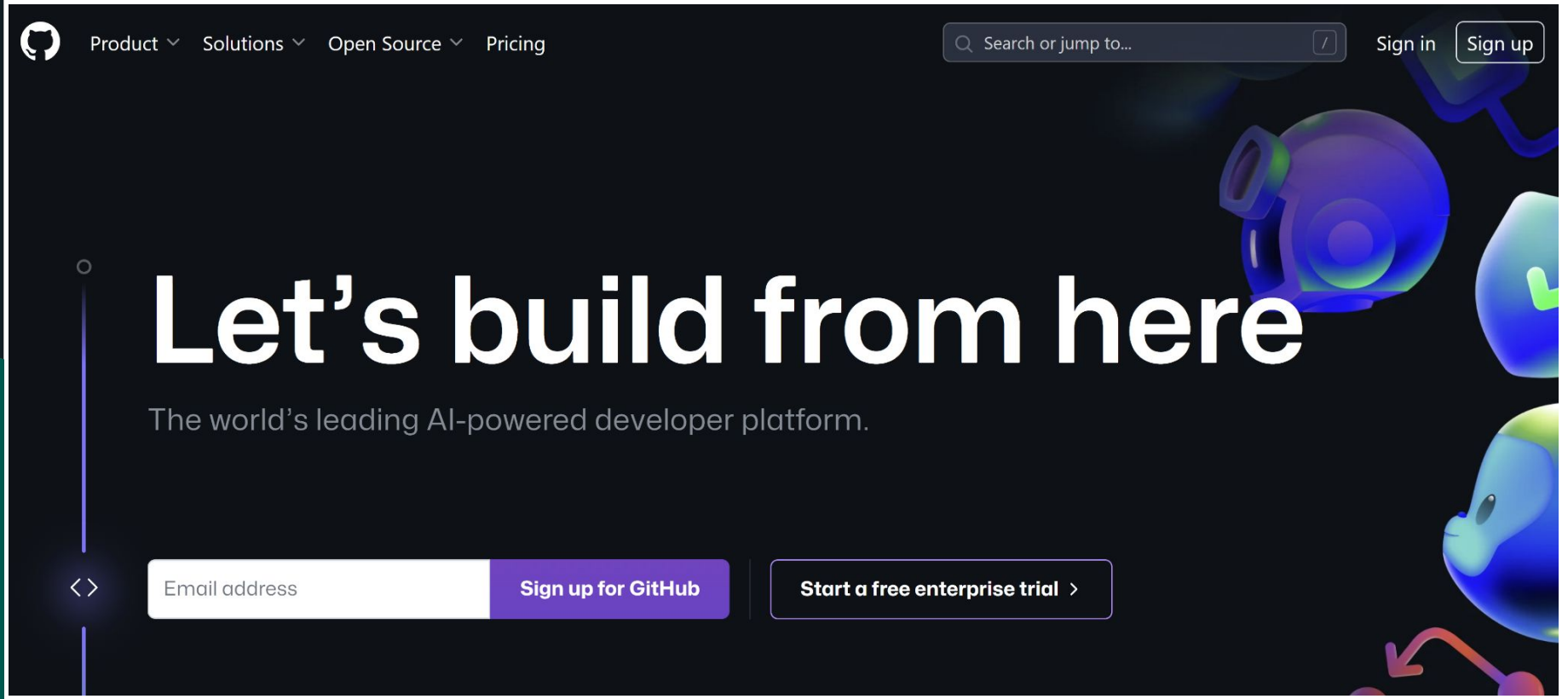
DOWNLOAD AND INSTALL R

2: Install RStudio

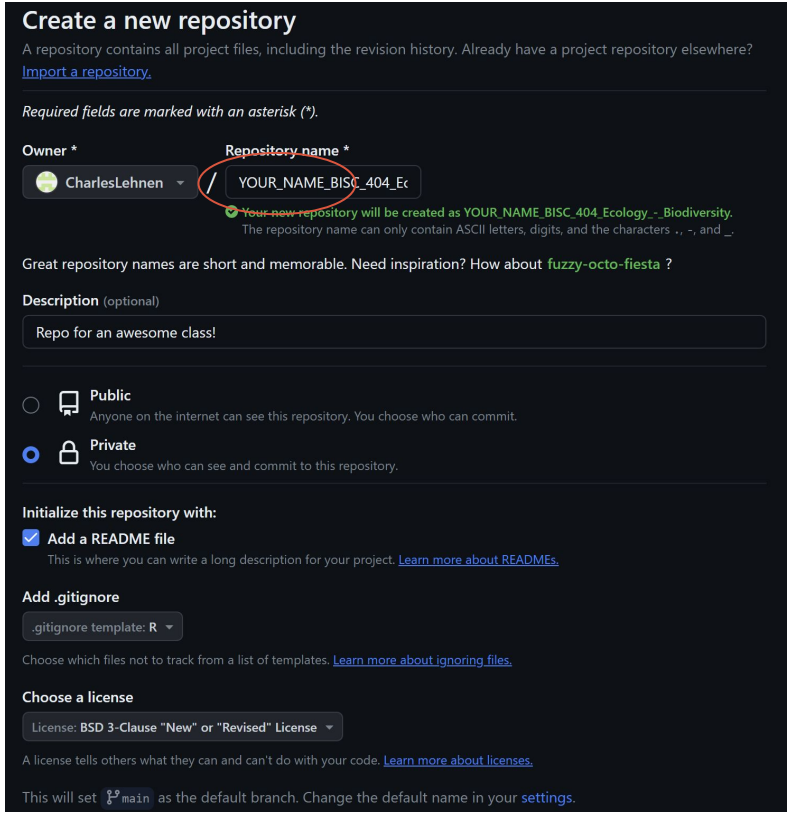
DOWNLOAD RSTUDIO DESKTOP FOR WINDOWS

Size: 215.66 MB | SHA-256: 93C7F307 | Version: 2023.12.0+369 | Released: 2023-12-20

https://github.com/



R/Rstudio: *GitHub integration*



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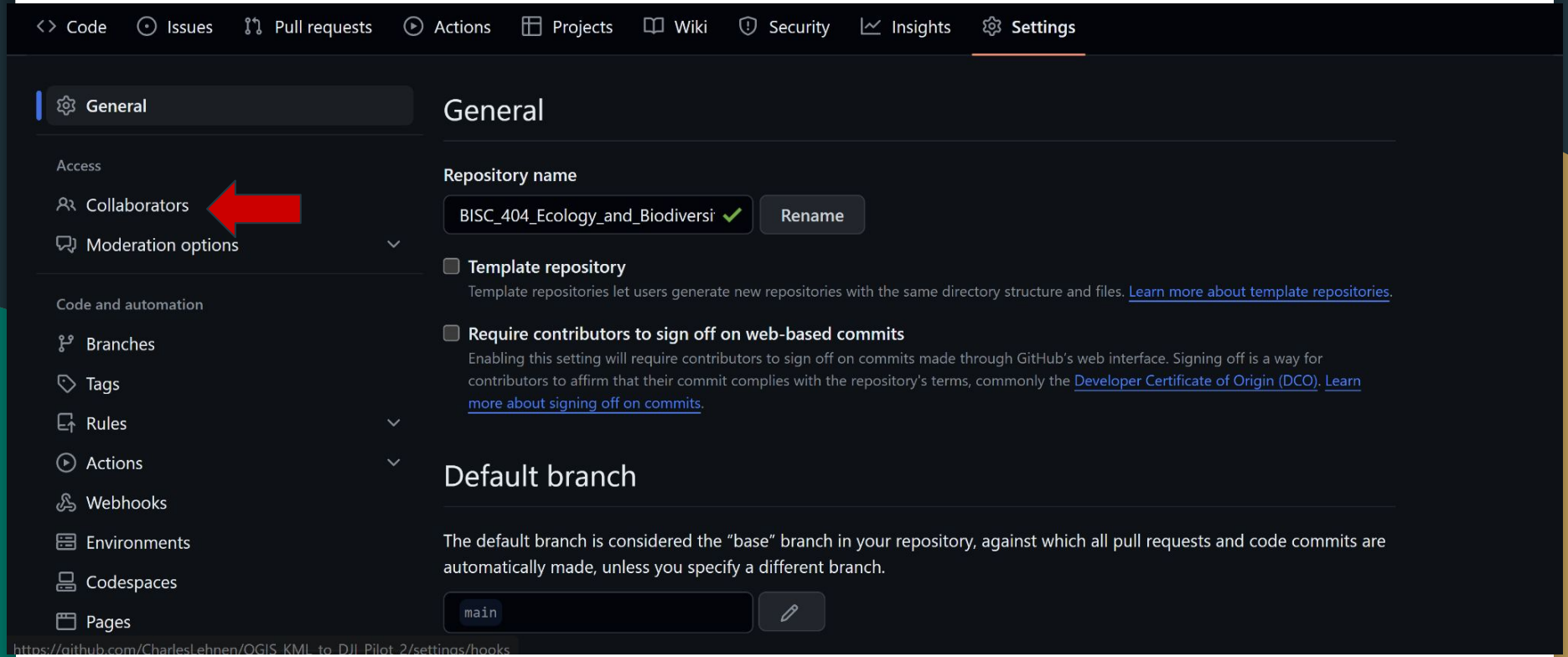

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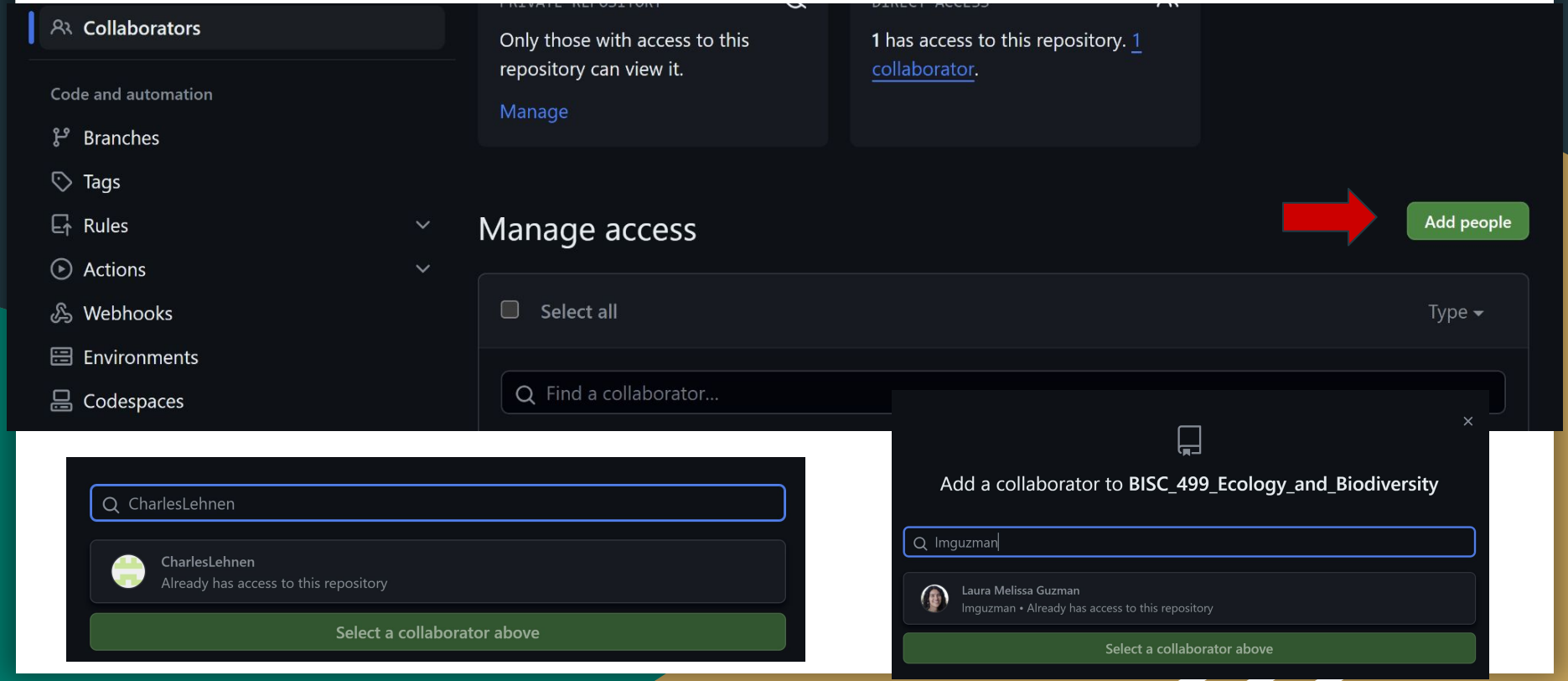


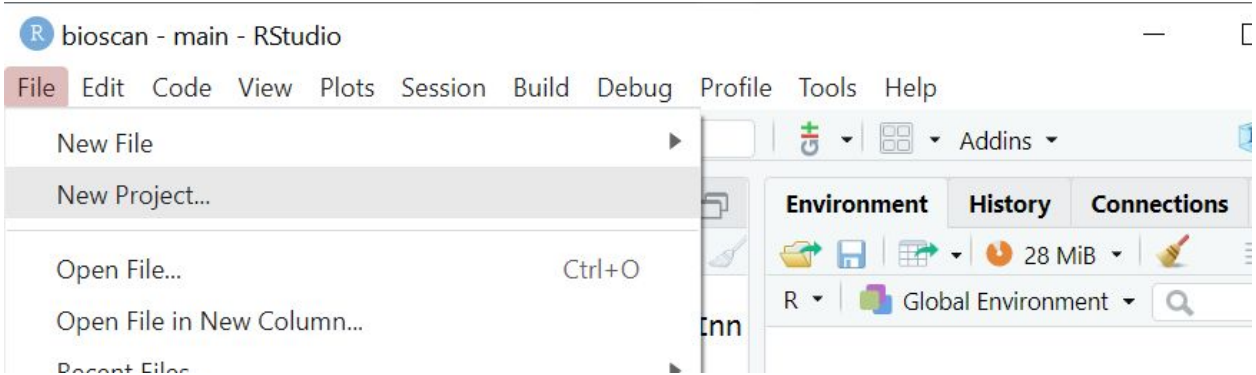
R/Rstudio: *GitHub integration*

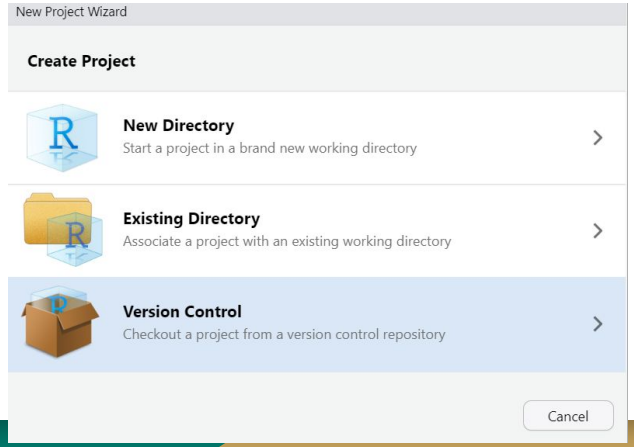
Download and install Git with default settings

- 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*





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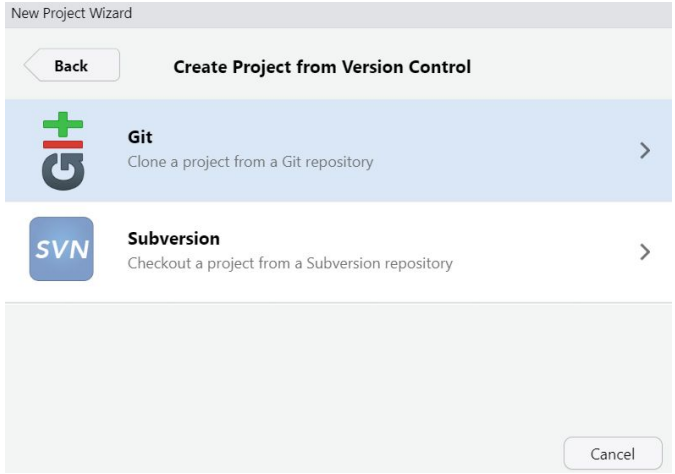

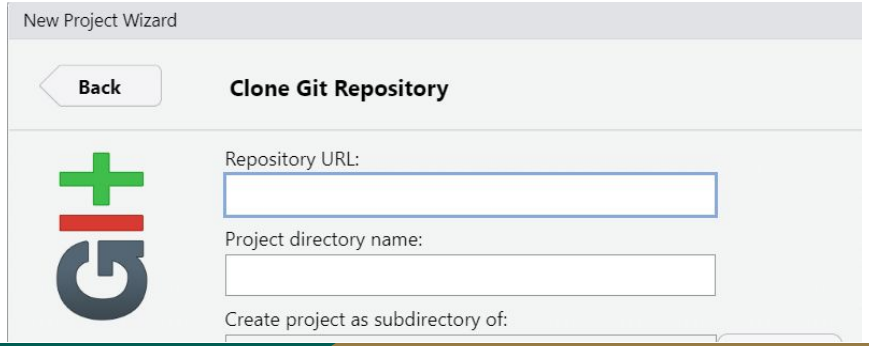

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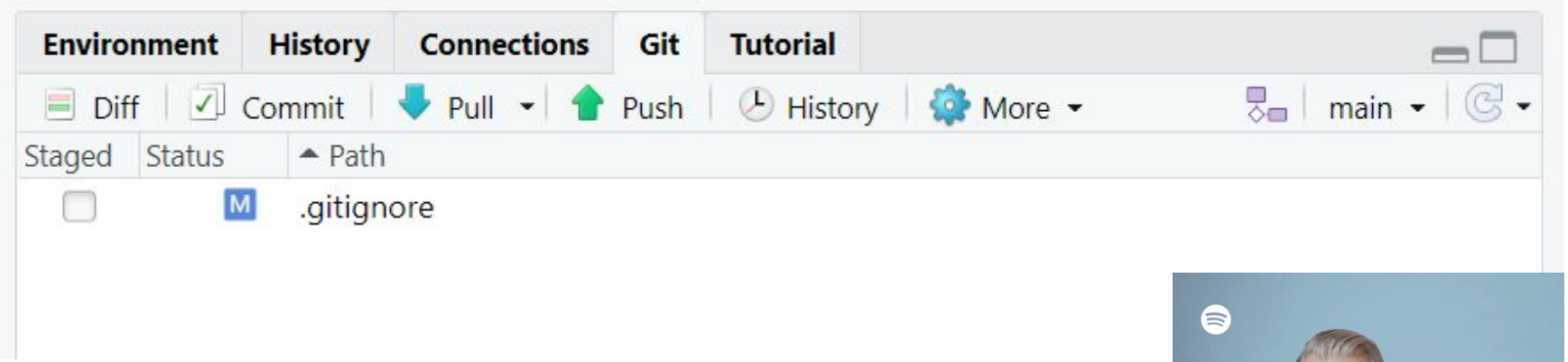
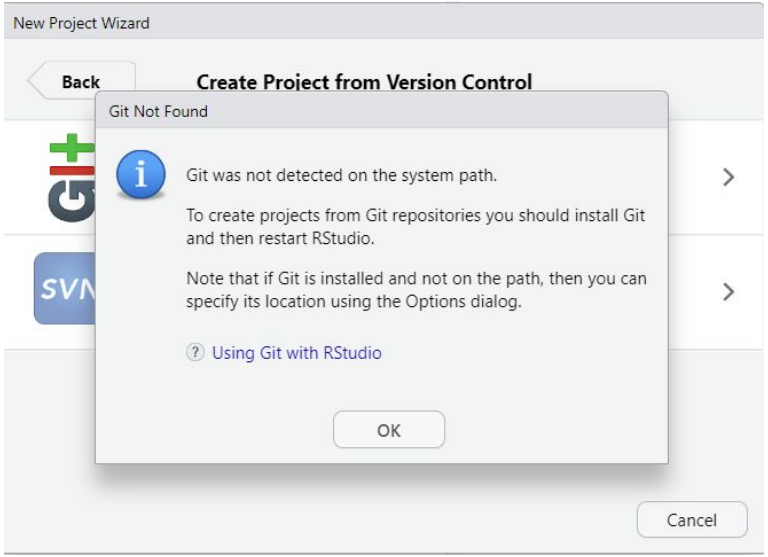
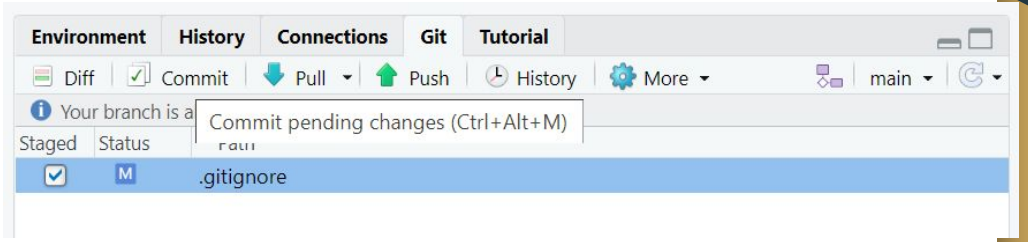


R/Rstudio: *GitHub integration troubleshooting*





- 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/'
```

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This is how I solved, step by step

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
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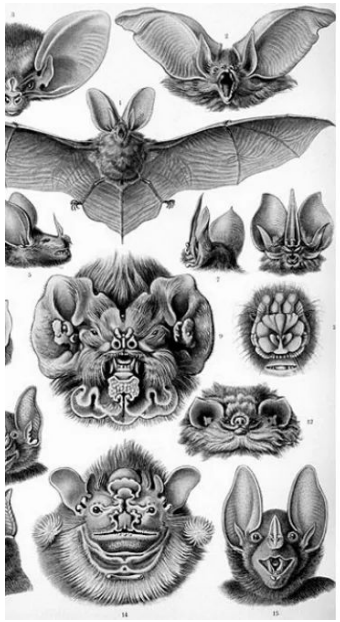
- **Course site and Google Sheet**



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

Welcome to BISC 499: Ecology and Biodiversity!

AUTHOR

Charles Lehnen and Melissa Guzman

Table of contents

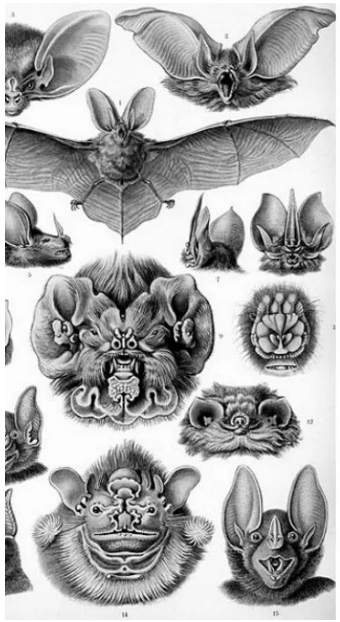
- Lab Content
  - Lab 2 - Introduction to R
  - Lab 3 - Population Growth
  - Lab 4 - Introduction to Interspecies Interactions
  - Lab 5 - Metapopulations and Biodiversity
  - Lab 6 - Morphological Diversity and Diversification
  - Lab 7 - Introduction to Taxonomy and Phylogenies
  - Lab 8 - Lemur Phylogenies
- 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 w… 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. Hippen[1], **Benjamin Watkins**[2], **Victor Tkachev**[3], **Amanda M. Lemire**[1], **Charles Lehnen**[1], **Megan J. Riddle**[1], **Karnail Singh**[2], **Angela Panoskaltsis-Mortari**[1], **Bernard Vanhove**[4,5], **Jakub Tolar**[1], **Leslie S. Kean**[#3], and **Bruce R. Blazar**[#1]

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

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

[3]Ben 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

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

[5]Effimune SA, Nantes, France

[6]Department 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.

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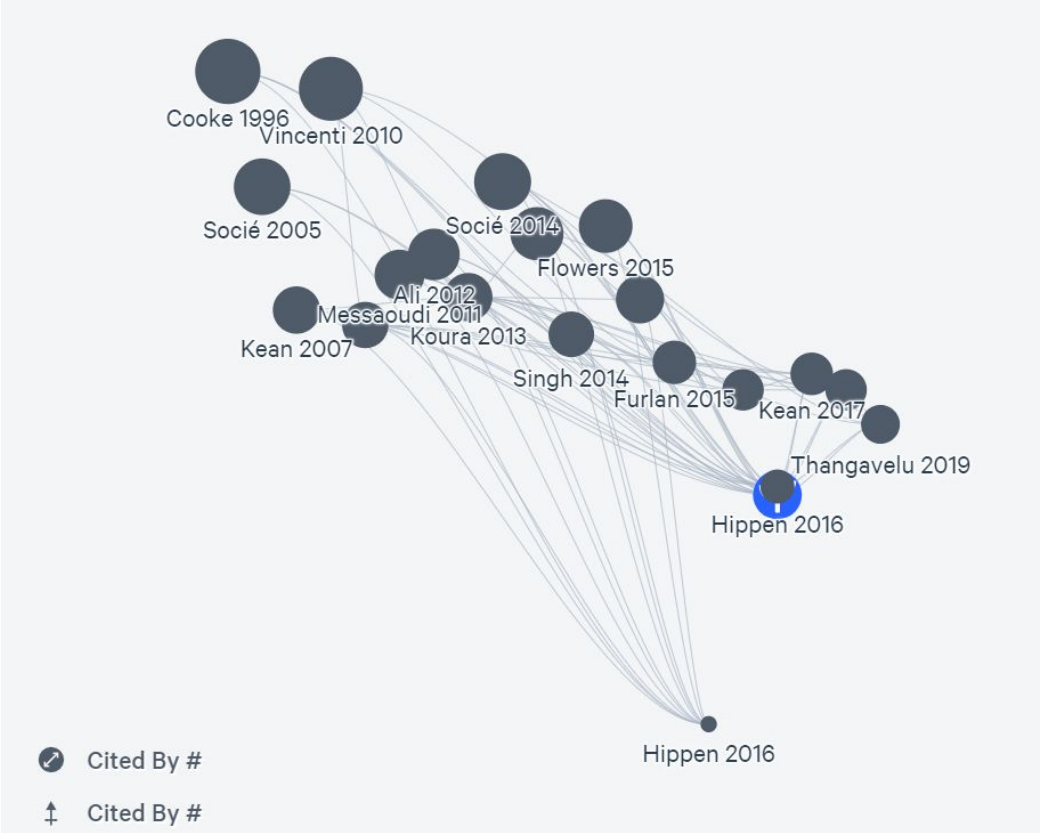
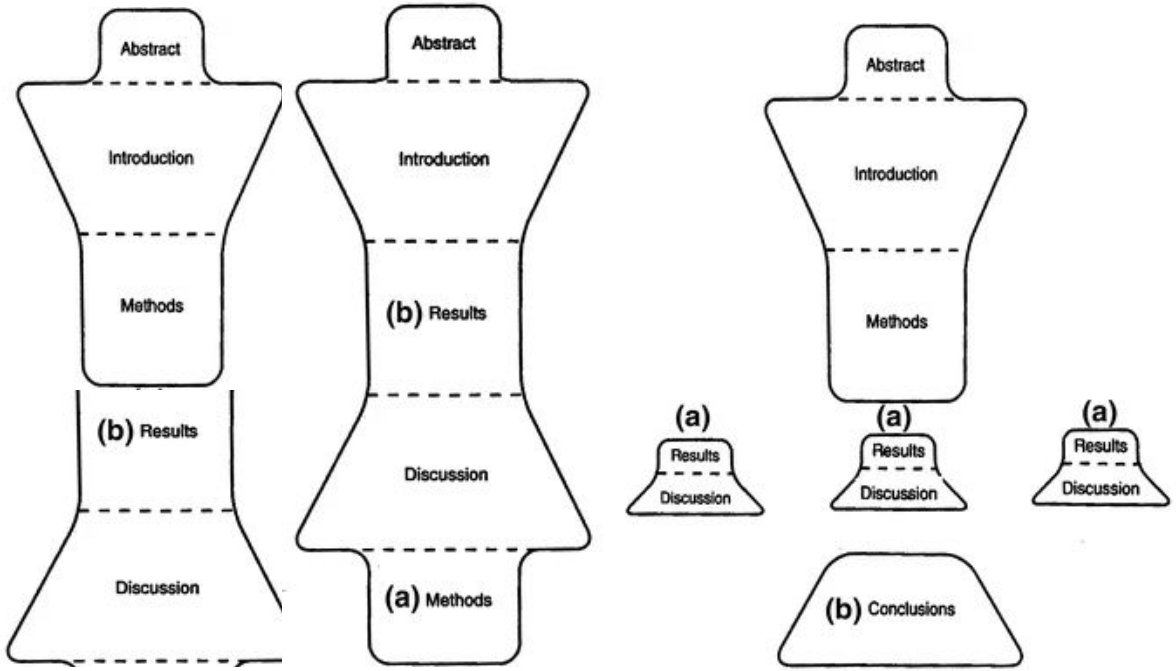


How to Read a Paper

1. How are papers organized?

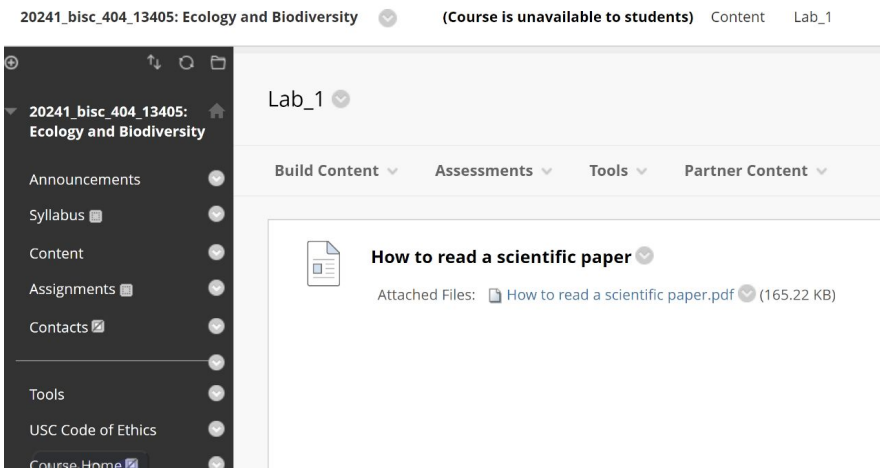
    - Summary or Abstract
    - Introduction
    - Materials and Methods
    - Results
    - Discussion



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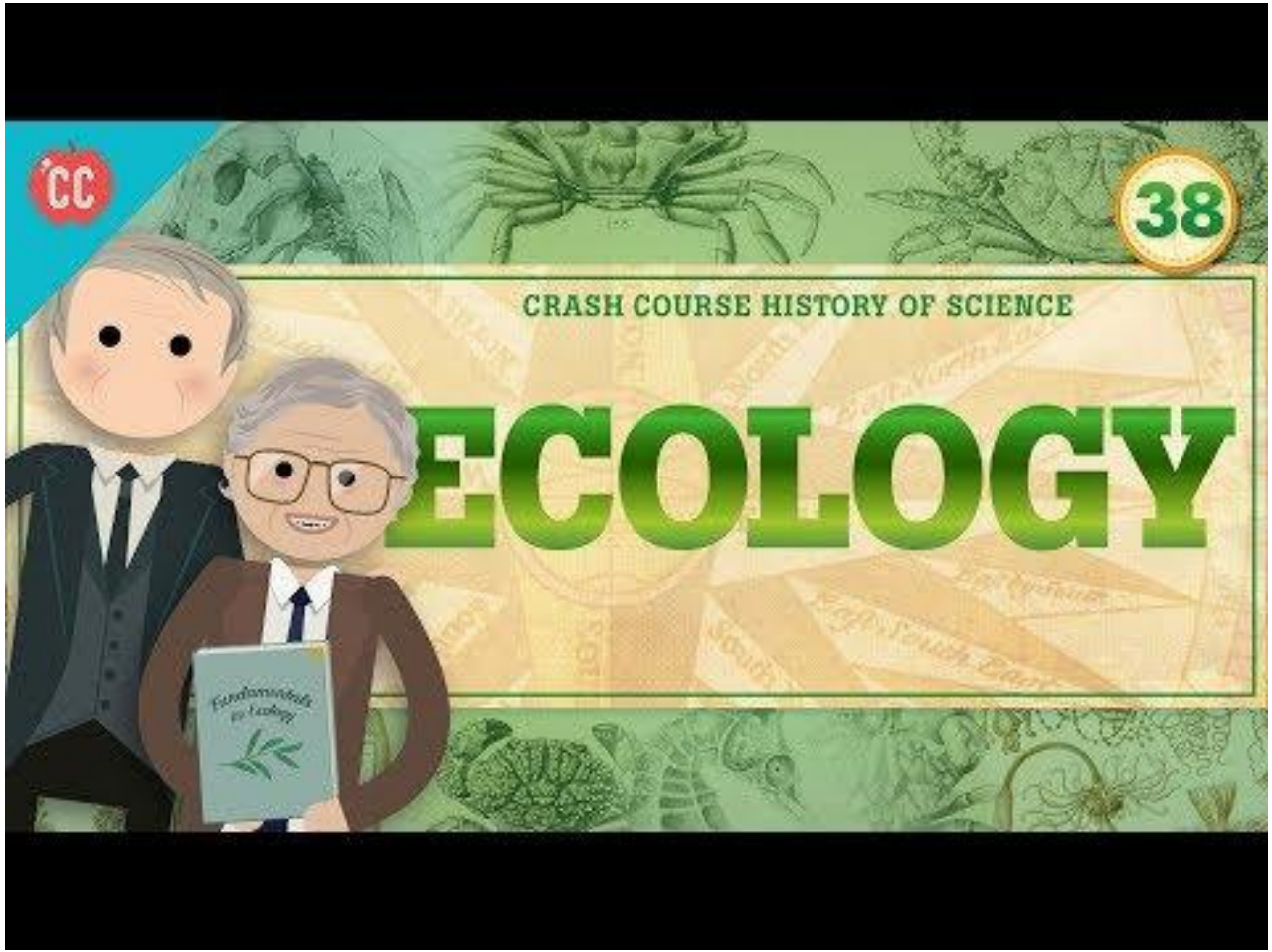
Melissa	Week 3 Jan 22, 24	Population growth and density dependence	Chapter 4 Mittelbach 2019 Community Ecology	Background: Woiwod and Hanski (1992), Kramer et al (2009), Monday Discussion: Johnson et al (2012), Wednesday discussion: Gotelli et al. (2017)	Lab 2: Introduction to R and Github		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CRASH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