

# Visualization of ecological data

(3 credits)

## FNR 6615C

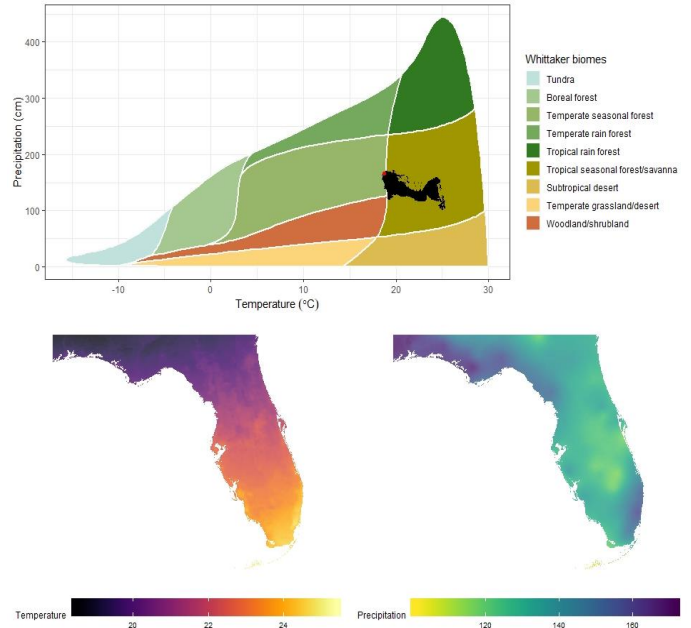
**Dr. Daniel J. Johnson**

363 Newins-Ziegler Hall

johnson.daniel@ufl.edu

352-273-0295

Student hour: Tuesday 12:30-1:30 pm, other times by appointment



### Course description

Equip students to work with big (ecological) data, with focus on data visualization as exploratory data analysis. Students will understand the importance and basics of data management and effective visualization and will be able to read data into R from external sources (csv, txt) and be able to check and manipulate data types. They will communicate their data and/or findings using R, Rstudio, and Rprojects, as well as make basic statistical summaries and plots of data.

### Class hours and location

**Tuesday 10:40 – 11:30 NZ 222**

**Thursday 10:40 – 12:35 NZ 222**

We will use CANVAS for all assignments, grades, resources and announcements.

Make sure that under Account > Notifications, “Announcements” are set to “Notify me right away”

*Visualization gives you answers to questions you didn't know you had.*

*-Ben Schneiderman*

### Learning objectives

By the end of this course, the student will be able to:

- Import, manipulate, organize, manage and visualize data sets with R
- Choose and implement appropriate visualization methods for exploratory data analysis or the presentation of results, depending on the type of data and visualization objective
- Create publication-quality graphics

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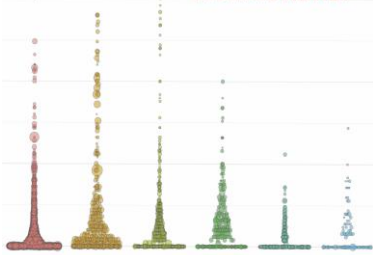
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## DATA VISUALIZATION

A PRACTICAL INTRODUCTION

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You will need to a computer for this class with R (<https://www.r-project.org/>) and Rstudio (<https://posit.co/>) installed.

There are several free online resources that we will use (selectively):

*R for Data Science* by Garrett Grolemund and Hadley Wickham (<https://r4ds.hadley.nz/>)

*Data Visualization* by Kieran Healy (<https://socviz.co/>)

*The tidyverse style guide* by Hadley Wickham (<https://style.tidyverse.org/>)

*Ggplot2: elegant graphics for data analysis* by Hadley Wickham (<https://ggplot2-book.org/>)

*The greatest value of a picture is when it forces us to notice what we never expected to see.*

-John Tukey

## Course requirements

We expect students to have a working knowledge of R. Please contact the instructors if in doubt. This course will be delivered as a hands-on experience. If you miss classes, and especially labs, you are required to do the work on your own – which can be challenging though recordings will be made available.

We strongly encourage peer to peer learning; this means that we expect those less experienced to ask questions to those more experienced, and vice versa, that more experienced students are willing to help others. To facilitate more interaction team-based activities will be implemented.

There will be **5 assignments**, spaced ~2 weeks apart. The **final project** will be a “storyboard”, +/- 4 figures based on (ideally your own) data sets. You will be required to present your story board to the class as well as produce a written document.

## Course evaluations

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.ua.ufl.edu/public-results/>.

## About the instructors

Dr. Dan Johnson is an Associate Professor in the School of Forest, Fisheries, and Geomatics Sciences. He has a PhD in Biology (Indiana University), MS in Environmental Science (Indiana University) and a BS in Forestry (Purdue University).



Teaching Philosophy: I strongly believe that a college education is not meant to simply relate facts and skills, but to provide the basic framework for the life-long adventure of learning. I approach class time as an explorer and guide while leading classes on an expedition of the knowledge landscape. I love making graphs.

# Grading policy

Assignments .....	40% of total
Quizzes.....	10% of total
Final project .....	50% of total

Assignments and quizzes compose 50% of the final grade, the final project the other 50%.

## Grading Policy

<b>A</b>	92.0-100
<b>A-</b>	90.0-91.9
<b>B+</b>	86.7-89.9
<b>B</b>	83.7-86.6
<b>B-</b>	80.0-83.6
<b>C+</b>	76.7-79.9
<b>C</b>	73.7-76.6
<b>C-</b>	70.0-73.6
<b>D+</b>	66.7-69.9
<b>D</b>	63.7-66.6
<b>D-</b>	60.0-63.6
<b>E</b>	< 60.0

More information on UF grading policy may be found at:

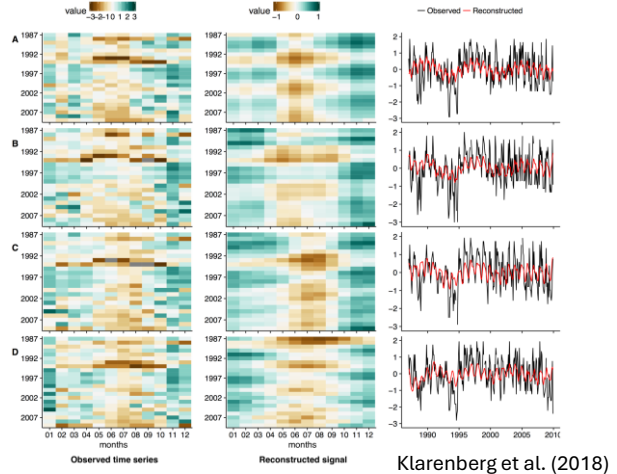
<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

*All grades will be announced on CANVAS. You have 1 week after grades are returned to discuss the grade. After this, grades are final.*

# Code of Conduct

We provide a welcoming and supportive environment for all people, regardless of background or identity. By participating in this community, participants accept to abide by these ground rules. Any form or behavior to exclude, intimidate, or cause discomfort is a violation of these ground rules. In order to foster a positive and professional learning environment we expect and encourage the following kinds of behaviors in all platforms and events:

- Use welcoming and inclusive language
- Be respectful of different viewpoints and experiences
- Gracefully accept constructive criticism
- Focus on what is best for the community
- Show courtesy and respect towards other community members



# Class expectations

## Attendance

Attendance is strongly encouraged, especially labs on Thursdays.

If you will be absent, inform the instructors at least a week in advance.

In the case of emergency absences, inform the instructors as soon as possible.

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

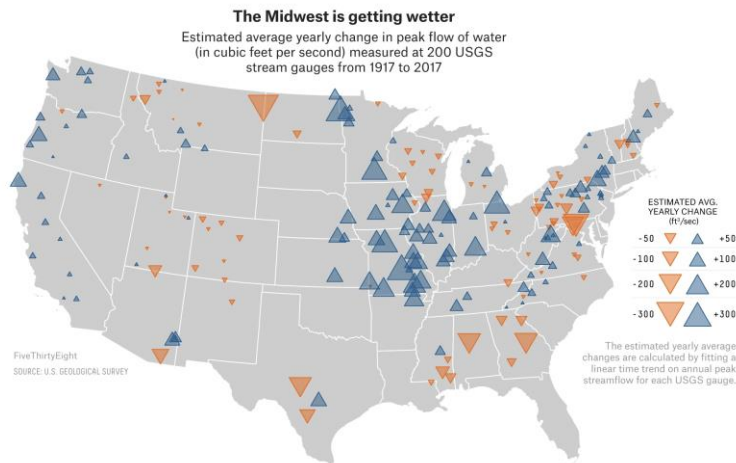
<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

```
heatmap_recon1<-ggplot(subset(mydata_melt,variable=="recon"),aes(x=months,y=years,fill=value))+
geom_tile()+
scale_fill_gradientn(colours = cols_recon,limits=c(-1.5,1.5),breaks = c(-1.5,0,1.5))+
xlab("")+ylab("")+
scale_y_discrete(limits = rev(levels(mydata_melt$years)), breaks=seq(1987,2009,by=5))+
theme(plot.margin = unit(c(0, 0, 0, 0), "cm"))+ #top,right,bottom,left
theme(axis.text.x=element_blank())+
theme(legend.positions="top")
```

## Late / make-up work

Late assignments will be graded as follows:  
 < 24 hrs: -10%  
 < 48 hrs: -25%  
 > 48 hrs: -50%

Make up work: contact the instructor to agree on new deadlines (only for excused absences)



# UF policies

## Software use

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All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. *We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.*

## Honesty policy

UF students are bound by The Honor Pledge which states, *“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.”* On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: *“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*

The Honor Code

(<https://policy.ufl.edu/regulation/4-040/>) specifies a number of behaviors that are in violation of this code and the possible sanctions.

Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

## In-class recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal education use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and deliver by an instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless, of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

## Student privacy

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the “Get Started With the DRC” webpage on the Disability Resource Center site <https://disability.ufl.edu/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible, in the semester.

## Whole Gator App

The Whole Gator and website and app connects UF students with resources dedicated to supporting overall health and well-being. In addition to many of the resources below it also has strategies to practice self-care. <https://one.ufl.edu/whole-gator/topics>

### Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non- crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352- 392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Student Success Initiative, <http://studentsuccess.ufl.edu>

### Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

Career Connections Center: Reitz Union Suite 1300, 352-392- 1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email [ask@ufl.libanswers.com](mailto:ask@ufl.libanswers.com) for more information.

Teaching Center: 1317 Turlington Hall, 352-392-2010 or to make an appointment. 352- 392-6420. General study skills and tutoring.

Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information.

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information.

### Student Complaints:

Residential Course: <https://www.ombuds.ufl.edu/complaint-portal/>

Online Course: <https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint>

