

## Overview

### FW8051 Statistics for Ecologists

Department of Fisheries, Wildlife and Conservation Biology



*Demonstrate an ability to implement a variety of statistical models and methods in frequentist and Bayesian frameworks*

*Demonstrate an understanding of a range of advanced statistical modeling techniques and an ability to choose an appropriate method depending on characteristics of the data.*

Will consider models for:

- Normal (i.e., Gaussian) data with constant variance (linear regression)
- Non-linear predictor-response relationships
- Data with non-constant variance (generalized least squares)
- Count and binary data (generalized linear models)
- Correlated data (mixed models, generalized estimating equations, cluster-level bootstrap).

*Will fit models using frequentist and Bayesian frameworks (using JAGs).*

Bring a computer every day to class!

*Demonstrate “model literacy” – be able to describe a variety of statistical models and their assumptions using equations and text and match parameters in these equations to estimates in computer output.*

```
Call:
lm(formula = age ~ proportion.black, data = LionNoses)

Residuals:
    Min       1Q   Median       3Q      Max
-2.5449 -1.1117 -0.5285  0.9635  4.3421

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.8790    0.5688   1.545   0.133
proportion.black 10.6471    1.5095   7.053 7.68e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.669 on 30 degrees of freedom
Multiple R-squared:  0.6238,    Adjusted R-squared:  0.6113 
F-statistic: 49.75 on 1 and 30 DF,  p-value: 7.677e-08
```

We will work on this nearly every day in class!

*Conduct research using a workflow that maximizes 'reproducibility' of your work.*

- Projects in Rstudio
- rmarkdown, knitr
- Project/file management

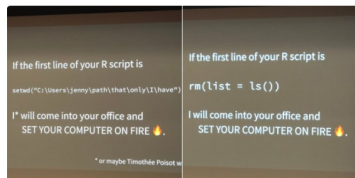
Homework and in-class assignments will give you experience with tools in R/Rstudio for reproducible research



**Hadley Wickham**   
@hadleywickham

Following

The only two things that make @JennyBryan 🤔😡👹. Instead use projects + here::here() #rstats



4:50 PM - 10 Dec 2017

295 Retweets 950 Likes



*Gain an appreciation for challenges associated with selecting among competing models and performing multi-model inference.*

- Multiple Models Topic will cover various model building strategies

## Self and Peer Evaluations

I use a combination of self- and peer-evaluations to aid in grading homework assignments.

- helps me spend my time efficiently
- provides an opportunity to teach and learn from your peers

To make this work, it is important that you turn in assignments on time, so please plan ahead if you will be away or have a busy stretch.

Please let me know if you have extenuating circumstances that prevent you from being able to turn in an assignment on time.

## Grading of Homework assignments

**Grading**  
Configure which facets of the activity should be weighed in the students grade.

30	pp	Hand-in step completed	
30	pp	Hand-in step completed on time	
10	pp	Completed giving feedback	
5	pp	Has written the minimum number of review comments: 1	
25	pp	Ratings received on work in total	

Scale rating section

10	pp	Completeness	3 point scale ⓘ	
10	pp	Accuracy	5 point scale ⓘ	
5	pp	Did the student document their code? Was it es...	3 point scale ⓘ	

## Peer Assessment

Comments from previous year's course evaluations

- I like the self and peer assessments. It helps to be forced to review answers and process, otherwise I would just move to the next 10 things I have to work on.
- Homework grading format is awesome: by evaluating ourselves and our peer before instructor sees our work, we are able to better understand mistakes that we made and /or others made and subsequently offer suggestions in a "learning by teaching" fashion.
- I found the peer assessments to be highly valuable. The code we were exposed to throughout the course plus looking at more variations within the peer assessments has brought my level of understanding up significantly.

## Grading

- Homework assignments (45%), includes self and peer assessments
- Quizzes (~7) (15%)
- Data analysis contribution to exercise book (10%)
- Final exam (30%)

S/N students will be required to complete all homework assignments and self and peer reviews, but will not have to take the final exam, quizzes, or contribute a data analysis to the exercise book.