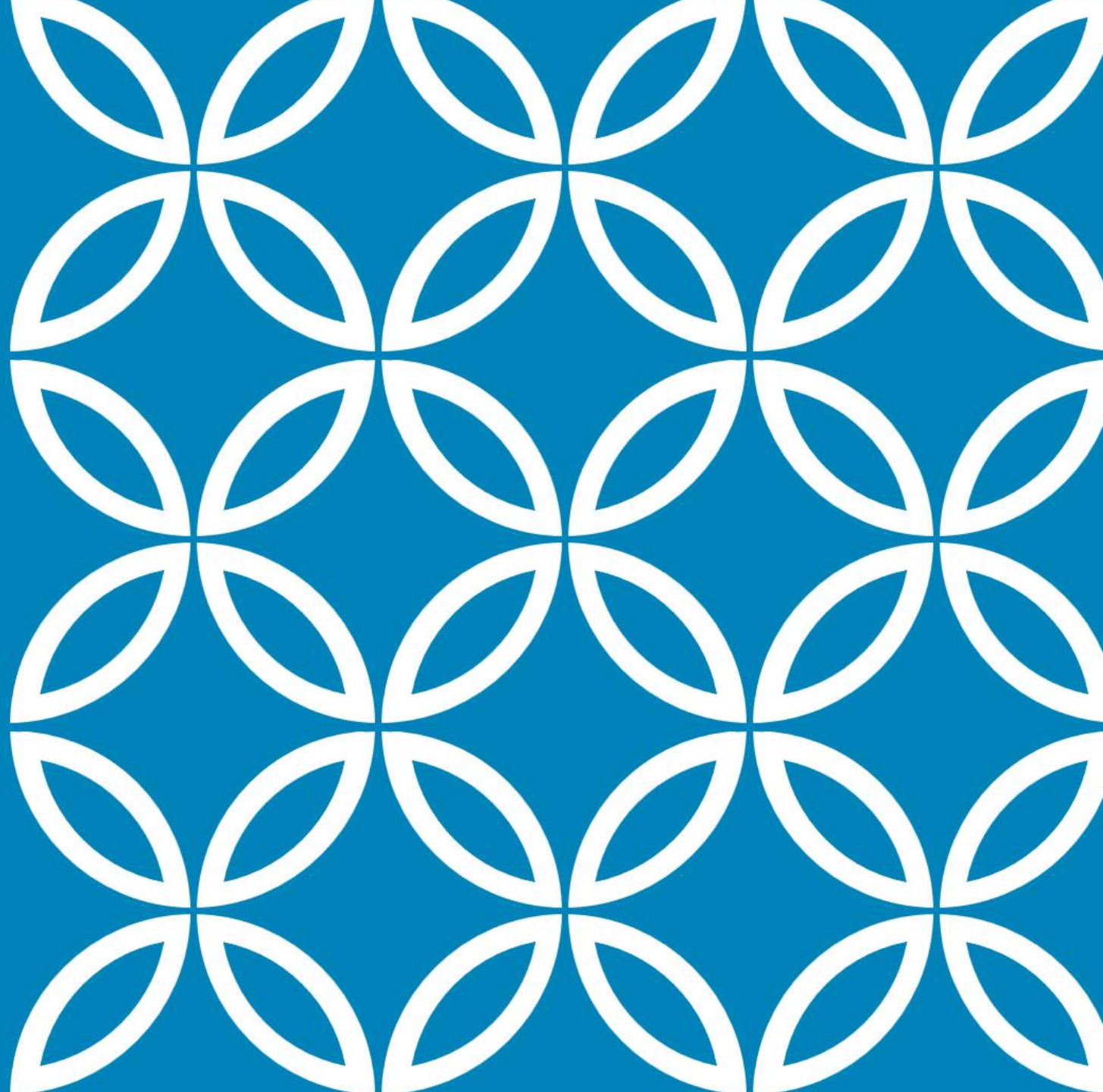


INDUSTRY AND INTERNSHIPS

Brody Erlandson and Katy Miles





OUTLINE

Differences in job titles

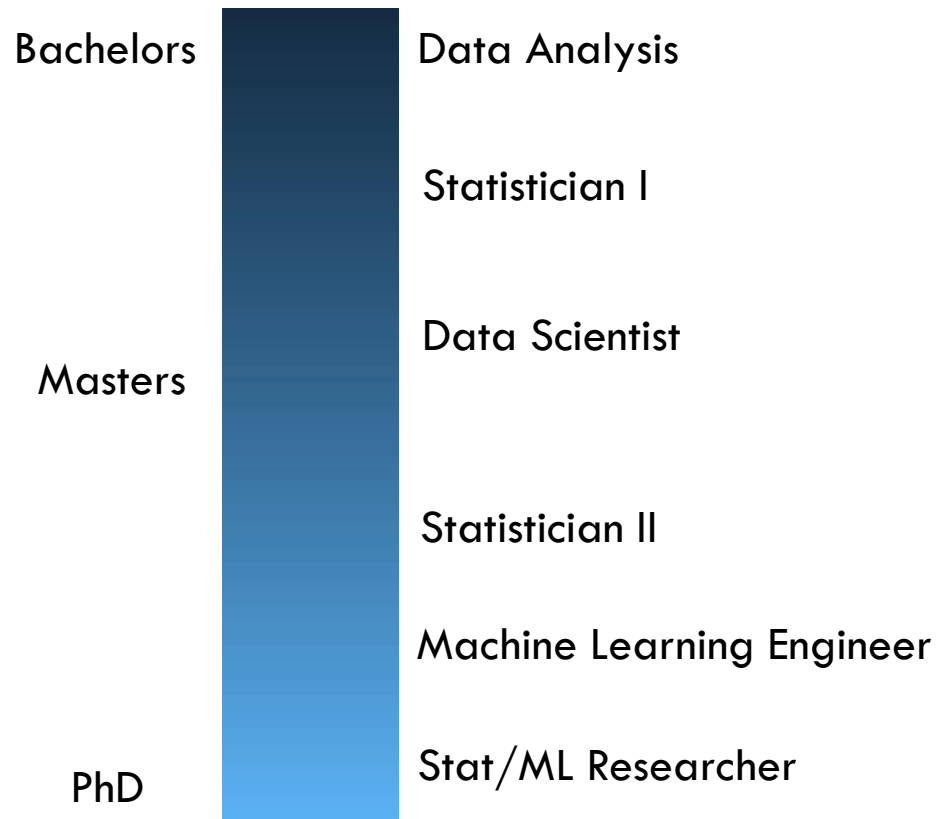
Job search process

Brody's Intern Experience

Katy's Intern Experience

Questions?

DIFFERENCES IN TITLES



Job titles can be subjective

Starting position is not ending position

Data Processing

Coding

Basic Modeling



Complex Modeling



Creating

JOB/INTERN SEARCH PROCESS

Internship posting will be from mid fall to mid spring.

Full time opportunities will be posted year around, but you should wait to apply until about December or January.

Jobsites/Boards are the best place to see a wide selection of jobs (i.e. Handshake, linkedIn, etc.)

GO TO CAREER FAIRS!!

UPDATE YOUR RESUME!!

INTERVIEWS

Show how you think, not necessarily what you know.

Make a “connection” with the interviewer

Know what type of interview you’re going into

Prepare but don’t study

Have questions ready

TIPS AND SKILLS THAT ARE USEFUL

R and Python

Data processing skills (SQL, Pandas, dplyr)

Communication

Implement your knowledge in a project (through the university, Kaggle, self-motivated)



BRODY'S INTERNSHIP

Title: Algorithms Engineer Intern

Company: KLA

Industry: Semiconductor

What Does KLA do? Engineers advanced inspection tools, metrology systems, and computational analytics. Along with creating software for these tools.

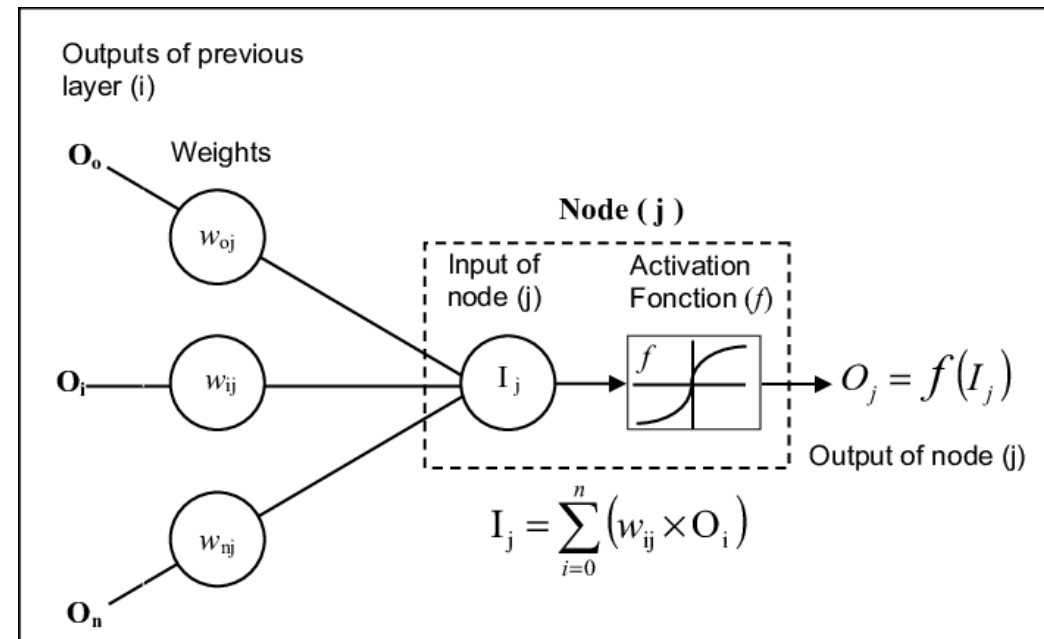
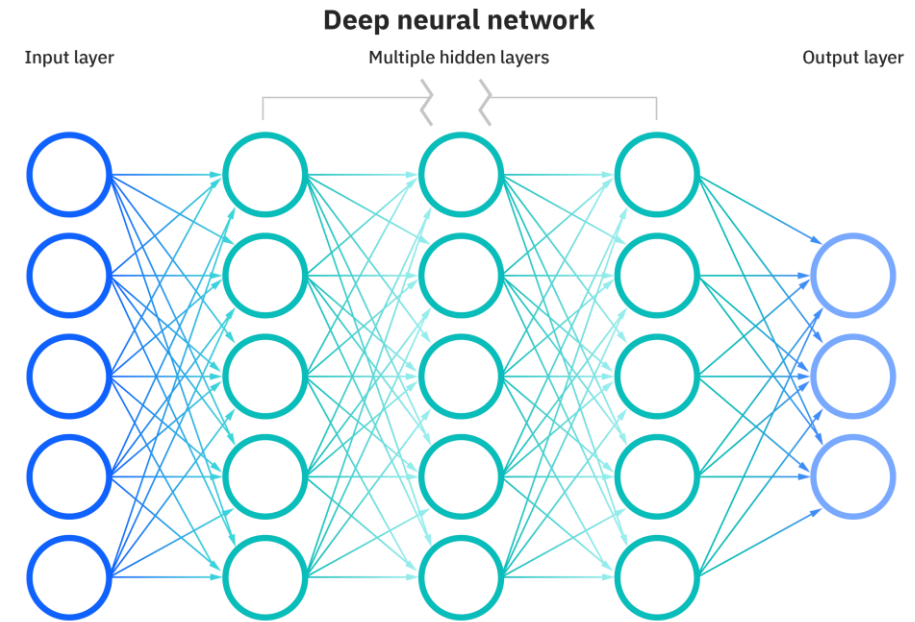
NEURAL NETS

Currently very popular in industry

Does very well at prediction

Backbone of generative A.I.
(ChatGPT, image generation, etc.)

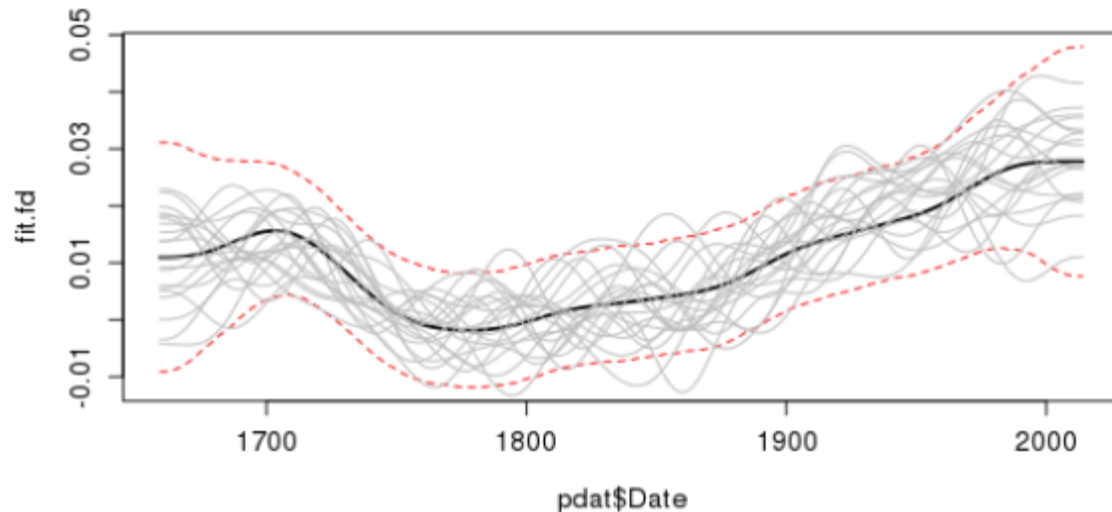
Universal approximation theorem



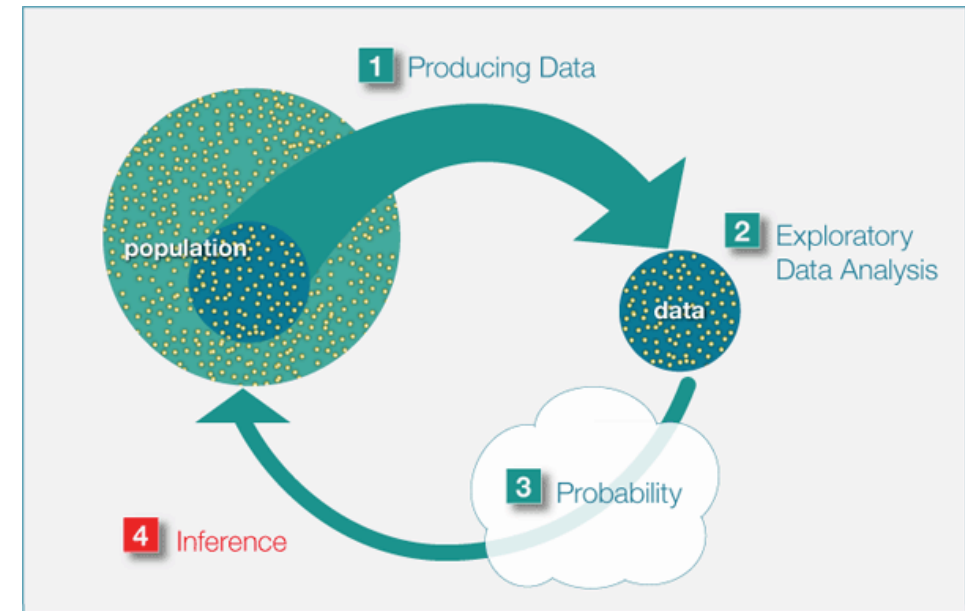
MACHINE LEARNING AND STATISTICS

Why might statisticians not like using Machine Learning models?

Uncertainty



Inference

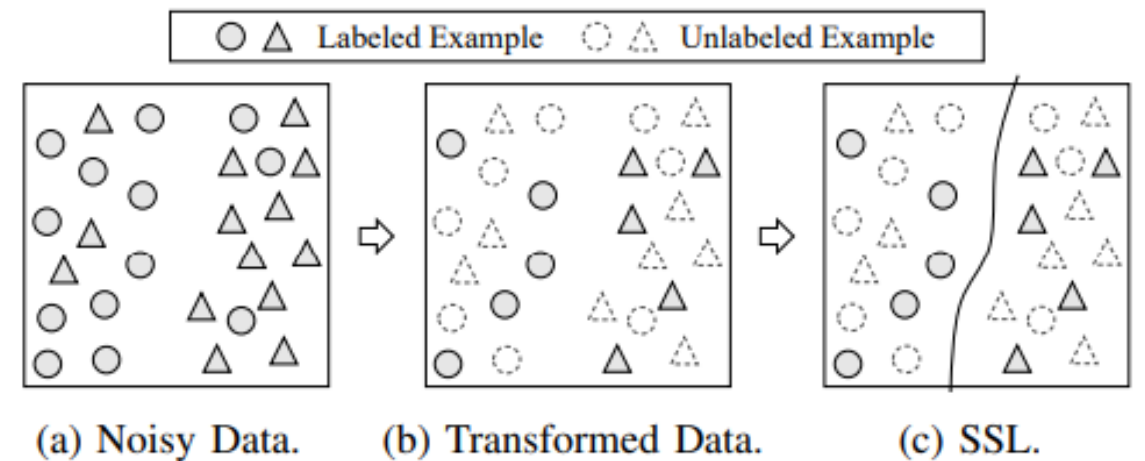
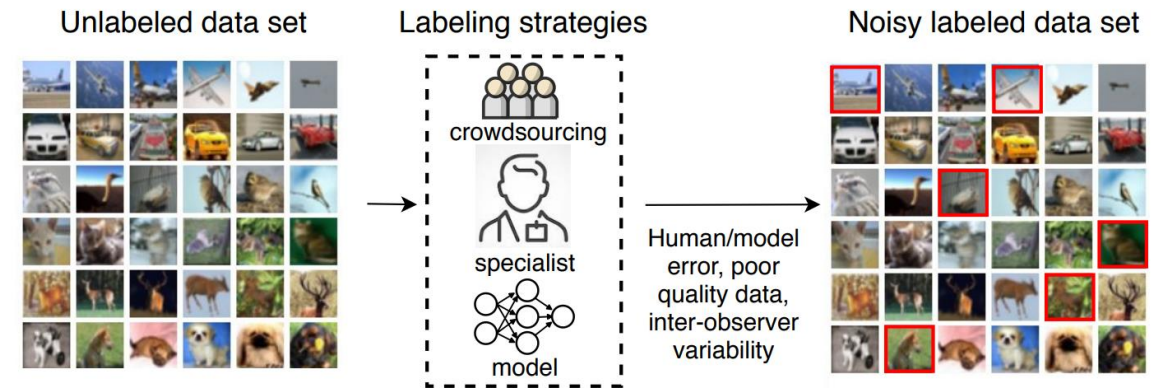


CLASSIFICATION AND NOISY LABELS

Classification is when you have a few labels for the data that you are trying to predict

Noisy labels are when some of your data is labeled incorrectly. Ex. Cat labeled as a dog.

Noisy labels can result in the “true” classification boundary to be harder to find.



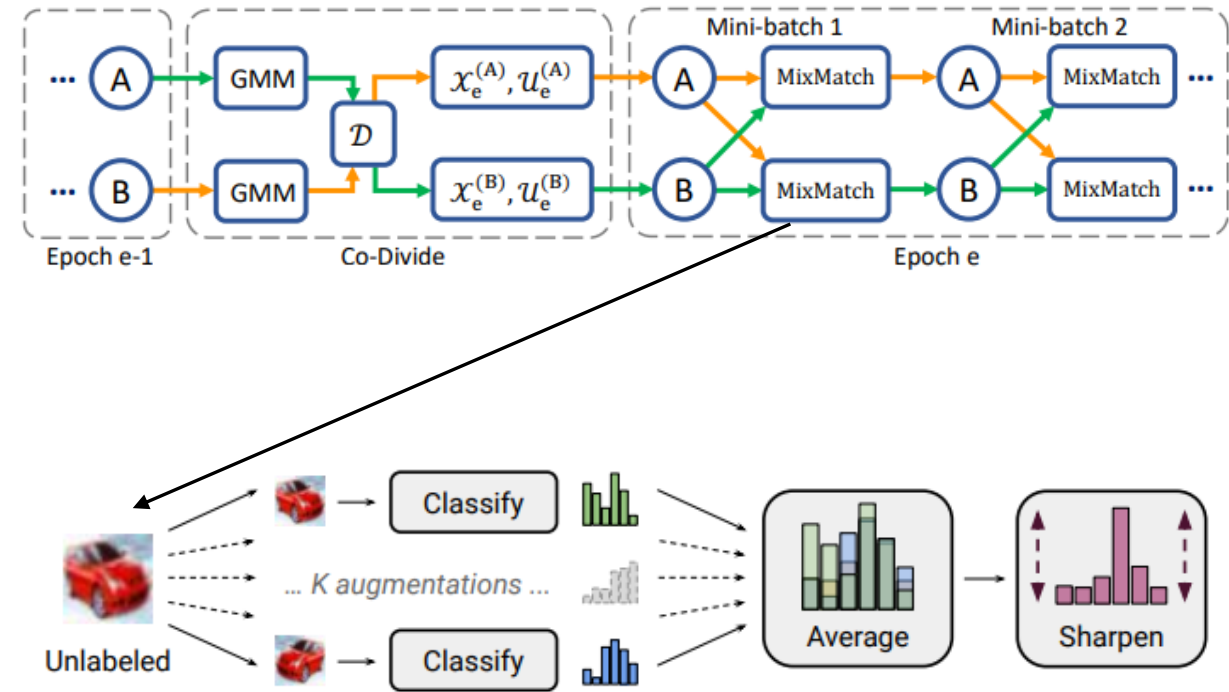
WHAT I DID

Researched and modified state of the art noisy-label deep learning classification techniques for KLA data.

The methods utilized semi- and self-supervised learning, alongside advance CNNs.

What does a full time position look like?

- Multi-month ML projects that involve research, modification, and development for deploying a model to production.





KATY'S INTERNSHIP

Title: Statistical Analyst

Company: U.S. Geological Survey

Industry: Statistical Hydrology

What Does USGS do? Hydrologists and engineers collect and perform research on hydrologic data and write publications to guide government and stakeholder decision making.

GOVERNMENT AGENCY WORK

Look for student internships if you're interested in a career with a government agency

Often easier to obtain an internship as a student rather than a full-time position after graduation

Lots of opportunity to continue on as a full time employee after graduation if you're an intern

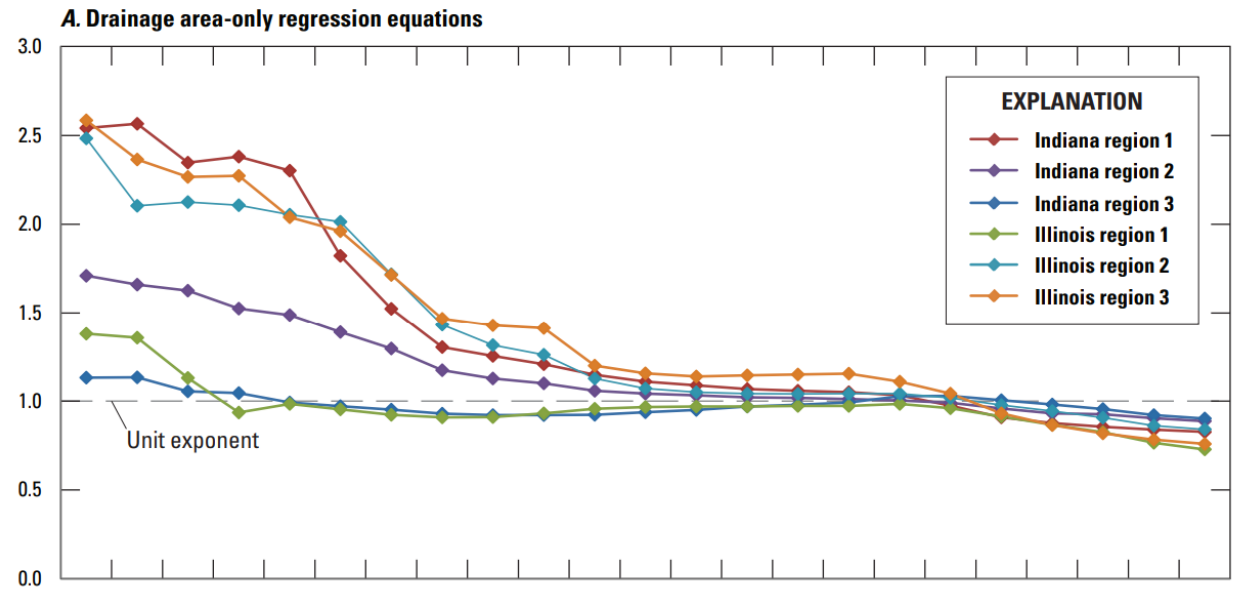
Pathways programs

WHAT I DID: DAILY TASKS

Collaborating with engineers and hydrologists to develop R scripts for their publications

Data organizing/cleaning and metadata creation

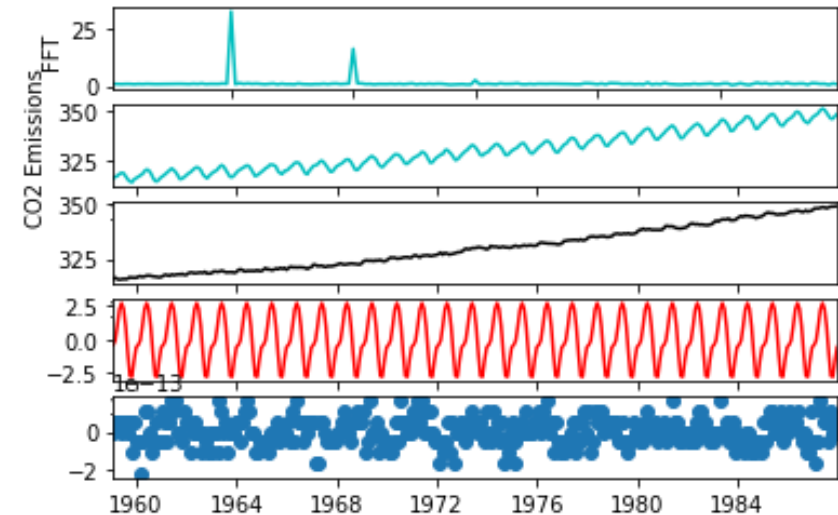
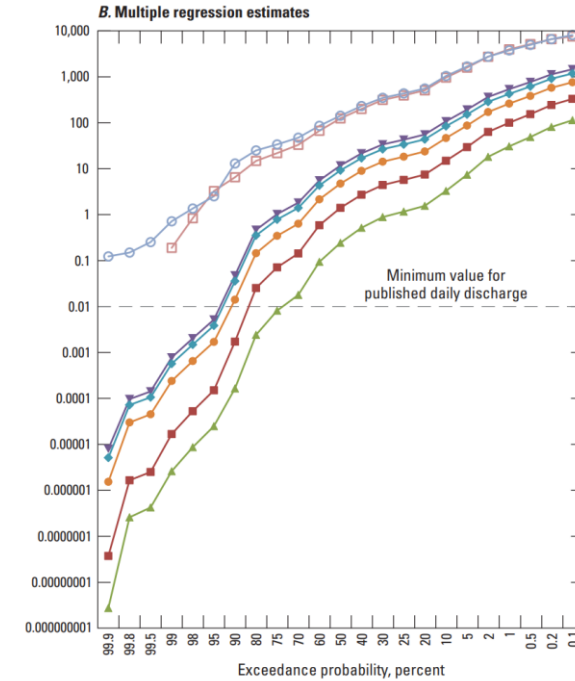
Creating publication-ready visualizations in R



WHAT I DID: LONG TERM PROJECTS

Variable selection for estimation of regional flow-duration curves for un-gaged sites in Indiana and Illinois

Developing a python package for seasonal-trend decomposition of time series data



SOURCES

Brody's slides: <https://arxiv.org/abs/2012.03061>,
<https://arxiv.org/abs/2007.08199>, <https://arxiv.org/abs/2002.07394>,
<https://bolt.mph.ufl.edu/6050-6052/unit-4/>, <https://www.r-bloggers.com/2014/06/simultaneous-confidence-intervals-for-derivatives-of-splines-in-gams/>, <https://www.ibm.com/topics/neural-networks>,
https://www.researchgate.net/figure/The-basic-element-of-a-neural-network-node-computation-fig1_4111262

Katy's slides: <https://www.usgs.gov/publications/estimation-regional-flow-duration-curves-indiana-and-illinois>, https://commons.wikimedia.org/wiki/File:USGS_logo.svg