

# Undergraduate research in statistics

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OURFA<sup>2</sup>M<sup>2</sup>  
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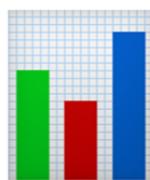
[bit.ly/ourfa2m2-statistics](https://bit.ly/ourfa2m2-statistics)



B.S. in Mathematics



First research experience at  
SUNY-Potsdam REU after  
sophomore year



First statistics class junior year



M.S. in Statistics

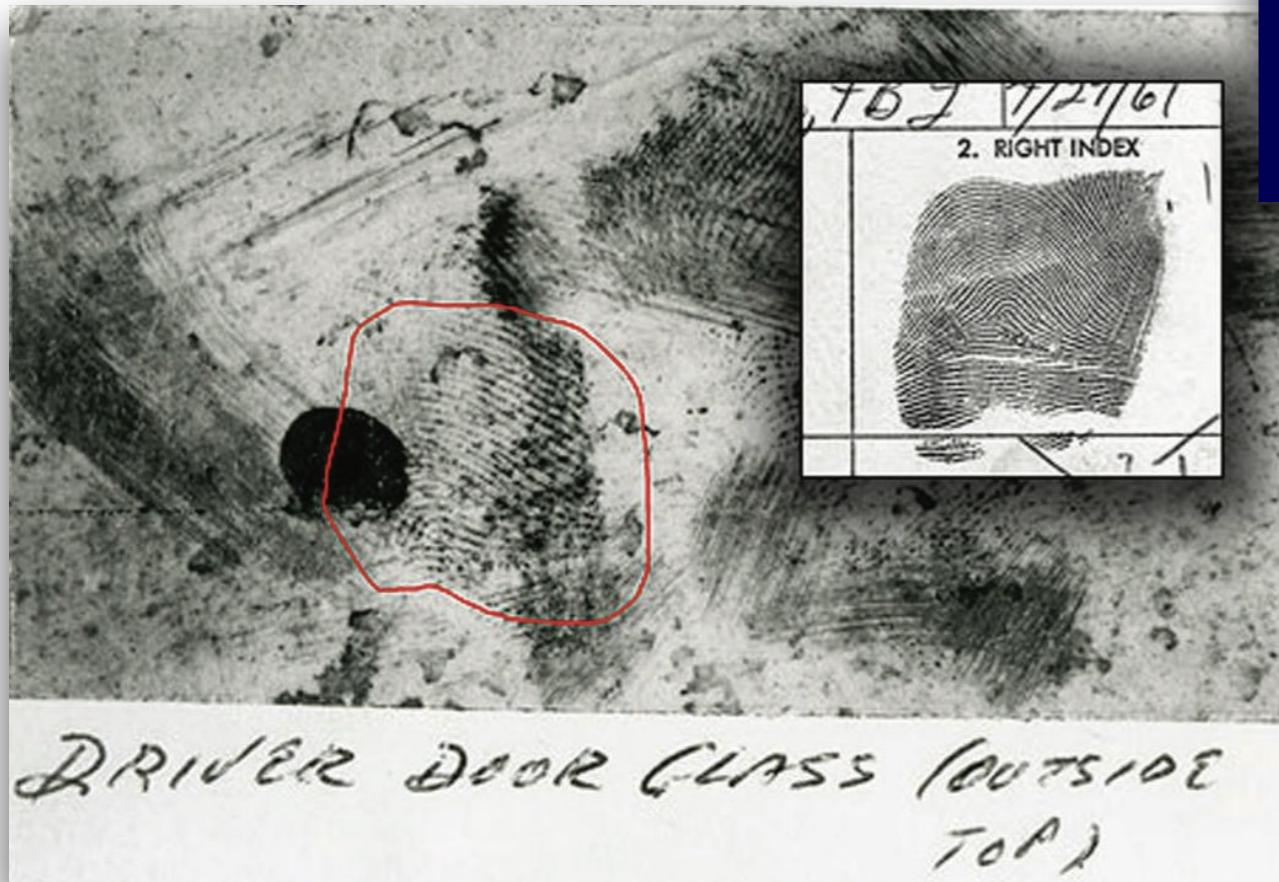
# Statistician @ Capital One



Design of Experiments

Regression Modeling

# 🎓 PhD in Statistics

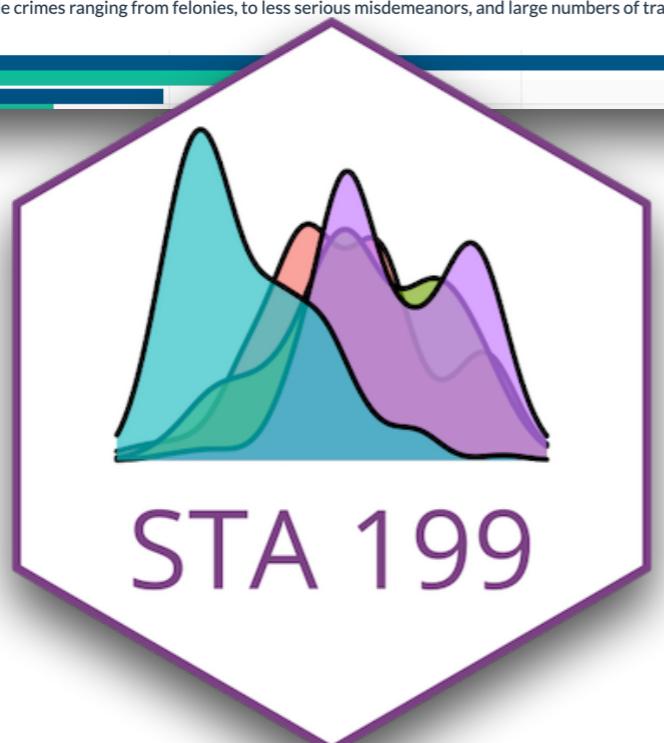
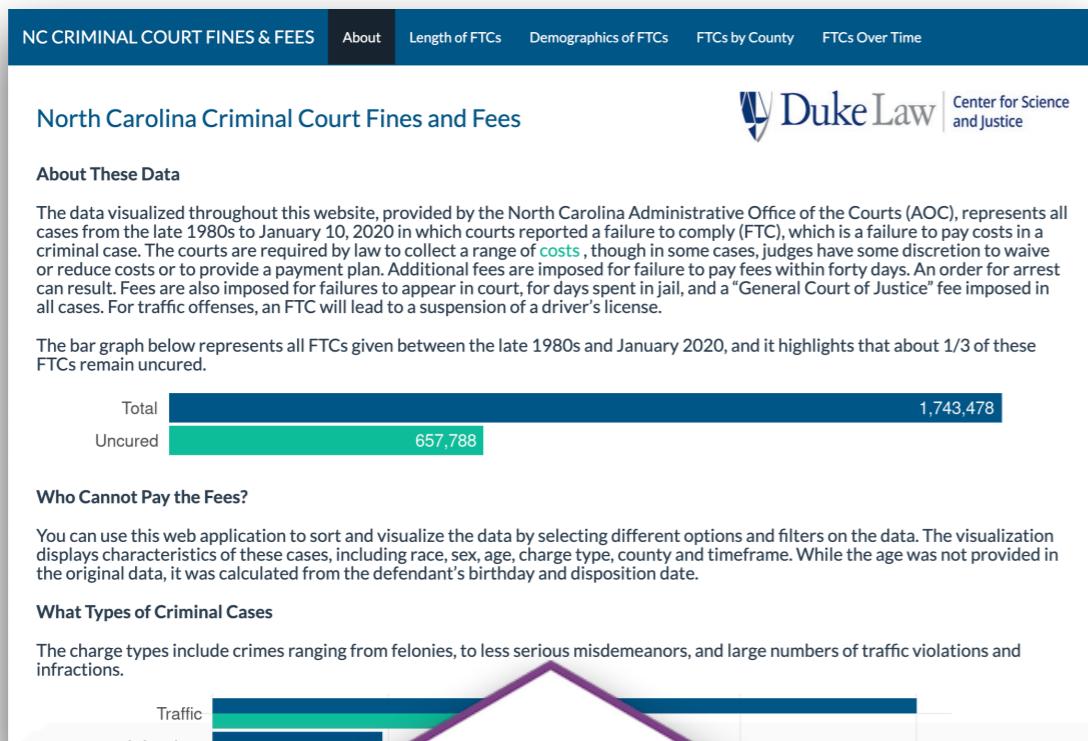


Used Bayesian models to  
quantify uncertainty in  
fingerprint examination  
decisions

# Assistant Professor of the Practice

@

Duke  
UNIVERSITY





What is  
undergraduate  
research in  
statistics?

# Research areas in statistics

## Methodology

- Statistical theory
- Bayesian statistics
- Spatial statistics
- Time series
- Network analysis
- Survival analysis
- High dimensional data
- Missing data
- Causal inference
- Machine learning
- ...and more

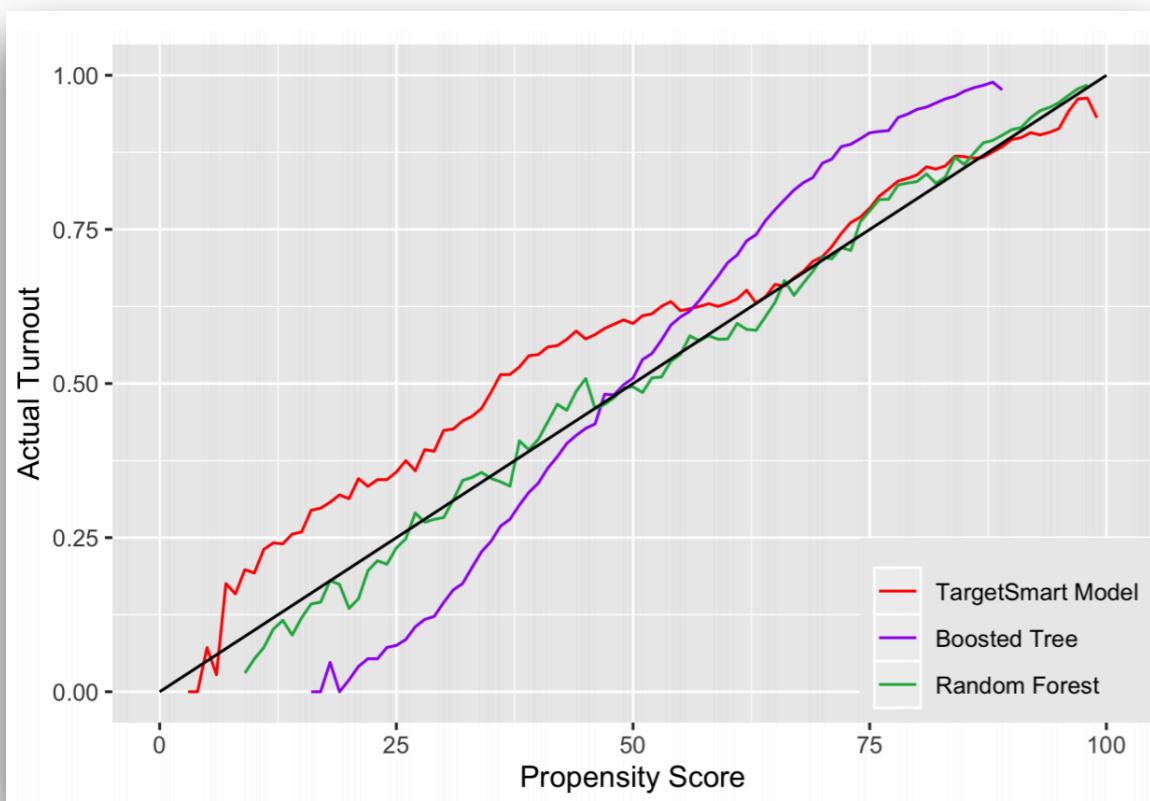
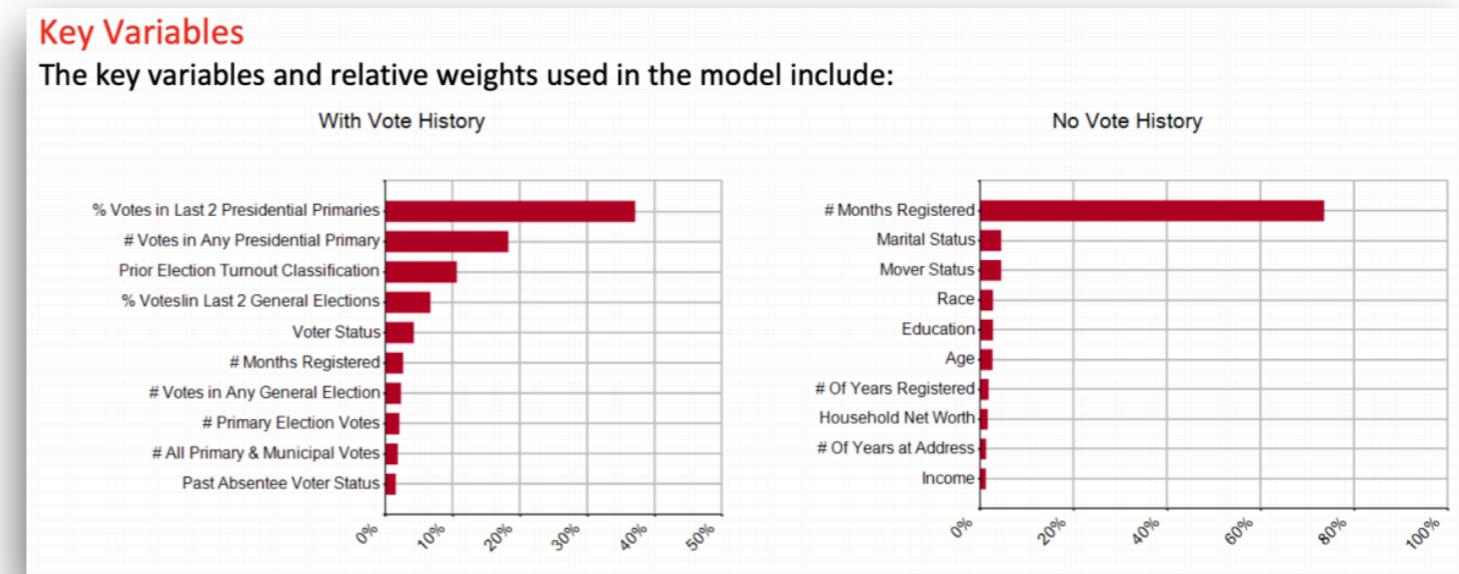
## Application

- Health and medicine, epidemiology
- Education
- Government and public policy
- Forensic science
- Environmental science
- Sports analytics
- Economic and financial data
- Data privacy and confidentiality
- ... and more

# Replication study on voter turnout

## Vote by Mail: A study on the effects of voting by mail on election turnout in Utah

by Naomi Boss & Timothy Shinners  
Reed College

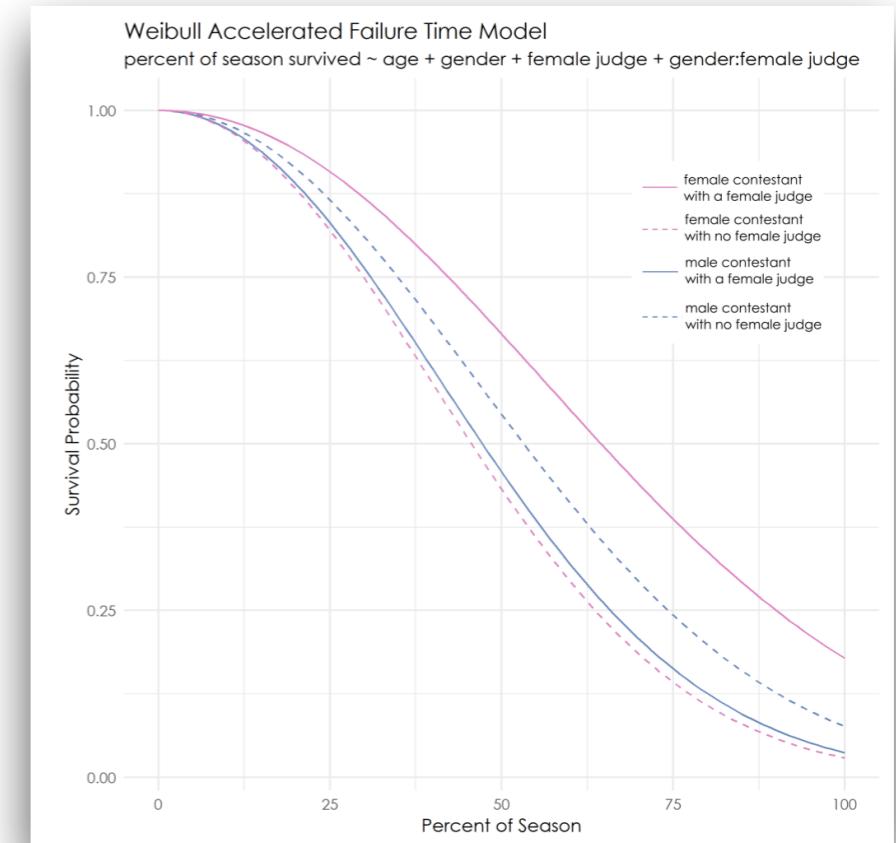
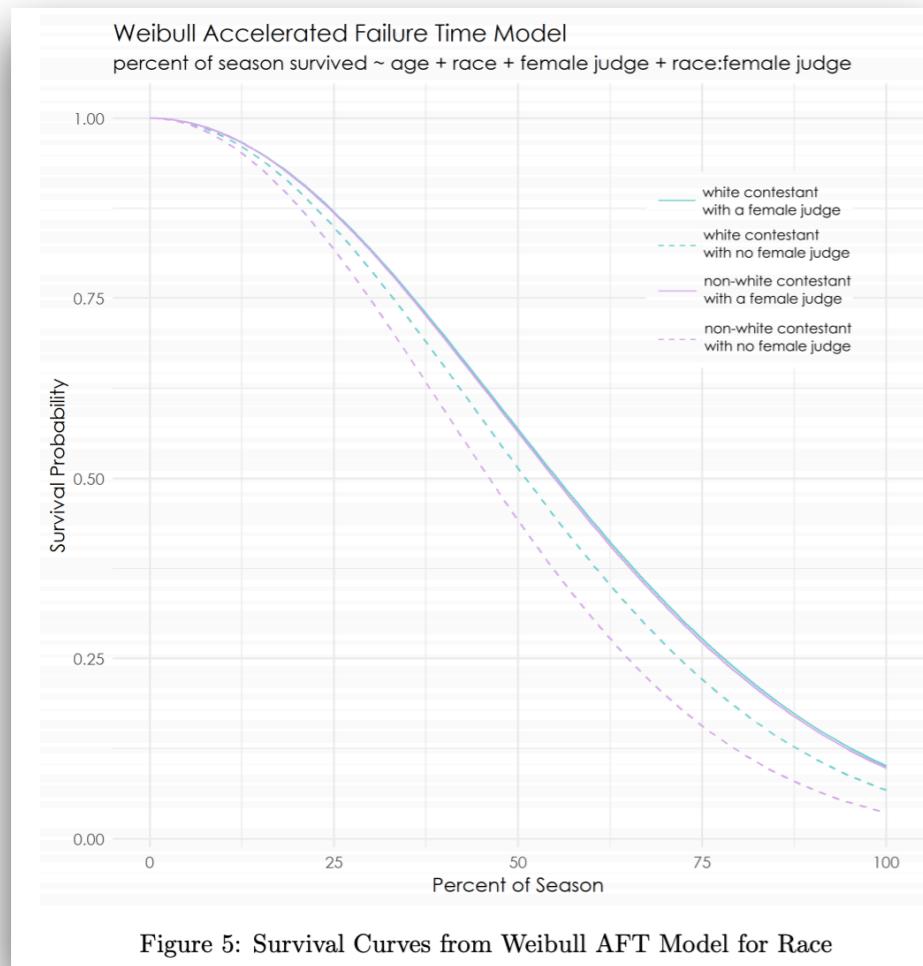


- Replicated 2018 study on the impact of vote-by-mail on election turnout in Utah
- Used **regression** to identify most important factors in TargetSmart voter propensity score
- Used **boosted tree** and **random forest** models to develop voter propensity score

# Survival analysis on *MasterChefJunior*

## Whip It Like A (Wo)Man: Survival Analysis of Minority Contestants in Masterchef Junior

by Katya Kelly & Katie Jolly  
Macalester College



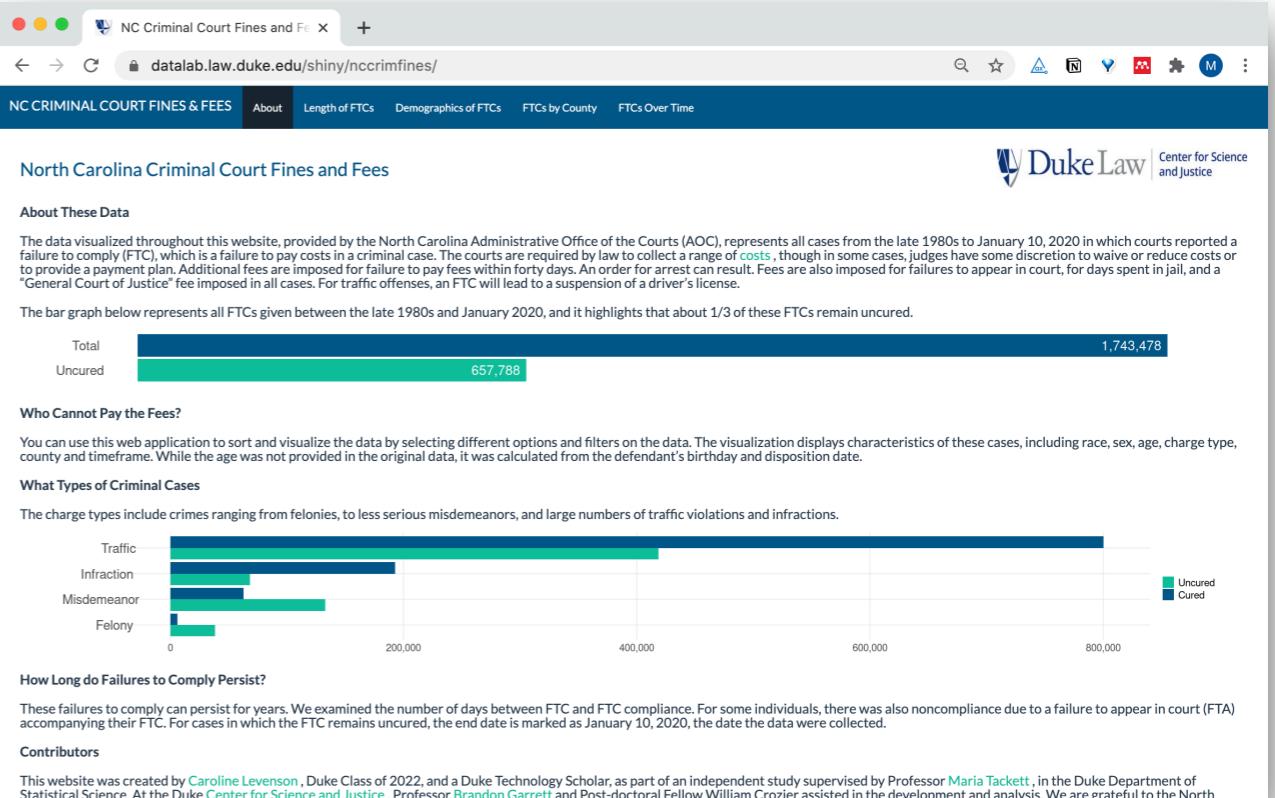
- Study of contestant survival on the TV competition show *MasterChefJunior*
- Used **survival analysis** to model how long females and people of color stay on the show and how that's impacted by the addition of a female judge

# Applied research in criminal justice

## Interactive Web App of North Carolina Criminal Fines and Fees

by Caroline Levenson  
Duke University

The cover page features the Duke Law logo and the text "Center for Science and Justice". Below this, it says "A Center for Science and Justice Report: The Explosion of Unpaid Criminal Fines and Fees in North Carolina". The date "April 22, 2020" is at the bottom left. The main image is a collage of yellow "FINE" signs.



- Used **R Shiny** to develop interactive web app to explore data about NC criminal fines and fees
- App used by legal professionals to better understand who is most impacted by these fines
- Used skills in **data visualization**, **data wrangling**, **missing data imputation**, and **computing**

# A few reasons to do undergraduate research

-  Learn while answering relevant and interesting research questions
-  Develop communication skills and other valuable professional skills
-  Connect with your professors, graduate students, and other undergraduate students
-  Figure out your own academic and career interests
-  Make a meaningful contribution to the field

# Finding research opportunities

-  Find research classes and programs at your college
-  Review math/statistics department website or directory to learn more about faculty research focus areas.
  - Email the faculty member you're interested in working with.
-  Reach out to faculty outside of math/statistics to ask if there is statistical analysis in their work
-  Additional Resources:
  - [Tips for writing the introduction email](#)
  - [Advice from students about undergraduate research](#)



What are more ways to  
get involved?

# Present your work!

## Undergraduate Statistics Project Competition

- Undergraduate Statistics Class Project
  - Next submission deadline: **December 23, 2020!**
- Undergraduate Statistics Research Project
  - Next submission deadline: **December 23, 2020!**
- Electronic Undergraduate Statistics Research Conference
  - Videos from the 2020 conference



# Participate in data analysis competitions



Data analysis competition held  
in the fall and spring

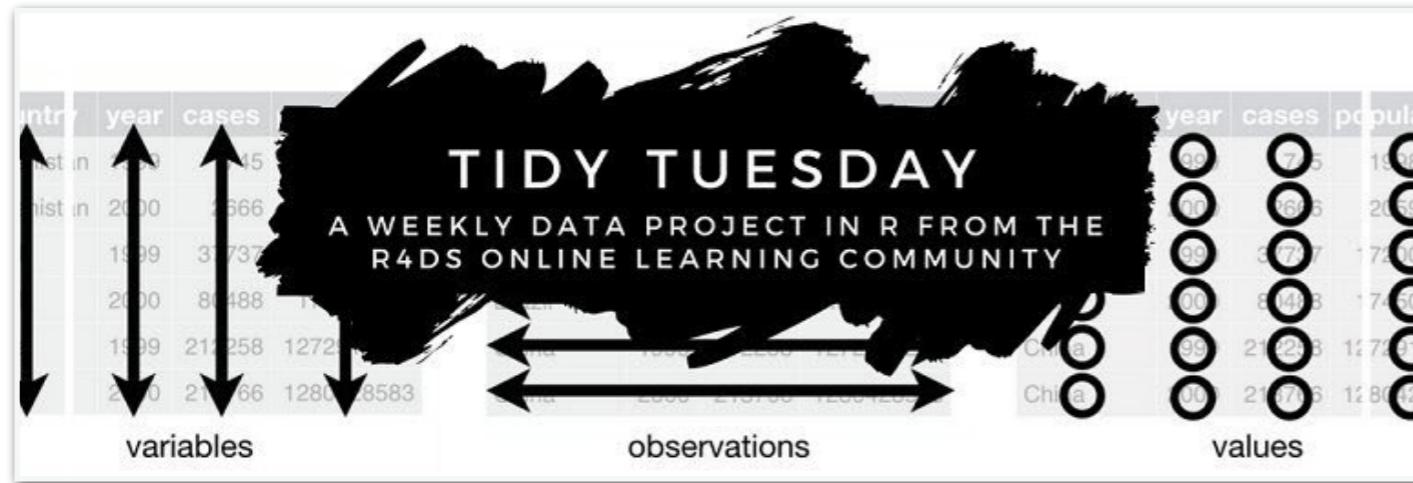
Click [here](#) for more information and winners from the fall competition.



Weekend-long data analysis  
competition held in the spring

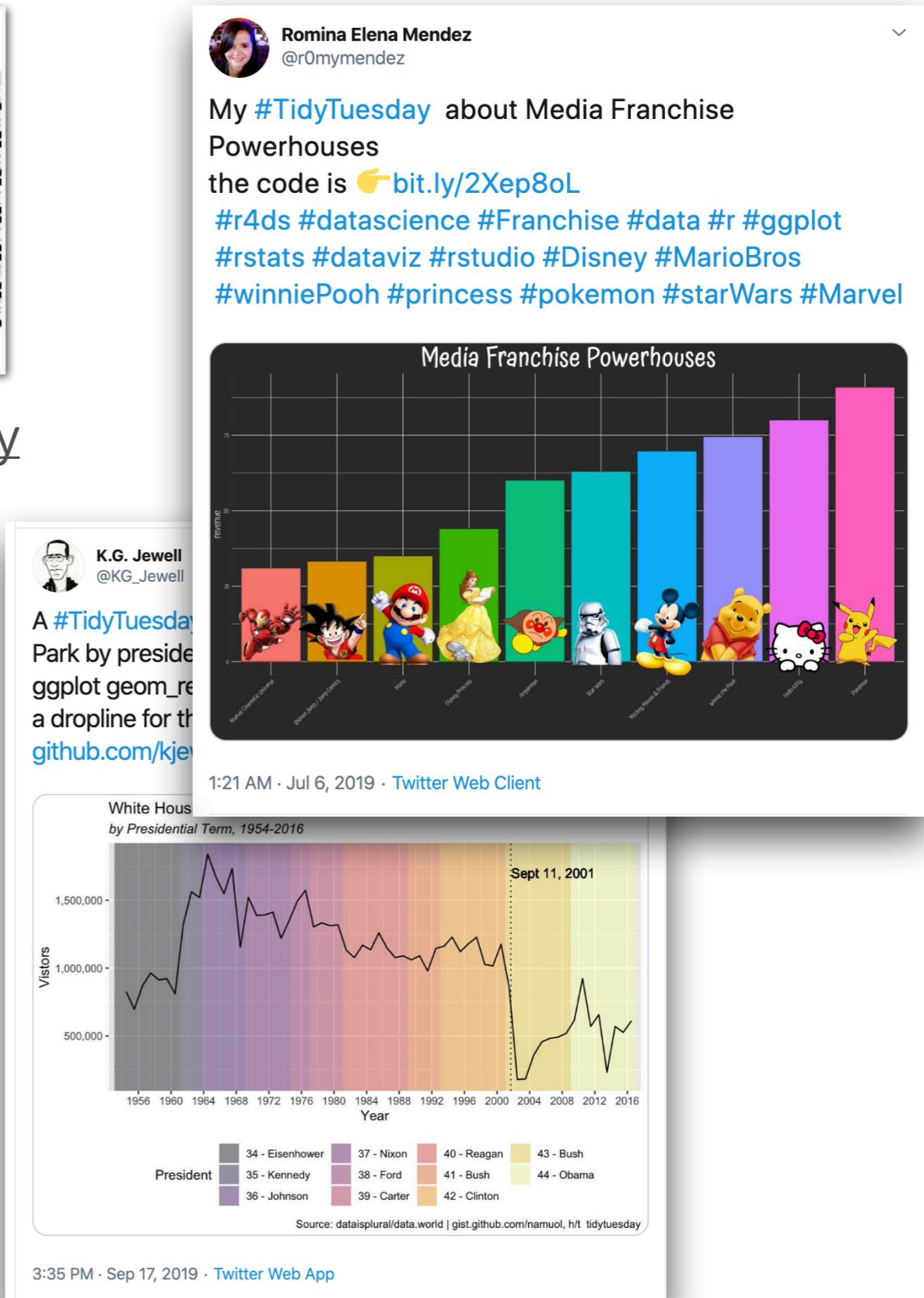
Click [here](#) for more information,

# Practice using small, informal projects



<https://github.com/rfordatascience/tidytuesday>

Week	Date	Data	Source	Article
1	2019-12-31	Bring your own data from 2019!		
2	2020-01-07	Australian Fires	Bureau of Meteorology	NY Times & BBC
3	2020-01-14	Passwords	Knowledge is Beautiful	Information is Beautiful
4	2020-01-21	Song Genres	spotifyr	Kaylin Pavlik
5	2020-01-28	San Francisco Trees	data.sfgov.org	SF Weekly
6	2020-02-04	NFL Attendance	Pro Football Reference	Casino.org
7	2020-02-11	Hotel Bookings	Antonio, Almeida, and Nunes, 2019	<a href="#">tidyverts</a>
8	2020-02-18	Food's Carbon Footprint	nu3	<a href="#">r-tastic</a> by Kasia Kulma
9	2020-02-25	Measles Vaccination	The Wallstreet Journal	The Wall Street Journal



# Any questions?



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