TEACHING COMPUTATIONAL SOCIAL SCIENCE

LESSONS AND STRATEGIES

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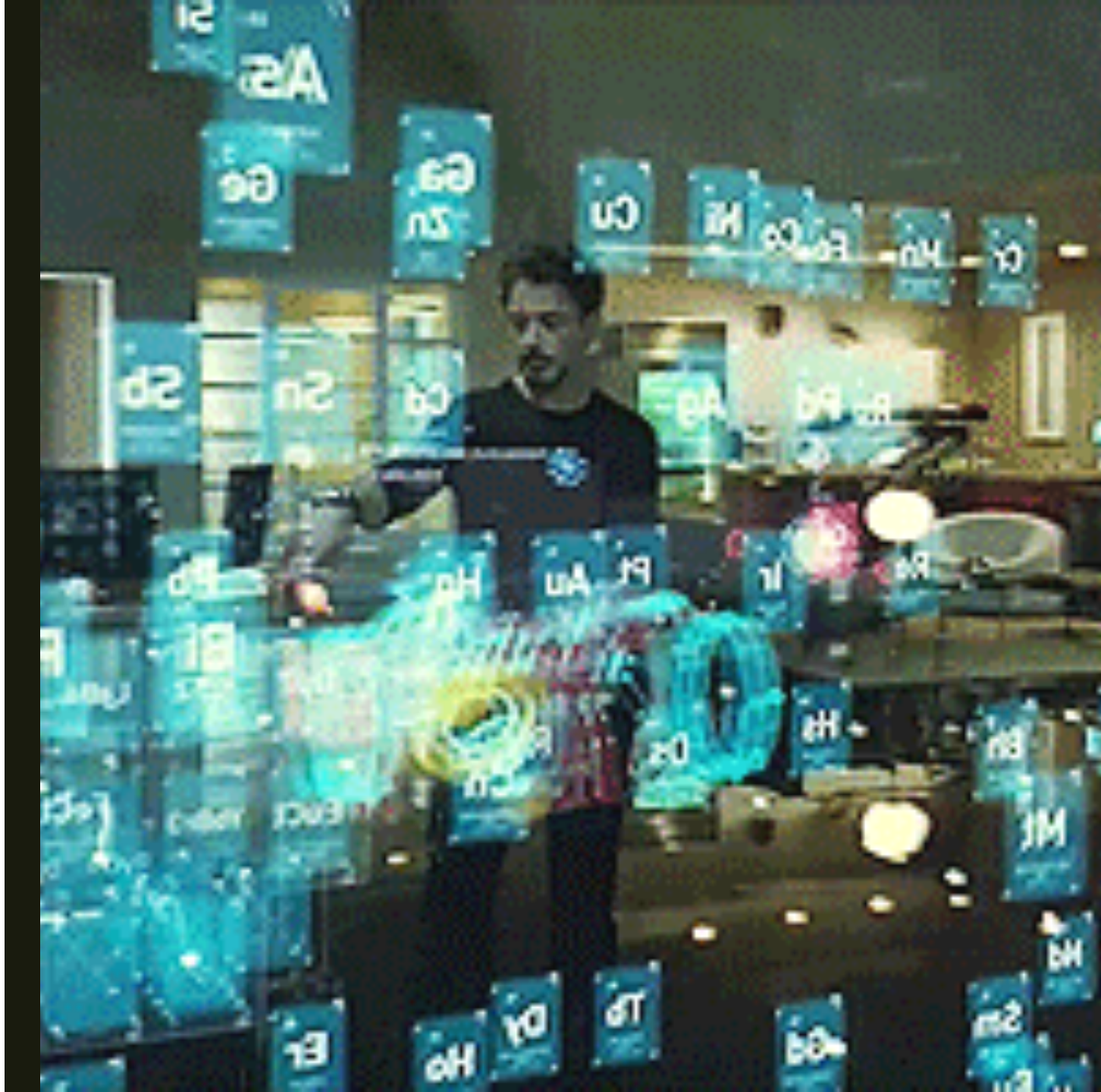
Here’s the dream*

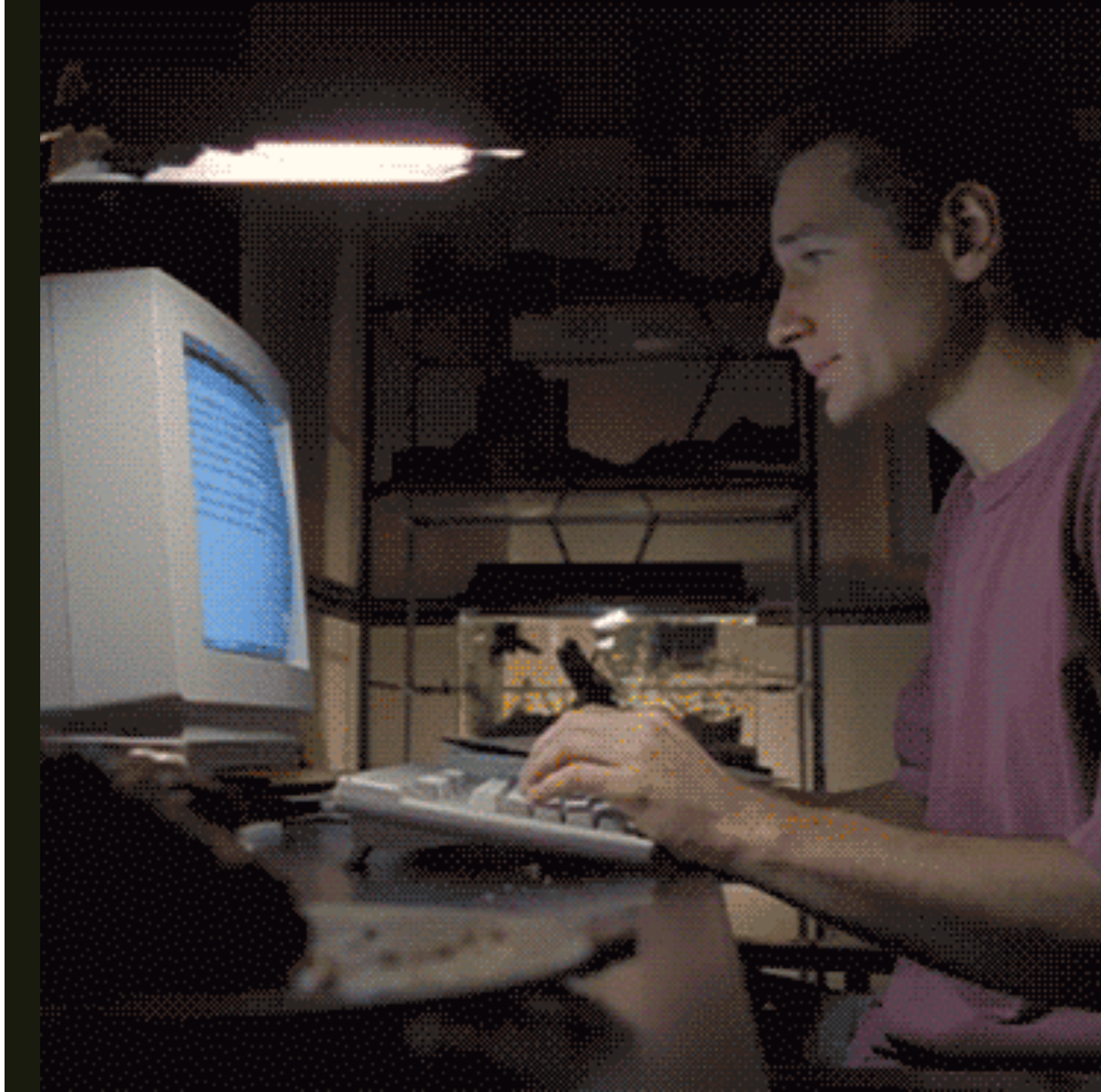
Every day, social scientists and humanists use computers to study things that are too big, too small, too slow, too expensive, too dangerous, or just too hard to study any other way.

**According to Software Carpentry*



Now here's the reality

Every day, scholars all over the world waste time wrestling with computers. When scholars try to get help, they are inundated with unhelpful information, and give up.



The Need

Demand

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- New Data
- Better Scholarship
- Professional Opportunities

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Supply

- Courses in CS, Statitistics
- Short-term workshops
- MOOCs and other Online Resources

Filling the Gap

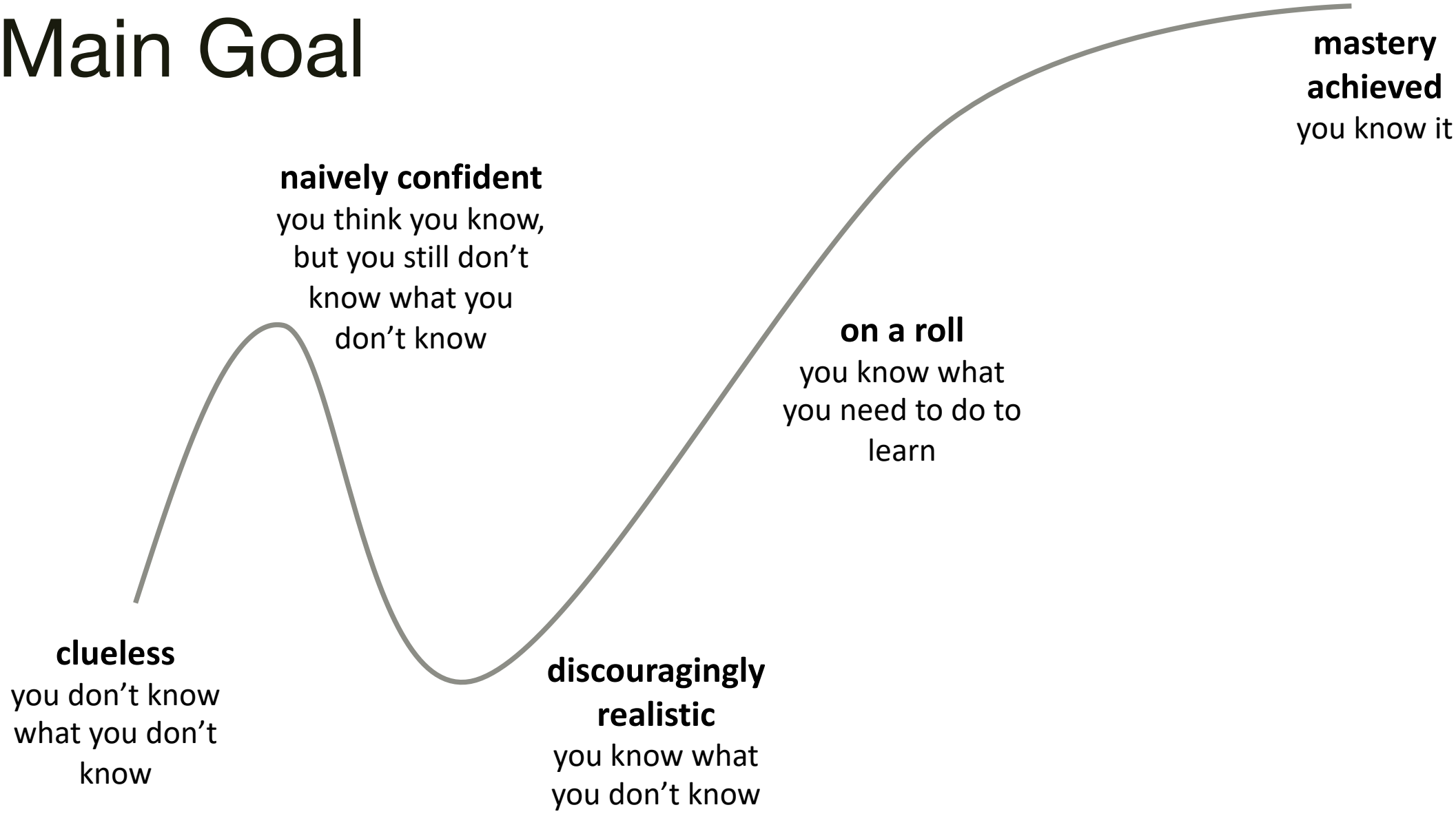
Courses I've Taught

- Berkeley: Introduction to Computational Tools for Social Science
- Stanford: Machine Learning for Social Science
- Uchicago: Computing for Social Scince

Courses I've Learned From

- Chris Bail (Duke)
- Justin Grimmer (Stanford)
- Peter McMahan and Michael Castelle (Uchicago)
- Software Carpentry
- Mark Huberty (Berkeley, Google)
- Laura Nelson (Berkeley, Northeastern)
- And many more…

Main Goal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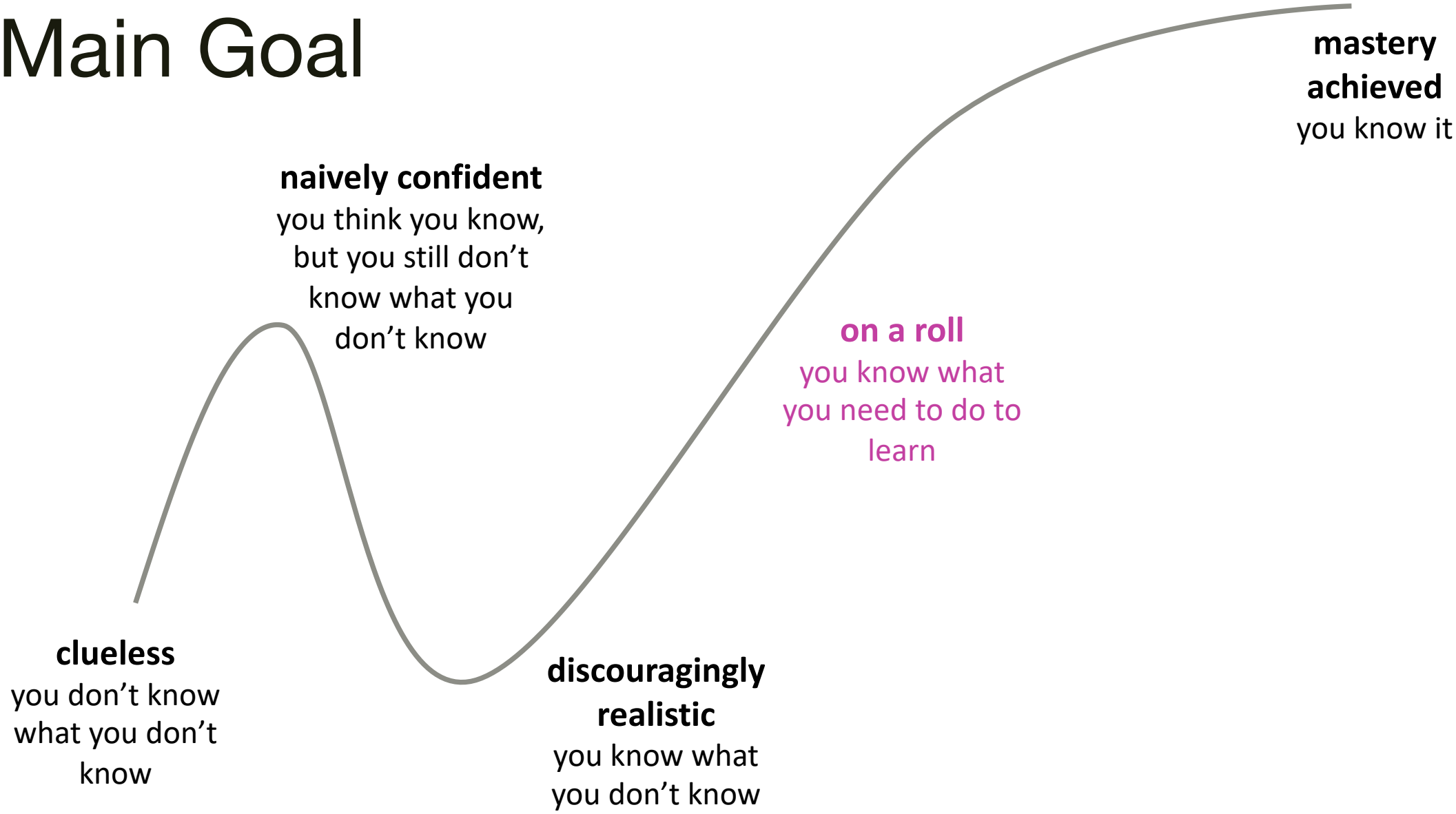
you don't know what you don't know
naively confident
you think you know, but you still don't know what you don't know
discouragingly realistic
you know what you don't know
on a roll
you know what you need to do to learn
mastery achieved
you know it

Main Goal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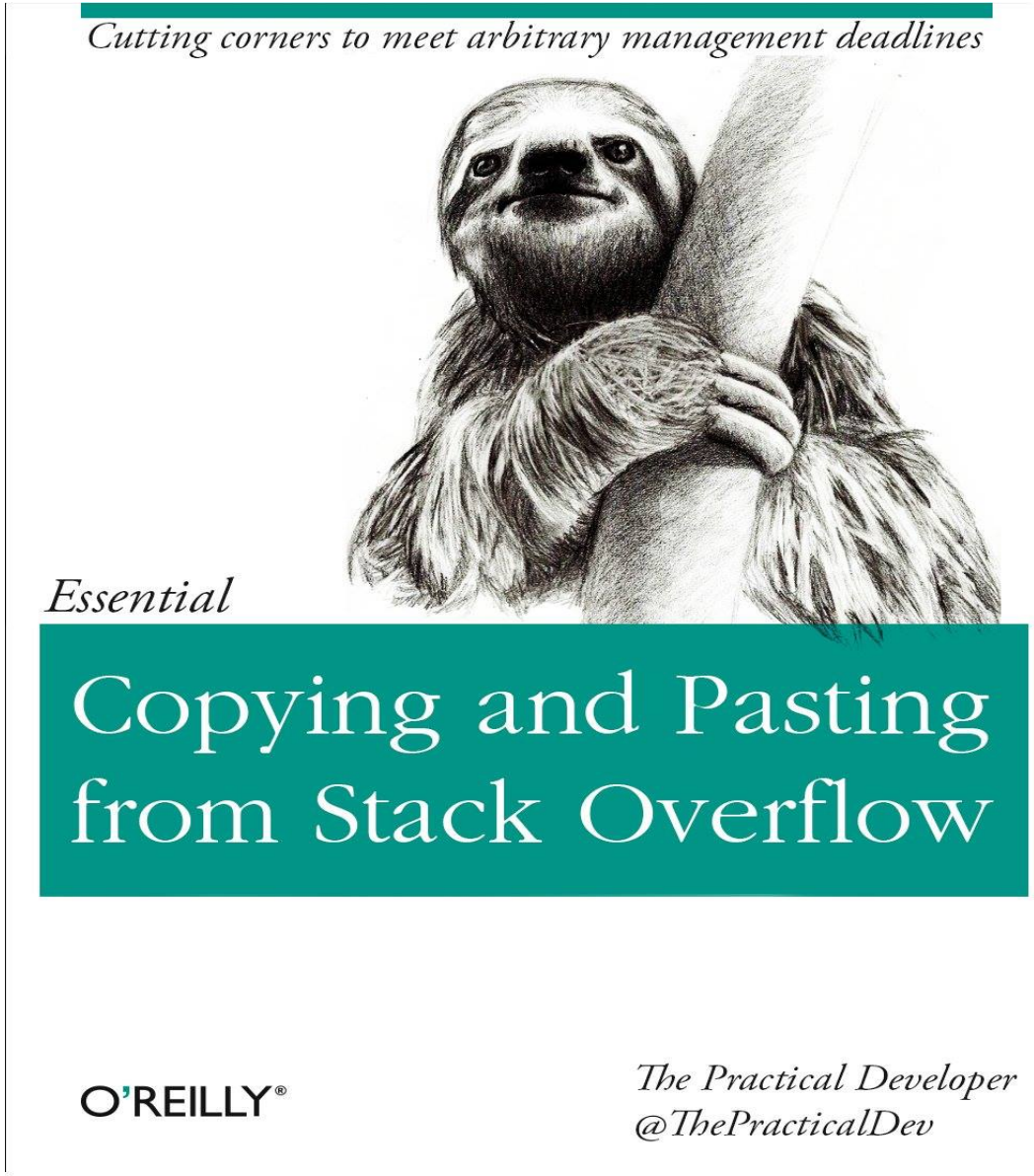
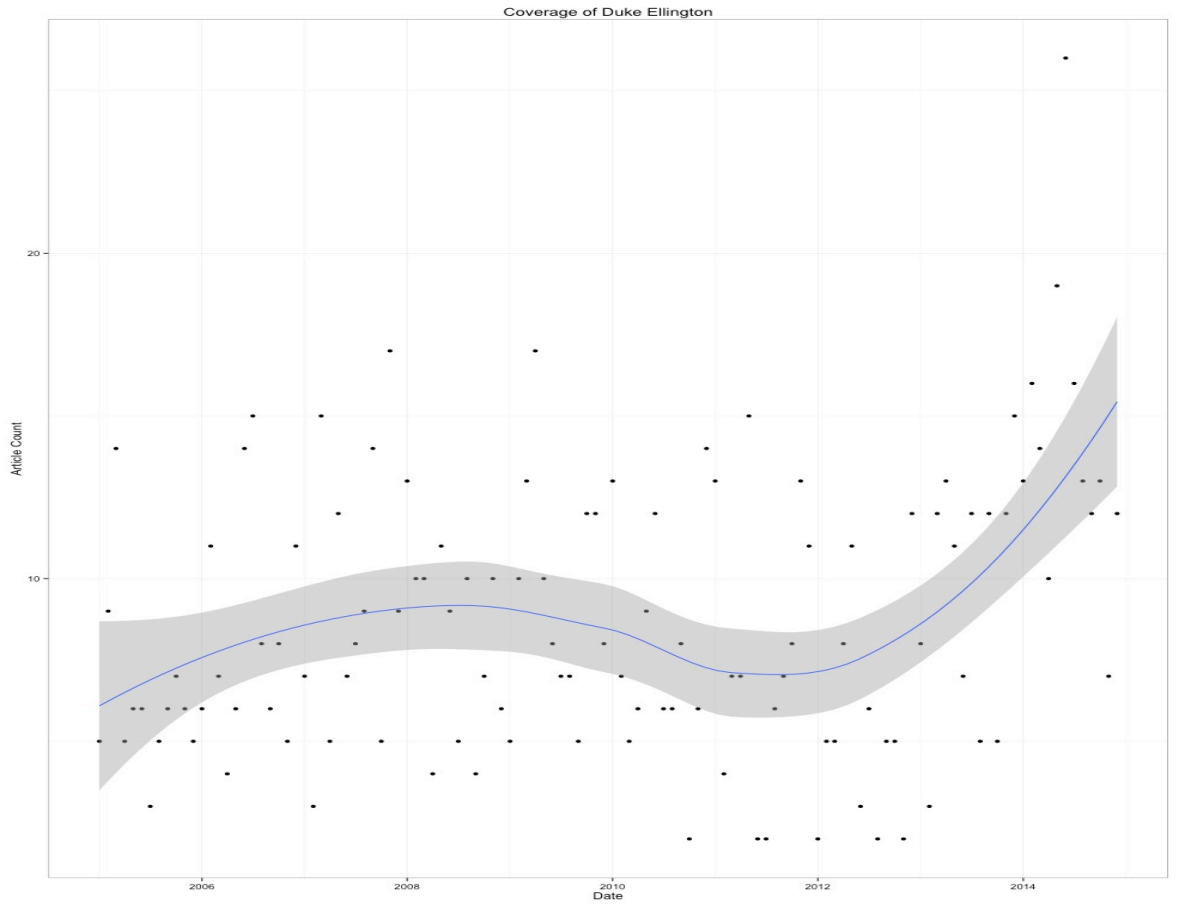
Main Goal: Learn to Learn

The basic learning objective of this course is to leave with the knowledge and skills required to learn on your own, whether that's through programming documentation, StackExchange and other online forums, or other courses.



Topics: Tools

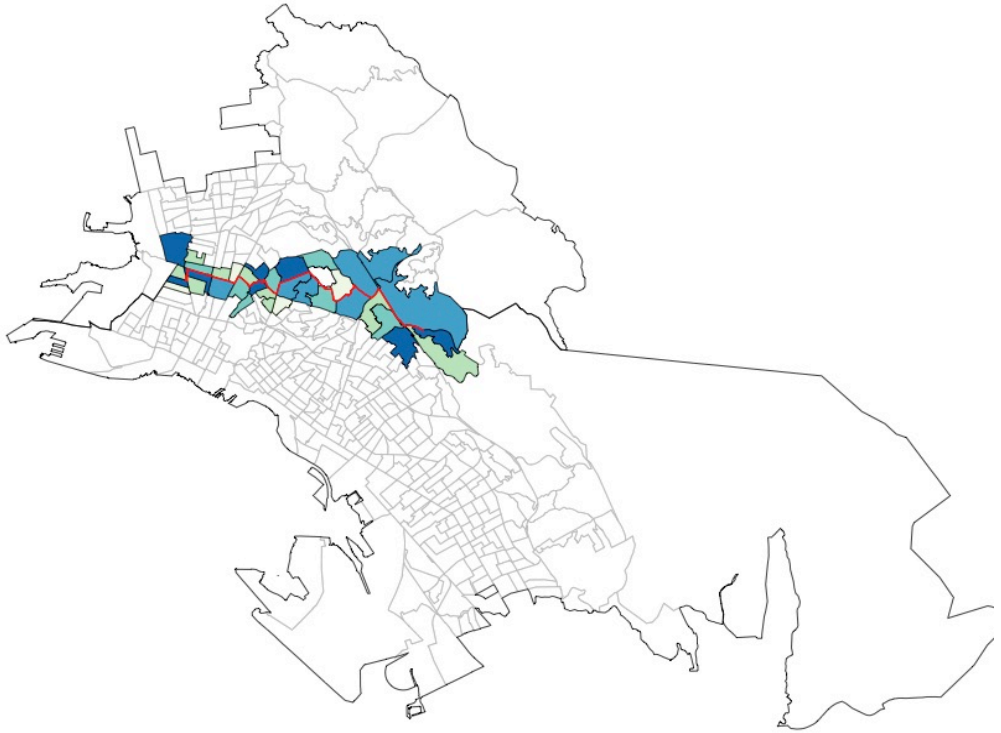
- Unix
- Python
- R
- Git & Github



NYT Coverage of Duke Ellington 2005-15, made in PS239T using Python and R

Topics: Applications

- APIs
- Webscraping
- Text as Data
- Machine Learning
- GeoSpatial Data
- Network Analysis
- Online Experiments
- Others?



Map of Oakland, made in PS239T with R

Challenges: 1

Problem

- Diversity in previous exposure / ability

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Strategies: Prevention

- Clear syllabus
  - *Honest pre-requisites*
- Pre-course assessment
  - *Separate skills from self-assessment*

Challenges: 1

Problem

- Diversity in previous exposure / ability

Strategies: Adjustment

- Tiered exercises
- Colored sticky notes for real-time assessment
- Online lecture notes, examples and resources
- Student contributions on Github and Etherpad

Challenges: 2

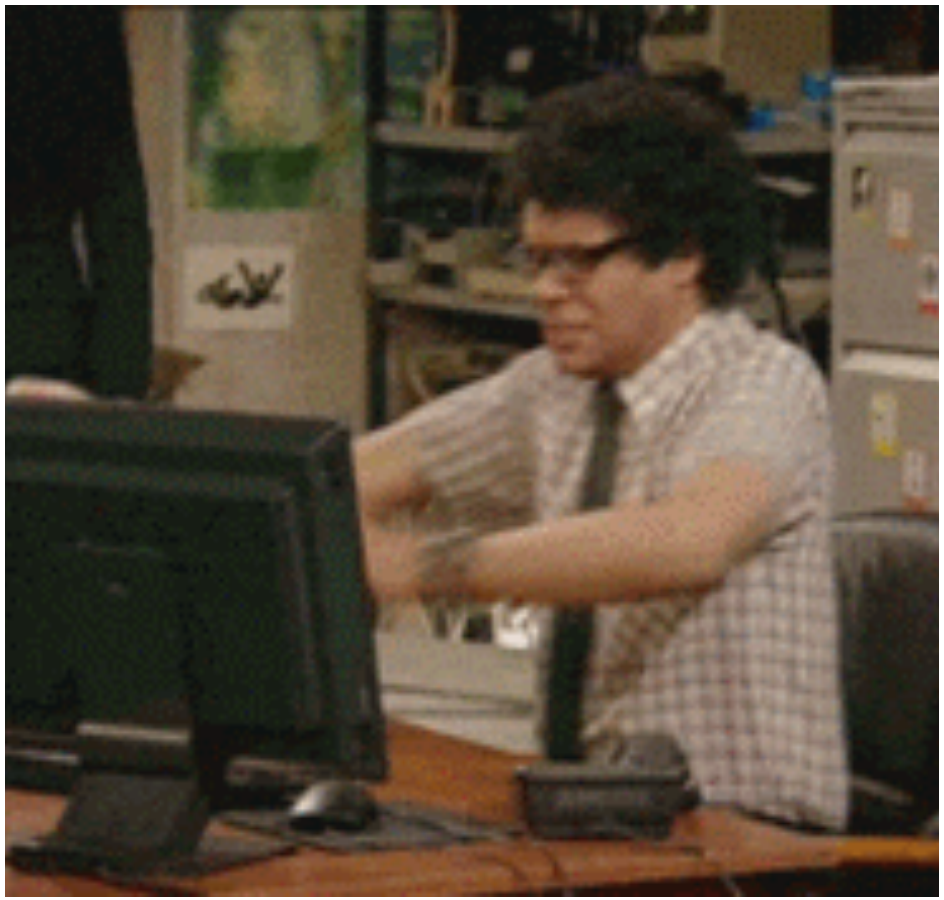
Problem

- Low confidence, imposter syndrome decreases motivation

Strategies

- Meta-learning skills (read documentation, google errors, etc)
- Address beliefs about learning (emphasize endurance)
- Encourage group work
- Balance foundational knowledge and real-life application

The “Come to R Moment”



Challenges: 3

Problem

- Group formation
- Lecture format
- Logistics (room, etc)
- Computer problems

Strategies

- Stay flexible
- Collaborate with students
- Plan ahead

Materials

Class materials are open-source on github: https://github.com/rochelleterman/

Includes lecture notes, code, assignments, etc.

Discussion Questions

- Curriculum:
  - *Tools v. method?*
  - *Base R or tidyverse?*
  - *How "deep" do you go?*
  - *Textbooks?*
- Format:
  - *Lecture notes: Slides? Livecoding?*
  - *Flipped classroom?*
  - *Homework assignments: Rmarkdown? Github?*
- Pedogagical Challenges:
  - *Balancing the basics + "cool stuff"*
  - *How fast or slow should you go?*

PS239T: The Students

19 enrolled students

10 auditors

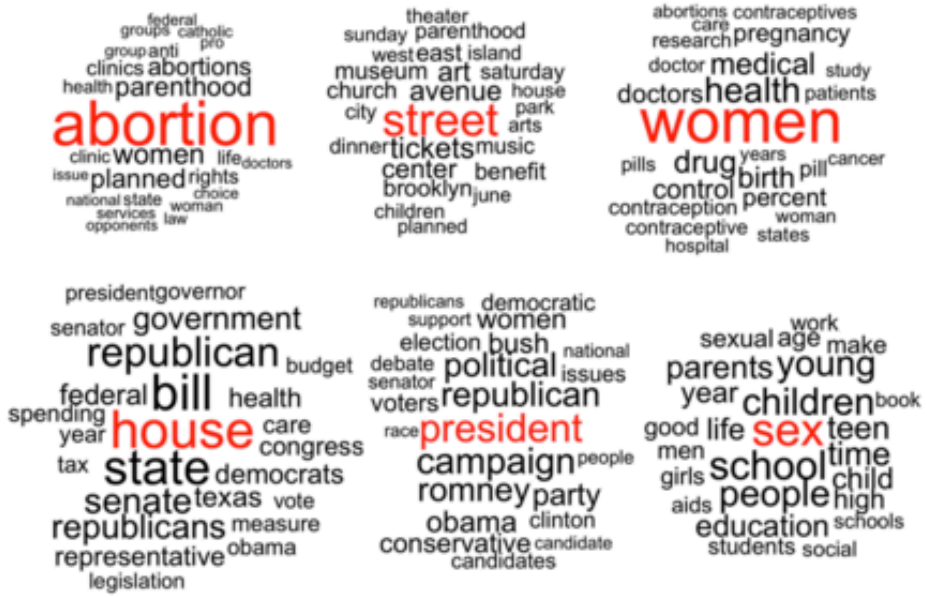
6 departments

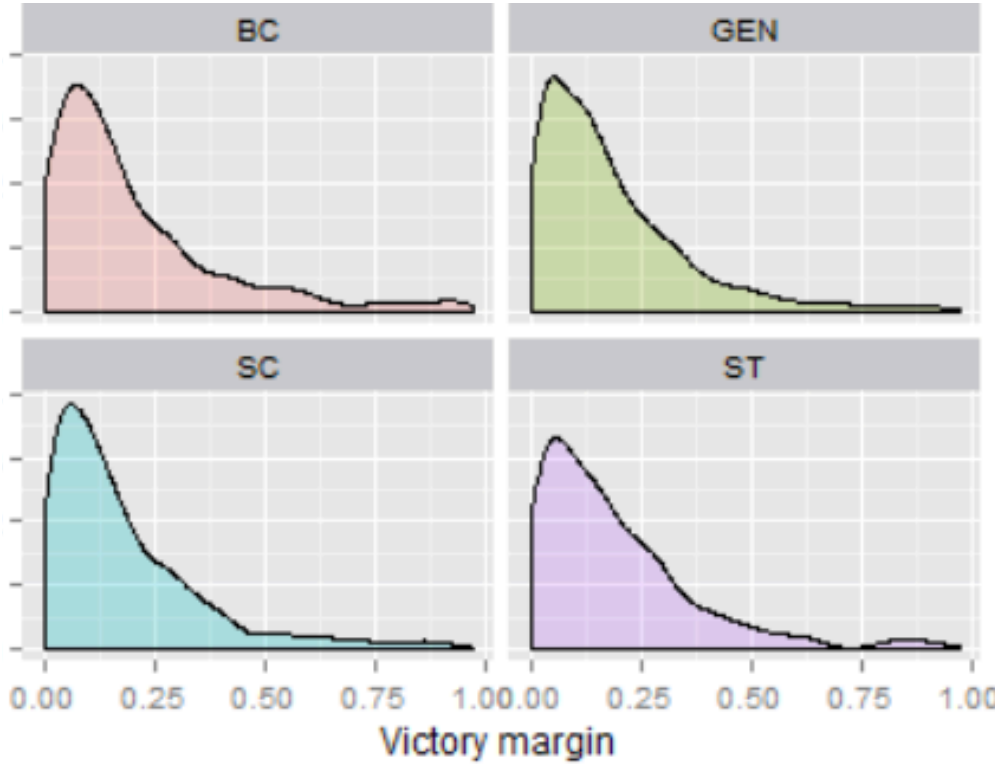
(POL SCI, GEOG, SOC, LAW, LAEP)

74% women and underrepresented minorities

64% with little to no programming experience

Exploring New Projects

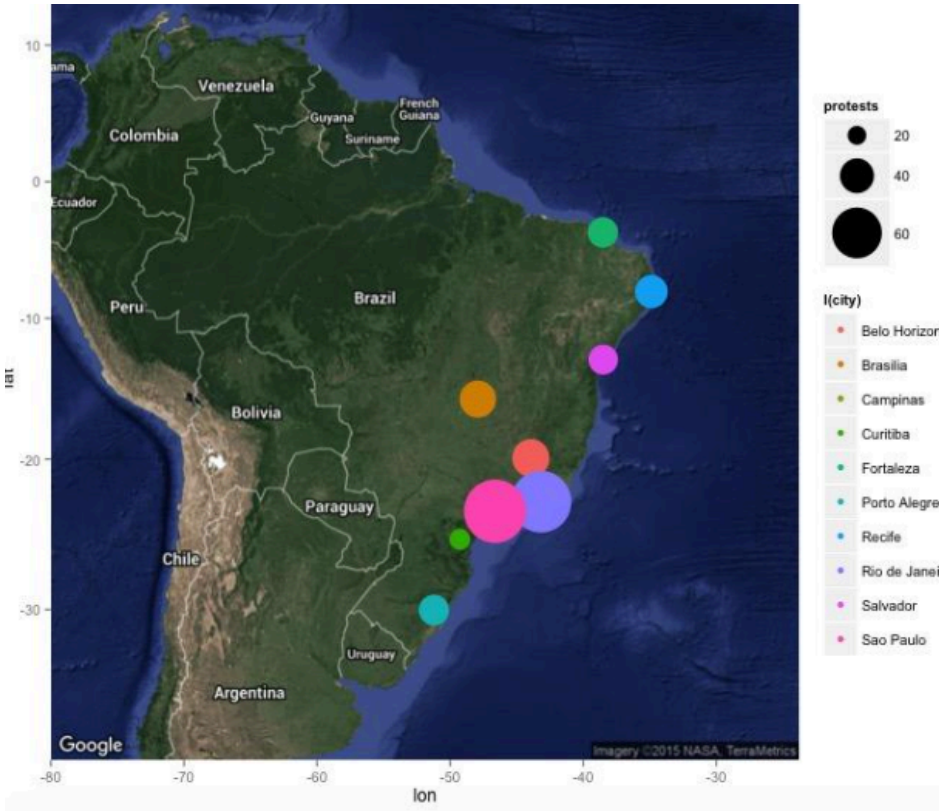




Elizabeth Herman
Political Science

Anirvan Chawdhury
Political Science

Aiding Existing Research



Liz McKenna
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Chelsea Zhou
Landscape Architecture &
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