Enhancing Pathways via Thinking with Data

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3 Approaches

• One new course – the ripple effect
• Campus-wide Initiative with many collaborators
• Professional Community workshop
1 New Course

• Motivation:
  – Students need broad computing skills to work with data
  – Students not going on to grad school don’t need proof-based linear algebra

• Concepts in Computing with Data
  – No prerequisites, 1 of 3 core courses in major
  – Students prepared to work with data in many settings

Impact -
Grown from 40 students a semester to 400
More students participate in research projects
Campus-wide Initiative

• Motivation:
  – Design data experience for ALL freshman
  – Connect with faculty across campus to understand their needs

• Intro to Data Science:
  – Jointly designed and taught by Stat and CS faculty
  – Dozens of connector courses

• Impact
  – Over 1,000 students will take it this year
  – Planning for a data science major is underway

https://github.com/data-8
https://ds8.org
Data Science Connections (15-16)

- Geospatial Data Explorations
- Probability and Mathematical Statistics in Data Science
- Computational Structures in Data Science
- Matrices and Graphs in Data Science
- Health, Human Behavior, and Data
- Race, Policing, and Data Science
- Data and Ethics
- How does History Count?
- Literature and Data
- Data Science in Ecology and the Environment
- Data Science for Smart Cities
- Data Science and the Mind
Professional Community

• Motivation:
  – Develop curriculum guidelines for Data Science undergraduate program
  – Support faculty and departments in creating new programs and courses

• 25 Math, Stat, CS faculty met at PCMI
  – Math faculty designed 2 courses that depart from traditional 4 course calculus sequence – core math for data science

• Impact:
  Guidelines (and syllabi) submitted for publication
Where are we headed?

• Definite: New Undergraduate Major Program

• Impact on existing statistics major: Imagine co-existence, but the exact form is unclear

• Possibility: Creation of a new Division of Computational and Statistical Sciences with several undergraduate tracks