A New Major:
BS in Data Science
A CS-STAT joint program
Definition we used ...

The new Data Science degree centers on computer science and statistics

• using computational methods and statistical techniques, modeling, data management, and domain expertise

• to make use of the growing wealth of data for data-driven discovery, extraction of knowledge, and informed decision making.
Data Science is hot…
Data Science is Interdisciplinary

- **Analytics:** Data Mining, Machine Learning, Math, Statistics, Optimization, Decision Making
- **User Interaction:** Visualization, Human Computer Interaction, Sense Making
- **Data:** unstructured data, graph data, text data, image, video
- **Systems:** Storage, DB, Security, networking, High-performance computing
- **Education**
- **Business**
- **Social Systems**
- **Humanities**
- **Ecology**
- **Smart Cities**
- **Environment**
- **Cybersecurity**
- **Personalized Medicine**
- **Health**
- **Biinformatics**
- **Science**
- **Marine Science**
- **Biology**
- **Astrophysics**

CRA 2016
Snowbird Conf.
Data Science degree programs/majors ...

(Professional) MS degrees

• Many
• http://analytics.ncsu.edu/?page_id=4184

Undergraduate degrees

• Penn State, UC Berkeley, U of Michigan, UC Irvine, U of Rochester, Ohio State, ...
• many under development
CS-STAT Joint BS in Data Science Major

• CS and Stat have the same Math and Science requirements
• New courses
  • CS/STAT 242: Introduction to Data Science
  • CS 4XX: Large Scale Data Analytics
  • Data Security and Privacy (panned)
• Required courses
  • Stat : 355, 416, 417
  • CS: 180, 182, 1-cr Python, 242, 251, 373, 4XX
  • Electives: CS (2), STAT (1)
• Capstone requirement
Data Science Faculty (CS and Stat)

- Chris Clifton
- Petros Drineas
- Jennifer Neville
- Bruno Ribeiro

- Elias Barenboim
- David Gleich
- Dan Goldwasser
- Jean Honorio
- Walid Aref

- Mark Ward
- Vinayak Rao

- Bill Cleveland

Plus future hires
Questions we asked ourselves?

• Why not make data science just a new track?
  • Could not allow for STAT courses
  • Role of the systems courses in DS was discussed extensively

• Besides CS and STAT students, who will pursue the DS major?
  • There was no in-coming class yet
  • Student interest has so far come from Science, Engineering, Technology
  • CS&DS double major will be attractive to CS students
  • Unclear if students leaving CS will pursue DS

• Are we giving students the right preparation for a career in a data science field?
  • Needs more assessment
  • Major was modeled after related courses/programs at UC Berkeley, Harvard, UW

• Should the major explicitly connect to a domain?
  • Science requirements could be tailored towards a domain
Questions we asked ourselves?

- Are we preparing students for graduate study?
  - Yes, but probably not for traditional CS graduate programs

- What education/experiences does industry expect from a BS in DS graduate? Now? In five years?
  - Needs ongoing discussion and input

- How to balance junior faculty building their research career with the need of involving them in developing new courses?
  - Tricky in a time of high enrollments
  - Faculty Hiring is a challenge: Fewer that 30% of all new Ph.D.s in CS (about 1950 in 2016) pursue an academic position and the majority of departments have open faculty positions in data science related areas
QUESTIONS?