

SCHOOL OF COMPUTING
BIG DATA PROGRAM



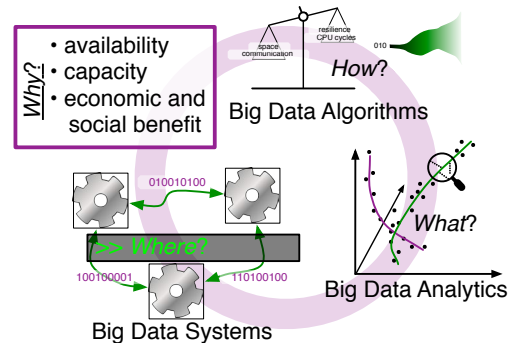
THE UNIVERSITY OF UTAH

OVERVIEW

Big Data is impacting many areas of science, engineering, and industry; from analyzing troves of weather data to modeling traffic patterns to processing millions of online customers, it is the enormous data which is creating new opportunities and challenges.

To tackle these challenges, one must have the training to store, manage, process and analyze data at these scales. But the challenges are beyond scale alone, the complexity of the data requires new powerful analytical techniques.

Finally, it is crucial to have skills in communicating and interpreting the results of this analysis. A person trained in all of these skills is a *big data scientist*.



BIG DATA PROGRAM

In the big data program in the School of Computing at the University of Utah, students will take classes from tenure-track professors actively developing the new techniques for these emerging challenges of big data. And students will learn by **doing**. They will work on real data, building on the techniques they learn in class under the guidance of the professors. The classes are hands on, and project-focused allowing them to interact with modern software tools and data processing techniques.

Moreover, students will not just see how to use these tools, but will learn the computer science behind how they work. To understand how emerging techniques (e.g. MapReduce) are best used and can scale, student will learn the fundamental analysis behind them and will code some core aspects of these systems. To understand which machine learning algorithm to use or which data mining technique to apply, students will study how they work, and work through the design choices. Knowledge of these deep concepts is essential when faced with real data, and one needs to confront situations when the standard approach is too slow or the answers do not make sense. Students will harness new approaches in visual analytics to quickly investigate, interpret, and present these enormous complex data.

Graduates of this programs will have acquired the broad and requisite technical skills and experience to be lead analysts at data rich companies, or to join top software companies at the forefront of this revolution.

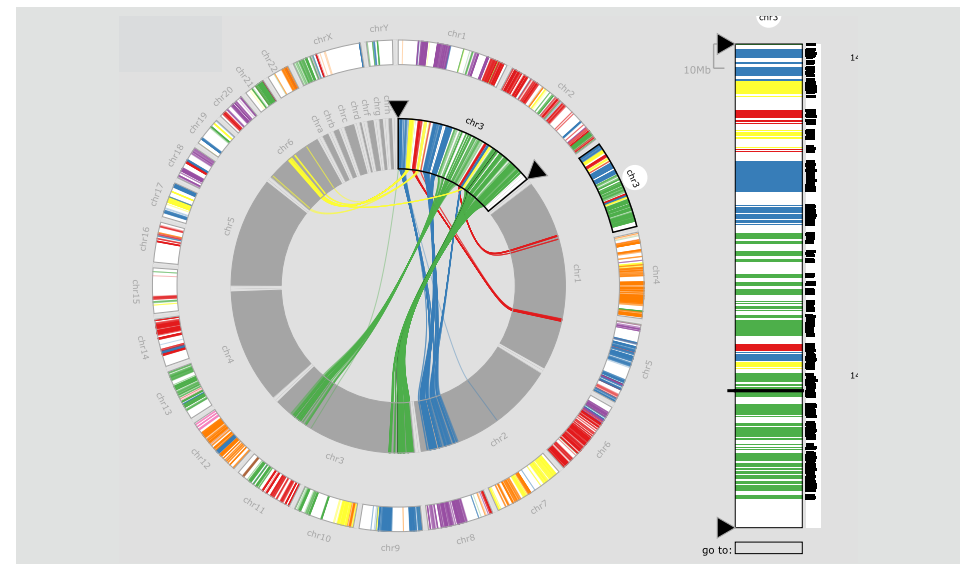
In addition, student will have the opportunities to interact with the active research going on in the department through a wide variety of regular research seminars, discussions, and colloquium. Active students can be exposed to new techniques and tools, before they reach the cutting edge!

ACCESSABILITY

The core courses associated with the program are scheduled in the late afternoons and evenings two days a week in consecutive time blocks.

The classes will be video recorded, with videos made available soon after each class. This will help professional students on a busy schedule from falling behind if they miss a class, and will allow all students to easily review the material as presented in the lecture.

We are also pursuing other techniques at the intersection of a intimate and interactive lecture setting where one **knows** the professor, and new approaches developed for distance education. These may include online office hours (through video chats) and cloud-based computing services.



CORE CLASSES

CS 6140 Data Mining
CS 6150 Advanced Algorithms
CS 6350 Machine Learning
CS 6530 Database Systems
CS 6630 Visualization

ELECTIVES

Algorithmics

CS 6160 Computational Geometry
CS 6170 Computational Topology
CS 7960 Models of Computation of Massive Data

Analytics

CS 6300 Artificial Intelligence
CS 6340 Natural Language Processing
CS 6964 Applications of NLP
CS 6950 Non-Parametric Statistics
CS 6210 Advanced Scientific Computing
CS 6640 Image Processing

Management

CS 6230 High Performance Parallel Computing
CS 6235 Parallel Programming for GPUs/Many Cores/Multi-Cores
CS 6480 Advanced Computer Networks
CS 6490 Network Security

- * Big Data Certificate requires all core classes
- * Big Data Masters (MS in Computing) requires all core classes + 5 electives or core classes + 3 electives + masters project or thesis
- * Big Data PhD (PhD in Computing) requires all core classes + 3 electives + PhD thesis

WHY UTAH?

The Salt Lake Valley and surrounding area, known as the Silicon Slopes (<http://siliconslopes.com>) is home to a surprisingly large number of technology companies (including Adobe, Overstock.com, and Ancestry.com), is consistently ranked as a top location for entrepreneurs, and is the home of many data centers, including for Ebay, C7 Data Centers, and the new massive NSA datacenter. The University of Utah is a world-class university with a rich history in computing, and big data is an emerging strength of the School of Computing. Moreover, Utah has unparalleled outdoors activities, with the campus nestled in mountains, located 10 minutes from downtown Salt Lake, 45 minutes from some of the best skiing on earth, and within 5 hours of at least 7 national parks including Yellowstone, Arches, and Zion.



HOW TO APPLY

For MS and PhD degrees:

- Following instructions on the SoC Graduate Admissions page
<http://www.cs.utah.edu/graduate/admissions/>
- Apply for the MS or PhD in Computing
Select "Data Management and Analysis" as an emphasis
- The degrees will follow the Data Track requirements
<http://www.cs.utah.edu/graduate/data/>

For Certificate in Big Data (pending):

- If enrolled in another graduate degree program: register for required classes
- Apply as a Non-Degree Seeking Student:
<http://admissions.utah.edu/apply/nondegree/>
- If one switches to MS or PhD degree, up to 9 credit hours (3 classes) can transfer

www.cs.utah.edu/bigdata

