Research areas:
• Bioinformatics
• Biomedical Image Analysis
• Computer Game Design
• Cyberphysical Systems
• Data Mining / Machine Learning
• Networking / Sensor Networking
• Semantic Web & WWW Systems

Also:
• Computer Security
• Database Systems
• Document Analysis
• Intelligent Agents
• Mobile Robotics
• Parallel Computing
• Programming Languages
Driving Forces

Where the STEM Jobs Will Be
Projected Annual Growth of NEWLY CREATED STEM Job Openings 2012-2022

- Computing: 65%
- Engineering: 17%
- Life Sciences: 4%
- Physical Sciences: 4%
- Social Sciences: 7%
- Mathematics: 3%

Lehigh CSE Undergrad Majors

86% increase from AY 2012-13

~10% of all Lehigh undergrads who have declared are majoring in CSE.
Lehigh CSE Core Enrollments

93% increase from Fall 2012

7.5% of all Lehigh undergrads took CSE 2 this past year.
New CSE faculty
As a result of Data X Initiative

Data X Consumer Analytics faculty hire in CSE:

• Ph.D. in Computer Science from the University of Illinois at Chicago: research on big data, data trustworthiness, and crowdsourcing.
• Over 30 papers in premier venues such as SIGKDD Conference on Knowledge Discovery and Data Mining, International World Wide Web Conference, and International Conference on Data Mining.

Sihong Xie

Data X Digital Media faculty hire in CSE:

• Ph.D. in Information and Computer Science from University of California, Irvine; currently serving as a Research Associate at Cornell.
• Interdisciplinary research synthesizing across computer science, sociology, and communication and media studies.
• Widely published in conferences and journals such as ACM CHI Conference, Social Media + Society, ACM CSCW Conference, Journal of Information Technology and Politics, and New Media & Society.

Eric Baumer
New CSE faculty
As a result of Data X Initiative

Data X Connected Health faculty hire in CSE:

Miaomiao Zhang

- Ph.D. in Computer Science from University of Utah; just completed post-doc at MIT CSAIL (CS and AI Laboratory).
- Developing new models at intersection of statistics, math, and computer engineering in fields of medical imaging and machine learning.
- Received Young Scientist Award at 2014 Medical Image Computing and Computer-Assisted Intervention (MICCAI).
- Joined CSE faculty in Fall 2017.

Data X Core Computer Systems faculty hire in CSE:

Roberto Palmieri

- Ph.D. in Computer Engineering at “Sapienza,” University of Rome; previously Research Assistant Professor at Virginia Tech.
- Work focuses on differentiated aspects of computing and service-oriented applications and platforms.
- This includes developing new frameworks and protocols for dependability in transactional systems (software and hardware).
- Joined CSE faculty in Fall 2017.
New Data Science Curriculum

Many new courses designed to meet student / industry demand:

- CSE 160: Intro to Data Science
- CSE 198: Intro to the Internet of Things
- CSE 264: Web Applications
- CSE 345/445: Web Search Engines
- CSE 350/450: Mobile Computing
- CSE 347/447: Data Mining
- CSE 398/498: Text Mining
- CSE 398/498: Big Data Analytics
- CSE 398/498: Services Computing
- CSE 398/498: Natural Language Processing
- CSE 398/498: Deep Learning
- CSE 431: Intelligent Agents
MT Building C Renovation
Supporting Data X, CSE, Mountaintop Experience
Lehigh University

Mountaintop Campus  Building C

April 7, 2016

EYP/
MT Building C Renovation
Exterior Entry Pavilion, SE Corner

EYP Architecture & Engineering
MT Building C Renovation
Academic Boulevard

EYP Architecture & Engineering
MT Building C Renovation
Collaborative Space (Second Floor)

EYP Architecture & Engineering
MT Building C Renovation
Active Learning ("Flipped") Classroom

EYP Architecture & Engineering
MT Building C Renovation
Graduate Student Lab (Third Floor)

Interiors  3rd Graduate Work Area

EYP Architecture & Engineering
MT Building C Renovation
Collaborative Space (Third Floor)

Interiors 3rd Floor Corridor

EYP Architecture & Engineering
MT Building C Renovation
C-2 High Bay “Mixing Box”
MT Building C Renovation
Seminar Room in C-2 Mixing Box

EYP Architecture & Engineering
MT Building C Renovation
Grab-and-Go Café (Second Floor)
MT Building C Renovation
Where we started

May 2, 2013

July 27, 2016
MT Building C Renovation
Where we are now

Earlier today
The big move

In the break between Fall and Spring semesters:
• Most CSE faculty will move their offices to Building C.
• CSE PhD students will move to new labs in Building C.
• CSE Department office will move (Lopresti, Steinberg, Wegrzyn).

Remaining in Packard Lab:
• Teaching-oriented faculty: Korth, Kalafut, Femister, Lowe, Fouh.
• CSE sys admin: Hodgson.
• Instructional labs: Sandbox Lab, Sun Lab.
• A new CSE staff member to help with undergrad matters.
• Some “hotel space” for when faculty in Building C come down.
What about CSE courses?

As a general rule:
• Courses with mostly undergrads remain on lower campus.
• Courses with mostly grad students taught on Mountaintop.
• Capstone courses will hold project meetings on Mountaintop.
• We will allow extra time for students who have to travel up/down.

More interesting, perhaps:
• We will use new telepresence classroom in Building C to connect with Silicon Valley, Lehigh / NASDAQ in SF, NYC, etc.
• We will link some courses on Mountaintop to lower campus, so that you can attend from the most convenient location.
• Next few semesters will involve some experimenting.
CSE 098: Women In Technology, 1 credit, F 2:10–4:00 (1st half), Lopresti

The tech industry has been the engine of growth for the US economy for the past four decades. Emergent tech companies have shaped all of our lives, and created significant professional and financial opportunities for leaders of these high growth ventures. Despite the many opportunities, women hold a minority of the leadership positions in the tech industry. Why? What can be done to change this? How can the next generation of female tech industry leaders succeed? Prerequisite: permission of instructor.

CSE 098: Software Product Management, 1 credit, F 2:10–4:00 (2nd half), Lopresti

Writing great software is only half the challenge. Successful companies are built on top of product/market fit - having the right capabilities at the right time in the market. Product management is key to establishing product/market fit. This class will cover the various elements of product management including: Product definition - writing PRDs and MRDs, Competitive analysis, Pricing, Go-to-market channel strategies, Promotion and demand generation. Prerequisite: permission of instructor.

Both courses will be in our new telepresence classroom in Mountaintop Building C, linked up to amazing contacts we have made in Silicon Valley and Lehigh / NASDAQ.
CSE 298/FIN 298 Blockchain, MW 12:45-2:00, Korth

Blockchain is the technology underlying Bitcoin, along with other digital currencies, and a technology applicable broadly in finance, accounting, and "smart" contracts. It offers the ability to decentralize financial transactions, automate record keeping, and increase privacy, but it remains controversial. Some describe it as "the most important invention since the Internet", yet others, including the CEO of a leading financial firm, have described Bitcoin as a "fraud" and that CEO has threatened to fire anyone in the firm caught trading it.

This course will provide an introduction to the technology underlying blockchain, the current and potential applications of blockchain in business, and the resulting policy issues. The course is designed for students with either some business-course background, some computer-science background, or both. Prerequisite: permission of instructor.

CSE 326 Foundations of Machine Learning, MW 2:35-3:50, Zhang

An introductory course offers a broad overview of the main techniques in machine learning. Students will study the basic concepts of advanced machine learning methods as well as their theoretical background. Topics of learning theory (bias/variance tradeoffs; VC theory); supervised learning parametric/nonparametric methods, Bayesian models, support vector machines, neural networks); unsupervised learning (dimensionality reduction, kernel tricks, clustering) and reinforcement learning will be covered. Also note that this course is a prerequisite for CSE 347 Data Mining.

With the tremendous success of data-driven services and applications (e.g., personalized recommendation, customized news, targeted ads) follows their immense threat to the privacy of people's sensitive information. This course discusses how to design and implement information systems that respect individuals' data privacy while still enabling high-quality services. Main topics covered in the course include: privacy-aware data publishing, privacy-aware data mining, privacy-aware mobile services, privacy-aware web services, and secure multiparty computation. The course will be a combination of lectures and paper presentations by the students. Students will also pursue a course research project. The final outputs of the project include a presentation and a short report. CSE 398 prerequisite: CSE 347/447, for CSE 498: permission of instructor.
CSE 398/498-010 Big Data Analytics, R 1:10-2:25, Lopresti

In this 2-credit project course, we will gain a practical working knowledge of large-scale data analysis using the popular open source Apache Spark framework. Spark provides a powerful model for distributing programs across clusters of machines and elegantly supports patterns that are commonly employed in big data analytics, including classification, collaborative filtering, and anomaly detection, among others.

Working from the course textbook, we will study and program solutions for problems including: music recommender systems; predicting forest cover with decision trees; anomaly detection in network traffic with K-means clustering; understanding Wikipedia with Latent Semantic Analysis; analyzing co-occurrence networks with GraphX; geospatial and temporal data analysis on the New York City Taxi Trips data; estimating financial risk through Monte Carlo simulation; analyzing genomics data and the BDG project; and analyzing neuroimaging data with PySpark and Thunder. Contact instructor for details.

CSE 403-010 Advanced Operating Systems, MW 11:10-12:25, Palmieri

Principles of operating systems with emphasis on hardware and software requirements and design methodologies for multi-programming systems. Global topics include the related areas of process management, resource management, and file systems.
CSE 280-010 Capstone Project I, MW 8:45-10:00, Spletzer

First of a two semester capstone course sequence that involves the design, implementation, and evaluation of a computer science software project. Conducted by small student teams working from project definition to final documentation. Each student team has a CSE faculty member serving as its advisor. The first semester emphasis is on project definition, planning and implementation. Communication skills such as technical writing, oral presentations, and use of visual aids are also emphasized. Project work is supplemented by weekly seminars. Prerequisite: junior standing, CSE 216.

CSB 312 Integrated Product Development (IPD) Capstone Course I

Industry-based business information systems design project. Information systems design methodology, user needs analysis, project feasibility analysis of design alternatives, and integrated product development methodology. Formal oral and written presentations to clients. Prerequisite: CSE 241, CSB 311 (can be taken concurrently).
CSE 198 Foundations of Discrete Structures and Algorithms - replaces CSE 261 (no longer offer through CSE Department, will have official number 2018-2019) TR 10:45-12:00 Wang, TR 1:10-2:25 Huang

Basic representations used in algorithms: propositional and predicate logic, set operations and functions, relations and their representations, matrices and their representations, graphs and their representations, trees and their representations. Basic formalizations for proving algorithm correctness: logical consequences, induction, structural induction. Basic formalizations for algorithm analysis: counting, pigeonhole principle, permutations. Prerequisite: (Math 021 or Math 031 or Math 51 or Math 76) and (CSE 001 or CSE 002 or CSE 012)

CSE 498 Advanced Algorithms - replaces CSE 441 (no longer offered through CSE Department, will have official number 2018-2019) TR 2:35-3:50 Munoz-Avila

Average-case runtime analysis of algorithms. Randomized algorithms and probabilistic analysis of their performance. Analysis of data structures including hash tables, augmented data structures with order statistics. Amortized analysis. Elementary computational geometry. Limits on algorithm space efficiency using PSPACE-completeness theory. Prerequisite: CSE 340 or MATH 340 or permission of instructor.
Other points

How will you get up there?
• Regular Lehigh shuttle bus service
• Short drive up mountain (lots of available parking)
• Bike, hike, etc. (if you’re in good shape!)

Ideas?
• Beyond courses, we will organize fun / interesting events that bring students up to Building C.
• We want to create a great environment for Lehigh students to work and learn. If you have ideas, let us know!

Like to see more? Sign up for a Building C tour.