Welcome to Computer Science

Department of Computer Science

University of Colorado at Boulder

August 16, 2010

These slides are available on our website:

<http://www.cs.colorado.edu/>
Introductions

Ken Anderson
Ugrad. Committee

Xiaochuan Cai
Department Chair

Lesley McDowell
Undergraduate Advisor
Introductions

Chris Schenk  
CSEL Admin

Alex Boughton  
CSUAC

Ben Limmer  
CSUAC
Introductions

James Bailey
ACM Student Chapter

Tyler Stevenson
GameDev

Katie Siek
Women in Computing
Excellent Time to be in CS

• Demand for CS skills is strong

• Bureau of Labor Statistics projected that computer science occupations will be responsible for nearly 60% of all job growth in all science and engineering occupations between 2008 and 2018

• The next highest contributor to growth was “all other Engineering disciplines” combined!

• Computer science is one of the more recession-proof graduate job options, according to the Computing Research Association
### Employees with a Bachelor of Science (BS/BSc/SB), Computer Science (CS) Degree

Salary Ranges by Job

<table>
<thead>
<tr>
<th>Job Title</th>
<th>National Salary Data ($)</th>
<th>$0</th>
<th>$100K</th>
<th>$200K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Engineer / Developer / Programmer</td>
<td>$50,871 - $70,737</td>
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<tr>
<td>Sr. Software Engineer / Developer / Programmer</td>
<td>$76,968 - $103,307</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Engineer</td>
<td>$56,767 - $74,642</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Technology (IT) Manager</td>
<td>$56,531 - $99,874</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Manager, Information Technology (IT)</td>
<td>$73,059 - $100,826</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programmer Analyst</td>
<td>$47,903 - $65,343</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Developer, Web Applications</td>
<td>$47,952 - $69,419</td>
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</tr>
</tbody>
</table>

*Country: United States | Currency: USD | Updated: 9 Aug 2010 | Individuals Reporting: 9,726*

**Average Salary across all categories: $71K**
But it’s not just jobs

There are some really exciting things going on in Computer Science right now!!
Robotics@CU

CSCI 4830/7000

Offering two robotics courses this semester:

Introduction to Robotics
&
Advanced Robotics

Nikolaus Correll
Joining our department last Fall from MIT!
Massive Data Sets

Image Processing and Data Collection FROM SPACE!!!

Example: System of Systems
Massive Computation

- Google recently donated 35 CPU years of compute cycles to a team of scientists who have now proved that the maximum number of moves to solve any position of the Rubik’s Cube is 20 moves
- There are 43,252,003,274,489,856,000 different possible positions of the cube (43.25 Quintillion)!
- partitioned the positions into 2.2B sets of 19.5B positions each.
- reduced sets needed to solve problem to 55M using symmetry and set covering.
- did not find optimal solutions, only of length 20 or less.
- wrote a program that solved a single set in about 20 seconds.
- Ran the computations in parallel over the course of a few weeks
Explosion in Mobile App Development!
Questions for You

• How many of you are transfer students from other institutions?

• From within CU
  • how many are transferring from another major (or OPEN) from within the College of Engineering?
  • how many are transferring from another College of School?

• What motivated you to transfer into our program?
Quality Education in CS

• Our department has the breadth and depth to give you an excellent foundation in
  • core technical skills
  • as well as an understanding of how computing technology (hardware and software)
  • fits into the world at large
• Computer science is no longer “just about programming,” it’s much broader than that!
Department

- Founded in 1970; Joined College in 1981
- Offers BS, BS/MS, MS, ME and PhD degrees
- 171 graduate students, 261 undergraduates, 60 minors
- 35 faculty members specializing in
  - SE, OS, networks, sensors, NA, scientific computation, bioinformatics, HCI, digital libraries, crisis informatics, machine learning, robotics, hypermedia/web and more...
- ~3000 alumni; 9 Distinguished Engineering Alumni
Outcome-Based Curriculum

- Our program is divided into tracks so you have the skills you need for the career you want

- Interested in networks?
  - Take the Network and Systems Track

- Want to evaluate a system’s impact on its work environment?
  - Take the Human-Centered Computing Track
Tracks

- General Computing
- Computational Biology
- Computational Science and Engineering
- Human-Centered Computing (Digital and Social Systems)
- Networked Devices and Systems
- Software Engineering
- Systems
Degree Requirements
Degree Requirements

128 credit hours
Degree Requirements

Computer Science Foundation
Degree Requirements

- Programming Languages
- Algorithms
- Introduction to Programming
- CS as Field of Study
- Computer Systems
- Data Structures

Total: 21 credits
Degree Requirements

Computer Science Track

Programming Languages
Algorithms
Introduction to Programming

CS as Field of Study
Computer Systems
Data Structures

21
Degree Requirements

Track

- General Computing
- Computational Biology and Health Informatics
- Computational Science and Engineering
- Digital and Social Systems
- Networked Devices and Systems
- Software Engineering
- Systems

Programming Languages | CS as Field of Study
---|---
Algorithms | Computer Systems
Introduction to Programming | Data Structures

21
Degree Requirements

**Track Core**
(select m of n)

**Track Foundation**
(all required)

- Programming Languages
- Algorithms
- Introduction to Programming
- CS as Field of Study
- Computer Systems
- Data Structures

~20

21
Degree Requirements

**Systems Track Core**
(select 3 of 6)

~20

**Systems Track Foundation**
(all 3 required)

Programming Languages

Algorithms

Introduction to Programming

CS as Field of Study

Computer Systems

Data Structures

21
Degree Requirements

Systems Track Core
(select 3 of 6)

- Network Systems (~20)
- Operating Systems
- Digital Logic
- Programming Languages
- CS as Field of Study
- Algorithms
- Computer Systems
- Introduction to Programming
- Data Structures

Total Credits: 21
Degree Requirements

- Computer Performance Modeling
- Compiler Construction
- Software Engineering Methods
- Network Systems
- Operating Systems
- Programming Languages
- Algorithms
- Introduction to Programming
- Computer Graphics
- Embedded Systems Design
- Computer Organization
- Digital Logic
- CS as Field of Study
- Computer Systems
- Data Structures

~20

21
Degree Requirements

Track Core
(select m of n)

Track Foundation
(all required)

Programming Languages
Algorithms
Introduction to Programming

CS as Field of Study
Computer Systems
Data Structures

~20
21
Degree Requirements

Track Core
(select m of n)

Track Foundation
(all required)

Programming Languages
Algorithms
Introduction to Programming

CS as Field of Study
Computer Systems
Data Structures

CS Elective
CS Elective
CS Elective
~8
~20
21
Degree Requirements

**Track Core**
(select m of n)

**Track Foundation**
(all required)

- Programming Languages
- Algorithms
- Introduction to Programming

- CS as Field of Study
- Computer Systems
- Data Structures

- CS Elective
- CS Elective
- CS Elective

Math: 17
Science: 17
Humanities: 24
Electives: 12

Total Credits:
- Math: 17
- Science: 17
- Humanities: 24
- Electives: 12

~8
~20
21

# Degree Requirements

## Track Capstone
- CS Elective
- CS Elective
- CS Elective

## Track Core
(select m of n)

## Track Foundation
(all required)
- Programming Languages
- Algorithms
- Introduction to Programming
- CS as Field of Study
- Computer Systems
- Data Structures

### Course Credits
- 17
- ~8
- ~20
- 24
- 8
- 12
- 30
128 credit hours

Numbers on previous slide add up to 127

You’ll take the final credit hour either in a Track Core class or as a CS Elective.
Degree Requirements

More Info at:

http://www.cs.colorado.edu/ugrad/bs/requirements/2010-2011/

and

Department Expectations

- Maintain your GPA
  - You need a cumulative GPA of 2.0 (C) or better
    - in all CSCI courses
    - in all courses attempted at CU
    - in all courses used to satisfy graduation requirements
  - You need at least a C- or better in all CS foundation and Track core/foundation courses
  - You need at least a C- or better for a prerequisite course to count for a required course in order to count that prerequisite towards degree requirements
Department Expectations

- Be aware of residency requirements
  - The last 45 credit hours must be earned on the Boulder campus after admission to the College of Engineering and Applied Science.
  - In addition, unless otherwise explicitly approved, these courses must be taken on the Boulder campus:
    - all Computer Science Foundation courses
    - all courses used to satisfy the Track Foundation
    - all courses used to satisfy the Track Core
    - the Track Capstone
  - Courses for which transfer credit has been explicitly approved are not required to meet the residency requirement.
Undergraduate Program Advisor

Welcome!

You can find me in ECOT 721

Lesley McDowell
Any Questions?