Welcome to Computer Science

Department of Computer Science

University of Colorado at Boulder

August 18, 2010

These slides will be available on our website:
<http://www.cs.colorado.edu/>
Introductions

Ken Anderson
Ugrad. Committee

Xiao-Chuan 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
**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!
Search Using GPUs
Enron Mail Archive
<http://www.keroseneandamatch.com/>
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!
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

21
Degree Requirements

Computer Science Track

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

CS as Field of Study
- Computer Systems
- Data Structures

Degree Requirements

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)

Systems Track Foundation
(all 3 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)

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

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Degree Requirements

Track Core
(select m of n)

Track Foundation
(all required)

CS Elective

Programming Languages

Algorithms

Introduction to Programming

CS Elective

CS as Field of Study

Computer Systems

Data Structures

~8

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21
Degree Requirements

Track Core
(select m of n)

Track Foundation
(all required)

Programming Languages

CS as Field of Study

Algorithms

Computer Systems

Introduction to Programming

Data Structures

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24

17

21

12

~20

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Degree Requirements

Track Capstone

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

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12

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24
Degree Requirements

128 credit hours
Degree Requirements

More Info at:

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

and

Undergraduate Opportunities

• Many opportunities for undergraduate research
• Explore Faculty Web Pages and then talk to faculty
• Many opportunities for internships and employment
  • Google, IBM, Microsoft, Sun (now Oracle), Ball Aerospace all with 5 – 20 minutes of campus
  • Lots of startup companies in the area
    • Some located on Pearl Street!
Undergraduate Community

• Computer Science Undergraduate Advisory Committee
• ACM Student Chapter
• Game Developers Club
• Women in Computing
• Women in Engineering Program
• Multicultural Engineering Program
The Domino Award

Computer Scientists Setting Big Things In Motion

Inspire students to “think big” by seeing how computer scientists have significantly impacted modern society.

- $500 cash award and chance to win “big prize”; Last year’s winners are traveling this Fall to visit Spaceport America!
- Meet influential technologists from around Colorado and the US.
- Get free pizza (now we’re talking).
- All participants receive a commemorative Domino and join an online “Topple” where people work together to “Set Big Things in Motion.”
- Conceived by Herb Morreale (CS alum 1991) and Professor Clayton Lewis
How to Enter

• Write a 500-800 word essay honoring someone from the field of computer science. Essays will be judged for their ability to clearly communicate how the honoree’s work set in motion a “series of dominos” that changed the world.

• Watch for department announcements regarding timing/deadlines.
# Previous Domino Award Winners

<table>
<thead>
<tr>
<th>Student</th>
<th>Honoree</th>
<th>Accomplishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Whaley</td>
<td>Ken Thompson</td>
<td>‘B’ programming language</td>
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<tr>
<td>Alan Verteeg</td>
<td>Daniel Bricklin</td>
<td>Visicalc – first commercial spreadsheet</td>
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<tr>
<td>Kelly Anne K. Shuster</td>
<td>Grace Hopper</td>
<td>Flow-Matic – first English language compiler</td>
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<tr>
<td>Jon Mai</td>
<td>Bill Gates</td>
<td>Altair BASIC, Microsoft</td>
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<tr>
<td>John French</td>
<td>Ray Kurzwiel</td>
<td>Inventor, futurist</td>
</tr>
<tr>
<td>Michael Ton</td>
<td>William Shockley, Walter Brattain, and John Bardeen</td>
<td>Transistor</td>
</tr>
<tr>
<td>Katherine A. Corner</td>
<td>Douglas C. Engelbart</td>
<td>Mouse, Hypertext</td>
</tr>
<tr>
<td>Doug Stillings</td>
<td>Ed Roberts</td>
<td>Altair 8800</td>
</tr>
</tbody>
</table>

Learn about pioneers of computer science and get inspired and go on to make your own big impact in Computer Science!
Recognizing Your Domino

• We’d like to recognize your most influential high school teacher...
  • It does not have to be a “computer science” teacher; it can be any teacher that inspired you in some way to pursue your dreams
• If you have a teacher you’d like to recognize, send me a short message at <kena@cs.colorado.edu>
  • describing the teacher, how he or she inspired you and the contact information for their school
• We’ll send them a recognition letter, a picture of you here at CU and a thank you note!
Undergraduate Program Advisor

Welcome!

You can find me in ECOT 721

Please come to tomorrow’s session in ECCR 245 from 10:30 AM to 11:30 AM for important information!

Lesley McDowell
CSUAC
Computer Science Undergraduate Advisory Committee

• What we do:
  • CSUAC acts as a voice for CS students in the department
  • Since CS is a rapidly evolving field, CS education must evolve rapidly as well. To help achieve this, CSUAC:
    • Provides input to the department, aids communication between students and professors, builds community among CS majors and holds exciting events often with free food!

• Where you can go for more information:
  • E-mail: CSUAC Announcements
  • Facebook: Search “CU Computer Science Undergraduates”
  • Talk to Ben (limmer@colorado.edu) or Alex (alexandra.boughton@colorado.edu)
ACM Student Chapter

- CU ACM
- LAN Parties
- Tech Talks
- Movie Nights
- Programming Contests
- Networking with local tech companies
- Website: <http://cuacm.org/>
- Contact: James Bailey <james.bailey@colorado.edu>
CSEL

- Admins: Chris Schenk, Ali Alzabarah
- Account activation
  - https://sac.colorado.edu (takes 30 seconds)
  - Card access automatic within 15 minutes of activation
- Accounts must be re-activated every semester for security purposes
- CS majors/minors/grads receive access year-round
- Help and information
  - email: trouble@csel.cs.colorado.edu
  - website: http://csel.cs.colorado.edu
GameDev

- When: Every Tuesday at 7:00 PM
- Where: DLC 170
- What
  - Socializing
  - Tutorials
  - Game Jams
  - Testing Games
- Contact: Tyler Stevenson <tyler.stevenson@colorado.edu>
Women in Computing

People who support women and diversity in computing

- Facebook Group
- Search “CU Women in Computer Science”
- First Event: Welcome Breakfast
  - 3 September 2010, 9am-11am
  - ECCS 122 – Near CSEL!
- Future Events
  - 2 Scholarships to attend Grace Hopper in Atlanta, Georgia
    - September 28-October 2, 2010
  - Colorado Celebration of Women in Computing in Golden, Colorado – November 4-5, 2010
Any Questions?