Welcome to Computer Science

Department of Computer Science

University of Colorado at Boulder

August 19, 2009

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

Ken Anderson  
Ugrad. Committee

Xiao-Chuan Cai  
Department Chair

Lesley McDowell  
Undergraduate Advisor
Introductions

Zach Flower  
CSEL Admin

Alex Boughton  
CSUAC

Ben Limmer  
CSUAC
Introductions

James Bailey
ACM Student Chapter

Richard Gist
GameDev

Ifeyinwa Okoye
Women in Computing

Suzanne Gallagher
Women in Computing
Excellent Time to be in CS

- Demand for CS skills is strong
  - In the US, figures released by the US Department of Labour in April 2009 predict that IT jobs will see some of the strongest growth of any profession by 2010.
  - Computer science is one of the more recession-proof graduate job options, according to a US industry report produced by the Computing Research Association.
  - In Jan. 2009, the salary survey of the National Association of Colleges and Employers reported the average salary for CS B.S. degree as 58K.
Median Salary by Years of Experience

April 2009

<table>
<thead>
<tr>
<th>Experience</th>
<th>Median Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>$51,140</td>
</tr>
<tr>
<td>1-4 years</td>
<td>$55,011</td>
</tr>
<tr>
<td>5-9 years</td>
<td>$72,494</td>
</tr>
<tr>
<td>10-19 years</td>
<td>$89,566</td>
</tr>
<tr>
<td>20 years or more</td>
<td>$100,421</td>
</tr>
</tbody>
</table>
But it’s not just jobs

There are some really exciting things going on in Computer Science right now!!
“Dear Twitter, My water broke. It wasn’t like Charlotte in Sex and the City. Now, timing contractions on an iPhone app.”

— Sara Morishige Williams, wife of Twitter CEO Ev Williams, dog-foods the product during labor, a growing trend (though it’s usually dad doing the tweeting).
Google reveals caffeine: a new faster search engine

Google has revealed project “caffeine”, a new test version of its search engine which it claims will be faster and more relevant than ever before.

By Emma Barnett, Technology and Digital Media Correspondent
Published: 10:51AM BST 11 Aug 2009

Comments 38 | Comment on this article

The front end of the improved search engine looks no different. It is the back end technology which Google developers hope will noticeably index new content faster.

Photo: AP

In the face of increasing innovation and competition in the search market, Google is upping the ante by developing new technology which will speed up indexing search results and create a larger index.
Search Using GPUs

Enron Mail Archive

<http://www.keroseneandamatch.com/>
Robotics@CU

CSCI 4830/7000
Multi-Robot Systems

This class covers current research topics in multi-robot systems ranging from coordination algorithms to analysis and synthesis.

Nikolaus Correll
Joining our department this Fall from MIT!
Image Processing and Data Collection FROM SPACE!!!

Example: System of Systems
Speaking of Space...

- The Colorado Space Grant Consortium has openings for engineering and science majors to join one of their five projects.
  - Open House on Thursday Aug 27 at 5:30pm in the Discovery Learning Center room 1B50.
- **DANDE** - 18” satellite to measure atmospheric density
- **RocketSat** - Develop a rocket that flies to over 100km.
- **HASP** - lighter than air astronomy observing platforms
- **CubeSat** - A 10cm cube shaped satellite to launch next year.
- **Ground Station** - Satellite communication system and building a ground dish communication system.
Ben Limmer (and other CU students) participated in an open source project working on the development of gnash, a free and open source version of Adobe’s Flash Player. gnash is considered a high-priority project of the Free Software Foundation.

Ben worked on extending the GStreamer library to work with webcam and microphone software to allow the Gnash software to support video conferencing!

The department hopes to continue offering the Open Source Lab in future summers!
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 it’s 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

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
- 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)

**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
- Operating Systems
- Digital Logic
- Programming Languages
- CS as Field of Study
- Algorithms
- Computer Systems
- Introduction to Programming
- Data Structures

~20
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
CS as Field of Study
Algorithms
Computer Systems
Introduction to Programming
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

~8

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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

~8

17

24

17

12
Degree Requirements

**Track Capstone**
- CS Elective
- CS Elective
- CS Elective

**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

**Math**
- 17

**Science**
- 17

**Humanities**
- 8

**Electives**
- 24

**Degree Requirements**
- ~20
- ~8
- 21
- 12
Degree Requirements

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
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

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

- $500 cash award and chance to win an all-expenses paid trip to the next Telluride Tech Fest.
- 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>
</tr>
<tr>
<td>Alan Verteeg</td>
<td>Daniel Bricklin</td>
<td>Visicalc – first commercial spreadsheet</td>
</tr>
<tr>
<td>Kelly Anne K. Shuster</td>
<td>Grace Hopper</td>
<td>Flow-Matic – first English language compiler</td>
</tr>
<tr>
<td>Jon Mai</td>
<td>Bill Gates</td>
<td>Altair BASIC, Microsoft</td>
</tr>
<tr>
<td>John French</td>
<td>Ray Kurzweil</td>
<td>Inventor, futurist</td>
</tr>
<tr>
<td>Michael Ton</td>
<td>William Shockley, Walter Brattain, and John Bardeen</td>
<td>Transistor</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 105 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>
GameDev

• Where: DLC 170
• When: Every Tuesday at 7:00 PM
• What:
  • Socializing
  • Tutorials
  • Game Jams
  • Testing Games
• Contact: Richard Gist <Richard.Gist@Colorado.EDU>
CSEL

- Computer Science Education Lab
- Zach Flower, CSEL Admin
- <zachary.flower@Colorado.EDU>

- Please attend tomorrow’s orientation session for lots of detailed information about the CSEL
Women in Computing

People who support women and diversity in computing

- Facebook Group – Search “CU Women in Computer Science ”
- Meetings 2nd Wednesday of the month from 11:30-1:30
  - 9/9 Welcome Lunch (Pizza Provided)
  - 10/7 Imposter Syndrome Panel (Bring lunch/dessert provided)
  - 11/11 Publish, Perish, Procreate? Panel (Bring lunch/dessert provided)
- Other social events being planned
  - Movie Night
  - Potluck
  - Bowling
  - Ideas always welcome
Any Questions?