Computer Science Department

Update for the Engineering Advisory Council 10/12/2012
Jim Martin
Professor and Chair
Department Profile
Students, Faculty, Programs

Research Highlights

Challenges
Faculty, Enrollments, Diversity and Retention

Response
BA in Computer Science in A&S
Department Profile
Faculty and Staff

- Faculty
  - 28 Tenured/Tenure Track Faculty
  - 2 Full-time Instructors
  - 2.5 Research Professors
  - 5 Postdoctoral research associates

- Staff
  - 5 Full-time staff
  - 2 part-time staff for CS lab support
Department Profile

Students

- 335 BS/CS Majors; 10 BS/MS
  - 63 Freshmen this year; largest class in 10 years
- 119 MS/ME
- 110 PhD
Highlights
Recent faculty and student awards

- Leysia Palen
  - Provost’s Faculty Achievement Award
- Katie Siek
  - CRA Anita Borg Early Career Award
- Sriram Sankaranarayan
  - College Outstanding Junior Faculty Award
- Nikolaus Correll
  - NSF and NASA Early Career Awards
Distinguished Professor Professor Ehrenfeucht
80th Birthday Celebration

The 80th Birthday Symposium for Andrzej Ehrenfeucht
Distinguished Professor of Computer Science
University of Colorado Boulder | September 13-14, 2012

Featuring Andrzej’s advisees and Distinguished Engineering Alumni
David Haussler and Gene Meyers.
Dan Knights (CS PhD 2012) received the College’s Outstanding Dissertation Award in May. This is the first time a CS grad has won this award.

Dan graduated with 20 journal articles (3 in Nature and 2 in Science) during his time here in Boulder.
Research

› $7.9M in expenditures; $4.5M in new awards last fiscal year

› Actively funded research groups
  • Intelligent Systems; Programming Languages and Software Engineering; Bioinformatics; High-Performance Numerical Computing; Networks and Systems; Human-Centered Computing

› Three affiliated research centers
  • Computational Language and Education Research Center
  • Lifelong Learning and Design
  • Center for Software and Society*
Research Highlight
Aaron Clauset; joined CU in 2010

- Clauset uses statistical methods and learning algorithms to model complex systems of all kinds

- Funding from DARPA and the McDonnell Foundation
Challenges and Opportunities

- Faculty turnover
- Boom and bust enrollments in CS
  - Associated problems with diversity and retention
Faculty

- Seven faculty departures since 2010
  - That is, seven since I started as chair.
  - 6 retirements, 1 resignation

- Three additions
  - 1 assistant professor
  - 2 instructors

- Searching for 2 additional tenure track faculty this year
Faculty
Opportunity

- Our newer faculty are more research active/motivated than the recent retirees
- Our hiring strategy has emphasized interdisciplinary clusters across the college, campus and system
  - Newest faculty have joint appointments/efforts with ECEE, Aero, BioFrontiers, Cognitive Science and the Med school
  - This year’s search is focused on cyber-physical systems and machine learning
  - Joint search effort proceeding with Cognitive Science on machine learning and brain science
Enrollments

- CS (nationwide) has a long history of boom and bust enrollment cycles – we’re now out of the last decline.
Why the decline?

Nationally

- Lots of reasons. Probably a combination of all of them
  - Stale curricula
  - Failure to diversify the applicant pool
  - Horrible High School AP curriculum
  - Dot-com fiasco; Fears of job off-shoring
    - Associated belief among parents that there were no jobs in computing
Diversity of Students Entering CSEN

- Under rep entering
- Females entering
Much of the difference resides in the overall first to second year retention. Past that point the numbers are more similar to the college as a whole.
Our responses

Starting around 2007

- Revised the major in various ways to adapt to changes in the field
  - Introduced multiple tracks to the major in 2007
    - Computational Biology, Computational Science, Human-Centered Computing, Networked Devices, Software Engineering, Systems, General

- Began the ABET process in 2008
  - Received highest level accreditation in 2010 (through 2016)
  - Extensive course revisions included in this process

- Curriculum committee revising the intro course sequence
  - Multiple tracks into the major based on starting point

- Began the creation of a new BA in the Arts and Science college in 2010
Pick your ranking... Every peer flagship institution offers a CS Bachelors in both Engineering and their Arts and Science College. Except CU.

There is intense interest in computing among students who have little interest in engineering (as they understand it). At CU most of those students are in A&S.

- That population is much more diverse, both demographically and in terms of their intellectual pursuits.
BA in Computer Science
Motivation for CSEN

- This should work to improve our retention/diversity numbers in our current CSEN BS.
- Right now the demographics are so skewed in each class that it is difficult to recruit/retain women in the major.
- The A&S students will share the same classes with Engineering students and will therefore change the climate
BA in Computer Science

Goal

- Create a rigorous technical degree:
  - That will satisfy potential employers looking for CS majors
  - Does not require significant changes to current curriculum/labs
  - Maintains a consistent prerequisite chain
  - Fits into the 120 hours permitted for the BA
  - Works with the A&S Core requirements
  - Is flexible enough to allow double majors that are in high demand
    - CS+Bio, CS+Film, CS+Linguistics, CS+Math
BA in Computer Science
Process started April 2010

- Department committee created initial proposal
- Proposal approved by CEAS Dean
- Several thousand iterations with A&S Curriculum committee.
  - Support from nearly all A&S Chairs, from English to Physics
- Approval from A&S Council
- Approval from Dean Gleason (A&S) and Dean Davis
- Campus approval
- Regent’s first reading in September; will vote in November
  - Enthusiastic support
- If all goes well, should launch in fall 2013.
Questions?