CS4EDU Workshop

July 31 & August 1, 2012

Christoph Hoffmann
&
the CS4EDU Team

Objectives

- Connect and engage CS education researchers and academics with high school teachers
- Updates on ongoing efforts
  - CS Principles Project
    - ACM Inroads: http://tinyurl.com/csprinciples
    - Free access to articles: http://tinyurl.com/csappubs
  - CS Methods Course
- Discuss and appraise new trends
  - Flipped Classroom
  - MOOCs (Massive Open Online Courses)

Our Team

- CS faculty
  - Hambrusch, Hoffmann, Korb, Popescu
- EDU faculty
  - Lehman, Yadav
- Students
  - Robb Cutler, Andrew Wirtz, Ninger Zhou
  - Chris Mayfield (now at James Madison University)

Program Overview: Tuesday

- Morning Session: CS Principles
  - College perspective
  - High school perspective
  - Panel discussion
- Afternoon Session: Tools & Techniques
  - Blown to Bits Jeopardy Game
  - Building Your CS Toolkit
  - Manipulatives to Teach CS
  - Learning Recursion
  - Methods Course
  - POGIL, Flipped class room
  - Breakout sessions

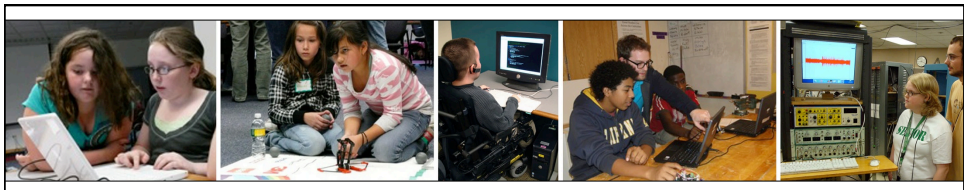
Program Overview: Wednesday

- Morning Session
  - Break-out reports
  - CSTA Indiana chapter
  - Parallelism
  - Job prospects
  - Wrap up, post-workshop survey

Practical Matters

- We need your receipts before you leave
  - Hotel
  - Air fare, mileage
- Dinner arrangements

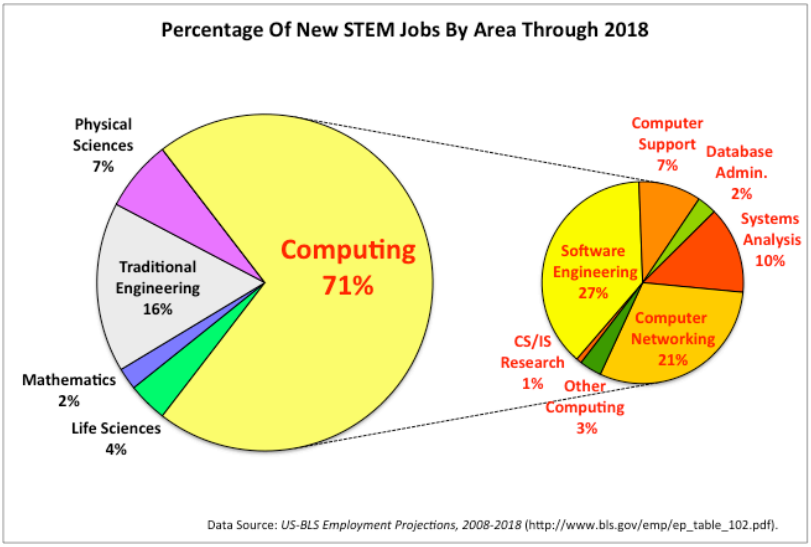
Additional Slides



The computing community faces three significant and interrelated challenges in workforce development.

- Underproduction of degrees
- Underrepresentation
- Lack of a presence in K-12

Strong Predicted Job Growth



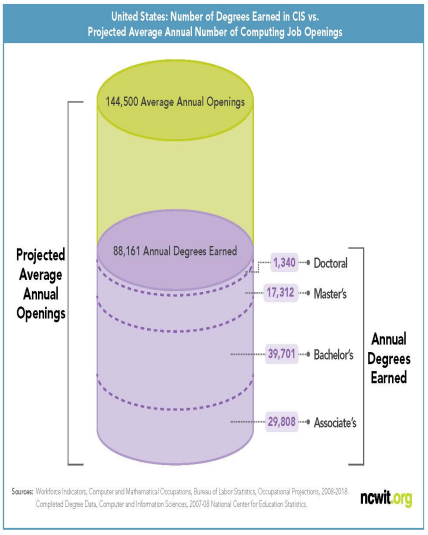
Underproduction of computing degrees

By 2018, there will be 1.4 million computer specialist job openings.

U.S. universities will have generated enough graduates to fill about 1/3 of these openings.

--NCWIT, By the Numbers, 2009 (from BLS and NCES data)

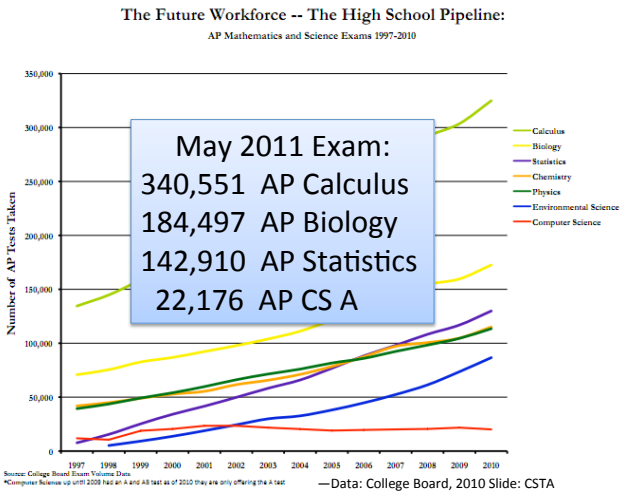
Underproduction



Underrepresentation

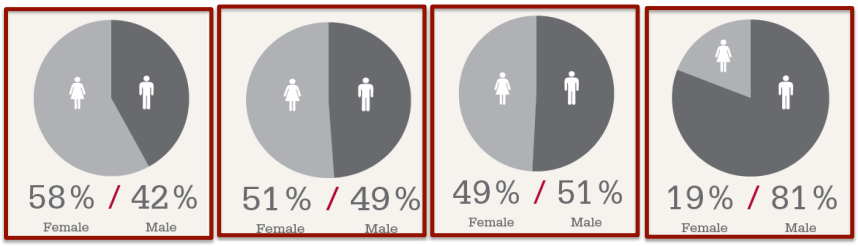
- Women, African Americans, Hispanics, Native Americans and indigenous people, and persons with disabilities—together representing 70% of US population —participate in very low numbers in computing.
- While there are disciplines with lower numbers, computing is the only field where the gender gap has grown significantly over the last 20 years (mostly at the undergraduate level).

High School Participation in AP STEM Disciplines



—Data: College Board, 2010 Slide: CSTA

2010 AP Gender Gap



Biology | Statistics | Calculus | Computer Science

—College Board, 2010

CS 10K Project

Transforming high school computing

Goal:

Get engaging, rigorous curricula into computing courses in 10,000 high schools, taught by 10,000 well-prepared teachers by 2016.

- ✧ New preAP course, *Exploring Computer Science (ECS)*
- ✧ New (proposed) AP Course, *CS Principles*
- ✧ Develops scalable models, curricula and materials for professional development for teachers
- ✧ Fosters the growth of national community and partnerships needed to scale to 10,000 teachers & schools

CS 10K: Outcomes and Progress

Exploring Computer Science
- Piloting in ~25 Los Angeles USD schools with 2000 students, 41% female, 87% URMs
- Also adopted in San Jose, Oakland, Oregon, and required in 2013 for CTE IT students in 75 Chicago Public Schools

CS Principles
- Piloting in ~20 universities and ~40 high
- More than 80 colleges and universities agreed to give credit or placement
- Strong community support: Partnering with ACM, CSTA, College Board, Google, NCWIT, NMSI, Microsoft