



With computing, we can dream big.



**The Future of Computing** <http://www.nytimes.com/indexes/2011/12/05/science/> 3

Computing is the new literacy.

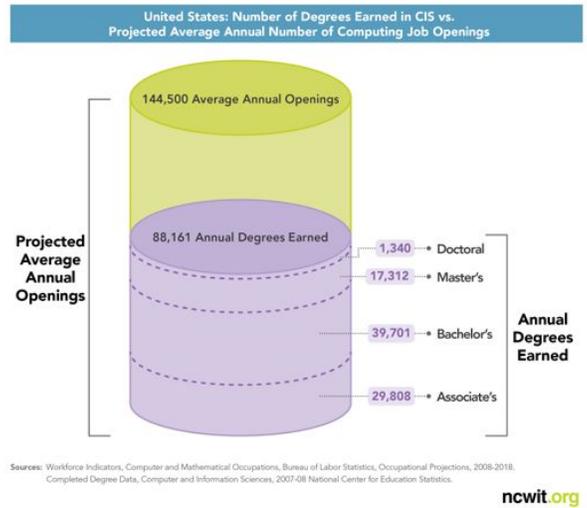
... the ability to make digital technology do whatever, within the possible, one wants it to do -- to bend digital technology to one's needs, purposes, and will, just as [we now] ... bend words and images.

—Marc Prensky, Edutopia, 1/13/2008

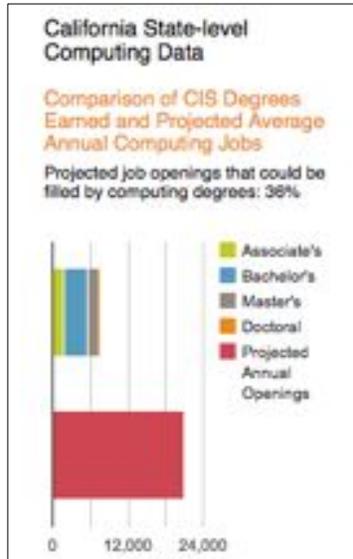
We face three significant and interrelated challenges in maintaining a robust U.S. IT workforce.

1. Underproduction
2. Underrepresentation
3. Lack of a presence in K-12 education

We are significantly underproducing postsecondary computing degrees.



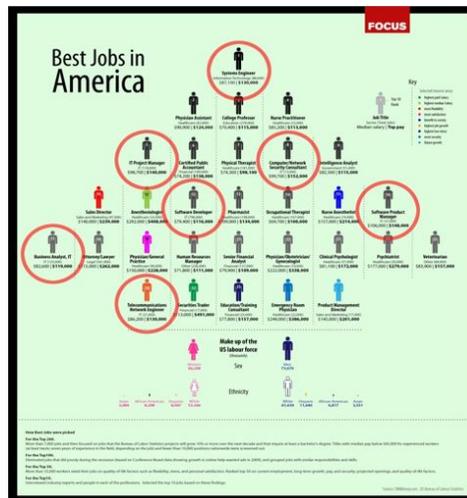
California is expected to experience a shortfall.



Data: BLS and NEC; Slide: NCWIT

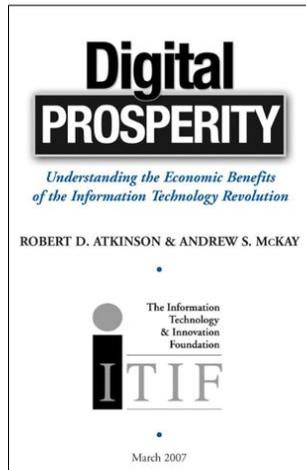
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And they're good jobs.



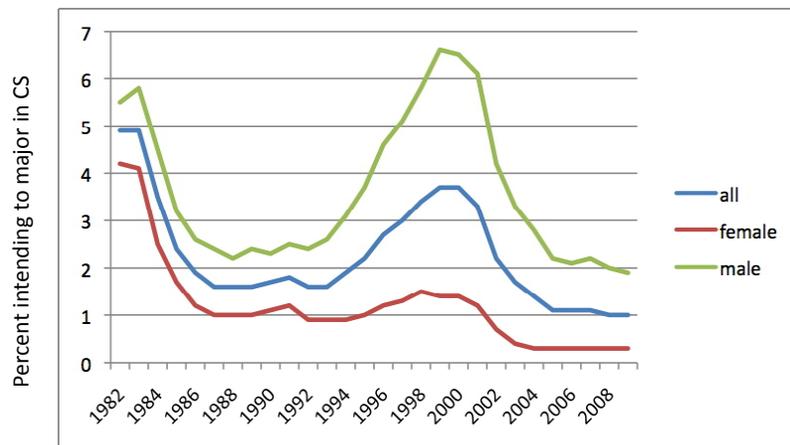
Slide: CNN Money

IT generates jobs.



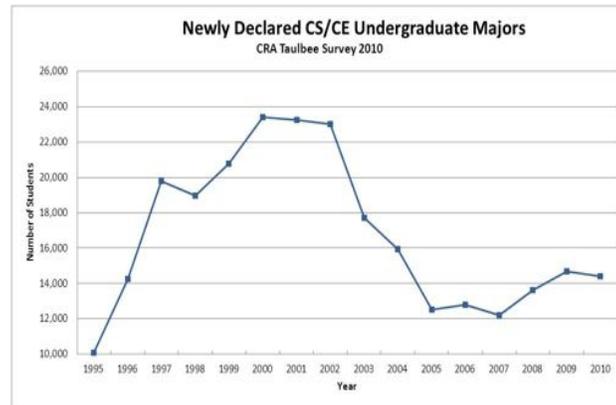
- US economy is \$2T larger because of the IT revolution since 1985
- IT is a job generator: IT jobs have grown 4x faster than non-IT jobs, and on average these jobs pay 75% more

Yet student interest in computing is very low.



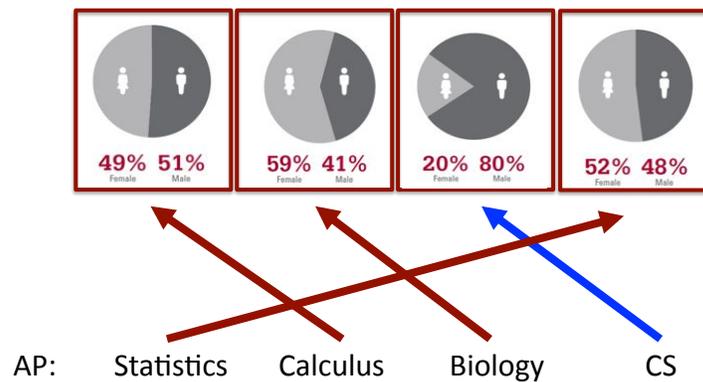
Data source: HERI, Slide: NCWIT

At the College level, we are seeing an increase in interest but it is not enough.



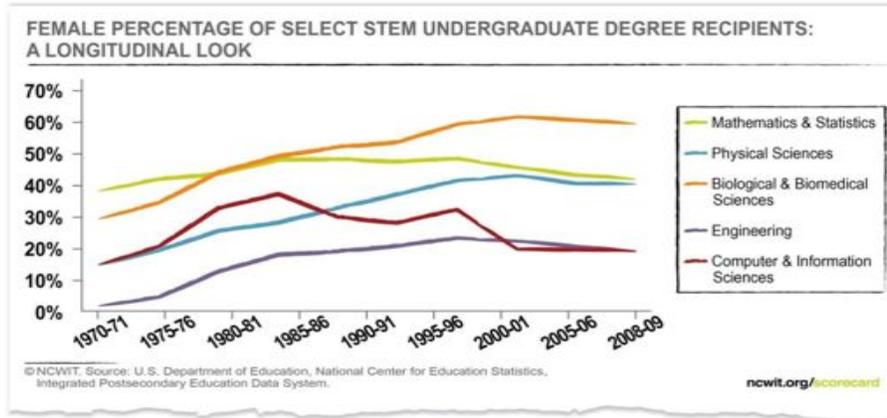
—Slide: CRA Taulbee Survey, 2010

Computing has a long standing, significant underrepresentation of women.



—Credits: College Board

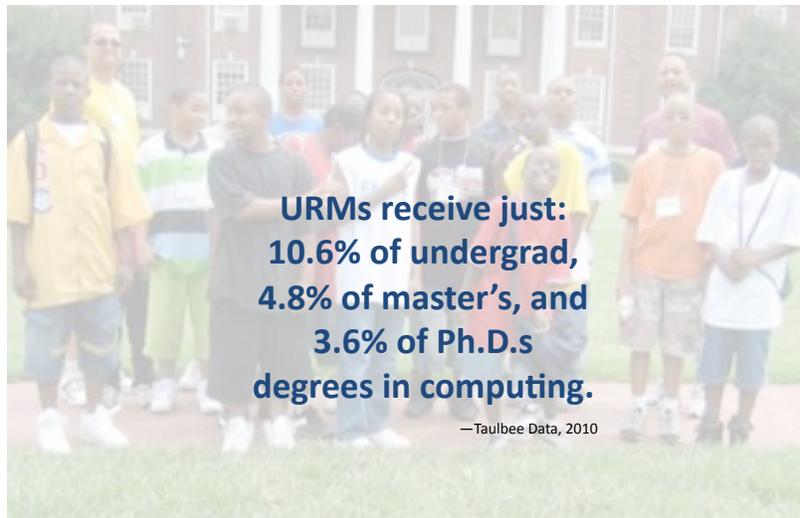
The underrepresentation of women in computing continues through college.



—Credits: NCWIT

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And computing has a long standing underrepresentation of minorities.



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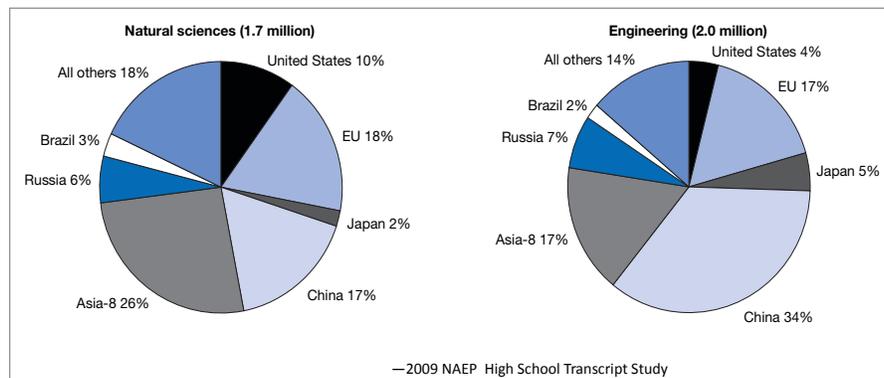
Computing does not have much of a presence in K-12.

The percentage of U.S. high school students taking STEM courses has increased over the last 20 years across all STEM disciplines *except* computer science where it dropped from 25% to 19%.

— 2009 NAEP High School Transcript Study

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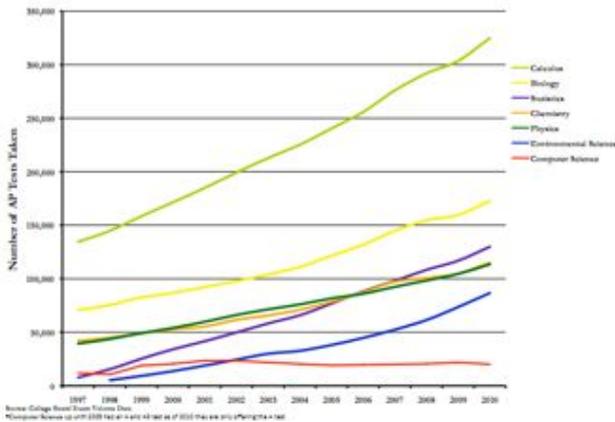
What are we thinking?



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The CS AP test has the lowest participation of any STEM discipline.

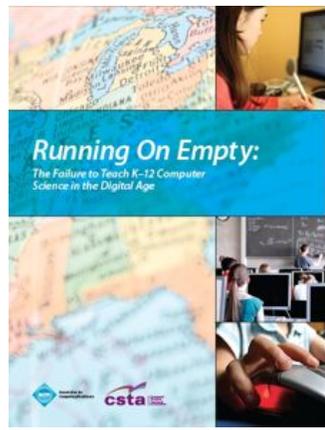
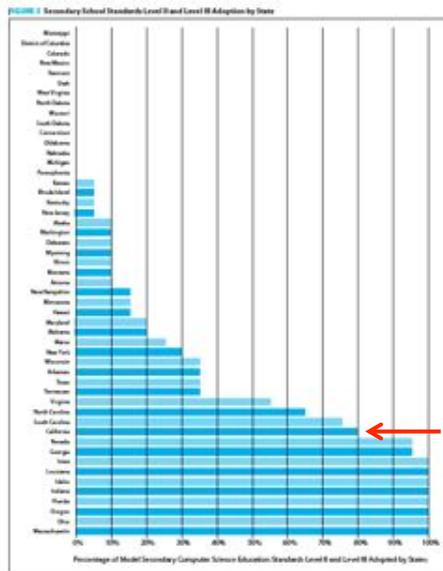
AP Test Taking in STEM, 1997-2010



In 2010, Senior participation:  
 340,551 AP Calculus  
 250,003 AP Biology  
 142,910 AP Statistics  
 22,176 AP CS A

—College Board

As a nation, we need to do better.



Source: CSTA, *Running on Empty*, 2011

The President's Council of Advisors on Science and Technology believes the need for better computing education particularly in high schools is "urgent."

Computer-related courses should aim not just for ... a deeper understanding of the essential concepts, methods and wide-ranging applications of CS. Students should gain hands-on exposure to the process of algorithmic thinking and its realization in ... a computer program, to the use of computational techniques for real-world problem solving, and to ... pervasive computational themes as modeling and abstraction, modularity and reusability, computational efficiency, testing and debugging, and the management of complexity.

—*Prepare and Inspire: K-12 Education in Science, Technology, Engineering and Mathematics (STEM) for America's Future*, 2010

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High school is key.



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The **CS 10K Project** aims to transform computing in high school.



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The CS 10K Project centers on a new CS AP course, called *CS Principles*.

**Why AP?**

- Often the only CS course that carries college prep credit
- Attractive to students & schools
- 2,000 CB-audited teachers
- Single point of national leverage
- Fidelity of replication

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Many schools will want an introductory (preAP?) course such as Exploring Computer Science (ECS).

- Piloted ECS 2008/2009
- This school year in ~25 LAUSD schools
- 2000 students, 40% female, 81% URM
- Complete, detailed curriculum & lessons plans on CSTA site ([csta.org](http://csta.org))
- College prep & CTE credit
- Also San Jose, Oakland, Chicago



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ECS & CS Principles are taking the country by storm.



To be successful, we'll need lots beyond the teacher training.

- New CS Standards
- Changes in teacher certification
- Changes in the crediting of CS courses
- CSTA Chapters
- Pre- and in-service teacher professional development
- Ongoing teacher support: Coaching, mentoring, communities of practice

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NSF can catalyze the CS 10K Project but the project as a whole is outside of NSF's mission and resources.

NSF can support the development of

- Curricula, materials, models
- Standards & assessments
- Teacher preparation
- Pilots

Beyond NSF's mission and resources

- Scale teacher preparation to 10,000
- Entrée into 10,000 schools

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We'll need the entire computing community to get involved.

- High school teachers
- Academic departments at universities and community colleges
- Individuals: students, faculty, professionals
- Companies and Foundations

CCEAN



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**Blog**

**NCWT Award for Aspirations in Computing Winners Visit the White House**  
by Vivian Stepp - 01.12.12

On December 6, 2011, I joined five other winners of the NCWT Award for Aspirations in Computing at the White House, in an event honoring the Girls and Women... 0000

**She's Geeky!**  
Mountain View, California

Join other technical women at the 5th annual She's Geeky Unconference, Jan. 27-29 0000

**Start Now!**

NCWT resources are researched, effective, and free. Find the right NCWT tool for your recruitment, retention, or advancement efforts, right now. 0000

Strategic Partners:

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dot diva We're young women with the power and passion to make a difference. We believe in the potential of computing to build a better world.

What's Your Passion?

My passion is...

- Advertising
- Archaeology & Anthropology
- Art & Art History
- Astronomy & Space
- Exploration
- Business
- Communications
- Computer Graphics & Media
- Cooking
- Disabilities
- Education
- Engineering
- Environment
- Fashion & Design
- Film, TV, & Theater

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*Thanks!*

Jan Cuny, [jcuny@nsf.gov](mailto:jcuny@nsf.gov)

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