

Computing's New Face - Current Developments in the USA

1. Trends in CS Entry and Degree Production in the USA (as at August 2007)

Updated trend data from both the [Taulbee Survey](#) and from the [National Science Foundation](#) is at -

<http://www.cra.org/wp/index.php>

Further sources say -

- Newly elected CS majors down 70% from 2000-2006. ([HERI study](#))
- Double digit declines in enrollments for graduate degrees in CS. ([Taulbee Report](#))
- Gartner states that by 2010, 10 – 15% of IT professionals will drop out of the IT occupation.
- In a recent study of college freshman, over 80% said they had no idea what Computer Science majors actually do. ([p27 carter.pdf](#))

"It is important to note that a steep drop in degree production among CS departments has happened before. According to NSF, between 1980 and 1986 undergraduate CS production nearly quadrupled to more than 42,000 degrees. This period was followed by a swift decline and leveling off during the 1990s, with several years in which the number of degrees granted hovered around 25,000. During the late 1990s, CS degree production again surged to more than 57,000 in 2004.[2]. In light of the economic downturn and slow job growth during the early 2000s, the current decline in CS degree production was foreseeable". Data is at – <http://www.cra.org/CRN/articles/march07/vegso.html>

It references the basic graphs (using NSF data) that are found at –

<http://www.cra.org/info/education/us/index.html>

Canadian information is discussed at –

<http://www.cra.org/CRN/articles/jan06/vegso.html>

and the latest Statistics Canada report mentioned that in 04/05, CIS undergrad enrollment dropped again, for a total drop of 23% between 01/02 and 04/05:

<http://www.statcan.ca/Daily/English/061107/d061107a.htm>

The most reliable workforce demand numbers probably are those from the Bureau of Labor Statistics. Summarized at:

<http://www.nsf.gov/statistics/nsf07319/>

particularly the post at <http://www.cra.org/wp/index.php?p=70>

2. Task Force on the Image of Computing

- Director, Jill Ross, Image of Computing Task Force
 - Co-Chair, Rick Rashid, Sr. VP Research, Microsoft
 - Co-Chair, Dr. James Foley, Georgia Institute of Technology and Past Board Chair, CRA
- Plus -

- Microsoft Corporation, www.microsoft.com
- Hewlett Packard, www.hp.com
- Intel Corporation, www.intel.com
- CRA, Computing Research Association, www.cra.org
- ACM, Association of Computing Machinery, www.acm.org
- SIAM, Society of Industrial and Applied Mathematics, www.siam.org
- IEEE-CS, www.computer.org/portal/site/ieeecs
- USENIX, www.usenix.org
- NCWIT National Center for Women in Information Technology, www.ncwit.org
- ATLAS Institute, www.colorado.edu/ATLAS/
- Association for the Advancement of Artificial Intelligence, www.aaai.org

What do they do?

<http://www.imageofcomputing.com/what.html>

State of Computing – Facts and Figures

<http://www.imageofcomputing.com/state.html>

For example –

- Most people have no idea what computing professionals actually do.
- Public is not aware of how technology impacts their daily lives in a positive way.
- Negative stereotypes enforce image of isolation and disconnection from society.
- High school teachers and parents skeptical about the job market, so they guide youth away.
- CS graduates reluctant to go on to advanced degrees thinking all grand challenges have been solved.
- Public is concerned about identity theft, predators and harmful viruses.
- CS major is particularly unattractive for women and minorities. ([NCWIT Statistics](#))

Opportunities

- According to the National Bureau of Labor's Statistics, computing careers are the fastest growing occupations with nearly 1 million new jobs added, an average of 31% growth rate by 2014.
- Grand challenges are yet to be solved including the extent to which computers can improve our quality of life. ([Denning](#)) <http://portal.acm.org/citation.cfm?id=948400>
http://www.acm.org/ubiquity/interviews/v4i48_denning.html
- Over 1 billion people are on the Internet daily, to communicate and coordinate their daily lives.

Facts, Figures, Data, and Articles

There is a disconnect between what students and employers want - and what everyone else thinks they need and should have. Consider the following -

“*Computational Thinking*”, Prof Jeanette Wing –

http://www.imageofcomputing.com/pdf/Computational_Thinking.pdf

“*Inspirational IT*”, Prof Nigel Shadbolt -

<http://www.bcs.org/server.php?show=ConWebDoc.7860>

“*Time to Reinvent IT*” -

<http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=28488>

[1](#)

“*Kids and Careers*” -

http://www.imageofcomputing.com/pdf/kids_careers_2007.pdf

“*Why Students don't choose Computer Science*”, Lori Carter -

<http://www.imageofcomputing.com/pdf/p27-carter.pdf>

<http://www.imageofcomputing.com/speak.html>

<http://www.imageofcomputing.com/resources.html>

<http://www.imageofcomputing.com/>

<http://www.imageofcomputing.com/who.html>

http://www.cc.gatech.edu/events/imovie/coc_imovie_manual_07.pdf

3. Competes Act signed by President Bush on 9 August 2007 funds \$43.3 billion for STEM

Programs over 3 yrs

“This bill has a lot of good things in it. As Cameron Wilson [points out](#) over on the USACM [Technology Policy Blog](#), the bill takes two basic routes to fostering the innovation the country will require to stay competitive in an increasingly global world. It addresses federal support for research -- both authorizing large amounts of new funding for three key science agencies (National Science Foundation, NIST, and the Department of Energy's Office of Science), setting a target to double the agencies budgets over 7 years, and by creating a new high-risk research agency at the Department of Energy (called the Advanced Research Projects Agency - Energy, or ARPA-E, in a nod to the DARPA-like character Congress hopes the agency will adopt). And the bill addresses a diversity of Science, Technology, Engineering and Mathematics (STEM) Education efforts”. More information -

<http://www.cra.org/govaffairs/blog/>

4. “New Face of Computing” Symposium at Georgia Tech, March 2007

http://www.cc.gatech.edu/events/symposium/symposium_program.pdf

<http://www.cc.gatech.edu/events/symposium/agenda/?searchterm=new%20face%20of%20computing%20symposium>

http://www.whistle.gatech.edu/archives/07/mar/05/cc_symposium.shtml

<http://www.cc.gatech.edu/news/features/feature-headline/>

5. ACM Education Policy Effort

ACM has started an education policy effort with Bobby Schnabel (Dean of Informatics at Indiana University) in the lead.

6. The Computing Community Consortium

New NSF-funded Computing Community Consortium initiative to get folks thinking in bolder ways and to energize "the best and brightest" college students to consider computing as their future.

Presentation to NSF by Prof Ed Lazowska, Bill and Melinda Gates Chair in Computer Science and Engineering, University of Washington, 11 May 2007 -

<http://lazowska.cs.washington.edu/ccc/Lazowska%20CCC%20for%20NSF.pdf>

<http://www.cra.org/ccc/>

<http://www.cra.org/ccc/ccc.white.paper.pdf>

<http://www.cra.org/ccc/ccc.pdf>

(Sources courtesy of Andrew Bernat and Jay Vegso, CRA)

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