



Understanding underrepresentation in Computer Science



What we have learned, what we plan to learn

Sex and the Japanese Single Girl

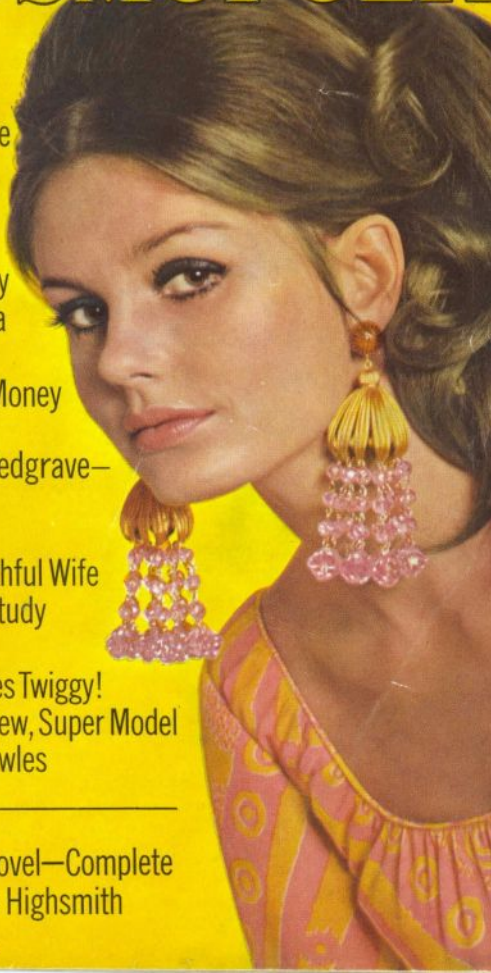
A Secretary Tells How a Con Man Took Her Money

Vanessa Redgrave—Zap!

The Unfaithful Wife—A New Study

Here Comes Twiggy! Britain's New, Super Model by John Fowles

Mystery Novel—Complete by Patricia Highsmith



The Computer Girls

BY LOIS MANDEL

A trainee gets \$8,000 a year ... a girl "senior systems analyst" gets \$20,000—and up! Maybe it's time to investigate....

Ann Richardson, IBM systems engineer, designs a bridge via computer. Above (left) she checks her facts with fellow systems engineer, Marvin V. Fuchs. Right, she feeds facts into the computer. Below, Ann demonstrates on a viewing screen how her facts designed the bridge, and makes

Twenty years a secretary, a school librarian, a social she was really at into the profession men . . . usually longer to earn less

Now have come puters—and a wh for women: programming. Telling the miracle machines what to do and how to do it. Anything from predicting the weather to sending out billing notices from the local department store.

And if it doesn't sound like woman's work—well, it just is.

("I had this idea I'd be standing at a big machine and pressing buttons all day long," says a girl who programs for a Los Angeles bank. I couldn't have been

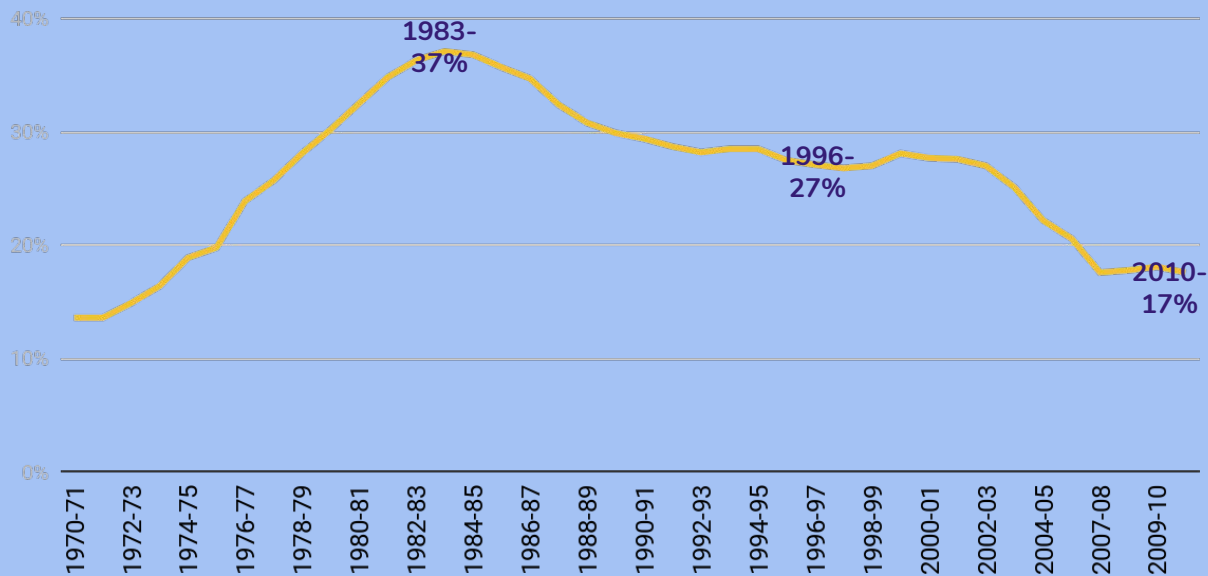
"It's just like planning a dinner ... You have to plan ahead and schedule everything so it's ready when you need it. Programming requires patience and the ability to handle detail. Women are 'naturals'."

need it. Programming requires patience and the ability to handle detail. Women are 'naturals' at computer programming."

What she's talking about is *aptitude*—the one most important quality a girl needs to become a programmer. She also needs a keen, logical mind. And if that zeroes out the old Billie Burke-Gracie Allen image of femininity, it's about time, because this is the age of the Computer Girls. There are twenty thousand

Rise and Fall of women in CS departments

Females as % of CS & CIS undergraduate degrees conferred(1971-2010)



So, what happened?



https://www.youtube.com/watch?time_continue=3&v=J2jRuh1bAxw&feature=emb_title



https://www.youtube.com/watch?time_continue=47&v=9l8R46hCiD8&feature=emb_title

1982

Gaming isn't marketed to girls



Adam Ruins Everything - Why People Think Video Games Are Just for Boys

<https://www.youtube.com/watch?v=i08CVkBxvBM>

Early computers were marketed to boys

“In 1983, the US experienced a video game recession. The market shrank from **\$3.2 billion in 1983 to \$100 million in 1985**, a drop of 97%.”

https://www.youtube.com/watch?time_continue=8&v=rxNjx_VWJ8U&feature=emb_title

1985

Silicon Valley's gender gap is the result of computer-game marketing 20 years ago

<https://qz.com/911737/silicon-valleys-gender-gap-is-the-result-of-computer-game-marketing-20-years-ago/>

It's no coincidence that the console touted to have saved the industry was called a "Game Boy."





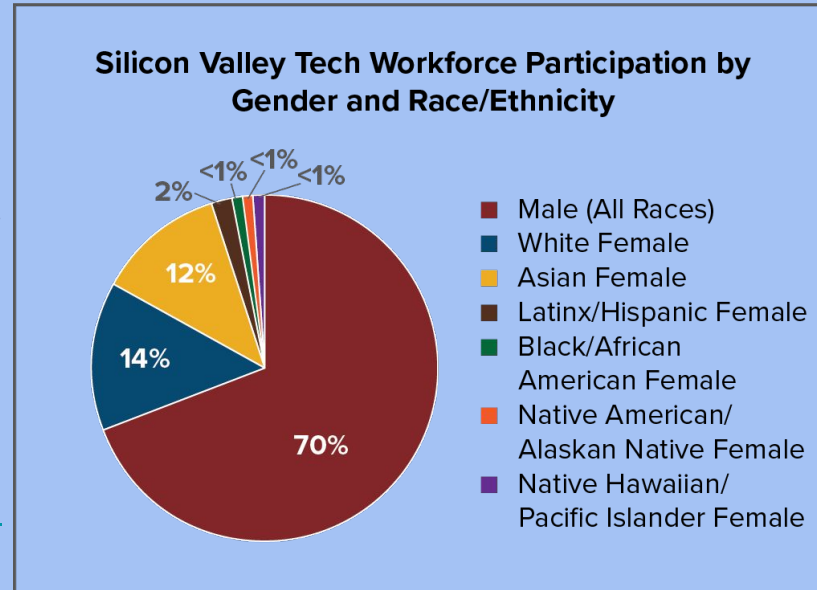
Is marketing really that powerful?

Why do women of color make up so much less of an already small piece of the pie?

And why is this problem so specifically worse in the US?

“Nationally, only about 14 percent of computer-science bachelor’s degrees go to women, and Latinas make up just a mere 1 percent of those graduates.”

<https://www.theatlantic.com/politics/archive/2015/12/where-being-a-latina-computer-scientist-is-the-norm/433662/#:~:text=Nationally%2C%20only%20about%2014%20percent,Almost%20all%20were%20Latina.>



Source: EEOC, 2016; Hongsdusit & Rangarajan (2018); Includes EEOC category of “professionals.”

“for instance, women constituted 42% of undergraduate students in CS and computer engineering in 2011 in India”

<https://cacm.acm.org/magazines/2015/5/186026-decoding-femininity-in-computer-science-in-india/fulltext>

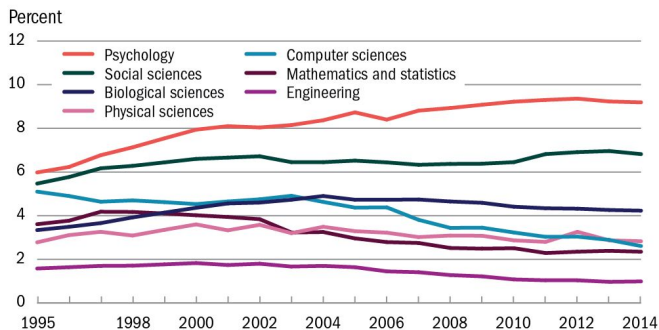
HIDDEN FIGURES



Black women were early pioneers in computing.

Black people make up 13.2% of the US population. In most larger companies the percentage of Black engineers is alarmingly low.

Science and engineering bachelor's degrees earned by black or African American women, by field: 1995-2014



NOTE: Data not available for 1999.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

The number of Black women in the CS department at PSU is so low we had trouble getting data.

Table 2: Black/African-American Representation (Detailed Representation)

Company	Percent		
	Tech	Non-Tech	Leadership Role or Senior Level
Apple	6%	9%	3%
EBay	2%	9%	2%
Facebook	1%	2%	2%
Google	1%	4%	2%
Groupon	2%	5%	1%
LinkedIn	1%	3%	1%
Twitter	1%	4%	2%
Yahoo	1%	3%	1%
Yelp	1%	5%	2%

Data represents the companies' employee demographics data for 2014.

Interviews

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