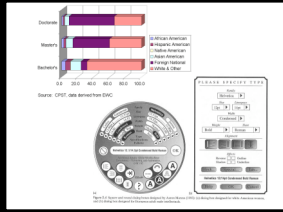


The Gender Divide & Minority Abyss

A Roundtable Discussion



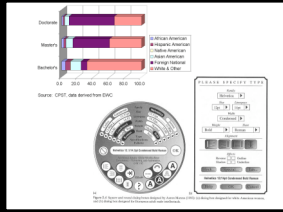
Hello Everyone...and welcome to our roundtable discussion - The Gender Divide and Minority Abyss. When I was asked to organize a roundtable about gender and underrepresented groups issues in computing, I immediately thought of this picture. When I was a freshman in college, I was given a brochure about computer science...here is a picture from the brochure. Notice anything? They are all Caucasian men. Luckily, I really wanted to be a computer scientist and was not deterred by the lack of diversity in computing.



Background/The Problem (~10 minutes)



Just to give you an idea of the schedule for our roundtable, I will give you a little bit of background of the problem..



Background/The Problem

(~10 minutes)

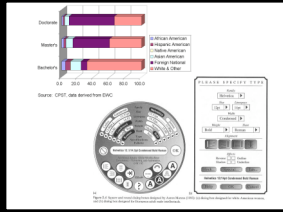


Introductions

(~5 minutes)



Then I will introduce the panel members...



Background/The Problem

(~10 minutes)



Introductions

(~5 minutes)

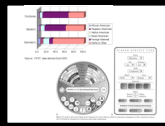
Brainstorming/Questions

(~30-45 minutes)

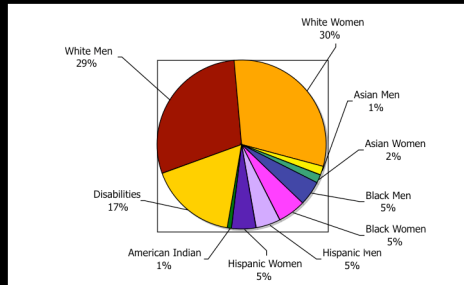


, and finally we'll open up the floor for a discussions.

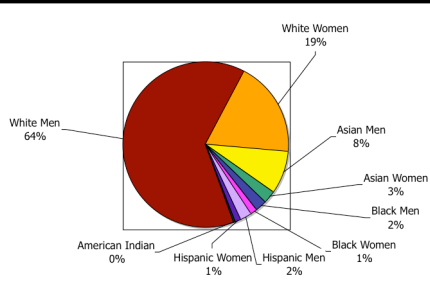
Evidence of under representation



Percentage of US Population (1999)



Percentage S&E Population (1999)

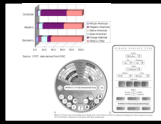


Data from NSF, SETAT, Census Bureau, Current Population Survey - March 1999, and NSB 2002. Totals may not add up to 100% because of rounding.

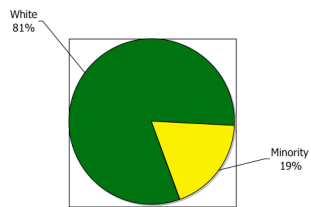


Here is some evidence of under representation. You can see on the pie chart on the left the percentages of the US population by sex and race/ethnicity. On the right, you can see the percentage of people working in science and engineering grouped by sex and ethnicity. You can see that minorities make up almost half of the US population.

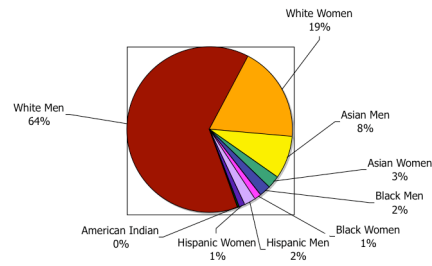
Evidence of under representation



White vs. Minority in S&E



Percentage S&E Population (1999)

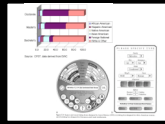


Data from NSF, SETAT, Census Bureau, Current Population Survey - March 1999, and NSB 2002. Totals may not add up to 100% because of rounding.

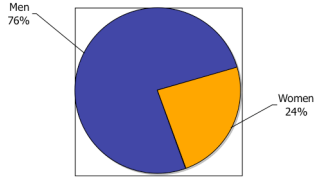


Even though minorities make up a little under half of the population, less than a quarter of people working in science and engineering are minorities!

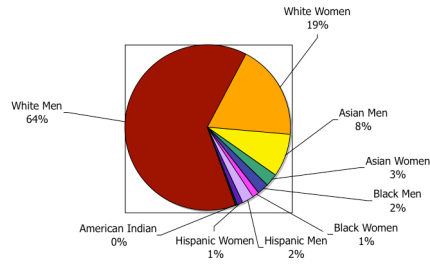
Evidence of under representation



Men vs. Women in S&E



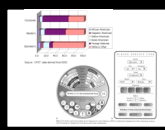
Percentage S&E Population (1999)



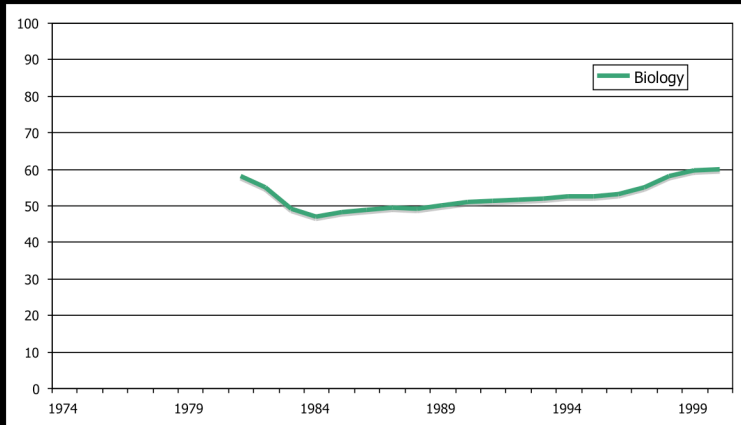
Data from NSF, SETAT, Census Bureau, Current Population Survey - March 1999, and NSB 2002. Totals may not add up to 100% because of rounding.



Despite women and minorities making up well over half of the general population, less than a quarter actually work in science and engineering.



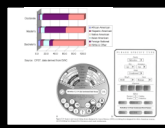
Bachelor degrees awarded to women in the sciences by major



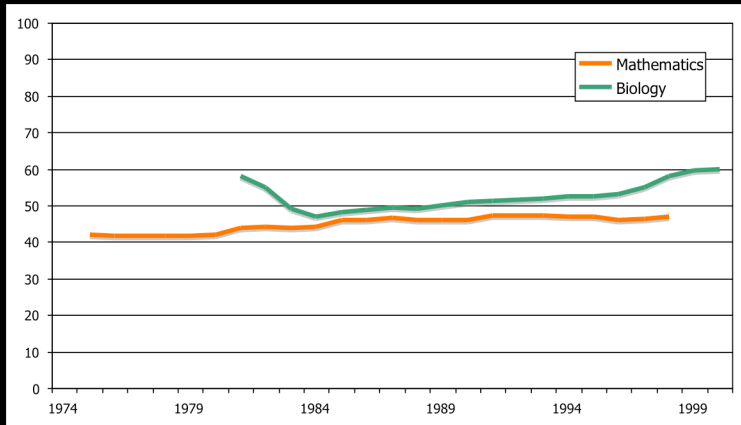
CPST, NSF, Association of Women in Science, Statistics: http://awis.org/statistics/r_statisticsmain.html
J. M. Gibson, Toward improving female retention in the computer science major, Communications of the ACM, 2001.
Report on the Status of Women Indiana University-Bloomington, Office for Women's Affairs, 2002.
Science and engineering degrees, by race/ethnicity of recipients: 1991-2000, <http://www.nsf.gov/sbe/srs/nsf02229/sectb.htm>, August 2002.



If we delve into science and engineering more, we can see women earn over 50 percent and sometimes 60 percent of biology degrees from 1980-2000.



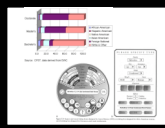
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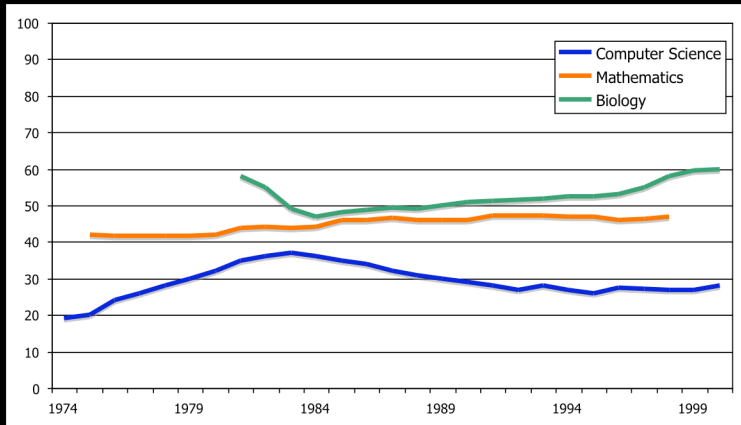
CPST, NSF, Association of Women in Science. Statistics: <http://awis.org/statistics/statisticsmain.html>
J. M. Carlson. Toward improving female retention in the computer science major. Communications of the ACM, 2001.
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Women earn around 45% of math degrees in the last two decades.



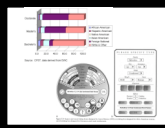
Bachelor degrees awarded to women in the sciences by major



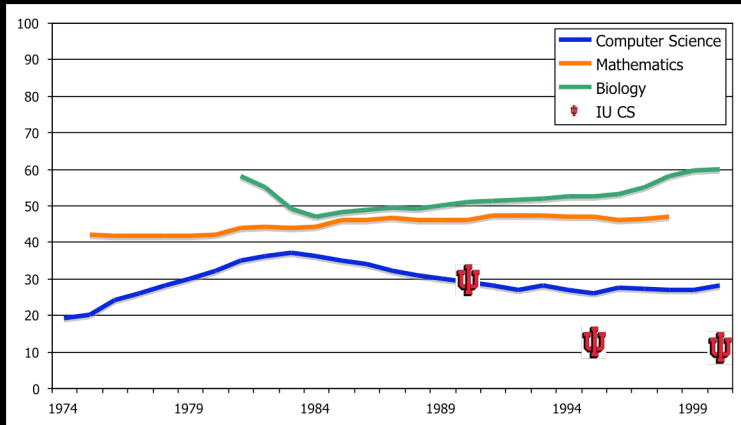
CPST, NSF, Association of Women in Science, Statistics: http://awis.org/statistics/r_statisticsmain.html
J. M. Carlson, Toward improving female retention in the computer science major, Communications of the ACM, 2001.
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Science and engineering degrees, by race/ethnicity of recipients: 1991-2000, <http://www.nsf.gov/sbe/srs/nsf02229/sectb.htm>, August 2002.



However, women who earn computing degrees is much worse.
Currently, women earn less than 30% of all CS degrees.



Bachelor degrees awarded to women in the sciences by major

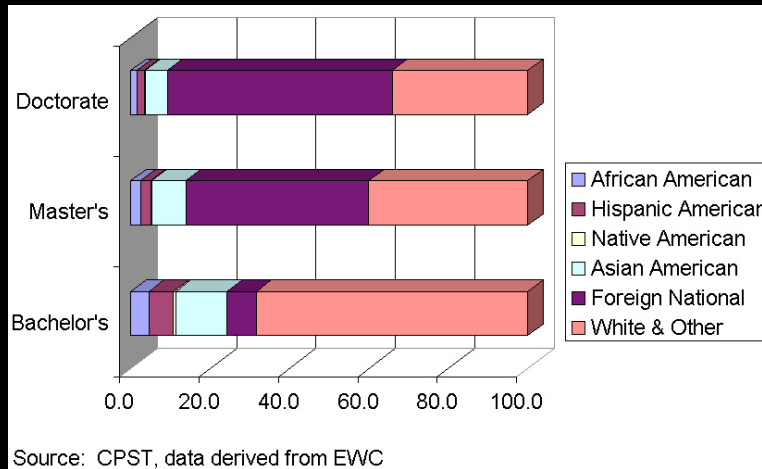


CPST, NSF, Association of Women in Science, Statistics: http://awis.org/statistics/r_statisticsmain.html
J. M. Cochran, Toward improving female retention in the computer science major, Communications of the ACM, 2001.
Report on the Status of Women Indiana University-Bloomington, Office for Women's Affairs, 2002.
Science and engineering degrees, by race/ethnicity of recipients: 1991-2000, <http://www.nsf.gov/sbe/srs/nst0229/sectb.htm>, August 2002.



Indiana University has even worse statistics... here we see IU is well under the national average - just above 10% of our bachelor degrees in computer science are awarded to IU students.

Engineering degrees by level and group, 2003



From "If your not there, You Can't Do It: Advancing Arguments for Diversity in Computing" by Dr. Shirley Malcolm



Here we can see the break up of bachelor, masters, and doctorates in engineering by race and ethnicity. For bachelor degrees, underrepresented groups only make up a little over 20% of the degrees. Masers and doctorates have even smaller numbers.

Why do we need women & minorities in computing?

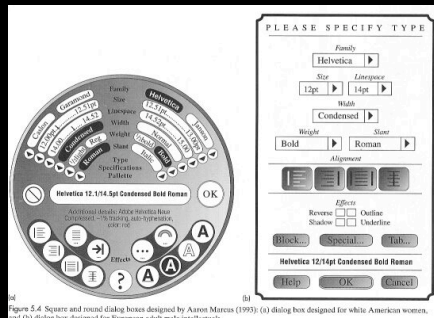


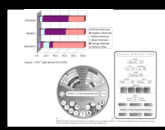
Figure 5.4. Square and round dialog boxes designed by Aaron Marcus (1993). (a) Dialog box designed for white American women, and (b) dialog box designed for European adult male intellectuals.

- Program design is improved when designers better understand users.
- Having designers from a diversity of gender and ethnic backgrounds will improve designs.

DESIGN: Marcus, A. (1993) Human communication issues in advanced UIs. Communications of the ACM, 101-109.
USER STUDY: Teasley, B., Leventhal, L., Blumenthal, B., Instone, K., and Stone, D. (1994) Cultural diversity in user interface design. SIGCHI Bulletin, 26(1), 36-40.
Is Diversity in Computing a Moral Matter? In Inroads, by Deborah G. Johnson & Keith W. Miller



One question you may be asking yourself is why do we need minorities and women in computing?



What can we do?

- Recruitment
- Retaining



So what can we do? Well...we have to recruit and retain students. These are some of the topics we can discuss during our roundtable here.

We can *recruit* by dispelling some common stereotypes

- CMU Roadshow
- IU's Just Be
- Invite guest speakers
- Be a positive role model

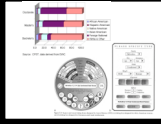
CMU Roadshow <http://women.cs.cmu.edu/What/Outreach/Roadshow/>

However, not all computer scientists are geeks. How do we dispel the geek stereotype? How do we tell students not all computer scientists are dilberts?

The CMU Women in Computing group created the “Roadshow.” The women gathered pictures from themselves, friends, and professors from when they were young and doing activities they enjoy. Then, they composed a powerpoint presentation describing to the students how they got involved in computer science. The presentation also discussed what is computer science (not just Programming, Programming, PROGRAMMING!). The students were shown pictures of people doing activities they enjoyed doing as shown on the pictures to our left and asked the children, “Do you think he/she is a computer scientist?” Well...do you? All three people are computer scientists. The ended the presentation by describing interdisciplinary work available to computer scientists. They presented the “Roadshow” at elementary, middle, and high schools in the Pittsburgh area.

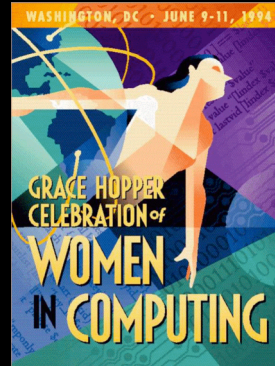
IU has also created a presentation similar to CMU’s Roadshow called Just Be that you will have the opportunity to see later today.

Also, invite guest speakers from industry and/or academia – male or female. Show students not all computer scientists look like Bill Gates.



We can create a supportive department to *retain* students

- Educate parents, counselors, and teachers
- Create opportunities for interdisciplinary work
- Provide a safe, positive lab environment
- Create a community/support structure for underrepresented students
- Encourage *all* students





Dr. Gloria Childress Townsend



- Taught @ DePauw U for 25 years
- Professor & Chair of Computer Science Department
- Three degrees from IU Bloomington in mathematics and computer science
- Research in Evolutionary Computing
- Advocate for Women in Computing Issues



Dr. Gloria Childress Townsend is a professor and chair of the computer science department at DePauw University where she has taught for 25 years. She holds three degrees from IU - Bloomington. When she is not researching evolutionary computing she is an advocate for women in computing issues.



Eden Miller Medina

- Assistant Professor of Informatics at IU
- Doctoral Student at MIT
- Research interests in intersection of Latin American Studies and the history and social studies of technology
- Graduated from Princeton with a degree in Electrical Engineering and certificate in Women's Studies



Eden Miller is an assistant professor of Informatics at IU. She is currently a doctoral student at MIT and researches the intersection of Latin American Studies and the history and social studies of technology. She graduated from Princeton University with an Electrical Engineering degree and certificate in Women's Studies.



Stephanie Rose Gato



- Senior computer science major at Indiana University
- Founding member and current president of WIC@IU
- Undergraduate instructor
- Interned at Argonne National Laboratories
- Working on Fluency Project <http://fluency.knownspace.org>



Stephanie Gato is a Senior at Indiana University pursuing a Bachelor of Science in Computer Science with a minor in Mathematics. She is a founding member and current Undergraduate President of Women in Computing (WIC) at Indiana University. Stephanie has worked as an Undergraduate Instructor in the Computer Science Department for the last two years as well as interned at Argonne National Laboratory working with grid computing. Currently, she is working on the Fluency Project (<http://knownspace.fluency.org>). She will be graduating in December and plans to look for a job in the Software Industry.



Discussion Time

- Discussions we had:
 - How can CS teachers compete with other electorates when colleges don't let us write recommendations and the NCAA does not count it as an elective?
 - We recommend contacting ACM Education and ACM-W about this issue
 - This was a new question for us, but we are interested in seeing what happens



Now it's time for discussion..anyone have a question?



Discussion Time

- How did Gloria, Eden, Stephanie, and Katie get interested in computing? How old were you?
- How can we compete with other electorates? Students want to sample all the electorates to know what they want to do.
 - We recommend getting technology integrated into other courses (photograph art, video tape guest speakers, look at population growth simulations in history classes, etc.)



Now it's time for discussion..anyone have a question?



Discussion Time

- How can we get students in the class room?
I lost a student because she was only going to take the class if her friend took the class. Since her friend did not take the class, she dropped.
 - We recommend creating a community, so she can meet other people interested in computing at her school
 - Create a newsletter inviting students to your class
 - Extracurricular activities, such as technology clubs could get people interested



Now it's time for discussion..anyone have a question?



Discussion Time

- You mention role models - where can we find them if we don't have girls taking our classes?
 - Local universities are great places to start. For younger high school students, nothing is cooler than to have an upper class woman as a friend. For upper class women, college women are cool to hang out with. Try your local university.
 - Get other female faculty involved in technology related projects.



Now it's time for discussion..anyone have a question?