
Linda J. Sax, Principal Investigator, UCLA

Gender Trends in STEM: 1971-2011

BRAID Initiative to Study Diversity in Computer Science, 2015-2018

Building Recruiting And Inclusion for Diversity
Intent to Major in Computer Science Among Students Entering Four-Year Colleges and Universities Nationwide

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Not Just “How Many?”, But “Who” are Computer Science Majors? (NSF HRD #1135727)

- What are the characteristics of women and men who intend to major in computer science?
  - Demographics, career plans, self-ratings, values, etc.
- How do they compare with men and women in other STEM majors?
- How have they changed over four decades?
- CIRP Freshman Survey STEM sample (1971-2011)
  - 54,845 women and 149,766 men planning to major in CS
  - 1.7 million students planning to major in other STEM fields (biological sciences, physical sciences, math/stats, and engineering)
- Selected Findings
Proportion of Entering CS Majors Who Aspire to be Computer Programmers (1971-2011)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Proportion of Entering CS Majors Who Are Undecided about their Career Aspirations (1971-2011)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Self-Rated Academic Ability (2011)
(% Indicating “Highest 10%”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Self-Rated Emotional Health (2011)
(% Indicating “Above Average” or “Highest 10%”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
(% Indicating “Highest 10%” or “Above Average”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Self-Rated Physical Health (2011) (% Indicating “Above Average” or “Highest 10%”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
(% Indicating “Highest 10%” or “Above Average”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
(% Indicating “Above Average” or “Highest 10%”)

Source: Cooperative Institutional Research Program Freshman Survey, Higher Education Research Institute, UCLA
Who Takes Intro CS?

- 15-campus initiative to promote gender and racial/ethnic diversity in undergraduate computing
- Collaboration between Harvey Mudd College, The Anita Borg Institute and UCLA
- Funded by Google, Facebook, Microsoft and Intel, with additional research support from NSF and the Computing Research Association
- Research focuses on thousands of students enrolled in hundreds of introductory CS classes (2015-2016 and 2016-17)
  - Pre-post design with annual follow-ups through 2018
  - Who takes intro CS?
  - What are their experiences and perceptions?
  - Longer-term major pathways and career plans
  - Variations by gender and race
Half of Students in Intro CS are Male CS Majors

- Male CS Majors: 50.9%
- Female CS Majors: 16.1%
- Male non-CS Majors: 17.4%
- Female non-CS Majors: 15.5%
Greater Racial/Ethnic Diversity Among Women in Intro CS

- **White**: 44.1%
- **Asian/Asian American**: 9.8%
- **Black/African American**: 8.6%
- **Hispanic or Latino**: 9.8%
- **Indigenous**: 2.5%
- **Other**: 2.2%
- **Two or more races/ethnicities**: 0.7%

Women: 50.3%

Men: 20.9%
When Do Students Take Intro CS?

- First year: 49.4% (Men) 38.8% (Women)
- Second year: 25.0% (Men) 23.5% (Women)
- Third year: 21.2% (Men) 17.0% (Women)
- Fourth year or beyond: 13.1% (Men) 8.6% (Women)
Timing of Intro CS Varies Between CS and Non-CS Majors

CS Majors...

- **First year**: Women 53.5%, Men 60%
- **Second year**: Women 20.5%, Men 22.8%
- **Third year**: Women 18.6%, Men 15.1%
- **Fourth year or beyond**: Women 0.5%, Men 4.1%

...tend to take it Year One

Non-CS Majors...

- **First year**: Women 23.6%, Men 28.1%
- **Second year**: Women 29.6%, Men 25.7%
- **Third year**: Women 23.9%, Men 22.4%
- **Fourth year and beyond**: Women 20.9%, Men 21.5%

...take it any year
Significant Differences in Prior Programming Experiences

- I took a computer programming course in high school: 43.0% (CS Major), 23.7% (Non-CS Major)
- I did not take a specific course, but I learned to program on my own: 25.6% (CS Major), 16.2% (Non-CS Major)
- I took a computer programming course online: 25.5% (CS Major), 14.3% (Non-CS Major)
- I took a computer programming course at this college: 27.5% (CS Major), 33.6% (Non-CS Major)
- I did not have programming experience prior to this course: 23.7% (CS Major), 39.2% (Non-CS Major)
What intro course strategies are most/least effective in promoting students’ computing confidence, sense of belonging, and longer-term persistence in computing? What is role of class size?

Does this operate differently for women or URMs? Must address intersectionality.

What happens to students who are undecided, non-computing majors, or double-majors?

Annual follow-ups funded by NSF

More info: https://braidresearch.gseis.ucla.edu/