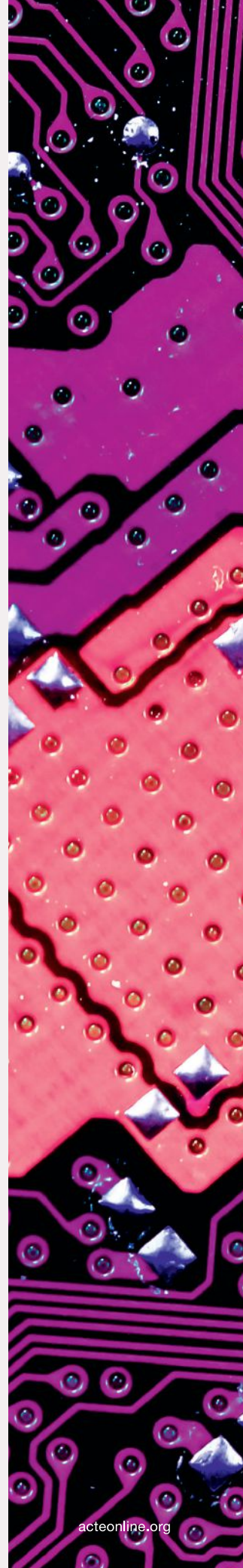
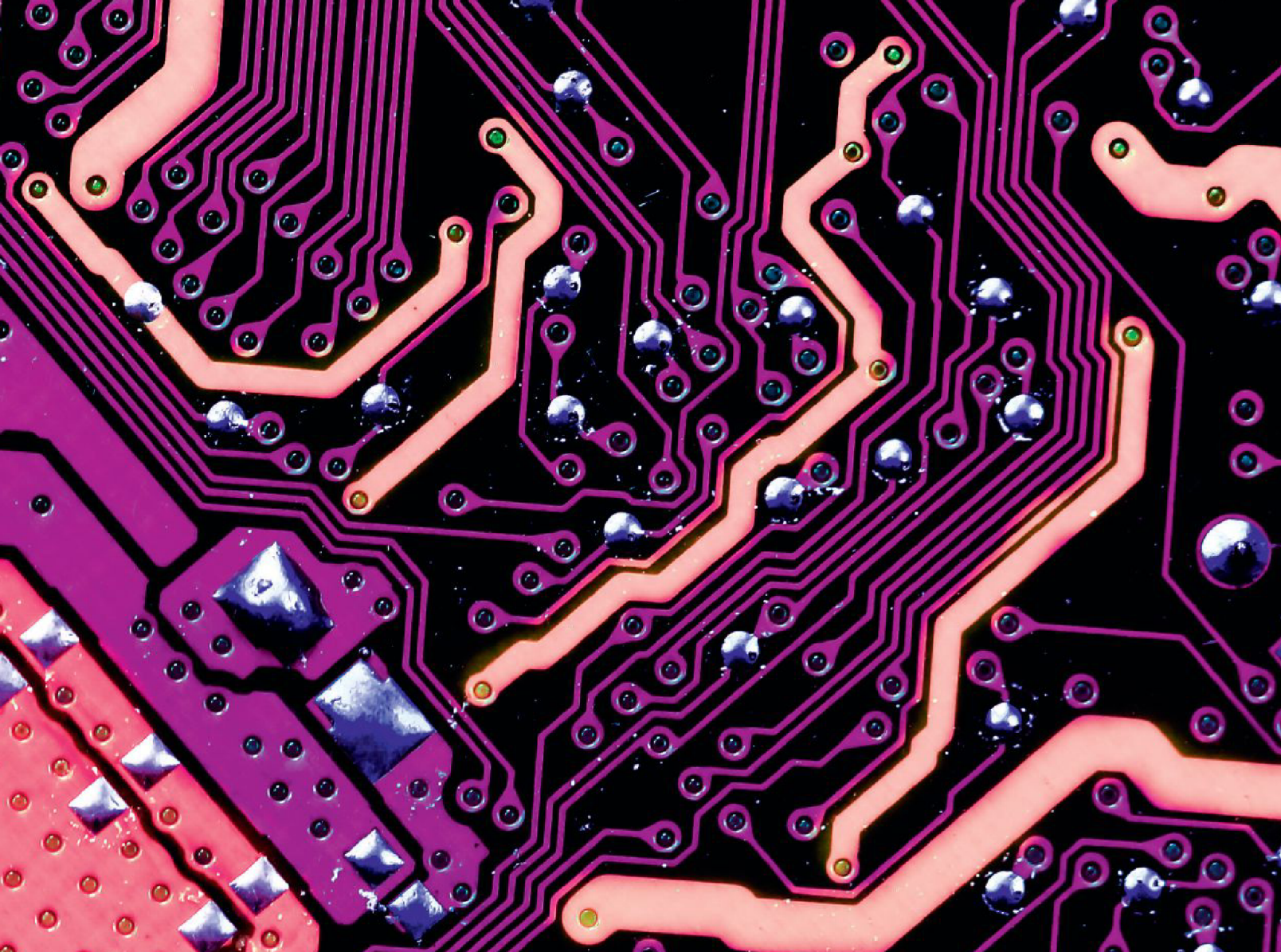


Driving Gender Diversity IN COMPUTER SCIENCE

By Jessi Chartier





The lack of girls in high school coding classes has dramatic implications downstream, for college and for the workplace. Women make up just 18 percent of college computer science majors (“Science and Engineering,” 2013). And though the computer industry is a jobs powerhouse — creating new jobs at a rate faster than the national average (“Computer and Information,” 2015) — women will hold only about 20 percent of those jobs by 2025 (“Cracking the Gender Code,” 2016) if current trends continue.

The Case for Diversity in Computer Science

Here’s why the gender imbalance is particularly troubling: Without a diverse group of developers tackling society’s problems, the industry’s field of vision is limited. Gender diversity in coding isn’t just about giving women jobs in the computer field. It also means enabling a large, key group of people to better participate in the problem-solving and societal improvement that technology brings.

At its core, coding is about solving problems. Increasing opportunities for those underrepresented in the field to learn the tools and skills of technology empowers them to solve problems directly facing them. I always say that I love teaching high school students how to code because they’re solving problems I didn’t know they had. Of course, that insight can be broadened to empower people of all walks of life to improve their lives and communities.

Coding as a skillset is a pathway to gainful employment. Software developers make a national average of \$63,000 a year, (“Software Developer,” n.d.) and for that income there is opportunity: Projections point to more than a million unfilled computer jobs in the United States by 2020 (“A National Talent,” 2012) due to a shortage of qualified, skilled workers. And yet... The number of women taking on computer science as a major has dropped dramatically in recent decades (“Science and Engineering,” 2013).

Reshma Saujani, CEO of Girls Who Code, gets to the central essence of the issue in a 2017 interview with EdSurge: “We’re living in a time where we’re dependent on American women as our bread winners — [research from the Decennial

Census and American Community Surveys indicates 40] percent of American women are the ones who pay the mortgage, who put food on the table (Wang, Parker & Taylor, 2013). These (development positions) are good-paying jobs, and quite frankly, as [more] of the things we do become automated, these will be ‘the’ jobs. So, it’s important to make sure that women are not left out.”

Forty percent is a significant number of women who are primary household earners. Yet they’re being excluded (or excluding themselves) from gainful employment, a quality of life and an industry that is starved for developers.

All said, there’s never been a more critical time to address the need for diversity in computer science at the high school

level. A growing number of states recognize computer science toward graduation credits for math, science and even, in Texas, foreign language (Zinth, 2016). And as such, it is the onus of educators to break stigmas and challenge assumptions in order to drive gender balance in computer science classes.

Tactics for Diversifying High School Computer Science

Many schools recognize there is a need for a concerted effort to recruit more girls into computer science classes. Still, many lack confident strategies to achieve this goal. There’s a lot that can make the chronic gender imbalance in computer science seem insurmountable, but there



are specific tactics career and technical educators (CTE) can use to make a difference and help drive the shift.

I. Position computers as more than games.

In 1983, *Wargames* hit theaters featuring an adolescent boy who saves the world by playing a game against a computer. This shifted the perception of computers from computational machines to gaming machines.

Of course, there is a place for games. But when students view computers as tools that solve problems, the technology can open doors and surface opportunities that even we, in the industry, can't imagine. Ask students, "What problem do you want to solve?"

CTE needs developers to build the safety algorithms in self-driving cars, the systems that translate magnetic fields into images for doctors, and apps for your phone to remember where you parked. At the heart of this myriad of possibilities are problem-solving, critical thinking and coding skills — and they're becoming applicable, often essential, to nearly every industry.

- **Journalists** need CSS and HTML skills to modify their work online.
- **Audio engineers** in music, film and live events need programming skills to create the sounds and audiovisual spaces their industries want.
- **Knowledge workers** who use spreadsheets need to know basic

.CSV commands, functions and scripting to create dynamic reports and data visualizations.

- **Designers** are closer to the code behind apps and websites than ever before, often working directly with developers to bring concepts to life.
- **Marketers** need programming skills to build campaigns, generate leads and grow companies.
- **Government employees** increasingly need data visualization and management skills to make decisions.
- **Urban planners** need data visualization and manipulation skills to understand the present and future of their communities.



“Coding is about solving problems at both micro and macro levels. But it’s also about discovery, collaboration, learning how to embrace and grow from failure, and building real solutions to actual problems.”

2. Rename your coding classes.

Make computer science curriculum more tangible, tuned for the audience you’re trying to attract. For example, demonstrate how programming can improve community and social environments by naming your class something like “Coding for Social Change.” Articulate how computer science helps address larger social needs, affecting real people and solving real problems. Consider a few examples:

- Neurocern is a startup in Chicago that’s helping to improve the efficacy of caregiving for dementia patients.
- Stop, Breathe, and Think is aimed at helping improve mental health through mindfulness and meditation.
- PNC’s Virtual Wallet is designed to help you manage your money on the fly.

3. Target girls’ sports teams or music clubs.

A cornerstone of many 21st century skills is the ability to solve problems on the spot and to persevere. Sports are a great place to cultivate these skills. Teams focus on practicing a skill over and over until the athlete can apply and synthesize the skill into action during a game. The goal isn’t perfect execution, but enough practice so you learn. The same is true in learning a musical instrument. No one picks up a recorder in elementary school and becomes a

star overnight. It’s all about practice, practice, practice. This is akin to programming: So much entails becoming comfortable in making mistakes so you can learn to get better.

Some schools are making great progress by targeting groups that practice grit and tackle challenges on a daily basis — like girls’ sports teams or musical groups. Approach the coach or club sponsor to coordinate an opportunity to pitch. It’s a direct recruitment tactic, to be sure, but an effective one. Many times these athletes or musicians may not realize how much skill they bring to the table when it comes to computer programming. CTE educators are encouraged to explore how these skills intersect to find the right messaging that sparks interest and inspiration.

4. Handpick great candidates.

Nothing beats an endorsement like a vote of confidence from a teacher. Ask colleagues and teachers you know to nominate one or two girls they think would be successful or enjoy a programming class. Then, host an open house for those invitees and their parents.

What qualities make a good computer science student?

- Likes to solve puzzles
- Enjoys working on a problem until it’s solved
- Thinks about how to solve a problem with resources at hand

- Collaborates well with others
- Is able to recognize patterns (Again, think musicians!)

5. Get the word out with your school communications team.

Work within your school to promote the course. You might consider a collaboration with your school’s media class to make a video about coding, like that which came out of Illinois’s Deerfield High featuring the school’s app development class and interviews with its students and their teacher (“Mobile Makers,” 2016); this encourages involvement from current CTE program students and entices others to get involved themselves.

The key element is to build interest by exposing students to what it looks like in the class and in practice. Coding is about solving problems at both micro and macro levels. But it’s also about discovery, collaboration, learning how to embrace and grow from failure, and building real solutions to actual problems. Try to capture those elements in your messaging.

6. Host a teaser course.

Give students a taste of what it is like to code by hosting a 30-minute workshop over lunch, before, or after school. Show them how an app is built to demystify the coding process. There are a lot of great, free resources you can use to make this happen. Like the Hour of Code, a global resource designed to provide programming education online to students of all ages, all around the world.

Final Thought

Everyone needs a seat at the table. Many of these strategies can also be used to recruit other underrepresented groups into your computer science classes. Diversity isn’t just a buzzword. We all come from different backgrounds, have different experiences, and offer unique solutions to the today’s problems and those in the future. Technology will unlock the solutions to tomorrow’s problems. More than ever, we need to help us turn the key. ■

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