

**intention+**

**inclusion+**

**influence+**

**=innovation**

# intention inclusion influence

Computing is one of the most powerful and influential fields shaping society today. Yet it's a field in which women are severely underrepresented, significantly impeding their power and influence as innovators, leaders, and researchers in shaping the future. This underrepresentation is not simply about numbers, about counting how many students or employees are from a particular demographic: It is about much more. Correcting underrepresentation is about intention, inclusion, and influence.

**Intention** represents the mindset of organizational leaders as they embark on the creation and maintenance of their cultures.

When the intention of an initiative is to create an inclusive culture for all through top leadership support, peer accountability, and building DEI (diversity, equity, and inclusion) capabilities from the inside out, then sustainable, authentic change is possible.

**Inclusion** is about embracing our differences, creating an environment of curiosity, growth, and learning. To realize the potential of diverse teams, we need to do more than bring people to the table: We need to invite, encourage, and reward contribution. Simply raising awareness, offering isolated diversity training programs, or taking an approach that implies underrepresented groups have a skills deficit that needs fixing is not going to work.

Finally, the importance of **influence** cannot be overstated. NCWIT's research shows that members of nonmajority groups still face difficulty accessing core, creative, and technical roles, hence influencing team decisions that lead to innovation. Addressing this requires that we understand who has power in a group, why they have it, and how they use it.

This is where the National Center for Women & Information Technology (NCWIT) comes in. NCWIT is a nonprofit that convenes, equips, and unites over 3,000 change leaders from more than 1,650 organizations to increase the influential and meaningful participation of girls and women — at the intersections of race/ethnicity, class, age, gender identity, sexual orientation, disability status, and other historically marginalized identities — in the field of computing.

On the following pages, you will find statistics and information about NCWIT, our members, our partners, the outcomes we have achieved together, and what we see on the horizon for tomorrow.

**Intention: the  
determination to do  
a specified thing in a  
specified manner**

*“NCWIT not only serves as a continual reminder to maintain a focus on diversity, but also has a wide variety of resources that can be used to craft changes to our culture.”*

-NCWIT member representative

## Intention highlight: Resources

NCWIT equips change leaders with programs, resources, tools, and information that help them intentionally create DEI initiatives that build inclusive cultures. It is through a mindset of equity that change leaders make use of the more than 258 paper/web resources and 424 multimedia media resources NCWIT has created. These research-backed reports and recommendations draw from decades of social science research.

Since 2009, NCWIT has distributed 1.3 million hard copy resources, and since 2012, there have been 1.68 million electronic resource pageviews. NCWIT members are creating inclusive cultures in the organizations that educate and employ technologists, making them a better place for all.

NCWIT highlights the value of intention for our members through live educational experiences and conversations with peers. In 2022, topics included Offering Inclusive Summer Internships, Recruiting and Retaining Inclusively in the Great Resignation, “Quiet Quitting”: A Discussion of Engagement, Remote Work, and Inclusive Culture, Faculty Hiring: Promoting Diversity, Equity, and Inclusion from Job Description to Offer, and Broadening Participation Through Partnerships Between Two-Year and Four-Year Programs.

NCWIT Conversations for Change offer members and non-members alike the opportunity to learn and be inspired. In 2022, we featured such notables as Jonah Edelman, Maya Israel, A Queer Endeavor, Damon A. Williams, and Julie Battilana.

# 92%

*of surveyed member representatives are making changes to improve diversity, equity, and inclusion for students.*

# 87%

*are improving gender diversity, equity, and inclusion for employees.*

## Intention highlight: Regional Initiatives

### **NCWIT's regional initiative approach is another form of intention: community-based.**

In 2022, we continued to bundle research-backed programs and practices to help us understand local computing ecosystems, and cater content and programming to needs within a specific location. NCWIT partners with community stakeholders to build awareness, inspire participation, and connect women to like-minded peers, role models, and other opportunities.

NCWIT has partnered with local organizations to form regional, action-oriented coalitions located in Birmingham, Ala., Detroit, Mich., Pittsburgh, Pa., San Diego, Calif., Milwaukee, Wis., and Atlanta, Ga. In these areas, we leverage national programming to focus and accelerate local impact. We bring together inspiration, education, support, and encouragement to deliver meaningful opportunities to local individuals and organizations. We drive participation in Aspirations in Computing, Counselors for Computing, the Higher Ed and Workforce Alliances, and local workshops and webinars. These programs build the foundation and the structure communities need to intentionally increase their local focus on gender underrepresentation in tech.

*“We did not have anything like that in Birmingham, before NCWIT's arrival. Whether it was the network, whether it was plug and play programs that were ready to go, I mean, none of that existed. And that is not to undermine any previous attempts here in Birmingham, but this is new. It is super new. And we had momentum, which is about leadership development and women. That's great, but we didn't have any tech focus. Nothing on this scale, nothing with this expertise...”*

BridgeUP STEM is the regional initiative in Atlanta, Ga., funded by the Helen Gurley Brown Foundation. It's an innovative program that connects high school students to near-peer mentors and the resources of one of the top research universities in the country to inspire, educate, and help them gain the skills they need to pursue a career in computing.

*“Coding is a tool, just as much as a paintbrush is. The sooner you understand that, the easier it is to fall in love. Ultimately, the canvas belongs to you .... you were the one with the idea, and the one to make the final product.”* –Selene Shen, BridgeUP STEM Scholar

In 2022, 40 high school Scholars (2/3 from historically underrepresented groups) explored computer science through rigorous coding classes and near-peer mentorship opportunities with eight undergraduate Fellows. Research shows that there are four key ingredients to making CS more accessible to all students, and our evaluation data shows that BridgeUP STEM makes all of these happen.

# 82%

reported that the coding class increased their awareness of career possibilities in computing.

# 96%

reported that the coding class increased their coding knowledge/skills.

# 88%

reported that the coding class increased their confidence in writing code.

# 76%

reported that the coding class increased their interest in pursuing a computing career.

## Intention highlight: Aspirations in Computing

The NCWIT Aspirations in Computing (AiC) program utilizes recognition, access to resources (scholarships, internships, jobs, etc.), and near-peer mentorship to build computing identity, reward persistence, and recognize women in their pursuit of technical, research, and leadership skills. Awarded a 2018 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, NCWIT's AiC Community supports women, genderqueer, and nonbinary individuals with diverse and intersecting identities in their computing education and career journeys. The largest community of its kind, with thousands entering each year from across the United States, the program strives to diversify the face of technology. AiC serves all 50 states, as well as the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, and all U.S. military bases overseas.

*Of the existing AiC Community members, 91% report a college major or minor in a science, technology, engineering, or mathematics (STEM) field, with 72% in computing or engineering specifically. These metrics serve as a stark contrast to the 4% of all women who earn engineering or computing postsecondary degrees.*

# 22,800

**In 2022, the AiC Community grew to more than 22,800 members, and NCWIT offered more than 350 various opportunities throughout the year. These included workshops, networking events, job and internship postings, scholarships, hackathons, and more. These are all offered with the intention of increasing persistence in computing. And it works. throughout the year.**

Through 2022, NCWIT has honored more than 22,000 high school students. We have also honored 202 collegiate technologists, and 834 educators. For the educators, receiving the award had great influence on their commitment to discussing career opportunities in technology with their students (88%), and their consideration of themselves as mentors for girls in computing (88%).

One of the ways NCWIT creates connections between AiC participants and our organizational members is through shared activities and conferences.

### IN 2022 WE:

- Connected 22 Workforce Alliance member companies with hundreds of AiC job seekers.
- Co-created exciting and meaningful recruiting experiences for Grace Hopper Celebration attendees to meet Workforce Alliance members.
- Partnered 110 AiC students with 46 advisors from Workforce Alliance companies to offer networking opportunities and career advice.

The NCWIT AspireIT Impact Award elevates the core values and spirit of NCWIT AspireIT, recognizing AiC Community members and TECHNOLOchicas for their incredible efforts to build and creatively offer near-peer, hands-on computing opportunities that encourage K-12 girls, women, genderqueer, and nonbinary individuals to contribute their unique perspectives and ideas to future innovations. In the past two years, NCWIT has honored 80 AiC Community members with the Impact Award. The Award recognizes these stand-out AiC Community members and selection is based on an individual's contribution to work that:

- connects communities of technical girls, women, genderqueer, and nonbinary people of all ages,
- creates opportunities to participate in computing for marginalized populations including girls, nonbinary individuals, or students of BIPOC heritage,
- exhibits strong near-peer mentorship or peer-led leadership models,
- promotes and expands computing career pathways and opportunities in the local community,
- continues to grow interest in computing in the local community in a sustainable manner.

A network diagram background consisting of numerous light blue circular nodes connected by thin white lines, set against a teal-to-blue gradient background. The nodes are of varying sizes and are scattered across the upper half of the page.

# Inclusion: recognition, appreciation, respect, and use of the talents and skills of students and employees of all backgrounds

*“NCWIT is a great resource to demonstrate that there is a space for those who identify as women and nonbinary students in STEM. Having a community widely accessible makes it much easier to promote this work and systemic change that can often be difficult to move the needle on.”*

-NCWIT member representative

## Inclusion highlight: Joanne McGrath Cohoon Service Award and Counselors for Computing

NCWIT believes that besides intentional practice, inclusion is crucial for enabling organizations to shift their focus from merely bringing individuals to the table to actively inviting and encouraging them to contribute to innovation and learning. Any person in an organization can be an advocate for inclusion.

Yet, when leaders implement culture change, sometimes efforts go unnoticed. That's why NCWIT created the Joanne McGrath Cohoon Service Award. Dr. Cohoon was one of NCWIT's founding social scientists, and this award is given in memory of her outstanding research and advocacy work to broaden and enrich women's participation in computing. Sponsored by AT&T, the award honors distinguished educators and staff who have effectively challenged and changed the systems that shape the experiences of women undergraduates in postsecondary computing programs. Awardees demonstrate exceptional commitment to and success in creating long-lasting systemic change that improves the environment, with attention to practices or interventions that advance the diversity, equity, and inclusion of women from historically excluded groups.

*At HMC, Dr. Alvarado helped to establish permanent structures that increased the percentage of women in computer science (CS) from 12 percent to roughly 50 percent; while at UCSD, she created programs and policies that vastly increased the number of women who do research in CS, and also contributed to the increase in women CS majors from 18 percent to 22 percent in just four years.*

The 2022 winner was Dr. Christine Alvarado, Associate Dean for Students of the Jacobs School of Engineering and Teaching Professor of Computer Science and Engineering at the University of California, San Diego. Dr. Alvarado has worked to effect systemic change that significantly improved the environment for women students at two institutions, Harvey Mudd College (HMC) and the University of California, San Diego (UCSD).

Professional School Counselors are important influencers for this next generation of techies. They advise and encourage students in their education and career aspirations, provide recommendations for course selections, and expose students to occupations through career fairs and internships. If students who have traditionally been excluded from computing are to get the exposure and encouragement they need to pursue computing, it is essential that counselors be up to date on the knowledge and resources necessary to guide effectively and to create an inclusive environment within their schools. Counselors are critical allies based on their unique position in students' pathways. However, research shows that counselors face barriers when it comes to advising about computing education and careers. In a recent study conducted by NCWIT, approximately half of the respondents reported that their lack of awareness of computer science careers and the limited number of computer science classes, labs, and/or teachers have been barriers to their counseling practices.

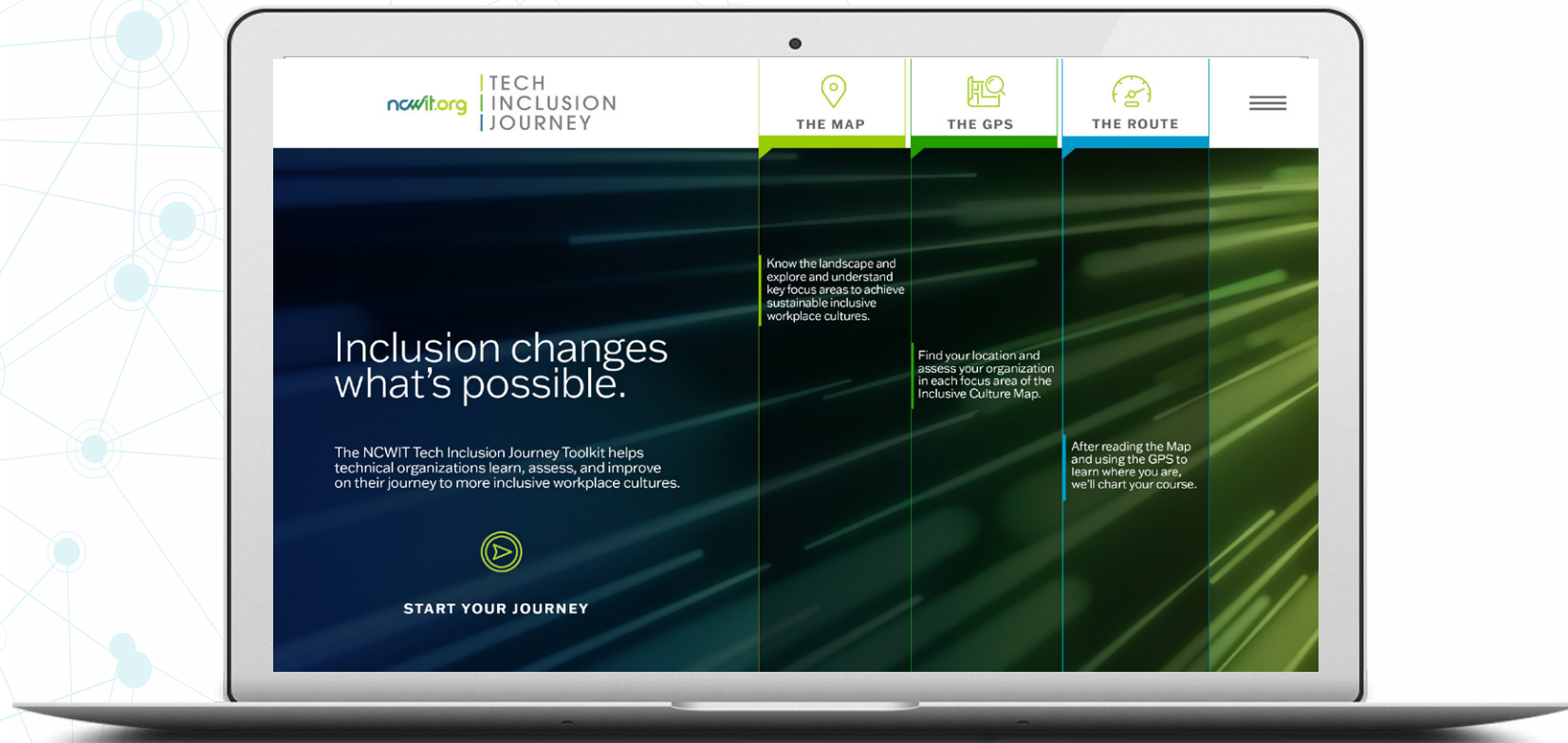
*“The event awoke the passion I once had for computing myself. And I am going to go for it this time. Thank you for giving me this boost.”*

NCWIT fills this gap with our Counselors for Computing (C4C) program. Survey data from recent C4C workshops indicate that most of the participants have gained understanding and changed their advising practices since attending a C4C event. For example, 71% reported that since attending, they have recommended that students try computing courses “a lot” or “a great deal,” and 64% reported that they have focused on underrepresented communities “a lot” or “a great deal.”

In 2022, C4C, offered 11 one-hour webinars to nearly 400 counselors nationwide. Topics included such things as CS+Ethics and CS+Barbering.



# Inclusion highlight: Tech Inclusion Journey



To inspire the creation of inclusive and welcoming technical organizations/teams, NCWIT developed the Tech Inclusion Journey™ (TIJ), a one-of-a-kind scalable decision-support software platform designed to avoid traditional DEI pitfalls, enabling organizations to implement systemic, sustainable approaches to create inclusive computing cultures. By instantiating research-based methods in an easy-to-use software platform that conveys not only what to do but how to do it, any organization can independently implement effective change efforts that positively impact outcomes for all employees, not just technical employees who are women or who come from other marginalized groups. The TIJ empowers stakeholders with practical strategies that help them dismantle organizational barriers, attend to the needs of a wide range of intersecting identities, and build inclusive cultures in which people feel they belong and can make outstanding technical contributions. TIJ upends the longstanding tendency for many technical leaders to abdicate responsibility to HR/D&I divisions and instead requires them to take personal ownership and accountability for change.

In 2022, NCWIT launched Version 2 of the corporate Tech Inclusion Journey. This new and improved platform includes an updated change model and overall improved user experience. We also piloted a beta of the undergraduate Tech Inclusion Journey with 30 postsecondary institutions, laying the groundwork for the official launch in 2023.

86%

reported that "it is easier to bring up bias-related topics at work"

91%

of participants reported their "ability to help create a more inclusive work environment has improved"

96%

reported "thinking more about how subtle bias might be occurring at work"

**Influence:** the power to have an important effect on someone or something

*“NCWIT causes me to constantly think about how we can advance girls, young women and teachers to “flip the script” and encourage more young women to pursue computer science and technology. I love hearing from diverse voices and see role models for these girls and young women featured in NCWIT events.”*

-NCWIT member representative

# Influence highlight: Powertilt and NCWIT Patenting Report

## POWERTILT

Social identities (e.g., gender, race, class, age) and role identities (e.g., job level, title, position) impact power and influence in society and in the computing discipline. The societal expectations and biases associated with these identities, conscious or unconscious, powerfully shape who can most successfully access and exert different types of influence. For example, research (e.g., Snyder, 2014) shows that women and members from marginalized racial/ethnic groups are more frequently interrupted; similarly, they are more often critiqued for their tone, style, or personality (e.g., being told to “be less aggressive, “tone it down,” or be more “professional”) compared to majority-group members engaged in similar behavior. These biases affect people’s perceptions of how effective or competent an individual is and, by extension, likely affect how influential one can be in certain contexts.

Recognizing how these biases affect power and influence also challenges the notion of meritocracy so commonly found in tech cultures — that is, that the best ideas and most qualified people are the most influential. Examining the relationship between influence and the ideals of meritocracy is important because one of the biggest hurdles to leveling the playing field across gender, race/ethnicity, and other social identities is the widespread assumption in tech that a meritocracy already exists. NCWIT’s Powertilt study aims to connect the dots of these many variables, identifying team members’ perceptions about influence and who has access to it, examining how these perceptions may be shaped by cultural norms and biases, considering the challenges these dynamics pose to meritocracy, and articulating the implications of all this for purposively creating more inclusive cultures. The Powertilt study will inform the release of a new software tool by NCWIT in 2023.

NCWIT, in partnership with 1790 Analytics, publishes periodic reports on gendered patterns in IT patenting, analyzing records from the U.S. Patent and Trademark Office. In 2022, we released an update to this critical data. Key highlights of the report include:

**In the last 5 years, approximately 10% of U.S.-invented IT patents were invented by women:** Between 2011 and 2015, the patenting rate for women was 7.8%, up from the original report’s findings of 4.7% between 1980 and 2010.

**Overall IT patenting is rapidly increasing:** IT patenting has grown substantially in the last four decades. In the U.S. alone, it increased almost 17-fold from 27,153 patents between 1980-84 to 452,315 total patents from 2016-2020.

**Meanwhile, women’s patenting rates are up 56-fold despite no increase in women’s participation in the computing workforce:** For women inventors to increase their patenting share during this period, they had to increase patenting by higher-than-average growth rates. Women’s patenting increased 56-fold from 1980-84 and 2017-2020, even as the percentage of women employed in IT either remained flat or decreased slightly.

**Trends point to continuing progress:** Although the overall level of women’s participation in IT patents remains relatively low, the trend shows an increase from 2% in 1980 to approximately 10% after 41 years of study. For evidence of growing inclusion in patenting, AI Learning and computer software are leading.

**Women’s patenting rates differ widely from one company to another.** In some companies, women account for 20% to 30% of patents while in others they account for only 5% of patents. This suggests that individual organizational environments do matter and can influence women’s patenting patterns.

# What's next?

2023

*NCWIT is deepening our focus on embedding a racial equity lens into all we do.*

NCWIT continues to challenge organizations to be intentional with their DEI efforts, to focus on inclusion, and to pay attention to influence and how to ensure the broadest spectrum of people can contribute. In 2023, we will launch a Powertilt tool that will allow organizations and teams to understand their own power dynamics, with an aim of helping them redistribute power more fairly. This year we will also launch an updated version of our revamped TIJ tool for corporations and undergraduate programs that has an enhanced strategic and action planning engine.

We look forward to working with our current sponsors, partners, and other member organizations, as well as expanding to include even more change leaders who need the research-backed tools and programs NCWIT provides.

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makes our work possible



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DoDSTEM

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