Deconstructing CS Culture

Dr. Amy J. Ko, Ph.D.
Professor
The Information School
University of Washington, Seattle
Everyone in CS deserves respect, support, and agency, no matter who they are.
Respect for their identities, cultures, interests, hopes, dreams, and visions
Support, in the form of encouragement, affirmation, and resources to thrive
Agency to make space in CS for their needs, to shape their learning, and to express their values
As we know, not everyone receives support, respect, or agency from CS. Some get the opposite, because of who they are.
Broadening participation is all about rectifying these inequalities, via equity, inclusion.
But whether someone is marginalized in CS isn’t strictly a function of their visible identity. Sometimes, it’s a function of what’s hidden.
This is true for me. In fact, in CS, I’ve simultaneously been treated as part of the dominant group, while also being erased and marginalized.
I am both White and Asian, the two dominant racial groups in CS...

... but White people in CS don’t really see me as White, and Asian people in CS don’t really see me as Asian.
By high school, I had the privilege of having my own computer...

.. but I was bullied for liking computers. My calculators were smashed, I was shoved into lockers, I was mocked, even by teachers.
I was privileged to have amazing public schools and nationally renowned K-12 teachers...

... but I had no CS in school. I took the AP CS A exam alone in a literal broom closet, unsupervised, unsupported. I got a 3, because I didn’t know what objects were. (The used textbook I found at a local bookstore didn’t teach them).

My high school math teachers.
Credit: Amy J. Ko.
My parents went to college, and encouraged me to go...

... but I didn’t know of Berkeley, Stanford, MIT, or Carnegie Mellon. The University of Washington offered me a $500 loan to cover $10,000 out of state tuition, so I went to my state university.

My college friends and I talking about politics in my dorm room. Credit: Unknown.
I enjoyed programming. It made me feel creative and in control. Majoring in CS seemed like a good fit.

But I primarily did CS for stability: I was tired of being poor. CS was my path to economic security.

I graduate from Oregon State University in 1998.
Credit: Unknown.
Thanks to an amazing undergraduate research mentor, Margaret Burnett, I earned my Ph.D. at an elite, private university, granting me an network of power and influence in CS...

... but I pursued a Ph.D. primarily to avoid a male-dominated, toxic software industry.
I earned tenure in 2014 without learning much of anything about diversity, equity, and inclusion, or contributing much to it.

... but my motivation for tenure wasn’t curiosity, but employment protection. I saw tenure as the safest way to be trans and not lose my job.
I co-founded a startup and raised millions in venture capital, saving enterprise businesses money and destroying tens of thousands of jobs, embracing a toxic work/life balance for profit.

But I absorbed myself in startup life mostly to run away from my transness.
I did all of this while being seen as a man in CS.

... but I wasn’t a man, I was a woman, and had to do a lot of painful masking in CS spaces to pretend to be.

Greg and I accept a best paper award at ICER 2018. At this point I was out to myself and plotting coming out. Credit: Amy J. Ko.
Despite all of this erasure, CS was still my refuge.
For whom else is CS a refuge? And how do we change it from a refuge to a culture that offers support, respect, and agency to everyone, including both marginalized groups, but also the dominant groups, who are often marginalized in their own ways outside of CS?
An answer in three parts...

A (Western) history of CS as a refuge

Deconstructing computing culture

Reimagining CS culture
1. A (Western) history of CS as a refuge
CS in the 1940’s

Alan Turing laid the foundations of modern computing. Turing was also a closeested gay man, and might have been an Autistic person: his schools described him as anti-social and aloof; he was obsessed with codes and ciphers; he avoided eye contact. **He found his refuge studying CS at Princeton.**
CS in the 1950’s

After Turing, Shannon, and von Neumann, the digital computer arrived. Programming labor was feminized, and therefore underpaid and undervalued. Computers served war, which financed the first computers. CS became a refuge for women in mathematics who began to lose jobs as human computers.
CS in the 1960’s

IBM monopolized the burgeoning computer industry, dominating business, shifting power to White businessmen. The White men of mathematics branched off to found CS departments. At Purdue, the first CS department in 1962, all new faculty hires were men. CS became a refuge for male mathematicians interested in computation, spurned by mathematics; women were excluded.

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CS in the 1970’s

CS departments in higher education proliferated, formalizing pathways between universities and industry. Admissions focused on students with preparatory CS privilege (e.g., Bill Gates and Paul Allen). As Allen described it, CS was a refuge for wealthy “young geeks,” looking for a place to play without being bullied for their interests.

CS in the 1980’s

Marketers decided computers and video games were for boys. Departments establish undergrad curriculum. Industry and enrollment booms. Faculty responded by restricting enrollment, increasing class sizes, pushing out women and students of color. **CS became a refuge for White boys captivated by the emergence of video games.**

A 1984 Apple Computer ad, speaking directly to young White boys. **Credit:** Apple.
CS in the 1990’s

The public internet arrives, Silicon Valley booms bigger than ever, but CS enrollment plateaus. Most interested in CS are White boys who grew up with computers in their homes. CS becomes a refuge for those seeking social mobility, especially White and Asian immigrant men whose parents valued mathematics and engineering.
This brings us to my entry into CS in 1998

I was a Freshman at Oregon State University (OSU), in Corvallis, Oregon, a 90 minute drive from home in Portland, and in the heart of the rural Willamette Valley, surrounded by cows, hay, hops, grapes, cherries, potatoes, onions, corn, watermelon, and trees.

Corvallis, Oregon, home to Oregon State University. Credit: Google.
A refuge for a **deeply closeted trans girl**

The gendered world was painful, complex, and hard to understand. Code was comparatively rewarding, simple, knowable, and genderless.

1990’s CS culture at OSU offered me:

- Freedom from gender anxiety since everyone was a man.
- Minimal social interaction, sparing me from having to be me.
- Affirmation of my mind.
- Encouragement to ignore my body.
But these same features made it safe for others I met in CS...
A refuge for **bullied boys**

I had many peers who adored puzzles and games, did not conform to rigid stereotypes of masculinity, and were ruthlessly bullied for it in primary and secondary school.

1990’s CS culture at OSU offered them:

- A place to find peers who’d suffered the same traumas, but where they didn’t have to talk about their traumas.
- A career that promised empowerment, rather than abuse.
- A community of people with shared interests.
A refuge for **queer youth escaping the farm**

Many of my White queer peers had grown up in rural Oregon and sought an escape from family and farming, and a pathway into queer-friendly urban life.

1990’s CS culture at OSU offered them:

- A promise of economic security in case they lost their families after coming out.
- A direct pathway to jobs in Seattle, Portland, and San Francisco, which many viewed as a queer refuges.
A refuge for parent-pleasing immigrant boys

I had many second generation Chinese and Indian peers who didn’t choose CS because of interest, but because their family valued mathematics, engineering, and social mobility.

1990’s CS culture at OSU offered them:

- A place to be affirmed for their mathematics skills.
- A place to build community around shared ethnicity.
- A place to earn economic security.
- A way to earn the love and support of their parents.
A refuge for Autistic youth

Some Autistic people often have strong interests, some have a close attention to detail, some have a need for routines, some have difficulty understanding social rules and making social inferences.

1990’s CS culture at OSU offered them:

- A place where attention to detail was prized and valued.
- An intellectual space that concerned rules and routines.
- Little need for social interaction or reflection on society.
2000’s - present

Google, Amazon, Facebook, Microsoft, and Apple dominate global markets. A gold rush ensues. The same faculty that founded the CS departments in 1960’s and 70’s are at the height of their powers, shaping curriculum, admissions, culture. The immense force of markets leads to cultural lock-in, ossifying the culture set in the 1980’s. **CS becomes a magnet for power.**

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Zuckerberg builds thefacebook.
Credit: Harvard.
2. Deconstructing computing culture
When I reflect on this history, and my participation in it, this is what I see...
The world
society, emotions, nuance, politics

This is the world as we know it, full of wonderfully diverse people and ideas.
The world
society, emotions, nuance, politics

CS
abstraction, structure, logic

We all know that CS is part of the world, part of that wonderful diversity and complexity.
But CS culture sees itself as separate from the world.
CS culture is defined as a refuge from the social world: it protects bullied less masculine boys, queer youth, White and Asian immigrants, Autistic youth—and yes, deeply closeted trans girls—from the oppression of the social world. It is a place of respect, support, and agency—but just for these groups, and likely others we haven’t examined.
And it’s not just social segregation, but intellectual segregation.

- **CS abstracts**, removing *messy social context*
- **CS neutralizes**, removing *nuanced values and politics*
- **CS normalizes**, erasing *diversity and exceptions*
- **CS automates**, removing *people and their unpredictable decisions*

These foundational CS concepts and values benefit the dominant groups in CS, reducing the burden of understand the complex social world, isolating them from its complexities.
Of course, the social and intellectual segregation of CS from the world has consequences...
CS is an unsafe space for many groups

Students who are Black, Brown, Native, disabled, gender non-conforming, non-binary, women, may all find the decontextualized, anti-social nature of CS psychologically unsafe, posing:

- Stereotype threats.
- Imposter syndrome.
- Culturally unresponsive pedagogy.
- Racism, sexism, ableism.
- Resistance to advocacy and social conflict.
CS as a space of unsafe ideas

Social segregation leads:

● Algorithms that **abstract**, ignoring diversity, exceptions, context.
● **Automation** that ignores humanity and its complexities, its beauty, and its need for community.
● **Systems** that disrupt, centralize, privatize, and standardize in service of order and parsimony.
The result is a culture more resilient to social complexity and social change, than ever, since CS works for its dominant groups.
It’s not clear that CS wants the power it has

Dominant groups in CS didn’t flock to CS for power, they came for respect, support, and agency.

Most are still unsure what to do with it (e.g., Mark Zuckerberg, Jack Dorsey, Elon Musk). Pressure is mounting, but few are equipped to respond inclusively. Many respond with defensiveness, ignorance.

Zuckerberg speaks to the U.S. congress. Credit: NY Times.
All of this leads to two major barriers to making change...
1. Broadening participation is a psychological threat

Asking CS to let in the rest of the world is asking dominant groups in CS to let in the very things they’ve been running from.

- It asks bullied boys to let in their bullies.
- It asks Asian boys to compete more for their parents’ love.
- It asks Autistic youth to face a social world they struggle to parse.
- It asks closeted trans youth to face their gender identities.
1. Broadening participation is a psychological threat, continued

This challenge raises new questions:

- What kind of CS culture would make space for everyone, but also bullied boys, immigrants, and Autistic people?
- How we do reconcile the toxic masculinity, Asian cultures, and neurodiversity of CS with the rest of humanity?
- What might groups marginalized in CS need to learn about bullying, Asian parenting, Autism, and trans shame to create a truly inclusive CS culture?
2. Diversity is an intellectual threat

The foundations of CS aren’t built to accommodate variation, exceptions, nuance.

- Conditional statements work with Boolean logic, not the fuzzy temporal indecision of human judgements.
- Loops have no social awareness of their amplifying forces.
- Machine learning is incapable of being humane to outliers.
2. Diversity is an intellectual threat, continued

These challenges raise new questions:

- What kinds of foundations would better account for diversity?
- Are new definitions of data and algorithms that account for the margins possible?
- Who will develop these foundations, if not the dominant groups in CS, and how might we adopt them without dismantling the entirety of 70 years of technical infrastructure?
None of these threats are excuses

The White and Asian men who dominate tech—despite many of them being marginalized in their own ways in broader society—still need to own their privilege, recognize their power, stop being sexist, racist, and ableist, and start using their power for equity and justice.
3. Reimagining CS culture
Respect. We need a CS culture that is respectful for all identities, cultures, values, and dreams.
Cultural tensions around respect

I often hear people in our community talking about dominant groups in CS needing to read the room in the context of diversity, equity, inclusion, and justice. That’s a fine sentiment that’s centered in a desire to account for social context in communication, decisions, and action.

But it’s also a very exclusionary idea: one characteristic of Autism is precisely the inability to do this; people who immigrate to other countries often lack historical context. How do we create a CS culture that accounts for neurodiversity and gaps in cultural knowledge?
Support. We need a CS culture that offers encouragement, affirmation, and resources.
Cultural tensions around support

We regularly discuss broadening participation in terms of minoritized racial and gender groups, and we absolutely need to offer these supports, robustly, sustainably, and inclusively.

But even dominant groups in CS need support that they’re not getting. Where are the student organizations for Southeast Asian students who need solidarity about the sometimes toxic family expectations that motivate their learning? Where are the student organizations for Autistic students to celebrate the assets their neurodiversity brings to how we see and understand the world?
Agency. We need to offer space for people in CS to shape their learning and to express their values.
Cultural tensions around agency

We need to engage culturally responsive and sustaining pedagogy, and teach the intersections between social justice and computing.

But what if a student’s values or minds center order, rules, and homogeneity (or the political conservatism that often stems from these views)? Do we offer agency to everyone except these students, since their values might be directly counter to embracing diversity? And how do we reconcile that offering them agency might mean taking away agency from others?
It’s these tensions that make reimagining CS culture so hard: there is likely no single culture or set of cultures that reconciles them.
Five approaches to reimagining CS culture.
The status quo

We let CS continue to **oppress**, enriching and empowering its dominant groups with responsibility they do not want.

*This transfer of power may simply continue despite our efforts to prevent it, due to inertia.*

A Jeff Bezos-as-action-hero meme. Credit: C-SPAN.
Regulate CS culture

We layer policy on top of the status quo, regulating business and education. In the process, we obstruct some harm, trying to mold CS into what the world needs it to be.

This may be muted by capitalism’s amplification of private action, and the limits of democracy in changing culture.
Change CS culture

We **broaden participation**, embracing culturally sustaining pedagogy, improving cultural humility, removing barriers, and diversifying power.

Such “desegregation” efforts, might be slow and fractured, much like racial desegregation in schools in the U.S. They also need to begin attending to dominant groups’ ethnic and neurodiversity.
CS splinter cultures

We can just make new CS cultures:

1. The Informatics degree at my university teaches CS, but situated.
2. K-12 CS has its own distinct pedagogies and values.
3. Industry != academia.

Multiple cultures requires bridges. Who will build them? Will the bridges create their own inequities?
A vibrant multiplicity of CS cultures

Everyone makes with CS: scientists, artists, writers, parents, engineers, teachers, children, and more, all with different values, goals, and tools.

Should we support people in creating, finding, engaging, and sustaining new CS cultures? Can they ever escape the hegemonic ideas from higher education?

We’re not choosing from these approaches. They’re all happening, simultaneously.
Even if there are a multiplicity of cultures, some CS cultures — higher education, big tech, programming language designers — will still hold most of the power, and will still use it to oppress, even if unintentionally.
The real question is how we connect these many cultures, while also transforming the CS cultures that hold the power to shape them through empathetic partnership with its (often) oppressive leadership.
What might empathetic partnership be?

We seriously engage the marginalization of Autistic, immigrant, and bullied boys who dominate CS power centers.

We partner with these dominant groups to imagine a CS culture that keeps both them and everyone else safe in CS, through respect, support, and agency.

We reinvent with them the intellectual foundations of CS, creatively replacing them with technical infrastructure that centers respect, support, and agency.
Perhaps we can create a rich and diverse constellation of CS cultures.
I hope we can continue this dialog—in research, in conversation, and in community!

Key points

- CS has long been a refuge for groups marginalized in invisible ways.
- This has caused CS has become defined by its social segregation.
- Efforts to change CS culture need to empathetically partner with dominant groups to create a CS culture that works for everyone.