Expanding Equity and Justice in Computer Science Education:
Challenges and New Opportunities
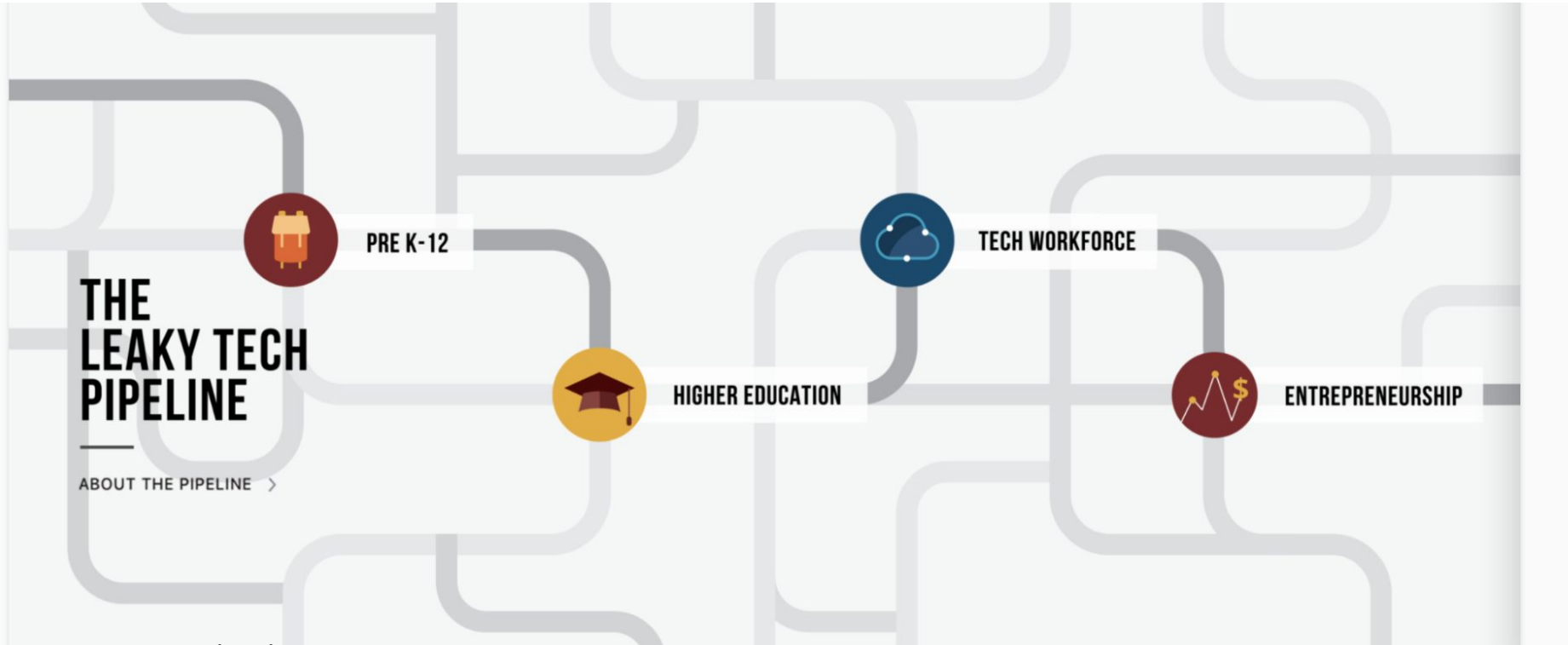
Allison Scott, Ph.D.

MSU/CREATE

November 30, 2022

KAPOR CENTER

Mission: To create a more equitable technology ecosystem that addresses longstanding racial inequality, creates economic opportunity, and reflects the power and perspectives of communities of color.

Dr. Allison Scott

Chief Executive Officer

Our research, teaching, and practice approaches support a vision of public education that has as its goal equity and inclusion at all levels – classroom, school, community, district, state, national, and global – and that positively impacts personal growth and social transformation. Our renowned faculty engage students in theoretical and practical studies, providing opportunities to develop interdisciplinary scholarship, as well as to participate in field studies, unpack the history and philosophy of education, and explore cutting edge research.

Figure 2. Percent of High Schools Offering Any CS, by School Demographics
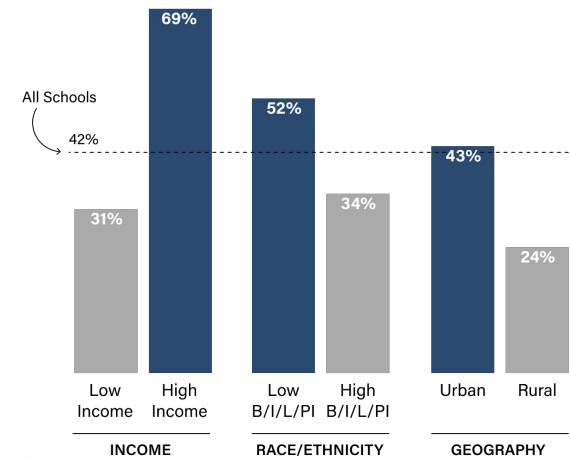
Acknowledgments:

Sincere thanks and gratitude to the scholars, researchers, educators, students, colleagues, funders, and advisors who have supported my personal journey in CS education and provided foundational knowledge and concepts for our field to continue to build upon, in pursuit of a better future.
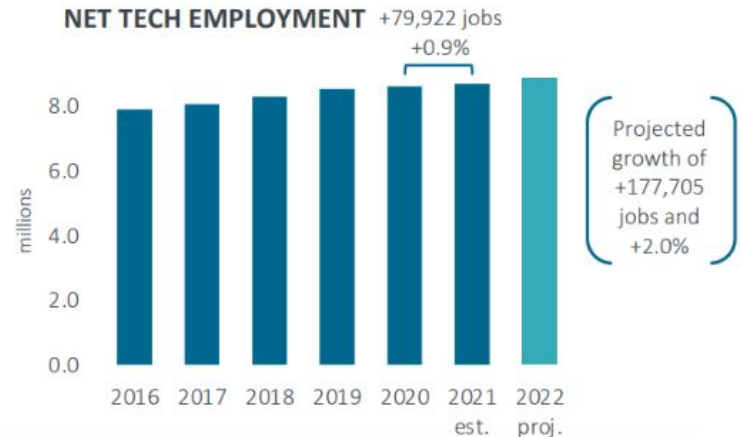
The National Tech Economy

The technology sector plays an increasingly significant role in our national economy.
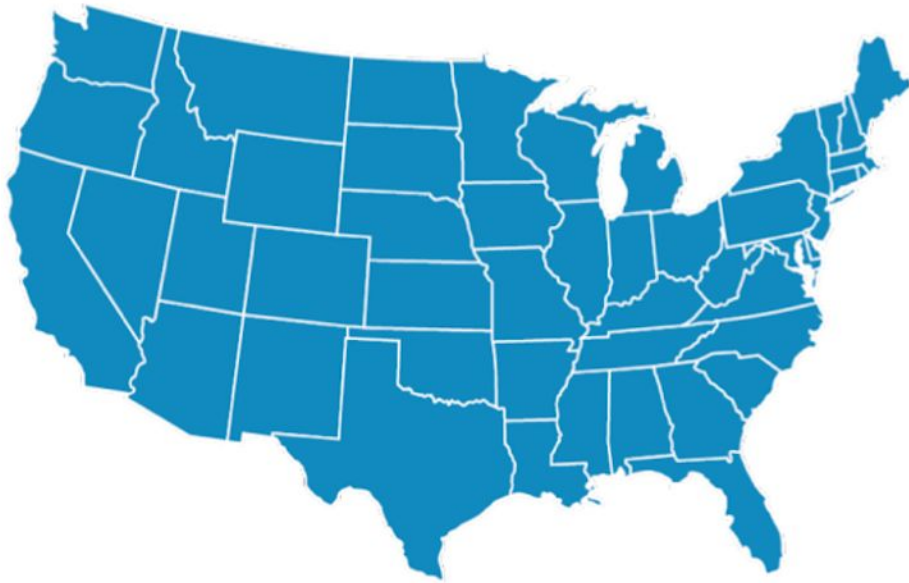
8.7M net tech employment

$1.9T in yearly economic output
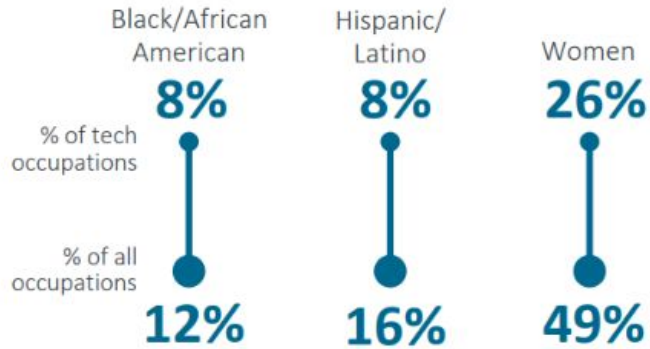
177,705 projected new tech jobs YOY

NET TECH EMPLOYMENT +79,922 jobs
+0.9%

Projected growth of +177,705 jobs and +2.0%

millions

8.0
6.0
4.0
2.0
0.0

2016 2017 2018 2019 2020 2021 est. 2022 proj.

KAPOR CENTER
SMASH = Kapor CAPITAL

Underrepresentation by race and gender remains profound in the tech sector and among the largest tech companies.

TECH WORKFORCE CHARACTERISTICS[4]

	Black/African American	Hispanic/Latino	Women
% of tech occupations	8%	8%	26%
% of all occupations	12%	16%	49%

[4]Data covers core tech occupations | See Appendix for other Race/Ethnicities and age characteristics

Figure 6. Representation of Black Talent in Technical Roles in the Largest US-Based Tech Companies by Market Cap, 2018 – 2021

Alphabet (Google)
U.S. Workforce (BLS): 12.7% 12.7% 12.8% 12.9%
Black Employees: 1.9% 2.1% 2.4% 2.9%
2018 2019 2020 2021

Cisco
12.7% 12.7% 12.8% 12.9%
3.4% 3.3% 3.4% 3.6%
2018 2019 2020 2021

Dell
12.7% 12.7% 12.8% 12.9%
3% 4.2% 4.2% 4.4%
2018 2019 2020 2021

Meta (Facebook)
12.7% 12.7% 12.8% 12.9%
1.3% 1.5% 3.2% 3.1%
2018 2019 2020 2021

Intuit
12.7% 12.7% 12.8% 12.9%
1% 1% 1% 2%
2018 2019 2020 2021

LinkedIn
12.7% 12.7% 12.8% 12.9%
1.3% 1.2% 1.3% 1.8%
2018 2019 2020 2021

Microsoft
12.7% 12.7% 12.8% 12.9%
2.8% 3.3% 3.6% 4.4%
2018 2019 2020 2021

Salesforce
12.7% 12.7% 12.8% 12.9%
2.3% 2.5% 2.7% 3.5%
2018 2019 2020 2021

Twitter
12.7% 12.7% 12.8% 12.9%
3.1% 4.2% 5.8% 6.8%
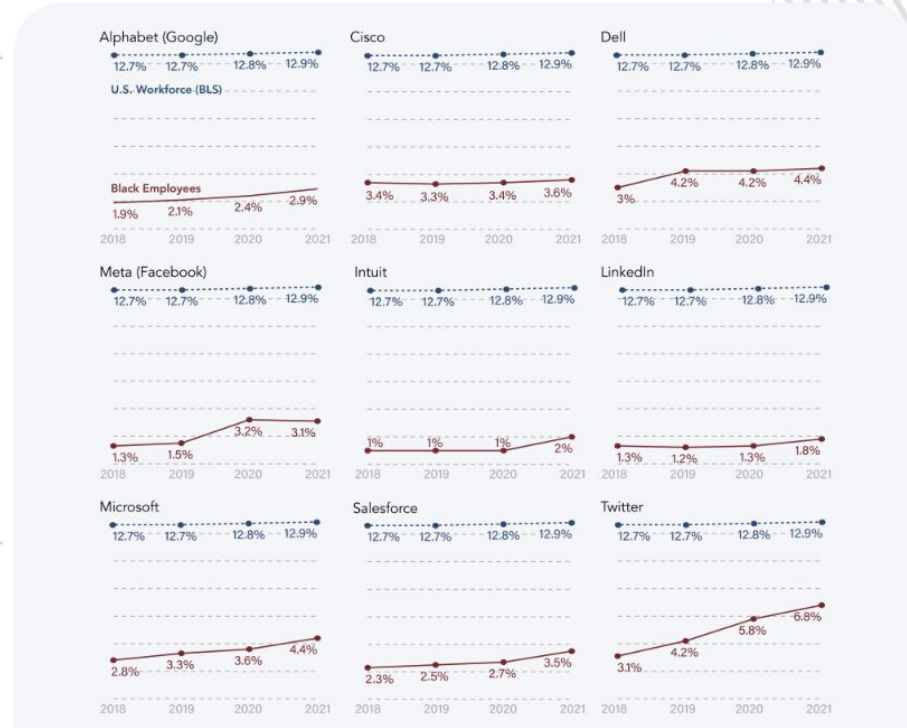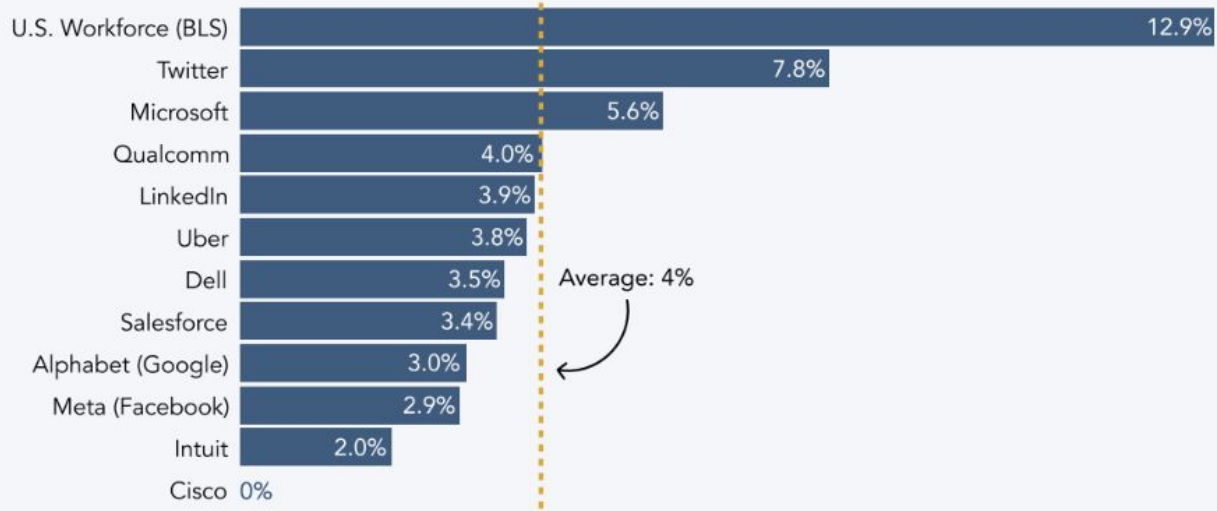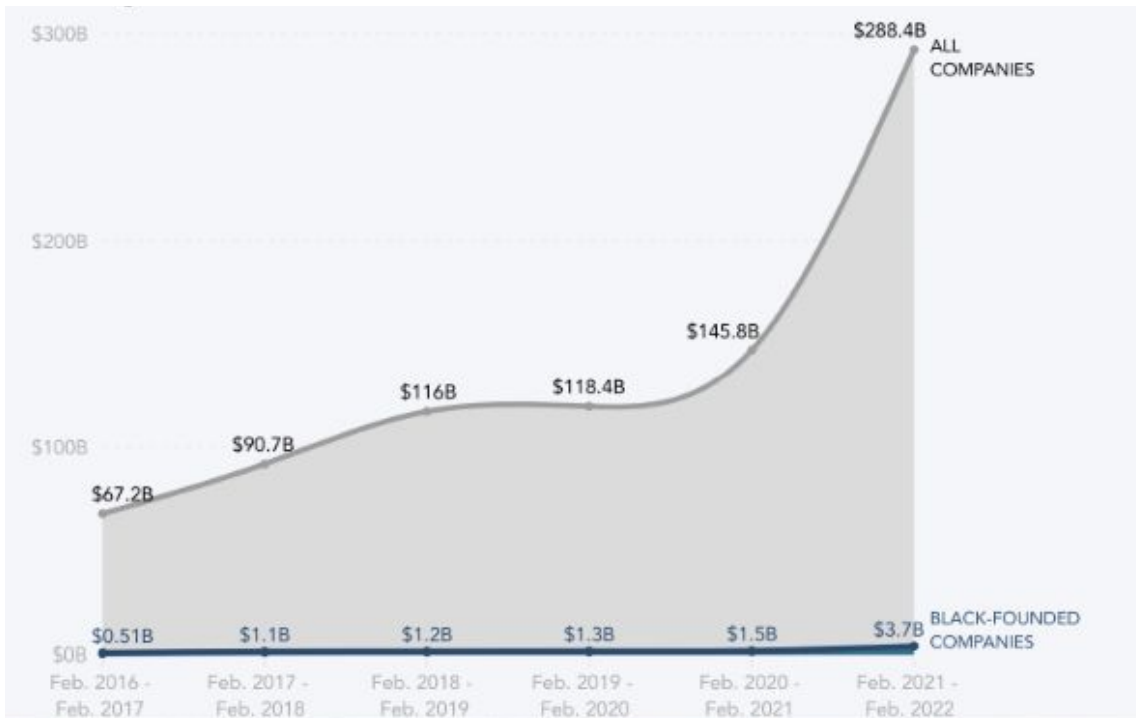2018 2019 2020 2021

Source: Kapor Center (2022); CompTIA (2022)

Figure 5. Representation of Black Talent in Executive Leadership Roles in the Largest US-Based Tech Companies by Market Cap, 2021

Company	Percentage
U.S. Workforce (BLS)	12.9%
Twitter	7.8%
Microsoft	5.6%
Qualcomm	4.0%
LinkedIn	3.9%
Uber	3.8%
Dell	3.5%
Salesforce	3.4%
Alphabet (Google)	3.0%
Meta (Facebook)	2.9%
Intuit	2.0%
Cisco	0%

Average: 4%

* Note: Kapor Center (2021) Analysis of 2020/2021 Company Diversity Reports. Each of these charts is highlighting the specific company identified in the title and their representation of Black executives in their workforce. The average percentage was calculated across 25 companies (of the top 30 by market cap) reporting race/ethnicity data.

Source: Kapor Center (2022)

Significant Underinvestment in Entrepreneurs of Color Restricts Innovation and Wealth Creation

$300B
$288.4B ALL COMPANIES

$200B

$145.8B

$116B
$118.4B

$100B
$90.7B

$67.2B

$0B
$0.51B $1.1B $1.2B $1.3B $1.5B $3.7B BLACK-FOUNDED COMPANIES

Feb. 2016 -   Feb. 2017 -   Feb. 2018 -   Feb. 2019 -   Feb. 2020 -   Feb. 2021 -
Feb. 2017   Feb. 2018   Feb. 2019   Feb. 2020   Feb. 2021   Feb. 2022

1%
of all VC investment goes to Black entrepreneurs

222
out of 11,790 companies receiving VC investment were Black-founded.

Source: Kapor Center (2022)

Diverse representation in the tech sector is critical in the design, deployment of technologies -- and decision-making about their use and impact on communities

Communities of color are simultaneously underrepresented in creation of technologies...

Machine Bias

There's software used across the country to predict future criminals. And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica

Wrongfully Accused by an Algorithm

In what may be the first known case of its kind, a faulty facial recognition match led to a Michigan man's arrest for a crime he did not commit.
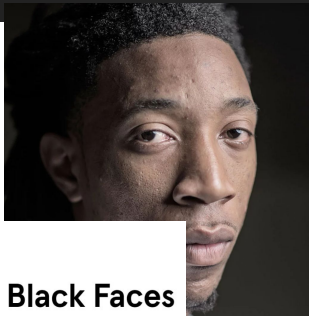
TOM SIMONITE   BUSINESS   JUL 22, 2019 7:00 AM

The Best Algorithms Struggle to Recognize Black Faces Equally

US government tests find even top-performing facial recognition systems misidentify blacks at rates five to 10 t[...] than they do whites.

Denied

The Secret Bias Hidden in Mortgage-Approval Algorithms

...AND most likely to be negatively impacted by technology products and their uses.

Technology--and computing education--is central to the fight for racial justice.

SOCIAL CONTEXT

Buffalo shooting: How far-right killers are radicalised online

By Shayan Sardarizadeh
BBC Monitoring

RESEARCH ARTICLE | SOCIAL SCIENCES ✔

Black Lives Matter protests shift public discourse

Zackary Okun Dunivin ✉, Harry Yaojun Yan, Jelani Ince, and Fabio Rojas Authors Info & Affiliations

Edited by Douglas Massey, Princeton University, Princeton, NJ; received September 22, 2021; accepted January 11, 2022

March 3, 2022 | 119 (10) e2117320119 | https://doi.org/10.1073/pnas.2117320119

How algorithms are amplifying misinformation and driving a wedge between people

We need an online environment that reflects the way a healthy society naturally acts rather than an algorithm designed to manipulate our attention.

By Jim Fournier, Opinion Contributor

Even social media-savvy teens can't spot a fake news story

Jan 19, 2021, 08:00am EST | 2,043 views

Disinformation Propelled By Social Media And Conspiracy Theories Led To Insurrection

Wayne Rash Contributor ⊙ ⊕
Consumer Tech
Wayne Rash is a technology and science writer based in Washington.

EDUCATIONAL CONTEXT

AVERAGE REVENUE PER STUDENT

nonwhite | white

- high-poverty (nonwhite): $11,500
- low-poverty (nonwhite): $12,205
- high-poverty (white): $12,987
- low-poverty (white): $14,121
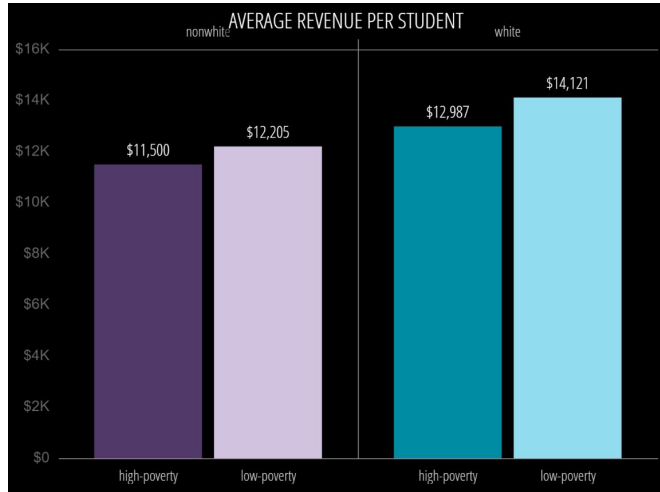
Non-White districts get an estimated **$23B less** than White districts in revenue indicating wide disparities in foundational resources.

Teachers are leaving and few people want to join the field. Experts are sounding the alarm

By Christina Maxouris and Christina Zdanowicz, CNN
Published 7:56 AM EST, Sat February 5, 2022

Luis Alejo ⚖ @SupervisorAlejo · Aug 25, 2020

2 of our children trying to get WiFi for their classes outside a Taco Bell in East Salinas! We must do better & solve this digital divide once &for all for all California students

CALIFORNIA NEEDS A UNIVERSAL BROADBAND INFRASTRUCTURE BOND FOR OUR STUDENTS
link.medium.com/7Ir6Dyo5f9

The latest round of mathematics scores for grades 4 and 8 showed the largest declines since NAEP assessments began in 1990
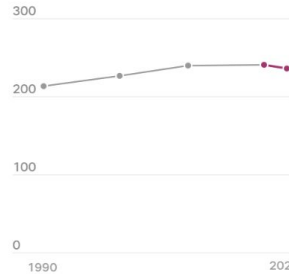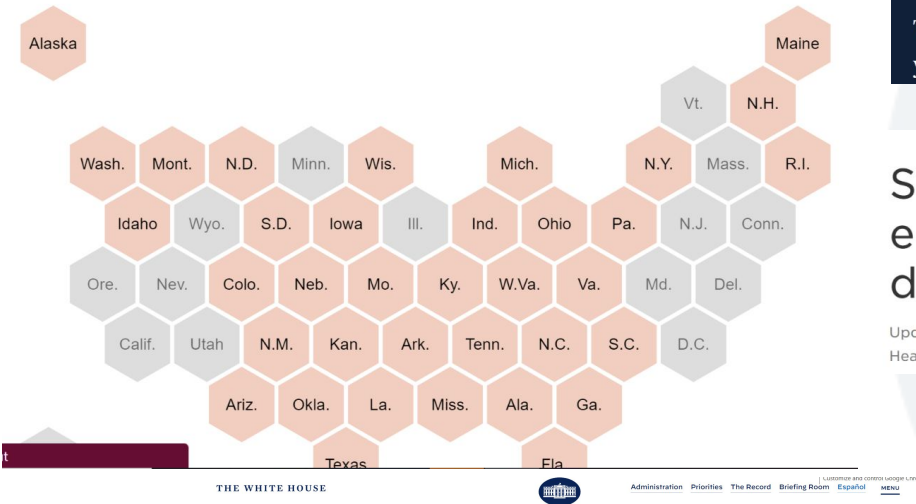
4th grade | 8th grade
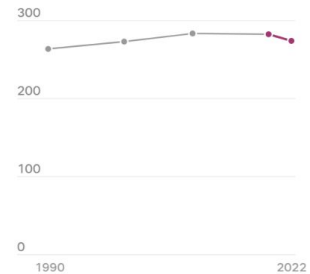
SOURCE National Assessment of Educational Progress

POLITICAL CONTEXT

We have tracked efforts in 36 states to restrict education on racism, bias, the contributions of specific racial or ethnic groups to U.S. history, or related topics

Click or tap on a state to see details.

Nearly 240 anti-LGBTQ bills filed in 2022 so far, most of them targeting trans people

The annual number of anti-LGBTQ bills to have been filed has skyrocketed over the past several years, from 41 in 2018 to 238 in less than three months of this year.

Supreme Court overturns Roe v. Wade, ending right to abortion upheld for decades

Updated June 24, 2022 · 10:43 AM ET
Heard on All Things Considered

What Happens When Democracies Become Perniciously Polarized?

JENNIFER MCCOY, BENJAMIN PRESS

JANUARY 18, 2022
ARTICLE

The United States' democracy is being threatened by increasingly polarized politics. Other countries' histories offer warnings and suggest possible solutions.

THE WHITE HOUSE

Administration Priorities The Record Briefing Room Español MENU

AUGUST 09, 2022

FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China

BRIEFING ROOM › STATEMENTS AND RELEASES

In President Biden's first year in office, the Biden-Harris Administration has implemented an industrial strategy to revitalize domestic manufacturing,

ECONOMIC CONTEXT

TECH OCCUPATION WAGES [by percentile]

Estimated median tech wage $94,058, 125% higher than median national wage[5]

$2020 data | most recent available

10.07.19

The Racial Wealth Divide Has Grown Over Three Decades
U.S. median wealth by race, 1983 and 2016

Source: Institute for Policy Studies
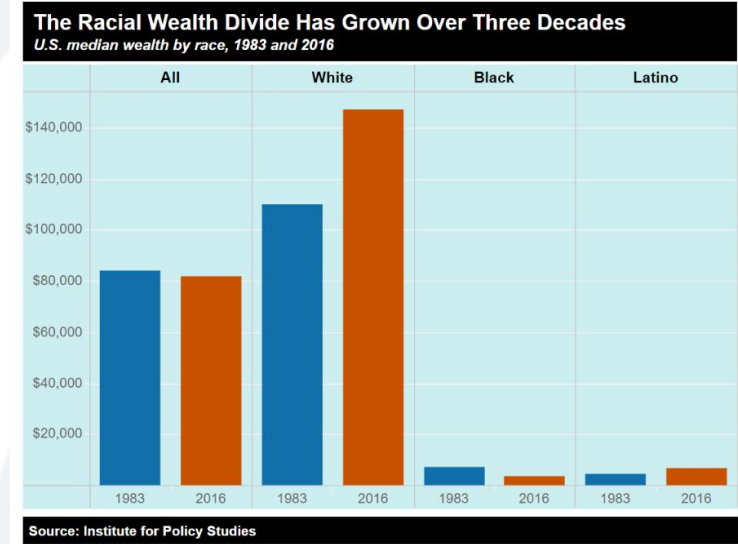
'We're being pushed out': the displacement of black Oakland

African American men will suffer the most as automation destroys jobs once held by humans

[Photo: Franck V./Unsplash]

BUSINESS • COVID-19

Millions of Americans Have Lost Jobs in the Pandemic—And Robots and AI Are Replacing Them Faster Than Ever

CONFIDENTIAL

The National K-12 CS Landscape

Computational literacies are basic literacies needed across all fields, future occupations, and for engaging in our tech-driven society.

ADVERTISING FEATURE

A career in cancer research? Computational skills wanted

BILL WRIGHT   BUSINESS   02.00.2020 07.00 AM

How AI Is Tracking the Coronavirus Outbreak

Machine-learning programs are analyzing websites, news reports, and social media posts for signs of symptoms, such as fever or breathing problems.

IDEAS

The Dangerous Experiment on Teen Girls

The preponderance of the evidence suggests that social media is causing real damage to adolescents.

By Jonathan Haidt

From the Ground to the Cloud: Big data analytics for air quality

concentration (ppb)

Karin Tuxen-Bettman
Program Manager

data from Google / Aclima

Google Earth

8TH SEPTEMBER, 2021   SHARE

What is Cleantech and How Can It Stop Climate Change

You would struggle today to find anyone unaware of the effects of fossil fuels; from droughts to floods, planet Earth is cracking under the pressure of years of unbridled pollutive energy consumption. The recent IPCC report confirms that climate change is widespread, rapid and intensifying; strong and sustained CO2 emission reductions could limit the effects of climate change, but only with a sincere effort.

The National Landscape of CS Education

Percentage of Public High Schools Offering Foundational Computer Science

Legend:
- 0-24%
- 25-49%
- 50-74%
- 75-100%

State values:
- 47%, 36%, 44%, 21%, 60%
- 63%, 38%, 55%, 39%, 66%, 82%, 76%, 78%
- 83%, 73%, 57%, 52%, 71%, 46%, 48%, 86%, 77%
- 40%, 40%, 49%, 44%, 85%, 48%, 77%, 67%, 40%
- 36%, 41%, 40%, 62%, 92%, 63%, 78%, 75%, 98%, 45%
- 47%, 32%, 60%, 85%, 66%, 61%, 93%
- 60%, 40%
- 77% (Hawaii)
- 51% (Alaska)

53% of schools offer computer science nationally

- No
- Yes

Source: Code.org/ECEP (2022);
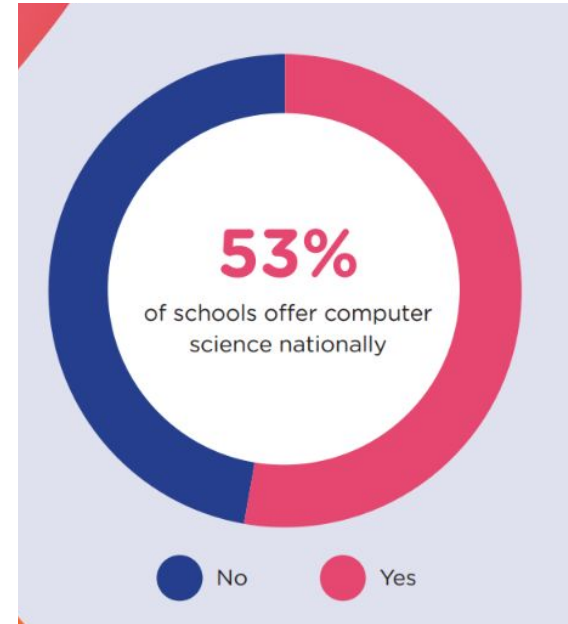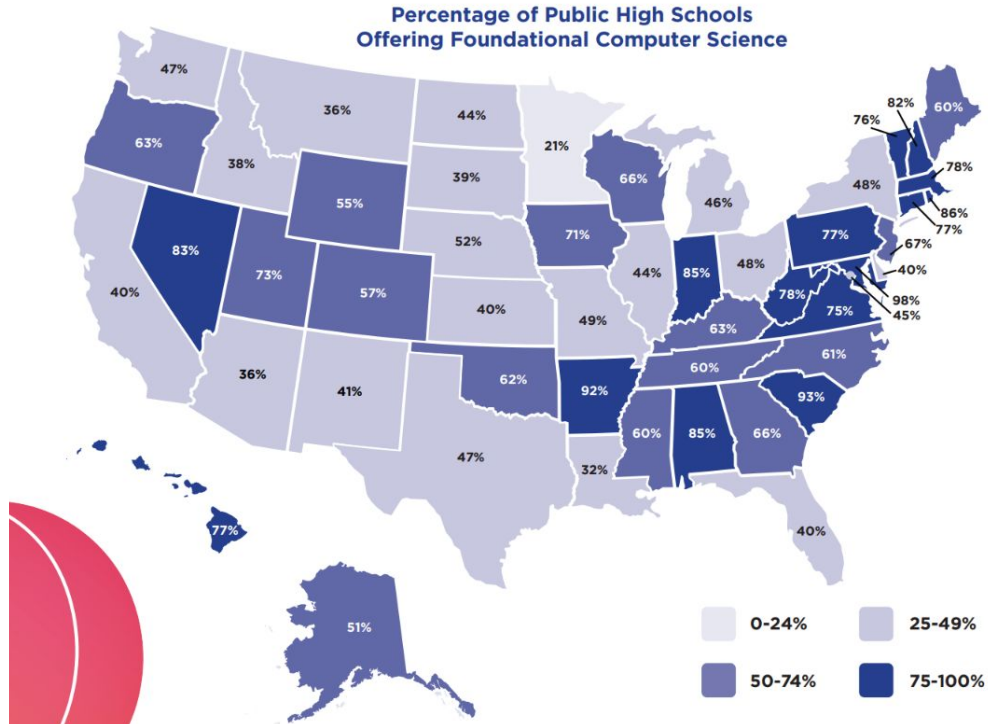
Access to foundational computer science courses are inequitably distributed by income and race.

Access to Computer Science by Race and Ethnicity

Native American/Alaskan	59%
Black/African American	70%
Hispanic/Latina/Latino/Latinx	73%
White	76%
Two or More Races	76%
Native Hawaiian/Pacific Islander	81%
Asian	86%

Access by % FRL in the School

0-24% FRL	57%
75-100% FRL	39%
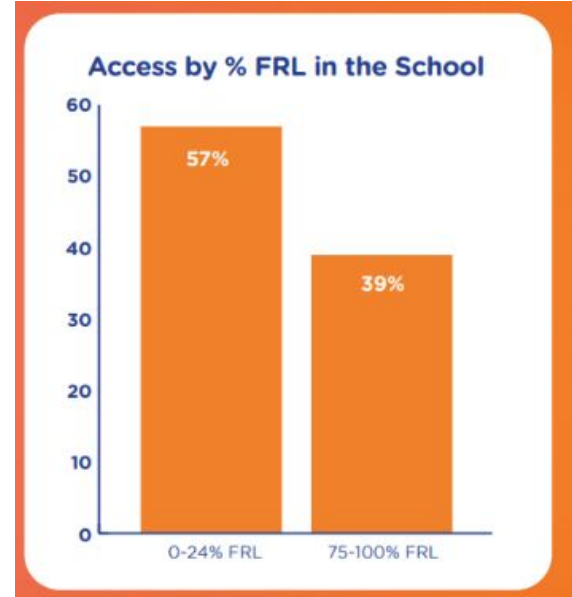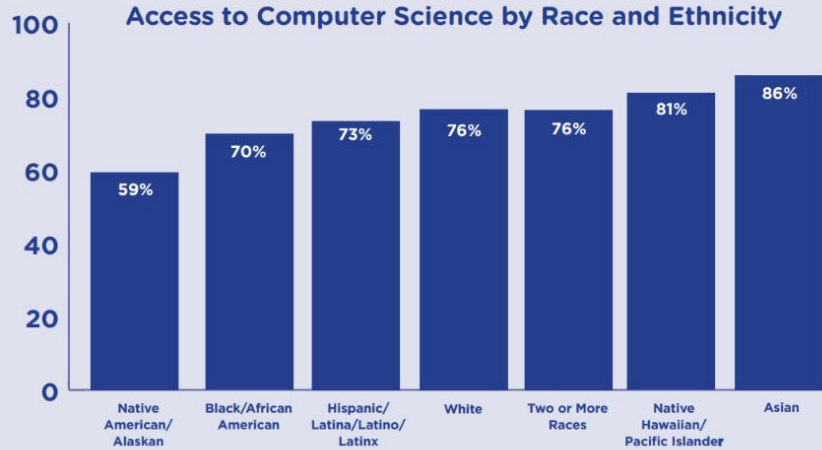
K-12 CS Education in Michigan

Access by % FRL in the School

66%
98 (0-24% FRL)

25%
77 (75-100% FRL)

Some students rather than students who qualify
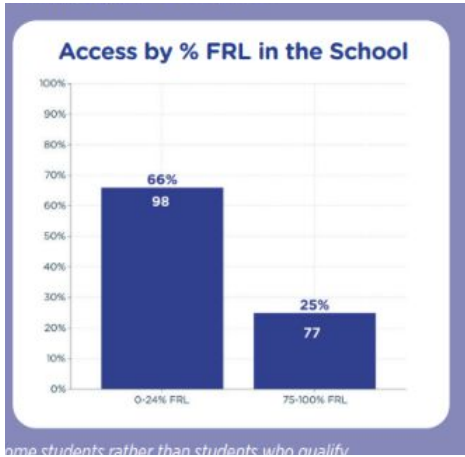
74% of MI high school students attend a HS offering a CS course

25% of MI high-poverty schools offer a CS course

Participation in AP Computer Science Exams by Demographic

Gender
■ Male   ■ Female   ■ Other

30%
0.16%
70%
0

Race/Ethnicity
■ Student Population 9-12   ■ AP Exam Takers

Demographic	Student Population 9-12	AP Exam Takers
Black/African American	17%	3%
Hispanic/Latina/Latino/Latinx	8%	5%
Native American/Alaskan	1%	0.4%
Native Hawaiian/Pacific Islander	0.1%	0.07%
Asian	3%	21%
White	67%	68%
Two or More Races	4%	3%
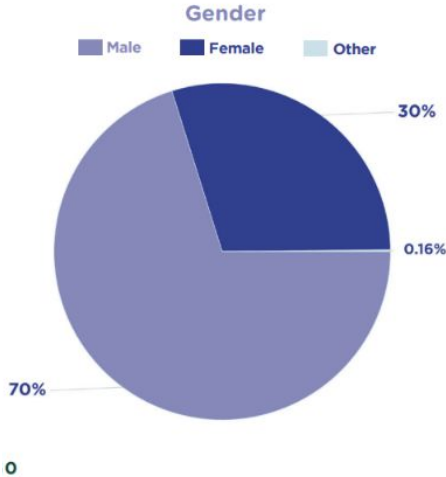
3% of AP CS test takers in MI are Black

30% of AP CS test takers are female

Source: Code.org/ECEP (2022)
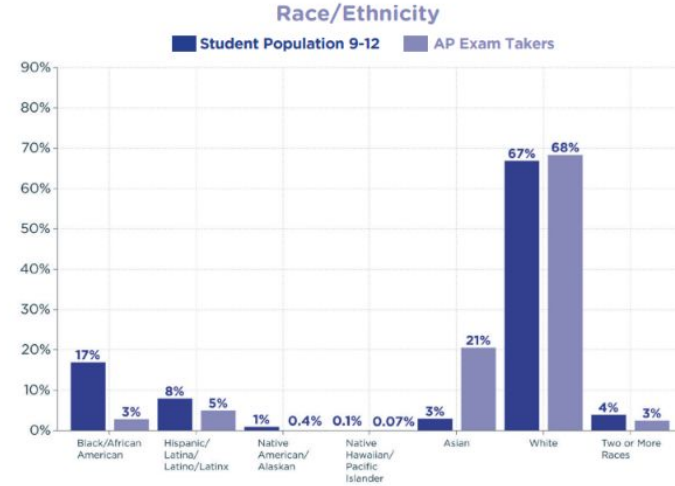
Advanced Placement CS Enrollment Trends from 2014-2020

AP CS Enrollment by Race, 2014-20

Legend: Overall, Asian, Black, Latinx, Native American, White

Source: College Board (2014-2020)
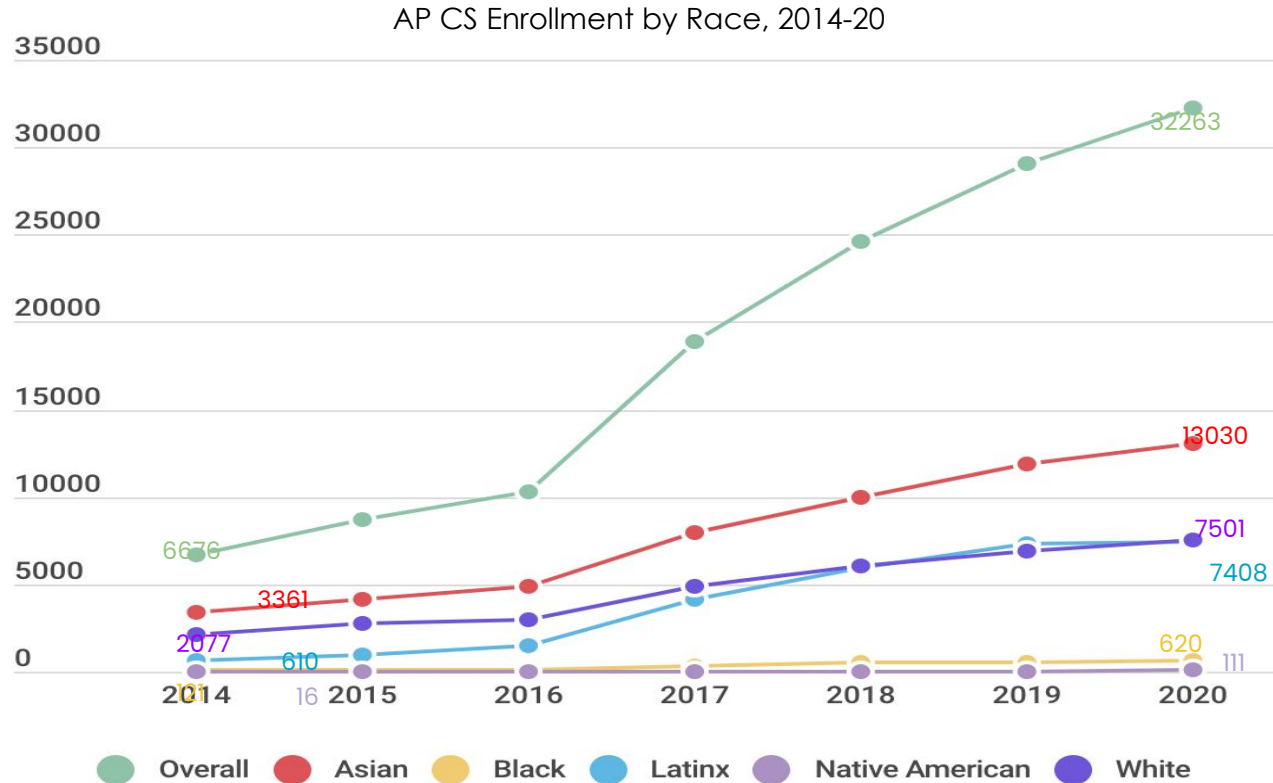
California AP CS Passage Rates, by Race/Gender

Figure 14. AP CS P Passage Rates by Gender and by Race/Ethnicity

Race/Ethnicity	Boys	Girls
Black	52%	55%
Indigenous	61%	50%
Latinx	57%	49%
Pacific Islander	70%	90%
Asian	85%	82%
White	84%	84%

Source: College Board (2018-19)
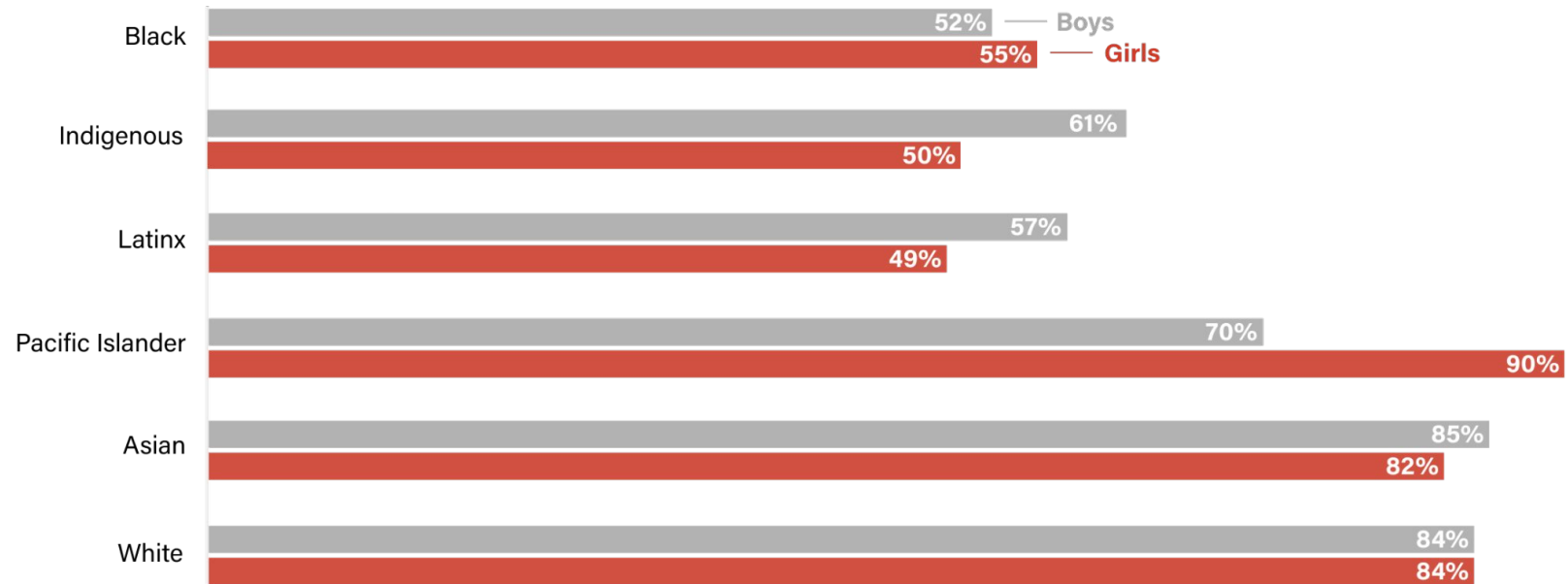
The percentage of Black students earning CS Bachelors' Degrees has *decreased* since 2016

Figure 3. Bachelor's Degrees in Computer Science Conferred, 2016 – 2020
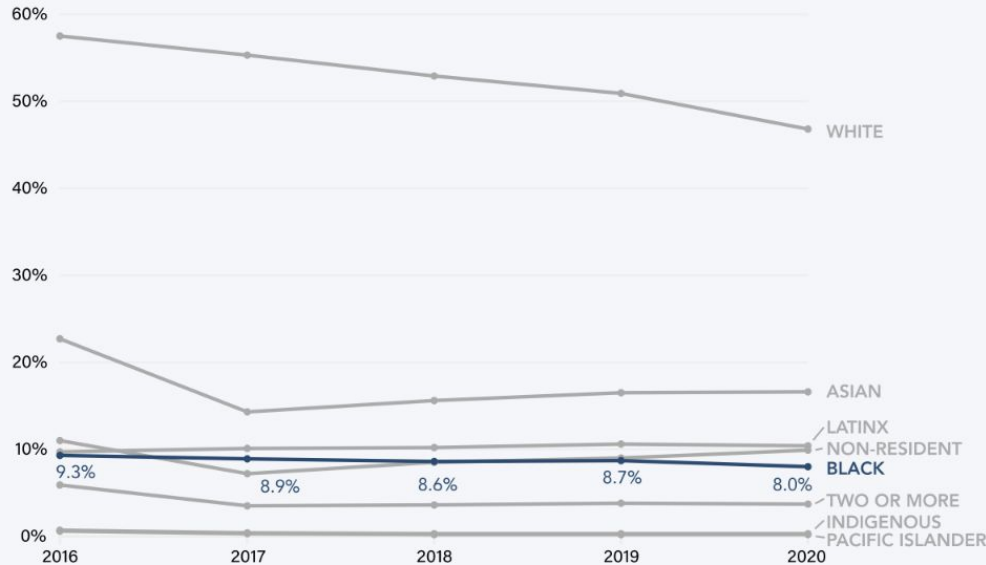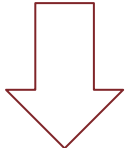
* Note: Analyzed from National Center for Education Statistics, 2016-2020

** Note: Percentages calculated above are of CS degrees conferred, what proportion is represented by each category identified above.

CS majors at 4-year institutions:

300%

Black students earning CS degrees:

0.7 pct. pts
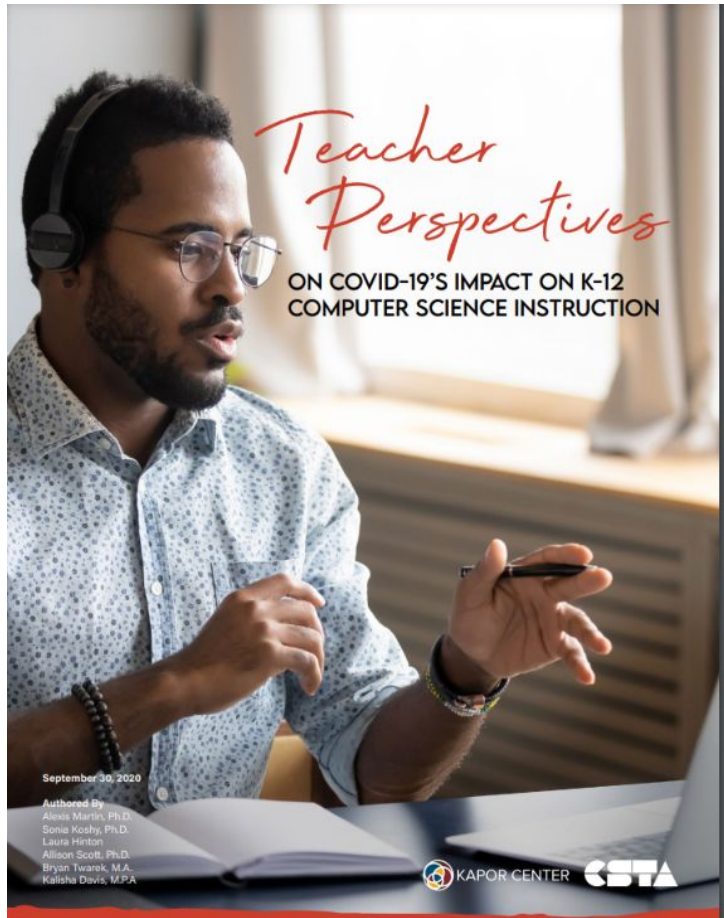
COVID's Impact on CS Education

- **24%** of CS teachers in high-poverty schools and 34% of teachers in rural areas indicated that they had to suspend CS instruction due to COVID

- **52%** of CS teachers in high-poverty schools reported distance learning (due to COVID) presenting major challenges to student achievement and engagement; 12% specifically articulated digital divide issues

Source: Code.org/ECEP (2022)

THE COMPUTER SCIENCE
TEACHER LANDSCAPE:
RESULTS OF A NATIONWIDE TEACHER SURVEY

May 2021
Authors
Sonia Koshy, Ph.D.
Alexis Martin, Ph.D.
Laura Hinton
Allison Scott, Ph.D.
Bryan Twarek, M.A.
Kalisha Davis, M.P.A.

CS Teacher Perspectives:
Pedagogy & Curriculum

- **65%** of teachers believed that existing CS curricular resources meet the needs of a diverse student body.

- **59%** of white teachers (compared to 67% of Black, Latinx, Indigenous, and Pacific Islander teachers) were confident utilizing material highlighting race, ethnicity, and culture

- **53%** of CS teachers felt that current CS content is culturally relevant and in alignment with student interests, and just **57%** felt equipped to utilize culturally relevant pedagogical practices.

- **61%** of CS teachers saw the importance of covering computing's role in perpetuating biases related to racism, sexism, and other inequities in the classroom. So nearly **40%** did not see this as critical or core to CS curriculum.

What are some of the main obstacles to equity in CS?

Challenges & Critiques of the Current CS Education Landscape

❖ Deep and systemic racial and socioeconomic inequality in education is not being addressed (broadband, teacher quality, achievement gaps, college readiness)

❖ Incremental increases are prioritized as opposed to centering racial inequality in policies and practices to close equity gaps.

❖ CS education cannot be viewed as an apolitical endeavor and issues of race, power, and justice must be core to teaching and learning.

❖ CS can no longer be viewed as a nice-to-have for a specialized group of students; instead every student must have basic computational and critical literacies to engage with, and create technology.

❖ Much more work is needed to move beyond access to rigorous preparation for CS career paths--and to ensure inclusive environments in higher ed and workforce

A Snapshot of CS Equity Initiatives

Culturally responsive-sustaining computer science pedagogy ensures that students' interests, identities, and cultures are embraced and validated, students develop knowledge of computing content and its utility in the world, strong CS identities are developed, and students engage in larger socio-political critiques about technology's purpose, potential and impact.

Young People's Race, Power, and Technology Project 2022

A collaboration by YPRPT, Kapor Center, and Family Matters Chicago

Overview

The Young People's Race Power and Technology Project is a program designed to empower young people to explore, engage, critique, and shape the role of technology in their neighborhoods, schools, and communities. YPRPT is directed by Dr. Sepehr Vakil at Northwestern University.

For this year's iteration of YPRPT, in collaboration with Kapor Center, we invited 6 young people to participate in a 6 week long program where we collaboratively developed curricular units around five topics: NFTs, cybersecurity, video games, fashion design and 3D printing, and social media and mental health.

Our goal with this project was to let the YPRPT participants lead the way with their curiosities, their questions, and their ideas for teaching about their topic. These

Curriculum Documents	Demo Videos
NFTs *by Gold A., Abraham A., and Sepehr Vakil*	Watch here
Social Media and Mental Health *by Jenifer N. and Charles Logan*	Watch here
Fashion Design and 3D Printing *by Dariana L. and Shai Moore*	Watch here
Video Games and Computers *by Emanuel M. and Alisa Reith*	Watch here
Cybersecurity *by AJ B. and Lucy Parsons Labs*	Watch here

Dr. Sepehr Vakil

Northwestern University

Seeding Innovation: Expanding CS for Native Students

KAPOR CENTER

Cultural Revitalization [Girl-Focused]

Language, art, music, regalia

Values, traditions, spirituality

Relationships with the land and non-human relatives (including healing, medicine, and foodways)

+

Culture Transformation

Indigenous futurisms and Afrofuturisms

Nation building, social justice, and rematriation

Youth and family cultures

+

Experiential and Observational Learning

Hands-on PBL

Small group learning

Land-based education (wherever possible)

Seeding Innovation 2022 Tribe-Specific Cultural Curriculum Framework

Stilwell High School in Eastern OK

- Cherokee-serving high school
- ~634 students in grades 9-12
- Teaching ECS, CSP, AI/ML, and CS2

Red Lake High School in Northern MN

- Ojibwe-serving school
- ~174 enrolled students grades 7-12
- Teaching CSP

Lakota Tech High School in SE SD

- Sicangu Lakota-serving high school
- 311 students in grades 9-12
- Teaching ECS

NSF#2049023

Duke
UNIVERSITY

NSF National Science Foundation

NSF Alliance for Identity- Inclusive Computing Education (AIICE) $10M Award 2021-2026

Nicki Washington
Professor of the Practice of
Computer Science
Duke University

Shani Daily
Professor of the Practice of
ECE and Computer Science
Duke University

"The computing discipline is finally acknowledging the ways in which technology is harmful for people of various identities. However, there is not enough being done to acknowledge how this applies in academic/professional environments. We are excited to lead this effort to transform the discipline."

– Nicki Washington

Feature

Racism in science

CONFRONTING RACISM IN COMPUTER SCIENCE

Black and Hispanic people face huge hurdles at technology companies and in computer-science education in the United States, with far-reaching consequences for science and society. **By Melba Newsome**

Juan Gilbert felt alone as he pursued a PhD in computer science in the 1990s. It was a familiar sense that had followed him throughout his university years, as a student from modest means and the first of his family to pursue higher education.

But there was something else that weighed on him during his doctoral training at the Ohio State University in Columbus, one of the largest academic institutions in the United States. Despite the size of the university, there were no people who looked like him in the computer-science graduate programme or among the department's faculty members.

"I didn't see another Black person in computer science until more than a decade after high school," says Gilbert.

He contemplated leaving the field entirely until a Black professor at another university encouraged him to find another programme instead.

Gilbert transferred to the University of Cincinnati in Ohio, where he built a community of other Black PhD students. But his 'a-ha' moment came when he joined the computer-science faculty at Auburn University in Alabama, where there was one other Black faculty member and two Black PhD students in the department. It clarified something for him he feels should have been obvious: all across the country, there were Black PhDs just like him who were struggling with isolation just like him, enduring microaggressions just like him and fighting the urge to quit, just like him.

With that realization, he pledged to help create a more supportive and inclusive computer-science environment for Black students, and has continued that work as chair of the Department of Computer & Information Science & Engineering at the University of Florida in Gainesville. He thinks that vision is why the university ranks top in terms of the number of computer science PhDs awarded to Black students, and why it boasts the largest proportion of Black computer-science

faculty members at any predominantly white institution in the United States.

Why diversity matters

There are diversity gaps in computer science and in science, technology, engineering and mathematics (STEM) subjects in many countries. The problem is particularly acute in the United States, which spends much more than any other country on research and development and is home to many of the largest technology companies. Despite being a global leader in computer science, the United States has long struggled to increase diversity in this area.

Computer occupations make up one of the fastest-growing employment sectors in the United States, and the US Bureau of Labor Statistics projects that the number of jobs in this area will increase three times faster than the average — and faster than many other fields in

> "Many of the efforts to broaden participation in computing try to change the students instead of their environments."

STEM. But Black, Latino and Indigenous people remain under-represented in computing jobs. Black and Hispanic people make up almost 13% and 18% of the US workforce, but they hold only 7% and 8%, respectively, of the jobs in computing. (The US government considers 'Hispanic or Latino' an ethnicity and that people of Hispanic or Latino origin may be of any race.)

The diversity gap is growing at universities. For bachelor's degrees, the primary degree granted by US universities, the proportion of computer-science degrees going to Black students has dropped from more than 11% in 2013 to less than 9% in 2020 (see 'Computing losses').

That's a problem, says Gilbert, because computer science is now so fundamental to

everything.

"Computing is in health, transportation, education, finance, you name it — computing is there," he says. "And recent reports have found that, when you have a lack of diversity, computing implementations can have a bias that disproportionately affects certain [marginalized] people in a very dramatic way."

That belief also drives Shaundra Daily, an electrical and computing engineer at Duke University in Durham, North Carolina. "When you leave people out of the thought, design, development and policy — and all the pieces that are important to make sure that we have equitable technologies — you end up with technology either not helping or effectively harming minoritized populations," she says.

Algorithms are perhaps the clearest example. They are supposed to make predictions or complex decisions about everyday life without the taint of human emotion or prejudice, say computer-science specialists.

"All data science is political," says James Mickens, a computer scientist at Harvard University in Cambridge, Massachusetts. "A lot of engineers and non-engineers think that math, science and engineering are somehow detached from values or, because we're dealing with numbers, the decisions are morally neutral. That's just not true."

Based on who builds algorithms, how they're developed and how they're used, they can and sometimes do replicate the very biases that they were designed to overcome, says Mickens.

Beyond the issue of algorithmic bias, businesses are finding financial reasons for increasing diversity along gender, racial and ethnic lines. "The most diverse companies are now more likely than ever to outperform non-diverse companies on profitability", according to a 2020 report by the global management-consulting firm McKinsey and Company[1]. Diverse teams are also more productive and creative, and bring different perspectives, says Mickens. Famously, non-diverse teams gave us seat belts that

Place-Based Efforts: Detroit, Oakland, Atlanta

Supporting collective impact efforts in key cities to advance equity in CS through:

- **District/School-level implementation:** Working collaboratively with district leaders and community partners to develop and implement efforts to expand access and equity in CS in OUSD, DPSCD, and Atlanta Metro area schools.

- **Out-of-School Program Partnerships:** Identify and fund out-of-school enrichment programs to align with the district-implementation plan in order to deepen the exposure, interest, engagement, and skill-building opportunities in computing.

- **Teacher Education:** Collaborating with schools of education to support the develop a pipeline of diverse CS teachers to deliver high-quality, culturally relevant CS instruction and provide ongoing professional learning, coaching

- **Policy Advocacy:** Working with statewide coalitions to implement state level policy that will advance equity, and address disparities among students under-served (rural communities) and historically marginalized (including Black, Latinx, Native American, girls and nonbinary students).
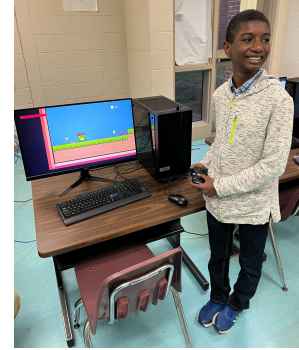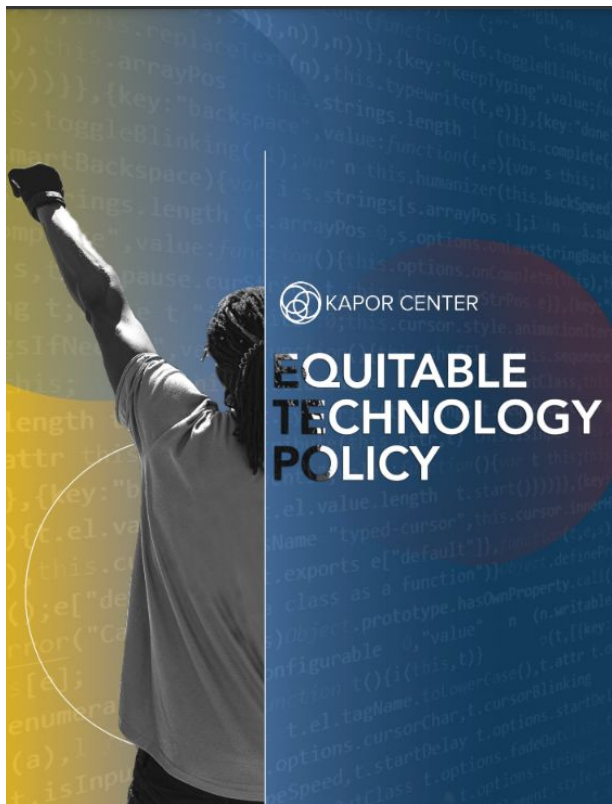
OUR NINE TECHNOLOGY POLICY AREAS:

EXPAND ACCESS TO TECH PATHWAYS

1. Expand access and participation in K-12 computer science education and close racial equity gaps
2. Invest in new models of inclusive tech workforce development, including new models for upskilling, reskilling, and hiring

PROMOTE TECH ACCOUNTABILITY AND PROTECTIONS

3. Expand technology company workforce data collection, reporting, transparency, and accountability / oversight
4. Expand technology worker protections, including whistleblower protections, gig worker safety nets, and unions to ensure equitable labor practices
5. Ensure technology platforms are held accountable for harassment, violence, discrimination, mis /disinformation, and other harmful consequences of their content
6. Combat the harmful consequences of artificial intelligence and autonomous systems, and create standards for the future development and deployment of artificial intelligence systems

INCREASE TECH INFRASTRUCTURE AND INNOVATION INVESTMENTS

7. Close the digital divide through universal high-speed broadband access and adoption
8. Increase deployment of capital to diverse startup entrepreneurs, fund managers, and ecosystem-building organizations to support diversity in tech innovation
9. Support progressive taxation policies that ensure the wealth created by technology companies is reinvested in communities historically excluded from the technology sector

$5.3M in funding to organizations to advance policy areas, supporting leaders like Timnit Gebru, Joy Buolamwini, Safiya Noble

Day 1 Project Policy Accelerator Launched!

National Center for Digital Civil Rights underway

Policy advocacy activities underway

Toward A New Vision for CS Education

What is the purpose of CS education?

CS VISIONS − VALUES & IMPACT AREAS

Equity & Social Justice

Competencies & Literacies

Citizenship & Civic Engagement

Technological, Social & Scientific Innovation

Economic & Workforce Development

School Reform & Improvement

Personal Agency, Joy & Fulfillment

Source: Santo, Vogel & Ching (2019)

Re-imagining CS Education through a Racial Justice and Equity Lens

➡️ **Utilize Frameworks of Racial Inequity.** We must start by understanding, acknowledging, and addressing the structures in place across society and across our computing spaces that perpetuate racial inequality

➡️ **Address Foundational Education Disparities.** CS education cannot exist within a vacuum, educators and policymakers must ensure we address fundamental barriers in education that will hamper opportunities for participation and success in CS, all disciplines, and in college/career.

➡️ **Culturally Responsive CS Instruction** Building from CRT and Culturally Relevant scholarship, within CS classrooms, instruction will align with students interests, identities, and cultures, while they develop knowledge of computing content and its utility in the world, and engage in socio-political critiques about technology's purpose and impact.

➡️ **Invest in Deep and Ongoing Educator Preparation:** Invest in preservice programs and PD programs which incorporate identity exploration, equity and racial justice, and culturally relevant CS instruction.

➡️ **Advocate for Policies with Intentionality around Closing Gaps.** Without intentional and targeted efforts, policies to expand CS for all will fail to close equity gaps. Make equitable CS a core component of mandatory curriculum across grade bands.

➡️ **Centering the Perspectives and Experiences of Students.** Developing student voice and agency in classrooms while empowering young people to co-create curriculum and experiences.

How might we envision a new path for CS that centers equity and justice, creates a more equitable future for the field, for the tech sector, and for our nation?

Resources

Download the report:

https://www.kaporcenter.org/blacktechecosystem/

Some Emerging Opportunities

➡️ **Contribute to a robust research agenda and development of a cadre of critical scholars in computing related fields.**

➡️ **Re-imagine teacher preparation and teacher certification, emphasizing computing integration, equity, justice.**

➡️ **Policy, policy, policy. Examine where progress has been made, where unintended consequences emerged, and how bold policy change can change fundamental realities in education**

Computational literacies are basic literacies needed across all fields, future occupations, and for engaging in our tech-driven society.

ADVERTISING FEATURE

A career in cancer research? Computational skills wanted

WILL KNIGHT   BUSINESS   02.06.2020 07:00 AM

How AI Is Tracking the Coronavirus Outbreak

Machine-learning programs are analyzing websites, news reports, and social media posts for signs of symptoms, such as fever or breathing problems.

IDEAS

The Dangerous Experiment on Teen Girls

The preponderance of the evidence suggests that social media is causing real damage to adolescents.

By Jonathan Haidt

From the Ground to the Cloud:
Big data analytics for air quality

Karin Tuxen-Bettman
Program Manager

Google Earth

8TH SEPTEMBER, 2021   SHARE

What is Cleantech and How Can It Stop Climate Change

You would struggle today to find anyone unaware of the effects of fossil fuels; from droughts to floods, planet Earth is cracking under the pressure of years of unbridled pollutive energy consumption. The recent IPCC report confirms that climate change is widespread, rapid and intensifying; strong and sustained CO2 emission reductions could limit the effects of climate change, but only with a sincere effort.

KAPOR CENTER
SMASH   Kapor CAPITAL

Detroit

Full MSA name: Detroit-Warren-Dearborn, MI

STATE OF TECHNOLOGY SUMMARY [note: definition changes[1]]

100,088	NET TECH EMPLOYMENT[1]
5.2%	NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
$12.3b	ECONOMIC IMPACT [estimated direct impact of tech sector]
5.0%	ECONOMIC IMPACT AS A % OF OVERALL
3,503	TECH BUSINESS ESTABLISHMENTS [firms with payroll]
57,515	EMPLOYER JOB POSTINGS [2021 total for tech occupations]
29.7%	EMERGING TECH EMPLOYER JOB POSTINGS % OF TOTAL

21st	NET TECH EMPLOYMENT RANK
44th	NET TECH EMPLOYMENT JOBS ADDED RANK
49th	TECH BUSINESS ESTABLISHMENTS % CHANGE RANK
2nd	DIVERSITY INDEX QUARTILE [1st = top	see footnote]

[1]IMPORTANT NOTE: definition change of tech industry and occupation employment; results will not be directly comparable to prior year reporting | Net of tech industry + tech occupation + self-employed | Sources: CompTIA analysis of EMSI Burning Glass, U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, and other sources | See report Methodology for details of rankings and related data.

TECH WORKFORCE CHARACTERISTICS[4]
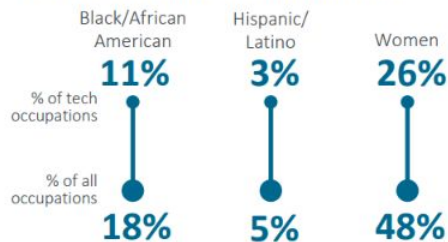
	Black/African American	Hispanic/Latino	Women
% of tech occupations	11%	3%	26%
% of all occupations	18%	5%	48%

[4]Data covers core tech occupations | See Appendix for other Race/Ethnicities and age characteristics

TECH OCCUPATION WAGES [by percentile]

Estimated median tech wage $87,469, 99% higher than median metro wage[5]

[5]2020 data | most recent available