Diversity and the Law, 2021[1]

# Research Charts

Research Chart 1: Benefits of Diversity – High Race and Gender Barriers in STEMM

Research Chart 2: Data Reports

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Diversity and the Law, 2021

# Research Chart 1:
# Benefits of Diversity – High Race and Gender Barriers in STEMM

## Overview

This compendium of scientific research and related analyses provides a sample of resources on systemic racism and sexism in academic science, technology, engineering, mathematics, and medical fields (STEMM) and society more broadly. It addresses the effects of racism and sexism on individuals' safety, opportunity, success, and quality of life, including in health, education, wealth, and many other areas. Research on the issue of effects of the intersection of racism and sexism on individuals is included; attention to such intersectionality better reflects the extra weight of inequity that burdens individuals with multiple targeted identities. While this compendium is not an exhaustive collection of available research, it provides institutions of high education (IHE) with a sample of data on the harm that societal racism and sexism are causing today to individuals who are applying, or could apply, for admission, participation in programs, and academic positions at their institutions in STEMM and other fields. This compendium also highlights research on some effective approaches that IHEs might consider to reduce the barriers and mitigate the harms of racism and sexism. Also included is research on the benefits of diverse learning environments for all students (educational diversity).

The research on the effects of racism and sexism, how to reduce associated barriers, as well as the benefits of diversity, is available to IHEs for several purposes, including: (1) to inform evidence-based policy development to advance diversity, equity and inclusion in STEMM, as distinct but complementary interests; (2) to avoid unwittingly perpetuating longstanding structures of inequity that may be accepted as "norms" but are harmful to women, people of color, LGBTQ+ individuals and people of multiple identities targeted for bias; (3) combined with institution-specific evidence, to contribute to an evidence base, required by federal non-discrimination laws, to demonstrate the need to pursue race-, ethnicity- and gender- conscious policies to advance educational diversity interests or employment equal opportunity; and (4) while not presently enough alone, to begin to build an evidence base to evolve law toward equity aims. See **Brief Legal Overview**, https://www.aaas.org/programs/diversity-and-law, for federal law standards and evidence requirements for such identity-conscious action.

## Connection of Research to Effective and Legally Sustainable Student and Faculty Diversity and Equity Initiatives

The introduction to each segment of this compendium illustrates how an IHE may connect the research to design of criteria and other aspects of student admission, faculty employment, and student and faculty advancement, financial support, mentoring, and other programming under existing legal standards. The criteria are framed as distinct "knowledge and expertise" or "commitment to serve social justice and ameliorate inequities" attributes of individuals. They recognize that knowledge may be attained by people of all races, ethnicities, and genders through a variety of means: personal experience, learning or service. Individuals who demonstrate strength in one criterion may not, and need not, demonstrate strength in the other. While the Supreme Court and federal appeals courts have not directly addressed this point, as described, each of these criteria—when serving authentic institutional interests—should be regarded as a so-called race-, ethnicity-

and gender- neutral attribute that may be particularly valued by an IHE to advance its educational mission and contributions to society. If such criteria are authentically valued by an IHE, and are applied to all individuals, regardless of their racial, ethnic or gender identity status, these criteria should not trigger exacting legal standards that apply when an individual's race, ethnicity or gender is considered in the conferral of benefits and opportunities. Even if such exacting standards were to apply, these knowledge/ expertise-, and commitment-focused criteria should increase the likelihood of satisfying the standard. These criteria do not stereotype individuals, but rather rely on substantive contributions that an individual of any identity can make.

## Compendium Parts

**Part 1: Trauma and other effects of racism and sexism on individuals; other barriers to inclusion of people of color, women, and LGBTQ+ individuals in STEMM (and other) education**
**Part 2: Race and sex demographic data (societal, higher education, and STEMM higher education) (Also see: Research Chart 2—Data, https://www.aaas.org/programs/diversity-and-law)**
**Part 3: Testing data and research**
**Part 4: Benefits of broad student diversity**
**Part 5: Effective approaches to recruiting a diverse student body**
**Part 6: Effective pedagogical approaches for retaining and educating a diverse student body**

**Note:** Each resource uses different terms to refer to students with Latin American ethnicities, including "Hispanic", "Latino/a", and "Latinx". For the sake of structural consistency and in order to support the use of inclusive language, this document will use the term "Latinx."

**Part 1: Trauma and other effects of racism and sexism on individuals; other barriers to inclusion of people of color, women, and LGBTQ+ individuals in STEMM (and other) higher education**

**Application:** Research on societal inequity in many areas supports the importance and authenticity of many IHEs' interest in recruiting, supporting, and advancing students and faculty of any and all races, ethnicities or genders who:

- Demonstrate an authentic action-backed commitment to ameliorating the causes of racism, sexism and associated trauma in the work and learning environment and/or society, whether through service, research, and teaching/study focus, or other means;
- Have a research and teaching/learning focus on the subject matter of racism, sexism, and associated trauma—and related effects on equitable opportunities in society;
- Have a research focus on effective inclusive pedagogy for all students (including those of diverse races, genders, religions, socio-economic backgrounds, and perspectives), and/or have a strong record of employing effective pedagogy or otherwise demonstrating inclusive conduct for all students and colleagues;
- Have a strong research, teaching/study, mentoring, or service focus/record of identifying and eliminating barriers and developing more welcoming and inclusive climate and culture for and mentoring a diverse student body and faculty, including for people of color, women, LGBTQ+ individuals, and people of diverse perspectives, and others; and
- Have a strong record of providing opportunities for students and/or colleagues to gain meaningful experience engaging in broadly diverse teams, enhancing their learning and research outcomes.

**Health Care, Health Disparities, and Racial Bias**

**Article: Bakke at 40: Remedying Black Health Disparities Through Affirmative Action in Medical School Admissions**

**Key Facts:**

Some of the starkest evidence that shows the impact of racism on people of color, particularly Black Americans, is found in the various health disparities outcomes, particularly between Black and White Americans. "The persistence of disparities in Black health has been called the "tragedy of American health care" and "the civil rights issue of the 21st century." The life expectancy of Blacks is about 3.5 years less than that of Whites.

- In 2012, the cancer death rate for Black men was 24% higher than it was for White men, while the cancer death rate for Black women was 14% higher than for White women.
- Black children in the United States are more likely to die before their first birthday than children of other racial groups.
- Black Americans between the ages of 18 and 49 are nearly twice as likely to die from chronic conditions such as diabetes, stroke, or heart disease as White people in the same age range, due in large part to earlier disease development.
- Black Americans are 20% more likely to experience serious mental health problems than the rest of the population, including high rates of major depression and posttraumatic stress disorder. Between 1993 and 2012, the suicide rate among Black preadolescent children in the U.S. doubled.
- While many attribute health disparities to income inequality and lack of access to consistent, high-quality health care, the poor health outcomes of Black Americans are evident across all levels of income and educational attainment.

**Citation:**
Jones, J., "Bakke at 40: Remedying Black Health Disparities Through Affirmative Action in Medical School Admissions" (April 13, 2019). *UCLA Law Review*. Bakke at 40: Remedying Black Health Disparities Through Affirmative Action in Medical School Admissions

**Article: Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between Blacks and Whites**

**Key Facts:**

Due to false beliefs about the correlation between race and pain tolerance, Black Americans are often undertreated for pain in comparison to White Americans.

- In a study of one million children with appendicitis, Black patients were less likely to receive any pain medication for moderate pain and were less likely to receive opioids for severe pain.
- A study examining pain management found that only 35% of patients of color received the appropriate prescriptions compared with 50% of White patients.
- "There are 2 potential ways by which racial disparities in pain management could arise. The first possibility is that physicians recognize Black patients' pain, but do not to treat it, perhaps due to concerns about noncompliance or access to health care. The second possibility is that physicians do not recognize Black patients' pain in the first place, and thus cannot treat it."
- In a study about physicians measuring the pain of patients, Physicians were more likely to underestimate the pain of Black patients (47%) relative to non-Black patients (33.5%).

For this report, authors collected data by having 418 medical students and residents read 2 mock medical cases about a Black and a White patient and made pain ratings and medication recommendations for each as well as rate the extent to which 15 biological differences between Blacks and Whites are true or untrue.

- Many White medical students and residents hold false beliefs about biological differences between Blacks and Whites which ended related to racial bias in their pain perception.
- White medical students and residents who endorsed false beliefs showed racial bias in the accuracy of their pain treatment recommendations.

"Those endorsing more false beliefs rated the pain of a Black (vs. White) patient half a scale point lower and were less accurate in their treatment recommendations 15% of the time."

**Citation:**
Hoffman, K., Trawatler, S., Jordan, A., Oliver, M., "Racial bias in pain assessment and treatment" (April 9, 2016). *Proceedings of the National Academy of Sciences of the United States of America*. In This Issue (nih.gov)

**Article: "Weathering" and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States**

**Key Facts:**

"Racial/ethnic differences in chronic morbidity and excess mortality are pronounced by middle age and evidence of early health deterioration among Blacks and racial differences in health are evident at all socioeconomic levels."

- "Weathering" refers to the notion that Black Americans "experience early health deterioration as a consequence of the cumulative impact of repeated experience with social or economic adversity and political marginalization" which can have a deleterious impact on health outcomes.
- "The stress inherent in living in a race-conscious society that stigmatizes and disadvantages Blacks may cause disproportionate physiological deterioration, such that a Black individual may show the morbidity and mortality typical of a White individual who is significantly older."

This research studies the difference in the "allostatic load," that is "the cumulative wear and tear on the body's systems owing to repeated adaptation to stressors." A higher allostatic load means that an individual had a higher exposure to stress and emotional burden and, as a result, would be more susceptible to stress related diagnoses that include "elevated systolic and diastolic blood pressures, cholesterol levels, glycated hemoglobin levels, and waist-to-hip ratio."

- Racial differences in allostatic load scores are small in the late teens and early 20s, but they quickly widen beginning in young adulthood through middle age and are largest between the ages of 35 and 64 years.
- Among both men and women, Blacks have higher mean allostatic load scores than do Whites at all ages, and the differential in scores increases with age.
- Although both poor Blacks and poor Whites have higher scores than their nonpoor counterparts, the greater poverty rates among Blacks do not account for the Black–White difference. Furthermore, nonpoor Blacks have a greater probability of high scores than do poor Whites.
- Black women, in particular, bear a large burden of allostatic load compared with either Black men or White women.
- Black women had higher scores than Black men at all ages studied. Differences were particularly pronounced among nonpoor Black women compared with nonpoor White women.

***Editorial comment**: These data, comparing poor Black and White people, provide some examples of the fact that, while individuals of all races face major challenges of the same kind, Black people do so with the added burden of racism. That is a consequential and inequitable difference.*

**Citation:**

Geronimus, A., Hicken, M., Keene, D., Bound, J., "'Weathering' and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States" (May 2006). *American Journal of Public Health*. "Weathering" and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States (nih.gov)

**Article: Racial Gaps in Children's Lead Levels**

**Key Facts:**

In comparison to White, Latinx, and "non-Latinx other" children, non- Latinx Black children are more likely to have exposure to high levels of lead.

Percentage of children with higher lead blood levels:

- Black: 15.2%
- Non-Latinx other: 9.6%
- Latinx: 8.2%

Non-Latinx White: 7.9%

**Citation:**

Packtor, C., "Racial Gaps in Children's Lead Levels" (May 24, 2018). *Public Health Post*. Racial Gaps in Children's Lead Levels

**Article: The Impact of Racism on Child and Adolescent Health**

**Key Facts:**

The impact of racism has been linked to birth disparities and mental health problems in children and adolescents.

- For example, racial disparities in the infant mortality rate remain and the complications of low birth weight have been associated with perceived racial discrimination and maternal stress.
- Although President Lyndon Johnson's War on Poverty led to the expansion of child health insurance, which has improved health care access for children, with significant gains for Black and Latinx children in terms of access to well-child, doctor, and dental visits, statistically, children raised in Black, Latinx, and American Indian populations continue to face higher risks of parental unemployment and to reside in families with significantly lower household net wealth relative to White children in the United States, posing barriers to equal opportunities and services that optimize health and vocational outcomes.

One example of how racism-impacted disparities manifests in educational attainment is in rates of chronic absenteeism. Chronic absenteeism is defined as missing more than 10% of school days in an academic year and it is a strong predictor of educational achievement. Chronic absenteeism disproportionately affects children of color, children living in poverty, children with disabilities, and children with chronic diseases.

- In high school, 21.2% of Latinx, 23.4% of Black, and 27.5% of American Indian children were chronically absent in 2013–2014 compared with 17.3% of White children.
- Additionally, immigration enforcement and the fear of apprehension by authorities can negatively affect school attendance for Latinx and Black immigrants, thereby perpetuating inequalities in attendance.
- Because missing school days impacts a student's ability to complete school on time, disparities in chronic absenteeism impacts the high school graduation rates of students of color.

The graduation rate for White students nationally in 2015–2016 was 88%, compared with 76% for Black students, 72% for American Indian students, and 79% for Latinx students.

**Citation:**

Trent, M., Dooley, D., Dougé, J. "The Impact of Racism on Child and Adolescent Health" (July 29, 2019). *Pediatrics.* American Academy of Pediatrics. The Impact of Racism on Child and Adolescent Health

**Article: COVID-19 and Racial/Ethnic Disparities**

**Key Facts:**

Geographic locations that reported data by race/ethnicity indicate that Black individuals and, to a lesser extent, Latinx individuals bear a disproportionate burden of COVID-19–related outcomes. The pandemic has shone a spotlight on health disparities and created an opportunity to address the causes underlying these inequities.

- Preliminary prevalence and mortality estimates in multiple geographic areas, which are being tracked daily, show a consistent pattern of racial/ethnic differences.
- In Chicago, Illinois, rates of COVID-19 cases per 100,000 were greatest among Latinx (1,000), Black (925), "other" racial groups (865), and White (389) residents. Mortality rates were substantially higher among Black individuals (73 per 100,000) compared with Latinx (36 per 100,000) and White (22 per 100,000) residents.
- New York City reported greater age-adjusted COVID-19 mortality among Latinx persons (187 per 100,000) and Black individuals (184 per 100,000), compared with White (93 per 100,000) residents.
- The most common explanations for disproportionate burden in COVID-19 rates involved 2 issues.
  - Racial/ethnic minority populations have a disproportionate burden of underlying comorbidities, including diabetes, cardiovascular disease, asthma, HIV, morbid obesity, liver disease, and kidney disease, but not for chronic lower respiratory disease or COPD.
  - Racial/ethnic minorities and poor people in urban settings live in more crowded conditions both by neighborhood and household assessments and are more likely to be employed in public-facing occupations (e.g., services and transportation) that would prevent physical distancing

**Citation:**

Hooper, M., Napoles, A., Stable, E., "COVID-19 and Racial/Ethnic Disparities" (May 11, 2020). *JAMA*.
https://jamanetwork.com/journals/jama/fullarticle/2766098

**Article: What Do Coronavirus Racial Disparities Look Like State By State?**

**Key Facts:**

- Nationally, Black deaths from COVID-19 were nearly 2 times greater than would've been expected based on their share of the population and in four states, the rate was three or more times greater.
- In 42 states plus Washington D.C., Latinos made up a greater share of confirmed cases than their share of the population and in 8 states, it was more than 4 times greater.
- White deaths from COVID-19 were lower than their share of the population in 37 states and the District of Columbia.
- In 32 states plus Washington D.C., Blacks died at rates higher than their proportion of the population; in 21 states, it was substantially higher, more than 50% above what would have been expected.
- While disproportionately black counties accounted for only 30% of the U.S. population, they were the location of 56% of COVID-19 deaths.
- Disproportionately black counties with above-average wealth and health care coverage bore an unequal share of deaths.

- In Virginia more than 12,000 cases — 49% of all cases with known ethnicity — came from the Latinx community, which makes up only 10% of the population.
- In New Mexico, Native American communities accounted for 60% of cases but only 9% of the population.
- In Arizona, at least 136 Native American died from COVID-19, a striking 21% of deaths in a state where just 4% of the population were Native American.
- In several states Asian Americans experienced a disproportionate share of cases. In South Dakota, for example, they accounted for only 2% of the population but 12% of cases.

**Citation:**
Godoy, M., Wood, D. "What Do Coronavirus Racial Disparities Look Like State By State?" (May 30, 2020). *NPR*. What Do Coronavirus Racial Disparities Look Like State By State?

**Article: Delivery Hospitalizations Involving Preeclampsia and Eclampsia**

**Key Facts:**
Despite the numerous advances in medicine, there is still a large gap between the maternal and infant mortality rates among White women and infants and Black women and infants, even when adjusting for socioeconomic status, education, and access to quality healthcare.

- High blood pressure and cardiovascular disease are 2 of the leading causes of maternal death, and hypertensive disorders in pregnancy, including pre-eclampsia, have been on the rise over the past 2 decades, increasing 72% from 1993 to 2014.
- Pre-eclampsia and eclampsia are 60% more common in Black women and also more severe.
- "In 1960, the United States was ranked 12th among developed countries in infant mortality and, since then, with its rate largely driven by the deaths of Black babies, the United States has fallen behind and now ranks 32nd out of the 35 wealthiest nations."
- Black infants in America are now more than twice as likely to die as White infants — 11.3 per 1,000 Black babies, compared with 4.9 per 1,000 White babies.

Black women are 3-4 times as likely to die from pregnancy-related causes as their White counterparts.

**Citation:**
Villarosa, L. "Why America's Black Mothers and Babies Are in a Life-or-Death Crisis." (April 11, 2018). *The New York Times*.

Figures in article from: Fingar K., Mabry-Hernandez I., Ngo-Metzger Quyen, T., Steiner, C., Elixhauser, A. "Delivery Hospitalizations Involving Preeclampsia and Eclampsia", 2005–2014. HCUP Statistical Brief #222. April 2017. *Agency for Healthcare Research and Quality*, Rockville, MD.
Why America's Black Mothers and Babies Are in a Life-or-Death Crisis

**Impacts of Racism on K-12 Education: Teachers and Students**

**Article: School district secessions shown to have deepened racial segregation**

**Key Facts:**

Since 2000, there has been an increase in the segregation of Black and White and Latinx and White students throughout the South.

- From 2000 to 2017, 47 school districts in the United States successfully seceded from a larger school district; this has happened in 13 counties, 7 of which are located in the South.
- School district boundaries accounted for, on average, 57.7% of multiracial school segregation, a figure that grew to 63.8% by 2015.
- In 2000, school district boundaries contributed, on average, to 59.9% of the school segregation for Black and White students; that number increased to 70.3% in 2015.
- For Hispanic and White students, the number increased from 37.1% in 2000 to 65.1% in 2015.
- In 2000, school districts were, on average, 32.9% less diverse for Black and White students than the county they were in, but by 2015, this figure had increased to 37.7%.

In 2000, school districts were, on average, 9.2% less diverse for White and Hispanic students; by 2015, this figure had increased to 23.9%.

**Citation:**

Mountz, A., "School district secessions shown to have deepened racial segregation" (September 4, 2019). *Penn State News*. School district secessions shown to have deepened racial segregation

**Article: 65 Years After 'Brown v. Board,' Where Are All the Black Educators?**

**Key Facts:**

Although *Brown vs. Board* played a role in moving towards integrating schools throughout the United States, one consequence was that Black teachers were often pushed out of the profession. Since the process of integration led to Black students being placed in White-majority schools, rather than integrating qualified Black teachers to lead classrooms with White students, school and districts preferred retaining White teachers.

- States often implemented certification measures, including cost-prohibitive examinations, that led to Black teachers being fired or to school districts not renewing their contracts.
- Prior to Brown, in the 17 states that had segregated school systems, 35 to 50% of the teaching force was Black.
  - Between 1984 and 1989, about 21,500 Black teachers were displaced because of new requirements for teacher education programs and certification.
  - According to the most recent federal data, about 7% of public school teachers, and 11% of public school principals, are Black.
  - According to 2012 federal data, 50% of Black teachers work in urban public schools and 27% work in suburban schools.
  - Nearly 70% of Black teachers teach in high-poverty schools and only 1% of Black teachers work in predominately White schools.

Over the last 30 years, the number of teachers of color has increased faster than the number of White teachers, mirroring the increase in the population of students of color.

- However, that growth has been driven by a significant increase of Hispanic and Asian-American teachers.

- The number of Black teachers has increased by about 34% over the past three decades, which is a smaller increase than any other group of teachers, except for Native American teachers.
- Forty percent of public schools across our country do not have a single teacher of color on staff.
- Eighty percent teachers identify as White.
- Black students benefit from having a Black teacher, both academically and socially and they are more likely to both graduate from high school and enroll in college when they have just one Black teacher in elementary school.
- Additionally, Black students are more likely to be placed in gifted education programs if they have a Black teacher, and less likely to receive suspensions, expulsions, or detentions from Black teachers as a result of Black teachers having higher expectations for Black students.

Black teachers are more likely than their White peers to quit teaching due to the additional responsibilities that are often placed on Black educators' shoulders (for example, many Black teachers report being pigeonholed as disciplinarians).

**Citation:**
Will, M., "65 Years After 'Brown v. Board, Where Are All the Black Educators?" (May 14, 2019). *Education Week*. 65 Years After 'Brown v. Board,' Where Are All the Black Educators?

**Race, Gender, and Economic Outcomes**

**Article: National Science Board, Vision 2030**

**Key Facts:**
The NSB highlights four elements of science and engineering (S&E) leadership that are essential to the U.S. remaining the world leader in innovation in 2030: practice of science and engineering, talent, partnerships, and infrastructure. Worldwide demand for STEM-capable (Science, Technology, Engineering, and Mathematics) workers keeps growing, driven by international opportunities and competition, and by rapid increases in the number of jobs that require STEM skills, including in lines of work that historically did not require S&E knowledge. This situation will only become more urgent: by 2026, S&E jobs are predicted to grow by 13% compared with 7% growth in the overall U.S. workforce. Yet even as STEM competencies have become more essential, U.S. K-12 mathematics and science scores are well below those of many other nations and have stagnated. Women and underrepresented minorities remain inadequately represented in S&E relative to their proportions in the U.S. population. The rapid growth of S&E jobs and demographic changes have outpaced the progress that has been made in the participation of these groups in S&E.

**Citation:** National Science Board, "Vision 2030" (May 2020). https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf

**Article : State of U.S. Science and Engineering**

**Key Facts:**
This report provides information on the state of the U.S. science and engineering (S&E) enterprise over time and within a global context. *Indicators* is a factual and policy-neutral source of high-quality U.S. and international data; it does not offer policy options or make

policy recommendations. The indicators presented in the report are quantitative representations relevant to the scope, quality, and vitality of the S&E enterprise. The U.S. S&E workforce continues to grow overall. The number of women and underrepresented minorities (URMs)—blacks, Hispanics, and American Indians or Alaska Natives—has grown. However, these groups remain underrepresented in the S&E workforce relative to their overall presence in the workforce and the population.

**Citation**:
"Science and Engineering Indicators: State of U.S. Science and Engineering" (2020). *National Science Board.* The State of U.S. Science and Engineering 2020 | NSF - National Science Foundation

**Article: National Snapshot: Poverty among Women & Families, 2019**

**Key Facts:**

- Women were 36% more likely to live in poverty than men; nearly 1 in 8 women, more than 15.5 million, lived in poverty in 2018.
- Forty-six percent of these women lived in extreme poverty, defined as income at or below 50% of the federal poverty level. This means 1 in 18 women lived in extreme poverty in a recent year.
- Women (12%) were more likely than men (9%) to live in poverty in 2018. Women were also more likely than men to be in extreme poverty: 6% of women versus 4% of men lived in extreme poverty in 2018.
- Women in all racial and ethnic groups were more likely than White, non-Hispanic men to live in poverty. About 9% of White, non-Latinx women lived in poverty in 2018, compared to 7% of White, non-Hispanic men. However, poverty rates were particularly high for many groups of women:
  - Black women: 20% of Black women lived in poverty.
  - Latina women: 18% of Latina women lived in poverty.
  - Native women: 22% of Native women lived in poverty.
  - Asian women: 10% of Asian women lived in poverty.
- More than 15% of foreign-born women lived in poverty in 2018.
- The poverty rate for women ages 18 to 64 was higher for women with disabilities than it was for women without disabilities, 29% and 11%, respectively. The poverty rate among their male counterparts was lower: 23% of men with disabilities lived in poverty and 8% of men without disabilities lived in poverty.
- Nearly 11.9 million (16% of) children lived in poverty in 2018, with 42% having lived in extreme poverty.
- Poverty rates were even higher for certain groups of children:
  - 30% Black children lived in poverty.
  - 28% Native children lived in poverty.
  - 24% Latinx children lived in poverty.
  - 22% foreign-born children lived in poverty.
  - 11% Asian children lived in poverty.
  - 9% White, non-Latinx children lived in poverty.

**Citation:**
Fins, A., "National Snapshot: Poverty among Women & Families, 2020" (December 2020). *National Women's Law Center.* National Snapshot: Poverty among Women & Families, 2019

**Article: Racial Wealth Divide**

**Key Facts:**

- Since the early 1980s, median wealth among Black and Latinx families has been stuck at less than $10,000. Meanwhile, White household median wealth grew from $105,300 to $140,500, adjusting for inflation.
- Between 1983 and 2016, the median Black family saw their wealth drop by more than half after adjusting for inflation, compared to a 33% increase for the median White household. Over that same period, the number of households with $10 million or more skyrocketed by 856%.
- The median Black family today owns $3,600— just 2% of the $147,000 of wealth the median White family owns.
- The median Latinx family has assets worth $6,600 — just 4% as much as the median White family.
- The proportion of all U.S. households with zero or "negative" wealth, meaning their debts exceed the value of their assets, has grown from 1 in 6 in 1983 to 1 in 5 households today.
- Thirty-seven percent of Black families and 33% of Latino families have zero or negative wealth, compared to just 15.5% of White families.
- Black families are about 20 times more likely to have zero or negative wealth (37%) than they are to have $1 million or more in assets (1.9%).
- Latinx families are 14 times more likely to have zero or negative wealth (32.8%) than they are to reach the millionaire threshold (2.3%).
- White families are equally likely to have zero or negative wealth (about 15%) as they are to be a millionaire (15%).
- Low levels of Black and Latinx wealth, combined with their growing proportion of the population, is a key factor in the overall decline in American median household wealth from $84,111 in 1983 to $81,704 in 2016.

**Citation:**
Collins, C., Asante-Muhammed, D., Hoxie, J., Terry, S., "Racial Wealth Divide" (2019). *Institute for Policy Studies*. Racial Wealth Divide

**Criminal Justice**

**Book: The New Jim Crow: Mass Incarceration in the Age of Colorblindness**

**Key Facts:**
Mass incarceration of Black men, particularly poor Black men, arises from many aspects of systemic racial inequity in American society and its justice system. It is, in effect, a modern-day Jim Crow policy that has devasting effects on the lives and promise of individuals and communities.

**Citation:**
Alexander, M., "The New Jim Crow: Mass Incarceration in the Age of Colorblindness" (2010). *The New Press*.

**Article: Black Lives Matter: A Commentary on Racism and Public Health**

**Key Facts:**
Racism is a key factor in public health; "race is a social construct with no biological basis, whereas racism refers to a social system that reinforces racial group inequity;" racism is structural. Police violence, mass incarceration of people of color from "aggressive enforcement" of low-level crimes and "harsh mandatory sentencing laws…disproportionately affect Blacks." The effects of incarceration include loss of rights and benefits, from voting, to housing and employment.

**Citation:**
Garcia, J., Sharif, M., "Black Lives Matter: A Commentary on Racism and Public Health" (August 2015), Vol. 105, No.8, *American Journal of Public Health*, p. 27. **Black Lives Matter: A Commentary on Racism and Public Health**

**Article: Report of The Sentencing Project to the United Nations Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia, and Related Intolerance**

**Key Facts:**
The United States criminal justice system is the largest in the world; in 2015 over 6.7 million individuals were under some form of correctional control in the United States, including 2.2 million incarcerated in federal, state, or local prisons and jails.

- Black American are more likely than White Americans to be arrested; once arrested, they are more likely to be convicted; and once convicted, and they are more likely to experience lengthy prison sentences.
- Black adults are 5.9 times as likely to be incarcerated than Whites and Latinx adults are 3.1 times as likely.
- As of 2001, 1 of every 3 Black boys born in that year could expect to go to prison in his lifetime, as could 1 of every 6 Latinos—compared to 1 of every 17 White boys.
- Racial and ethnic disparities among women are less substantial than among men but remain prevalent.

Policing:

- In 2016, Black Americans comprised 27% of all individuals arrested in the United States—double their share of the total population.
- Black youth accounted for 15% of all U.S. children yet made up 35% of juvenile arrests in that year.
- More than 1 in 4 people arrested for drug law violations in 2015 was Black, although drug use rates do not differ substantially by race and ethnicity and drug users generally purchase drugs from people of the same race or ethnicity.
- Blacks were 3.7 times more likely to be arrested for marijuana possession than Whites in 2010, even though their rate of marijuana usage was comparable.
- Between 2001 and 2013, 51% of the New York City's population over age 16 was Black or Latinx. Yet during that period, 82% of those arrested for misdemeanors were Black or Latinx, as were 81% of those who received summonses for violations of the administrative code (including such behaviors as public consumption of alcohol, disorderly conduct, and bicycling on the sidewalk.)

- Nationwide surveys also reveal disparities in the outcomes of police stops. Once pulled over, Black and Latinx drivers were 3 times as likely as whites to be searched (6% and 7% versus 2%) and Blacks were twice as likely as Whites to be arrested. These patterns hold even though police officers generally have a lower "contraband hit rate" when they search Black versus White drivers.

Sentencing:

- Although Black and Latinx American comprise 29% of the U.S. population, they make up 57% of the U.S. prison population, resulting in imprisonment rates for Black and Latinx adults that are 5.9 and 3.1 times the rate for White adults, respectively.
- Of the 277,000 people imprisoned nationwide for a drug offense, over half (56%) are Black or Latinx.
- Nearly half (48%) of the 206,000 people serving life and "virtual life" prison sentences are Black and another 15% are Latinx.
- Among youth, Blacks are 4.1 times as likely to be committed to secure placements as Whites, American Indians are 3.1 times as likely, and Latinx are 1.5 times as likely.

Post Prison/Collateral Consequences

- In 2010, 8% of all adults in the United States had a felony conviction on their record; among Black men, the rate was (33%).
- A record 6.1 million Americans were forbidden from voting because of their felony record in 2016, rising from 1.2 million in 1976; felony disenfranchisement rates for voting-age Black Americans reached 7.4% in 2016—four times the rate of non-Black Americans (1.8%).

**Citation:**

"Report of The Sentencing Project to the United Nations Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia, and Related Intolerance" (March 2018). *The Sentencing Project*. Report to the United Nations on Racial Disparities in the U.S. Criminal Justice System

**Gender and Labor and Economic Participation**

**Article: Addressing the Elephant in the Room: Microaggressions in Medicine**

**Key Facts:**

Unconscious and conscious sex-based bias toward women physicians is increasingly recognized in the medical community and consistent with societal expectations of physicians and leaders being men. From residency lore to mainstream press, there are mentions of women physicians being called "sweetie" or "honey"; in response, many become well versed at reminding patients and colleagues of their qualifications as physicians. Although these encounters are traditionally associated with male patients or male professional counterparts, there is less discussion about these interactions occurring between women physicians and the predominantly women nursing workforce.

- The current medical workforce demographics create an environment in which existing differences set the stage for unconscious biases to affect behavior. According to the 2017 National Nursing Workforce Survey, registered nurses are majority women (90.9%) and white (80.8%), with an average age of 51 years.
- In that same year, the Association of American Medical Colleges reported that 48% of enrollees in US medical schools were women and 52% were white, with an average age of entry into medical school of 24 years. Demographically, medical school enrollees are younger and less homogenous than the nursing workforce.

- Additionally, a 2015 survey of US academic EDs showed that of 1,371 full-time faculty, 33% were women, 78% were white/non-Hispanic, 4% were black, and 4% were "other" (including white/Hispanic, Pacific Islander, multiracial, and Native American).
- The survey highlighted the dearth of women and underrepresented minority faculty in emergency medicine, despite a more balanced representation in medical school; with the graduation of these medical school enrollees, the overall physician demographic will become more diverse, yet that of nursing and emergency medicine faculty remains relatively homogenous.

Although one may expect that sex-based treatment is difficult for women residents, women trainees from racial or ethnic groups that are underrepresented in medicine experience additional challenges. When sex bias, conscious or unconscious, is overlaid on the racial and ethnic biases that exist in medicine, individuals at the intersection of these groups are cumulatively affected.

- The effects of microaggressions extend beyond personal offense. Several studies examining how microaggressions affect women and those underrepresented in medicine, in particular, have linked microaggressions to the development of anxiety, depression, and even hypertension.
- One study investigating racial microaggressions experienced by graduate students of color found them to be a significant predictor of burnout.
- Another study examining the perspectives of nursing and medical students underrepresented in medicine highlighted that students thought that racial microaggressions not only devalued their experiences but also negatively affected their learning, academic performance, and personal wellness.
- Individuals receiving microaggressions often are unable to express the effect of these exchanges, which can prove to be even more destructive to their mental health.

Ways to Address Microaggressions

1. The first step in addressing implicit biases and microaggressions is to recognize that they exist. Although these experiences may be hard to digest and can elicit a sensation of discomfort or even defensiveness, the feelings of women physicians and physicians who are underrepresented in medicine should be acknowledged. Similarly, we must acknowledge, explore, and address the experiences of disrespect that have been shared by our nursing colleagues. Whether this is done through workshops, teaching conferences, or other educational modules, fostering open discussion is imperative. With this commentary, we hope to create awareness of ongoing workplace challenges and catalyze change in collaboration with our esteemed nursing colleagues.
2. The second step in addressing unconscious or conscious bias is to identify strategies to counteract it. One such strategy involves developing frameworks to respond to microaggressions directly in a productive and respectful way.
3. Lastly, ongoing efforts are needed to diversify the physician and nursing workforce, strengthen multidisciplinary teamwork, and identify strategies to promote a healthy work environment. Specifically, further research is needed to elucidate adaptive responses that can be used to counter the deleterious mental and physiologic effects induced by microaggressions. One qualitative study focusing on strategies used by mental health professionals identified self-care, spirituality, mentorship, and collective organization as ways to establish resilience in the face of microaggressions in the workplace

**Citation:**
Molina, M., Landry, A., Chary, A., Burnett-Bowie, S. "Addressing the Elephant in the Room: Microaggressions in Medicine" (May 23, 2020). *Annals of Emergency Medicine*. Addressing the Elephant in the Room: Microaggressions in Medicine - Annals of Emergency Medicine (annemergmed.com)

**Article: Gender Pay Inequality Consequences for Women, Families, and the Economy**

**Key Facts:**

- A woman working full time, year-round earns $10,800 less per year than a man, based on median annual earnings. This disparity can add up to nearly a half million dollars over a career.
- On a percentage basis, a woman earns only 79% of what a man earns. This is known as the "gender earnings ratio." The 21% difference between men's and women's earnings means that women are paid less than $4 for every $5 paid to men.
- Although the gender pay gap has narrowed over time, at the current rate of change, it will not close until 2059, according to the Institute for Women's Policy Research.
- Lower career earnings result in an even greater disparity in retirement income. Median income for women ages 65 and older ($17,400) is 44% less than the median income for men in the same age group ($31,200). Women 75 years and older are almost twice as likely as men to live in poverty.
- The gender pay gap varies widely across states, from a low of 10% in Washington, DC, to a high of 35% in Louisiana.
- Women's median earnings are lower at every level of education. In fact, women are often out-earned by men with less education: the typical woman with a graduate degree earns $5,000 less than the typical man with a bachelor's degree.
- Women of color face even larger gender pay gaps. Compared to White men, African American women, on average, are paid only 60 cents on the dollar and Latinas are paid only 55 cents on the dollar.
- The pay gap typically grows with age. While women ages 18 to 24 earn 88% of what their male counterparts earn, women over age 35 earn only 76%.
- Economists believe that the gender pay gap is caused by complex factors. However, even when all those factors are taken into account, as much as 40% of the pay gap may be attributed to discrimination.
- American families depend on women's earnings. In the typical (median) household with a mother working outside the home, women contribute nearly 40% of their family's total earnings.
- Women's increased participation in the paid labor force has been a major driver of economic growth in recent decades. According to the Council of Economic Advisers, the U.S. economy is $2.0 trillion bigger today than it would have been if women had not increased their participation and hours since 1970.
- Enacting policies that would narrow the gender pay gap and help more women work full time in the paid labor force would decrease income inequality and lift many women out of poverty.

**Citation:**
Democratic staff of the Joint Economic Committee, "*Gender Pay Inequality Consequences for Women, Families and the Economy"* (April 2016). Gender Pay Inequality Consequences for Women, Families, and the Economy

**Article: For Women's History Month, a look at gender gains – and gaps – in the U.S**.

**Key Facts:**

- Women make up 47% of the U.S. labor force.
- In 2017, 57% of working-age women (ages 16 and older) were either employed or looking for work, which is higher than it was in 1980 (51%) but down somewhat from its peak of 60% in 1999.
- Women's median hourly earnings were $16.00 in 2016, up from $12.48 in 1980 (after adjusting for inflation). Men earned a median hourly wage of $19.23 in 2016, down slightly from $19.42 in 1980.
- In 2017, 38% of women and 33% of men between the ages of 25 to 64 had a bachelor's degree. In 2017, 14% of women ages 25 to 64 had an advanced degree, compared with 12% of men. In 1992, a higher share of men (9%) than women (6%) in this age group had an advanced degree.
- Women only account for about 20% of members of Congress and about 25% of state legislature members.
- Women made up roughly 5% of Fortune 500 company CEOs in the first quarter of 2017 and about 20% of Fortune 500 board members in 2016. As of March 2018, there were 6 women governors and 5 women in executive branch cabinet-level positions.
- In 2014, women were the sole or primary financial provider in 4-in-10 households with children younger than 18.
- Thirty-one percent of women who are married to or cohabiting with a male partner contribute at least half of the couple's total earnings, but men earn more than women in 69% of married or cohabiting couples.
- Women are about twice as likely as men (42% vs. 22%) to say they have experienced at least 1 of 8 specific forms of gender discrimination at work.
- A significant proportion of working women (25%) say they have earned less than a man who was doing the same job, compared with just 5% of men who say they've earned less than a women peer. Women are also about 4 times as likely as men to say they have been treated as if they were not competent because of their gender (23% of women vs. 6% of men), and they are about 3 times as likely to say they have experienced repeated small slights at work because of their gender (16% versus 5%).

**Citation:**
Geiger, A.W., Parker, K. "For Women's History Month, a look at gender gains – and gaps – in the U.S." (March 15, 2018). *Pew Research Center*. For Women's History Month, a look at gender gains – and gaps – in the U.S.

**Article: The Women's Leadership Gap**

**Key Facts:**

- Women are 50.8% of the U.S. population.
- Women earn more than 57% of undergraduate degrees and 59% of all master's degrees.

- Women earn 48.5% of all law degrees and 47.5% of all medical degrees.
  - However, in the in the legal profession, women are 45% of associates but only 22.7% of partners and 19% of equity partners.
  - In medicine, they represent 40% of all physicians and surgeons but only 16% of permanent medical school deans.
- Women earn 38% of Master of Business Administration and other generalist degrees and 49% of specialized master's degrees.
- Women account for 47% of the U.S. labor force and 52.5% of the college-educated workforce.
  - In the financial services industry, women constitute 61% of accountants and auditors, 53% of financial managers, and 37% of financial analysts. But they are only 12.5% of chief financial officers in Fortune 500 companies.

**Citation:**
Warner, J., Ellmann, N., Boesch, D., "The Women's Leadership Gap" (November 20, 2018). *Center for American Progress*. The Women's Leadership Gap

**Article: 7 charts that show the glaring gap between men and women's salaries in the US**

**Key Facts:**

- The average gender pay gap in the United States is around 19.3%, which means that the average woman working a full-time, year-round job earns 80.7% as much as her male counterpart earns; this can vary depending upon which state a woman works in.
- In 28 states, the gender pay gap is larger than the national average. Louisiana has the highest gender pay gap, at 32.1%, while California has the smallest pay gap at 10.9%, with full-time, year-round women over 16 making a median salary of $46,783, while men make $52,487.
- Black and Hispanic women are most affected by the wage gap, especially when compared to White men, who make up the largest demographic segment of the workforce.
- Asian women face the smallest wage gap — they earn 97% of what White men earn, resulting in a pay gap of just 3%. White women earn 79% of what White men do, while Black women earn 67% and Hispanic women earn 58%.
- When compared to Black men, Black women earn 89% of what Black men do, and Latina women make 86% of what Latino men do.
- Women with children often earn less than their child free counterparts (average weekly earnings of $767 vs. $777, respectively) while the opposite is true for men, with fathers out-earning their child free counterparts (average weekly earnings of $1,059 vs. $877, respectively.)
- The median full-time, year-round male worker earns more than his women counterpart at every year of age. The gap is narrower for younger workers, with the median 25-year-old woman earning about 91% of the median 25-year-old man. Meanwhile, the median 50-year-old woman earns just 77% of her 50-year-old male counterpart.
- As a result, women over the age of 75 are almost twice as likely to live in poverty.

**Citation:**
Sheth, S., Gal, S., Kiersz, A., "9 charts that show the glaring gap between men and women's salaries in the US" (August 26, 2019). *Business Insider.* Wage Gap, Gender Pay Gap Charts Show How Much More Men Make Than Women (businessinsider.com)

**Selection Criteria and Bias in Section Processes Affecting Opportunities**

**Article: The Time Is Now: Systemic Changes to Increase African Americans with Bachelors' Degrees in Physics and Astronomy**

**Key Facts:**

Despite that the overall number of bachelors' degrees awarded in physics in the U.S. has more than doubled, the number of degrees awarded to Black Americans dropped from 5% in 1995 to 4% in 2015.

- While the percentage of Black Americans earning bachelor's degrees in all fields has grown much faster than the overall population, physics has not benefitted.
- From 1995 to 2015, the number of physics bachelor's degrees awarded to Black Americans increased by 4% compared with a 36% increase for all physical sciences.
- Although predominantly White institutions (PWIs) enroll the most Black physics students, historically Black colleges and universities play an outsized role producing physics bachelor's recipients.

There are five factors that play a role in the success or failure of Black students in physics and astronomy.

1. Belonging: Fostering a sense of belonging is essential for Black student persistence and success. Forty-nine percent of Black physics students report feeling often or sometimes socially isolated in their physics labs and classes and 35% report feeling discouragement due to interactions with students.
2. Physics Identity: To persist, Black student must perceive themselves, and be perceived by others, as future physicists, and astronomers.
3. Academic Support: Effective teaching and a strengths-based approach to academic support are necessary for Black student retention and success.
4. Personal Support: Many Black student need support to offset financial burdens and stress; 67% of Black students are concerned about paying for college.
5. Leadership and Structures: For sustainability, academic and disciplinary leaders must prioritize creating environment, policies, and structures that maximize Black student success.

**Citation:**

"The Time Is Now: Systemic Changes to Increase African Americans with Bachelor's Degrees in Physics and Astronomy" (January 5, 2020). *American Institute of Physics*.

**Article: NSF graduate fellowships disproportionately go to students at a few top schools**

**Key Facts:**

The Graduate Research Fellowship Program (GRFP), which is sponsored by the National Science Foundation (NSF), is designed to support early-career graduate students in science, technology, engineering, and mathematics (STEM) fields and provides its approximately 2,000 annual awardees with 3 years of funding. However, an overwhelming number of award recipients are from the same universities, limiting the diversity of the recipient pool.

- Of the 2,052 recipients from the 2019 pool, the 10 schools with the most graduate student awardees amassed 31% of all the grants.
- Fourteen percent of recipients are at the top 3: The University of California (UC), Berkeley; the Massachusetts Institute of Technology (MIT); and Stanford University.
- Only 0.3% went to historically Black colleges and universities, and none went to tribal colleges or universities.
- A further analysis from the 2017 pool shows that 86% of awards went to students at R1 (very high research activity) institutions.
- Similarly, there is a smaller pool of schools where award recipients received their bachelor's degree. Students who receive their undergraduate degree from 3 schools—UC Berkeley, MIT, and Cornell University—receive 10% of the awards.
- Graduate students at the top 10 schools accounted for about 25% of awards, and the top 30 made up about 50% of the entire pool.

Eighteen of the 20 schools with the most GRFP awardees are also in NSF's top 50 schools for R&D expenditures, and NSF's top 10 R&D schools generated 20% of this year's awardees.

**Citation:**

Hu, J. "NSF graduate fellowships disproportionately go to students at a few top schools" (August 26, 2019). *Science Magazine*. NSF graduate fellowships disproportionately go to students at a few top schools

**Article: It Was a Mistake for Me to Choose this Field**

**Key Facts:**

Black women account for 6.8% of bachelor's degrees in the social sciences.

- In 2017, 0.6% of doctoral degrees and 2% of bachelor's degrees in economics were awarded to Black women.

The American Economic Association (AEA) conduced a professional climate survey to all members of the AEA and found:

Reports of experiencing racial or gender discrimination or both:

- Black women: 62%
- White women: 50%
- Asian women: 44%
- Latinas: 58%

Experiences of discrimination in promotion:

- Black women: 29%
- White women: 26%
- Asian women: 28%
- Latinas: 32%

Experiences of discrimination in pay:

- Black women: 38%
- White women: 36%
- Asian women: 36%
- Latinas: 40%

**Citation:**
Cook, L., Opoku-Agyeman, A., "It Was a Mistake for Me to Choose this Field" (Sept. 30, 2019). *The New York Times*. It Was a Mistake for Me to Choose This Field

Figures cited from: Allgood, S., Badgett, L., Bayer, A., Bertrand, M., Black, Bloom S., Cook, L., "AEA Professional Climate Survey: Final Report" (September 15, 2019). *American Economic Association*.

**LGBTQ+ Bias**

**Article: Coming out in STEM: Factors affecting retention of sexual minority STEM students**

**Key Facts:**
While there is a robust discussion on the paucity of representation of men of color and women in STEM, the experiences of LGBTQ+ academics is another area where negative assumptions and experiences impact recruitment and retention.

- Students, trainees, and faculty members regularly encounter implicit biases that go under the radar, often from scientists with the best of intentions.
- LGBTQ+ individuals are roughly 20% less represented in STEM fields than expected.
- When LGBTQ+ individuals persist in STEM, they report more negative workplace experiences than their non-LGBTQ+ counterparts, and roughly 70% of out STEM faculty members report feeling uncomfortable in their department.
- LGBTQ+ students are 9.54% less likely to be retained in STEM than their heterosexual peers; this is despite the fact that 49.4% of LGTBQ+ STEM aspirants reported having participated in undergraduate research in comparison whereas 41.1% of heterosexual STEM; and participation in research is often a significant indicator of persistence.
- As the result of heterosexism, which often attributes more feminine traits to gay, bisexual, and transgender men and more masculine traits to lesbian, bisexual, and transgender women, sexual minority men's expected probability of retention in STEM was lower than that for heterosexual men (0.45 versus 0.54), whereas sexual minority women's expected probability exceeded that of heterosexual women (0.39 versus 0.32).

One step towards mitigating LGBTQ+ STEM experiences is by including sexual orientation and gender identity measures in surveys and official reports of the national STEM census, and in reports by universities, funding agencies and scientific societies. This enables decision makers to understand where in the pipeline they find the largest attrition and disparities in order to begin drafting policies that address them.

**Citation:**
Hughes, B., "Coming out in STEM: Factors affecting retention of sexual minority STEM students" (March 14, 2018). *Science Advances.* American Association for the Advancement of the Sciences. advances.sciencemag.org

**High Barriers in the STEMM fields**

**Article: Education in a Pandemic: The Disparate Impacts of COVID-19 on America's Students**

**Key Facts:**

This report highlights a review of the COVID-19 pandemic's effects on instruction, student mental health, and student achievement for elementary, secondary, and post-secondary school students. It also provides an overview of COVID-19's disparate impacts on several groups of students: students of color, English learners, students with disabilities, and LGBTQ+ students. Included is a background on disparities that predated the pandemic, followed by preliminary evidence of the disproportionate risks and harms experienced by these groups of students. Key findings include:

- COVID-19 has raised new barriers for many postsecondary students, with heightened impacts emerging for students of color, students with disabilities, and students who are caregivers, both for entry into higher education and for continuing and completing their studies.

- Many institutions of higher education that disproportionately serve students of color and students from low-income backgrounds have seen declines in enrollment since the pandemic began. During the 2020-21 academic year historically Black colleges and universities (HBCUs), Minority Serving Institutions (MSIs), and Tribal Colleges and Universities (TCUs) also had declines in enrollment that in some cases far outpaced enrollment declines in their predominantly white peer institutions. Higher-education institutions also reported a sharp drop-off in enrollment in 2020 of students graduating from high-poverty high schools compared to pre-pandemic numbers.

- Students with disabilities in higher education are facing significant hardships and other barriers due to COVID-19, threatening their access to education, including through remote learning, and basic necessities.

- Emerging evidence shows that the pandemic has negatively affected academic growth, widening pre-existing disparities. In core subjects like math reading, there are worrisome signs that in some grades students might be falling even further behind pre-pandemic disparities.

- COVID-19 appears to have deepened the impact of disparities in access and opportunity facing many students of color in public schools, including technological and other barriers that make it harder to stay engaged in virtual classrooms.

- Even before the pandemic, many students learning English struggled to participate on equal terms in the classroom as they confronted the dual challenge of mastering grade-level content while continuing to learn English. For many English learners, the abrupt shift to learning from home amid the challenges of the pandemic has made that struggle even harder.

- For many elementary and secondary school students with disabilities, COVID-19 has significantly disrupted the education and related aids and services needed to support their academic progress and prevent regression. There are signs that those disruptions may be exacerbating longstanding disability-based disparities in academic achievement.

- During the pandemic, LGBTQ+ identifying students in elementary and secondary schools have faced particularly heightened risks for anxiety and stress and have lost regular access to affirming student organizations and supportive peers, teachers, and school staff. These students also are at an increased risk of isolation and abuse from unsupportive or actively hostile family members.

- Nearly all students have experienced some challenges to their mental health and well-being during the pandemic and many have lost access to school-based services and supports, with early research showing disparities based on race, ethnicity, LGBTQ+ identity, and other factors.

- Heightened risks of sexual harassment, abuse, and violence during the pandemic, including from household members as well as intimate partners, and online harassment from peers and others, affect many students and may be having a continued disparate impact on K-12 and postsecondary girls and women and students who are transgender, non-binary, or gender non-conforming.

- Identity-based harassment and violence have long had harmful effects on targeted students and their communities. Since the pandemic's start, Asian American and Pacific Islander students in particular have faced increased risk of harassment, discrimination, and other harms that may be affecting their access to educational opportunities.

**Citation**: "Education in a Pandemic: The Disparate Impacts of COVID-19 on America's Students" (June 9, 2021). *U.S. Department of Education Office of Civil Rights*. https://www2.ed.gov/about/offices/list/ocr/docs/20210608-impacts-of-covid19.pdf

**Article: Transformation in the U.S. Higher Education System: Implications for Racial Equity**

**Key Facts:**

This paper examines the effects of systemic racism in American society on the origins and development of the U.S. higher education system, analyzing how facially "equal" policies and laws implemented in a structurally racist society have resulted in inequitable opportunities for people of color and widened race-based disparities. The article presents a paradigm for evaluating the effect of different policy constructs in the context of systemic racism. The article examines transformational moments in STEM postsecondary education, including the Morrill Acts, the G.I. Bill, the emergence of community and technical colleges, and the Higher Education Act to demonstrate how racial inequities have endured, despite facially "equal" milestones in the history of our higher education system. As we look to create a more equitable and inclusive higher education system and realize racial equity in STEM, a critical examination of the ways in which context matters throughout history can lead to better outcomes for students and society in the future.

**Citation:** Malcom-Piqueux, L., "Transformation in the U.S. Higher Education System: Implications for Racial Equity" (October 2020). *National Academies*.

**Additional Studies and Research on High Barriers[2]:**

- Carnevale, A., Fasules, L., Porter, A., Landis-Santos, J. "African Americans: College Majors and Earnings" (2016). *Georgetown Center on Education and the Workforce*. AfricanAmericanMajors_2016_web.pdf (georgetown.edu) ("African Americans account for only eight percent of general engineering majors, seven percent of mathematics majors, five percent of computer engineering majors, and 10 percent of health majors. In health, they are clustered in the lowest-earning detailed major: 21 percent in health and medical administrative services, six percent in higher-earning pharmacy, pharmaceutical sciences, and administration.")

- Ong, C. W., Espinosa, L., Orfield, G., "Inside the Double Bind: A Synthesis of Empirical Research on Undergraduate and Graduate Women of Color in Science, Technology, Engineering, and Mathematics" (June 11, 2011). *Harvard Educational Review, 8*1(2), 172–209. (PDF) Inside the Double Bind: A Synthesis of Empirical Research on Undergraduate and Graduate Women of Color in Science, Technology, Engineering, and Mathematics | Maria Ong - Academia.edu

- Riegle-Crumb, C., King, B., Irizarry, Y., "Does STEM Stand Out? Examining Racial/Ethnic Gaps in Persistence Across Postsecondary Fields" (2019). *Educational Researcher*, *48*(3), 133–144. **https://doi.org/10.3102/0013189X19831006**

- "Assessing and Responding to the Growth of Computer Science in Undergraduate Enrollments, Consensus Study Report" (2018). *National Academies.* ReportHighlights_CS Enrollments.pdf (nap.edu)

- "Investigating the Potential Impact of COVID-19 on the Careers of Women in Academic Science, Engineering, and Medicine" (2021). *National Academies*. **https://www.nationalacademies.org/our-work/investigating-the-potential-impact-of-covid-19-on-the-careers-of-women-in-academic-science-engineering-and-medicine**

- "Women, Minorities, and People with Disabilities in Science and Engineering" (2021). *National Science Foundation*. https://ncses.nsf.gov/pubs/nsf21321/report/executive-summary (all data is pre-COVID-19 pandemic, but indicates high barriers even before the pandemic for "Blacks or African American, Hispanics or Latinos and American Indians or Alaska Natives," as well as to a significant but lesser extent to women, in science and engineering education and the workforce)



[2] Felice Levine, PhD, Executive Director of the American Educational Research Association provided this list of valuable research.

**Part 2: Race and sex demographic data (societal, higher education, and STEMM higher education)**

**STEMM Demographics**

**Article: Trends in Racial/Ethnic Representation Among US Medical Students**

**Key Facts:**

The number of medical school applicants increased 53%, from 33,625 to 51,658, and the number of matriculants increased 29.3%, from 16,488 to 21,326, between 2002 and 2017.

- Despite an increase in the overall U.S. population of Black, Hispanic and Asian, male and female individuals between 2002 to 2017, with no significant population change among American Indian and Alaska Native individuals, Black, Latinx, and American Indian and Alaska Native applicants and matriculants of both sexes were underrepresented, with a significant trend toward decreased representation for Black women applicants from 2002 to 2012.

Study results indicate that, relative to the overall U.S. population:

- Latinx individuals are underrepresented among medical school applicants and matriculants by nearly 70%;
- Black male applicants and matriculants, by nearly 60%;
- Black women applicants by nearly 30% and Black women matriculants by nearly 40%; and
- AIAN applicants and matriculants, regardless of sex, by more than 60%.

**Citation:**

Amaad L., Murdock, M., Orji, W., Aysola, J., Sebro, R., "Trends in Racial/Ethnic Representation Among US Medical Students" (September 4, 2019). *JAMA Network Open.* JAMA Network Trends in Racial/Ethnic Representation Among US Medical Students

**Overall Demographics**

**Article: The Coming College Enrollment Bust**

**Key Facts:**

As the result of the stagnation in the US population, which can be attributed to a variety of factors, it is expected that the "college enrollment bubble" will burst for some colleges and universities beginning in 2026.

- After peaking in 2024 with an estimated 3.6 million high school graduates, the student population is expected to decrease steadily to 3.3 million in 2032.
- However, not all universities will be impacted the same; while there is expected to be an 11% decrease in post-secondary attendance, applications, and enrollment:
  - Elite universities (classified as universities that are ranked in the top 50 by the U.S. News World and Report) will see a slight increase in the number of applicants;
  - Two-year colleges are facing a potential 13% decline (with, the East South Central [Alabama, Kentucky, Mississippi, and Tennessee], facing a 29% decline);
  - Four-year national universities are facing a 10% decline; and

Four-year regional universities are facing an 11% decline.

**Citation:**
Fox, J., "The Coming College Enrollment Bust" (May 30, 2019). *Bloomberg*. The Coming College Enrollment Bust - BNN Bloomberg

**Article: Impact of the COVID-19 Pandemic on College-Going High School Seniors**

**Key Facts:**

- For students who plan to attend college, 83% of polled students still aim to enroll full time in bachelor's programs, although 63% had concerned about their ability to attend their first-choice school (mostly due to cost).
- Of the 17% who changed their plans at the result of COVID-19:
  - 35% will take a gap year
  - 35% will enroll in a part-time bachelor's program
  - 7% will enroll in an associate degree program or attend community college
  - 6% will work full time
  - 4% will enroll in a certificate or apprenticeship program
  - 13% don't know their plans

**Citation:**
"Impact of the COVID-19 Pandemic on College-Going High School Seniors" (March 2020). *Art and Science Group*. (PDF) Impacts of the Coronavirus Pandemic on Incoming High School Seniors' Postsecondary Plans About the Authors (researchgate.net)

**Part 3: Testing data and research**

**Application:** Evaluating the role of test-use, and if used, calibrating how, is part of designing an overall enrollment program that can best serve an IHE's mission, including its diversity and equity interests. Understanding the related research, as well as what data demonstrate about an IHE's own student body, are important. IHEs may identify a variety of ways to meaningfully assess promise, achievement, and ability to benefit and contribute in the context of each student's opportunities, challenges, and experiences. Each IHE may want to consider data on the bundle of qualities that are associated with student success at that IHE. Within that mix, each IHE may want to evaluate the correlation of student success, benefit, and contributions (as defined by that IHE) with ranges of test scores, high school grade point average, and personal qualities such as resilience, drive, and leadership. IHEs that use tests may also want to examine whether the meaning they attribute to particular score differentials in consequential decision-making aligns with the test design and data on their own students' outcomes.

**Article: NACAC Task Force on Standardized Admission Testing for International and US Students. Ensuring All Students Have Access to Higher Education: The Role of Standardized Testing in the Time of Covid-19 and Beyond**

**Key Facts:**
The National Association of College Admission Counseling (NACAC) Task Force on Standardized Admission Testing for International and US Students approached its work through an access and equity lens, noting the role of admission offices in achieving a fair and equitable process.

College admission exams stand out for their visibility and, arguably, their outsized importance, which has prompted a decades-long debate over the question, "What are the ways in which college admission exams contribute to or detract from postsecondary access and success for a diverse set of students?" This report suggests steps that institutions can take to review their standardized admission testing policies and assess their effects. These steps cannot alone resolve issues of access and equity in admission but deserve careful consideration. Among these are:

- Consider the public good. Consider what admission policy decisions mean for higher education generally, and whether institutional policies and practices enable more students access to higher education.
- Be student-centered. Offer simplicity and clarity in a time of complexity and heightened anxiety about the college admission process. Though the COVID-19 pandemic created additional barriers to accessing standardized tests, certain populations— including international applicants, who are critical to postsecondary institutions—have faced barriers for decades that will remain, or even be exacerbated, if or when testing returns to pre-COVID-19 operations.
- Focus on student success. Review historical institutional data for enrolled students to determine the factors that contribute to student success.
- Be transparent and provide clear explanations for all decisions related to testing, with related data.
- Include a plan for conducting frequent reviews of institutional data to inform testing policy.
- Consider unintended consequences. Standardized tests have served a role in the evaluation process to assess cognitive characteristics of students independently of any particular secondary school curriculum. When colleges and universities do not utilize SAT or ACT scores, and other measures of academic achievement become more important in determining who is admitted, does this place new pressures on secondary schools?

The task force recognizes that it is up to each institution to determine whether admission tests add sufficient value to the admission process to justify the social and monetary costs, and respects that institutions will arrive at different decisions about the tests' usefulness in their admission processes.

For institutions that require tests, the task force recommends that they:

- Conduct predictive validity studies regularly and share the results; these studies are commonly used to review, validate, and/or refine criteria used in the admission process. Openness about this process, and how factors are weighed in decisions, can help to restore public trust in and understanding of the college admission process.
- Report the middle 50th percentile of test scores for admitted students, at minimum, and consider more robust and transparent reporting to allow students to assess their prospects for admission. Also consider breaking down scores by applicant type, such as international applicants, to help students better assess their fit.
- Consider the student context relative to score policies, including the likelihood of improving scores when the test is taken more than once and issues of affordability to some students of doing so.

For test-optional institutions, the task force recommends that institutions commit to several practices, such as:

- Clearly explaining the rationale for the chosen test policy, within the range that allows the role of standardized tests to be de-emphasized, including test-optional, test-flexible, and test-blind. Recognize that certain populations of students may still feel an obligation to submit scores where there is a test-optional or test-flexible policy and carefully examine student expectations, experiences, and outcomes to ensure that the goals of test policy are met.
- Explaining exceptions to test-optional policies related to academic programs and financial and merit aid. Also providing pathways to technical, science, honors and other program areas that require a test score for admission.
- Analyzing outcomes data on the effects of the testing policy for different demographic, socio-economic, and school type groups.
- Publicly communicating accurate, complete, and current information on the factors considered in making admission, financial aid, and scholarship decisions, including, but not limited to, effect of standardized test scores and grades and students' demonstrated interest, social media presence, personal conduct, legacy status, and financial need. Given the public perception of the outsized role of standardized tests in competitive admission, being transparent and specific about how institutions' "equations" for evaluating students will change as a result of not having test scores.

Several additional topics on other aspects of the application process, the role of technology, and new or alternative tests were identified but not addressed by the task force, due to the scope of its charge and time limitations.

**Citation:**
NACAC Task Force on Standardized Admission Testing for International and US Students, "Ensuring All Students Have Access to Higher Education: The Role of Standardized Testing in the Time of Covid-19 and Beyond" (August 18, 2020). *National Association for College Admission Counseling*. Ensuring All Students Have Access to Higher Education: The Role of Standardized Testing in the Time of Covid-19 and Beyond

**Article: SAT-Only Admission: How Would It Change College Campuses**

**Key Facts:**
While many university systems outside the United States rely on standardized test scores as a primary tool of admission, the more holistic approach at most U.S. IHEs is often important to increasing the diversity of the student body. A study from the Center on Education and the Workforce (CEW) at Georgetown University found that if institutions began relying only on SAT scores for admissions purposes, the students who would benefit the most are wealthy and overwhelmingly White.
[**Note:** This research is not suggesting that the SAT or ACT was designed to be the only criterion for admission; they are not intended for that purpose. However, some opponents of diversity considerations in admission have equated standardized test scores with "merit" when IHEs have a much more holistic and nuanced bundle of factors that contribute to assessment of merit and readiness.]

- With SAT-only admissions, 53% of incoming students at the 200 most selective colleges would no longer be attending.
- Currently, 60% of incoming freshmen at selective colleges are from the top quartile of family socioeconomic status, but that would increase to 63% if students were admitted based on standardized test scores alone.
- If schools were SAT-only, the median score would increase to 1320 (out of 1600).

- Currently, enrollment at the nation's selective colleges is 66% White, 19% Black and Latino, 11% Asian, and 5% other races.
    - However, if schools distributed seats to only students with the highest scores on the SAT and ACT, White enrollment increases to 75%, Black and Latinx enrollment decreases to 11%, Asian enrollment decreases to 10%, and enrollment of other races and ethnicities remains 5%.

The CEW conducted the study by analyzing the high school graduating class of 2013, identifying who enrolled at the most selective colleges and universities in the country, looking at all the prospective college students from that year who reported SAT or ACT scores, sorting by score and then taking the highest-scoring students until every seat (about 300,000) was filled in the most selective institutions. The study found that:

- No one with an SAT or SAT-equivalent score below 1250 would have been admitted to the 200 most selective colleges and universities if admissions were based on test scores alone.
    - When test scores are not the sole admission criterion: Lower-scoring affluent students disproportionately take seats that might have otherwise go to students with higher test scores.
    - Fifty-three percent of students who get into selective colleges with scores below 1250 from the top quartile of SES among families with college-age children (defined as families with a median annual household income of $122,000).
    - Sixty-six percent of affluent students who are admitted with scores below 1250 are White.
    - Only 27% of students who scored below 1250 are either Black or Latinx and 8% are Asian.

Only 16% of students admitted to selective colleges with test scores below the 1250 SAT threshold are from the lowest three-quarters of family SES are Black or Latinx, in comparison to the 35% with scores below the threshold who are White and affluent.

**Citation:**

Carnevale, A., Strohl, J., Van Der Werf, M., Quinn, M., Peltier, K., "SAT-Only Admission: How Would It Change College Campuses" (2019). *Georgetown Center on Education and the Workforce*. SAT-Only Admission: How Would It Change College Campuses? - CEW Georgetown

**Article: Graduate programs drop GRE after online version raises concerns about fairness**

**Key Facts:**

Some graduate school programs are dropping the Graduate Record Examination (GRE) as a requirement for admission during the COVID-19 pandemic due to concerns about inequitable access to an appropriate test-taking environment and technology. Some graduate programs had done so or considered doing so before the pandemic, and are proceeding to eliminate consideration of the test, finding that it is not a predictor of success in their programs and "disadvantages applicants from underrepresented groups." Others disagree and find that the test is valuable if used in a holistic review of other substance considered in admission decisions, due to differences in undergraduate programs.

**Citation:**

Hu, J., "Graduate programs drop GRE after online version raises concerns about fairness" (June 24, 2020). *Science Magazine*.

**Article: High School GPAs and ACT Scores as Predictors of College Completion: Examining Assumptions About Consistency Across High Schools**

**Key Facts:**

It is commonly believed that high school grade point averages indicate different levels of readiness for college, based on the high school a student attends, and that ACT scores are consistent indicators.

- However, this research indicates that high school GPAs perform in a strong and consistent way across high schools as measures of college readiness, whereas ACT scores do not.
- There are large high school effects on college graduation such that students with either the same high school GPAs or the same ACT score graduate from college at different rates, based on which high school they attended.
- As measures of individual students' academic readiness, ACT scores show weak relationships and even negative relationships at the higher achievement levels.
- There is little evidence that students will have more college success if they work to improve their ACT score because most of the signal from the ACT score seems to represent factors associated with the student's school rather than the student.
- In contrast, students' efforts to improve their high school GPAs would seem to have considerable potential leverage for improving college readiness.

**Citation:**

Allensworth, E., Kallie C., "High School GPAs and ACT Scores as Predictors of College Completion: Examining Assumptions About Consistency Across High Schools." (Jan. 2020). *Educational Researcher.* High School GPAs and ACT Scores as Predictors of College Completion: Examining Assumptions About Consistency Across High Schools

**Article: Looking at Discrepant Scores**

**Key Facts:**

The College Board produced a study of "discrepant scores," referring to when a student's SAT scores are inconsistent with their academic performance in high school.

- One-third of students who took the SAT in the study received discrepant scores—either their GPA was higher than their SAT score or their SAT score was higher than their GPA.
- Below is a breakdown of the 33% of students with discrepant scores.

  **Students with SAT scores higher than GPA:**

  Gender:

  - Male: 63.8%
  - Women: 37.8%

  Parent Education Level:

  - Graduate: 69.3%

- Bachelor's: 50.4%
- Associate's: 29.7%
- HS Diploma: 29.0%
- No HS Diploma: 18.1%

Ethnicity:
- Asian/Asian American: 55.9%
- White: 53.6%
- Other: 51.7%
- Native American: 45.2%
- Black: 32.1%
- Latinx: 26.5%

Income:
- >$100,000: 67.6%
- $70,000-$100,000: 46.2%
- $50,000-$70,000: 37.7%
- $30,000-$50,000: 31.8%
- <$30,000: 24.1%

**Students with GPAs higher than SAT scores:**
Gender:
- Male: 36.2%
- Women: 62.2%

Parent Education Level:
- Graduate: 30.7%
- Bachelor's: 49.6%
- Associate's: 70.3%
- HS Diploma: 71.0%
- No HS Diploma: 81.9%

Ethnicity:
- Asian/Asian American: 44.1%
- White: 46.4%

- Other: 48.3%
- Native American: 54.8%
- Black: 67.9%
- Latinx: 73.5%

Income:

- >$100,000: 32.4%
- $70,000-$100,000: 53.8%
- $50,000-$70,000: 62.3%
- $30,000-$50,000: 66.2%
- <$30,000: 75.9%

**Citation:**
"Looking at Discrepant Scores" (March 10, 2019). *Higher Ed Data Stories.* **Looking at "Discrepant Scores"**

**Additional Research on Testing Data:**

Buckley, J., Letukas, L., Wildavsky, B., "Measuring Success: Testing, Grades, and the Future of College Admissions" (2018). *Johns Hopkins University Press*

Flanagan, C., "The University of California Is Lying to Us" (July, 2021). *The Atlantic.* Why Is the University of California Dropping the SAT? - The Atlantic

Syverson, S., Franks, V., Hiss, W., "Defining Access: How Test-Optional Works" (2018). *National Association for College Admission Counseling.* DEFINING ACCESS: How Test-Optional Works (nacacnet.org)

"Disentangling the Role of High School Grades, SAT ® Scores, and SES in Predicting College Achievement" (May 2013). *Educational Testing Service.* https://www.ets.org/Media/Research/pdf/RR-13-09.pdf

**Part 4: Benefits of broad student diversity:**

**Application: Research is helpful to inform the design of effective diversity-advancing policies and procedures that avoid triggering exacting legal standards, when possible—and policies that trigger but satisfy those standards when unavoidable.**

**Article: Diversity, Equity, Inclusion and Racism in STEMM Education and Workforce**

**Key Facts:**

This report emphasizes undergraduate and graduate STEMM education and the workforce. However, it also includes some information from National Academies reports on relevant structural inequalities in the K-12 education system that contribute to later underrepresentation in STEMM and recommended approaches to address those inequalities.

**Citation:**
"National Academies Reports on Diversity, Equity, Inclusion and Racism in STEMM Education and Workforce" (June 2021). National Academies

**Article: A retrospective assessment of the educational benefits of interaction across racial boundaries.**

**Key Facts:**

Through the analysis of alumni survey data from three graduating cohorts, this study examined the influence of interracial interaction on college outcomes and explored factors that helped to promote interracial interaction on college campuses. Its findings indicate that interracial interaction made unique, consistent contribution to college outcomes and that college activities, such as coursework outside the major, contact with campus staff, intramural sports, performing arts or music, and visiting speakers, were likely to promote interaction across racial boundaries.

**Citation**:
Luo, J., Jamieson-Drake, D., "A retrospective assessment of the educational benefits of interaction across racial boundaries" (2009). *Journal of College Student Development*, *50*(1), 67-86. https://doi.org/10.1353/csd.0.0052

**Article: Racial Diversity Matters: The Impact of Diversity-Related Student Engagement and Institutional Context**

**Key Facts:**

This study addressed two questions: (a) Do different forms of campus racial diversity contribute uniquely to students' learning and educational experiences when they are simultaneously tested utilizing multilevel modeling? (b) Does a campus where students take greater advantage of those diversity opportunities have independent positive effects on students' learning? Consideration of racial diversity extended beyond student composition and included social and curricular engagement. Results suggest that benefits associated with diversity may be more far-reaching than previously documented. Not only do students benefit from engaging with racial diversity through related knowledge acquisition or cross-racial interaction but also from being enrolled on a campus where other students are more engaged with those forms of diversity, irrespective of their own level of engagement.

**Citation**:
N. Denson, M. Chang, **"**Racial Diversity Matters: The Impact of Diversity-Related Student Engagement and Institutional Context" (2019). *American Educational Research Journal*, *46*(2), 322–353, ). https://doi.org/10.3102/0002831208323278

**Article: Winners and Losers? The Effect of Gaining and Losing Access to Selective Colleges on Education and Labor Market Outcomes**

**Key Facts:**

This report uses the Texas Top Ten Percent (TTP) Rule, a policy that guaranteed admission to any Texas public university to anyone in the top 10 percent of their high school class in Texas, and administrative data from the state of Texas to estimate the effect of access to a selective college on student graduation and earnings outcomes.

- TTP dramatically changed student enrollment patterns; "Pulled In" students, or students with relatively high performance at schools that had traditionally sent few if any students to the University of Texas flagship campus in Austin, became more likely to attend both the flagship UT campus at Austin and the other, less selective four-year campuses as a result of the policy.
  - TTP pulled students into the Texas public higher education system (from not attending college, from private colleges, or from out of state institutions).
  - TTP increased the share of Pulled In students who graduated with bachelor's degrees within six years after high school.
  - The increases in graduation are similar to what would be expected given average graduation rates at the institutions that students were induced to attend.
  - It substantially increased log wages nine to eleven years after high school.
- In contrast, students who lose access do not see declines in overall college enrollment, graduation, or earnings. "Pushed Out" students, or those who were ranked outside of the top 10 percent at high schools that had previously sent a relatively large share of their students to UT, became less likely to attend.
  - About two-thirds of the displaced students enrolled in less selective public four-year colleges in Texas, while another one-third enrolled in Texas community colleges.
  - The net effect on total enrollment at public colleges and universities in Texas is near zero, thus, for the Pushed Out group, the policy experiment amounts to a reduction in college selectivity with no change at the extensive margin of enrollment.
  - The study found no reduction in Pushed Out students' college graduation probabilities, in part because the colleges that they attended had only slightly lower graduation rates than in the pre-TTP counterfactual and in part because the Pushed Out students previously had below-average graduation rates at UT Austin.
  - The study did not find any sign that TTP reduced wages for Pushed Out students, which suggests that the benefits of attending a more selective public institution may be quite small for these students.

**Citation:**

Black, S., Denning, J., Rothstein, J., "Winners and Losers? The Effect of Gaining and Losing Access to Selective Colleges on Education and Labor Market Outcomes" (February 2020). *National Bureau of Economic Research, Inc*. top_ten_06_2021.pdf (berkeley.edu)

**Article: Affirmative Action, Mismatch, and Economic Mobility After California's Proposition 209**

**Key Facts:**

Proposition 209 banned race-based affirmative action at California public universities in 1998. This study analyzes Prop 209's impact on student outcomes using a difference-in-difference research design and a newly-constructed longitudinal database linking all 1994-2002

University of California applicants to their college enrollment, course performance, major choice, degree attainment, and wages into their mid-30s.

- Ending affirmative action caused UC's 10,000 annual underrepresented minority (URM) freshman applicants to cascade into lower-quality public and private universities.
- URM applicants' undergraduate and graduate degree attainment declined overall and in STEM fields, especially among lower-testing applicants.
- As a result, the average URM UC applicant's wages declined by five percent annually between ages 24 and 34, almost wholly driven by declines among Hispanic applicants.
- By the mid-2010s, Prop 209 had caused a cumulative decline in the number of early-career URM Californians earning over $100,000 by at least three percent.
- Prop 209 also deterred thousands of qualified URM students from applying to any UC campus and enrolling at less-selective UC campuses did not improve URM students' performance or persistence in STEM course sequences.
- Analysis suggests that affirmative action's net wage benefits for URM applicants exceed its net costs for on-the-margin white and Asian applicants.

**Citation:**
Bleemer, Z., "Affirmative Action, Mismatch, and Economic Mobility After California's Proposition 209" (August 2020). *Center for Studies in Higher Education* Affirmative Action, Mismatch, and Economic Mobility After California's Proposition 209 (escholarship.org)

**Additional Studies and Research on the Benefits of Broad Student Diversity:**

- Bowman, N. A., "Promoting Participation in a Diverse Democracy: A Meta-Analysis of College Diversity Experiences and Civic Engagement" (2011). *Review of Educational Research*, *81*(1), 29–68. Promoting Participation in a Diverse Democracy: A Meta-Analysis of College Diversity Experiences and Civic Engagement on JSTOR

- Bowman, N. A., Brandenberger, J. W., Hill, P. L., Lapsley, D. K., "The Long-Term Effects of College Diversity Experiences: Well-Being and Social Concerns 13 Years After Graduation" (2011). *Journal of College Student Development, 52*(6), 729-239.

- Bowman, N. A., Denson, N., Park, J., "Racial/cultural awareness workshops and post-college civic engagement: A propensity score matching approach" (2016). *American Educational Research Journal*, *53*(6). https://doi.org/10.3102/0002831216670510

- Chang et al., "The Educational Benefits of Sustaining Cross-Racial Interaction Among Undergraduates" (2005). *The Journal of Higher Education* (indicating that one important conclusion that has emerged from research is that the vitality, stimulation, and educational potential of an institution are directly related to the composition of its student body, faculty, and staff)

- Chang, M. J., Denson, N., Saenz, V., Misa, K., "The educational benefits of sustaining cross-racial interaction among undergraduates" (2006). *The Journal of Higher Education*, *77*(3), 430-455. A Hierarchical Linear Modeling Approach to Examining (arizona.edu)

- Pitt, R. N., Packard, J., "Activating Diversity: The Impact of Student Race on Contributions to Course Discussions" (2012). *The Sociological Quarterly*, *53*(2), 295-320. https://doi.org/10.1111/j.1533-8525.2012.01235.x

- Sorenson, N., Nagda, B., Gurin, P., Maxwell K., "Taking a "Hands On" Approach to Diversity in Higher Education: A Critical-Dialogic Model for Effective Intergroup Interaction" (2009). *Analyses of Social Issues and Public Policy*, Vol. 9, No. 1, 2009, pp. 3-35 (positing that higher education will be most influential when students encounter an educational environment that diverges from students' prior experiences and when its diversity and complexity encourages active thinking and an intellectual interest in exploring new and different educational experiences)

- Wolfe, B. L., Fletcher, J., "Estimating benefits from university-level diversity" (2013). *National Bureau of Economic Research*. Estimating Benefits from University-Level Diversity (nber.org)

**Part 5: Effective approaches to recruiting a diverse student body**

**Application: IHEs may want to consider these strategies that have been effective for some. Each IHE is different and what works well at one will not necessarily work well in another. However, experience of other IHEs may provide useful context for evaluation of strategies that can eliminate barriers and enhance diversity.**

**Article: "Segregation Forever?" The Continued Underrepresentation of Black and Latino Undergraduates at the Nation's 101 Most Selective Public Colleges and Universities**.

**Key Facts:**

This report examines how access for Black and Latinx students at the nation's 101 most selective public colleges and universities has changed since 2000, and whether these institutions are serving an undergraduate student body that represents the racial and ethnic diversity of their particular state's population. Findings show very little progress has been made since 2000, and the overwhelming majority of the nation's most selective public colleges are still inaccessible for Black and Latinx undergraduates. Over half of the 101 institutions earned D's and F's for access for BOTH Black and Latinx students. While underrepresentation at these institutions is problematic for both groups, the findings are much worse for Black students who have less access at these institutions than they did in 2000.

**Black Student Access**

- Over 75% of these colleges received F grades for their representation of Black students. Fewer than 1 out of 10 (9%) received an A, indicating that the percentage of Black students on campus was representative of the state's Black population.

- Institutions in states with larger Black populations were the least accessible. Nearly all of the 32 institutions in the 14 Southern states, which account for over half of the nation's Black population, received failing grades. The three institutions without failing grades were in Kentucky and West Virginia, which are the two Southern states with the lowest share of Black residents.
- Since 2000, the percentage of Black students has decreased at nearly 60% of the 101 most selective public colleges and universities.

**Latinx Student Access**

- Nearly half of these colleges received F grades for their representation of Latinx students. Just 1 out of 7 (14%) received an A, indicating that the percentage of Latinx students on campus was representative of the state's Latino population.
- The institutions in the nine states with 75% of the nation's Latinx population were — on average — less accessible. Twenty-seven of 37 institutions (73%) received D's and F's.
- While all of the 101 selective public institutions saw gains in the percentage of Latinx students since 2000, the gains at 65% of these institutions were less than the growth in the state's Latinx population.

Improving access for Black and Latinx students at the 101 colleges and universities included in this report is a matter of will. With larger endowments and more funding, these institutions have the resources to do so, but their leaders must make a conscious commitment to increasing access. Policymakers can also help institutions become more accessible.

1. Adopt goals to increase access
2. Increase access to high-quality guidance counselors
3. Use race more prominently in admissions decisions
4. Rescind state bans on affirmative action
5. Increase aid to Black and Latino students
6. Alter recruitment strategies
7. Improve campus racial climates
8. Use outcomes-based funding policies equitably
9. Leverage federal accountability
10. Reduce the role of standardized testing and/or consider making tests optional

**Citation:**

Nichols, A., "Segregation Forever?" The Continued Underrepresentation of Black and Latino Undergraduates at the Nation's 101 Most Selective Public Colleges and Universities" (July 21, 2020). *The Education Trust*. Segregation Forever? - The Education Trust (edtrust.org)

**Article: Winners and Losers? The Effect of Gaining and Losing Access to Selective Colleges on Education and Labor Market Outcomes**

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- As a result, the average URM UC applicant's wages declined by five percent annually between ages 24 and 34, almost wholly driven by declines among Hispanic applicants.
- By the mid-2010s, Prop 209 had caused a cumulative decline in the number of early-career URM Californians earning over $100,000 by at least three percent.
- Prop 209 also deterred thousands of qualified URM students from applying to any UC campus and enrolling at less-selective UC campuses did not improve URM students' performance or persistence in STEM course sequences.
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**Citation:**
Bleemer, Z., "Affirmative Action, Mismatch, and Economic Mobility After California's Proposition 209" (August 2020*). Center for Studies in Higher Education.* Affirmative Action, Mismatch, and Economic Mobility After California's Proposition 209

**Article: In a push for diversity, medical schools overhaul how they select Canada's future doctors**

**Key Facts:**
In order to address the lack of diversity among Canada's doctor pool, medical schools are beginning to develop application questions that will provide them with insight into their applicants.

- Between 10-20% of applicants are admitted to medical schools and 75% of Canadian doctors were educated in Canada.
  University of Manitoba
- However, the University of Manitoba, which studied its medical school admissions data, found a pattern of wealthy White students from big cities being more likely to be interviewed and offered admission, partly because of built-in advantages. As undergrads they don't have to work part-time to pay for school, they're able to pay for MCAT prep courses and, in interviews, they can cite an impressive range of travel and volunteer experiences.
- In order to increase the diversity of their applicant pool, U of M added a section to the application, creating about 30 questions that included factors such as visible minority status, sexual orientation, involvement with the child-welfare system and living with family members who suffer from addiction. The committee then ranked each question based on the perceived level of disadvantage suffered by the applicant.
- The numerical values assigned to each answer are combined to create a number meant to reflect the degree to which the applicant's background would put them at a disadvantage in the application.
- U of M's diversity efforts, which have been ongoing and evolving for over 30 years, led to the 2018 incoming medical school class comprised of more than 50% women, 10% Indigenous students, 20% from rural areas and 50% from families with incomes of less than $75,000.
- Sample questions included:

- Did you or your family ever have to use a food bank?
- During the second decade of your life, was the annual gross income in the household in which you lived between $40,000-$75,000?
- During the second decade of your life, did you have to work to contribute to family income?
- Will your parent(s) be paying for the tuition fees if you get accepted to our medical school?
- Do you currently receive student aid?
- Do you consider yourself to be a member of a Visible Minority?
- Do you identify as First Nations, Metis, Inuit, or other North American Indigenous ancestry?
- Is your primary language other than English or French?
- Do you have a participation or activity limitation that has an impact on your day-to-day life?
- Were you raised or are you living in a household in which there was/is a person living with substance abuse?

***Editorial Note****: Asking questions to elicit information that can inform diversity-advancing decisions is a good practice. So is undertaking regression analyses of data to determine whether race, ethnicity, or gender—each with all other factors (e.g., socio-economic status, parental education attainment, test scores and GPA, etc.) being equal—has a significant statistical effect on pursuit and retention of students in a STEMM (or other) major, graduation rate, academic performance (positive and negative), etc. However, under U.S. non-discrimination law, assigning a number to an individual's racial and ethnic status in isolation as part of the winnowing or decision-making process when conferring opportunities and benefits raises the question whether there is a legally prohibited mechanical consideration of such status when conferring benefits and opportunities. Assigning the same number to every individual of the same race would clearly be prohibited. (These practices are distinguishable from considering an individual's unique knowledge/expertise or commitment related to race and ethnicity, or contextually considering an individual's experience of their racial and ethnic identity along with many other factors when evidence demonstrates a need for such consideration, to arrive at a "holistic" evaluation.) See the* ***Brief Legal Overview****,* ***5-Step Design Guide-Students****, and* ***Example Application Questions-Faculty and Students****, https://www.aaas.org/programs/diversity-and-law, to guide design of a program that considers race in a manner sustainable under U.S. law.*

**Citation:**

Friesen, J., "In a push for diversity, medical schools overhaul how they select Canada's future doctors" (July 29, 2019). *The Globe and Mail*. In a push for diversity, medical schools overhaul how they select Canada's future doctors - The Globe and Mail

**Part 6: Effective pedagogical approaches for retaining and educating a diverse student body**

**Application:** Research is helpful to inform development of barrier removal strategies that advance equity and can result in increased racial, ethnic, and gender diversity without triggering exacting legal standards, if well designed. IHEs may consider research on effective pedagogy for all students, and faculty who have the expertise and/or commitment to advance such pedagogy, as one, among other barrier removal strategies.

**Article: STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes**

**Key Facts:**

A study of 150 STEM professors and 15,000 STEM students found that the racial achievement gaps in courses taught by more fixed mindset faculty, or those who believe that one's intelligence or abilities are stagnant, were twice as large as the achievement gaps in courses taught by more growth mindset faculty, or those who believe intelligence or abilities can develop with proper support.

- On average, all students performed more poorly in STEM courses taught by faculty who endorsed more fixed (versus growth) mindset beliefs.
  - However, fixed faculty mindset beliefs were more strongly associated with lower course performance among Black, Latinx, and Native American (URM, as defined by the study) than among White and Asian students (non-URM as defined by the study).
- On average, non-URM students earned 0.14 GPA points (on a 4.0 scale) higher than URM students; however, in courses taught by faculty who endorsed more of a fixed mindset, the racial achievement gap grew to 0.19 GPA points.
  - However, in courses taught by faculty who endorsed more of a growth mindset, the racial achievement gap shrank to 0.10 GPA points.
- Course evaluations revealed that students were demotivated and had more negative experiences in classes taught by fixed mindset faculty.
- Faculty mindset beliefs predicted student achievement and motivation above and beyond any other faculty characteristic, including their gender, race/ethnicity, age, teaching experience, or tenure status.

Statistically, men and women faculty were just as likely to endorse fixed mindset beliefs, and there were no mindset differences by faculty race/ethnicity.

**Citation:**

Canning, E., Muenks, K., Green, D., Murphy, M., "STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes" (February 15, 2019). *Science Advances.* American Association for the Advancement of Science.

**Article: Leading After a Racial Crisis Weaving a Campus Tapestry of Diversity and Inclusion**

**Key Facts:**

In 2015, a series of protests related to race and leadership embroiled the University of Missouri–Columbia campus and catalyzed a crisis years in the making. Over the past five years, the university has steadily increased its capacity for diversity, equity, and inclusion (DEI) work. The American Council on Education report sheds light on how leaders can help their campuses build DEI capacity, particularly when considering institutional histories with race and racism. The report documents the activities that have helped Missouri to progress, including its Inclusive Excellence Framework and funding process, leadership training, resource investment in DEI work, and engagement with the local community.

- **Trauma remains salient, and a new set of emotions need processing.** Campuses that experience a racial crisis will have trauma that needs to be continuously addressed. The trauma recovery framework outlined in our first report is equally important now, two years later, especially as new emotions of frustration, anxiety, and exhaustion emerge.

- **Racial crisis leads to fragmentation of perspectives and tensions after the initial shared trauma subsides**. The views of campus community members have become fragmented, with many different perspectives on the progress and approach to addressing the racial crisis. It is important for the leadership to understand these diverse perspectives and to work internally on building stronger connections and communication between and among groups. Fragmentation of perspectives is based on an assortment of characteristics, including perceptions of race, access to information, time on campus, and differing beginning expectations and campus context features ranging from disconnected chains of action and uneven work on racial climate. Some of the fragmentation of perspectives is natural based on the decentralized nature of many campuses, and issue leaders need to keep in mind as they try to move a community forward. A set of tensions has emerged as well that make the work of DEI challenging if left unaddressed. They include:
  - Patience versus impatience,
  - Critical versus celebratory,
  - Work in progress versus why are we not there yet,
  - Add-on versus deeply integrated,
  - Inspiration versus anger,
  - Speaking out versus fear of repercussion,
  - Moving on versus respectfully remembering,
  - Excellence versus DEI,
  - Status quo versus negotiating change, and
  - Mandating involvement versus faculty autonomy.

  Tensions left unaddressed create barriers to moving forward. Leaders who are closely focused on their own vision for DEI work can become removed from and miss seeing how fragmented campus contexts are and the tensions, emotions, and perspectives that prevent common ground.
- **The need for a weaver-leader.** The fragmented perspectives, tensions, and unresolved emotions set the stage for a particular type of leadership work that is necessary to move forward, which we place within a weaver-leader framework. This framework connects several foundational leadership activities, including over-communicating, setting expectations, and building relationships, all in the service of creating shared expectations or a common ground on which to move forward. This work is particularly salient for creating a shared vision. Campus leaders play an important role as weavers encouraging the participation of many individuals in the rebuilding process. Weavers' work is one of identifying different fragments, connecting them, and helping to network and connect ideas, beliefs, activities, and feelings. Weavers are important to sense making, building relationships, and creating coherent communications to create the tapestry as a whole. Weaving is not easy, as it means being able to stand apart from the many activities and perspectives in order to connect them with a vision for the whole tapestry.
  - **Overcommunicating**. Weaver-leaders take up the mantle to communicate the progress being made, address the approach taken, and draw on more personalized forms of communication. In this current phase it is very important for the university to invest significant time and resources in enhancing formal and informal channels of communication in ways that are public, proactive, personal, caring, and transparent. The reason for the importance of "humanized" over-communication is that it builds relationships and trust that are so critical in healing and recovery.

- **Setting Expectations.** One of the most important ways to address the fragmented worldviews and emerging tensions is to set expectations. Setting expectations is a valuable practice for leaders to implement large-scale change during the aftermath of a racial crisis. Expectations influence the pattern or design that the weaver is envisioning to create a full tapestry. While patterns might alter as progress is made, they are still useful in setting the overall course and direction. Without expectations to follow, weavers might lose sight of how all the campus efforts and work on DEI are contributing to the tapestry

**Citation:**
Fries-Britt, S., Kezar, A., "Leading After a Racial Crisis Weaving a Campus Tapestry of Diversity and Inclusion" (June 22, 2020). *American Council on Education*. Leading After a Racial Crisis: Weaving a Campus Tapestry of Diversity and Inclusion

**Article: Bridging the Research to Practice Gap**

**Key Facts:**
Research and evaluation are essential to help institutions define their diversity-related goals, identify optimal strategies to achieve them, and assess impact over time. A strong research foundation can provide more effective and efficient allocation of scarce resources, more confidence in educational judgments, and – for those institutions that pursue "race-conscious" policies – the evidence required by the courts as justification of the need to consider race. This paper is focused on assisting individual colleges and universities as they work to enhance their own research efforts, informed by the broader landscape of common principles and interests at play in the broad higher education community. Broad-based findings are often an important starting point for institutional action.

A. Institutional goals related to the educational benefits of diversity
    1. The educational benefits of diversity are well documented, most often in undergraduate settings.
    2. Adverse effects associated with a lack of diversity – such as racial isolation or tokenism and stereotypes based on race, gender, income, or first-generation status – are also generally well documented.
    3. Though all students can benefit from diversity, benefits may flow differently for different types of students. Different students require different types of experiences and supports to benefit from campus diversity.
    4. More research is needed to examine how general conclusions about educational benefits of diversity play out in different institutional contexts, disciplines, and fields.
B. Defining and measuring success in achieving institutional goals
    1. Adequate representation of different groups in the student body is a prerequisite for achieving the educational benefits of diversity but is not sufficient on its own.
    2. A clear relationship exists between campus climate and achievement of goals associated with the educational benefits of diversity. Positive campus climate and opportunities that foster meaningful interactions inside and outside the classroom are research-based benchmarks.
    3. Alumni and employer perspectives can confirm the importance of the educational benefits of diversity.
    4. Determining sufficient numbers of students with diverse backgrounds and characteristics is inherently context-specific. What works at any one institution will depend on an array of many factors, such as mission, historical setting, student demographics, academic focus, and geographic reach.

C. Enrollment strategies
   1. Each element of the enrollment process (outreach, recruitment, admission, financial aid/scholarships) can play an important role in achieving diversity goals.
   2. Race-conscious enrollment practices – in concert with race-neutral efforts – have been shown to have a positive impact on obtaining a racially diverse class in certain settings. But these determinations are inherently institution- and context-specific.
   3. Admissions can be an essential strategy for achieving diversity goals.
      a. Individualized, holistic review is used by a variety of institutions and has been demonstrated to be effective in advancing diversity-related goals.
      b. The relative success of "automatic" or "guaranteed" admission policies (i.e., "percent plans") has been shown to depend heavily on context such as state demographics and segregated K-12 schools.
   4. Research on the relationship between financial aid and scholarships and the achievement of diversity goals is limited, but significant research reflects the essential role financial aid plays in attracting and retaining low-income students.
   5. Research on the relationship between outreach and recruitment and the achievement of diversity goals is growing, and some studies have demonstrated the effectiveness of certain recruitment strategies that may include a racial focus.
   6. Strategies designed to attract low income and first-generation students may complement those focused on racial and ethnic minorities. That relationship, however, does not establish that those strategies are in all settings effective substitutes for race-conscious strategies. Again, context matters.

D. Strategies in and outside the classroom
   1. Pedagogy and curricular offerings can be important strategies to achieve an institution's diversity goals. Opportunities for collaborative learning may be especially important, while negative classroom experiences for minority students may have a particularly significant negative impact on their overall attitude toward the campus.
   2. Faculty members are essential partners in the achievement of diversity goals. They serve as "human bridges" between the student and the institution. Their classroom practices play an important role in creating and leveraging the benefits of diversity for learning and their perspectives can be important benchmarks for success. Having a diverse faculty can also be an important signal to students that diversity is an institutional priority.
   3. Institutional housing policies and support for diverse peer groups can make a meaningful impact on the achievement of diversity goals.

E. Alignment Across Policies and Programs
   1. Alignment across institutional policies, programs, functions, and offices creates the greatest potential for achieving diversity goals, with direct educational, management, and cost benefits.
   2. A sustained effort with dedicated resources and common purpose can work toward alignment and help achieve institutional goals.

**Citation:**
Taylor, T., Milem, J., Coleman, A., "Bridging the Research to Practice Gap" (March 2016). *College Board. EducationCounsel*. Bridging the Research to Practice Gap

Diversity and the Law: 2021

# Research Chart 2: Data Reports

## Overview

This summary compilation of recently published data by the National Science Board/Science Foundation (NSF) (2019, 2020), the National Academies of Sciences, Engineering and Medicine (NASEM) (2016), and the American Council on Education (ACE) (2019), highlight racial, ethnicity and sex compositional diversity of: the U.S. resident population; U.S. higher education and the U.S. workforce in science, technology, engineering, and mathematics (STEM); U.S. education and the U.S. workforce in all fields; diploma recipients in STEM and all fields; persistence and completion rates of men of color and women; and undergraduate borrowing in all fields. Throughout the document, "underrepresented minorities" include individuals who are Black, Latinx, or American Indian or Alaskan Native. This aggregated definition does not include individuals who are Native Hawaiian or Pacific Islander. It does not reflect how individuals of any single race or ethnicity fare. None of the reported data address women of color, who bear the effects of societal bias for both identities and are significantly underrepresented in some STEM fields in relation to their representation in the U.S. population.

## Relevance to Diversity and Equity Initiatives

The Supreme Court has consistently rejected under-representation of a race, ethnicity or gender in the student body or workforce, as compared with the group's representation in the general population, as justification for considering individuals' race, ethnicity or gender in conferring educational and employment benefits and opportunities. However, these data are critical and legally permissible considerations for establishing and investing in effective outreach and communications to welcome all talent to apply for admission, employment and other programs; content of courses and programming; areas of research focus; effective pedagogy; and identifying and eliminating conduct, processes, climate and culture that create barriers to inclusion of all talent. See **Brief Legal Overview and, for more, the 5-Step Design Guide-Students and 5-Step Design Guide-Faculty, https://www.aaas.org/programs/diversity-and-law.**

**The State of U.S. Science and Engineering (S&E) 2020—Racial and Sex Diversity by Occupation**

| Women, Underrepresented Minorities, Black Americans, Latinx Americans in S&E and All Occupations | | | |
|---|---|---|---|
| **Demographic** | **U.S. Residential Population** | **All Occupations** | **All S&E Occupations** |
| **Women** | 51.5% | 51.6% | 29% |
| **URMs** | 28.1% | 17.0% | 13.3% |
| **Black Americans** | 11.9% | 7.9% | 5.6% |
| **Hispanic Americans** | 15.6% | 8.9% | 7.5% |

| Women in S&E occupations, by broad occupational category: 2003 and 2017 | | | | | |
|---|---|---|---|---|---|
| **Year** | **Engineering** | **Computer Sciences and Mathematics** | **Physical Sciences** | **Life Sciences** | **Psychology and Social Sciences** |
| **2003** | 11% | 29% | 28% | 42% | 53% |
| **2017** | 16% | 27% | 29% | 48% | 59% |

| URMs in S&E occupations, by broad occupational category: 2003 and 2017 | | | | | |
|---|---|---|---|---|---|
| **Year** | **Engineering** | **Computer Sciences and Mathematics** | **Physical Sciences** | **Life Sciences** | **Psychology and Social Sciences** |
| **2003** | 8% | 9% | 7% | 9% | 11% |
| **2017** | 13% | 13% | 12% | 7% | 23% |

**Citation:** National Science Board. National Science Foundation. 2020. Science and Engineering Indicators 2020: The State of U.S. Science and Engineering. *The State of U.S. Science and Engineering 2020.* NSB-2020-1. Alexandria, VA.

**Higher Education in Science and Engineering—Racial and Sex Diversity by Degree Attainment**

| Representation of racial and ethnic groups in the U.S. population and among S&E degree recipients: 2017 | | | | | |
|---|---|---|---|---|---|
| **Racial or Ethnic Group** | **U.S. Population (20-34)** | **Associate's Degree Recipients** | **Bachelor's Degree Recipients** | **Master's Degree Recipients** | **Doctoral Degree Recipients** |
| **Black** | 13.2% | 11.0% | 9.0% | 11.3% | 7.7% |
| **American Indian or Alaska Native** | 0.8% | 1.1% | 0.5% | 0.5% | 0.4% |
| **More than one race** | 1.8% | 3.6% | 0.2% | 3.3% | 2.8% |
| **White** | 57.9% | 47.8% | 4.0% | 11.0% | 71.1% |
| **Hispanic** | 20.4% | 27.5% | 14.8% | 11.2% | 7.8% |
| **Native Hawaiian or Other Pacific Islander** | 0.2% | 0.5% | 10.6% | 0.3% | 0.1% |
| **Asian** | 5.7% | 8.6% | 60.9% | 62.4% | 10.1% |

| S&E degrees awarded to women, by degree level and field: 2017 | | | | |
|---|---|---|---|---|
| | **Associate's** | **Bachelor's** | **Master's** | **Doctoral** |
| **All Fields** | 60.8% | 57.3% | 59.4% | 50.4% |
| **All S&E Fields** | 46.3% | 49.4% | 43.6% | 45.2% |
| **Engineering** | 15.7% | 21.5% | 24.8% | 23.8% |
| **Agricultural Sciences** | 42.2% | 55.7% | 56.5% | 49.6% |
| **Biological Sciences** | 68.7% | 61.5% | 58.7% | 52.2% |
| **Computer Sciences** | 20.2% | 19.1% | 30.9% | 22.6% |
| **Earth, atmospheric, and ocean sciences** | 33.1% | 38.9% | 43.3% | 42.7% |
| **Mathematics and statistics** | 31.4% | 41.7% | 43.6% | 27.1% |
| **Physical Sciences** | 42.5% | 40.0% | 36.3% | 30.9% |
| **Psychology** | 76.3% | 78.1% | 79.0% | 72.8% |
| **Social Sciences** | 69.6% | 55.1% | 56.6% | 49.2% |
| | | | | |

| S&E degrees awarded to Hispanic students, by degree level and field: 2017 | | | | |
|---|---|---|---|---|
| | **Associate's** | **Bachelor's** | **Master's** | **Doctoral** |
| **All Fields** | 21.2% | 13.7% | 10.1% | 7.5% |
| **All S&E Fields** | 26.6% | 14.2% | 10.5% | 7.2% |
| **Engineering** | 20.5% | 11.9% | 9.7% | 6.7% |
| **Agricultural Sciences** | 6.6% | 9.2% | 7.3% | 6.5% |
| **Biological Sciences** | 32.7% | 13.0% | 9.7% | 7.4% |
| **Computer Sciences** | 14.0% | 11.3% | 7.4% | 5.3% |
| **Earth, atmospheric, and ocean sciences** | 23.4% | 9.7% | 6.6% | 6.1% |
| **Mathematics and statistics** | 34.9% | 10.9% | 7.1% | 4.7% |
| **Physical Sciences** | 25.3% | 10.9% | 8.1% | 5.8% |
| **Psychology** | 44.5% | 18.1% | 13.3% | 12.6% |
| **Social Sciences** | 35.0% | 17.3% | 12.5% | 6.6% |

| S&E degrees awarded to Black students, by degree level and field: 2017 | | | | |
|---|---|---|---|---|
| | Associate's | Bachelor's | Master's | Doctoral |
| All Fields | 12.6% | 10.0% | 12.5% | 10.9% |
| All S&E Fields | 10.7% | 8.7% | 10.6% | 7.1% |
| Engineering | 6.9% | 4.2% | 5.0% | 4.0% |
| Agricultural Sciences | 1.2% | 3.2% | 3.9% | 5.2% |
| Biological Sciences | 8.5% | 7.9% | 7.8% | 4.7% |
| Computer Sciences | 12.6% | 9.1% | 13.0% | 7.3% |
| Earth, atmospheric, and ocean sciences | 0.7% | 2.3% | 2.0% | 1.8% |
| Mathematics and statistics | 3.3% | 4.9% | 4.7% | 2.1% |
| Physical Sciences | 9.8% | 6.2% | 4.5% | 2.9% |
| Psychology | 7.5% | 12.5% | 13.8% | 9.2% |
| Social Sciences | 13.2% | 11.5% | 15.6% | 10.3% |

| Total first university degrees by S&E field, by selected region, country, or economy: 2016 or most recent year | | | |
|---|---|---|---|
| Country | Natural Sciences | Engineering | Social Sciences |
| China (2015) | 8.8% | 32.9% | 6.1% |
| United Kingdom | 21.5% | 8.2% | 12.7% |
| Poland | 10.1% | 20.5% | 11.9% |
| Germany | 13.0% | 21.9% | 6.0% |
| South Korea | 10.4% | 22.9% | 7.4% |
| United States | 14.4% | 6.8% | 18.7% |
| Italy | 10.1% | 14.3% | 12.8% |
| France | 12.7% | 14.7% | 8.8% |
| Spain | 9.7% | 16.0% | 9.2% |
| Taiwan | 11.7% | 19.5% | 3.4% |
| Japan | 6.2% | 14.8% | 10.1% |

| Total doctoral degrees by broad area of study, by selected region, country, or economy: 2016 or most recent year | | | |
|---|---|---|---|
| **Country** | **Natural Sciences** | **Engineering** | **Social Sciences** |
| **China (2015)** | 25.2% | 38.8% | 4.1% |
| **United Kingdom** | 33.7% | 14.5% | 9.4% |
| **India** | 39.5% | 11.4% | 12.7% |
| **Germany** | 35.2% | 12.7% | 6.3% |
| **South Korea** | 16.6% | 25.3% | 5.3% |
| **United States** | 27.9% | 15.2% | 14.0% |
| **Italy** | 33.9% | 18.3% | 5.5% |
| **France** | 49.3% | 13.5% | 10.7% |
| **Spain** | 39.0% | 7.8% | 10.2% |
| **Taiwan** | 19.2% | 34.3% | 5.2% |
| **Japan** | 20.2% | 21.8% | 4.8% |
| **Sweden** | 28.4% | 26.2% | 7.3% |

**Citation:** National Science Board. National Science Foundation. 2019. *Higher Education in Science and Engineering*. *Science and Engineering Indicators*. Alexandria, VA.

**Barriers and Opportunities for 2-Year and 4-Year STEM Degrees Conferral in the U.S.—By Race, Ethnicity and Sex**

| Gender in STEM | | | |
|---|---|---|---|
| | **Biological Sciences** | **Engineering** | **Math and Computer Science** |
| **Male** | 38% | 79% | 75% |
| **Female** | 62% | 21% | 25% |

| Four-, Five-, and Six-Year Graduation Rates in STEM Degrees (by Race) | | | |
|---|---|---|---|
| | **Four-Year Rates** | **Five-Year Rates** | **Six-Year Rates** |
| **All** | 22% | 36% | 40% |
| **Asian** | 30% | 47% | 52^ |
| **Black** | 9% | 18% | 22% |
| **Hispanic** | 12% | 24% | 29% |
| **Native American** | 12% | 20% | 25% |
| **White** | 24% | 39% | 43% |

| Four-, Five-, and Six-Year Graduation Rates in STEM Degrees (by Gender) | | | |
|---|---|---|---|
| | Four-Year Rates | Five-Year Rates | Six-Year Rates |
| **STEM** | | | |
| **Male** | 23% | 37% | 43% |
| **Female** | 21% | 34% | 38% |
| **Engineering** | | | |
| **Male** | 15% | 34% | 40% |
| **Female** | 20% | 40% | 43% |
| **Biomedical Sciences** | | | |
| **Male** | 22% | 32% | 34% |
| **Female** | 23% | 32% | 34% |
| **Physical Sciences** | | | |
| **Male** | 23% | 31% | 33% |
| **Female** | 23% | 27% | 28% |

| Four-, Five-, and Six-Year Graduation Rates in STEM Degrees (by Minority Serving Institution type) | | | |
|---|---|---|---|
| | Four-Year Rates | Five-Year Rates | Six-Year Rates |
| **Predominantly White Institutions** | 23.7% | 38.0% | 42.6% |
| **Historically Black Colleges and Universities** | 8.0% | 15.6% | 19.3% |
| **Hispanic-Serving Institutions** | 10.0% | 22.2% | 28.6% |
| **Emerging Hispanic-Serving Institutions** | 26.7% | 44.1% | 47.5% |

| Six-Year Outcomes for Community College STEM Students | | | |
|---|---|---|---|
| | All | Science and Engineering | Technician |
| **Attained STEM Credential** | | | |
| **Any Credential** | 19% | 21% | 20% |
| **Bachelor's** | 10% | 16% | 7% |
| **Associate Degree or Certificate** | 9% | 5% | 13% |
| **Still Enrolled** | | | |
| **At any institution** | 16% | 19% | 14% |

| | | | |
|---|---|---|---|
| **At community college** | 7% | 6% | 28% |
| **At 4-year college** | 8% | 13% | 6% |
| **Transferred to Four-Year College in STEM Program** | 25% | 37% | 19% |

**Citation:** National Academies of Sciences, Engineering, and Medicine. 2016. *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways*. *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees.* The National Academies Press. Washington, DC.

**Women, Underrepresented Minorities, Blacks and Hispanics in Science and Engineering and all Occupations, 2017**

| | **Women** | **Underrepresented Minorities** | **Blacks** | **Hispanics** |
|---|---|---|---|---|
| **All Science and Engineering Occupations** | **29** | **13.3** | **5.6** | **7.5** |
| **All Occupations** | **51.6** | **17** | **7.9** | **8.9** |
| **U.S. Resident Population (21 and older)** | **51.8** | **28.1** | **11.9** | **15.6** |

**Citation**: National Science Board, National Science Foundation. 2020. *The State of U.S. Science and Engineering 2020 | NSF – National Science Foundation*. *Science & Engineering Indicators 2020*. Alexandria, VA.

## Race and Ethnicity in U.S. Higher Education—All Undergraduate Fields

| Undergraduate Enrollment, by Race and Ethnicity | | |
|---|---|---|
| **Racial or Ethnic Group** | **1995-96** | **2015-16** |
| **American Indian or Alaska Native** | 1% | |
| **Asian** | 5.4% | |
| **Black** | 12.3% | |
| **Native Hawaiian or other Pacific Islander** | n/a | |
| **Hispanic** | 10.3% | |
| **White** | 69.8% | |
| **More than once race** | 0.6% | |
| | | |

| First-Year Persistence at Four-Year Universities (Entered 2011) | |
|---|---|
| **Overall** | 85.9% |
| **American Indian or Alaska Native** | 82.3% |
| **Asian** | 90.9% |
| **Black** | 81.7% |
| **Native Hawaiian or other Pacific Islander** | 94.0% |
| **Hispanic** | 84.8% |
| **White** | 86.9% |
| **More than once race** | 83.9% |
| | |

| Six-Year Completion Rates (Entered Fall 2011) | |
|---|---|
| **Overall** | **Completion Rate** |
| **American Indian or Alaska Native** | 37.% |
| **Asian** | 46.8% |
| **Black** | 26.0% |
| **Native Hawaiian or other Pacific Islander** | n/a |
| **Hispanic** | 35.0% |
| **White** | 46.7% |
| **More than once race** | 41.8% |
| **Race or Ethnicity Unknown or Missing** | 28.6% |

| Total Borrowing for Undergraduate (2015-16) | | |
|---|---|---|
| | **Percent Borrowed** | **Average Amount Borrowed** |
| **Overall** | 68.9% | $29,669 |
| **American Indian or Alaska Native** | 76.2% | $26,380 |
| **Asian** | 58.7% | $25,510 |
| **Black** | 86.4% | $34,010 |
| **Native Hawaiian or other Pacific Islander** | 89.6% | $26,515 |
| **Hispanic** | 67.3% | $25,524 |
| **White** | 70.3% | $30,119 |
| **More than once race** | 73.7% | $29,906 |

**Citation:** Espinosa, L., Turk, J., Taylor, M., and Chessman, H. *Race and Ethnicity in Higher Education*. (2019). American Council on Education.