

re:work

insights on inclusion

Ben Jones
Challenging the Myth
of Young Genius

Janine Vanderburg
What the Workplace Loses
Without Older Employees

re:learn
4 Ways to Combat Ageism

Dr. Jane Goodall
Inspiring the Next Generation
of Change Leaders

powertilt

[pou-er-tilt]

1.

a differential distribution of power and influence along lines of gender, race, and other intersecting social identities

2.

lack of access and influence by historically marginalized groups in key innovation processes

3.

a phenomenon in which influence in innovation remains primarily a majority-group advantage, maintaining the status quo

ncwit.org/powertilt

Evidence

demonstrates that even when companies increasingly diversify their workforces, members of historically marginalized groups still face disproportionate difficulty accessing core, creative, technical roles (and associated resources) and influencing work team decisions—the place where innovation so often happens.

ncwit.org/power tilt



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Welcome to the second issue of re:think magazine, created by NCWIT.

How many innovations never came into existence because the creators at the table did not reflect the rest of society? As a Black woman with more than 35 years in the tech field as a general manager and entrepreneur, I have seen the benefits of what happens when there is not only diversity of race and gender, but diversity of thought as well. It takes the creativity and problem-solving skills of people from all intersecting identities, including age, to make the most innovative and purposeful technology.

In the first issue of re:think, we dove into complexities around biased bots and altruistic algorithms, how technology can perpetuate systems built on stereotypes or challenge them. With this issue, we focus on age. We look at age through various lenses—how we define ageism, how age impacts creativity (or doesn't), how teams diverse across age are better equipped to create technical solutions, and how we can bring generations together to learn from one another. By doing so, we re:examine age as a concept and expand the range of voices being heard.

As change leaders, it's important that we foster inclusive cultures that celebrate our differences and welcome contributions of people from historically marginalized groups along the lines of race/ethnicity, class, age, gender identity, sexual orientation, disability status, and many other identity categories that shape our day-to-day experiences both at work and in our personal lives.

Technology has the potential to liberate us, to allow us to live freer, more fulfilled lives as we confront the realities of aging. But, in order for this potential to be realized, we need to ensure that the teams creating new technologies reflect the full range of people who will be using them.

—AVIS YATES RIVERS, TECHNOLOGY CONCEPTS GROUP INTL (TCGI) CEO AND NCWIT BOARD OF DIRECTORS MEMBER

The National Center for Women & Information Technology (NCWIT) is the farthest-reaching network of change leaders focused on advancing innovation by correcting underrepresentation in computing.

Carissa Lintao

a 24-year-old CEO who entered the tech industry at the age of 18

Carissa Lintao is a “Kind Innovator” and the CEO and founder of Apptuitive, an award-winning app store optimization agency. Over the past five years, her work has led her to oversee the growth of more than 300 apps and the beginning stages of countless aspiring entrepreneurs’ app ideas. Carissa has been recognized in Forbes, Thrive Global, Business Insider, and Roadtrip Nation’s documentary Venture Forward for her entrepreneurial efforts and focus on changing tech for the better. Raising awareness about the intersection of ethics and tech to bridge information gaps and level the playing field is her passion. Carissa also mentors the next generation through her work as an independent TEDx advisor and a TECHNOLOchicas Ambassador. In addition, Carissa researches and reports on overlooked ethical issues regarding tech, such as humane design, social media usage, app developer responsibility, and inequality.

My personal mantra? “Choose not to be harmed — and you won’t feel harmed. Don’t feel harmed — and you haven’t been.”

I live by this quote from Marcus Aurelius every day. Personally, I never take offense to people questioning my age or even poking fun at it. However, professionally, I recognize that misconceptions of age affect how my company, my employees, and I are perceived; and, as an industry leader, I choose to address and counteract such bias.

I vividly remember the first time that I experienced discrimination because of my age. I was 20 years old, interning at a leading app development agency. One day, there was a prospective client meeting, where the client was attending virtually. In the room, I pulled up my seat next to the CEO, and we both waited for the prospective client to pop up on the screen. After exchanging the standard introductions, one of the first things out of his mouth was, “Shouldn’t you be in class right now? You look like you belong in high school!”

The three of us laughed it off, and I didn’t think anything of it at the time. About a year later, I launched my app marketing agency, Apptuitive. Even then, I thought the only form of discrimination I might face would be sexism. I quickly came to realize that my age would still be one of the first things people notice about me.

Since I started working in the tech industry at 18, I’ve gone out of my way to appear older by adjusting how I speak and present myself. Of course, the onus shouldn’t be on me to appease others by giving in to their expectations. Yet, I found myself removing the word “intern” from my LinkedIn, investing in premium headshots, and studying the dictionary to sound “older.” I knew my tactics were working when I heard, “You’re an old soul.”

Now, as a 24-year-old CEO, it’s still top of mind. Comparison is a killer, especially in the world of marketing agencies. You need as many advantages as possible to stay competitive. When someone makes a statement like, “You look like you belong in high school,”

or interrogates me with blanket, trivial questions related to my age, it sets the stage for how I will be perceived by the rest of the room. It signals others to think, “This 20-something is not as old, or as experienced, as this other person who owns a marketing agency.” (Not to mention that such statements are unnecessary to say in a professional environment.)

I use my leadership role at Apptuitive to mitigate ageism through several strategies and approaches. For example, we never tell clients that an intern is working on a project; rather, we always use first names. Without taking this approach, Alana, the youngest person on staff at the age of 16, might otherwise be underutilized on some of our biggest accounts, where her contributions have had proven results. Additionally, we always use high-quality photos of ourselves, wherever possible, so as not to be perceived as amateurs. We associate ourselves with industry professionals of all ages, as I know everyone has valuable skills to offer, based on their unique experiences.

The end goal is for Apptuitive to be judged solely on the quality of work and results that we produce; nothing more, and nothing less. So, if my age is a major factor in a prospective client’s decision-making process, I refer them to an agency that may be a better fit.

“We associate ourselves with industry professionals of all ages, as I know everyone has valuable skills to offer.”

Kari Santos holds an MS in Information and Communication Technology for Development from the University of Colorado Boulder and a BS in Electrical Engineering from Stanford University. She worked as a Software Engineer for more than 20 years before making a career change to teach Computer Science to the next generation.

Kari credits a lifetime of varied experiences for ultimately leading her to her current profession. She first discovered a passion for computers while studying abroad in Germany in the 1980s, when an employer asked her to take their new computer and “do something useful” with it. After college, Kari went on to work in Research and Development at Hewlett Packard, followed by part-time work for a Boulder startup in 1997, after her son was born. In 2010, when Kari, her husband, and her three kids spent 10 months backpacking through Asia, devoting a third of that time to volunteering in developing countries, Kari realized that she wanted to use her technical skills to help others.

It was my time abroad that made me realize that I wanted to do something more useful with my life—to reignite my passion. But, what would that be?

A full-time engineering job would allow me to use more of my technical skills to contribute to the greater good, but that feeling of imposter syndrome had me questioning whether or not I was capable. After taking time away, what if I was underqualified or rusty?

What if I could not keep up with my younger colleagues who, I assumed, spent their weekends working on hobby coding projects and sharpening their skills while I was attending and coaching my kids’ soccer games? What if I failed?

So, I decided to go a different direction, applying to be a Physician Assistant (PA). My travel had taught me how important basic healthcare was, and how often it was lacking. I dreamt of going to a developing country in Africa and sewing up fistulas. However, after realizing the PA program that I had applied to was not as flexible as I would have preferred, I made the crushing decision to decline. A week later, a friend told me about a relatively new, small program at CU Boulder that combined engineering with work in developing countries — Information and Communication Technology for Development (ICTD). I applied right away and was accepted two weeks later!

The flexible program allowed me to take one or two classes each semester while working and raising my kids. I was busy and typically happy; yet, I still didn’t feel like I was on a known path. Then along came Professor Ben Shapiro, the director of the ATLAS Laboratory for Playful Computation (LPC). I somewhat randomly decided to take his class, “How to Teach Computer Science (CS) to Kids.” I thought it would be “how to teach nerdy boys Java,” but it was far from that.

Professor Ben focused on reaching underserved kids through novel ways of teaching CS. Because of that class, I decided to run a summer coding camp for middle school girls, especially those from low-income families. I received an NCWIT AspireIT grant for “Girls on Fire,” a series of five-day bootcamps with the goal of introducing a variety of technologies that allow both creative expression and problem-solving using CS. Ben, who I partnered with to develop the bootcamp experience, continued to mentor me through my Master’s practicum, which centered on code and curriculum for teaching CS to girls.

After graduating from the ICTD program in 2017, I took a couple of turns that didn’t pan out—from creating a nonprofit focused on teaching CS to girls to being a CS instructor for an after-school robotics company. I wasn’t sure how to get unstuck. Then the pandemic hit, which led to a number of companies trying to pivot to online teaching while parents were desperate to find classes for their kids. I took a chance and joined OutSchool, an online teaching platform. Before I knew it, my classes filled up, and I found my niche.

I view my years of experience and challenges as unique advantages to offer students.

It took me almost 10 years to find this new career, but I can look back now and see how each twist and turn got me closer to teaching coding to girls and other underserved populations. In retrospect, I probably learned more about resilience in those 10 years than any other part of my life. And now, I view my years of experience and challenges as unique advantages to offer students. I feel very lucky and fortunate to be enjoying my career again, and I look forward to putting more effort into reaching populations of kids who would benefit from this help the most.

Tim Faiella, NCWIT
Social Science
Program Manager

■ **re:learn**
**When Tech Doesn't
Age Well**

*Ageism not only affects
how tech is marketed, but
also how it is developed
and adopted.*

We've all seen depictions of older people struggling to grasp new technologies. These images are pervasive in our culture. In fact, as I sit down to write this, there's an ad on television where a thirtysomething woman walks through a store while talking on speakerphone, imitating an older person. As it happens, this ad appeared in the midst of a show in which an older character refuses a mobile phone gifted to her by a grandson because she doesn't want to invest the time to learn how to use it. And, this point isn't lost on me either: in both instances, women were featured, as women are often perceived as being less technically savvy.

We're supposed to find humor in all of this because we know that it's older folks who are presumed inept when it comes to tech—when, in fact, the relationship between age and technology is much more complex and multifaceted.

Ageism not only affects how tech is marketed, but also how it is developed and adopted. On the flip side, technology can play a role both in perpetuating and/or disrupting ageism. No doubt, age bias is ingrained in the technical workforce, particularly for women. But, by understanding historical and current contexts, we can mitigate the barriers that prevent older people from contributing to technological innovations that would benefit us all.

What is ageism?

Ageism is discrimination against a person based on their age. These biases are most often held toward elderly or middle-aged people, but it can also be true that these biases affect youth. NCWIT uses intersectional approaches to increase the meaningful and influential participation of women and girls in computing, recognizing that one's social location—oftentimes shaped by race, class, gender, and other dimensions of who we are—creates multiple, interconnected identities and distinct experiences. Age is one of these intersections. It's important to investigate how it interacts with the other social identities, and how these intersections might lead to greater barriers, fewer opportunities, and more hostile work environments.

As a nation, we are getting older. According to data from the Centers for Disease Control, in 2018, the life expectancy at birth was 78.7 years.¹ That number has risen steadily over the past hundred years (in 1900, life expectancy at birth was 47.3 years).² Census data shows that the average household is shrinking (from 3.3 people in 1960 to 2.53 people in 2020).³ Families are growing vertically and shrinking horizontally. ➤

¹ Mortality in the United States, 2018 - Xu JQ, Murphy SL, Kochanek KD, Arias E. Mortality in the United States, 2018. NCHS Data Brief, no 355. Hyattsville, MD: National Center for Health Statistics. 2020.

² National Center for Health Statistics. Health, United States, 2019: Table Q04. Hyattsville, MD. 2021. Available from: <https://www.cdc.gov/nchs/hus/contents2019.htm>.

³ U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements, 1940 and 1947 to 2020.

In the United States, aging is viewed primarily as a process of decline. We're perceived to lose skills, mobility, and brain power. It's assumed that older people are less able to assimilate new information. While work experience is often valued, this seems to be less true of the tech workforce, where older employees' skills are often considered obsolete and older employees are often relegated to less-influential projects. Bias against older workers costs the U.S. economy an estimated \$850 billion annually. About 57 percent can be attributed to involuntary retirement. The impact on women is particularly severe—one-third of that total lost GDP is from women being forced to retire sooner than they would prefer, due to age discrimination. And, these dynamics are moving in the wrong direction. By 2050, that number is projected to climb to almost \$4 trillion.⁴

To make matters worse, a recent AARP survey found that nearly half of older workers concerned about job security worry that their age will impair their ability to find a new job, with women slightly more concerned than men. Among the most vulnerable, those who believe they could lose their job within the year, 61 percent believe their age would be a factor.

Ageism and the tech workforce

Because of its rate of change, tech is commonly considered a realm of youth—products are developed by, used by, and marketed toward young people. Including older workers in this process is particularly important because it helps ensure that the needs of aging populations are considered and met.

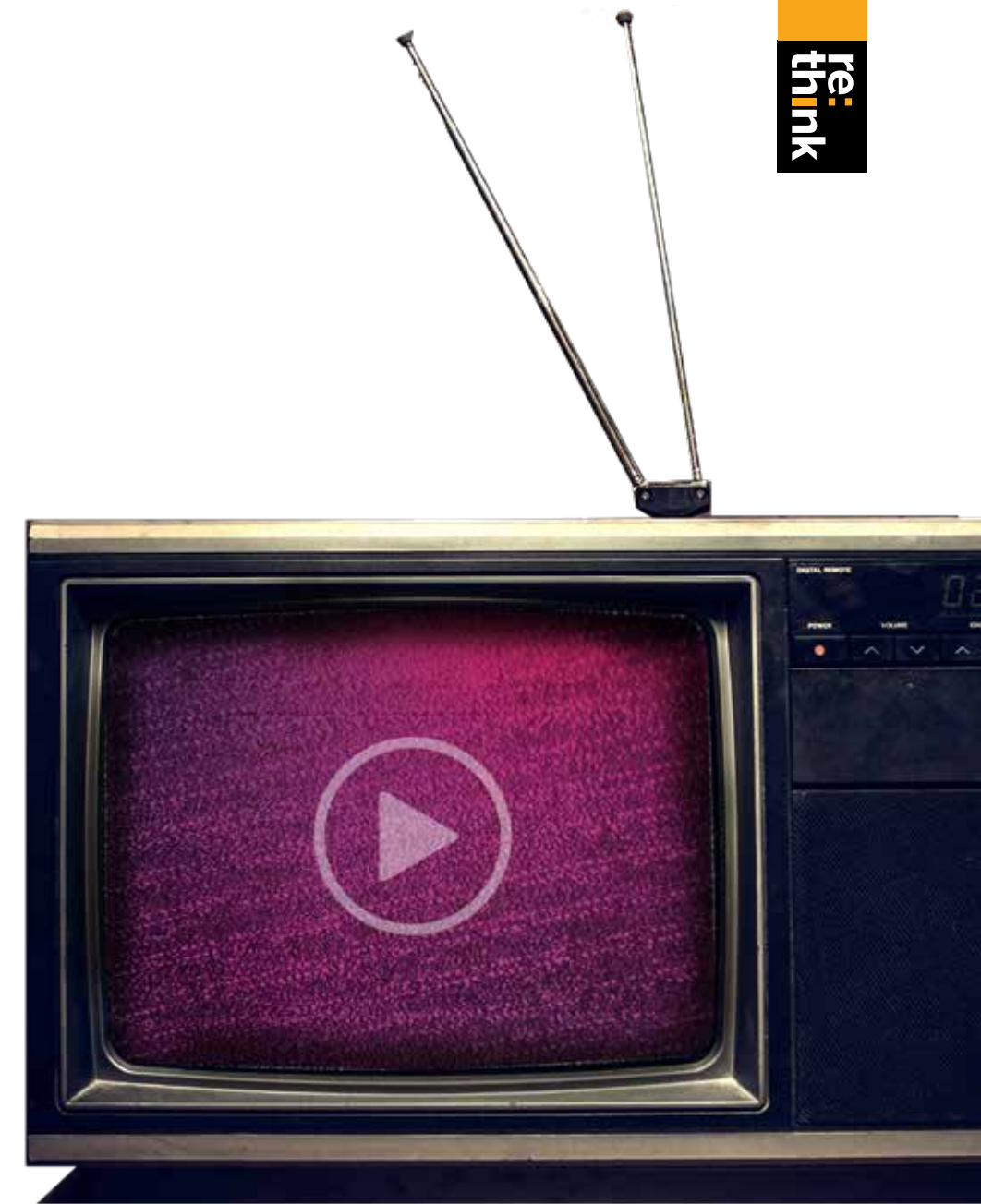
Age can become a technical divide. Though often willing and able to learn, older people are presumed to be unfamiliar with new technologies. Ignoring the physical and psychological processes associated with aging in the development of new technologies makes many products and systems less accessible to older people, creating opportunity gaps, especially when these technologies are required for further employment. By addressing the structural and interpersonal barriers outlined here and including older people on teams that are diverse across age and other identity categories, there is an opportunity to develop new products and systems that better meet the needs of the full spectrum of end-users, enabling us all to lead fuller lives.

Assistive technologies can minimize the need for physical labor, supplement our hearing and vision with the use of sensors, provide flexibility by creating opportunities for remote work, etc. But these things will only happen if the needs of older people are considered when technologies are developed. While policies like the Age Discrimination Act of 1978 seek to prevent inequality based on a person's age, older workers continue to be marginalized, and in male-dominated fields like computing, women are particularly vulnerable, as older women are perceived more negatively than older men.

There's no evidence that older employees are less productive than younger employees. While older people might require more time to master new skills, research shows that they are willing and capable of doing so. And yet, training opportunities are rarely made available to older workers, leaving them ill-equipped for these emerging opportunities. As the rate of technological change and the demand for technically adept workers increase, all workers—including older people—will need training, and designing programs specifically for older workers might be an effective way to grow the pool of technical talent.

How can ageism impact younger workers?

While we're more familiar with discrimination directed at older people, young people can also experience ageism in the workplace. Young women in particular face significant barriers to opportunities, especially in male-dominated fields like computing. And, the lucky few who successfully navigate that gauntlet have no guarantee that older colleagues will take them seriously. Their ideas might be dismissed. The projects that they're assigned to might not carry the same prestige as those assigned to men with similar skills and experience. Women are often directed toward administrative roles. These experiences lead to lower retention rates for women. More than half (56 percent) of women in technical occupations leave their organizations in the middle of their careers. And in the high-tech sector, the quit rate is more than twice as high for women (41 percent) as it is for men (17 percent).⁵ While women are more likely to be the primary caregivers for their families, research suggests that they are not, for the most part, leaving tech careers because of family concerns. Evidence points to workplace conditions, a lack of access to key creative roles, and a sense of feeling stalled in one's career as some of the most significant factors contributing to women's attrition from the tech field. ➤



Tim Faiella is the Social Science Program Manager with the National Center for Women & Information Technology (NCWIT) at the University of Colorado Boulder. His career spans social science research, creative writing, and publishing. Tim's research focuses on media analysis using both content and systems approaches, social issues related to behavioral health, and storytelling in support of social change initiatives. He has an MA in Sociology and an MFA in Creative Writing.

Technical solutions have the potential to level the playing field for older workers.

⁴ AARP and The Economist Intelligence Unit. The economic impact of age discrimination — How discriminating against older workers could cost the U.S. economy \$850 billion.

⁵ Women in Tech: The Facts: <https://ncwit.org/resource/thefacts/>.

What Can We Do?

Review your job ads and recruitment materials (and your own beliefs) for subtle bias. Sometimes the language and images we use have unintended consequences. Do any of the criteria reflect typical assumptions about the “kind of person” you think usually does this job? Do you list “perks” about your workplace environment that might subtly indicate that some potential applicants won’t feel welcome (e.g., free beer, foosball friendly, or nerf-filled)? Do the images reflect a diverse range of people in terms of age, gender, race, and so on? Expand or modify these descriptions and images as needed to include a range of people and preferences. By becoming aware of our unconscious biases and interrupting bias in the workplace, we’ll create a welcoming environment that allows all employees to flourish. Be careful about language used in everyday conversation as well.

Make accommodations for flexible work schedules. Older workers often cite flexibility as an important factor in their employment decisions. The first step toward an effective flexible workplace is for managers to create an environment where employees feel they can discuss available work-life options without being stigmatized. This is particularly true for older workers.

Review task assignment processes. Task assignment is a key area where bias emerges, exacerbating workplace inequity. As a result, older (and younger) employees can have fewer opportunities to creatively contribute, learn, innovate, and shine. Such patterns can also lead to low job satisfaction and higher quit rates for these employees. Research shows that diverse teams are especially creative and productive.

Encourage training, mentorship, and sponsorship opportunities for older employees. By providing opportunities for learning and growth as an employee, older employees can apply their experiences to new problems and work with younger colleagues toward innovative solutions. ■



Find more ways to take effective action as a change leader with hundreds of free resources from NCWIT: ncwit.org/resources.

Research

has shown that biases related to race, gender, and other social identities greatly affect opportunities to demonstrate ability and to prove oneself. These biases influence how resources and opportunities are distributed, how people are mentored or sponsored, and how they are ultimately evaluated.

ncwit.org/power tilt

Reshaping Underlying Ageism Beliefs

*A recent survey by AARP found that **78 percent** of people between the ages of 40 and 65 have either seen or personally experienced age discrimination in the workplace. However, out of all companies that have diversity, equity, and inclusion policies, only eight percent include age as a category.*

Why is it important to consider age and ageism as part of diversity, equity, and inclusion? The world is aging and changing. A graph put out by the U.S. Census Bureau shows how the population of the United States is shifting. In 1960, we had a population pyramid, with a large number of younger people tapering up to a very small number of older people. In 2060, by contrast, it's projected that we will see relatively equal numbers of people across the age span. ➤

*Janine Vanderburg leads Changing the Narrative, a campaign to change the way people **think, talk, and act** about aging and ageism.*

56 percent of people who entered their 50s with stable employment in the United States were pushed out or laid off, and only 10 percent of them ever recovered financially.

A STUDY BY THE URBAN INSTITUTE
RELEASED AT THE END OF 2018

This is a massive demographic shift, and it requires a new way of thinking about what the workplace looks like. It is not going to be a race to see who can attract the most young people. We've got to learn how to accommodate older people, and not just accommodate them, but also think about what kinds of opportunities this shift could provide for us. Unfortunately, many of our current policies and practices are tailored to that 1960 pyramid.



Across the United States, 250,000 people aged 85 and over were in the workplace last year.

The government defines the prime working age as between 25 and 54.

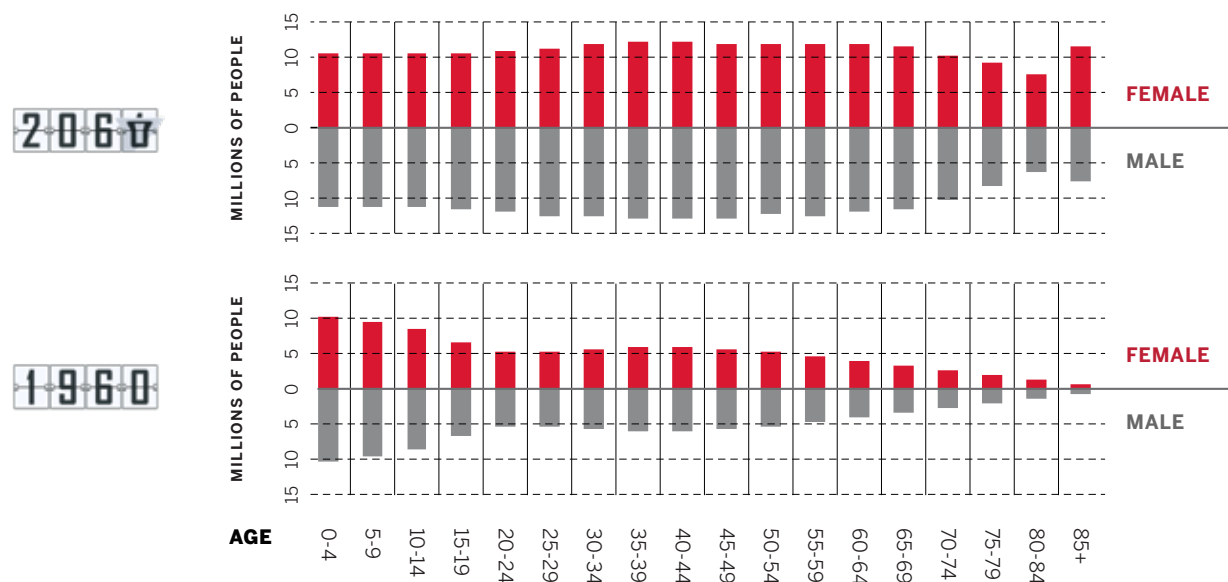
Normal retirement age is considered to be 62 or 65. For the most part, we look at education and higher education as being front-loaded, rather than upskilling across the lifespan. All of those things are going to have to change.

We know that people are staying in the workforce longer. Before COVID-19, approximately one in four people age 65 and over was in the workforce. Across the United States, 250,000 people aged 85 and over were in the workforce last year. Yet many of our policies are not accommodating those realities. So I would encourage everyone to ask, what are the opportunities for all of us, knowing that people are living longer, and that many people want to and are able to continue to work?

What can we do with the expertise and insight that older people have accumulated, and how can we use that to benefit our workforce?

The biggest barrier to reaping these benefits is ageism. Ageism is prejudice, stereotyping, and discrimination against people based on age. It can be directed against younger people as well as older. But, we know that ageism has incredibly harmful effects, not only for individuals, but also on the economy.

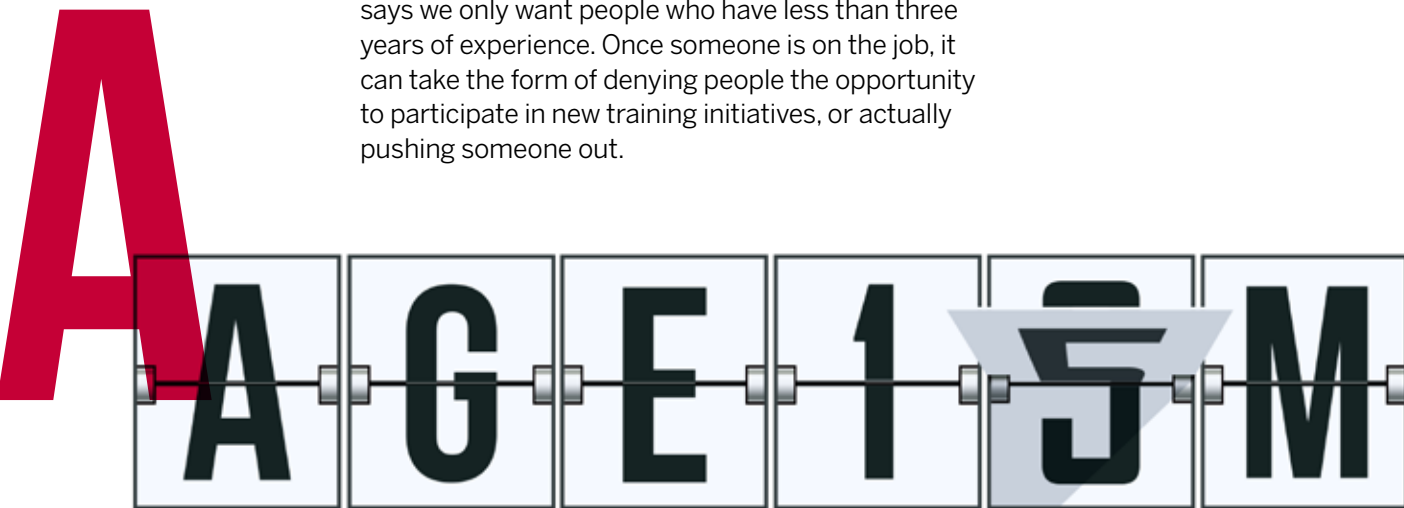
This prejudice can be as simple as saying, "I really don't like having old people around," or "Younger people are just smarter." Stereotyping looks like making assumptions about what people can and can't do. ➤



Source: National Population Projections, 2017 www.census.gov/programs-surveys/popproj.html

“Those older people, I just don’t think their skills are up to date, and they’re not what we need right now.”

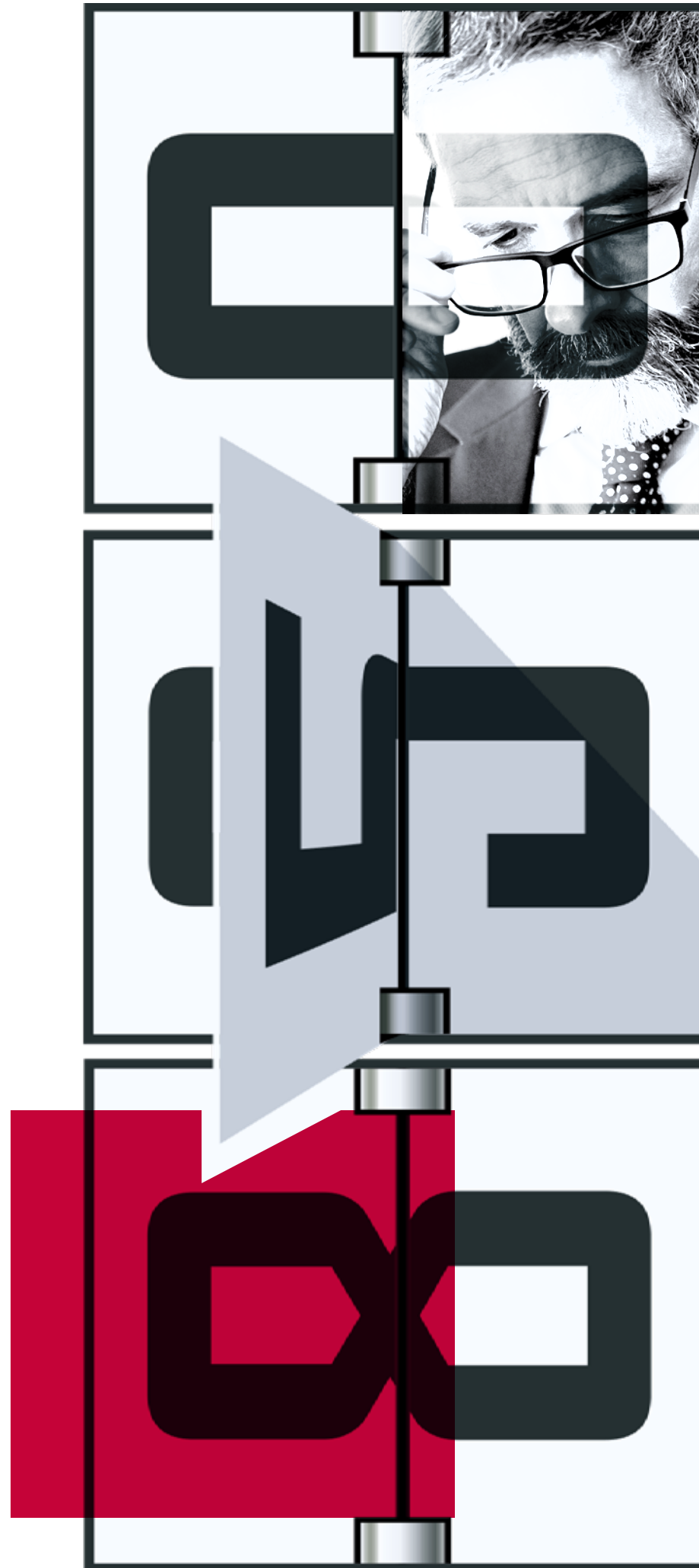
Discrimination can take place at any stage in a person’s career. It can take place in recruitment and hiring, when we use online advertising to target only people of younger ages. It can look like a job description that calls for “digital natives,” or that says we only want people who have less than three years of experience. Once someone is on the job, it can take the form of denying people the opportunity to participate in new training initiatives, or actually pushing someone out.



A study by the Urban Institute that was released at the end of 2018 showed that 56 percent of people who entered their 50s with stable employment in the United States were pushed out or laid off, and only 10 percent of them ever recovered financially. Older women and people of color, if they are laid off, tend to experience much longer periods of unemployment before they’re able to return to the workforce.

At the same time, the Economist Intelligence Unit in conjunction with AARP, did a study which found that in 2018, the cost of age discrimination in the workplace to the U.S. economy was \$850 billion in lost productivity, and of that, \$44 billion was the cost specific to the tech sector. Looking forward into 2050, the projection is that the tech and automotive sectors have the most to lose, and on the other hand, potentially the most to gain, if there are active efforts to recruit and retain older people in our workplaces.

In 2018, the cost of age discrimination in the workplace was \$850 billion in lost productivity.



Ageism: Underlying Beliefs

So why is this discrimination going on? Frameworks Institute did a study on how people think about aging and ageism in America. They found that a lot of the ageism we see is a result of deeply embedded cultural models or patterns of thinking that we have about aging itself, and about older people.

The first cultural model is the conflict between an idealized view of aging and the perceived reality. The idealized view is what I call the “pharmaceutical ad version,” where we’re on the beach holding a glass of champagne; it’s a time of self-sufficiency and leisure. The perceived reality of aging, on the other hand, is basically the idea that it’s a time of decline, loneliness, and dependence; it’s all about loss.

This widely held view totally ignores what experts know, which is that as we age, there is an enormous opportunity for contribution to our communities, our workplaces, and our economy.

The second cultural model is called “us versus them.” In this case, we see older people pitted against younger people in the workforce, and more broadly in the community, in a competition for resources. This sounds like, “If older people stay in the workplace, they’re taking jobs away from younger people.” This belief ignores all of the economic studies that show the reverse is true: the longer people stay in the workforce, the better for everyone on a macro level, in terms of overall economic growth.

Individualism is a very strong theme, certainly, in America. It’s the idea that if someone isn’t doing well as they get older, it’s their fault. They didn’t make the right choices. In the workplace, it sounds like, “If Judy had just kept up with her skills...” In reality, studies have shown that older workers are much less likely to receive opportunities for ongoing training and upskilling than younger workers are. ➤

The final cultural model is this idea of nostalgia. In the good old days, the economy was stable. In the good old days, we had pensions and Social Security was solvent. The challenge of this particular line of thinking is this: if we're thinking about the good old days, we're not able to think innovatively about the opportunities presented by an aging demographic. What would be the opportunities if we had people with a lot of experience and expertise who could work on some of our problems?

Strategies to Reduce Ageism

Research suggests there are three things that are effective in reducing ageism. The first is fostering intergenerational connection. This can take place in K-12 and higher education, and it can certainly happen in the workplace. In the same way that exposure to any group that is different from the group that you identify with creates increased awareness and understanding, fostering intergenerational connection is very effective in reducing ageism.

The second thing is training all managers on implicit bias. Research shows that when managers are trained in implicit bias and are shown how to recognize it, this can help to stop bias in its tracks. This training must be embedded; it can't be simply a one-off workshop, but must be reinforced over time.

And the third strategy is reframing our image of the older worker. Part of what we need to work on, instead of just relying on myths and stereotypes, is looking at the reality of aging, and viewing the older worker as a valuable source of insight, experience, connections, and resilience.

**viewing the older worker
as a valuable source of insight,
experience, connections,
and resilience**

70 percent of younger people
actually wanted mentorship
and considered it valuable.



Research shows that older workers are very motivated to learn, though they may learn in different ways. They are also very motivated to exceed expectations, and they have higher degrees of engagement in the workplace, which can lead to productivity gains. They often have better communication skills and other soft skills. We know that older workers tend to be very loyal, and on average have four times the tenure of younger workers.

But the idea here is not to just hire older workers instead of younger ones. The real benefit comes when we have intergenerational teams. We know that when we have age diversities, similar to when we have teams that are racially, ethnically, and gender diverse, then we have improved team problem-solving and improved creativity. And we know that intergenerational teams increase productivity, and over time, profitability as well.

Now I want to talk about some very specific and concrete actions you can take to reduce the impacts of ageism in your workplace. First, include age in diversity, equity, and inclusion policies. This pushes people to consider what equity for people of all ages would actually look like in the context of your company.

Use age-friendly language and images in recruitment materials. If all of the images are of younger people, or if you are asking for high school graduation dates or saying, "We want less than X years of experience," those are a kind of code telling older people, "We really don't want you to apply." There has also been a lot of discussion recently about bias that is built into algorithms, and this is really important to look at if you're using algorithm-based application screening mechanisms. Finally, to refute the myth that older people don't have current skills, use skill-based assessments.

There are other actions that can be taken to reduce the impact of ageism in the workplace itself. One of the best examples of this approach is BMW in Germany. BMW was faced with the question of what would happen if a large number of people all retired at the same time. For a relatively modest sum of money, they basically went around and asked the people, "What would it take to keep you here?" And, some of the things turned out to be really simple: instead of standing all day, maybe we could have high stools and flexibility in our work hours.

Interestingly, out of the various workplace adaptations that were attractive to older people, some of them were specific to getting older, and some of them were the kinds of things that make a business attractive to anyone at any age.

Investing in training and upskilling across the talent pipeline is another way to reduce the impact of ageism. Instead of making the assumption that new arrivals get trained and people who are deemed promising get trained and move up in the company, ensure that at every point across talent pipelines, training opportunities are available.

Deliberately encourage reciprocal mentorship.

A study released by AARP showed that 70 percent of younger people actually wanted mentorship and considered it valuable, and older people also had a desire to mentor. But, we want to take that one step further and realize that any organization can benefit when they encourage people to learn from each other.

Going beyond what happens in the workplace, we also need to think about the whole ecosystem, and look at policy. It is very important to foster education and training across the lifespan. Institutions of higher education have a strategic business imperative to consider older students as part of their target audience. In the U.S. workforce, development programs have historically been seen as being for younger people. There is now a push to encourage workforce development programs to also look at older workers.

So, it's not just within your organization, but pushing the ecosystem around you as well to upskill older people. Ultimately, the change we're trying to drive is this big idea that we can start looking at older people in multi-generational workplaces as a source of innovation that can drive our organizations forward, especially in times of great flexibility and uncertainty. ■

Janine Vanderburg leads *Changing the Narrative*, a campaign to change the way people think, talk, and act about aging and ageism. She chairs the Encore Network Leadership Council, and is an Encore Public Voices Fellow. Janine is also CEO of Encore Roadmap, which provides tools, inspiration, and workshops for capitalizing on the strengths of older adults.

Inspiring the
next generation
of change leaders

Jane Goodall

In June 2020, NCWIT Research Scientist Brad McLain sat down (virtually) with renowned researcher Dr. Jane Goodall as part of the online thought leadership series, NCWIT Conversations for Change. Among other topics, they discussed the impacts of the COVID-19 pandemic and the critical importance of involving young people in change leadership. In this excerpt from their conversation, Dr. Goodall talks about the ways she sees a new generation of activists stepping up to tackle the world's most pressing problems, and she offers advice to members of the NCWIT Aspirations in Computing Community who want to make a difference in the world. ➤

BRAD MCLAIN: I've been thinking a lot about Roots and Shoots, a program for young people that you founded, that's designed for making positive change in the world. The thing I like most about Roots and Shoots is that it tells young people that you don't have to wait until you grow up to make a difference. You can make a difference now.

JANE GOODALL: Yes, Roots and Shoots is about listening to the voices of young people. It is empowering them to take action. And so youth groups around the world, in more than 100 countries now, are actually taking action and making change. We're training young people who can be leaders—leaders in academia and leaders in all of the different walks of life. The whole COVID-19 pandemic is pushing people to want to, and to have to, live in a different way. To create a new world.

BRAD: What do you think the COVID experience is teaching us as a society, or not teaching us, about how we will deal with other looming threats that we all face together?

JANE: One thing it's done, which is good, is that it has brought people together as communities. They've been finding ways to help each other, to cheer each other up. But the problem for me is, we've proven that we can get together around the globe, and most countries are fighting in the same sort of way to prevent the spread of this disease. We can do it. But why haven't we done it for climate change? Why have the leaders consistently denied climate change, or ignored it, and not met their requirements and the goals they set for themselves about the reduction of emissions? Because again, short-term economic gain.

“We’re training young people who can be leaders, leaders in academia, and leaders in all of the different walks of life.”

BRAD: The idea that our children are all watching as we deal with these challenges is very powerful. In the context of COVID, what do you think is the alternative attitude that would provide more balance and safety against these kinds of epidemics?

JANE: We have to try to emerge from the pandemic with a new understanding, with a determination to create a better, more harmonious relationship with the natural world, with the animals with whom we share it. We have to learn, and somehow persuade our leaders in business and government that it is not always the bottom line, the short-term economic benefit, that's more important than protecting the environment. So, that's the hard part.

One of the really pressing issues that we have to address, other than reducing our own environmental footprint, for those of us in affluent societies, is that we've got to alleviate poverty. Because if you are really poor, you are going to destroy the last trees to try and grow food, fish the last fish to try to feed your family. So we've got to alleviate poverty, and we've got to reduce our own environmental footprint. ➤



Photo Credit: Robert Ratzer

63,540
Youth around the world taking action

Dr. Goodall's organization, Roots and Shoots, is working to equip young people from diverse backgrounds with STEM education, leadership skills, and material resources to address needs in their own communities, while connecting the generations through mentorship and encouragement.

“My goal has always been to
*reach
 the
 heart,*
 not to argue with the mind.”

BRAD: You had a big change in your life; you transformed yourself from celebrity scientist to conservation activist almost overnight. Can you describe what compelled you toward that transformation?

JANE: Actually, I don't think anything changed except my understanding of what was going on. Either I hadn't understood before, or I hadn't wanted to. But I was at this big conference in 1986, bringing the chimp researchers together, and it was meant to be about learning about chimp behavior in different environments. We had a session on conditions in some captive situations. And seeing our closest relatives, who can live 60 years, in medical research laboratories, in five foot by five foot cages with bars all around, bars underneath, and bars on the top, it was shocking to me. I couldn't sleep. But we also had a session on conservation. And while of course I knew there was some deforestation, I had no idea of the extent of it. I went to that conference planning on having this amazing time out in the rainforest, and I left as an activist. I just knew when I left that I had to do something.

I think change must come from within. So my goal has always been to reach the heart, not to argue with the mind. Although you have to have the facts there to argue with the mind, if necessary. But how do you reach the heart? Telling stories. That's been my modus operandi, and it's worked so often. People change because they hear some of the stories of the suffering, or stories of what it is like in the wild, or stories of the results of certain actions. You leave them, and you don't even know that you've changed them until maybe sometime later.

BRAD: I'd like to talk more about Roots and Shoots. It's an education program aimed at empowering young people to create campaigns to benefit people, animals, the environment, and their local communities. But even more than that, I like to think of it as an identity development program, because really, it helps kids generate a sense of self as compassionate change leaders who can make a difference in the world today. Jane, how did this all happen?

“Once young people understand the problems and they are empowered to take action, it is unbelievable what they are doing.”

BRAD: From your perspective, how does the work of leading other people to change themselves present a unique challenge?

JANE: To me there was no point in confronting the medical researchers in the labs, or the politicians or business people, because I don't believe you can create change by arguing. People immediately become defensive; they're not really listening anymore.

JANE: It happened because when I was traveling around the world, trying to raise money and awareness, I met so many young people who seemed to have lost hope. And you hear that we haven't inherited this planet from our ancestors, we've borrowed it from our children. But we haven't been borrowing our future. We've been stealing it. We're still stealing today. ➤

The Roots and Shoots program started when 12 high school students in Dar es Salaam, Tanzania approached me with their concerns over their local environment and for the natural world in general. They were concerned about the destruction of the coral reefs, poaching in wildlife reserves, and lack of environmental education. They felt helpless to do anything and wanted me to help solve the problems.

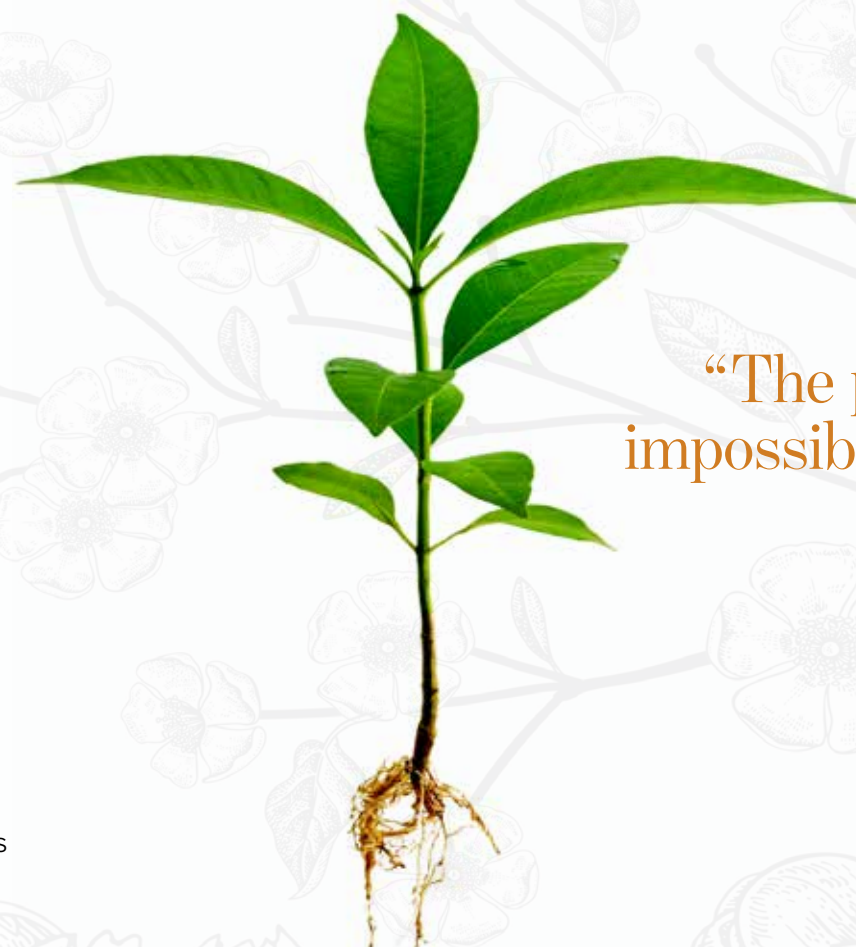
This occurred in many parts of the world, and I realized that in order to help, we needed to empower young people to study the local problems and work together to find solutions and change the status quo. So, Roots and Shoots began with the main message: every one of us makes an impact on the planet every single day. And we have a choice as to what kind of impact that we want to make.

We decided that each group would take on projects to benefit their local community, animals (including domestic animals), and the environment we all share, and that those activities would depend on wherever in the world the group was located, to work within local customs and traditions. There is a strong element of learning to work together to break down socio-economic barriers, across different ethnicities and beliefs. In the past 30 years, Roots and Shoots students of all ages have undertaken thousands of projects around the world. Many have moved into governmental and corporate roles and are now bringing up their own families with the same values they acquired from being a part of Roots and Shoots. The program now includes kindergarten, university, and everything in between.

BRAD: What do you see as the most significant barriers to young people's empowerment today?

JANE: Many young people grow up in dysfunctional families, with little access to education or future job opportunities. Many feel helpless to change the world around them, and some are limited by the pressures of the government in the locations in which they live. Some have little access to modern technology in our increasingly internet-based world. These are some of the issues we seek to address in Roots and Shoots, where we empower young people of all ages to believe that they CAN and do make a difference every day and that it is up to each one of them to seek to make the right kind of difference in our world.

“We have to create a better world for our great-great-grandchildren.”



“The people who tackle what seems impossible, but they don't give up, they inspire people around them.”

BRAD: **Here at NCWIT, we have Aspirations in Computing, which is a national community of women in computing supporting each other. And we have a couple of questions from Aspirations in Computing members for you, Jane. We would like to bring in one of those members now.**

CHRISTINA LEE: Hi, Dr. Goodall. My name is Christina Lee, and I'm a 2020 NCWIT Aspirations National Honorable Mention and Massachusetts Affiliate Winner. As a 17-year-old, I'm a member of Generation Z. We're young, but we have the passion, ideas, and will to create meaningful change in the world. However, we're often overlooked due to our young age, and we're sometimes discouraged by our lack of resources and experience. Do you have any advice for us as the change makers of now and in the future?

JANE: My advice for you is the same as my mother gave to me: if there's something you want to do, then you've got to work hard, take advantage of opportunity, and don't give up. The key message for any young person is, if there's something you want to do, then make sure you really do it. Is this touching your heart? Is it your passion? If it is, then dive in and don't give up.

BRAD: Here's another question from our community: “I love your message about hope. Thank you for sharing that. What do you tell yourself to keep your hope alive?”

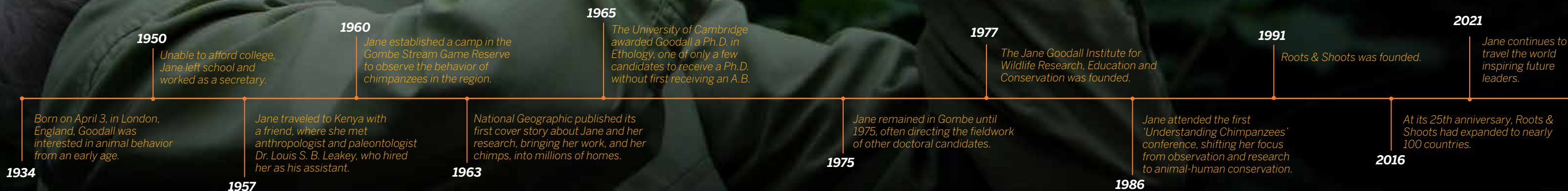
JANE: My main reason for hope is the young people. All these hundreds of thousands of Roots and Shoots [participants] and alumni all around the world. Everywhere I go, there are young people who are changing the world. And there's this extraordinary intellect that we have, and the bizarre thing is that this most intellectual creature is destroying our planet—our only home. And so the young people, hopefully, will help us change that scenario of destruction into one of reconciliation with nature and each other.

And then there's the resilience of nature; places we've utterly destroyed can once again support life. Chimpanzees have more forest now than they had in 1990. The isolated communities can once again communicate. And then, finally, the indomitable human spirit. The people who tackle what seems impossible, but they don't give up, they inspire people around them. When we have that inspiration from the people out there, and all of the stories, we can't give up. We all have to go on fighting. We all have to get together. We have to create a better world for our great-great-grandchildren.



Equipped with little more than a notebook, binoculars, and her fascination with wildlife, Jane Goodall has given the world a remarkable window into humankind's closest living relatives. Through nearly 60 years of groundbreaking work, Dr. Goodall has not only shown us the urgent need to protect chimpanzees from extinction; she has also redefined species conservation to include the needs of local people and the environment.

“My advice for you is the same as my mother gave to me: if there’s something you want to do, then you’ve got to work hard, take advantage of opportunity, and don’t give up.”



WE RE THINK AGEISM

Benjamin Jones.
Professor of Economics at
Northwestern University, and Lead
of Entrepreneurship and Innovation
Efforts at the Kellogg School

IN THE 21ST CENTURY

The idea that young people drive scientific and technological breakthroughs is very, very long-standing, but I want to see if that's actually true. Before we examine the possibility of ageism in Silicon Valley, let's look back in history a bit. ➤

YOU CAN GO BACK TO THE EARLY 20TH CENTURY,

and take someone as notable and thoughtful and brilliant as Albert Einstein. What was his view? He said, “A person who has not made his great contribution to science before the age of 30 will never do so.” Einstein, at age 26 in 1905, a miracle year, did several things for which he would ultimately win the Nobel Prize. So, he was quite precocious. Paul Dirac, a contemporary of Einstein, who also did his Nobel-Prize-winning work at age 26, made a poem out of this idea: “Age is, of course, a fever chill that every physicist must fear. He’s better dead than living still when once he’s past his 30th year.”

Fast forward to today, and you can find all sorts of quotes in this same vein from other innovators and achievers. For example, there’s Mark Zuckerberg, who said, “Young people are just smarter.” Then there’s Paul Graham, the founder of Y Combinator, who said, “The cutoff in investors’ heads is 32.” (He’s being slightly more generous; you get an extra two years.) “After 32, they start to be a little skeptical.” Vinod Khosla, another venture capitalist, who’s even more generous, says, “People over 45 basically die in terms of new ideas.”

“WHY DO PEOPLE TEND TO HAVE THIS FAIRLY COMMON, PERSISTENT VIEW?”

Those who articulate their reasoning will often draw on three types of stories:

1

One story is that young people are just better at deductive reasoning. People who are more seasoned may have more wisdom and may be better at inductive reasoning, but if it’s just pure mathematical deductive horsepower, somehow people think young people have an advantage.

2

The second story is that young people might have more energy. This is a claim about health, but it’s also a claim about being unencumbered by other responsibilities, like a family, children—those kinds of things.

3

The third story, perhaps the most common in the minds of those who really believe you need to bet on young people, is that young people are better at transformative thinking. The idea here is that as we age, we become beholden to certain sets of ideas, ways of thinking, paradigms of thought, that make it harder to break out and have a truly radical new idea. Young people who haven’t been exposed to those traditions for as long, and are exposed to the latest technology first and foremost, may be better positioned to do something transformative.

These beliefs are held by very prominent people. So what is actually true when you look at the data: are young people actually more capable?

THE ANSWER IS, SIMPLY, NO.



OUR TEAM ANALYZED THE AGE OF ALL BUSINESS FOUNDERS IN THE U.S.

in recent years by leveraging confidential administrative data sets from the United States Census Bureau. We found that the average age of entrepreneurs at the time they founded their companies is **42**. But, the vast majority of these new businesses are likely small businesses with no intentions to grow large (for example, dry cleaners and restaurants). To focus on businesses that are closer in spirit to the prototypical high-tech startup, we used a variety of indicators: whether the firm was granted a patent, received VC investment, or operated in an industry that employs a high fraction of STEM workers. We also focused on the location of the firm, in particular whether it was in an entrepreneurial hub such as Silicon Valley.

In general, these finer-grained analyses do not modify the main conclusion: the average age of high-tech founders falls in the early 40s. We found no evidence to suggest that founders in their twenties are particularly successful. Rather, founders who were middle-aged and beyond tended to outperform other age groups, while younger founders appear disadvantaged. The average age of founders from the top-performing companies within the high-tech sector is about **45**. While it's important to note that this is partly because there are so many founders within this age range, the likelihood of creating successful firms also rises dramatically with age.

45

42

IF YOU WANT TO DO SOMETHING BIG

YOU'RE GOING TO HAVE TO ASSEMBLE A GROUP OF PEOPLE WITH THE REQUISITE SKILLS AND KNOWLEDGE.

WHAT, THEN, ARE THE IMPEDIMENTS THAT EXIST FOR YOUNGER PEOPLE?

Knowledge accumulates over time, meaning that each generation builds on the knowledge produced by previous generations. In order to acquire the knowledge and skills required to make the next generation of contributions, each generation has to master a larger set of information. This means that training must also shift because every generation is born as children with empty minds. One response is that you can extend your training. It's going to take longer to learn all there is to know before one can actually innovate oneself. So we might see fewer and fewer innovations by people in their 20s, systematically over time, simply because these people are actually still learning as opposed to innovating for the most part.

There's another option, though. Specialization. Instead of taking the time to learn an entire field, you can narrow your focus. Instead of mastering all of biology, you might know a lot about viruses, or about protein-folding, but you can't know all of biology. This is a fundamental narrowing effect that is leading, I think, to large organizational changes in how we innovate successfully and how we should think about organizing ourselves to innovate successfully.

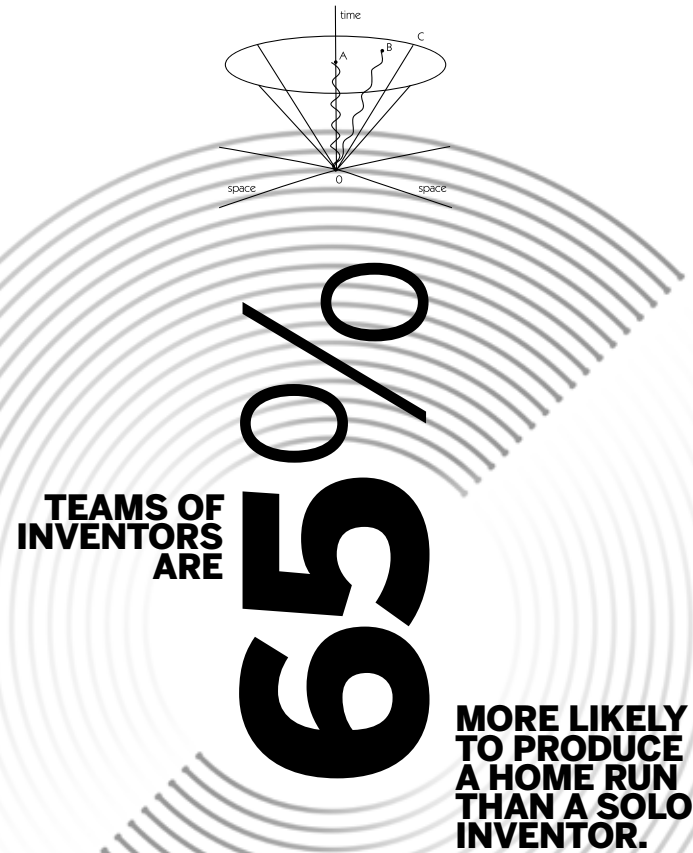
The individual is too narrow, so if you want to do something big, you're going to have to assemble a group of people with the requisite skills and knowledge. That is interesting because it's no longer just brilliance on your own staring out the window. You need to have some team-building skills. You've got to work well with others to some extent. You've got to think about all those softer skills that might be essential. ➤

IF YOU LOOK AT HOME RUNS IN PAPERS OR PATENTS

you see striking patterns. A home run is often measured, for the sake of convenience, as an article or patent that receives a lot of citations. It's influential to ongoing work. It's highly cited. If you look in science and engineering papers, it's hard to write a paper that is very impactful. These are rare. But team authors are four times more likely to write such a paper than a solo author. Same goes in social sciences. In patenting it's not quite as dramatic, but it's still a huge difference. Teams of inventors are 65 percent more likely to produce a home run than a solo inventor.

Ultimately, there is no fundamental tension between the existence of great young entrepreneurs and a general tendency for founders to reach their peak entrepreneurial potential later in life. Some entrepreneurs are hyper-talented—so good, that they are good even when they are very young. But even these people tend to perform better as they age. As we've seen, key innovations are more likely to be achieved in middle age.

If the goal is to put people in the best position to make meaningful and influential contributions to their field, evidence suggests depth of expertise is very important. And teams are usually the key to bringing sufficient expertise together to drive a big advance. When you aggregate people, you aggregate expertise. You also have a better chance to combine ideas in fresh ways. In innovation, a team is not about repeating the same person over and over again but about connecting different perspectives, skills, and ideas. Diverse backgrounds can then be very important. For instance, new evidence from biomedicine shows that mixed-gender research teams substantially outperform same-gender teams. The research from mixed-gender teams is both more novel and more impactful. ■



Benjamin F. Jones

is the Gordon and Llura Gund Family Professor of Entrepreneurship, a Professor of Strategy, and the faculty director of the Kellogg Innovation and Entrepreneurship Initiative at Northwestern University. An economist by training, Professor Jones studies the sources of economic growth in advanced economies, with an emphasis on innovation, entrepreneurship, and scientific progress. His research has appeared in journals such as Science, the Quarterly Journal of Economics, and the American Economic Review, and has been profiled in media outlets such as The Wall Street Journal, The Economist, and The New Yorker.

To meaningfully increase

the influential participation of historically marginalized groups, we need to move beyond headcount metrics alone. We need metrics that assess how power and influence work on technical teams and who is able to access them.

ncwit.org/power tilt

Recognizing how power and influence are affected not only by role identities (e.g., job level, title, position), but also by biases associated with social identities (e.g., gender, race, class, age, etc.) challenges the notion of meritocracy, which is so commonly found in tech cultures.

meritocracy

[mer-i-tok-ruh-see]

There is a mismatch between our belief in meritocracy and the difficulties in actually achieving it in reality. Awareness of, and attention to, this mismatch is an important first step in creating inclusive cultures that foster broader access to influence.

ncwit.org/power tilt



2021 NCWIT Pioneer in Tech Award Recipient

GLADYS WEST

Dr. Gladys West started her career at the Naval Proving Ground in Dahlgren, Virginia, now called the Naval Surface Warfare Center, in 1956, and she worked there for 42 years as a mathematician and computer programmer. When she began, she was the second Black woman ever to be hired at the site, and one of only four Black employees total. Inspired by the civil rights movement that was unfolding around her, she countered prejudice within her workplace through hard work and intellectual achievement.

As Forbes reports, Dr. West “specialized in large-scale computer systems and data-processing systems for the analysis of information obtained from satellites. She was the very first person to put together altimeter models of Earth’s shape to significant precision in the 1960s, and served as the project manager for Seasat: the first satellite to perform remote sensing of Earth’s oceans.” Soon after she began working at Dahlgren, Dr. West participated in an astronomical study that proved the regularity of Pluto’s motion relative to Neptune. In a commendation that Dr. West received upon her 2018 induction to the Space and Missiles Pioneers Hall of Fame, this work was described as “path-breaking” and “award-winning.”

The commendation also noted the ways Dr. West’s work laid the foundations for today’s GPS system. From the mid-1970s through the 1980s, the commendation continues, “using complex algorithms to account for variations in gravitational, tidal, and other forces that

distort Earth’s shape, [Dr. West] programmed an IBM 7030 ‘Stretch’ computer to deliver increasingly refined calculations for an extremely accurate geodetic Earth model, a geoid, optimized for what ultimately became the Global Positioning System (GPS) orbit.”

Despite her contributions to several high-profile projects, Dr. West remained one of computing history’s “hidden figures” until a member of her sorority realized that she had played a key role in the development of GPS technology, and contacted the press. “You never think that anything you are doing militarily is going to be that exciting,” she reflected in an article in *The Guardian*. “We never thought about it being transferred to civilian life, so that was a pleasant surprise.”

Dr. West grew up in a rural agricultural community in Dinwiddie County, Virginia. Knowing from a young age that she did not want to work in the fields, she graduated at the top of her class and earned a full scholarship to Virginia State College (now University), where she majored in mathematics. She returned to Virginia State a few years later for her master’s degree in mathematics. While working at Dahlgren, she completed a second master’s degree in public administration from the University of Oklahoma. Dr. West never stopped pursuing new interests, and at the age of 70, she received a PhD in public administration and policy affairs from Virginia Tech.

**THE
IDEA YOU
DON'T
HAVE** **IS THE
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