Engineering the American Dream: A Study of Bias and Perceptions of Merit in the High-tech Labor Market

by

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Submitted to the Department of Comparative Media Studies in partial fulfillment
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Abstract

In recent years, a significant amount of resources and attention has been directed at increasing the diversity of the hi-tech workforce in the United States. Generally speaking, the underrepresentation of minorities and women in tech has been understood as an "educational pipeline problem," – for a variety of reasons, these groups lack the social supports and resources needed to develop marketable technical literacies. In this thesis I complicate the educational pipeline narrative by taking a close look at the perspectives and practices of three different groups. First, I explore widespread assumptions and recruitment practices found in the tech industry, based on interviews I conducted with over a dozen leaders and founders of tech companies. I found that widespread notions of what merit looks like (in terms of prior work experience and educational pedigree) have given rise to insular hiring practices in tech. Second, I offer an in-depth examination of the risks and opportunities related to an emerging set of practices termed "algorithmic recruitment," which combines machine learning with big data sets in order to evaluate technical talent. Finally, I analyze the strategies adopted by a non-profit called CODE2040 in order to facilitate structural changes in how tech recruits talent to include a more diverse set of qualified applicants. I conclude by offering a more robust conceptualization of diversity and its value in the tech sector, as well as some specific ways to increase tech's diversity in the future.

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Contents

Chapter 1

Engineering the American Dream: A Historical View

On a warm Sunday afternoon in late July, I found myself sitting on the expansive living room floor of "the Sub," an arts and technology cooperative located in the heart of San Francisco's Mission District. From the outside, the Sub looks like a half-abandoned warehouse, situated along a city block speckled with fruit stands, colorful murals and bursts of laughter from a crowd waiting outside of a homeless shelter down the street. The interior of the Sub oozes a particular brand of Silicon Valley cool. That afternoon it was littered with musical instruments whose names and origin I couldn't place, and a few groggy 20-somethings in Airbnb t-shirts, emerging from their bedrooms after a long night of festivities.

I had frequented the Sub several times over the course of the summer to attend trendy parties and visit my buddies from college, who founded the cooperative in 2009 after they graduated from Stanford. Over the last five years, the Sub's cachet has climbed as steadily as the neighborhood's rent prices. In

many ways, the cooperative and its leader, Johnny Hwin, embody the rise of the

tech sector as a symbol of America's future prosperity in the aftermath of the

worst economic crash in living memory. The 2008 recession hit Millennials (those

born around the early to mid-1980's) particularly hard. In spite of being the most

educated generation in U.S. history, young adults who graduated from college

during the recession experienced unemployment rates nearly double that of other

generations.[1] For many, it became apparent that a college degree no longer

guaranteed the stability of a well-paying job upon graduation.[2]

Against this dire backdrop, Johnny Hwin, a kid from a working-class

immigrant family went to Stanford on a full financial aid package and made his

first million on the Internet. Today he uses his money and reputation to foster a

community of entrepreneurs and artists who are hell bent on making a career on

their own terms, emphasizing code over credentials, innovation over corporate

ladder climbing. Underlying this new image of success is a strong anti-

establishment (or new establishment)[3] undercurrent: the belief that, where

traditional institutions have failed us, technology provides hope for new pathways

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[1] Denali Tietjen, "Jobs Scarce, College Grads Go into Business for Themselves - CSMonitor.com," *Chrisitan Science Monitor*, February 7, 2014, http://www.csmonitor.com/Business/2014/0207/Jobs-scarce-college-grads-go-into-business-for-themselves.

[2] Moreover, these hardships are not evenly distributed across society. Studies have revealed that black college graduates have face unemployment rates double that of their peers since 2008. Also, in *Paying for the Party: How College Maintains Inequality*, sociologists Elizabeth Armstrong and Laura Hamilton provide a vivid portrait of how class inequality is reproduced in the party culture that pervades large public universities. College had become the place where the children of the privileged have permission to play while the children of the poor work away, only to realize that their degree has given them more debt than opportunity.

[3] Although the tech scene maintains their image as the land for "scrappy" startups, there are major institutions (venture capital funds, tech accelerators, multi-billion dollar companies, etc) who hold a significant amount of power and influence over which ideas and companies are funded, and ultimately succeed in the tech sector. In order to thrive in this eco-system, one must successfully navigate the status-driven politics of this new tech establishment.

to prosperity. This narrative is premised on the idea that the rapid growth of tech provides unprecedented opportunities for a fresh start in life. Though the tech scene itself is relatively young, this idea builds on much older notions of "the American dream," in which any individual has the opportunity to create their own success, regardless of where they start out in life.

As the political philosopher Jennifer Hochschild argues, there is a fundamental tension embedded in the ideology of the American dream. On one hand, it offers hope to all individuals, positing that we all should have the right and the means to pursue our dreams. At the same time, logic follows that those who do not succeed fail as a result of their own personal inadequacies. Success is a sign of virtue, and the losers in life "have no real value in the ideology except insofar as they are potential winners sometime in the future."[4]

But tech is about more than just money and jobs – it's about ideology and culture more broadly. As one *New Yorker* article profiling Johnny and the Sub described in 2013, "Tech today means anything about computers, the Internet, digital media, social media, smartphones, electronic data, crowdfunding, or new business design. At some point, in other words, tech stopped being an industry and turned into the substrate of most things changing in urban culture."[5] Once confined to the interests of a narrow set of "geeks and misfits," technology is now an integral part of mainstream cool, shaping fashion trends and musical beats, as much as it influences new paradigms of work and play.

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[4] Jennifer L. Hochschild, "The Word American Ends in 'Can': The Ambiguous Promise of the American Dream," *Wm. & Mary L. Rev.* 34, no. 139 (1992).
[5] Nathan Heller, "Bay Watched: How San Francisco's Entrepreneurial Culture Is Changing the Country," October 14, 2013, http://www.newyorker.com/magazine/2013/10/14/bay-watched.

As this vision of tech has gained momentum, more and more young people have flocked to San Francisco to carve out their own slice of the new American dream.

Accompanying the arrival of well-paid techies is an influx of cash into neighborhoods like the Mission, where many of the long-time residents of the diverse community have been evicted by landlords making room for newcomers willing and able to pay twice the price. Over the last few years the tech sector, and all of its cultural adornments, has become the target of protests, as many people struggle to preserve their position in this new landscape of prosperity. In this emerging scene of tech-driven gentrification, scholars and activists have begun to investigate the ripple effects of inequality in economies driven by digital innovation.[6]

Running in parallel to these developments in the Mission is a broader concern over the lack of diversity in the tech sector itself, where the demographic makeup is disproportionately white and male.[7] As the tech industry has grown in wealth and prestige, a significant amount of resources and effort has been mobilized to increase the industry's diversity. Generally speaking, the underrepresentation of minorities and women in tech has been explained as an "educational pipeline problem," meaning that, for myriad reasons, these groups (including "women" as a group) lack the social supports and resources needed to

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[6] Leo Mirani, "The Secret to the Uber Economy Is Wealth Inequality - Quartz," December 16, 2014, http://qz.com/312537/the-secret-to-the-uber-economy-is-wealth-inequality/.

[7] In 2014 Google released statistics on the demographic makeup of its employees. The release produced a domino effect in the industry, as other major tech companies Apple and Yahoo subsequently came clean about the disproportionate number of white males in leadership and technical roles in their companies. Stats can be found at:
http://www.pbs.org/newshour/updates/google-discloses-workforce-diversity-data-good/

develop marketable technical literacies. Accompanying this explanation is a notion that, in spite of its current homogeneity, tech is a uniquely meritocratic industry, where anyone with interest and a good idea can get ahead. This sentiment is captured well in a statement made by Internet entrepreneur Jason Calacanis, who in 2013 was quoted saying, "The tech and tech media world are meritocracies. To fall back to race as the reason why people don't break out in our wonderful oasis of openness is to do a massive injustice to what we've fought so hard to create. It flies in the face of our core beliefs: 1. anyone can do it, 2. innovation can come from anywhere and 3. product rules."[8]

Such statements are reinforced by books and newspaper articles which depict the lone entrepreneur/innovator who drops out of college to pursue "the next disruptive idea." This too-cool-for-school narrative implies that raw talent is far more important than a piece of paper from a university. This can be appealing when one considers the mounting costs of attaining a college degree, along with the growing ambiguity around how that degree will translate into real opportunity in the job market. As student debt continues to rise, there is a growing interest in the expansion of alternative pathways to promising careers via online educational resources. This is particularly true in the tech sector, where online learning platforms like Treehouse, Codecademy, and Udacity, advertise the promise of

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[8] Jemima Kiss, "The Tech Sector a Meritocracy? I Wish," *The Guardian*, February 7, 2013, sec. Comment is free, http://www.theguardian.com/commentisfree/2013/feb/07/tech-sector-meritocracy-jemima-kiss.

future prosperity for any hardworking individual looking to make a career change.[9]

Yet, this kind of talk gets uncomfortable when we consider just how white and male the tech sector is today. Hypothetically speaking, if anyone with interest and reliable internet access can learn to code within a short period of time, does that mean that students who are female, Black, or Latino/a simply lack interest or aptitude for these subjects? How does one demonstrate his or her competency in a sector that perceives itself as an anti-credentialist meritocracy? If working for a successful technology company is the new American dream, who gets to participate and on what terms?

It was these questions that led me to invite a group of Black and Latino college students to join me at the Sub to discuss their experiences working as interns in San Francisco's tech scene. The students were all summer fellows with CODE2040, an organization whose flagship program connects minority college students with high-profile tech internships in Silicon Valley. The CODE2040 summer regimen is intense. In addition to working full-time jobs, the fellows are expected to attend 2-3 evening events every week, designed to foster their professional development and increase their network ties to industry. This left little time for more casual conversation and frank reflection amongst themselves. As a research fellow with CODE2040, I spent a large part of the summer snagging conversations and conducting observations with the fellows during

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[9] "Start a New Career with Treehouse." Youtube. February 24, 2014. Accessed December 19, 2014. https://www.youtube.com/embed/zeGT4UArCdc?rel=0.

official events and lunch breaks. As I got to know them, many of the fellows

asked me how their experiences compared to others' in the program. Were they

struggling to fit in? Had the fellows' college experiences prepared them for the

hustle and bustle of San Francisco? What were their strategies for talking about

race at work?

In response to their inquiries, I collaborated with a summer fellow named

Alex[10] to organize this afternoon conversation at the Sub, where we found

ourselves sitting in a circle, eating fruit picnic-style on a well-worn fancy rug. The

conversation was spearheaded by Alex, a Latino student from southern

California who had been particularly vocal about his struggles to navigate and

integrate his summer experiences into an authentic sense of self. Early on in the

conversation, Alex expressed his discomfort with the steady flow of praise he

received from his co-workers and mentors at CODE2040,

> "I always have this concern with, like, what's the context of being
> awesome. Like, when somebody says, 'You're awesome!' I think, am I
> awesome for a Hispanic person in CS? Or am I awesome for a
> CODE2040 fellow? Or am I awesome for like a 21-year old? In what
> context am I awesome? Compared to Mark Zuckerburg am I that
> awesome? I don't think so. I'm always concerned that it's within the scope
> of my race that people give me some form of approval. Like, 'For the
> situation you're in, you're good.'"[11]

Rather than being praised for who he was, Alex wanted to be praised for what he
did.

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[10]Alex is not a pseudonym. However, unless explicitly stated otherwise, all individuals have been
assigned pseudonyms in order to anonymize their identity throughout this thesis.
[11] Alex Triana, group discussion, July 27, 2014

"I just want it to be known by my actions and by the work that I do that I'm awesome. It doesn't have to be something that's that explicit, 'Oh you're so awesome!'"

He pumped his right fist in the air in a playful mock cheer. There were vigorous nods in agreement around the circle. Minutes before, the group had been discussing how good it felt when people set high expectations for them. They liked to be given challenging tasks and then receive recognition for doing them well. I asked the fellows to explain at what point high expectations and praise transformed into empty cheerleading. When did they deserve credit for being "authentically awesome"?

A student from Puerto Rico named Rodrigo explained his desire for clear, objective metrics to establish the merit of his work,

> "We're all engineers, so we're very objective about stuff. If you set a high expectation, I expect you to explicitly tell me what is the bar, what is the metric, what are you using to measure... you have to be very objective. I hate being told that I'm something and not being told the reason why."[12]

As the conversation started to wind down about an hour later, Alex asked the group if they thought that the industry would need to lower their standards in order to substantially increase the proportion of minority students into their workforce. People shook their heads in disagreement, eyebrows furrowed as a half dozen "no's" echoed around the circle. Alex hesitated, but then persisted,

> "But it's not even like we're a few years behind. It's like we're multiple generations behind. We're playing catch up from like fifty or sixty years. That's not something that you can study in your own time and catch up on.

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[12] "Rodrigo," group discussion, July 27, 2014.

That's like multiple lives… I would love to think that we don't have to lower our standards. But I don't honestly believe that."

With that, the fellows launched into an energetic conversation exploring questions that have plagued American policymakers, educators, equal opportunity activists and business leaders for decades: How do we reconcile our beloved ideals of the American dream with a sense of fairness in an imperfect world, where people are born into massively varied situations of privilege and hardship?

Central to this question is the issue of what gets measured, and therefore valued, in a meritocratic society. The concept of meritocracy has played a central role in American notions of fairness since the middle of the 20th century.[13] The idea is a natural corollary to the American dream, as it emphasizes the apportionment of opportunities and resources according to merit, rather than inherited status. Merit is broadly understood as the achievements and competencies one accrues through natural aptitude and hard work. A meritocratic society is one that creates clear, objective measures of performance, along which individuals are evaluated and compared. Fairness, therefore, is promoted through the creation of structures that enable individuals to compete on a level playing field. This formulation of merit is particularly American in its rejection of class hierarchies in favor of a system where, hypothetically, individuals from any origin have the potential to achieve fame, fortune and success.

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[13]The term was first coined in 1958 by Michael Young. Young wrote a dystopian fable called *The Rise of the Meritocracy*, which depicted a future society where rank and order was rigidly defined by a series of standardized assessments.

However, creating structures that effectively provide all citizens an equal opportunity to demonstrate their merit remains an elusive goal. The American Dream is premised on the problematic notion that anyone can shed his or her past, start over, and engage equally in the pursuit of their life aspirations. As Hochschild argues, until quite recently, a significant segment of the American population (women, Native Americans, African Americans, etc) were actively excluded from all but a very narrow range of "electable futures."[14] Nevertheless, the struggles of these groups are eclipsed by the image of those (mostly male, European immigrants) who rose from humble beginnings to prosperity during the Industrial Revolution and post-WWII era. The centrality that this story plays in our collective self-image as Americans makes it difficult to delve critically into ways disparate circumstances complicate the idea of equal opportunity and merit in American society.

Throughout my research on the issue of diversity in the tech sector, the concept of meritocracy has been a recurring theme. As Rodrigo and Alex's comments demonstrate, the fellows' vision of success is an inherently social one. They don't simply want to be successful; they want their worthiness of success, their "awesomeness," to be recognized by others. However this gets tricky when they consider the role that their racial identity should play in others' evaluation of their merit. While Rodrigo emphasizes his desire for clear, objective measures, Alex feels ambivalent about how the compounding effects of history will negatively affect the ability of young people from his community to compete. This

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[14]Hochschild, "The Word American Ends in 'Can': The Ambiguous Promise of the American Dream."

inevitably leads to a debate about the role that metrics, the proxies for merit, play in our decision making processes. Should the bar be lowered for individuals from historically marginalized groups? Or, more fundamentally, what traits and skills do we actually care about, and how do we evaluate them in a fair way?

This has been a particularly difficult question to answer in the context of higher education and the job market, where there remains a great deal of uncertainty about what skills and aptitudes constitute an ideal employee. Over the course of history there have been fierce debates surrounding how to create equal opportunity in a society with a legacy of systemic inequality and the oppressive treatment of minority groups. In the following sections I outline some of the key ways Americans have attempted to navigate these challenges through educational and legal reforms. Specifically, I chart out the expansion and evolution of higher education as a foundational component of the American vision for equal opportunity. I also touch on how the emerging digital landscape has begun to destabilize the way educational credentials dictate the relationship between workers and employers in the tech labor market. Finally, I discuss the struggles and limitations we've encountered while attempting to regulate and mitigate biases through law. This leads to a discussion about how an expansion of the metrics used to evaluate candidates for employment could address issues of implicit bias, which prior reforms have struggled to address.

Expanding Higher Education and the Hope for Equal Opportunity

The structure of the American education system embodies and perpetuates a particular sense of "American exceptionalism"[15] -- low levels of class consciousness, the perceived fluidity of class boundaries and, most importantly, a constant preoccupation with equality of opportunity, as opposed to equality of outcome.[16] In contrast to other developed industrial nations in the 19th and 20th centuries, the U.S. fostered a distinctively open and fluid education system that embraced the "comprehensive school" model, in which students from different social origins were taught a common curriculum under the same roof. American academic institutions were much less segmented than those found in Europe, where students were shepherded into particular programs from an early age based on their class status and academic performance. As a result, the education system in the States served as an important institution for the dissemination of the American dream, and the meritocratic ideology underlying it. As Karabel and Brint argue, "By avoiding early selection and providing numerous opportunities to show one's talents, the educational system reaffirms the core national belief that any individual, no matter how humble the circumstances of his birth, can rise as far as ability and hard work will take him."

Indeed, this resistance to performance-based tracking helped to foster the belief that all students, even "late bloomers" without stellar track records, should

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[15] Academic explorations of the concept of American "exceptionalism" started in 1906 with the work of sociologist Werner Sombart, *Why is there No Socialism in the United States?*

[16] Jerome Karabel and Steven Brint, "American Education, Meritocratic Ideology, and the Legitimation of Inequality: The Community College and the Problem of American Exceptionalism," *Higher Education* 18, no. 6 (1989): 725–35.

have the opportunity to pursue higher education.[17] In the 20th century, this issue became the focal point for U.S. efforts to foster social mobility and a sense of equal opportunity for all of its citizens. In the years following WWII, there was a steady and significant increase in the number of adults pursuing higher education, particularly amongst the working class and racial minorities. The decision to reward military service with full inclusion in educational opportunity is critical for understanding how this trend came about. In 1944 Congress passed the Servicemen's Readjustment Act (more commonly referred to as the G.I. Bill), which provided financial support for all veterans to enroll in a university or vocational training after the war.

By 1956, over 2.2 million veterans had taken advantage of the bill in order to attend university, with an additional 5.6 million using the funds to enroll in some form of vocational training program.[18] This influx of students coincided with the first major expansion of the American community college, "the quintessential open-door institution."[19] By 1980 more than 90% of the U.S. population was within commuting distance of a community college, as there were more than 900 distributed across the country. In contrast to four-year institutions, community colleges were designed to enable students to live, and even work, at home while taking classes.

Yet, as the numbers grew, so did skepticism around community colleges' role as a democratizing force in higher education and as a ladder for upward

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[17] Ibid.

[18] Keith W. Olson, "The GI Bill and Higher Education: Success and Surprise.," *American Quarterly*, 1973, 596–610.

[19] Karabel and Brint, "American Education, Meritocratic Ideology, and the Legitimation of Inequality: The Community College and the Problem of American Exceptionalism."

mobility.[20] Whereas high school had long been considered a semi-universal institution of education in the U.S., university attendance was historically limited to only the most elite in society. For example, in 1909 only five percent of the college-age population was enrolled in higher education.[21] As such, a university degree did not have a significant impact on the vast majority of people's long-term career trajectories. However, as the number of students grew steadily by ten percent every twenty years, the distinction between degree holders and non-degree holders became more salient.

By the early 1970's approximately half of the young adults ages 18-21 were enrolled in an institution of higher education. As a broader swath of Americans pursued these degrees, universities evolved from being an institution of the elite to becoming a necessary stepping stone on the path towards upward mobility. They also shifted from being a mere indication of class status (those who went to college were primarily from the elite) to a powerful arbiter of social stratification.[22]

By this I mean that the expansion of higher education greatly increased the importance of holding a college degree for anyone looking to improve or maintain their competitiveness in the labor market. In the most extreme interpretations of this trend, one might argue that a university degree became a necessary baseline credential, particularly in the competition for white-collar careers. As Thurow argues, when this occurs, "in effect, education becomes a

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[20] Early critical research on this topic includes the work of Karabel, 1972; Zwerling, 1976; Astin, 1982.

[21] Jerome Karabel et al., "Social Class, Academic Ability, and College Quality." *Social Forces (University of North Carolina Press)* 53 (1975): 381–98.

[22] Daniel Bell, "On Meritocracy and Equality.," *Public Interest* 29 (1972): 29–68.

defensive expenditure necessary to protect one's 'market share.' The larger the class of educated labor and the more rapidly it grows, the more such defensive expenditures become imperative."[2324]

As the prevalence of college enrollment increased, so did the range of prestige and status associated with the various types of higher-ed institutions available. When more individuals began to obtain college diplomas, the key differentiator between job candidates shifted to a more stratified system based on the prestige and quality of the institution from which the degree was obtained. Because community colleges were intentionally created for the masses, with very few barriers to entry, they were widely understood to be on the bottom rung of this higher-ed hierarchy.[25]

However, this was not initially viewed as a negative thing, as community colleges were conceived of as a stepping-stone towards a four-year degree. Accordingly, they offered both vocational and academic subjects that hypothetically could be transferred to more prestigious institutions down the line. However, early empirical work revealed that attending community college was actually negatively correlated with obtaining a bachelor's degree. Starting in the 1980's, researchers found that, amongst students who were otherwise similar in

[23] Lester C. Thurow, "Education and Economic Equality," *Public Interest*, 1972.

[24] This stands in contrast to more mainstream conceptions of higher education, which view a college degree as the foundation of a more productive workforce, equipped with specific skills taught in school. Indeed, Thurow and others have argued that most relevant work skills are actually taught on the job. A college degree merely serves as a rough proxy for how much time and resources need to be allotted to generate the desired level of productivity from a given employee candidate.

[25] Steven Brint and Jerome Karabel, *The Diverted Dream: Community Colleges and the Promise of Educational Opportunity in America, 1900-1985.* (Oxford University Press, 1989).

terms of class status and academic ability, attending community college had a negative impact on their long-term earnings and occupational status.[26]

In recent years, these findings have been complicated by research which demonstrates a modest positive correlation between community college enrollment and bachelor's degree completion for low-resource students, who otherwise would not have enrolled in college.[27] However, it remains true that more advantaged students (who have the means and academic track record necessary to enroll in a four-year university straight-away) are less likely to complete their bachelor's degree if they opt for community college first. As increasing numbers of students pursued higher education, a clear binary formed between selective and non-selective schools, with the majority of students attending non-selective schools that are operating under pinched budgets. In contrast to selective schools, who served a relatively well-off student population, non-selective institutions continued to graduate less than half their students.[28]

Rather than serving as an equalizing force, the expansion of higher education in the post-war era has led to a disconcerting case of what Jerome Karabel calls "educational inflation," in which an increase in access fails to diminish the relative difference between groups or modify the underlying structures of opportunity that mediate social mobility.[29] In light of these dispiriting

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[26] Ibid.

[27] Jennie E. Brand, Fabian T. Pfeffer, and Sara Goldrick-Rab, "The Community College Effect Revisited: The Importance of Attending to Heterogeneity and Complex Counterfactuals.," *Sociological Science* 1 (2014): 448–65.

[28] Roger Geiger, "Postmortem for the Current Era: Change in American Higher Education, 1980-2010," *Center for the Study of Higher Education, The Pennsylvania State University.*, Working Paper No. 3., July 2010, http://www.ed.psu.edu/educ/cshe/working-papers/WP%233.

[29] Jerome Karabel, "Community Colleges and Social Stratification in the 1980s.," *New Directions for Community Colleges*, no. 54 (1986): 13–30.

findings, public universities and community colleges were criticized by free market reformers, who argued that bulky public institutions were not well-suited to meet the human capital needs of a rapidly growing economy.

In the face of mounting pressure to perform and diminishing public funds in the 1980's, community colleges and large public universities underwent a substantial transformation to align themselves more closely with the image and values of a rationalized, corporate institution. This strategy was developed in response to critics who argued that traditional college curriculum was disconnected from the needs of the student masses in pursuit of gainful employment in a rapidly evolving economic landscape. As Tressie McMillan-Cottom argues,

> "By convincing us that higher education is a failed experiment whose time has passed, corporate enthusiasts framed the terms of debate such that public higher education, whose tuition and mission is mainly controlled by external actors, barely stands a chance. The growing educational-industrial complex of publishers, consultants and lobbyists has made substantial inroads into college decision-making circles, and strongly reinforce the notion that public higher education is not up to the task."[30]

As a result, McMillan-Cottom and Tuchman claim, a growing number of public institutions have adopted the language of the free market, "professors become human capital, students become consumers, education becomes a deliverable."[31] This process of corporatization is perhaps most clearly reflected in the evolution of labor relations between colleges and their faculty workforce.

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[30] Tressie McMillan Cottom and Sara Goldrick-Rab, "The Education Assembly Line: The Problem with For-Profits.," *Contexts* 11, no. 4 (2012): 14–21.
[31] Tressie McMillan Cottom and G. Tuchman, "The Rationalization of Higher Education.," in *Emerging Trends in the Social and Behavioral Sciences* (Sage, forthcoming).

Over the last thirty years, professors have become increasingly vulnerable to market fluctuations in enrollment, as a significant proportion of tenure-track positions are supplanted by adjunct and contract-based professorships.[32]

It is important to note that these trends have impacted some institutions more than others. Many prestigious research universities and private colleges continue to operate in a way that is deeply removed from this market-driven approach to education. Educational inflation has driven the creation of a two-tier educational system: elite universities and the rest. In the elite realm, there is much less emphasis on restructuring education around workforce development goals. Students are still encouraged to pursue majors, such as English or philosophy, which have limited direct transfer power in the job market. Classroom seminars and faculty interactions remain centered around the lofty values of intellectual exploration, rather than the pragmatics of efficient professional development.

However, there has been a steady increase in the number of for-profit institutions, liberal arts colleges[33] and public universities who have embraced corporate logics in order to increase the efficiency and market relevance of the educational services they deliver. In such institutions, control over classroom curriculum has shifted from the professoriate to administrative planners, who

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[32] In 1970 43% of professors held adjunct positions, compared to the 70% of professors in 2012 working in non-tenure track positions. McMillan-Cottom and Tuchman, 9.

[33] A study released in 2012 found a 39% decrease in the number of colleges which offer a traditional liberal arts education between the years of 1990 and 2010. Most of this change is the result of a significant number of colleges making significant changes to their curriculum and course offerings, or overhauling their mission to broaden the scope of their course offerings. For more on this research see: http://www.aacu.org/publications-research/periodicals/where-are-they-now-revisiting-brenemans-study-liberal-arts

champion the development of standardized curricula that feature occupationally-oriented subjects that scarcely existed in prior decades.[34]]

While the rise of more occupational training is not in and of itself a negative development, it is indicative of the broader shift in how the burden of workforce development is distributed between workers, colleges and corporations. Today many of the skills that historically were taught on-the-job have been offloaded to third party degree programs, and the students who pay to attend them.[35] Accompanying these developments is the rise of a cottage industry of publishers, software companies and consultants that support the standardization and efficiency of curriculum development, content delivery and academic evaluation.

In the 1990's for-profit or non-selective universities became early adopters of the Internet and other digital technologies that enabled them to further minimize costs and scale their operations to thousands more students. The affordances of the Internet fit nicely within the rationalized paradigm of higher education - courses could be easily recorded and delivered to thousands of students with minimal overhead costs. And for the majority of college students, who typically balance significant family and work responsibilities along with their

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[34] Steven G. Brint et al., "From the Liberal to the Practical Arts in American Colleges and Universities: Organizational Analysis and Curricular Change.," *The Journal of Higher Education* 76, no. 2 (2005): 151–80..

[35] This rationalized model of higher education was brought to full fruition with the rise of for-profit college model in the 1990's, which focused specifically on practical, professional degrees catered to specific corporate interests and operated on an ethic of efficiency and profit, rather than educational quality.

schoolwork,[36] online learning provided a new level of flexibility in how and when they completed their course load.

The online franchise model of higher education has been termed the "McDonaldization of higher education" by Wynyard and Hayes,[37] who argue that this approach to delivering courses to the masses has led to an exploitative sub-industry within higher education that is more interested in driving up profits than providing quality education to its students. Over the last twenty years, a significant number of for-profit universities have emerged on the scene to offer online degree programs. These colleges have come under fire for their tendency to spend more on marketing their degrees than they do on teaching staff and curriculum development, particularly when budgets need to be tightened.[38] In light of the startlingly low completion rates and high loan default rates for students who attend such universities, the Department of Education began to implement the College Scorecard in 2013. This scorecard is designed to help families make better decisions about college, by increasing transparency about degree completion rates, alumni employment statistics, and cost comparisons between universities.

Of course, not all colleges who have experimented with online learning were incentivized purely by economic gain. For some universities and community colleges, especially those with diminishing financial support from the

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[36] Note that the term "traditional student" tends to be a misnomer, used to indicate young adults who are attending school full-time. However, the largest proportion of college students tends to be older, part-time, female and balancing other significant responsibilities along with school work.

[37] Hayes, Dennis, and Robin Wynyard, eds. *The McDonaldization of higher education*. IAP, 2006.

[38] A. Ananthalakshmi, "U.S. for-Profit Colleges Spend Big on Marketing While Slashing Other Costs | Reuters," November 28, 2012, http://www.reuters.com/article/2012/11/28/net-us-forprofitcolleges-analysis-idUSBRE8AR0FJ20121128.

government, online learning presented a new opportunity to experiment with democratizing access to courses without substantially increasing the costs incurred by the institution. While creating educational access for all is a laudable goal, many of these institutions have struggled to use online courses as an effective medium for scaling quality education to more students. In recent years, there has been a remarkable "trickle-up" effect of this experimentation, as world-premier universities like Stanford and MIT vie for thought leadership in the online education space.

Online education was initially appealing to non-selective and for-profit universities because it enabled them to replicate and scale their lessons to thousands, or even millions, of paying students. In contrast to their for-profit predecessors, elite universities did not jump on the online bandwagon in order to increase their profit margins. The primary currency of selective institutions is prestige and reputation, and online learning enabled them to add a new dimension of esteem to their image, as a beacon of democratized learning for eager learners the world over.

As more prestigious institutions invest in the production of online courses, there is a renewed interest in increasing the legitimacy and value of online learning through the "disruption" of our current degree paradigm. At the heart of this newfound enthusiasm is the concept of "unbundling" higher education, whereby the services and products that historically have been coordinated and sold under one proprietor, the university, are broken into smaller modular

components. These modules can hypothetically be remixed into more customizable packages that cater to the needs and means of each student.

Although completion rates of online courses have proven to be quite low, ed-tech enthusiasts interpret this as an opportunity to innovate beyond curriculum distribution, to include support services such as on-demand tutoring, peer-to-peer study groups and incremental student evaluation and feedback. As this idea has gained momentum, there has been a surge in entrepreneurial activity and venture capital aimed towards the development of new models for training and credentialing the future workforce. This wave of ed-tech enthusiasm has brought forth a new era in higher education, one of renewed hope in the idea of providing equal opportunity to all through market-driven education interventions.

Udacity, an online learning platform founded by tech celebrity Sebastian Thrun, embodies many of the developments currently underway in this space. In 2012, Thrun announced he was leaving his position at Stanford University to found Udacity, a platform he claimed would become the world's leader in providing access to high-quality education for individuals who face serious obstacles to obtaining a four-year degree. However, Udacity's first year in operation yielded embarrassingly low rates of course completion, so the platform pivoted to target a different demographic of students.[39] These were individuals who typically already held a college degree and are looking to level up their technical skills in order to be more competitive, specifically in the tech job market.

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[39] Tamar Lewin, "After Setbacks, Online Courses Are Rethought."" (The New York Times, December 10, 2013), http://www.nytimes.com/2013/12/11/us/after-setbacks-online-courses-are-rethought.html?_r=0.

To these students Udacity now sells "nano-degrees" - credentials for specific skill sets that are in high demand in the tech sector. Moreover, Udacity partners with industry leaders like AT&T and Dropbox to ensure that those degrees are recognized and valued in the job market.

The story of Udacity exemplifies how the ed-tech movement fits into ongoing efforts and struggles to realize the dream of equal opportunity through democratized access to education. Though education entrepreneurs have very much embraced the language of democratized learning, most have struggled to develop products and services that actually meet the needs of those most in need. As for-profit entities, many ed-tech companies subsequently shift their efforts to create business models geared towards serving more privileged subsets of the population. These learners have the means to pay for ed-tech services, as well as the resources necessary to thrive in these emerging alternative pathways in higher education. Rather than bridging the bifurcation of higher education into high quality experiences for the elite and low-quality courses for the masses, these developments appear to be increasing that divide.

Nevertheless, the ed-tech space is still fairly young, and many are optimistic about the democratizing potential of emerging models of education on the horizon. These developments have led to more expansive thinking about how digital learning can be leveraged not only to broaden access to curriculum, but also to re-envision what credentials actually matter in the marketplace. As influential institutions and individuals continue to expand the range of educational options available, the next question is how these experiences will translate into

actual career opportunities. Ed-tech and "big data"[40] companies have begun to experiment with translating unbundled credentials into trusted indicators of competency in the job market.

Some of the most cutting-edge work in this field is happening in the tech sector, where there already exists a vibrant ecosystem of online resources at the disposal of individuals learning to program on their own. This trend fits nicely into the prevailing mythos in tech, which portrays the industry as a space that embraces outsiders and misfits who did not fit into the traditional university system. This image is fueled by the well-known biographies of successful entrepreneurs like Steve Jobs, Bill Gates and Mark Zuckerberg, who dropped out of college in order to pursue the next big idea. Such narratives fuel the belief that tech is the new frontier of opportunity, where good ideas trump pedigree. At the same time, many of the people who work in tech continue to have fairly traditional high-prestige university educations. As Katherine Losse describes in her memoir *The Boy Kings*, alumni from elite universities like Stanford and Harvard tend to be overrepresented at large tech companies like Facebook.[41] As Alice Marwick argues in her book on the role of status in the hi-tech sector, "virtually all tech companies recruit heavily from elite computer science schools like MIT, Carnegie Mellon, and Stanford."[42] However, the story of the college dropout turned billionaire tends to eclipse this reality.

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[40] Big data refers to extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions.

[41] Katherine Losse, *The Boy Kings: A Journey into the Heart of the Social Network* (Free Press, 2014).

[42] Alice Marwick, *Status Update: Celebrity, Publicity and Branding in the Social Media Age* (Yale University Press, 2013).

There is a clear tension between tech's aspirational self-image and the reality of the hi-tech labor market. Amidst this backdrop, a fresh wave of entrepreneurs are developing methods for gleaning data-based insights about who is likely to make an ideal tech employee. However, the data used to develop these insights extends far beyond traditional notions of what we consider educational credentials, and can include seemingly mundane and unrelated information, such as the movie preferences one lists on social media or the zip code in which one lives. Big data companies argue that such information can yield unexpected insights that enable overlooked workers to be found and valued in the tech labor market.

Take as an example Gild, a startup that recently launched a web platform for companies looking to hire web developers and software engineers. The company uses an algorithm to sift through thousands of bits of public data online in order to identify skilled coders. Dr. Vivienne Ming, Gild's former Chief Scientist, argues that this approach is not only more efficient for companies, it's also fairer.[43] She points to the case of Jade Dominguez, a college dropout from a blue-collar family in southern California who taught himself how to code. In spite of having no college degree and minimal formal work experience, Gild's algorithm identified Jade as one of the most promising developers in his region. The young man now works for Gild and serves as an example of their algorithm's ability to find those precious "diamond in the rough" coders startups are so eager to unearth.

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[43] Matt Richtel, "How Big Data Is Playing Recruiter for Specialized Workers," *The New York Times*, April 27, 2013, sec. Technology, http://www.nytimes.com/2013/04/28/technology/how-big-data-is-playing-recruiter-for-specialized-workers.html.

For some, Jade's story is an optimistic example of the ways online learning, and the data produced from it, can be harnessed to provide opportunities for individuals who otherwise would not be considered for the job, due to a lack of conventional college credentials. In this way, Gild situates itself squarely in line with the concept of merit-based hiring: the quality of a person's code (and a thousand other "objective" data points) is more valuable than their personal or academic background. Gild's methods depend on creating predictive models that identify patterns across large data sets, but do not necessarily provide an underlying explanation for why a given pattern is significant. This emphasis on letting insights "emerge from the data" could provide valuable clues about an individual's future behavior, but it could also lead to biased decisions that have disproportionately negative impacts on individuals who belong to protected social classes. This theme will be explored more in-depth in Chapter 3 of this thesis.

In light of the substantial developments outlined above, we must reflect on the role that higher education and credentials play in current notions of meritocracy and equal opportunity in America. As hope for equal opportunity through publicly-funded mass education dwindled in the 1970's and 80's, we witnessed the rise of a more rationalized, corporate logic, particularly within low-prestige institutions and for-profit colleges. As this trend matured, there developed a clear split between elite research universities and mass higher education in terms of the market value and prestige of one's college degree. The advent of online learning took this corporate ethos to another level, as there has

been a surge in the number of companies aiming to "unbundle" the college degree into credentials that fall outside the realm of traditional academia. This has elicited an unprecedented level of experimentation both in terms of the structure of higher education and the signals, or credentials, that have value in the labor market.

Imbued throughout these developments is the continued belief that access to education is the foundation for equal opportunity. At first glance, this idea appears to be in tension with the college dropout-turned-tech-billionaire storyline. However, the latest iteration of the "equal opportunity through open education" paradigm is not necessarily tied to a traditional institution of higher education. Rather, it promotes a vision of the ideal learner as a self-driven autodidact, who can pursue whatever interests him through an abundance of online resources. An emerging class of intermediary institutions is seeking to displace the monopoly that universities have long held as the vehicle for differentiation between workers in the labor market.

While these developments are still in the nascent stages, they signal a bigger shift in the contest over who determines and controls the knowledge capital of the future economy. Some great work is beginning to emerge that critiques the technical limitations of algorithmic sorting processes like the ones briefly outlined above.[44] However, to my knowledge no one has developed a robust theory of how these algorithms interact with and amplify the pre-existing biases harbored by the humans who deploy them. In a talk at MIT in 2014,

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[44] Barocas, Solon and Selbst, Andrew B., "Big Data's Disparate Impact," *SSRN 2477899*, 2014.

Tarleton Gillespie argued that recent attempts to use algorithms as a tool for fair hiring are a part of a much longer history,

> "People who hire people have already had algorithms to do it. It's just not a computational algorithm. It's a set of professional guidelines, and it's a checklist...and in a lot of ways these were stand-ins for (us) to not let our bias get to (us)...we're left with this weird calculus... And we try to squeeze the benefit from human acumen and the benefit of some impartial mechanism, but it's not perfect."[45]

He suggested that the important thing for us to do now is to hone our ability to recognize and adjust the values we inscribe in new algorithmic tools. This includes questions about the quality of the input data, the implied priorities behind weighted variables, and the limitations of category formation. But it also involves understanding how to mitigate bias in the perceptions of the people who develop and use such tools, lest we run the risk offloading those biases onto tools and processes that, on their surface, seem more objective.

As Gillespie points out, this is not a new issue. Over the last several decades, equal opportunity advocates have developed a variety of legislative interventions to regulate bias and discrimination in hiring. As it turns out, regulating human perception is a very challenging task. It is relatively straightforward to introduce policies like affirmative action to increase the number of employees from underrepresented groups. However, it is much more difficult to use such policies to promote cultural shifts in how we collectively conceive of

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[45] Tarleton Gillespie, *Algorithms, and the Production of Calculated Publics*, CMS Colloquium, 2014.

groups that have endured the brunt of bias and discrimination throughout history. In the following section, I'll discuss the challenges that laws like affirmative action and Title VII have encountered in terms of achieving this bigger goal of transforming stigmatizing stereotypes into more empowering perceptions of diverse individuals.

Regulating Bias and Discrimination

Forty years after President Johnson signed into existence the Civil Rights Act of 1964, two economists designed a study to investigate what role racial bias continued to play in the contemporary labor market. Marianne Bertrand, Dolly Chugh and Sendhil Mullainathan sent out fictitious resumes to companies who published help-wanted ads in newspapers from Boston and Chicago. To manipulate the perceived race of the applicant, each resume was given either a very "Black sounding name" (i.e. Jamal, Lakisha) or a very "White sounding name" (i.e. Emily, Greg). The results revealed significant discrimination against stereotypical African-American names: White names received 50 percent more callbacks for interviews[46]. The variation was particularly stark for well-qualified applicants. For White names, high quality credentials elicited 30 percent more callbacks, whereas a far smaller increase was documented for African Americans. More recently a similar set of methods were used to document biases against women pursuing careers in academic science. When evaluating

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[46] Marianne Bertrand and Mullainatha Sendhi, "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination," *NBER Working Paper No. 9873*, JEL No. J7, J71, J23, J24, J63, J82, C93, July 2003.

applicants for a lab manager position, faculty rated male applicants as significantly more competent and hire-able than females with identical credentials.[47]

In contrast to overt discrimination, these studies reveal the subtle ways that cognitive biases continue to shape our decisions and impressions of people from diverse backgrounds. Since the 1960's, scholars from the field of behavioral economics and cognitive psychology have sought to provide a more detailed portrait of the heuristics and biases embedded within our everyday decision-making practices.[48] These studies have shown what a fundamental role that categorizations of humans into social groups, otherwise known as stereotypes, play in our ability to make sense of the social world around us.[49] Stereotypes enable us to move fluidly and efficiently through a world full of strangers. Yet, when stereotypes become widely accepted it is very difficult to shake inaccurate assumptions at the individual level. Researchers have revealed that our brains tend to interpret and retain information in a way that confirms our preconceived notions of what a person will think, say and do.[50] Negative stereotypes are exacerbated by what researchers refer to as "ingroup bias," the tendency to view

[47] Corinne A. Moss-Racusin et al., "Science Faculty's Subtle Gender Biases Favor Male Students," *Proceedings of the National Academy of Sciences* 109, no. 41 (October 9, 2012): 16474–79, doi:10.1073/pnas.1211286109.

[48] For foundational research in this area please see: Kahneman and Tversky, 1974; Tversky and Kahneman, 1981; Martino et al., 2006; Markman, 2012.

[49] Gordon Willard Allport, *The Nature of Prejudice.* (Basic Book, 1979).

[50] C. Neil Macrae and Galen V. Bodenhausen, "Social Cognition: Thinking Categorically about Others.," *Annual Review of Psychology* 51, no. 1 (2000): 93–120.

others who are not considered members of our own social group less favorably than members of our own "in-group."[51][52]

These studies provide critical insight into the mechanisms underlying the racial and gender biases that continue to prevail in our current labor market. They also reveal how challenging it can be to wrap our heads around the way bias shapes our perceptions on a personal level, even when we belong to the negatively affected group. After all, in many of the studies mentioned above, members of the minority group demonstrated the same level of bias against applicants as their majority counterparts.

Implicit bias has proven very challenging to regulate under the law. Title VII of the Civil Rights Act was intended to hold employers liable for both implicit and explicit bias in their hiring practices. While the law has been relatively successful in regulating overt forms of discrimination, it has proven quite difficult for plaintiffs to successfully contest decisions that are biased in the ways outlined above. Some legal scholars and civil rights activists have called for more stringent measures to be integrated into the law in order to make it easier to establish implicit bias in court and expand the types of situations in which employers are held liable.[53] However, others have argued that implicit bias

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[51] Marilynn B. Brewer, "The Psychology of Prejudice: Ingroup Love and Outgroup Hate?," *Journal of Social Issues* 55, no. 3 (1999): 429–44.
[52] Studies have shown that people also tend to be more charitable in their explanations for the actions and outcomes of members of their in-group. This can shape how people interpret the achievements and failures of people, and subsequently accord them merit.
[53] Linda Hamilton Krieger and Susan T. Fiske, "Behavioral Realism in Employment Discrimination Law: Implicit Bias and Disparate Treatment.," *California Law Review*, 2006, 997–1062.

stretches the law to its limits in terms of its ability to effectively regulate human behavior and inculcate pro-social norms.

Katharine Bartlett highlights the central role that motivation and self-image play in the way that individuals react to and subsequently internalize norms that are externally imposed by the law, "The law can stretch people's thinking, challenging them to think critically about and perhaps revise their thoughts, including judgement, decision and behaviors that may have been based on group stereotypes."[54] She goes on to argue, however, that laws which are perceived to be overly intrusive or harsh can have the opposite effect, causing people to resist the practices and perspectives the law was originally intended to support. Bartlett calls for employers and policymakers to embrace more "soft interventions" that promote exposure between members of different groups, enabling them to develop positive counter-stereotypes. In the context of work, this is a bit of a chicken-before-the-egg issue. If the solution to decreasing implicit bias in hiring practices is to hire more people from the stereotyped group, how does an organization shift their values and practices in order to intentionally increase the number of diverse employees?

Affirmative action legislation has played a central role in prior efforts to intentionally increase the number of underrepresented groups in certain industries and institutions. In some ways affirmative action overcomes the

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[54] Katharine Bartlett, "'Making Good on Good Intentions: The Critical Role of Motivation in Red' by Katharine T. Bartlett," accessed December 7, 2014, http://scholarship.law.duke.edu/faculty_scholarship/2111/.

challenge of implicit bias, because it eschews the assumption that one must hire

who he or she believes is the "best" person for the job, prioritizing instead an

increased representation of members from historically marginalized groups.

These policies were initially conceived of as a remedial intervention, designed to

compensate for years of discrimination and unfair treatment against minority

groups. As President Johnson explained in a speech in 1965,

> "Imagine a hundred yard dash in which one of the two runners has his
> legs shackled together. He has progressed 10 yards, while the unshackled
> runner has gone 50 yards. At that point the judges decide that the race is
> unfair. How do they rectify the situation? Do they merely remove the
> shackles and allow the race to proceed? Then they could say that "equal
> opportunity" now prevails. But one of the runners would still be forty yards
> ahead of the other. Would it not be the better part of justice to allow the
> previously shackled runner to make up the forty yard gap; or to start the
> race all over again? That would be affirmative action towards equality."[55]

This rationale was upheld by the courts on numerous occasions

throughout the 1960's and 70s. As the Commission on Civil Rights described in

1977, affirmative action was an endeavor "beyond simple termination of

discriminatory practice, adopted to correct or compensate for past or present

discrimination or to prevent discrimination from recurring in the future."[56]

However, in 1978 a new explanation was introduced into the legal system to

justify the deployment of affirmative action practices -- the diversity rationale. In

Regents of the University of California v. Bakke, Justice Powell wrote an opinion

brief dispelling many other potential justifications for affirmative action, positing in

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[55] Lyndon Johnson, "Commencement Address at Howard University: "To Fulfill These Rights,"
June 6, 2007, LBJ Presidential Library,
http://www.lbjlib.utexas.edu/johnson/archives.hom/speeches.hom/650604.asp.
[56] Nancy Leong, *Racial Capitalism.*, 2012.

their place the idea that race-conscious admissions processes contributed significantly to "a robust exchange of ideas" that further the noble goals of universities and other public-good institutions. Over the course of the next decade the diversity rationale grew to be the most widely accepted justification for affirmative action policies, both in the courts and throughout the social sphere.[57] However, the diversity rationale has its limitations. Diversity of experience was largely valued in abstract and general terms, as a quality that could enrich and challenge the perspectives of groups comprised primarily of a dominant class. It did not mean that diverse experiences in and of themselves were seen as valuable. At its core the diversity rationale was used as a justification for decisions that were viewed as fundamentally remedial, rather than as a vehicle for embracing a wider range of specific experiences that were valuable in their own right.

As such, researchers have expressed concerns that affirmative action policies may ultimately perpetuate harmful stereotypes of minorities as less competent and undeserving of competitive positions. A large body of research has demonstrated how affirmative action policies, or even the presumption that an individual is the target of affirmative action, can negatively shape the way both third parties and minority individuals themselves view their competence on the

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[57] This grew increasingly important in the face of mounting perceptions in the white community that affirmative action is a form of "reverse racism." This critique reached a high in the 1990's when people started to more aggressively attack these policies. Hochschild explains that this reflects a (mis)conception on the part of whites that minorities had achieved, or even surpassed the well-being and resources allotted to the white community. (see Leong, 2012; Hochschild, 2001)

job.[58] According to the psychological principle of discounting,[59] when individuals think that demographics play a role in a hiring decision, it causes others to discount the possibility that the individual was hired because they were actually qualified and competent at the job. These negative stereotypes can objectively impair the performance of an individual who's been a target of affirmative action, as the fear of confirming negative stereotypes can trigger high levels of stress and anxiety that inhibit an individual from performing at their best.[60] Such anxieties were often expressed to me in interviews with CODE2040 fellows. As Rodrigo and Alex explained during our group meeting, they wanted to be seen as "objectively awesome" rather than as good "for a Latino."

Research on the challenges that first generation college students face while attending university illustrates the complexity of such situations.[61] On the one hand, it's likely that students from low socio-economic backgrounds have received less preparation before going to college, making their learning curve steeper than, say, a student who previously attended private school. At the same time, the fear of affirming a negative stereotype about one's group can prevent students from seeking out additional support or asking questions in class. Heightened levels of anxiety about one's academic abilities can then lead to

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[58] See for example: Jones & Nisbett, 1972; Malle & Knobe, 1997; Miller & Ross, 1975; Pronin, Lin, & Ross, 2002.

[59] The principle of discounting states that when the perceived importance of a given cause is discounted, or diminished, when a plausible alternative exists. i.e. When your colleague snaps at you for a minor offense, and then you learn of an external event that happened just before the incident, you may discount their aggressive behavior as being an unfortunate by-product of the external event, rather than a result of your misdeed.

[60] Amy JC Cuddy, Peter Glick, and Anna Beninger, "The Dynamics of Warmth and Competence Judgments, and Their Outcomes in Organizations.," *Research in Organizational Behavior* 31 (2011): 73–98.

[61] Claude M. Steele, "A Threat in the Air: How Stereotypes Shape Intellectual Identity and Performance.," *American Psychologist* 52, no. 6 (1997): 613.

poorer performance on high pressure exams. In such situations, there are a myriad of interwoven factors that influence how one's background and group membership shape learning habits and performance in class.

Moreover, Nancy Leong argues that affirmative action is easily entrapped by "racial capitalism," whereby an individual or institution derives social or economic value from another person's racial identity. For instance, increasing the diversity on a corporate team may enable the company to deflect charges of racism, or bolster their credibility when they want to implement a new racially charged policy. On the one hand, pragmatists could argue that aligning pro-diversity interventions with capitalist values makes sense. Corporations are more likely to embrace affirmative action policies if they perceive them to be tied to their own well-being.[62] Yet Leong argues that this can lead to a system that tokenizes and exceptionalizes nonwhite employees in a way that ultimately maintains a system in which white employees are preferred.[63] She argues that racial capitalism inhibits progress on bigger issues related to race and equal opportunity because it promotes a superficial process of assigning value to non-white identities, displacing measures that could lead to more meaningful reform.

At the same time, research has shown that companies which increase the number of minorities they hire in response to affirmative action regulation continued those hiring practices even after the regulation was lifted.[64] While there is no definitive explanation for why this happens, it could be that employers are

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[62] Jennifer L. Hochschild, "Affirmative Action as Culture War | Jennifer L. Hochschild," July 13, 2001, http://scholar.harvard.edu/jlhochschild/publications/affirmative-action-culture-war.
[63] Leong, *Racial Capitalism.*
[64] Conrad Miller, "Essays on Labor Market Inequality" (PhD Dissertation, Massachusetts Institute of Technology, 2014).

updating their stereotypes about certain groups once they gain more exposure to them in the workplace. There is some research to support this claim. One study showed that white college freshmen developed more positive attitudes towards minorities after being randomly assigned a black roommate in their college dorm.[65] Similarly, white students who were assigned a minority roommate in the U.S. Air Force Academy were more likely to seek out a minority roommate in the future.[66] In India, random gender quotas for local leadership positions were shown to improve local attitudes towards female leaders and weakened negative gender stereotypes.[67]

These studies point to the positive impact that exposure can have on dominant group perceptions of minorities, even when such exposure is imposed through regulation or involuntary assignment. These examples illuminate the complex dynamics at play when deploying affirmative action policies to realize what ultimately comes down to a cultural shift in the way we perceive minority groups. While affirmative action policies may create more opportunities for minorities to enter certain fields, some critics argue that it falls short of realizing the bigger goal of promoting positive stereotypes that recognize and value the unique contributions that diverse individuals bring to the table. Yet, there is empirical evidence to show that such policies have a structural and social impact

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[65] Johanne Boisjoly et al., "Empathy or Antipathy? The Impact of Diversity.," *The American Economic Review* 96, no. 5 (1905 1890): 2006.

[66] Scott E. Carrell, Mark Hoekstra, and James West, "Impact of Intergroup Contact on Racial Attitudes and Revealed Preferences.," *National Bureau of Economic Research* No. 20940 (2015).

[67] Lori A. Beaman et al., "Powerful Women: Does Exposure Reduce Bias?," *National Bureau of Economic Research* No. w14198 (2008).

on the way underrepresented groups are perceived and integrated into certain social and professional environments.

Within the movement to diversify the tech sector, some organizations have made the deliberate choice to distance themselves from the language of affirmative action, opting instead to talk about the untapped potential of minority tech talent. At the heart of this framing is the idea that the work of organizations like CODE2040 is not charity. Rather, CODE2040 provides an access point to valuable minority talent that is currently overlooked by tech companies struggling to find qualified workers. However, as Alex brought up during our afternoon picnic, a significant proportion of minority communities still face challenges in accessing the resources necessary to be competitive in the tech labor market. To address this need, many organizations have begun to create educational programs that serve minorities who cannot access costly four-year degrees. These developments come at a time when the notion of professional credentials is being destabilized by recent innovations in the way companies search for and evaluate technical talent with the help of algorithmic recruiting tools. As these tools become more sophisticated and widespread, they open up unprecedented opportunities to expand the metrics along which we evaluate the merit of employee candidates.

The expansion of metrics could potentially provide new opportunities for diverse candidates to overcome harmful stereotypes by constructing new narratives around the unique contributions they bring to the team. However, just because this potential exists, doesn't mean it will necessarily come true.

Depending on how metrics are determined, such developments also provide a possible excuse for companies to duck issues of diversity, arguing that they are simply hiring the most qualified candidates, who happen to be predominantly white and male.

In subsequent chapters, I critically examine the trends outlined above, specifically within the context of the tech sector. This will lend specific insight into the significant challenges and immense potential underlying the rapid changes we are witnessing today in the space of workforce development and equal opportunity employment.

In Chapter 2, I draw from interviews with over a dozen CEOs and head recruiters of tech companies in order to illustrate how the issue of diversity is understood by those most influential in determining who is integrated into the tech workforce. This chapter will touch on the theories that leaders in tech use to explain why minorities and women are underrepresented in their industry, as well as detail the specific practices they implement in order to remedy tech's diversity problem. Chapter 3 provides a more in-depth case study of emerging practices in data driven recruitment and hiring. It outlines the distinctive philosophies of fairness that accompany these practices, and also identifies the potential cultural and technical pitfalls of this emerging regime of decision making. In Chapter 4, I draw from my field research during my time at CODE2040, an organization that is leading the movement to increase the representation of racial minorities in tech. These reflections illuminate the specific ways the organization's strategy is distinct from a typical non-profit approach to increasing diversity in the tech

sector. I'll describe some of the inherent tensions with their "social enterprise" model of change and discuss their implications for the organization's long-term success in increasing the representation of Black and Latino workers in tech. At the core of this discussion is an in-depth consideration of how the organization seeks to "re-brand," or culturally shift the stereotypes associated with, a marginalized group of people. Through these discussions, my hope is that readers will gain a more nuanced perspective how technological developments and social movements currently underway could fundamentally shape future struggles for equal opportunity in the tech sector, as well as the U.S. labor market more broadly.

In recent years, tech, as both an industry and a cultural movement, has come to symbolize the revitalization of this American dream. Future struggles over who is represented in this vision will likely be centered on what metrics and experiences are valued in this rapidly changing landscape. At stake is not only the diversity of a specific sector, but rather an all-out struggle for how we will reconcile our beloved ideals of the American dream with a sense of fairness in an imperfect world, where some people start out forty yards behind of the rest of the pack.

Chapter 2
Tech's Mirror-tocracy

On a cool Tuesday evening in July, the Impact Hub[68] office was still bustling with people well after the end of working hours. As a petite Asian American woman with platinum blonde hair and thick black-rimmed glasses assumed her place behind the microphone at the front of the room and the collective murmur of seventy people's small talk died down. "Innovation is a process, not a product," the woman explained, with the conviction of a true evangelist, "And in this process, everyday people are the experts." Over the next few minutes she walked the group through a series of example innovations that her company, a design consulting firm called IDEO, had developed through their trademark process called design thinking. On this particular evening, CODE2040 and guests would use design thinking to brainstorm ways of increasing the diversity of the workforce in tech.

Step one: Thoroughly explore the problem space.

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[68] The Impact Hub is a co-working space for nonprofits in San Francisco. It is where the headquarters of CODE2040 are based and where they hold many of their community events throughout the year.

"Any thoughts on why tech lacks diversity?" asked the IDEO representative, dry erase marker in hand, poised to write down responses from the group. There was a pause.

"White racism," a voice challenged from the back of the room. Heads twisted to identify the speaker, a middle-aged black woman sitting at the back of the room, arms folded across her chest. Some people giggled nervously, though the speaker herself didn't look particularly amused. The IDEO woman paused uncertainly, dry erase marker in hand as she tried to figure out an appropriate response. "Like biases in hiring practices?" someone else offered in what could have been interpreted as a more diplomatic reframing of the first speaker's words. The tension in the air released slightly as the group turned its attention back toward the facilitator at the front of the room.

After the event was over, I grabbed dinner with an old family friend, who we'll call Pete.[69] Pete had come from out of town for a visit and decided to tag along as I did my fieldwork at the IDEO event that night. As a freelance programmer, he was interested in the ongoing conversation about diversity in tech. But as a 20-something white guy in a hoodie, he also felt a bit self-conscious about the role he should play in an event like the one we were just leaving,

"Do those things ever make you feel uncomfortable?" he asked. I could sense the hesitation in his voice, the care he was taking to show me that his question was well-intentioned. My mind immediately leapt to the tense moment

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[69] Pete is a pseudonym. Unless explicitly stated otherwise, all names in this chapter have been changed in order to maintain the anonymity of the speaker.

earlier in the workshop. Yes, I admitted, there were moments when, as a white woman who had attended two highly prestigious universities (and ones that, moreover, had a lot of brand recognition in Silicon Valley)[70], I felt self-conscious in discussions about diversity and privilege. But overall, I thought out loud, it was pointed commentary like the "white racism" moment from earlier that had helped to elevate the topic of diversity in tech to the national spotlight.

I explained further, in some ways trying to convince myself as much as my friend of what I meant: Policy makers and educators have been lobbying to increase the number of women and underrepresented minorities in STEM (science, technology, engineering and mathematics) careers for a long time.[71] But in recent years, a series of high-profile scandals had sparked a much more critical conversation about the "brogrammer culture" of Silicon Valley.[72][73] Rather than placing sole focus on improving the educational pipeline into tech, critics

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[70] It's remarkable how many people in the industry assume I am highly competent in technical domains, given my affiliations with MIT and Stanford. On more than one occasion I was encouraged to apply for engineering jobs at tech companies that I interviewed or conducted observations at. Given my degrees in Sociology, Feminist Studies and African Languages and Literature, I would probably not be a very strong candidate.

[71] Generally speaking, the movement to increase the number of women and underrepresented minorities in STEM has not been limited to the domain of computer science. However, computer science occupations now comprise fifty percent of all STEM careers. Many predict that this proportion will only grow over time. Hence, there has been an increasing amount of attention specifically around equity and diversity within computer science careers. The epicenter of this conversation often centers on the tech industry, specifically in Silicon Valley.

[72] Miller, Claire Cain, "Technology's Man Problem - NYTimes.com," April 4, 2015, http://www.nytimes.com/2014/04/06/technology/technologys-man-problem.html?_r=1.

[73] For example, in the fall of 2013 TechCrunch came under fire for broadcasting a live demo of an app called called, "Titstare." The app was created by two young men whose mission in life was to enable other men to upload images of themselves staring at women's breasts. In early 2014, Julie Ann Horvath, an early employee at GitHub, launched an exposée of the sexism and intimidation she encountered while working at the company. Meanwhile, publications like Model View Culture, emerged on the scene with headlines written by women, people of color, and members of the LGBTQ community regarding issues of discrimination, inclusion and harassment, to name a few. The publication's founder, Shanley Kane, is twitter famous for going on angry tweet tirades about the arrogance and bro-ness of tech's leaders.

argue, we must work to produce deep cultural change in order to attract and retain underrepresented individuals who feel unwelcome and excluded in their current work environments.[74] Unwelcoming environments are not synonymous with racism. But such situations point to the need for a change in habits, norms, and expectations that exclude members of some races (and genders, etc.) more than others.

"But, like, that doesn't make *me* the bad guy just because I'm a white dude." Pete interjected with an exasperated sigh. Now that we had opened the conversation fully, his discomfort and anxiety were even more apparent. "I've worked really hard to get where I am today. It's just so...uncomfortable," he said. I knew what he meant. Only recently had Pete been able to quit his two jobs waiting tables and switch full-time to freelance web development projects. But I also found it interesting how the evening's events had impacted him so personally, so emotionally. Although the "white racism" comment had not been directed at Pete specifically, he felt personally implicated in it.

As it turns out, many Silicon Valley CEOs and company founders share Pete's discomfort. While most of my interviews stopped short of the frank, personal exchanges I shared with my close friend, many of them echoed some degree of the tension, and personal frustration, with figuring out how to meaningfully engage with the diversity problem in tech as a leader within their own company. What I realized through these discussions is that the issue of diversity in tech struck a personal chord with those who work and lead within the

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[74] Snyder, Kieran, "Why Women Leave Tech: It's the Culture, Not Because 'Math Is Hard' - Fortune," accessed May 5, 2015, http://fortune.com/2014/10/02/women-leave-tech-culture/.

industry, because it challenged fundamental notions of how the industry views itself, and the people who succeed within it. By and large, the insiders I spoke with saw tech as a place where hardworking, smart people get ahead. All of them identified diversity as an important value to foster in their company. Yet, their technical workforce remained largely white and male. As a result, it was widely assumed that this lack of diversity stemmed from leaks in the education pipeline for women and minorities pursuing STEM careers.

This is not an entirely inaccurate conclusion to draw. Women and people of color have produced consistently lower rates of enrollment and graduation from STEM degree programs.[75] However, it is also important to point out that, among those who graduate with a degree in science or engineering, the unemployment rate for Black and Native American graduates is double that of the their peers.[76] Although women make up thirty-nine percent of the science and engineering graduates, only fifteen percent are employed in a STEM career, a rate that is half that of their male graduate counterparts. These kinds of statistics highlight the incompleteness of the education pipeline explanation, because it fails to take into consideration the role that industry recruitment and hiring practices play in perpetuating employment disparities along race and gender lines. This begs the question: If leaders of tech companies truly value the idea of

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[75]Moin, Syed and Chemers, Martin M., "Ethnic Minorities and Women in STEM: Casting a Wide Net to Address a Persistent," *Blackwell Publishing Inc* 67, no. 3 (September 2011): 435–41, doi:10.1111/j.1540-4560.2011.01708.x.
[76] Landivar, Liliana Christin, "Disparities in STEM Employment by Sex, Race, and Hispanic Origin -- American Community Survey Reports" (U.S. Census Bureau, September 2013), https://www.census.gov/prod/2013pubs/acs-24.pdf.

a diverse workforce, and there exists an under tapped talent pool of minority workers, what constrains organizations from actually increasing the diversity of their teams?

This chapter delves into the values and assumptions that guide recruitment and hiring practices in tech. I argue that circular notions of meritocracy, which are premised on the idea that those who succeed are those who have the most merit (and those who have merit are those who succeed, and so forth), have led to recruitment methods that narrowly target individuals who already have successful careers in the industry. Underpinning these practices are a set of assumptions about what constitutes an excellent employee, which bring tech's dual values of diversity and excellence into tension with one another. I ultimately argue that this tension can only be reconciled through a renegotiation of the metrics and heuristics used to define and evaluate potential and excellence in tech.

Tech: A Haven of Meritocracy?

Far from being an exclusionary place, the tech insiders I spoke with viewed their industry as a haven for the geeky high school outcast types. As one founder named Patrick explained to me, "What sets apart the douchebag tech people from the douchebag Wall Street people is that the douchebag Wall Street people fully accept their privilege and advantage, 'Fucking sucks to be you.'" Patrick twisted his face in an exaggerated grimace to accompany his imitation of the douchebag Wall Streeters, "But the nerds still have this mindset of, 'I was the lower class person in high school. Therefore how can I possibly be accused of

bullying someone now? I've had a tough life. How can you say that I have an easy life?' It's really that mindset that colors a lot of it."

As a somewhat overweight, slightly balding, self-identified geek with an extremely good sense of humor, Patrick was able to describe this knee jerk reaction with a high degree of empathy. He told me that it had been a slow process for him to broaden his self-image as an oppressed brainiac to acknowledge aspects of his life (his maleness, his straightness, his whiteness) which had granted him the privilege of ease and default acceptance throughout his career in tech. As journalist Laurie Penny argues, this form of "nerd entitlement" greatly limits the ability of prototypical male geeks to understand the struggles of less privileged groups, because they characterize themselves as victims, rather than acknowledging the ways they contribute to the oppression of others.[77]

Of course, this downtrodden nerd profile, and the emotional baggage that accompanies it, is not uniform across the tech industry. Tech today attracts a wide range of individuals who don't necessarily identify with the iconic nerd culture[78] so widely associated with Silicon Valley. Nevertheless, common amongst most people I interviewed was the idea that everyone who made it in Silicon Valley had been an outsider in some form or fashion. As a result, the industry is seen as the natural frontier of meritocracy, where people climb their way up through hard work and ingenuity.

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[77] Ibid.
[78] Warden, Pete, "Nerd Culture Is Destroying Silicon Valley - Quartz," *Qz.com*, October 13, 2014, http://qz.com/279823/nerd-culture-is-destroying-silicon-valley/.

Tech was often compared to other industries like banking and finance, where privilege and class were seen as deeply entrenched gatekeepers to success. As one young African American entrepreneur named Mike described to me, "[Tech] is not an insider's game from the standpoint of, like, I came from [the South], you know? And I didn't know anything about technology. That was 30 months ago. So in a very short amount I've time I've been able to get extremely far and build everything from scratch. It's not like you get grandfathered in, or like I followed my dad to get in. It's not like banking."

At twenty years old, Mike had just secured $1.5 million in seed funding for his latest start-up, a mobile application that enables users to shop with their friends online. On the surface, Mike's narrative serves as a powerful testament to Silicon Valley's meritocratic promise. Yet, what his story leaves out is the fact that Mike had arrived in Silicon Valley after being selected as a participant in a highly coveted tech accelerator program. As a member of this high-profile program, Mike received $100,000 in seed funding and access to an immense network of investors, entrepreneurs and mentors who helped him get a foothold in the industry. He may have been working from scratch, but he had all the ingredients laid out before him.

I was curious to get Mike's perspective as a young black entrepreneur on the rising conversation about the lack of diversity in tech. Did tech have a diversity problem, I asked. Mike paused for a moment. "I don't know," he reflected thoughtfully, "I guess in some ways it is an insider's game...but is that an excuse that should be used, or is that even something that should be like a

discussion topic for this so-called movement? Absolutely not. Because like, if I

can do it, anyone can. It just takes effort." Mike went on to recount many other

stories that were intended to reinforce his image as an "organic"[79] entrepreneur:

like the time he was a small boy and got the reputation for asking precocious

questions while tagging along to his dad's breakfast meetings with investors, or

how he'd given his first pitch to a venture capitalist at the age of fourteen so that

he could fundraise the costs of travelling to tennis championships around the

country. Or the countless college classes he skipped by escaping into his

parent's spare apartment in SoHo for start-up brainstorms.

Although these stories were intended to reinforce Mike's image as a

natural go-getter, to an outside listener like me, they portrayed a life of

considerable economic privilege. Whereas Patrick was the beneficiary of

privileges conferred to someone who fits the default profile of "hacker nerd" in

tech, Mike's privilege is class-based. The juxtaposition of these two profiles

highlights the importance of understanding the intersectionality of identity and

privilege when discussing the issue of diversity in the high-tech sector. Each

individual's identity sits at the intersection of many categories: she can be a

female, Caucasian, able-bodied, middle class, college-educated, homosexual,

worker, mother, Republican, etc. Depending on the context, any combination of

these categories can be more or less relevant to how she is able to operate in

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[79] This was a term that Mike used repeatedly to describe his circumstances and success. He formed "organic" relationships with mentors and investors in Silicon Valley. Opportunities to pursue his interests arose "organically" during his childhood, etc.

the world at a given time.[80] Indeed, for a given set of salient categories there often exists a mixture of privilege and subordination that is actively held in tension within the same person.[81]

While I do not doubt that Mike is an exceptional young man (after all, not just anyone can raise seven figure seed round funding before their twenty-first birthday!), his personal narrative oversimplifies the circumstances that facilitated his rapid rise to the tech elite. In spite of his high-status membership in the accelerator and considerable economic means, Mike viewed himself fundamentally as an outsider whose accomplishments were the result of hard work and perseverance.

In many ways, Mike's perspective demonstrates the well-documented challenges that individuals face in acknowledging, or adequately weighing the importance of, the privileged circumstances that facilitate their success in life.[82] Feminist scholar Peggy McIntosh has written extensively about the problematic ways in which conversations about diversity and privilege are framed in contemporary discourse.[83] According to McIntosh, discussions on privilege often center around the plight of the "disadvantaged": the women, the people of color, the queer, etc.. Rarely do they take an explicitly critical look at the advantages

[80] Grillo, Trina, "Anti-Essentialism and Intersectionality: Tools to Dismantle the Master's House," *Berkeley Journal of Gender, Law & Justice* 10, no. 1 (September 2013): 16–30.
[81] Wildman, SM and Davis, AD, "Language and Silence: Making Systems of Privilege Visible." (35 Santa Clara L. Rev. 881, 1994), http://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1456&context=facpubs.
[82] For more discussion of the ways that dominant group members manage their identity when their racial, sexual, or gender-based privilege is made apparent, see: Knowles, Eric D., Brian S. Lowery, Rosalind M. Chow, and Miguel M. Unzueta. "Deny, Distance, or Dismantle? How White Americans Manage a Privileged Identity." *Perspectives on Psychological Science* 9, no. 6 (2014): 594-609.
[83] McIntosh, Peggy, "White Privilege: Unpacking the Invisible Knapsack," 1989.

conferred to members of a dominant group. This blind spot in mainstream

discourse makes it challenging to acknowledge such privilege, much less

minimize or end it. As legal scholars Adrienne Davis and Stephanie Wildman

describe, privilege and subordination are two-parts of a "double-headed hydra":

in order to get rid of one, you must address the other.[84]

Yet, researchers have found that people are more likely to embrace the

framing of social inequity in terms of discrimination, rather than privilege,

because it it less likely to directly confront one's own self-image as a member of

certain privilege categories.[85] The complexity of this situation is compounded by

the fact that most people (like Patrick and Mike) operate as both outsiders and

insiders in some form or fashion. As such, people tend to emphasize personal

characteristics over external, structural factors that have shaped their life

trajectory. The narrative Mike constructed for himself calls into question the

premise that tech is an insider's game, while an observer's narrative of Mike's life

might confirm the insider's game hypothesis. This can make it very challenging to

move forward with conversations related to increasing diversity in the tech sector.

As my conversations with Patrick and Mike demonstrate, there exists a

spectrum of backgrounds and perspectives that tech insiders bring to the table

regarding the issue of diversity in tech. However, constant across them was the

idea that tech was a merit-based system. The kneejerk reaction to discussions

about privilege and merit was often a defensive stance -- I've worked hard to get

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[84] Wildman, SM and Davis, AD, "Language and Silence: Making Systems of Privilege Visible."
[85] Lowery, Brian S, Eric D. Knowles, and Miguel M. Unzueta, "Framing Inequity Safely: Whites' Motivated Perceptions of Racial Privilege.," *Personality and Social Psychology Bulletin* 33, no. 9 (2007): 1237–50.

where I am today, and I've succeeded because this is a place where the best

thinkers, creators, etc. are rewarded. The foundation of this notion lay in the idea

that most people who come to Silicon Valley were outsiders or oddballs who had

made their own way. To call this into question involves challenging people's

personal narratives of where they came from and how they ended up where they

are today. As such, it can be challenging to discuss privilege and bias without

jeopardizing a central aspect of people's view of themselves and the industry

they worked in.

This situation is exacerbated by the fact that the conversation about

diversity in tech has risen to the national spotlight thanks in large part to

provocative narratives that challenge these prevailing discourses of meritocracy

in tech. Many involve headlines about individuals who say and do the most

inflammatory things: the sexual harassers, the hackers who build boob apps[86],

the bros who insist that tech is the ultimate meritocracy on big stages with loud

mics. These are the people who tend grab the headlines and generate the stories

that make people angry.

Anger is a powerful force to harness for social change. Yet, the problem

with such headlines is that they perpetuate unhelpful dichotomies of opinion on

issues that are not necessarily of central importance to the diversity debate -- Did

he harass her or didn't he harass her?[87] Is that app racist or isn't it?[88] Are all

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[86] Ohleiser, Abby, "Meet 'Titstare,' the Tech World's Latest 'Joke' from the Minds of Brogrammers - The Wire," *The Wire*, September 8, 2013, http://www.thewire.com/technology/2013/09/titstare-tech-worlds-latest-brogrammer-joke-techcrunch-disrupt/69171/.

[87] Bowles, Nellie, "Preston-Warner Threatens Legal Action in Github Scandal Fallout | Re/code," April 21, 2014, http://recode.net/2014/04/21/as-horvath-accusations-continue-preston-werner-threatens-legal-action/.

white guys brogrammers or aren't they?[89] Such debates have left us with an

uncomfortable undercurrent in the ongoing conversation about diversity in tech,

one that manifested itself in the pointed question at the IDEO event, and my

friend's subsequent reaction. It also makes it challenging to understand how

people with the power to implement significant change in their companies are

navigating the nuances of the issue in real, concrete ways.

It was this desire to cut through the mainstream discourse surrounding

diversity in tech that led me to focus a significant portion of my research on

understanding the perspectives and approaches embraced by leaders of tech

companies.[90] In total, I interviewed seventeen CEOs and founders of tech

companies who were listed in a database of CODE2040 supporters.[91] I selected

my interviewees from this database in the hopes of creating a sample of leaders

who were already bought into the idea that diversity was a good thing, and that

Silicon Valley was not yet diverse enough. With the exception of one person, all

individuals I interviewed were the head of small to medium sized companies that

employed less than one hundred people. I limited my sample to companies of

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[88] Strachan, Maxwell, "White People Create App To Avoid, Um, 'Sketchy' Areas," August 8, 2014, http://www.huffingtonpost.com/2014/08/08/sketchfactor-app-white-creators_n_5660205.html.

[89] Tufekci, Zeynep, "No, Nate, Brogrammers May Not Be Macho, but That's Not All There Is to It — The Message — Medium," March 18, 2014, https://medium.com/message/no-nate-brogrammers-may-not-be-macho-but-thats-not-all-there-is-to-it-2f1fe84c5c9b.

[90] Research from a decade-long Stanford study of nearly 200 high-tech startups in Silicon Valley has demonstrated that the founders of tech companies act as "organizational architects" who design employment models and blueprints that have enduring effect on how their company recruits and retains talent as they grow and mature. The logic and assumptions about employment that early leaders lay into the foundation of their organization have enduring consequences. Founders and CEOs are also the people who have the power to spearhead real change within the hiring apparatus of their companies. It's for this reason that I wanted to interview them to get a clearer sense of how they understood tech's "diversity issue," and how that subsequently shaped the way they led their companies.

[91] All of them had attended one of CODE2040's "friendraisers," an event intended to recruit professionals from the industry to take on mentorship or advisory positions for the organization. I reached out to anyone who listed founder of CEO as their current job title.

this size in the hopes that the CEOs and founders I interviewed would have more hands-on experience and knowledge about their company's current hiring practices. I made the decision to limit my sample to known CODE2040 supporters so that I could move beyond the basic premise that diversity is an important goal to pursue, in order to gain deeper insight into the challenges and effective strategies that exist for actually realizing that value.

In addition to these interviews, I was an active participant in social mixers and professional events around Silicon Valley. I attended on average three events per week, where I had the opportunity to talk with a much broader cross-section of people working in tech. Over time, certain recurring themes emerged in those interactions, revealing significant external and internal barriers to making pro-diversity changes in the work place. While most founders I spoke with believed that it was beneficial for their businesses to hire a diverse workforce, most did not actively pursue this goal until they had reached a certain level of financial stability. Most of the processes and procedures these companies used for recruitment were premised on the idea that tech has a severe shortage of skilled technical labor.

Rather than creating a job market that is more welcoming to new or unconventional job candidates, these assumptions perpetuate an insular labor market that is very difficult for people who lack the necessary social capital or traditional markers of merit to get noticed. In a market where labor is scarce, one might expect to see innovations in hiring processes, and an increased effort to find undervalued talent. However, such developments are less likely to occur if

the scarcity of talent is conceived of as a scarcity of "people like us," in terms of their educational pedigree or overlapping social networks.

As I detail in the following sections, such heuristics greatly shape the practices for identifying and recruiting skilled workers in tech. However imperfect these processes are understood to be, they are very closely tied to the industry's understanding of itself as a meritocracy. As a result, leaders must find ways to reconcile their teams' perceived tension between excellence and diversity in order to get buy-in for proposed changes necessary for diversifying their teams. I outline these challenges in greater detail in the rest of this chapter.

Origins of Insular Hiring Practices in Tech

By and large, most of the people I interviewed expressed specific, thoughtful reasons for why they believed having a diverse workforce in their company was a good idea, both socially and economically.[92] Yet none of them identified diversity as a priority consideration when starting a new company. In the sink or swim start-up culture of Silicon Valley, the prevailing ethos is to run as lean and efficient as possible in the early stages of the company's development. This often meant that founders turned to their networks for recommendations of trustworthy, effective people to hire onto their early teams.[93] However, as their companies grew it became increasingly apparent how homogenous the teams had become. This phenomenon is reflected in the demographic statistics of a

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[92] Most identified diversity as being important for their long-term success, as it would minimize errors from group think and ultimately lead to better designed products.

[93] Granovetter, Mark, "The Strength of Weak Ties.," *American Journal of Sociology*, 1973, 1360–80.

dozen major tech companies[94] who released their workforce data in a push towards transparency in 2014. On average, eighty to ninety percent of these companies' workforces were comprised of Caucasian and Asian workers, with sixty to seventy-five percent of the staff being male.[95] These diversity numbers decrease even more when one breaks them down according to the number of women and racial minorities in leadership positions and technical roles. For example, males made up 83% of the technical staff for middle of the pack companies like Yahoo and Linkedin. The racial makeup of the technical employees was over 90% white and Asian at all twelve companies listed.

As the individuals I interviewed explained to me, the larger their company grew the more challenging it became to hire that first employee from an underrepresented group. For example, Patrick's company was about two years old at the time of our interview, and had grown from three founders to about fifty employees. Roughly forty percent of their employees were female. However, there were no women in any of the company's technical roles -- they were primarily in marketing and administrative positions. Furthermore, of the twenty-six technical team members, none of them had children. Not everyone was white, but most of the non-white employees were of Asian descent.

As the company grew more financially stable, Rob (who remains the primary person in charge of hiring the technical staff) began to more intentionally seek out individuals who would diversify their overwhelmingly young, single and

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[94] This list includes Facebook, Pinterest, Intel, Apple, Google, Twitter, Yahoo, Microsoft. eBay, Linkedin, HP and Cisco.

[95] DeAmici, Carmel and Carson, Biz, "Eight Charts That Put Tech Companies' Diversity Stats into Perspective | Gigaom," August 21, 2014, https://gigaom.com/2014/08/21/eight-charts-that-put-tech-companies-diversity-stats-into-perspective/.

male team. After intentionally seeking out a few well-qualified female candidates for a senior engineering position, Rob's team faced the significant challenge of getting that *first* woman to join the team. Though they extended offers to more than one of the candidates, none of them accepted the job. "The bigger we get the harder it's going to be to hire that first person who's different from everyone else," Patrick explained, "Because they walk into our office and they can't see themselves already here, so it's very hard for them to picture it and commit to it. And that just gets harder and harder over time as our team grows."

Rob's experience was emblematic of the trajectory recounted to me by many of the founders I spoke with -- they generally acknowledged that diversity was a good thing, but the idea wasn't actively shaping the way they ran and grew their companies in the early days. As their startups grew and they had more headspace to reflect on the growth of their organization, some of the individuals I interviewed made a more intentional effort to increase the diversity of their teams[96]. For some, the challenge then came in adjusting their company culture so that new individuals felt comfortable on the team. Others told me that engineers from underrepresented groups were simply nowhere to be found.

In fact, my interviewees frequently told me that good engineers of any background were quite scarce. A prevailing assumption in Silicon Valley is that there is a severe shortage of skilled technical talent in the high-tech labor market. This belief shapes people's notions of what an ideal candidate looks like and where they come from, as well as the hiring practices used to find them. I spoke

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[96] They did things like reach out to CODE2040 to see if they could host some of their fellows for the summer. Remember, it was the CODE2040 database of potential companies and supporters that I used in order to create my interview sample.

with one serial entrepreneur named Patricio[97] who described to me how desperate he and his peers were to find competent engineers. As he explained to me, in recent years people have grown less picky about who they hire, as long as the employee has the programming chops necessary to get the job done, "Before, people would say, 'You have to get me a smart, well-rounded individual, etc.' and now it's just 'I need someone who can code python and I don't care if, like, they are a bad person or have a criminal record...I just desperately need someone who knows how to code python.'" Patricio's comment echoes a common refrain I heard throughout my research -- Why are you talking to me about diversity and bias when I'm desperate to hire anyone who can get the job done!

The implication of such statements is that companies are more than willing to hire anyone who is able to do the job, regardless of their background. One might assume that such circumstances would push companies to be quite flexible and open to hiring individuals who were new to the tech scene or lacked impressive credentials. However, I found that this perceived labor shortage led to a different set of assumptions that actually perpetuate, rather than mitigate, insular recruitment and hiring practices. I was repeatedly told in interviews that, given the shortage of technical talent, any engineer who is good at their job is probably already employed at a company that they love, or getting paid so much that they don't care where they are working. According to my interviewees, this was evidenced by the fact that they received very few responses to public job notices they posted on their company website or sites like Linkedin.

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[97] Patricio is originally from Spain, but now lives and works full-time in Silicon Valley.

Almost all of the companies I spoke with said that traditional job-post methods were the least fruitful strategy they had for finding qualified engineers. They would receive just a handful of mediocre candidates through un-targeted public advertising of open positions. As a result, most of them had adopted quite aggressive recruitment strategies that stemmed directly from their assumption that all good engineers already had jobs. For example Patrick, who was both a co-founder and the CTO of his company, spent a significant amount of time each week searching for engineers and writing personalized emails to try to attract them to his company,

> "It's a very small group of people who actually come to our jobs page and apply for jobs. Instead what a lot of it is scouring places like Linkedin, finding what companies are like us, what companies have we heard are having trouble right now. If we hear that X company is having a cultural problem or something, let's try to pull people out of that...but then you have to reach out to them and try to talk to them... [which involves] talking to them about our company, telling them what you think is particularly cool as related to their interests."[98]

Keep in mind that Patrick is one of the top executives at a rapidly growing company that already employs fifty people. Nevertheless, proactive recruitment of engineers is one of his primary responsibilities. Rob told me he sends between twenty and thirty personalized emails per week to engineers he's hoping to lure into an interview with his company. He sends the emails personally in the hopes of standing out amidst the barrage of inquiries received by engineers from professional recruiters. One of Rob's preferred search tactics is to poach

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[98] "Patrick," interview by Chelsea Barabas, June 27, 2014

engineers from companies that are struggling to stay afloat, or are rumored to have an unhealthy team culture.

These practices are not new. After the dot-com bubble burst in 2000, a site called Fucked Company emerged, which allowed tech employees to post anonymous commentary on why their company was losing money or was likely to be going out of business. Not only did this site fuel the industry's desire for juicy gossip, but it also gave readers a heads up on where they might find disillusioned and soon-to-be-unemployed engineers and product managers. Though the site closed in 2007, the poaching practices that they fostered continue to thrive as a natural extension of the industry's assumption that most good engineers are already employed.

The significant amount of time and effort that Rob put into recruiting engineers was not unusual amongst the founders and CEOs I spoke with. Another individual I interviewed told me that he went so far as to sit down with his employees and review their entire list of friends and acquaintances on social networks like Facebook and Twitter in the hopes of finding software engineers. By recruiting from their current employees' social networks, companies hoped to identify solid candidates who would be more likely to respond to a cold recruitment email, due to their personal connection to someone already working at the company.

It is also a classic way of increasing ingroup homophily, which refers to the selection of other team members on the basis of shared characteristics that can range from similar appearance to common interests and tastes. A large body of

research has demonstrated that social contact between people with similar

ascriptive characteristics, such as race and gender, happens at a rate higher

than the frequency of association between dissimilar people.[99] As a result, certain

qualities and characteristics tend to become localized to, and associated with, a

specific socio-demographic space.[100] As McPherson et al document, these

cultural, behavioral, and genetic characteristics can come to be associated with

"people like us." Therefore, it makes sense for an employer to pursue candidates

from within their employees' social networks if he or she is hoping to find

candidates similar to their current team.

However, this homophily in our social lives can exacerbate the

homogenizing effects of hiring practices that rely heavily on personal referrals

from people already within the industry. These findings are complementary to

arguments that have been made by researchers in the field of psychology.

Anthony Greenwald and Thomas Pettigrew argue that most discrimination today

stems from extending favors to individuals who are in our in-group, rather than

resulting from feelings of hatred or malice towards individuals from outside our

social circles.[101]

The assumption that most skilled programmers were already employed

led many leaders of tech companies to rely on poaching tactics and personal

[99] Shrum, Wesley, Neil H. Cheek Jr, and Saundra MacD, "Friendship in School: Gender and Racial Homophily.," *Sociology of Education*, 1988, 227–39.

[100] McPherson, Miller, Lynn Smith-Lovin, and James M. Cook, "Birds of a Feather: Homophily in Social Networks," *Annual Review of Sociology*, 2001, 415–44.

[101] Greenwald, Anthony G. and Thomas Pettigrew, "With Malice Toward None and Charity for Some: Ingroup Favoritism Enables Discrimination," *American Psychologist* 69, no. 7 (October 2014): 669–84.

referrals from their current employees. As a result, the recruiting environment in Silicon Valley has developed into a very closed ecosystem of talent, in which companies spend a large amount of time and resources trying to attract the same subset of engineers already working in industry.

In addition to poaching professional programmers, companies often send recruiters to university job fairs to find fresh talent. The job fair circuit tends to be limited to well-respected universities in the San Francisco Bay Area, as well as a few schools outside of Silicon Valley with reputations for top-notch engineering programs, such as MIT and Carnegie Mellon. While many of the founders and CEOs I interviewed said they did not think it was necessary to have a university degree in order to be a solid software engineer or web developer, they often used such credentials as a first pass screening mechanism. As one interviewee named Johnny explained to me,

> "Though I do believe that there are people who have no formal training, don't look good on paper and are still great to work with, if I were to look for them on paper I'd end up interviewing everyone. And that's just not going to scale. So we're basically willing to miss out on those people because, though the benefit could be high, the cost is too high to find them. We will probably only find those people through personal referrals."[102]

In lieu of significant prior work experience, candidates need either an elite university degree or a personal connection to the company in order to be seriously considered for the job. Oddly enough, most people I interviewed believed that a candidate's educational background had little predictive value when evaluating who would make a good hire. Many of them referenced a study

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[102] "Johnny," interview by Chelsea Barabas, July 17, 2014.

released by Google in 2013, in which the company announced that they found no

correlation between metrics like GPA or test scores and employee

performance.[103] Nevertheless, academic pedigree and performance remain one

of the primary filtering mechanisms for employee candidates. Like Johnny, many

of the leaders I interviewed use these traditional markers of merit because they

could conceive of no other sensible way of differentiating one resume from

another. As Will, founder of an online platform that matches college students with

summer internships, explained to me, most companies have only a vague idea of

what indicators to look for when hiring a new employee or intern,

> "Companies use a set of heuristics to evaluate candidates, particularly those with less experience…and those heuristics tend to be pretty faulty. The number one heuristic is where you go to school. Another one is GPA. They do that because they don't have any effective way of evaluating candidates. A lot of times they don't really even know what they're looking for, so that's what they do."[104]

The more I discussed hiring practices with tech company leaders, the

more I realized how imprecise their metrics for competence and talent actually

were, particularly for candidates with limited prior work experience. Although

many of the founders and CEOs I spoke with expressed frustration with these

methods, few of them critically reflected on the role that they played in creating

and perpetuating a homogenous workforce in tech. Rather, they assumed that

there was a general scarcity of technical talent, particularly for individuals from

underrepresented groups. Because their search methods yielded very few

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[103] Soave, Robby, "Google Executive: GPA, Test Scores 'Worthless' for Hiring | The Daily Caller," June 20, 2013, http://dailycaller.com/2013/06/20/google-executive-gpa-test-scores-worthless-for-hiring/.
[104] "Will," interview by Chelsea Barabas, July 1, 2014.

women or people of color, they assumed that the problem stemmed from leaks in the education pipeline for STEM careers.

This is not entirely an inaccurate conclusion to draw. As I mentioned earlier in this chapter, women and people of color have produced consistently lower rates of enrollment and graduation from STEM degree programs.[105] However, among those who graduate with a degree in science or engineering, the unemployment rate for Black and Native American graduates is double that of the their peers.[106] Qualified women enter science and technology careers at half the rate of their male counterparts. These kinds of statistics highlight the incompleteness of the education pipeline explanation, because it fails to account for the role that industry recruitment and hiring practices play in perpetuating employment disparities along key ascriptive categories like race and gender.

In many ways, the rapid growth of the high-tech sector has created a job market that is ripe for inclusion of people who are new to the industry, or who lack traditional credentials like a college degree. Given how few people respond to traditional job postings, companies have developed more proactive practices for seeking out potential candidates. At the same time, there has been a significant rise in the number of resources and programs available to individuals who want to enter the tech workforce as engineers. Many of these programs are targeted at individuals who are unable to study computer science in college.

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[105]Moin, Syed and Chemers, Martin M., "Ethnic Minorities and Women in STEM: Casting a Wide Net to Address a Persistent."
[106] Landivar, Liliana Christin, "Disparities in STEM Employment by Sex, Race, and Hispanic Origin -- American Community Survey Reports."

Hypothetically, these resources should provide a fresh supply of talent to the tech labor market, ready to be picked up by rapidly growing companies in Silicon Valley.

However, circular notions of meritocracy, which are premised on the idea that those who succeed are those who have the most merit (and those who have merit are those who succeed, and so forth), have led to recruitment methods that target individuals who are already successfully working in the industry. In addition to poaching tactics, the companies I spoke with relied heavily on personal referrals, which limit the talent search to social circles that are likely to be racially homogenous. The best bet for someone with limited prior work experience and/or personal connections to the industry is to graduate from one of a handful of prestigious universities that are have gained recognition as a rough indicator of future success. This option is obviously limited to the very small group of students who are accepted to these institutions. According to the American Society for Engineering Education, the ten schools which awarded the largest number of engineering degrees between 2004 and 2013 included the following:[107]

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[107] Yoder, Brian L, "Engineering by Then Numbers" (American Society for Engineering Education, 2012), http://www. asee. org/papers-and-publications/publications/collegeprofiles/2011-profile-engineering-statistics. pdf.

**ENGINEERING BACHELOR'S
DEGREES AWARDED BY SCHOOL**

1.	Georgia Institute of Technology	1,823
2.	Pennsylvania State University	1,653
3.	Univ. of Illinois, Urbana-Champaign	1,604
4.	Purdue University	1,405
5.	Texas A&M University	1,394
6.	Virginia Tech	1,331
7.	University of Michigan	1,299
8.	North Carolina State University	1,283
9.	The Ohio State University	1,126
10.	University of Texas, Austin	1,100 [108]

Given their large student populations, it's unsurprising that big public universities dominate the list. Interestingly, California public schools, such as UC Berkeley and CalTech, are not amongst the top engineer-producing schools in the country. Yet, they are amongst the top ten schools from which Asian-American students graduate with engineering degrees:

**BACHELOR'S DEGREES AWARDED
TO ASIAN-AMERICANS BY SCHOOL**

1.	University of California, Berkeley	576
2.	University of California, San Diego	488
3.	University of California, Los Angeles	353
4.	Georgia Institute of Technology	328
5.	University of California, Davis	286
6.	University of Texas, Austin	268
7.	Univ. of Illinois, Urbana-Champaign	256
8.	University of Washington	229
9.	California State Poly. U., Pomona	227
10.	Rutgers University	217 [109]

These are also universities from which the tech industry recruits heavily, given their geographic proximity to Silicon Valley and their well-respected reputation in the industry. Although Asian-Americans are approximately five

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[108] Ibid.
[109] Ibid.

percent of the overall U.S. population, they comprise approximately one quarter

of the workforce in the Bay Area tech scene.[110] Their overrepresentation in tech is

at least in part due to the fact that most of their engineering students graduate

from schools that are within tech's recruitment network. In contrast, African

American and Latino/a engineers graduate in the largest quantities from schools

that are concentrated in the South, far outside the tech college recruitment

network:

BACHELOR'S DEGREES AWARDED TO BLACK OR AFRICAN-AMERICANS BY SCHOOL		BACHELOR'S DEGREES AWARDED TO HISPANICS BY SCHOOL	
1. North Carolina A&T State Univ.	162	1. University of Puerto Rico	521
2. Georgia Institute of Technology	109	2. Florida International University	385
3. Morgan State University	88	3. Polytechnic Univ. of Puerto Rico	359
4. Prairie View A&M University	74	4. University of Texas, El Paso	236
5. North Carolina State University	71	5. California State Poly. U., Pomona	210
6. Florida International University	61	6. Texas A&M University	203
7. Alabama A&M University	58	7. University of Central Florida	196
7. University of Central Florida	58	8. University of Florida	178
9. University of Florida	57	9. Arizona State University	151
10. Massachusetts Inst. of Technology	54	10. University of Texas, Austin	149 [111]

If tech companies are looking to increase the proportion of Black and

Latino/a engineers in their workforce they should think seriously about how they

might establish stronger ties with the universities included in the above list.

In addition to broadening the university recruitment circuit, the industry

might also develop strategies to reap the benefits from new programs supported

by the White House's new TechHire Initiative. Through TechHire, the government

is investing in the expansion of accelerated workforce development programs

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[110] Nakaso, Dan, "Asian-American Citizens Hold Slight Edge over Non-Citizen Asians in Bay Area Tech Jobs - San Jose Mercury News," December 9, 2012, http://www.mercurynews.com/ci_22147394/citizen-asians-hold-slight-edge-over-non-citizen.
[111] Yoder, Brian L, "Engineering by Then Numbers."

across the country. These bootcamp style programs are designed to equip individuals with the baseline skills necessary to work in tech within months, rather than years.[112] The initiative also plans to collaborate with city government in order to build stronger ties between industry and individuals who complete these alternative workforce training programs. It remains to be seen what the quality and quantity of students are who graduate from these interventions. Nevertheless, it is likely that plans like this, in addition to the rapidly increasing number of alternative tech education programs emerging on the scene, will provide a fresh wave of technical workers looking for jobs.

As the critical conversation about diversity continues to rise, so does the pressure on companies to take a more proactive stance towards recruiting diverse talent. This requires broadening the set of practices used to identify and evaluate potential job candidates. This is much easier said than done. As companies begin to explore ways of recruiting diverse talent, they must also renegotiate the way they see themselves as a group of competent professionals. However weak the current metrics for evaluating merit are, they are now an integral part of the Silicon Valley's identity as a merit-based industry. Changing them requires a reconsideration of that identity. At the heart of that process is a debate about how to understand and evaluate professional potential and excellence.

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[112] Office of the Press Secretary, "FACT SHEET: President Obama Launches New TechHire Initiative | The White House," March 9, 2015, https://www.whitehouse.gov/the-press-office/2015/03/09/fact-sheet-president-obama-launches-new-techhire-initiative.

Reconciling Excellence with Difference

For many of the leaders I spoke with, a considerable challenge lay in communicating to their teams that hiring for diversity did not equate to lowering their standards for hiring top-quality engineers. As one interviewee named Arvind explained to me,

> "There's always these difficult challenges with certain managers or employees who think, 'Oh gosh what are we doing? Are we lowering the bar?' So we have to engage in this internal chatter … because people usually think in black and white, meaning like they usually think in terms of we're lowering the bar or we're keeping things the way they are. We have to be like, we're just making extra effort to go outside of our usual channels and we're actually working harder to see that there are qualified people everywhere. We just haven't found them and they haven't found us."[113]

Arvind's company had close connections with Stanford University, whose campus was just a five minute walk from the company headquarters. As such, a large portion of their engineers were recent graduates of the school. When Arvind proposed that they expand their talent search beyond the usual elite university circuit, he was met with resistance. Even when they managed to get more women and people of color through the door for an interview, Arvind said it was a gradual process leading managers to make the "mind shift" necessary to value the potential of candidates who didn't fit the standard employee profile for the company.

The discomfort associated with such a transition is symptomatic of living in a "mirror-tocracy," a phrase coined by the internet entrepreneur Mitch Kapor in

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[113] "Arvind," interview by Chelsea Barabas, July 17, 2014.

order to describe the tendency for people to easily recognize and reward excellence in individuals who remind them most of themselves.[114] In order to cope with this discomfort, the knee-jerk reaction of some companies has been to seek out candidates who are diverse in terms of the ascriptive categories of race and gender, but who have more or less the same pedigree and background as the status quo employee at the company. In other words, Arvind's company was looking for female and Black Stanford graduates.

Will, the founder of the intern placement platform mentioned earlier, recounted to me his experiences working with tech companies over the last year, once the conversation about diversity in tech had become a mainstream topic in the news. He said that many of his clients had expressed a strong interest in hiring minority engineers from elite universities like MIT and Stanford. In fact, his clients sought out advice on tactics and strategies they could use to successfully compete for this very small group of minority talent. They were less interested in recruiting students from lower-tier universities, where a larger number of minority students could be found.

This begs the question: if all of your "diverse employees" attended the same prestigious schools and touted the same work experience as everyone else on the team, would race and gender still serve as an adequate metric for diverse experiences and perspectives? Cognitive diversity refers to differences in the heuristics, or problem solving tools, we use to understand the world around

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[114] Nocera, Joe, "Silicon Valley's Mirror Effect - NYTimes.com," December 26, 2014, http://www.nytimes.com/2014/12/27/opinion/joe-nocera-silicon-valleys-mirror-effect.html?_r=1.

us.[115] Race is often a useful proxy for cognitive diversity, but that begins to break down when it is simply a "cherry on top" characteristic that distinguishes a person who otherwise has the same experiences and pedigree as the rest of the team.

In an industry like tech, where the population has been quite homogeneous for some time, the challenge comes in understanding how the processes of identifying the 'ideal candidate' are optimized to narrowly reflect the strengths and characteristics of those who have traditionally filled those positions. Without doing that, we run the risk of overlooking the valuable contributions of individuals who break the mold of 'the good candidate.' As Will the recruiter explained,

> "We need to start thinking about bridging the gap between students who may not have the same social and cultural capital as students who went to a top school or come from wealthier families. Like within a given minority status you can have a student who came from a poor background that went to community college and studied engineering that can be just as good of an employee as a student that came from a wealthy background and went to UIUC [University of Illinois Urbana-Champaign] for engineering. But there are all kinds of small things that are going to factor into how a company thinks about recruiting that student...All of those things need to be thought about and we need to be careful that we recognize our own bias."[116]

Organizational sociologists from the neo-institutional tradition would likely characterize this tendency towards surface-level diversity as simply a performative phenomenon,[117] in which companies modify their practices in order

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[115] Page, Scott E., *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies* (Princeton University Press, 2008).

[116] "Will," interview by Chelsea Barabas, July 1, 2014.

[117] Neo-institutional theory provides a theoretical lens for understanding organizational behavior as situated in and influenced by other organizations and wider social forces—especially cultural rules and beliefs. Initial scholarship documented how the construction of broader cultural norms

to satisfy external expectations from funders, customers or the public sphere more generally. However, I think that it is more complicated than that. Rising external pressures did galvanize leaders to demonstrate that they were making an effort to fix their diversity problem. However it also made them wary of drawing attention to efforts that appeared disingenuous or ineffective.

For example, Johnny expressed optimism over the increased attention that diversity in tech was receiving, but he also felt frustrated about how it might affect the way others interpreted his efforts to increase diversity in his company. As the issue has gained attention in the media, it gave rise to both internal and external pressures on companies to demonstrate how they were dealing with the problem. These pressures manifested in complicated ways that both motivate and constrain the way leaders think about responding to their "diversity problem,"

"When [diversity] becomes a hot topic and things gets better, then intentions are unclear. Like, did you do it because of fearing the backlash or did you do it because it's important? So that's awkward," Johnny added, "But it's also inspiring in the sense that it's raising awareness." For Johnny's company, diversity remained an uncomfortable topic to talk about directly. They preferred to frame such discussions around the more general challenge of finding skilled engineers to join the team. Johnny's company was hesitant to establish formal, public partnerships with pipeline programs like CODE2040 for fear of seeming disingenuous in their efforts to create a more inclusive workforce.

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shaped organizational actors and facilitated institutional isomorphism (the growing similarity of organizations in a field).

This ambivalence was due to the fact that diversity in tech is currently such a hot topic in the industry and the media. If Johnny's company started forming partnerships with pro-diversity organizations in the Valley, they worried, then someone might accuse them of being mere trend followers in pursuit of the token diverse candidate, rather than a genuine proponent of a diverse workforce. In spite of these fears, Johnny's company did broaden their search process to places where underrepresented candidates were more likely to be found.

For example, in an effort to bring more women into his company, Johnny actively recruited from a code school called Hackbright Academy. Hackbright runs ten-week long intensive training programs for women aspiring to enter the tech workforce as software engineers. Last summer Johnny interviewed every single student in Hackbright's graduating class, and ultimately extended an offer to a few of the candidates. The next challenge came in explaining to his team why they were spending so much time and effort recruiting people who had substantially less work experience than most of the people who joined the team,

> "People like working with great people and one way that you visualize that is that there's some sort of quality bar. If you lower the bar then people might become less proud of the team that they're working with and they might leave, which would be bad... so it's delicate to think about how to frame why they're deciding to hire people with so much less experience"[118]

For Johnny, the solution was to conceptualize the decision as an issue of risk, rather than quality. He explained to his team that everyone who joined the company would be expected to maintain the same high level of performance. His

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[118] "Johnny," interview by Chelsea Barabas, July 17, 2014.

job during the recruitment process was to make intelligent projections about a candidate's future performance based on their prior work. Given how limited the Hackbright students' prior work experience was, the company was admittedly taking on a greater degree of risk and uncertainty by hiring them.

However, if they did not meet the company's standards of excellence, Johnny assured, they would be let go. In other words, the company wasn't lowering the bar; they were increasing the degree of risk they were willing to take on in order to diversify their team. In contrast to the industry's poaching practices, which are low-risk but highly resource intensive, recruiting from Hackbright requires a higher degree of risk taking, but much less time and money. Through this type of messaging Johnny was able to broaden the set of heuristics his team used to evaluate competence without jeopardizing their self-identity as a top-notch team of engineers.

As these examples demonstrate, the prevailing perception in tech is that there is a fundamental tension between recruiting for excellence and recruiting for diversity. This idea stems from the belief that tech is largely a merit-based industry, where outsiders and misfits of all shapes and sizes can rise to the top through hard work and ingenuity. This perception is closely intertwined with the self-narratives that individuals within the industry hold of themselves and their peers, who often moved to San Francisco from other places around the world.

Conclusion

While most founders I spoke with believed that it was beneficial for their businesses to hire a diverse workforce, most did not actively pursue this goal

until their company had achieved some degree of financial stability. By that time, their technical teams tended to be overwhelmingly comprised of young, single, white males. This was the result of the talent sourcing strategies that companies used, which are premised on the idea that tech has a severe shortage of skilled technical labor. Rather than creating a job market that is more welcoming to new or unconventional job candidates, these assumptions have perpetuated an insular labor market that is very difficult for people who lack the necessary social capital or traditional markers of merit to get noticed.

However imperfect these processes are understood to be, they are very closely tied to the industry's understanding of itself as a meritocracy. Breaking with them requires a clear rationale for why an alternative set of practices makes sense in tech's merit-based approach to recruitment. One way that leaders have begun to reconcile the perceived tension between excellence and diversity is to frame the issue in terms of a trade-off between risk and resource expenditure. While it may be riskier to hire an untested and unfamiliar candidate, it may be worth the saved costs in terms of time and money that would otherwise be spent on recruiting engineers from more familiar backgrounds. Such framings of the trade-offs in tech hiring could enable the industry to broaden their recruitment networks to include a larger set of universities and workforce development programs that are currently disconnected from the industry.

In this chapter, I argue that there is a fundamental tension in the way that the tech industry conceives of the values of excellence and diversity in their workforce. Since it's inception, tech has viewed itself as a haven of meritocracy,

one that rewards only the most hardworking and talented individuals. Rather than status or pedigree, insiders say, it is this sense of excellence that determines who succeeds in the industry. Only recently has the tech sector come to actively embrace another value: diversity. Amidst mounting pressure from media and outside interest groups, tech companies have been pushed to acknowledge the high level of homogeneity that exists in their technical work force. As a result, many companies have publicly committed to prioritizing the development of more diverse teams. Moreover, they cite diversity as an important value to foster in order to maintain their competitive edge in the marketplace.

However, the instantiation of this value has been circumscribed by the widespread assumption that tech's diversity problem is largely an educational issue -- for a variety of reasons, women and people of color lack the resources and social supports necessary to successfully pursue degrees in STEM fields. I challenge this hypothesis by taking a closer look at the widespread recruitment strategies, and the assumptions underlying them, which shape who is valued and ultimately hired in the tech labor market. I found that prevailing talent sourcing strategies are premised on the idea that the industry suffers from a severe shortage of skilled technical labor. Rather than creating a job market that is more welcoming to unconnected or unconventional job candidates, these assumptions have perpetuated an insular labor market in which people who lack the necessary social capital or traditional markers of merit struggle to get noticed.

In order for the tech industry to recognize and rectify its role in perpetuating a homogenous technical workforce, they must reconsider the way

they conceive of themselves as a meritocracy. At the heart of this process is a redefinition of where good tech talent comes from. However weak the current heuristics for evaluating excellence are, they are now an integral part of the Silicon Valley's identity as a merit-based industry. Changing them requires a reconsideration of what experiences, backgrounds and skills constitute professional excellence and employee potential. This is much easier said than done. As the leaders and recruiters I interviewed repeatedly emphasized, it is very challenging to develop reliable methods for identifying and assessing qualified job applicants, particularly those with less familiar backgrounds and experiences.

In the following chapter, I offer an in-depth examination of an emerging set of tools and processes which could have significant consequences on how technical talent is identified, evaluated and valued in the future high-tech labor market: algorithmic recommendation systems.

Chapter 3
Calculated Bias in Algorithmic Recruitment

"Welcome to the Future of Recruiting," a sign announced as I walked into

a large hotel ballroom in downtown San Francisco. The image on the sign

portrayed a needle emerging from a cluster of hay, with the subtitle, "Hire your

needle in the haystack." I was at the official product launch of TalentAI's[119] latest

project. According to a pamphlet I was given on the way in, the company had

built "the world's first intelligent, automatic, collaborative hiring platform."

Over the course of the next hour and a half, I listened as a parade of

people explained to the audience how TalentAI was harnessing the power of

data to fundamentally change the way companies hire their employees. As the

founder of TalentAI explained on stage, "The way we do hiring hasn't really

changed a whole lot. There has not really been any disruption. Disruption

happens when you have free flow of information. Disruption happens when there

is more intelligence in the process."

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[119] TalentAI is a pseudonym. The name of the company, as well as the names of all individuals
employed at the company, has been anonymized.

The explanations of TalentAI's platform came in the form of short sound bites. At last, recruiters would be able to move beyond their biased perceptions, to use data for more informed decision-making: "Big data trumps intuition." At the same time, the platform would function like a customized recommendation system, similar to those found on sites like Amazon and Netflix: "The more you use it, the better the recommendations get."

As I listened to the company's presentation, a sense of impatience welled up inside of me in the form of nagging questions about how TalentAI could integrate all of these characteristics into one product. Was it possible to build a system that both challenged one's intuition as well as provide customized recommendations based on prior choices? Could an *automated* system enable more *thoughtful* hiring decisions? How could a technology both "disrupt" hiring practices and fit seamlessly into recruiters' current workflows? Who would benefit and who would be hurt by these disruptions?

This chapter offers an in-depth examination of an emerging set of tools and processes which could have significant consequences on how technical talent is identified, evaluated and valued in the future high-tech labor market: algorithmic recommendation systems. These systems aggregate and synthesize large quantities of data in order to construct and rate profiles of job candidates in the tech industry. Proponents of algorithmic recruitment tools argue that these methods have the potential to redefine the metrics and characteristics that companies use to evaluate talent in tech. Not only might these new methods be more convenient, proponents argue, but they could enable more fair hiring

decisions by factoring out personal characteristics, like race or gender, from the decision-making process. Machine learning models can draw from a thousand data points to construct a more authentic and detailed portrait of an employee's real potential.

However, I argue that the revolutionary potential of big data in recruitment is circumscribed by the interests and beliefs of the consumers of these products. At the end of the day, these tools are sold to corporate recruiters. As a result, big data recruitment companies create products that prioritize corporate interests and logics, rather than challenge status quo assumptions. In this chapter, I recount the journey I went on to understand the development of TalentAI's big data recruitment platform over the course of several months. By taking an in-depth look at how the company's leaders envisioned the tool's potential, and contrasting it to the reality of what TalentAI ultimately built, I offer an in-depth analysis of the challenges and risks big data recruitment companies pose to consumers, particularly those from marginalized minority communities.

Big Data: An Overview

In recent years, there has been a surge in interest surrounding the potential of using "big data" to increase the efficiency and accuracy of recruitment and hiring decisions. The term big data refers to very large data sets, and the processes used to analyze them, which have the ability to reveal certain patterns, trends, and associations that otherwise are not readily apparent. One allure of big data is that it is "hypothesis free" – we could potentially avoid discriminatory cognitive shortcuts in decision making by finding alternative, data-based

heuristics to assist in talent identification. As our everyday activities become increasingly mediated by digital exchanges, key details about our personal lives such as our habits, preferences, and relationships have become more legible to third parties. As the Internet matured over the last couple of decades, so have the processes for gathering and capturing value from our data. The development of these processes was fueled in large part by the advertising-based revenue model of the web.[120] Online marketing companies led the charge in developing sophisticated algorithms able to analyze and interpret large amounts of data in ways that provide useful insights into consumer behavior. Large online platforms like Google, Amazon and Netflix took this process one step further by repurposing vast quantities of customer data in order to develop more refined and personalized product recommendations and services on their platforms.

In recent years big data has been proclaimed the "new oil" of the twenty-first century, as more and more companies rush to capitalize on the monetize-able insights derived from the digital footprints of our everyday lives.[121] In addition to recruitment, these practices are being used to make predictions and formulate recommendations for a wide variety of purposes: marketers want to reach profitable customers, medical researchers seek to identify the side effects of prescription drugs,[122] judges hope to hand down more effective sentencing for

[120]Ethan Zuckerman, "The Internet's Original Sin," *The Atlantic*, August 14, 2014, http://www.theatlantic.com/technology/archive/2014/08/advertising-is-the-internets-original-sin/376041/.

[121] Toonders, Joris, "Data Is the New Oil of the Digital Economy | WIRED," July 2014, http://www.wired.com/2014/07/data-new-oil-digital-economy/.

[122] Greenfieldboyce, Nell, "Big Data Peeps At Your Medical Records To Find Drug Problems : Shots - Health News : NPR," July 21, 2014, http://www.npr.org/blogs/health/2014/07/21/332290342/big-data-peeps-at-your-medical-records-to-find-drug-problems.

drug offenders,[123] lenders want to identify low-risk loan clients,[124] and the list goes on.

Big data is processed using machine learning algorithms that are good at detecting the emergence of patterns. However, such algorithms are less good at determining whether those patterns are persistent over time. And they are no good at determining what the underlying causes are behind the phenomena that the machine learning model has detected. Proponents of big data argue that, by allowing insights to emerge from the data, they can provide a fresh perspective on what characteristics and patterns are most relevant when answering tough questions, such as who to hire for a job. Over the last couple of years there have been a growing number of companies which use big data to build platforms and tools intended to help recruiters identify promising web developers and software engineers.

The tech sector is an industry particularly well-positioned to embrace these algorithmic recruitment practices, given the large amount of digitized activity available online for companies to gather and analyze regarding one's professional skills and interests in programming. Such information can be found on a wide range of platforms where programmers share and collaborate on software projects online. For companies who sell data-driven recruitment tools,

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[123] Barajas, Joshua, "Holder: Big Data Is Leading to 'Fundamental Unfairness' in Drug Sentencing," July 13, 2014, http://www.pbs.org/newshour/rundown/holder-big-data-leading-fundamental-unfairness-drug-sentencing/.

[124] Lohr, Steve, "Banking Start-Ups Adopt New Tools for Lending - NYTimes.com," *NYTimes*, January 18, 2015, http://www.nytimes.com/2015/01/19/technology/banking-start-ups-adopt-new-tools-for-lending.html.

these sites are a gold mine of information about large groups of people who are actively working on software projects and honing their programming skills.

In 2014, Github, a web-based code repository that enables programmers to collaboratively manage software projects, reported having over 3.4 million users with a total of 5.9 million repositories, making it the largest code host in the world.[125] On Github, clients have the option of paying for a private account, which enables them to limit their repository's visibility to only project collaborators. However, the hosting service incentivises open source projects by offering free accounts to clients who keep their projects publicly available for anyone to access and view online. This bias towards open source collaboration makes it easy for third party companies to gather and repurpose this data in order to build profiles of potential employees for tech companies.

In addition to repositories like Github, there exist a vibrant set of online resources designed to help programmers troubleshoot problems they encounter while working on software projects. For example, on sites like Stack Overflow anyone can post a question[126] regarding a problem they are struggling to solve. The question is typically answered within minutes of being posted. As a query receives more and more responses, the community up-votes those which they find most helpful, thus making it easier for others to find the most relevant and accurate guidance related to the topic. Such resources foster a rich digitized

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[125] Whitaker, Marisa, "GitHub Co-Founder Chris Wanstrath Shares His Story, University of Cincinnati," April 2014, http://magazine.uc.edu/favorites/web-only/wanstrath.html.
[126] Given how widely used Stack Overflow is, it is quite rare that you will be the first person to ask a given question. Most often, individuals first look to see if their question has already been asked and answered by the community before taking the time to write it themselves.

environment for peer-to-peer learning to take place between programmers with varying levels of expertise.

Sites like Github and Stack Overflow enable individuals to cultivate the foundational literacies they need in order to continuously stay up-to-date with rapidly evolving trends in programming languages and tools. Those literacies include the ability to repurpose and adapt existing code to meet a programmer's specific needs and the skill of querying the Internet for reliable advice and guidance when he or she is stumped. Such practices rely heavily on open source repositories like Github and crowdsourced advice forums like Stack Overflow.

In addition to serving as a valuable learning resource, these sites generate a large amount of data about what types of projects people are working on, the skills and languages they are developing, and the level of expertise they have in a given domain. Given the open nature of these sites, the data generated from them is often public, making it possible for third parties to gather and integrate it into data-based predictive models. As a result, it's unsurprising that many of the big data recruitment companies emerging on the scene in recent years have chosen to focus specifically on building tools for recruiting programmers.

Moreover, as was outlined in Chapter 2, skilled programming talent is currently in high demand in the tech industry. Mainstream methods for recruitment in tech are costly and inefficient, as companies scramble to poach employees from competitors and rely heavily on the overtapped social networks of their current workforce. Most of the company leaders I spoke with recognized that their methods were limited, and were eager to learn about alternative

approaches that might give them a competitive edge in such a cut-throat market. Big data recruitment tools are designed to assist companies with "passive recruitment," whereby companies seek out passive candidates who do not actively reach out in response to a formal job post. Big data recruitment companies like Gild, TalentBin, and Entelo market themselves as smarter, more dynamic platforms for this type of recruitment. They claim their algorithmically constructed databases enable recruiters to make more efficient and informed decisions about which candidates to spend time and resources on pursuing.

In theory, these platforms could facilitate the discovery of individuals from underrepresented communities who, up to now, have remained largely invisible to tech recruiters. Indeed, as the issue around the lack of diversity in tech has become a mainstream topic of discussion, big data recruitment companies have framed their services as a way for companies to expand their search efforts to find overlooked and undervalued coders. The *New York Times* published an article in 2014 featuring Dr. Vivienne Ming, Chief Scientist at a big data recruitment company called Gild. In the article Dr. Ming recounted the story of Jade Dominguez, college dropout from a blue-collar family in southern California who taught himself how to code.[127] In spite of having no college degree and minimal formal work experience, Gild's algorithm identified Jade as one of the most promising developers in his region. The young man now works as a programmer for Gild and serves as an example of their algorithm's ability to find those precious "diamond in the rough" coders that startups are so eager to unearth.

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[127] Richtel, "How Big Data Is Playing Recruiter for Specialized Workers."

For some, Jade's story is an optimistic example of the ways big data can be harnessed to provide opportunities to individuals who otherwise would not be considered for the job. In this way, Gild situates itself squarely in line with the concept of merit-based hiring: the quality of a person's code is more valuable than their personal or academic background. One could argue that Gild's services address well documented human biases by enabling promising candidates to "emerge" from the data, rather than relying on flawed heuristics and biased recruitment practices.

However, critics have warned that this approach could lead to biased and discriminatory decisions that disproportionately affect individuals who belong to protected social classes.. Barocas and Selbst provide a foundational understanding of the technical limitations of big data analysis, arguing that such practices are likely to have a disproportionately negative impact on historically marginalized and minority groups.[128] Other researchers have challenged the notion that big data practices provide a more objective or rational basis for decision-making. Scholars like Kate Crawford, Tarleton Gillespie, danah boyd and Nick Seaver are exploring the ways that deep seated biases are obfuscated behind the promise that the numbers speak for themselves.[129] At the heart of this research is the recognition that big data analysis remains essentially a process of

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[128] Barocas, Solon and Selbst, Andrew B., "Big Data's Disparate Impact."
[129] Such as boyd and Crawford 2011; Hassin, Uleman, and Bargh 2005; Gillespie, Boczkowski, and Foot 2014

interpretation, one that is prone to the same biases and limitations we encountered in prior regimes of decision making.[130]

For example, big data models are developed using "learning algorithms," which learn to identify patterns and trends from a set of "training data," the data which it's fed as exemplars for what to look for in the future. If the training data reflect biases found in the real world, the algorithm is likely to integrate those biases into its model. For example, if CEOs are disproportionately white males, then any inferences drawn by a machine learning model regarding CEOs are likely to be skewed towards valuing the specific habits, characteristics and choices of this dominant group.

Scholars are also concerned about the way big data may be used to further corporate interests at the expense of consumer well-being. As Frank Pasquale describes in *The Black Box Society*, big data regimes of decision-making have given rise to a "scoring society," in which rewards and punishments are allotted according to the signals one feeds into the system.[131] Lev Manovich argues that these data-driven regimes of decision making entrench power in the hands of the few who are able to access and analyze it to serve their special interests.[132] Problems are bound to arise when corporate interests are in direct conflict with the well-being of everyday consumers and workers.

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[130] danah boyd and Kate Crawford, "Critical Questions for Big Data," *Information, Communication & Society* 15, no. 5 (2012): 662–79, doi:10.1080/1369118X.2012.678878.

[131] Pasquale, Frank, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Harvard University Press, 2015).

[132] Manovich, Lev, "Trending: The Promises and the Challenges of Big Social Data" (self, April 28, 2011), http://manovich.net/content/04-projects/066-trending-the-promises-and-the-challenges-of-big-social-data/64-article-2011.pdf.

For example, Amazon has come under fire in recent years for using technology to collect minute-by-minute data on the movements of its employees at their company "fulfillment centers," where online orders are filled and shipped. The company used a point system to dole out automatic infractions to employees who failed to meet certain productivity targets for filling orders, even when working in extreme conditions or extra-long hours. Amazon made headlines when their workers started fainting in a warehouse in Pennsylvania on one particularly hot summer day in 2011.[133] In spite of the three-digit temperature reading inside the warehouse, employees did not pause to take a break for fear of being penalized for diminished productivity. All of this was driven by Amazon's digital surveillance system, which continuously tracked employees' actions throughout the day with the help of continuous data collection.

Although the technology behind big data is relatively new, the potential challenges that it brings about echo age-old issues of discrimination and exploitation.

Allistair Croll argues that big data sits at the heart of contemporary civil rights issues, as companies use machine learning models to maximize profits at the expense of historically marginalized communities.[134] For example, big data analytics can yield very personal insights about an individual's spending habits and tastes. Croll points out that companies use this information to create "customized" product offerings that blur the line between personalization and

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[133] Ibid.

[134] Croll, Alistair, "Big Data Is Our Generation's Civil Rights Issue, and We Don't Know It – Solve for Interesting," July 31, 2012, http://solveforinteresting.com/big-data-is-our-generations-civil-rights-issue-and-we-dont-know-it/.

price discrimination.[135] Rosenblat and Kneese warn that online reputation can produce unintended, and often invisible, ripple effects on one's career trajectory. Well-qualified candidates run the risk of being turned away from jobs after being red-flagged as "high-cost" or "unproductive" according to algorithmic recommendation systems.[136] These labels can easily serve as euphemistic terms for life situations which job candidates cannot control, such as their likelihood to develop a costly illness for which a company does not want to pay the insurance fees. In such situations, the risk is that big data will be used to minimize the risk and cost that corporations take on, at the expense of consumer and employee welfare.

Up to now, the critiques of big data have remained largely abstract and speculative. This is due to the fact that it is extremely difficult for researchers and critics to gain access to the inner workings of algorithmic decision-making systems. Most companies consider their algorithms trade secrets to be guarded with the utmost secrecy. The rationale behind this is that transparency could undermine the company's competitive advantage or leave the system open to manipulation and gaming by third parties. In spite of the black-box nature of these systems, researchers and journalists have developed auditing methods

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[135] *Big Data and Differential Pricing* (Executive Office of the U.S. President, January 2015), https://www.whitehouse.gov/sites/default/files/whitehouse_files/docs/Big_Data_Report_Nonembargo_v2.pdf.
[136] Rosenblat, Alex and Tamara Kneese, "Networked Employment Discrimination" (Open Society Foundations' Future of Work Commissioned Research Papers, 2014).

that give outside observers some sense of how these algorithms work.[137] However, these methods have their limitations.

As Nick Seaver argues, the barriers to understanding algorithms are much larger than issues of access or expertise.[138] Seaver conceptualizes algorithms as a set of processes that actively contribute to the production of local and contingent truths. Algorithms are highly complex processes, whose outputs are often the by-product of many people's authorship, maintenance and revision. Once algorithms pass a certain threshold of complexity, their outputs are difficult to foresee, even for those with intimate knowledge of how the system works. As such, it can be difficult to pinpoint and rectify any one specific point within an algorithmic system which is producing problematic or biased outcomes.

Rather than focusing solely on transparency and revealing the technical "truth" behind algorithms, Seaver argues, we should expand our focus to study *algorithmic systems*, which include a close examination of "the logic that guides the hands, picking certain algorithms rather than others, choosing particular representations of data, and translating ideas into code."[139] Foundational to this approach is an understanding that the technical details of algorithms are inextricably linked to the cultural context in which they are developed and used. The beliefs and assumptions of an algorithm's creators and users are integral to how knowledge is ultimately encoded and understood within these systems.

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[137] Diakopoulos, Nicholas, "Algorithmic Accountability: Journalistic Investigation of Computational Power Structures," *Digital Journalism Ahead-of-Print*, 2014, 1–18.

[138] Seaver, Nick, "Knowing Algorithms," February 2014, http://nickseaver.net/papers/seaverMiT8.pdf.

[139] Ibid.

I have embraced Seaver's proposed approach to studying algorithms in my own research of data-based algorithmic recruitment in the tech sector. During my fieldwork I conducted interviews with four different companies who create and sell algorithmic recruitment tools. Of these four companies, I selected one to focus on by conducting more in-depth field observations, which included product launch events, customer demos and one-on-one conversations with the data science team at the company's headquarters. This company serves as the anchor for most of my analysis of how algorithmic recruitment interacts with the tech industry's notions of meritocracy to shape the future of diversity in the sector. I will draw from the interviews and interactions with the other three companies to reinforce and complicate the findings from this case study. By doing this my aim is to move beyond abstract hypotheticals and identify specific factors that shape who is seen and valued through the lens of algorithmic decision making tools. At the heart of this analysis is the question of how these tools are used to either challenge or amplify existing assumptions and heuristics used to hire talent in the high-tech sector.

TalentAI's Vision for Equal Opportunity Recruitment

TalentAI is a big-data recruitment company whose revenue model is based on a subscription service that gives recruiters access to an online platform indexing profiles on over ten million programmers around the world. Most individuals profiled on TalentAI's database have no idea that their details are listed there. The company scrapes[140] data from public sources across the web in

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[140] The term "scrape" is frequently used to refer to the gathering of data by third-parties from public sources online.

order to construct individual profiles and score coders along several different

metrics. Of all the companies that I investigated during my fieldwork, TalentAI

stood out because of the way they closely aligned the marketing of their products

with ongoing debates about merit and diversity in the tech industry. Throughout

their website a recurring theme is that TalentAI's data-driven products enable

recruiters to move beyond flawed heuristics to find the best talent on the market.

Written across the middle of their website's homepage are the slogans

that encourage recruiters to make decisions based on data, rather than their

gut.[141] In addition, the company offers a free e-book about implicit bias, which

describes how challenging it is for individuals to understand and meaningfully

counter implicit bias in their work. They frame their platform as a tool that enables

recruiters to look "beyond pedigree" to discover top-notch engineering talent[142]

with the help of big data. Behind much of this messaging was the company's

chief data scientist, Dr. Claire Smith.[143] As a scientist with a PhD in computational

neuroscience and psychology, Dr. Smith is well-versed in the literature

surrounding the biases and limitations of measuring human potential through

formal assessments. She's spoken extensively about her views on how big data

might drive more meritocratic practices for assessing and recruiting talent in the

tech industry. When I sat down with her for my first interview at TalentAI's

headquarters, I was interested in understanding how she thought of bias and

objectivity in her own work at TalentAI. She explained to me that no assessment

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[141] These slogans are roughly paraphrased from the general concept of the slogans in order to preserve the company's anonymity.
[142] This is a paraphrase from TalentAI's web page, last accessed on 3.27.15.
[143] Both Dr. Smith's name and the name of the company are pseudonyms.

is free from bias, including those conducted through the TalentAI platform. At best, such assessments were close approximations of human potential, which were always biased towards one's ability to carry out certain measurable behaviors.

Nevertheless, Dr. Smith believed that TalentAI's assessments were far better than those generally used to evaluate job candidates in the tech sector. This, she said, was due to the fact that most employees who asked to evaluate a job candidate have no experience in creating valid and fair evaluations. "They think they know what they're doing, but there are whole disciplines around the idea of assessment, and how you build and validate a test," explained Dr. Smith, "The idea that 'I'm smart so whatever I come up with is going to be a valid assessment,' would be laughable to huge communities of people." She went on to describe how most companies had no idea what characteristics to look for when evaluating a potential employee.

According to her, the assessments most tech companies use to vet talent are skewed towards the skills and experiences of a recent college graduate with a degree in computer science. This meant that well-qualified people who did not fit that specific profile were often overlooked and undervalued in the job market. Smith recounted the story of a few friends who, in spite of holding PhDs in various scientific disciplines, struggled to perform well on the standard coding exams that companies administered during their recruitment process.[144]

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[144]It's worth noting that technical interviews, themselves, were introduced in an attempt to make hiring in tech more meritocratic. Coding challenges are a relatively measurable and repeatable process. Once a company standardizes the questions and develops a rubric for evaluating the answers, then almost any technical employee can carry out a code test.

"I've heard from so many academics saying, 'They brought me in for a data scientist interview and they gave me an engineer-right-out-of-school interview, and then said I wasn't qualified,'" explained Smith, "Clearly they don't even know what the qualifications are for the job that they're interviewing." Smith's perspective was echoed several times during my interviews with other data scientists who develop algorithmic recommendation and recruitment tools. Like Dr. Smith, they saw the prevailing heuristics for merit in tech to be a relic of the pre-digital era. As John, the CEO of one of TalentAI's main competitors, explained to me, most recruiters are limited in their ability to recruit top talent because resumes still form the basis of their understanding about a candidate,

> "Recruiters who use Linkedin are constrained to the information that individuals list on their profiles, which is more or less a digital resume...Resumes are an eight and a half by eleven piece of paper...which is a vestige, literally, of file cabinets... It is kind of weird and archaic, the same way that the solid rocket boosters on space shuttles were the width of a standardized railroad, which were the width of chariot tracks. A standard gets cemented for reasons that no longer matter and they become surprisingly long-lived."[145]

John's description captures a widespread sentiment I heard from many people working on algorithmic recruitment tools -- the current standards used to evaluate job candidates are unnecessarily constrained to the details that one can fit on a paper resume. Over time, these standards have grown increasingly out of touch with the traits that actually matter in the job market. For individuals like John and Dr. Smith, big data offers a dynamic new approach to understanding how a person's skills and interests evolve over time. They saw their competitive

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[145] "John," interview by Chelsea Barabas, July 3, 2014.

edge in building systems that are able to continuously update information about a candidate based on their online activity.

The benefit of this approach is that recruiters have a much more up-to-date sense of what people are working on, without having to rely on candidates taking the time to update their work history on their own. "No software engineer in the history of the universe took their hands off the keyboard and was like 'You know what, I should really go over to LinkedIn right now and update my profile," John explained to me, "What we do is we consume all of that implicit professional activity, make sense of it, score it, and then composite it together into a unified picture for that individual."

In contrast to a standard resume, this "unified picture" tends to include details from a much broader cross-section of an individual's life. For instance, TalentAI incorporates information from sites like Github and the U.S. patent database, as well as data from individuals' Twitter streams and exchanges on certain professional email listservs. By drawing from such a wide range of sources, Dr. Smith hopes to create a living, unified portrait of a person's professional development, one that is more authentic than the impressions gleaned from a standard resume. This perceived authenticity is achieved by building profiles based on a person's recorded actions, rather than what they report about themselves. As a salesman for TalentAI named Collin explained to me, the company's platform is able to fact-check what people say about themselves on sites like Linkedin in order to give recruiters a truer sense of a candidate's accomplishments,

"We all know that resumes are nothing more than a sales tool for the person putting the information on it. So the candidate gives you a resume, which is a sales tool for themselves, and we sort through that and give you the real data based on what's available online...We legitimately profile somebody and show you what kind of person they really are."[146]

TalentAI claims to achieve legitimacy and authenticity by gathering information about a person's actions, rather than their words. The company's algorithmically constructed profiles take the control of self-representation out of the hands of job candidates, who Collin says are likely to pad their resumes and gloss over rough patches in their career histories. This makes it much more challenging for individuals to game the system, Dr. Smith claimed, because TalentAI's machine learning system is constantly updating and improving based on new information it collects. Even if an individual is able to manipulate the system for a short while, the benefits would be short-lived, as the algorithm is likely to pick up on suspicious patterns and adjust to a more authentic calculation of merit.

When I asked Dr. Smith whether or not she thought consumers would balk at the idea of losing control over their own self-representation in the job market, she told me that generally she thought people would appreciate the opportunity to demonstrate their potential and skills in new ways. Certainly, the TalentAI platform made it more difficult for people to game the system early on in the recruitment process. But those individuals were unlikely to progress very far anyway, if they did not actually have the requisite skills for the job.

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[146] "Collin," interview by Chelsea Barabas, November 3, 2014.

Dr. Smith went on to explain enthusiastically how the TalentAI platform could open up more opportunities for skilled workers who lack the typical credentials and experiences necessary to get noticed by a recruiter in tech. For her, the most exciting aspect of big data analytics was that it enabled industry to reimagine what characteristics actually matter during the recruitment process. Dr. Smith's ideal metrics were closely connected to her academic research on cognition and the science of learning. During our interview, she repeatedly cited the work of renowned psychologist Carol Dweck, best known for her research on the role that mindset plays in an individual's long-term success in life.[147] Dweck's basic thesis is that individuals who believe in their ability to learn new things through dedication and hard work are far more likely to succeed than individuals who view their intelligence as a fixed trait. Dweck is a strong advocate of cultivating a "growth mindset" in young people that will enable them to embrace a love for learning from an early age.[148]

Dr. Smith's hope is that the TalentAI platform can be used to identify and reward individuals who fit Dweck's profile of a lifelong learner. This would be beneficial for both prospective job candidates and companies in search of quality workers. Dr. Smith believes that even the most in-demand skills in the tech industry could be learned within a relatively short period of time, if an individual is truly motivated to learn them. Rather than focusing on the skills that someone already has coming into a job, she contended, companies could shift their focus

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[147] Dweck, Carol S. and Ellen L. Leggett., "A Social-Cognitive Approach to Motivation and Personality," *Psychological Review* 95, no. 2 (1988): 256.
[148] Dweck, Carol S., "Mindset | What Is Mindset," *What Is Mindset*, accessed May 7, 2015, http://mindsetonline.com/whatisit/about/.

to evaluate whether or not a candidate has the desire and capacity to learn new skills. Smith considered one's ability and desire to learn to be far more valuable than one's prior work experience and background. As she put it, "If they have the right motivation set… I don't care what they did before. I'll hire them, spend six months training them on the job and then I will reap so much more out of that workforce than if I had built them based on a skillset match."

It is unclear whether the motivation that Dr. Smith referenced needed to be aimed towards a specific field or if she considered it to be more of a generally positive disposition towards learning. Did companies need to find individuals who were motivated to master about their specific job, or were they simply looking for someone with a broad interest in learning new things? Smith's concept appeared to be some vague combination of both. As the above quote indicates, if a person was not already familiar with a given field, then they would need to be intrinsically motivated about growing in that new area. However, Smith went on to describe how a company could also gauge mindset according to how passionate someone was about honing their craft.

Dr. Smith explained that big data could provide a real glimpse into what a person is truly passionate about. In contrast to an elite education or prior work experience at a well-known company, passion is something that anyone can access and cultivate throughout life. It is a metric that can truly level the playing field of opportunity. The key for Dr. Smith was to make individuals' motivation and passion for coding visible through big data analytics. This was possible, she said, because programmers with passion tended to follow a distinctive pattern of

behavior, "What do the best developers do the day after a major product release? They submit new code. That is their motivational structure -- the people for whom writing code is what they want to do in their *life,* not just on the job. It's what they want to do for fun. That is the thing you really want to be able to measure."

For Dr. Smith, professional passion naturally extends beyond the context of work, to become something that defines one's very identity. Her ideal employee is someone who happily spends time both in and out of the office honing their craft. Such people are not motivated by salaries or promotions as much as they are driven by some internal desire to do what they love. Although company recruiters are the ostensible customers of platforms like TalentAI, it is the job candidates she hopes will benefit most from her work. To Smith, the TalentAI platform is built to enable these people to thrive.

In Dr. Smith's ideal vision of future impact, TalentAI's platform would enable companies to reorient their recruitment efforts to find individuals from a wide range of backgrounds who fit this profile. But how diverse is the group of people who are willing and able to spend time outside of the office working on software projects just for fun? It's unlikely that a single parent would have much time or energy to devote to coding after working hours. And what about the college student from a working-class family who spends most of her free-time working at a restaurant in order to pay tuition? Or the artist who prefers to play music rather than code on the weekends?

For all of Dr. Smith's aspirations of equalizing the playing field, her model for passion and latent potential is rife with biases. Baked into her paradigm of the "motivated programmer" are many assumptions that favor people with a certain degree of privilege, and monotony, in their lifestyle. Far from breaking the mold of the typical tech employee, this model describes a very narrow image of success, one that resembles widespread stereotypes of the typical Silicon Valley techie: young, single, with no dependents and enough money and free time to pursue side projects without any expectation of remuneration. Moreover, when cast in a slightly different light, Dr. Smith's ideal programmer looks an awful lot like a workaholic. Her prototypical employee is not just someone who does good work, it's someone who lives and breathes their work.

It is important to understand the ripple effects such a system would have on people's opportunities in the labor market. If this system of evaluation were widely adopted, it would mean that individuals seeking work would need to spend more and more time demonstrating their "passion" by doing extra work outside of the office. Individuals who lack the resources and time necessary to engage in such activities are more likely to be overlooked and undervalued in the labor market. The term passion could be used to justify collecting more and more data about people's personal lives, because for passionate people, the personal is the professional. This aligns with TalentAI's proclivity to collect information from a wide range of sources, in order to gain a more authentic portrait of a person that cuts across all spheres of his or her life. It also raises the specter of rejecting

qualified candidates either because they've got passions other than work, or a personal life they try to keep truly private.

Beyond TalentAI, I observed these tendencies in several of the other companies I interviewed. Many embraced nebulous labels like "passion" and "culture fit" to describe the metrics they hoped to evaluate with their algorithmic tools. Underlying each of these concepts were assumptions about how these characteristics were reflected in specific digitizable actions. In the case of Dr. Smith, these actions fit nicely into an overarching narrative about why passionate workers exhibited certain behaviors. For others, no underlying narrative was necessary to explain the patterns that emerged from their models. In fact, they believed that the secret sauce of their predictive models lay in the fact that they had no idea why a given attribute was predictive of success.

As the CEO of another algorithmic recruitment company explained to me, "We found that one of the biggest predictors of an engineering graduate becoming a good CTO at an Internet company in Silicon Valley was that they have *Ender's Game* listed as one of their favorite books on Facebook. There are a lot of insights that can be gained from things like that." He went on to explain how his company's business model was based on finding these hidden insights in the data, and using them to help companies gain a competitive edge in the market. The more obscure and unexplainable a predictive attribute is, he said, the more valuable it can be for recruiters looking for top-notch talent. After all, most twenty-three year old fans of *Lord of the Rings* are likely to make excellent CEOs. Extra points if they wear their hoodies to work.

The rise in big data practices has propelled a gold rush for hidden gem insights that emerge from data whose relevance is not readily apparent. The above example exemplifies the risks of looking for insights and patterns in data without establishing an explanatory rationale for why the emergent characteristic or trait is relevant. The company's model is likely to yield an alarming number of false positives and/or false negatives because it bases job suitability on the tastes and lifestyle choices of the people currently in power.

As Barocas and Selbst have pointed out, herein lies one of the biggest risks with decision-making processes based on machine learning.[149] When we begin to look at tastes and lifestyle as predictors for professional success, we're likely to reproduce existing biases about who is right for the job. The reason *Ender's Game* emerges as a salient predictor of CTO performance is probably because many current CTOs of tech companies have listed it as one of their favorite books on Facebook. Given the exceptionally low diversity found in leadership positions of tech companies,[150] this model is likely to recommend candidates that perpetuate, rather than challenge, the current homogeneity of the industry. Such methods provide little more than a mirror into what the tech leadership currently looks like.

There is a common misconception that if attributes associated with protected classes--race, gender, sexuality--are left out of the model, such bias will not be propagated through big data. However, these protected attributes are often *redundantly encoded* in the data, meaning that they are latent in the

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[149] Barocas, Solon and Selbst, Andrew B., "Big Data's Disparate Impact."
[150] DeAmici, Carmel and Carson, Biz, "Eight Charts That Put Tech Companies' Diversity Stats into Perspective | Gigaom."

included attributes and are therefore reflected in the model regardless. Without taking thoughtful precautions to understand and minimize such biases, big data recruitment companies will simply amplify them.

Big data recruitment companies are in the business of finding hidden insights regarding which individuals companies should pursue during the recruitment process. The question is whether or not these new metrics are actually fairer than those that came before. For some companies caught up in the big data gold rush, this question has not even entered into the equation, except in the most peripheral of ways. By training their models on data related to the current winners in tech, they are bound to reflect current biases found in the tech labor market.

For others, such as TalentAI's Dr. Smith, fairness is a central part of their vision for how big data can be used to make hiring and recruitment better in the future. Smith has drawn from her background in neuroscience and psychology in order to conceive of a new ideal worker, one who is passionate and motivated to learn. Hypothetically, these attributes are things that anyone can access. However, when one digs into the actions that Dr. Smith considers exemplary of passion, it becomes clear that the paradigm for passionate worker is conceived very narrowly. Would Dr. Smith's algorithms register "lifelong learner" for someone who demonstrated through their social media that they were deeply passionate about, say, cosplay?

My conversation with Dr. Smith demonstrated the pitfalls of developing models that do not critically assess the assumptions and potential consequences

of reconfiguring the definition of merit. Dr. Smith's vision is more likely to entrench opportunity for a narrow subset of individuals who "live to code" than open up pathways for diverse people into tech. This is due in part to the fact that her model of human potential is anchored on a problematic and narrow concept of passion. This shapes which data features the company decides to fold into their analysis, and which ones they deem irrelevant.

As Barocas and Selbst argue, members of minority groups (whether that be African-Americans or cosplay enthusiasts) will find that they are subject to much less accurate predictions if the features relevant to statistical variations within their sub-group are not expressed in the features selected for analysis.[151] Such models reward those who fit a dominant model of excellence, rather than create spaces for unique experiences to be valued. The algorithmic recruitment companies I interviewed consider their strength to lie in their ability to take the power of self-representation out of the hands of the individual and into the realm of machine learning processes. This is all done in the spirit of "actions speak louder than words." Yet the range of actions they've decided to capture and give value to can be very limited. Obtaining the additional information necessary to provide richer distinctions and insights for minority groups can prove expensive and time consuming.

From Vision to Product

Perhaps it's unfair to critique Dr. Smith's vision without getting more into the details of the data and algorithms that are actually inputted into her company's machine learning models. For the most part my conversation with

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[151] Barocas, Solon and Selbst, Andrew B., "Big Data's Disparate Impact."

Smith hovered in the realm of the abstract. She did not get into the specifics of the TalentAI platform, but assured me that we could meet again in the future to discuss more concrete details. However, when I followed up with her a few weeks later she informed me that she would soon be leaving TalentAI to work full-time at an ed-tech company she co-founded with her partner. As she explained to me, her new endeavor would give her more opportunity to address the root causes of inequality by using big data to improve education, rather than recruitment. She was reluctant to put me in touch with anyone else at the company who might be able to discuss the details of the TalentAI platform. According to her, the rest of the data science team was unlikely to be as receptive to an outside researcher. We left it at that.

A few weeks later I attended a product launch of the latest version of TalentAI's platform. Consistent with their online marketing, the theme of the launch was "Find your needle in the haystack." Contrary to what Dr. Smith told me, the data science team was very receptive to my questions, and even invited me back for an extended question and answer session at their office the next day. It was in this meeting that it became apparent that Dr. Smith's vision for TalentAI did not square up with the reality of the company's product. From the outset of our conversation the data science team placed the recruiter, rather than the candidate, at the center of their story for how they designed their talent sourcing platform. This was an important aspect of their product development process, they said, because the recruiters have the domain knowledge necessary to inform their approach to building big data models. According to

Jake Brown, who was now leading the data science team after Dr. Smith's

departure, the data science team had to rely on outside experts to provide the

domain knowledge necessary to ask (and answer) the right questions via their

machine learning methods,

> "Something that we talk about a lot here, that doesn't tend to get talked about much in data science, is domain knowledge. We're all smart. We have the tools to analyze data. But without the domain knowledge it's hard to know what questions to ask and how to apply machine learning and other things to solve real problems and not just be like [Dr. Smith] and tell big stories that sound great but are hard to actually realize."[152]

For Brown, the data science team's work was only possible when done in

collaboration with the company's product developers and their customers, the

recruiters and hiring managers from tech companies. As we continued our

conversation I got a better sense of how the TalentAI team tried to strike a

balance between catering to the prevailing assumptions in the tech recruitment

space, while also offering a fresh perspective on evaluating candidate potential.

There are two principal metrics on which every candidate is rated in

TalentAI's system: expertise and demand. Both scores are based on machine

learning models that take into consideration where an individual went to school,

their prior work experience and their assumed skillset. These factors are

weighted differently for each score. As the data science team explained to me,

their expertise score is intended to be fully meritocratic, because it's primary

emphasis is on how people perform on sites like GitHub and Open Source Code.

This model measures performance on these sites based on an algorithm that

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[152] "Jake Brown," interview by Chelsea Barabas, October 23, 2014.

was initially developed to internally identify bugs in company code. It was then adapted to form part of their assessment of how strong someone's coding abilities were in the expertise score. However, a challenge lies in the fact that there are many possible candidates who are not active on open source repositories like GitHub. For such profiles, the data science team relies more heavily on what schools a person has attended, what skills they list on Linkedin, and where they worked in the past.

Built into this model are certain ideas about what schools and companies produce top talent. "We make the assumption that companies like Google, Facebook and Microsoft hire top tech talent. And we look at the degrees of separation between those companies and other companies via their employees. So if there's an up-and-coming startup that happens to be hiring a lot of ex-Google employees then we infer that they're hiring top talent," explained Brown. He went on to describe how the team built out a heat diffusion model[153] that tracks prestige as it spreads from a "top talent company" to other companies in the industry. The team is able to do this because they collect data about all of the prior places people have worked, and can observe how such prestige spreads and intermingles over time.

In this model, TalentAI is offloading the vetting of talent to a few high-profile companies. As a result, these companies' hiring practices have immense influence on how other companies, and the people who work for them, are ranked in TalentAI's expertise score. These assumptions are borrowed directly

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[153] A heat diffusion model is derived from a function that describes how heat, or another given variable (i.e. prestige) spreads through space from an identified source (i.e. Google).

from recruiters in the tech industry, who generally believe that a) top performers in tech already have jobs and b) a very small subset of companies tend to hire top talent. As discussed in Chapter 2, these assumptions make it very difficult for newcomer and non-traditional candidates to be valued in the job market, because it follows a circular logic of merit: those who win are the best, therefore the best are those who are already winning.

TalentAI's expertise algorithm relies heavily on this diffusion model to weight school prestige, as well. Rather than importing wholesale the industry's assumptions about which schools produce the best engineering talent, TalentAI tries to identify what universities tend to produce students who go on to work at a Google or a Facebook. This is where the team's meritocracy value really shines through, they explained. Their list of top-ten schools includes the usual suspects: Stanford, MIT, Carnegie Mellon, etc.. However, the list of top-thirty universities includes schools like San Jose State and the University of Phoenix. The data science team thought that individuals who completed a degree from an online school like the University of Phoenix were likely to be "hacker types" who just needed a degree to get a job. Their expertise score gave value to that career trajectory.

To their surprise, when the company conducted user testing they found that many recruiters balked at the idea that someone from the University of Phoenix could have a high expertise score. "It's kind of a hard thing because we understand it and we believe the model that is learning these relationships, but when you're presenting that information to a recruiter it's a challenge to explain to

them why this profile is ranking high in their search results," Brown explained to me. The team attributed this to the fact that most recruiters and hiring managers had relatively little experience related to the field of software engineering. As a result, they heavily relied on traditional markers of excellence, such as the prestige of one's alma mater, to evaluate candidates.

This was an interesting assertion, given that just a few minutes earlier the team had highlighted the importance of seeking out recruiters for their in-depth domain expertise. What exactly did recruiters have expertise in that TalentAI thought was valuable? The answer is probably that they have extensive domain knowledge in how tech recruitment works and what companies value in prospective candidates. Therefore, their value-add comes in informing TalentAI about market demand for their products, and not so much about what good technical talent looks like. They have less knowledge about software engineering than they have about market demand, and therefore may be limited in their ability to assess candidates whose experiences do not map onto their heuristics for success. As the above example demonstrates, friction is likely to arise when prevailing recruitment heuristics are challenged by new metrics that require a certain level of understanding about what software engineers actually do, as well as the characteristics and skills that enable them to thrive in their jobs.

Given this tension, the team decided to develop the TalentAI demand score, which evaluates how sought after a candidate is likely to be in the current labor market. This score includes many of the same factors that were incorporated into the expertise metric (skills, university, work experience) but the

weighting structure more closely mirrors prevailing heuristics used in the industry to evaluate talent. The team saw this score as a way of striking a compromise between providing new insights via their expertise score and giving their customers what they wanted and expected via their demand score. "The expertise score is fully meritocratic...But we're also giving a nod to how recruiters actually work," explained Brown. He went on to describe other features they built into their platform in order to cater to the way recruiters currently work, such as the ability to filter candidates by their major in college or the highest degree held. These were often things that the data science team viewed as having little value, but which their customers frequently requested during the user testing phase of development.

As a member of the data science team explained, "The thing that frustrates me is that recruiters still want to sort candidates to just identify the people with CS degrees… To us that's not a useful signal at all." Interestingly, customers weren't completely closed off to trying out new things, but the novel features that garnered enthusiasm tended to be more trendy than insightful. For example, Brown told me that the team had received a lot interest around the potential of using social media, such as an individual's Twitter stream, to gauge a candidate's interest in getting a new job. Although models based on this data had yielded very little predictive insight, they still marketed it as part of their product, because it was a popular selling point to potential customers.[154]

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[154] For example, as Collin (the salesman from TalentAI) explained to me during a pitch session, these details could be used to garner interest from elusive candidates, "Our social analysis showed that this [candidate] had used the word 'beer' and 'kegs' and a lot of homebrewing and that type of thing. So what they did is they used that to say 'Hey, we have a project very similar called a kegerator that shows you on

My interview with Dr. Smith gave me the impression that the company's work was all about finding passionate and motivated workers, especially those who are overlooked and undervalued in the labor market. However, my conversation with the rest of the TalentAI data team framed the company's work in a whole new light:sss ultimately the company's goal is to develop a product that they can sell to recruiters and hiring managers. At the end of the day, this fact drives the creation of products that cater to the logics and interests of the companies that do the hiring, not consumer interests.

Even when the company puts forth a genuine effort to introduce a new perspective to recruiters about what merit looks like, it's not certain that industry will use such tool to create a more fair and diverse hiring ecosystem. This was made particularly clear during a conversation with one of TalentAI's salesmen, Collin, who explained the value of having both the demand and the expertise score to make smart hiring decisions in the following way: "If you dial down the demand and dial up the expertise… we can pull a profile up for somebody who may be an extremely good coder but might have a low demand score. So those are the type of people that are easier to reach out to, are more responsive and actually you don't have to pay a whole lot of money to."

Collin chuckled half-jokingly as he said this, but he brings up a serious point. Although the intended use-case of the expertise score is to give value to candidates who fall outside the typical standards of merit, it could very well be

your smartphone how much beer is in the keg. And by the way we're having a party next Friday, we'd like to invite you for free beer… [the candidate] responded within two minutes." It's unclear whether or not this is a true story or simply a sales story. I never saw information regarding one's social media profile explicitly delineated on the TalentAI platform.

used by companies to gain an unfair advantage during salary negotiations, particularly with marginalized groups. Rosenblat et. al. have highlighted these risks as well, arguing that hiring algorithms are developing in ways that empower employers at the expense of employee welfare by supporting practices that enable low wages via contingency and contract labor.[155]

In addition to maximizing profits, corporations are in the business of minimizing risk. There are a wide range of behaviors, conditions and circumstances that could be labeled as "risky" to corporations and which result in individuals being excluded from opportunities for which they are qualified. Many of the algorithmic recruitment specialists I spoke with were careful to emphasize that they only offer positive recommendations for candidates. Few were willing to engage seriously with the idea that implicit in a non-recommendation of a candidate was a rejection.

Given that these individuals are not actively seeking jobs, that may be a reasonable stance for them to take. Yet, the more invisible and opaque these processes are, the more difficult it will be for individuals to verify and correct inaccurate profiling and unwarranted red flags. The need for greater transparency will only become greater as these products gain traction within the industry. Without some clarity around how these algorithmic regimes of decision making are being applied it is difficult to know the extent to which this exploitative behavior is happening.

Conclusion

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[155] Rosenblat, Alex and Tamara Kneese, "Networked Employment Discrimination."

The development of TalentAI's product is primarily shaped by the need to turn a profit, not a vision for achieving greater diversity and equal opportunity through big data. For the most part, companies like TalentAI appear to import the assumptions and heuristics used by their customers into more formalized and efficient models of evaluating merit. Their ability to offer new insights into the tech workforce is tempered by the fact that change is perceived as risky by their customers. Even when new insights were gleaned from big data practices, it's unclear whether or not they will be used to promote equal opportunity hiring or maximize corporate profits.

My interviews with Dr. Smith and the rest of the TalentAI data science team revealed the importance of analyzing these algorithmic systems within the broader context of their development and use over time. When considering the potential social impact of big data applications for recruitment, we must recognize that the foundation of these tools, as they currently stand, is built on two layers of corporate interest: those of the companies building the tools and those of the companies purchasing them. TalentAI was a company whose lead product developer, Dr. Smith, had a vision for using the company's platform to promote fairness and equal opportunity in tech. That is a worthwhile and noble mission. However, the implementation of this vision proved challenging when the company placed its product in the hands of actual users.

Friction arose when TalentAI tried to introduce new heuristics that challenged prevailing assumptions about where good talent comes from in tech. At the end of the day, market incentives pushed them to reinforce, rather than

challenge, prevailing assumptions about where good talent comes from. Changing those incentives requires changing the way the industry calculates risk and value in their hiring practices. Up to now, TalentAI and the other algorithmic recruitment companies I studied have yet to make a compelling case for why the tech industry should abandon their status quo practices in favor of more pro-diversity evaluations of talent.

This does not bode well for those who advocate for greater diversity in the hi-tech workforce. One might argue that if algorithmic recruitment companies fail to fundamentally shake up perspectives on evaluating merit in tech, other pro-diversity interventions are unlikely to fare much better. Algorithmic recruitment companies market their work in terms of finding "authenticity in the data." This framing holds a lot of currency in spaces like tech, where quantitative approaches to understanding the world are given great authority. Legitimacy is conferred to arguments that are rooted in quantifiable metrics or data, because it is viewed as more trustworthy and objective than fuzzier concepts or rationales for increasing diversity.

But perhaps algorithmic companies are too "disruptive" in their approach to increasing the value and visibility of unconventional and diverse workers in tech. They did not take the steps necessary to gain buy-in for their novel approaches to evaluating merit, opting instead to revert back to status quo assumptions about hiring in tech.

In the following chapter, I examine a very different approach to increasing diversity in tech, one that embraces, and builds from, the current hiring heuristics

used in the industry. These efforts are being spearheaded by an organization called CODE2040, which has intentionally leveraged the power of high-status social networks, as well as their affiliation with elite universities, in order to bridge opportunities to a greater number of minority engineers around the country. Rather than disrupting prevailing heuristics of meritocracy, CODE2040 builds from them in order to gradually push industry to extend their trust and respect to unfamiliar sources of talent. If these methods work, CODE2040 could lay the necessary groundwork for platforms like TalentAI to offer more innovative and novel approaches to evaluating talent through big data in the future.

Chapter 4
CODE2040

As the sun sank below the horizon in San Francisco's SoMa district,[156] I

emerged from the Caltrain. I had five minutes and 3 percent phone battery

remaining before I would be both lost and late for the evening's CODE2040 event

at a local tech company. As I scanned my surroundings, I caught a glimpse of

two familiar faces jogging through the rush hour foot traffic ahead of me. Alex

and Raul were also dangerously close to being late. "It took us two hours to drive

20 miles!" Alex remarked as I jogged up beside them. They were coming from

LinkedIn's headquarters in Mountain View, where both Alex and Raul were

interning for the summer. When we finally arrived at our destination the door was

locked. Like many tech companies in the neighborhood, this one required an

employee id card in order to access the elevator. "I hope we're not in trouble,"

Alex groaned. I glanced at my watch. We were six minutes late.

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[156] South of Market, or SoMa as it's commonly referred to, is a large district situated between Embarcadero and 11th Street in San Francisco where many tech companies have their headquarters.

Not long after, we intercepted an employee who accompanied us to the company headquarters a few floors up. As the elevator doors opened we came face to face with the furrowed brow of Bianca St. Louis[157], one of the core staff members at CODE2040. I sheepishly slid past to the next room while Bianca reviewed CODE2040's strict punctuality policy with Raul and Alex. As an affiliated researcher, I could come and go from these events as I saw fit. But Alex and Raul were CODE2040 summer fellows, which meant that they were expected to show up to every event, on time, no excuses. This policy had been emphasized repeatedly during the fellows' orientation at the beginning of the summer. "You are the brand ambassadors of this organization. What you do is what we are," Amy Schapiro, the former Director of the Fellows Program, had explained then. As I would learn throughout my time with CODE2040, maintaining the integrity of the organization's brand was central to their theory of change.

The evening's event was getting started in a large conference room down the hall, where the host company was giving a presentation about how to write technical documentation for software projects. I assumed a seat in the back of the room next to a tall blond woman donning a CODE2040 t-shirt under a hoodie with her company's logo emblazoned on the back. After a few whispered exchanges I learned that her name was Alyssa and she was the lead organizer of the event within the host company. "They're such a great bunch," Alyssa said as Bianca joined us in the back a few minutes later.

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[157] All the names of CODE2040's staff are the individuals' real names.

Alyssa told us that she was passionate about increasing diversity in tech and she was glad to make connections with organizations like CODE2040. Just a few weeks earlier, she said, the company had hosted a different organization that was teaching girls to code in Oakland. As we chatted, the speaker at the front of the room asked the fellows how many of them had done some technical writing before today's workshop. More than half of the fellows raised their hands. "Oooh, it looks like several of them have some experience already! That's so awesome," remarked Alyssa enthusiastically.

 "Yes, they're very competent developers. They have internships with top companies in the Valley," Bianca explained. She went on to give a more detailed description of how CODE2040 selected its fellows, emphasizing that the students had to complete a series of technical interviews and ultimately be extended an internship offer from a company before they could join the program. The fellows were getting paid for the work they did. Though Bianca and the others at CODE2040 rarely said it explicitly, the message was clear: CODE2040 provides a service, not a charity.

Over the course of the summer, I would observe the CODE2040 staff repeat this pattern of conversation over and over. It typically started with someone from the industry mischaracterizing the work that CODE2040 does, usually describing them as an organization that teaches Black and Latino/a youth how to code. This was a common misconception. As Bianca once explained to me, "Whenever I say Black or Latino, people are like, 'Oh, are you teaching them how to code? Do you want me to connect you with this program in Africa that

teaches really poor, broke students...'" she paused, "So getting people to understand the value of Black and Latino talent is really tough."

It's not surprising that most people who are unfamiliar with CODE2040's work would assume that their main focus is on education. Most organizations that are working to increase diversity in tech focus on equipping underrepresented groups with the resources they need to learn marketable technical skills. Organizations like Black Girls Code and UrbanTxT host educational programs for urban youth of color. An organization called Girls Who Code partners with major companies in Silicon Valley to provide mentorship and education to high school girls enrolled in summer coding programs. All of these interventions align nicely with the prevailing understanding of tech's diversity problem as being primarily an issue of a leaky educational pipeline.

CODE2040's work, however, is starting from a very different point of intervention. Rather than teaching minority youth how to code, the organization's primary goal is to link Black and Latino engineers who already have the necessary technical skills with internship opportunities in the tech sector. This strategy is premised on the idea that there already exists a significant, and growing, supply of untapped minority talent in the tech labor market. Due to what CODE2040 terms "an opportunity gap" in the industry, minority engineers are disconnected from good employment opportunities, thanks in large part to insular hiring practices in tech.

Meanwhile, tech companies continue to struggle to find enough qualified engineers to join their rapidly growing teams. CODE2040's goal is to directly

address prevailing assumptions in the industry about where good talent comes from in order to open up opportunities to a greater number of qualified minority engineers. To accomplish this, the organization is building out a talent search process that recruits and vets young Black and Latino engineers from across the country, while at the same time cultivating a greater demand for those students in the industry.

I conducted field research with CODE2040 during the summer of 2014. This was a period of major growth and expansion for the organization, as they brought on their largest and most diverse cohort of fellows to date. I spent three months attending staff meetings and organizational events, as well as shadowing a select number of CODE2040 fellows while they worked in their summer internships. During this time I developed a clear sense of the strategies that the organization has developed to expand the heuristics and networks used to recruit talent in tech.

In this chapter, I outline the strengths and weaknesses of the CODE2040 model, as well as the next steps the organization will need to take in an effort to fundamentally broaden the pipeline into tech. I argue that by cultivating a well-respected brand, the organization has been able to create demand for minority candidates who otherwise may have been overlooked in the hiring process. However, it remains to be seen how far the organization will be able to use their brand to extend credibility and value to students who break the mold of the current ideal hire in tech. In order to do this, CODE2040 will need to develop

more robust recruitment strategies and supports for students who come from less privileged backgrounds.

CODE2040: An Overview

CODE2040 is a non-profit. Or is it a social enterprise? More than once I heard it referred to as a company. In reality, it is very difficult to place CODE2040 into one clear organizational category. On the one hand it looks like a typical non-profit with a mission to promote diversity and increase economic opportunity for minority communities. On the other hand, the organization describes its work in terms that sound more like a for-profit business than a do-gooder charity. For instance, in describing how she and her co-founder decided to move forward with the idea of starting CODE2040, Laura Weidman Powers describes, "Tristan and I started doing some market research, just speaking to people in our networks, asking if this is something they'd be interested in. The response over and over was a desperate 'Yes… I would buy what you're selling.'"

What exactly were they selling? Diversity. Or rather, as Laura's co-founder Tristan Walker described to me, CODE2040's "products"[158] were the qualified Black and Latino engineers who nobody else in the industry was able to find, "It really all boils down to the product. If the product is good and valuable then people take a liking to it. And our product is damn good. We will find you an amazing group of technical talent… And it's working. [Companies] want them back." CODE2040 considers itself to be part of a generation of organizations

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[158] This is not a term that others in the organization felt 100% comfortable using to describe the CODE2040 fellows. As you will note in a later quote on page 13, Laura explicitly states that she does not consider the fellows to be products. Nevertheless, this framing came up more than once in my time with CODE2040, particularly when Tristan was talking about the program.

that fall into a grey area somewhere between traditional non-profit and for-profit social enterprise. The organization was founded in 2012 shortly after Walker and Powers graduated from the Stanford Graduate School of Business (GSB). From the outset, Walker and Powers framed the issue of diversity in tech as fundamentally an issue of supply and demand.

CODE2040's work is premised on the belief that there is a significant supply of untapped minority talent already available in the tech labor market. In addition, as the minority STEM pipeline strengthens, there will be a growing number of Black and Latino engineers ready to work in the sector in the coming years. Yet, the industry's current hiring practices and recruitment networks are disconnected from this growing pool of minority workers. In order to augment or change these practices, the industry must recognize and place sufficient value on the talent that can be gleaned from new and untested sources of skilled labor.

CODE2040 has made it their job to identify a reliable supply of minority talent and link it to a growing interest in hiring Black and Latino engineers. Their success hinges on the organization's ability to cultivate an industry demand for minority engineers who are currently overlooked in the labor market. A key part of this strategy, therefore, lies in CODE2040's ability to develop strong brand recognition for the Black and Latino engineers they source from around the country.

They have laid the groundwork for this through their flagship initiative, the CODE2040 Summer Fellows Program, which is designed to give high-performing college students the opportunity to work in an internship in Silicon Valley during

the summer. CODE2040 piloted the program in the summer of 2012 with a small number of Black and Latino students, mostly from high-profile schools like Stanford and MIT. The following summer they launched a full-blown version of the program with eighteen fellows. Of the students in this cohort, ten were from elite research universities, or schools with well-known engineering programs like Harvey Mudd College. Eight students were from less celebrated schools, including the University of Houston - Downtown Campus and the University of Maryland Baltimore County (UMBC).

It was in 2014 that CODE2040 made its first big push to increase the number of fellows from outside the elite university network. Their third cohort was comprised of a total of twenty-seven fellows. Ten of them were from top-tier engineering or Ivy League schools.[159] The remaining seventeen were from universities that fall outside of the typical tech recruitment circuit. This included universities that CODE2040 had made intentional efforts to visit in the months leading up to application season, such as Morehouse College and Spelman College, two of the oldest historically Black universities found in the South. In addition, CODE2040 enrolled their first two community college students in the program.

As CODE2040 has matured over the last three years, their recruitment and application process has grown increasingly sophisticated. In the months leading up to the opening of the 2014 fellow application process, members of the

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[159] This tally is the result of my subjective sense of what schools are considered "top engineering" universities. These ten students were from the following universities: Carnegie Mellon, John's Hopkins, UC Berkeley, Stanford, MIT, Columbia, Georgia Institute of Technology. I was unsure whether or not to include two students from the University of California San Diego. They are not included in the tally of ten students.

CODE2040 team travelled around the country to encourage students to apply to the program. They placed particular emphasis on schools where there were a significant percentage of minorities enrolled in engineering programs, such as UMBC, which offers scholarships to promising minority students pursuing STEM fields through their Meyerhoff Scholars Program. They also relied on alumni from the previous year to be ambassadors on their campuses, recruiting minority students from places like Stanford and Berkeley.

There are two paths to getting accepted into CODE2040's fellows program. Some students apply with a tech internship already lined up in the Bay Area for the summer. In that case, the organization conducts an interview to make sure the student's background and motivations align with their mission, and then they are offered a spot in the program. Most students, however, apply to the program without an internship offer already in hand. In 2014 the CODE2040 team screened these applicants through a technical exam, which they asked engineers from their volunteer network to grade against a rubric. If students pass the exam, then they are briefly interviewed by one of the CODE2040 staff to evaluate the student's leadership potential, growth mindset, professional demeanor and style of self-presentation. From this process CODE2040 creates a short list of promising intern candidates that they extend a "soft offer" to join the program. However, before the students can be fully accepted into the fellowship, they must be offered an internship from one of CODE2040's partner companies.

In the early days of the organization, the CODE2040 staff did not have a clear process for matching students with partner companies, which resulted in a

few kinks in their system. For example, in 2013 they had a student who interviewed with, and was offered internships from, five different companies. The companies whose offers were ultimately decline expressed frustration that the student had been given so many interviews to begin with, because it diminished their chances of successfully recruiting a fellow. As Amy Schapiro, the former director of the fellows program, explained to me, companies typically showed the most enthusiasm for students who had prior work experience or were from well-respected engineering schools like Carnegie Mellon. In order to make sure that these students did not eclipse the profiles of others from traditionally attractive backgrounds (and to maximize the total number of offers), the organization decided to limit the number of student profiles that companies were able to see.

For the recruitment process in 2014, CODE2040 asked their partner companies to submit a job profile with information about the internship they were offering, as well as the skills required for the position. The fellow candidates then accessed the job profiles through an online application portal, where they indicated which companies they were the most and least interested in working for. Once the organization received this input, they gave companies a short list of candidates from which they could select up to four to interview. If a candidate received more than three interview offers, CODE2040 asked them to pick their top three choices, in order to minimize the possible number of offer rejections the candidate would have to make. From that point, companies were free to engage fellow candidates in their standard interview process. If the companies liked the candidate, then they offered them an internship. As it drew closer to the start of

the summer, CODE2040 allowed companies to take another look at the profiles of any students who had not yet been offered an internship, in one final push to connect remaining candidates with an opportunity.

By the beginning of May 2014, CODE2040 had successfully connected twenty-one minority students with internships in Silicon Valley. There was only one problem. Only four of them were women. For an organization building a brand based on their ability to find diverse talent, this posed a serious threat to their image. It also demonstrates the real challenge of finding minority women candidates in tech, even when they are intentionally targeted for employment.

About a month later in early June, and just one day before the official launch of the 2014 Fellows Program, the entire CODE2040 team gathered together in their small office to review the final statistics on their summer cohort. Listed on a white board in alphabetical order were the names of twenty-seven Black and Latino/a students enrolled in the year's fellowship: seventeen males and ten females. "This year we are legitly diverse." Schapiro remarked as she reviewed the list of names and schools written on the whiteboard, "I even got to tell Google that the class was almost forty percent women." The team clapped their hands in celebration. As they debriefed their recruitment process, it struck me how much of a dual focus CODE2040 maintains in their work. Not only is CODE2040 committed to connecting minority students with internship opportunities, but they are also concerned with building and maintaining a strong reputation for themselves in the industry.

Over the last few weeks they had scrambled to increase the percentage of female fellows in their program. To accomplish this, CODE2040 asked for referrals from their partner companies for any female Black or Latina interns they were bringing on board without the assistance of CODE2040. In addition, they made one final push to place two students who had not been picked up by any companies during the normal recruitment process. At the end of the day they were able to bring on board three women from Stanford and three women from lesser-known universities, including two community colleges and a university in Puerto Rico.

As we reviewed the final list of fellows on the board, Schapiro made sure everyone knew how to pronounce each student's name. She also remarked on students who were outliers of some form or another: which students were coming out of their freshman year, which ones were older than the average fellow, who might be particularly charismatic and could be groomed for interviews with the media, etc. The staff at CODE2040 often referred to their fellows program as a "high touch" intervention, meaning that the organization spent a significant amount of time and resources getting to know who the fellows were, where they came from, what their needs were, etc.

At the same time, the organization was also very outward oriented, concerned with cultivating strong relationships with company clients who might be interested in bringing one of their fellows on as interns. A large part of this process involved the creation of an organizational brand that was respected and valued in the industry. Their struggle to find a proportional number of women to

bring onto the program posed a direct threat to their image, because it could potentially undermine their authority as experts in sourcing diverse talent. The organization managed to resolve this issue mostly by tapping into their company networks to find women who already had internships, and therefore could bypass the long recruitment process.

In some ways, the women who joined the fellow cohort at the last minute were benefitting CODE2040 as much as the organization was supporting them. The fellows would certainly gain insights from the professional development events and networking opportunities that the organization provided in the fellows program. Yet, these women were also essential to the organization's long-term branding strategy, as they helped to cement the organization's image as the go-to place for diverse talent in tech. CODE2040's brand also enabled the organization to influence companies' recruitment efforts by serving as a respected role model on how to successfully find and cultivate high quality diverse talent. As Powers explained to me, "In order for companies to do the hard work needed to become diverse and inclusive, they need a model that shows that it is possible to achieve – otherwise why make the investment? ...So our brand being strong is central to our ability to influence the industry and create change."[160]

In contrast to a typical non-profit, CODE2040 blends the roles of beneficiary and benefactor in their work. Their fellows are both an end and a means to broadening the pipeline in tech. Their corporate clients are both

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[160] Laura Weidman Powers, personal communication, May 4, 2015.

supporting and being supported by the organization's work. In the end, CODE2040 is in the business of aligning mutually beneficial interests between their organization, minority engineers and companies in the industry. In the following section, I discuss the ways that CODE2040 has carefully framed their work with their company partners, and how these efforts connect to their long-term goal of building up a high demand for minority engineering talent in the industry.

Having Half the Conversation

From the outset, CODE2040 framed their work as a value-add for companies seeking skilled labor, rather than as a charity for underprivileged young people. They reinforce this idea by structuring their interactions with companies much like a business partnership. For example, if CODE2040 places a fellow into an internship with a partner company, the company pays a partially tax-deductible fee to the organization, just as they would pay a head hunting service for successfully sourcing an employee.

This money exchange is a critical part of their organizational branding strategy. "We're charging people for our services," Walker explained to me, "A lot of start-ups will pay $20,000 for full-time talent. We can do it at, potentially, that cost or less, and it's tax deductible and it's really great talent… So more and more we like to view ourselves as an alternative to other recruiting services." Charging fees for their services reinforced the idea that CODE2040 was aiding companies as much as the communities of color that they target for recruitment.

In the early days of the organization, this distinction was challenging to convey because the industry lacked a clear framework for fully comprehending issues of diversity within the sector. As Powers described to me,

> "When CODE2040 started there just wasn't language around diversity in tech. So trying to figure out what that is has also been part of CODE2040's struggle to define itself as a non-profit with a business model. I would never describe us as a charity. I hate that word. So we… make a lot of effort to also use language that is business and value driven and not charity driven. I don't think of our students as a product, but I do think that they play two roles for CODE2040. One is they're beneficiaries of the work we do. But two is that they're the beacons or examples that we hold up… by putting them in companies, by putting them in front of younger students and the media…They're a means to an end, as well as the end goal of the program."[161]

Laura's explanation of the fellows' dual role in their strategy illustrates the organization's two-pronged approach to impact. Not only are they in the business of creating opportunities for a growing number of Black and Latino engineers, but they are also working to make a broader impact on the way industry conceptualizes and recruits for top talent. Foundational to this work is addressing head on issues of implicit bias and stereotyping in the industry. As I highlight in Chapter 2, there is a direct tension between tech's notions of excellence and diversity in their workforce. This is due in large part to the fact that recruiters and workers in tech have a very narrow view of where reliable workers are found and, what experiences and skills are indicative of a promising future employee. This tendency is fueled by widespread assumptions that there are very few minorities with the skills requisite for being competitive in the tech labor market.

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[161] Laura Weidman Powers, interview by Chelsea Barabas, August 8, 2014.

As the conversation about diversity in tech has grown in recent years, so have the number of organizations and pundits who reframe these issues in terms of implicit bias and cultural exclusion, rather than just an issue of scarce talent. In 2014 two female technologists launched an online publication called *Model View Culture*, which aims to highlight the structural and cultural barriers that limit diverse individuals' ability to thrive in tech. Non-profit research centers like the National Center for Women and Information Technology (NCWIT) and the Level Playing Field Institute have published research and educational materials regarding implicit bias in hiring and recruitment.[162] There are even a small number of consulting firms that now focus specifically on advising tech companies on how to mitigate bias in their approaches to hiring and promotion.[163]

Yet, for the staff at CODE2040, it has been a delicate challenge to figure out how to build the necessary trust and rapport with companies in order to have tough conversations about how bias factors into their struggle to develop a diverse workforce. As Schapiro (former Director of the Fellows Program) described to me, "Sometimes it's hard to have that conversation and engage… without people feeling defensive or tokenized… and have people see diversity as a business opportunity, and a business necessity, just as much as some other factors are." As a result, CODE2040 decided early on to forego an educational

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[162] "Research Reports | Level Playing Field Institute," accessed May 7, 2015, http://www.lpfi.org/category/research-reports.
[163] DeAmici, Carmel and Carson, Biz, "Eight Charts That Put Tech Companies' Diversity Stats into Perspective | Gigaom," August 21, 2014, https://gigaom.com/2014/08/21/eight-charts-that-put-tech-companies-diversity-stats-into-perspective/. and http://www.paradigmiq.com/

approach to addressing these issues (i.e. holding seminars with company recruiters on implicit bias) in favor of a more active strategy of impact.[164]

The thrust of this approach is to make it as easy and low-risk as possible for companies to find high-quality minority engineers. CODE2040 spends the time and resources necessary to vet students from around the country. Partner companies then have the opportunity to select their favorite candidates from this vetted pool of talent. As Powers described to me, this meant that in many cases her organization was only having "half the conversation" with their partner companies. Their main goal was to frame themselves as allies who are providing a valuable service, rather than outside crusaders attacking companies' practices,

> "I know that that's a bit of a cop out because essentially what we are doing is saying like, 'Well we can help you with this ready-made solution. You don't have to do anything on your own,' but it's also a bit deliberate because essentially in the early days of CODE2040 it's about building a brand and being inclusive and non-threatening and solutions-based."[165]

The obvious risk of this approach is that, in an effort to form relationships with companies, CODE2040 misses a critical opportunity to reflect with their partners on their role in perpetuating a homogenous workforce. Researchers have warned that nonprofits which forge close partnerships with the private sector have a tendency to reduce or tame their advocacy work when such efforts could threaten their amicable working relationships with clients.[166] As the above comments from Schapiro and Powers indicate, CODE2040 fears that companies

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[164] Since the conclusion of my research with CODE2040, the organization has begun to work on a programmatic strategy to work directly with companies on these issues, without students in the equation

[165] Laura Weidman Powers, interview by Chelsea Barabas, August 8, 2014.

[166] Skloot, Edward., "Evolution or Extinction: A Strategy for Nonprofits in the Marketplace.," *Nonprofit and Voluntary Sector Quarterly* 29, no. 2 (2000): 315–24.

will be less likely to engage with their work if they feel threatened or attacked. The key question is whether or not bypassing these direct forms of confrontation will compromise the success of their long-term mission.

Yet for CODE2040, the bias conversation is not critical to their theory of change. Rather, the organization seeks to reduce the amount of perceived risk and ambiguity companies take on in the process of broadening their talent pipeline. In doing so, they aim to shepherd a structural shift in the way the industry recruits talent. This shift necessitates that CODE2040 build up enough brand recognition to become the trusted source for minority talent in the industry. Then the organization can use their brand credibility as a bridging force, connecting the industry to unfamiliar sources of minority talent. In the following section I review the ways that CODE2040 has built a brand which tech companies value and want to be associated with.

Building a Brand

During my research with CODE2040, one of the things that struck me most was how well integrated into the tech industry the organization had become in such a short period of time. In 2014, CODE2040 was launching its third year of operation with just a small team of six full-time staff. In spite of their heavy emphasis on engineering, none of the CODE2040 team had any experience working in a technical capacity within the hi-tech industry. In fact, most of them came from other fields, such as social work and youth development, and had very limited exposure to the tech sector prior to joining the CODE2040 team.

Nevertheless, the organization had strong ties to well-known engineers, CTOs and CEOs within the industry.

This was made possible thanks in part to the strong industry connections that the founders, Walker and Powers, cultivated during their time at the Stanford GSB. In Walker's view, however, their connections with Stanford were not as important as the trust and reputation he'd developed as an effective entrepreneur and innovator in the years leading up to the founding of CODE2040. As he explained,

> "A big reason why I was able to secure a lot of the early funding and support was folks saw what I did at Foursquare. They know that I can do what I say I'm gonna do. And they thought about funding the organization the same way they do my current company:[167] what's the value I'm bringing to society, what's the ROI we're going to get on our capital… So I had a bit of a track record already and that's helpful."[168]

During his time at Stanford and the years immediately following, Walker became well known for his early participation in companies like Twitter and Foursquare. He also served as entrepreneur-in-residence at the prominent venture capital firm Andreesen Horowitz. By 2012, he was a well-known figure amongst the entrepreneurial elite of Silicon Valley. Thus, when Powers and Walker began to work on CODE2040, they were able to raise money by leveraging Walker's professional reputation as a strong entrepreneur with a knack for sniffing out good ideas.

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[167] Tristan Walker's latest company, Walker & Company, also has a social component to it's mission. They have a vision for creating products specifically for the growing Black and Latino consumer market in the United States. Their first trademark is a razor specifically engineered to deal with coarse, curly hair.--- stuff about how this is related to how Walker envisions the power of the minority consumer in the future – how he lives his own vision for impact that CODE2040 leaders will have in the future.

[168] Jonathan Brack, interview by Chelsea Barabas, October 31, 2014.

In addition to facilitating their fundraising efforts, their association with other prominent people in the Valley enabled them to develop the social capital necessary to become a recognizable brand within a relatively short period of time. Their board includes prominent people such as Ben Horowitz, principal at Andreesen Horowitz, and Marc Hedlund, Vice President of Engineering at Stripe, a well-known e-commerce company. Facts like this came up frequently in conversations I had with workers in the tech community. Their interest was clearly piqued when the name of someone they knew or, rather, knew of was mentioned in affiliation with the organization. By leveraging the personal networks and professional reputations of their founders, CODE2040 has been able to develop credibility and demand for their fellows over a relatively short period of time.

During their first three years of operation, CODE2040 has been intentional about extending this high-profile network by inviting prominent people to speak and host their fellows at events during the summer. For example, at a panel entitled, "Engineering Career Pathways," the organization was able to bring Peter Norvig (Director of Research at Google), Raffi Krikorian (VP at Twitter) and Julia Grace (CTO of Tindie) to share their insights about their personal career trajectories. This association with high-profile people served two strategic purposes for the organization. First, it enabled them to establish meaningful connections with companies that could later become official partners with CODE2040. As the director of the fellows program explained to me, most of their

company partnerships were the result of making a connection with one or two "cheerleaders" within a host company.

These are people who are enthusiastic about CODE2040's mission and had the clout necessary to push their companies to get involved. Given the significant financial component involved with participating in the program (in the form of intern salaries and talent-sourcing donation-fees), the higher up the cheerleader was in the company, the easier it was to establish a partnership. CODE2040 events were a great way to expose fellows to influential people in the industry, and vice versa. As staff member Bianca St. Louis explained to me, these events played a transformative role in getting company leaders on board with the idea that CODE2040 could provide real value to their companies,

> "Time and time again anyone that leaves our events are like 'Oh my god, your students are so talented.' I think before anyone goes into a talk, when you hear Black and Latino you're like, 'Meh.' But then the students press them with questions that veterans in the industry haven't even asked them. So I think it's a matter of redefining what Black and Latino is, and basically exposing them to high caliber people "[169]

Central to CODE2040's work is this idea of "redefining" Black and Latino by exposing influential people to excellent minority engineers. This exposure serves to directly counter prevailing assumptions that there simply were no minority engineers prepared for or interested in working in tech. In addition to facilitating company partnerships, these affiliations also signal more broadly that CODE2040, and their mission, is something worth being associated with. When I asked Bianca St. Louis why she thought they were able to get such high profile people to participate in their events, she said that it partially had to do with the

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[169] Bianca St. Louis, interview by Chelsea Barabas, August 5, 2014.

fact that people wanted to be associated with other high-status individuals in the

industry,

> "They've seen who else is invested. Like, if you look at our board members people are like, 'Oh wow, Ben from Andreesen Horowitz is giving them time? Maybe I should be in the ranks of these people.' So it kind of just increases the bar. If we came out and had no-name people… the bar would be set differently. But I think it is an honor to join the ranks of people like Charles Hudson, Ben Horowitz, people who have been so successful."[170]

Bianca's explanation resonates with the work of Alice Marwick, who has

researched the ways that personal branding and micro-celebrity shapes one's

influence and opportunities in tech.[171] As Marwick argues in *Status Update:*

Celebrity, Publicity and Branding in the Social Media Age, the technology scene

in Silicon Valley is organized along an informal hierarchy of status and power.[172]

One's social position greatly influences his or her ability to access opportunities

and privileges in the industry. Informal social relationships and affiliations with

other high-status individuals in tech are central to raising one's status. As Bianca

points out, this holds true for organizations as much as it does for individuals.

Over the last few years, CODE2040 has managed to cultivate a reputation for

being an organization worth associating with. This has enabled them to form

partnerships with prominent corporations in the industry, as well as develop

credibility for their brand and connect their students to influential industry

networks.

These high-profile associations are a critical aspect of CODE2040's theory

of incremental change, because they enable the organization to build from the

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[170] Bianca St. Louis, interview by Chelsea Barabas, August 5, 2014.
[171] Alice Marwick, *Status Update: Celebrity, Publicity and Branding in the Social Media Age*.
[172] Ibid.

heuristics that industry already uses to make low-risk hiring decisions. For example, my interviews with leaders of tech companies revealed that employers tend to seek referrals from their friends and colleagues, because they consider that network to be a trusted proxy for competency and potential. By and large, communities of color do not have strong connections to this status quo referral network and therefore miss out on opportunities that propagate through these informal ties. To remedy this, CODE2040 has built out a sort of synthetic network of high-status individuals who place their seal of approval on CODE2040's fellows. Sometimes these individuals are the "cheerleaders" who actively recommend that their company take on a CODE2040 intern. Other times, it is the visibility of the person's affiliation which lends credibility to the fellows program more generally.

CODE2040 has intentionally leveraged the clout of its founders in order to accumulate credibility as a trusted source of quality talent. In contrast to the algorithmic recruitment companies discussed in Chapter 3, in these early days CODE2040 has not pushed companies to re-conceptualize how they evaluate top talent.[173] Rather, they have intentionally built from the practices and markers of merit that the industry already trusts in order to demonstrate the value of their fellows. The CODE2040 brand is generally considered cool and relevant in the industry, thanks to its close association with high status individuals in tech. The organization is able to use its brand to extend legitimacy and value to a relatively

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[173] In my most recent correspondence with the organization (May 2015) I have been told that they are doing some of this work now. Powers talks about the importance of sequencing -- if CODE2040 had started out pushing companies to re-conceptualize merit, they would have been met with skepticism. But now CODE2040 has built up a brand, they say that they are able to have more pointed conversations with their partner companies about this topic.

unknown community of talent, one that, before CODE2040, was not actively sought out by industry.

CODE2040 has taken a similar approach to harnessing the power of their affiliations with elite universities. In the early days of the fellows program, CODE2040 drew its fellows primarily from schools that are well respected in the industry, such as Stanford and MIT. As one CODE2040 staff member explained to me, minorities from prestigious universities are best positioned to counter the assumption that CODE2040's students were somehow charity cases, "Industry's not downgrading their bar for Black and Latino students… I've had companies tell us, 'Do you want us to modify how we recruit?' We're like 'No, there's no change that needs to be made'… I don't want them to lower the bar for Black and Latino talent." In order to demonstrate the quality of their students, the organization sought out fellows whose backgrounds aligned well with the indicators (i.e. educational pedigree) currently used to evaluate excellence in the industry. In addition, by mixing students from universities of varied esteem, the organization was able to provide a "status boost" to students from less prestigious institutions.

The CODE2040 team acknowledged that this strategy would get them only so far towards realizing their long-term mission. After all, if the organization only ever sourced minority engineers from elite schools, they would ultimately fail to broaden the pipeline for engineers from a wider range of backgrounds. A critical part of expanding the talent pipeline involves slowly increasing companies' exposure to reliable talent from sources that they don't currently value or trust. As Bianca St. Louis explained to me, "We're giving [industry] more

data points for Black and Latino engineers... [because] tech companies' values and practices are currently optimized for a young white male versus optimized for a diverse community." Over the last three years, CODE2040 has steadily expanded their network to include a greater number of students from less known academic institutions. However, they still have a lot of work to do in order to build trust and demand for students from off the beaten path. In the following section, I examine the successes and the struggles CODE2040 has experienced in extending opportunities to students who do not fit the current mold of ideal employee in tech.

Building a Bridge via the CODE2040 Brand

The biggest challenge that CODE2040 faces in opening up industry hiring practices to new sources of talent is navigating the perceived risk of change and the unknown. CODE2040 is in the business of making it as easy as possible for companies to find and value the potential of students who come from outside their usual recruitment networks. Not only does the organization do all the heavy lifting in order to find and vet minority candidates, but they also take special care to explain why they find a student's background and accomplishments to be exceptional. This is particularly important in the pre-interview phase of selection, when evaluation is constrained to just the information students provide on their resumes.

It is at this phase of the process that CODE2040 takes special care to cultivate a more thoughtful appreciation of unfamiliar candidate backgrounds. The staff at CODE2040 wrote supplementary notes in students' profiles

explaining why they thought he or she was a strong candidate, emphasizing notable things about their background that might not be fully understood or appreciated. They also included reflections from CODE2040's technical evaluators regarding students' programming abilities. This extra effort appears to have paid off. Amy Schapiro, the former director of the fellows program, told me that she received feedback from companies saying that this additional input had pushed them to consider individuals whose resumes they otherwise would not have seriously considered.

In this way CODE2040 was able to ease industry into to expanding their search from familiar networks to ones which contained a more diverse set of students. The organization put in the resources and effort necessary to make these students' stories more legible to recruiters who have limited exposure to engineers from such backgrounds. As CODE2040 expands, they will be able to combine their growing brand recognition with this extra effort in order to broaden the networks from which tech companies recruit top talent.

However, this effort to build up industry demand will only pay off if CODE2040 is able to find a reliable supply of students who thrive in the intensive structure of their fellows program. In addition to their full-time internships, CODE2040 fellows are expected to attend two to three events per week, which include professional development workshops and networking events, as well as hackathons and company information sessions. The fellows are expected to attend all of these events, unless they have a valid excuse (i.e. they are sick or have a family emergency). Obviously, they are also required to maintain their

employment status at their host company. In 2014, CODE2040 had two of its fellows leave their fellowship early, because they were not fulfilling at least one of these two requirements of the program.

These two students also happened to be the only two community college students to ever enroll in the program, two of the females who joined the cohort at the last minute in May. In many ways, these women fit the profile of a typical community college student. They were bit older than most of the other fellows, because they had been attending school off and on for several years, or on a part-time basis, so that they could save money for the next semester's tuition. As a single parent of a young child and a part-time summer student, one of the women named Carmela expressed concerns to me in an interview over whether or not she would be able to attend all of the mandatory CODE2040 events. She ended up leaving the program after realizing that she had a class that frequently conflicted with the timing of CODE2040's evening programs. Carmela decided to prioritize earning her course credits over attending the events, and thus was eventually asked to leave the program.

For the other fellow, named Shirley, the situation was a bit more complicated. A couple of weeks into her internship, Shirley encountered some challenges with her boss. This incident quickly escalated into a situation in which she no longer felt she could work at her host company. As an outside observer, it was difficult for me to gain a clear perspective on what exactly had transpired at Shirley's job. When I spoke with her about the incident it was clear that she was

filtering the conflict through the lens of her prior experiences working in establishments where she felt she had been taken advantage of and mistreated.

"If I was 19 maybe I wouldn't care anymore, but I've been in the world and I know what to expect." Shirley explained to me. While most fellows had limited prior work experience (since they were just a couple of years out of high school), Shirley had been working for over a decade, mostly in low-wage service industry jobs. Now that she was nearly thirty, she felt a sense of urgency in establishing herself as a professional, someone who could not be easily dispensed of like she had been in her prior jobs working as a waitress. Over the two weeks after the initial incident, Shirley withdrew from all CODE2040 programming events. She also decided to quit her job and move back to Tennessee, where she lived with her family.

When I reflected on these experiences with the staff at CODE2040, it was clear that they were concerned with the precedent Carmela and Shirley set for the organization's future engagement with community college students. As Schapiro explained, "I look at what they had in common…they both went to community college. I want to include a lot of students from community college. But I want to figure out a way we can better support them, or more accurately vet students who come from non-traditional four year universities." Schapiro acknowledge that part of their challenge in vetting these particular students was due to the fact that the organization brought both of them on board very last minute. In general, they needed to build out more robust networks in order to find

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more community college students earlier in the process so that they could be properly screened.

At the same time, CODE2040 needs to take a realistic look at what supports and resources they would need to provide in order for students from the least advantaged backgrounds to thrive in their program. As CODE2040 staffer Jonathan Brack explained,

> "The more we expand, the more we're going to confront students with really high needs that I don't know if we'll be able to serve. This is a theme that's come up a lot in my prior work… you have to make a decision on, do you really want to serve the most underserved population, that needs all kinds of social support? Or do you want to hit that middle ground, or top performing kids, so that you can nudge them on to that next level?"[174]

As someone who had spent several years working with youth from low-resource communities, Brack had a firm grasp of the high level of resources it would take to enable such students to thrive. He was uncertain that these communities were the appropriate target audience for CODE2040's work. At the same time, he was passionate about expanding the opportunities that the organization had to offer to a broader group of students from around the country. During my time with CODE2040, Brack was leading the development of a new program called the Technical Applicant Preparation Program (TAP).

TAP was officially launched in February 2015, and is CODE2040's first major extension outside of Silicon Valley. Through TAP, the organization plans to provide workshops, retreats and webinars targeted at students from select locations around the country.[175] Through these educational activities, CODE2040 will provide training and mentorship to underrepresented youth who are

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[174] Jonathan Brack, interview by Chelsea Barabas, October, 31, 2014.
[175] CODE2040 has yet to officially announce the locations for the TAP program.

interested in working in hi-tech jobs. TAP's programming will include one-day

workshops on technical interviewing and building an online profile, as well as

online code tutorials and mentorship sessions with people in the industry. As

Brack explained to me, these activities will enable CODE2040 to cultivate a much

larger population of young minority talent, by giving an extra leg up to those

students who may already know how to code, but who lack other key knowledge

about how the industry evaluates engineers. As Brack explained to me,

> "I think TAP allows us to take a step back from just looking for the most competitive students that have the stellar skillsets, that are coming from top ranked universities... and start to go to a student who is two steps away from that, either school-wise or experience-wise. We'll provide them with some additional support to prepare themselves to be really strong and land those jobs."[176]

In addition to their workforce development plans, CODE2040 plans to

expand its partnerships to include companies that need technical workers based

in locales outside of Silicon Valley. Their new partners might not be what one

would consider a typical tech company. Rather, they are "companies with tech

hiring needs" -- corporations and businesses who need to leverage digital

platforms in order to reach their customers or deliver key services online. As

Brack explained to me, most major corporations, ranging from Walgreens to

Target, now have large teams of programmers and web developers on their staff

full-time, "Almost every sector of the economy needs people who can build

technology, whether it's healthcare or consumer facing retail, all of these areas

are being built more and more, infrastructure-wise, on technology." Through TAP,

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[176] Jonathan Brack, interview by Chelsea Barabas, October 31, 2014.

CODE2040's goal is to prepare a significant pool of Black and Latino/a talent to be competitive for these jobs.

It remains to be seen how successful CODE2040 will be at expanding the talent pipeline into technical jobs for youth around the country. The organization's success hinges on its ability to cultivate a high demand for minority talent, while simultaneously developing a reliable system for identifying and vetting Black and Latino engineers across the country. Over the last three years the organization has done an exceptional job at building a brand for sourcing top-notch minority engineers, who were generally assumed not to exist in any significant quantity in the industry. Their goal is ultimately to create direct connections between companies and minority talent without the Fellows Program having to be the funnel, and potentially the bottleneck, for recruiting diverse talent. It remains to be seen which half of this equation will be more difficult to do: the cultivation of an enduring demand or the search for a reliable supply to meet the demand.

Rather than confronting flawed industry assumptions and biases through conversation or educational initiatives, CODE2040 has embraced a more active strategy to addressing these problems. The organization has harnessed the heuristics already used in the industry, namely social networks and prestigious university networks, in order to build a high profile brand for minority talent. They have used that brand to extend credibility to candidates who otherwise would have gone unnoticed or undervalued in the current tech labor market.

At the same time, CODE2040 is in the process of developing a more robust infrastructure for identifying and vetting minority talent, so that there is a

strong supply of Black and Latino/a engineers ready to compete for a wide range

of jobs in the future economy. CODE2040 is moving full steam ahead to increase

the level of support for and knowledge of students who are not as competitive as

their current summer fellows for jobs in the industry. As Brack explained to me,

the organization needs to move quickly in order to bridge the opportunity gap

between minority communities and the rapidly evolving U.S. economy, "If we

don't start preparing people for these jobs now, we're gonna miss the boat.

There's going to be a generation of people who're going be literally

unemployable." When cast in this light, the significance and scope of

CODE2040's mission can be fully appreciated: they are not just in the business

of getting more minorities into Silicon Valley -- their mission is to make sure that

the communities they serve have a place in the future of the rapidly changing

U.S. economy.

Chapter 5

Tech and the Future Battle for Equal Opportunity

Meet Shirley. In many ways, Shirley fits the description of the archetypal "winner" in tech. She is smart and creative, which she combines with a high degree of drive and intensity to everything she does. For her, coding provides a toolkit for exploring the world. In the year prior to applying for a CODE2040 fellowship, she taught herself how to code so that she could build a computer simulation of some of the concepts she was learning in a college physics class. Shirley's autodidactic tendencies were emblematic of a deep curiosity of the world around her. "I'm a bit of a mad scientist," she joked with me one day after I noted how tired she looked at a CODE2040 event. The evening prior she had gotten obsessed with a personal software project and ended up staying up most of the night working on it, even after a long day at her internship. In fact, Shirley had many personal projects she was working on. Some of them were simple

games, while others were more theoretical attempts to combine concepts from art, psychology and math.

My last face-to-face conversation with Shirley took place on a sunny afternoon in late June. She was part of a small group of fellows who I had requested permission to conduct on-site observations with at their workplace. As it turned out, my first visit to Shirley's office would also be my last. A week or so before, Shirley had a minor confrontation with her boss. Though the incident had more or less been resolved, she found it difficult to concentrate at work. While at her office, she gave no clear sign of the frustration she harbored from the incident. However, her discontent grew much more apparent once we left the office to grab a drink once the workday was over. "I'm never going to work for someone again," Shirley fumed as we reflected on the afternoon's interactions with her boss. She was seriously considering an early departure from her internship, and fellowship with CODE2040.

As an outside observer it was hard for me to understand how a seemingly small incident at work, no more than a few passive aggressive emails, had so quickly escalated to this point. However, the more I spoke with Shirley the more I understood how the impacts of this event were compounded by years of prior experience working in jobs where she had been underpaid and undervalued. She didn't know if she could keep working at a company where she felt she couldn't speak her mind. "I'm sick of this. I deserve better than this," she said over and over, so inwardly emphatic that it sounded like she was trying to convince herself more than anyone else of the truth in her words.

At 29 years old, Shirley was one of the oldest participants in CODE2040's fellows program. Originally from New Orleans, she and her family now lived in Tennessee after losing everything during Hurricane Katrina in 2005. Like her six other siblings, Shirley still had not yet managed to finish college. When finances and circumstance permitted, she studied math at a local community college in Memphis. She had aspirations of one day starting her own tech company.

If she were to succeed, Shirley would fit beautifully into the prevailing narratives of tech as a haven of meritocracy, where anyone with good ideas and grit has a shot at success. Alice Marwick argues that underlying the merit-based image of tech is the Gramscian concept of the "organic intellectual," or a person who rises from the working class to gain power and influence through expertise and know-how.[177] She argues that this concept plays a powerful role in how high-status individuals understand their own success in tech: success is something that the winners in tech achieve through their own actions, rather than as a result of external circumstances.

Yet for Shirley, the idea of "organic success" was a mirage never quite within her grasp, "How is it that it's been nearly 10 years since the hurricane and we still don't have anything? We just can't seem to get into that circle of life," she mused. I asked Shirley what she meant by this phrase, "the circle of life," and she explained that it had to do with the positive momentum one builds in life, whereby one good circumstance naturally leads to another (i.e. you go to college, then you find a good job, etc.). For some people, such momentum is positive, or in the

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[177] Alice Marwick, *Status Update: Celebrity, Publicity and Branding in the Social Media Age*.

circle of life. For others, like Shirley, it was all too easy to get trapped in a cycle of misfortune that was difficult to escape.

For every step Shirley took forward, there was an outside force ready to push her two steps back -- the hurricane, a sickness in the family, accumulating debt, the recession, so many dead end jobs, the list went on. She then quoted a verse from the Bible, Matthew 7:13-14, "...wide is the gate, and broad is the way, that leadeth to destruction...and narrow is the way, which leadeth unto life and few be there that find it." No matter how hard she worked, Shirley struggled to pass through the narrow gates of good fortune, where the momentum of life would finally start working in her favor. Her internship in Palo Alto had seemed like such a promising step forward. But now it just seemed like more of the same. The incident at work had put Shirley back in survivor mode. If things weren't going to work out, it was time to move on. A few days later, she packed up her bags and quietly disappeared back to Tennessee.

Shirley's story complicates prevailing perceptions of tech as an open space of merit-based opportunity. In contrast to more entrenched industries, like Wall Street or Hollywood, tech is seen as a place where outsiders can make a name for themselves through creativity and hard work. The only real barrier to entry is having the skills necessary to engage with the fast-paced change of the industry. This logic extends to conversations around issues of diversity in tech, as well. While it is widely acknowledged that the tech workforce is disconcertingly homogenous, most people point to the "leaky educational pipeline" as the root of the industry's diversity problems: for a variety of economic and cultural reasons,

there exist significant disparities in the number of women and people of color enrolling in computer science and other STEM fields of study.

Thus it follows that, if only more people from these communities had the opportunity to learn how to code, then the racial and gender diversity of tech would naturally increase. This idea is reinforced by the fact that there are currently over half a million vacant job positions in IT fields in the United States.[178] If only more people had the requisite coding skills, then they would have access to all the promise and prosperity that tech has to offer. However, Shirley's story points to the many layers of circumstance which make it difficult for people like her to access opportunities in the rapidly evolving U.S. economy.

Certainly, Shirley would have benefitted from improved access to higher education. Though she didn't need a university to teach her how to code, she did need the signaling power of a university degree. Without many social ties to people working in tech, it was challenging for Shirley to get an interview at a company without such a credential. She was one of the few people I met who had actually managed to teach herself how to code on her own. But learning to code was not the greatest barrier to accessing a promising career in tech. It was the confluence of many economic, cultural, psychological and structural barriers that make the pursuit of tech's new version of the American Dream so challenging for her to access.

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[178] "Tech Hire | The White House," accessed May 7, 2015, https://www.whitehouse.gov/issues/technology/techhire.

In this thesis I have tried to complicate the educational pipeline narrative by taking a close look at the perspectives and practices of three different groups: the CEOs and founders of tech companies, the scientists and employees who build and sell algorithmic recruitment tools and the staff and fellows of CODE2040. I found that widespread assumptions about what merit looks like (in terms of prior work experience and educational pedigree) have given rise to insular hiring practices in tech. I argued that any meaningful change to the industry's demographic makeup will require a reconceptualization of the metrics and heuristics used to identify high-potential employees. I then examined one technology-driven approach to doing this, through the lens of emerging algorithmic recruitment systems. I found that, unless more thoughtful provisions are made to evaluate harms and/or optimize for social good using these systems, they are more likely to amplify rather than challenge prevailing assumptions found in the industry.

I then examined a different approach to increasing diversity through CODE2040's minority recruitment network. I argued that CODE2040 seeks to facilitate structural changes in how tech recruits talent by taking on most of the cost and risk of recruiting untested sources of talent onto themselves. Moreover, CODE2040 has built a brand that serves as a bridging mechanism between the companies in need of technical workers and sources of talent that are currently unfamiliar and untrusted by the industry. These findings complicate the prevailing narrative around diversity in tech by moving beyond the educational pipeline to examine how hiring and recruitment practices contribute to the problem. This is

important, because it pushes some of the burden of responsibility back onto the industry itself, rather than offloading it fully onto third party programs in the education space.

In this way, I hope my research expands the conversation regarding the factors which contribute to tech's diversity problem. In addition, I hope that this research can serve as an entry point into broader conversations regarding the relationship between technology and inequality in the U.S. workforce. In many ways, learning to code has become the catch-all solution to growing anxieties and hope about the role that technology plays in shaping access to opportunity in the future U.S. economy more generally. This sentiment is captured well in the following quote from activist Van Jones after being asked why he thought teaching "opportunity poor" youth to code was important, "First, coding is the new literacy. It's the key to the future. Second, and I think even more important, the future is not being written in laws in Washington, DC — it is being written in code in Silicon Valley. That's where change is happening and that's what's driving humanity forward."[179]

Recent technological breakthroughs in the fields of machine learning and robotics engineering have led to dramatic changes in the nature of work across many different sectors. Some researchers predict that over the next twenty years, forty-five percent of jobs in the U.S. will be "computerized," meaning that they will be broken down into automatable tasks that can be carried out by robots

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[179] Blackwell, Angela Glover, "America's Tomorrow: Equity Is the Superior Growth Model | Policylink.org," accessed May 7, 2015, http://www.policylink.org/focus-areas/equitable-economy/at/van-jones-on-yes-we-code.

of one form or another.[180] Re-skilling people for technical jobs is frequently framed as the solution for maintaining employment levels amidst such dramatic change.

Until recently, it was blue-collar jobs that were most impacted by such technological advances, as machines replaced workers on the assembly line. However, in recent years, artificial intelligence and big data have combined in a way that enables the automation of a wide range of white-collar professions. For instance, websites like Esurance, LegalZoom and TurboTax have automated, and lowered the cost of, information processing services that were traditionally done by insurance agents, law firms and accountants.[181] In recent months companies have developed management software like the "iCEO,"[182] a virtual management system that automates complex project management responsibilities by breaking them down into smaller micro-tasks. These modular activities are then outsourced to a large number of low-wage workers on a "virtual assembly line." It remains to be seen how effectively this software operates in a range of real-world project management scenarios. Yet, such developments indicate the rapid changes that are underway across a wide range of high and low-level occupations.

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[180] Frey, Carl Benedict and Osborne, Michael A., "The Future of Employment: How Susceptible Are Jobs to Computerisation?" (Oxford Martin Program, working paper, August 16, 2013).

[181] Tan, Lizzy, "The Information Age: Why White-Collar Jobs Could Soon Become Extinct," accessed May 7, 2015, http://elitedaily.com/money/end-era-white-collar-jobs-next/922931/.

[182] Fidler, Devin, "Here's How Managers Can Be Replaced by Software - HBR," April 21, 2015, https://hbr.org/2015/04/heres-how-managers-can-be-replaced-by-software.

Automated machines are even mastering skills and attributes that, in prior times, we would have characterized as uniquely human abilities. Emotion detection software has gotten good at reading the "micro-expressions" of our emotions.[183] Bots can now be hired to evaluate when we are stressed, happy, content or being deceptive.[184] As sociologist Zeynep Tufekci argued recently, "Machines are getting better than humans at figuring out who to hire, who's in a mood to pay a little more for that sweater, and who needs a coupon to nudge them toward a sale."[185] Tufekci's quote is a bit hyperbolic, given the fact that sentiment analysis and related domains are still fraught with problems.[186] Regardless of the (in)accuracy of such methods, companies are increasingly turning to them in order to automate the understanding and assessment of fuzzy human characteristics.

These innovations have led to a boom in productivity, as a wide range of cognitively-intensive tasks become more efficient and cheaper through automation.[187] However, it remains uncertain what all the humans will do once their current jobs have been taken over by the bots. Some people argue that recent technological innovations are not replacing jobs so much as they are displacing them, much like what happened during the Industrial Revolution when

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[183] Rani, Pramila et al., "An Empirical Study of Machine Learning Techniques for Affect Recognition in Human–robot Interaction," *Pattern Analysis and Applications* 9, no. 1 (2006): 58–69.

[184] Khatchadourian, Raffi, "We Know How You Feel - The New Yorker," January 15, 2015, http://www.newyorker.com/magazine/2015/01/19/know-feel.

[185] Tufekci, Zeynep, "The Machines Are Coming - NYTimes.com," April 18, 2015, http://www.nytimes.com/2015/04/19/opinion/sunday/the-machines-are-coming.html?_r=1.

[186] Feldman, Ronen, "Techniques and Applications for Sentiment Analysis," *Communications of ACM* 56, no. 4 (April 2013): 82–89, doi:10.1145/2436256.2436274.

[187] Brynjolfsson, Erik and McAfee, Andrew, *The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies* (W.W. Norton and Company, Inc., 2014).

machines took over the manual labor in sectors like agriculture and manufacturing.[188] In spite of large-scale automation of jobs in these sectors, employment rates tended to increase throughout the twentieth century.[189]

However, according to technology scholars Brynjolfsson and McAfee, this recent wave of technological innovation is eliminating jobs faster than creating them. Although technology has brought about a significant increase in the U.S. gross domestic product, it has not driven a commensurate increase in employment or the median income. They point to the "great decoupling" of productivity and employment in the U.S. economy as a primary source of rising income inequality.[190] Even as automation increases the profits of those at the top, it leaves everyday workers unemployed and uncertain about where their next paycheck will come from.

The intuitive reaction to these developments has been to look for ways of "re-skilling" the U.S. workforce in order to work alongside these new technologies. Educational expansion has played an important role in prior times of rapid technological advancement. As economists Goldin and Katz argue, increased access to higher education throughout the twentieth century helped to temper the negative effects of technological developments in the workplace, as

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[188] Brynjolfsson, Erik and McAfee, Andrew, *Race Against the Machine: How the Digital Revolution Is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy* (Digital Frontier Press, 2011).
[189] *Ibid.*
[190] Brynjolfsson, Erik and McAfee, Andrew, *The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies*.

more and more people moved from the fields to the office.[191] Similarly, today researchers argue that the solution to current technological advances is to equip people with the digital literacies necessary to build, augment and interact with emerging technologies.[192] As Brynjolfsson explains, "People are falling behind because technology is advancing so fast and our skills and organizations aren't keeping up."[193]

In the last few years, there has been a significant amount of resources mobilized to reorient the U.S. workforce around technology-centered jobs. For example, preparing Americans for hi-tech careers is a central part of President Obama's recent work to promote "middle class economics."[194] Obama, along with many other political leaders on both sides of the aisle, cite the growing number of technology jobs as an important avenue for upwards mobility and middle class security. The White House recently launched a new program called the TechHire Initiative in an effort to train and connect individuals with hi-tech jobs across the country.[195] According to the White House, these are not just jobs; they're good jobs. As described on the TechHire website,

> "The average salary in a job that requires information technology (IT) skills
> – whether in manufacturing, advertising, retail or banking – is 50 percent

[191] Goldin, Claudia and Lawrence F. Katz, *The Race between Education and Technology* (Harvard University Press, 2010).

[192] Brynjolfsson, Erik and McAfee, Andrew, *The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies*.

[193] Rotman, David, "How Technology Is Destroying Jobs | MIT Technology Review," June 12, 2013, http://www.technologyreview.com/featuredstory/515926/how-technology-is-destroying-jobs/.

[194] Office of the Press Secretary, "FACT SHEET: President Obama Launches New TechHire Initiative | The White House."

[195]Ibid.

higher than the average private-sector American job. Helping more Americans train and connect to these jobs is a key element of the President's middle-class economics agenda."[196] [197]

This is the same way that organizations like CODE2040 describe their rationale for focusing on increased diversity in technology occupations. Their primary focus is on the way such jobs can support upwards mobility and middle class lifestyles in the communities of color that they serve. CODE2040 compares the growing number of well-paying jobs available in tech to the average incomes found in Black and Latino households.[198] In contrast to the $77,000 in average salary that computer or information professionals make, the median income for Black households is $32,000. For Latino households, the median income is not much better, almost $38,000. The message is clear: communities of color could really improve their economic prospects if the pipeline is strengthened for young minority talent into tech.

Or, put another way, if young people of color do not jump on the code bandwagon, they're going to get left behind. As CODE2040 staffer Jonathan Brack explained to me, "If we don't start preparing people for these jobs now, we're gonna miss the boat. There's going to be a generation of people who're going be literally unemployable." The work of initiatives like TechHire and CODE2040 is premised on the idea that creating access to more technology jobs will keep people connected to good opportunities in a rapidly changing economy,

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[196] Ibid.

[197] It is also worth noting that technology jobs are also non-union jobs. Promoting high such jobs is one of the least controversial things a president could do, as it appeals to the aspirations of the left and the interests of business owners on the right.

[198] insert citation from CODE2040/LPFI graphic

where technology is quickly redefining what the future of work will look like in the coming years.

In some ways, this rationale echoes prior policy agendas that emerged in the 1990's to address issues of the "digital divide" in society. The concept of the digital divide is based on what Virginia Eubanks calls the "distributive paradigm" of social justice.[199] Following the work of Iris Marion Young,[200] Eubanks describes the distributive paradigm as one that "defines social justice as the morally proper distribution of social benefits and burdens among society's members." In the context of rapid technological advances at the turn of the twentieth century, this meant providing computers and digital literacy training to under-resourced communities who otherwise could not "access" technology.

Eubanks challenges this line of thought by arguing that the way in which digital divide interventions have been framed renders invisible the daily interactions low-income people already have with technology. This is particularly important, she argues, because low income and marginalized communities tend to bear a disproportionate amount of the negative impacts of technological advances in situations like the workplace. For example, Eubanks argues, low income workers are more likely to work in jobs where their every move is tracked with the help of surveillance technologies like keystroke counters and phone and

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[199] Eubanks, Virginia E., "Trapped in the Digital Divide: The Distributive Paradigm in Community Informatics.," *The Journal of Community Informatics* 3, no. 2 (2007).
[200] Young, Iris Marion, *Justice and the Politics of Difference.* (Princeton University Press, 2011).

email monitoring.[201] These technologies create substantial information asymmetries between companies and their employees, leading to disparities in power and control over what terms and conditions employees must work under.

Furthermore, while technology may not change the overall quantity of jobs available, it could drastically modify the quality of the work people do. Increasingly complex cognitive tasks are being automated by software that breaks down complicated projects into micro-tasks that can be outsourced to an army of low-wage workers on a "virtual assembly line." Rather than opening up opportunities for people to engage in more meaningful occupations, these technologies seem to be replacing high-skilled work with menial tasks that low-wage laborers can carry out on a contract or freelance basis. Moreover, technology gives rise to new paradigms of work, such as freelancing in "the sharing economy," critics have grown increasingly concerned about the risk of exploitation of workers whose employment status remains ambiguous.[202]

Against this backdrop, access to technology/tech training is simply the most visible among many forms of "virtual inequality" on the rise in today's economy.[203] The issues touched on above go far beyond whether or not people will have jobs, and extend to questions about how technology is changing the nature of work and labor relations more generally. In order to develop a more

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[201] Eubanks, Virginia E., "Trapped in the Digital Divide: The Distributive Paradigm in Community Informatics."

[202] Cheng, Denise, *Is Sharing Really Caring? A Nuanced Introduction to the Peer Economy*, Future of Work Initiative (Open Society Foundation, October 2014).

[203] Mossberger Karen, Caroline Tolbert, and Mary Stansbury, *Virtual Inequality: Beyond the Digital Divide.* (Georgetown University Press, 2003).

comprehensive agenda for addressing tech-driven inequality in the economy, we must look to the various ways that technology amplifies and reinforces existing forms of social and economic stratification in the workplace. As such, we must re-conceptualize access to tech jobs not just as an important bridge to economic opportunity, but also as a critical site of negotiation, where the battle over what values and interests get baked in to our maturing technological infrastructure will take place.[204]

In order to address these issues, we need to cultivate a workforce that is able to thoughtfully grapple with the social implications of the things that they build with technology. Increasing the diversity of the tech workforce is central to this goal. Right now, the cultural perspectives represented in tech are dominated by a heterosexual, white, male experience. Without the perspectives of a *culturally diverse* group of people, we will not be able to build out a more robust digital infrastructure that serves the serves the interests of a wide range of users. To solve these issues, we need more people seated at the table who can empathize with the experiences, interests and perspectives of people from a diverse set of backgrounds. This is why cultural diversity, and the work of organizations like CODE2040, is so important.

Of course, it would be wrong to assume that employees from underrepresented groups will automatically consider and act in the best interests

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[204] This idea is something that Virginia Eubanks argues for more generally in her critiques of the "digital divide" paradigm. I extend her framing of technology as a site of strggle specifically to the conversation regarding workforce equity.

of people who share their demographic details. Their actions and intentions will always be shaped by the structure and expectations of their work environment, which may perpetuate the status quo, particularly with regard to an imagined user. For example, in April 2015, the makers of the video game *Temple Run* came under fire for charging their players extra money to play their game with a female character. The gender of the default character was a white male.[205] The makers decided to make some extra money by charging people to play with one of their more specialized (aka female) characters. After this issue was made public through an op-ed (written by a twelve-year old female player of the game), one of the two co-creators of *Temple Run*, a woman named Natalia Luckyanova, came out to publicly acknowledge the oversight.

Natalia explained that she and her partner had considered the gender of their main character in the early days of designing the game, and they assumed their primary users would be male. As she explained "[Temple Run] didn't look like the stereotypical sort of game that women would play." Although Natalia enjoys playing and creating games like Temple Run, she did not challenge the prevailing stereotype of what is considered a "game that women would play." As it turns out, more than half of the game's user base is female. In other words, more than half of the game's players have to pay extra in order to access a character that aligns with their gender category.

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[205] Jess Jiang, "A 12-Year-Old Girl Takes On The Video Game Industry : Planet Money : NPR," April 8, 2015, http://www.npr.org/blogs/money/2015/04/08/398297737/a-12-year-old-girl-takes-on-the-video-game-industry.

Once the problem was pointed out, Natalia and her partner were quick to adjust the pricing model so that at least one female character was offered for free. As Natalia explained, although she is female, this aspect of her identity did not trump default assumptions she'd absorbed from the industry, "For all of our good intentions and for all of my good intentions, it's true that, you know, you start out with this male character - the male, you know, the white male is always the default. And then anything else, it's like you have to work for it."[206] Natalia had not really thought about the negative impacts she and her partner's decision would have on their game's female players until the young female player wrote about it in the Washington Post.

This story points to the need for more intentional restructuring of workplace values and assumptions so that the experiences and perspectives of a wide range of users are intentionally taken into consideration during the process of developing a new technology product. While having an employee on staff that is familiar with those perspectives is helpful, it certainly is not sufficient. Moreover, those perspectives must be captured and weighed across all phases of a product's development and distribution. As sociologist TL Taylor found in her research on the design and marketing of the online game *EverQuest*, sometimes the preferences and perspectives of women designers can be compromised when combined with status quo marketing strategies down the line.[207] As Taylor argues, "While a designer may develop an innovative form of play or

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[206] Editor, "Episode 615: A 12-Year-Old Girl Takes On The Video Game Industry | WPSU," April 5, 2015, http://radio.wpsu.org/post/episode-615-12-year-old-girl-takes-video-game-industry.
[207] T.L. Taylor, *Play Between Worlds: Exploring Online Game Culture* (MIT Press, 2006).

representation in a game, we cannot overlook that these artifacts (and their creators) exist in larger organizational and cultural structures that shape and distribute products in particular ways."

In order for cultural diversity to manifest into meaningful changes in product design and marketing, space must be created for those perspectives to be integrated and understood throughout the product development and distribution process. Virginia Eubanks calls for employers to promote "cognitive justice" in the workplace, which "demands that multiple knowledges be recognized as arising from specific social locations and be integrated into decision making."[208] This could come in the form of more actively seeking out the perspectives of diverse staff in the design and creation of new technology. But it could also come in other thoughtful attempts to integrate diverse perspectives into the process of designing new technology.

For example, the U.S. government has taken significant steps to make their digital services and platforms more effective and accessible to a broad range of citizen groups. They have done this through the creation of the United States Digital Service Department, which hires qualitative researchers to gather information regarding the needs and experiences of their target users. Rather than serving as diverse representatives based on their personal experiences, these researchers are trained in the processes of finding and representing the diverse perspectives and interests of others in their work.

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[208] Eubanks, Virginia. *Digital Dead End.* p 151/152

In addition to cultural diversity, the builders of our future technological systems would benefit from increasing the *cognitive diversity* of their teams. By cognitive diversity I refer to the variety of domain expertise and cognitive heuristics a group is able to access and use in order to solve problems. Currently, the training and education of engineers is largely confined to the technical considerations of their work. The typical engineer is not fully equipped with the concepts and tools necessary to critically evaluate the social implications of the things they build. As a result, there arise significant blind spots in the development of technology, which can be difficult to see or understand without a more robust training in the social sciences or feminist critique. For example, in Chapter 3, I cited many instances of ideas that data scientists were implementing through big data which were likely to reinforce or exacerbate existing inequalities in tech. Although the people building those tools were very well trained as data scientists, they were limited in their ability to see how the algorithmic models they were building could reinforce bias and privilege in hiring practices.

This problem could be addressed in two different ways: 1) increase collaboration between computer engineers, social scientists and feminist scholars, and 2) expand the training of a typical engineer to include key concepts from social science and feminist scholarship. During my research on this topic, I struggled to find any tech companies that were taking significant steps to do either of these things, with the exception of one, complicated example: a data software and services company called Palantir. Palantir was initially funded by In-Q-Tel, the CIA's venture capital arm, and its major clients are the intelligence

community. The company faced increased scrutiny from the public in the wake of NSA leaker Edward Snowden's revelations about the government's mass surveillance efforts. As one publication described, in the wake of the Snowden revelations "Palantir's tools have come to represent privacy advocates' greatest fears of data-mining technology — Google-level engineering applied directly to government spying."[209]

In an effort to assuage growing concerns over the company's ability to violate civil rights through large-scale data analysis, the company created a Council on Privacy and Civil Liberties. This council includes experts from a variety of fields and backgrounds, including law professors and civil liberties advocates. The council ostensibly serves to advise the Palantir team on the privacy and civil liberties implications of their work, as well as make recommendations for how negative impacts in these areas can be mitigated.[210] Yet, it remains unclear whether or not this council is a perfunctory PR stunt or truly creates a space for a diversity of backgrounds and expertise to be heard and inform their work at a high level.

In addition, Palantir has hired a team of "privacy and civil liberties engineers," which is made up of engineers who have an in-depth understanding of ongoing debates related to these issues. According to Palantir's website, this team is expected to get into the weeds with the company's engineers regarding

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[209] Andy Greenberg, "How A 'Deviant' Philosopher Built Palantir, A CIA-Funded Data-Mining Juggernaut," August 14, 2013, http://www.forbes.com/sites/andygreenberg/2013/08/14/agent-of-intelligence-how-a-deviant-philosopher-built-palantir-a-cia-funded-data-mining-juggernaut/2/.
[210] John Grant, "Announcing the Palantir Council on Privacy and Civil Liberties | Palantir," November 12, 2012, https://www.palantir.com/2012/11/announcing-the-palantir-council-on-privacy-and-civil-liberties/.

decisions about any software deployment that involves significant privacy and civil liberties concerns. Similar to the Privacy and Civil Liberties Council, it remains unclear how much power and influence this team actually has in the implementation of Palantir's products and services. However, the concept of "civil liberties engineers" is powerful, and more work should be done to prepare individuals with the background necessary to fill such roles in the future.

In order to create a more robust pipeline of engineers with the skills and expertise necessary to fill such a role, university engineering programs should think through ways of augmenting their curriculum to include key concepts from fields outside of engineering, such as training in Participatory Action Research and basic sociological concepts such as social stratification, privilege and intersectionality. For example, Santa Clara University offers a course in Introduction to Software Engineering Ethics, which seeks to address the following topics, according to a recent syllabus:[211]

- The types of harms the public can suffer as result of this work;
- How software engineers contribute to the good life for others;
- Who exactly are the 'public' to whom the engineer is obligated;
- Why the software engineer is obligated to protect the public;
- What other ethical obligations software engineers are under;
- How software engineers can actually live up to ethical standards;
- What is the end goal of an ethical life in software engineering;
- What are the professional codes of software engineering ethics;

In addition to supporting cognitive diversity, such courses help to foster *motivational diversity* in the industry. By motivational diversity I refer to the range of motivations and goals individuals come into the profession hoping to pursue.

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[211] Tim Healy, "ENGINEERING ETHICS," accessed May 8, 2015, http://www.ee.scu.edu/eefac/healy/ethics.html.

Currently, there are very few opportunities for software engineers to prepare for and pursue jobs that are specifically geared towards serving the public interest. Although there are a growing number of opportunities to work in the public sector with programs like Code for America or the United States Digital Service, it remains a challenge to cultivate a solid pipeline of highly skilled engineers to enlist in this work.

Given the perceived shortage of labor in the tech industry, salaries and benefits have continued to rise to levels that are very difficult for the public sector or non-profits to compete with. As one of the tech company founders I interviewed explained, "Everyone in Silicon Valley is either in a job that they love, or they don't love it, but they're getting paid so much they don't care." In order to open up more professional pathways for individuals to use their engineering skills to serve the public interest, more resources must be allotted to the creation of job positions in both the private and public sector that focus on safeguarding the interests of the public through the development of ethical technology.

We need a much more robust concept of diversity in tech in order to deal with the emerging social issues that arise from rapid technological advances in the workplace. In addition to cultural diversity, more consideration must be given to how we can achieve greater cognitive and motivational diversity within the talent pipeline into tech. Increasing access to technology careers for more diverse people is a much bigger issue than simply giving people access to good jobs. It opens up the arena for a more diverse set of perspective to be considered in the development of our rapidly growing technological infrastructure. Only then

can we build out a tech workforce that is equipped with the skills, perspectives

and motivations necessary to broaden the "circle of life" through the development

of technologies that serve the public interest.

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