However, these benefits may be difficult to realize in a blockchain without Bitcoin. It has proven to be a challenge to create a decentralized, permissionless, and safe blockchain to transfer assets other than the native cryptocurrency (for example, bitcoins).

The first major issue is the gateway problem: The information about the underlying assets must enter the blockchain in the first place. The second major challenge is ensuring immutability of the ledger without a native currency. In most of the currently proposed applications, both these issues have been addressed by creating closed, permissioned blockchains, which require some involvement of a trusted third party. This is because blockchain without bitcoins is no longer virtually immutable without a trusted third party. In many cases, the permissioned blockchains are the right tools for their purpose, but more often a centralized system would be more efficient and reliable.

Current applications of blockchain have gathered only limited appeal. Bitcoin's blockchain is the most successful, but even after a decade Bitcoin has been adopted as a payment method only for specific niches. Mainstream users often indicate existing payment systems, such as credit and debit cards, not only satisfy their needs, but also provide services above what Bitcoin delivers.[2]

There are ideas for other, non-currency applications of blockchain, such as real-estate ownership records, voting information, or identity verification. However, a careful look into these areas shows the problems there do not arise from the need for a distributed ledger of transactions.

Consider an example of the pilot program administered by the Cook County real-estate office.[1] When someone acquires property, they usually need to purchase title insurance in case someone else claims the ownership property over the seller. The Cook County office was wondering whether putting the real-estate ownership on a blockchain would resolve this uncertainty. However, the major cause of the title uncertainty is that when a property is sold, there is no obligation to report it to the county office (or elsewhere). It is enough to have a written sales contract as a proof. Moreover, the sales reported to the county office are manually entered into the system, which results in typing errors. Neither of these problems is solved by implementing a blockchain ...

The Future of the Blockchain Revolution

I expect blockchain technologies will have a big impact on many industries, and that it will not be limited to finance. However, it may not happen in the way it is currently envisioned. Both the entrants and the incumbents are looking with interest at the properties of Bitcoin's blockchain and smart contracts. But as they realize the benefits of different elements of the system, it may turn out that while new encryption tools and automated execution of transactions (smart contracts) have large and clear benefits, distributed databases may have a more limited appeal. Most of all, we need to realize that outside of Bitcoin (or other cryptocurrencies) we do not have a technology that offers "permissionless distributed ledgers that cryptographically assure immutability without a need for trusted third parties."

The blockchain revolution may give us new tools and change the landscape of some industries. But since the benefits of encryption and smart contracts can be realized without a distributed ledger, the world after the blockchain revolution may well be a world without the blockchain. C

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4. Nakamoto, S. Bitcoin: A Peer-to-Peer Electronic Cash System. 2008; https://bit.ly/2IgFLx8
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For more extensive discussion on the topic see "Blockchain Revolution without the Blockchain," BoC Staff Analytical Note 2018-5; https://bit.ly/2GhXhva

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The views expressed in this column are those of the author. No responsibility for them should be attributed to the Bank of Canada.

Calendar of Events

July 2–4
ITiCSE '18: Innovation and Technology in Computer Science Education,
Larnaka, Cyprus,
Sponsored: ACM/SIG,
Contact: Janet Read,
Email: jcread@uclan.ac.uk

July 7–8
CI 2018: Collective Intelligence 2018,
Zurich, Switzerland,
Sponsored: ACM/SIG,
Contact: Abraham Bernstein,
Email: bernstein@ifi.uzh.ch

July 8–11
UMAP '18: 26th Conference on User Modeling, Adaptation and Personalization,
Singapore,
Co-Sponsored: ACM/SIG,
Contact: Jie Zhang,
Email: zhangj@ntu.edu.sg

July 8–12
SIGIR '18: The 41st International ACM SIGIR Conference on Research and Development in Information Retrieval,
Ann Arbor, MI
Sponsored: ACM/SIG,
Contact: Kevyn Collins-Thompson,
Email: kevynct@umich.edu

July 9–12
HT '18: 29th Conference on Hypertext and Social Media,
Baltimore, MD,
Sponsored: ACM/SIG,
Contact: Dongwon Lee,
Email: dongwon@psu.edu

July 15–19
GECCO '18: Genetic and Evolutionary Computation Conference,
Kyoto, Japan,
Sponsored: ACM/SIG,
Contact: Keiki Takadama,
Email: keiki@inf.uec.ac.jp

July 16–18
SPAA '18: 30th ACM Symposium on Parallelism in Algorithms and Architectures,
Vienna, Austria,
Co-Sponsored: ACM/SIG,
Contact: Christian Scheideler,
Email: scheidel@upb.de

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Alex Ahmed

▸ Richard Ladner, Column Editor

Broadening Participation Beyond Diversity

Considering the confluence of research questions and sociopolitical dynamics.

I WAS NERVOUS when I took the stage. Despite assurances from everyone I had shown my speech, I was nervous because I was about to tell the 400 attendees at the 2017 ACM CHI conference's Diversity and Inclusivity Lunch that "diversity" and "inclusivity" are not enough.

There is a rapidly growing appreciation that diversity is a Problem That Must Be Solved in computing; as an example, despite women earning 57% of undergraduate degrees in the U.S., we earn only 18% of degrees in computer and information sciences (see https://bit.ly/1W7j2Re). But it is not just about women: academics facing multiple oppressions—homophobia, transphobia, ableism, racism, anti-Blackness, and intersections of all these[a]—have much to say about the often-entrenched views of the "old guard" and the institutions they control. During my time at CHI 2017, I found this firsthand. But what I also found inspired me: young academics (mostly graduate students, many of them queer) are turning a critical eye to established research practices and transforming computing research.

Gender-identity and sexual-orientation symbols on a Rubik's-cube-themed display in Paris, France, 2017.

PHOTO BY NEIL ANTON DUMAS/SHUTTERSTOCK.COM

Essential to this transformation is the understanding that powerful institutions—academia among them—often embrace "diversity and inclusion" but stop short of structural change.[7] Who gets to decide who is "the right kind of diverse"? What are people being included in? Who is doing the including, and for what reasons? The answers to these questions hinge upon the social, economic, and political power structures that form the fabric of our society. In my speech, I argued that tokenization and privilege pervade the self-indulgent initiatives that often mark "diversity work."[2] I reflected on my experiences being tokenized: highlighted for my "diverse" personhood, and yet being unable to control my own narrative or to bring about meaningful, positive changes in my institutional environment. I wondered aloud whether I would be standing at that podium if I were raised in poverty, if I were a Black or indigenous person, or if I were disabled. Despite being both queer and a trans woman of color, my social position affords me privilege, safety, and a platform to speak. Critically, however, it does not matter how many "diverse" people are let into the room if we do not possess the power to change what hap-

a Throughout this column I will refer to LGBTQ people (lesbian, gay, bisexual, transgender, queer). Transgender people are individuals whose gender does not match the one they were assigned at birth. I will also use first-person plural pronouns (we, our) variably to refer to these groups and identities I occupy. Finally, as a U.S.-based graduate student, this column features only my own limited perspective.

pens inside it. Without that power, we can be ignored, silenced, or removed, and the status quo remains intact.

These issues impact not only the environments in which we do our work, but also the work itself. I have realized that asking certain research questions—such as how to build technology for women, disabled people, or trans people—requires critical engagement with sociopolitical problems. In my field of human-computer interaction (HCI), we have recently seen the development of important frameworks and approaches to support this: feminist HCI, anti-oppressive design, and social justice-oriented design. These are much more than research tools; as a graduate student slowly developing my mind-set and conceptual framing, they were impactful. And in a computer science department whose faculty, students, and administration largely look nothing like me, they are indispensable.

CHI 2017 featured papers that applied and built upon these frameworks and introduced new ones: they analyzed the full corpus of the conference's proceedings with an intersectional feminist lens; explored technological interventions for sex workers; and promoted an equitable participatory relationship between disabled people and assistive technology researchers. I made a point of meeting several like-minded authors throughout the conference, and as we laughed, shared our struggles and successes, and talked trash about the old guard, I began to believe we could change the future together. Or, at the very least, I wanted it.

One of many avenues that beg further exploration in HCI involves transgender people. As a group, we are systematically oppressed at both the institutional and individual levels: we face disproportionate violence due to hate crimes and punitive policing practices; barriers in access to both primary and transition-related healthcare (and significant health disparities more broadly), denials of coverage by insurance providers and lack of provider knowledge, discrimination in public accommodations, housing, and employment; the list goes on.[3] And, of course, these injustices can be ameliorated or intensified by race, class, gender, and disability. Schlesinger's analysis indicated that only three papers in

Who gets to decide who is "the right kind of diverse"?

CHI's history dealt directly with the experiences of transgender people.[6]

These papers, among others, tend to deal with the experiences and challenges of transgender users within existing technologies, such as Facebook and Tumblr. Such studies are critical in understanding how interactive systems fall short of providing trans people self-determination; they consistently find the assertion of identity, fear of reprisal and judgment, and the importance of collective belonging mark our interactions with technologies. From my own experiences, these findings extend to our daily lives, and the everyday struggles that arise from living in a society that oppresses us. It should come as no surprise, then, that most interactive systems we use today reflect and reinforce dominant and damaging cultural narratives. Technology designers—and researchers more broadly—therefore inhabit a privileged position; whether we perpetuate or subvert oppressive social structures is *our decision*. My goal, which I share with the inspiring researchers I met at CHI 2017, is to subvert narratives that silence and suppress, that obstruct our self-determination, and that strip us of power. I am committed to using my privilege to collaboratively design technologies with and for trans people.

As an example: in my work designing trans health technology, I interviewed several trans people about their experiences. One woman said that the pressure to come out "perfect"—as an embodiment of a stereotyped and objectified notion of womanhood—completely stopped her from transitioning and forced her to stay in the closet for decades, at the severe expense of her mental health. These narratives are reflected not just in media and culture, but also in the resources and health professionals that trans people frequently navigate throughout their lives. My dissertation work focuses on building a mobile application for voice training. Trans people may feel as though our voices do not represent us; this does not just hurt internally, but could also put us at risk for harassment or assault. When we present ourselves to the world (through our speech, dress, mannerisms, or otherwise), we might find ourselves walking a line between what we want to see in ourselves and what others expect of us. Another of my interview participants said she sometimes presents herself as more feminine than she feels in order to be gendered correctly by others. While a voice-training app could be useful, it could easily become prescriptive and propagate notions about how trans people should sound, act, and live. Without appreciating the complex personal and social contexts in which such technologies would be used, they will fail.

Conclusion

At CHI 2017, Ann Light presented her alt.chi submission (for which she won a Best Paper Award),[4] which considered what HCI researchers should do in the face of existential crisis, a political and socioeconomic climate hostile to many, and the continuing decline of the environment and the associated uprising of the upper class. She was asked, "Are you hopeful?" To which she responded, "No, but I am determined to make change."

Her words inspired me to fight for change in my institutional environments *and* through my research, and I am excited to join a community of researchers who share that goal. As we pursue work that appreciates the multifaceted nature of human identity, the injustices of stigma and oppression, and the shared responsibility of technology designers, engineers, and academics to work toward *true* social good (the health of our people and our planet),[5] we are making a statement. And with every author, advisor, and collaborator behind that work, we are building collective power. We are beginning to move beyond diversity and inclusion—are you joining us?

Addendum

Because this column was first written following CHI 2017, I want to add some thoughts on this year's conference, which wrapped up at the end of April. If you made a word cloud from the SIG-