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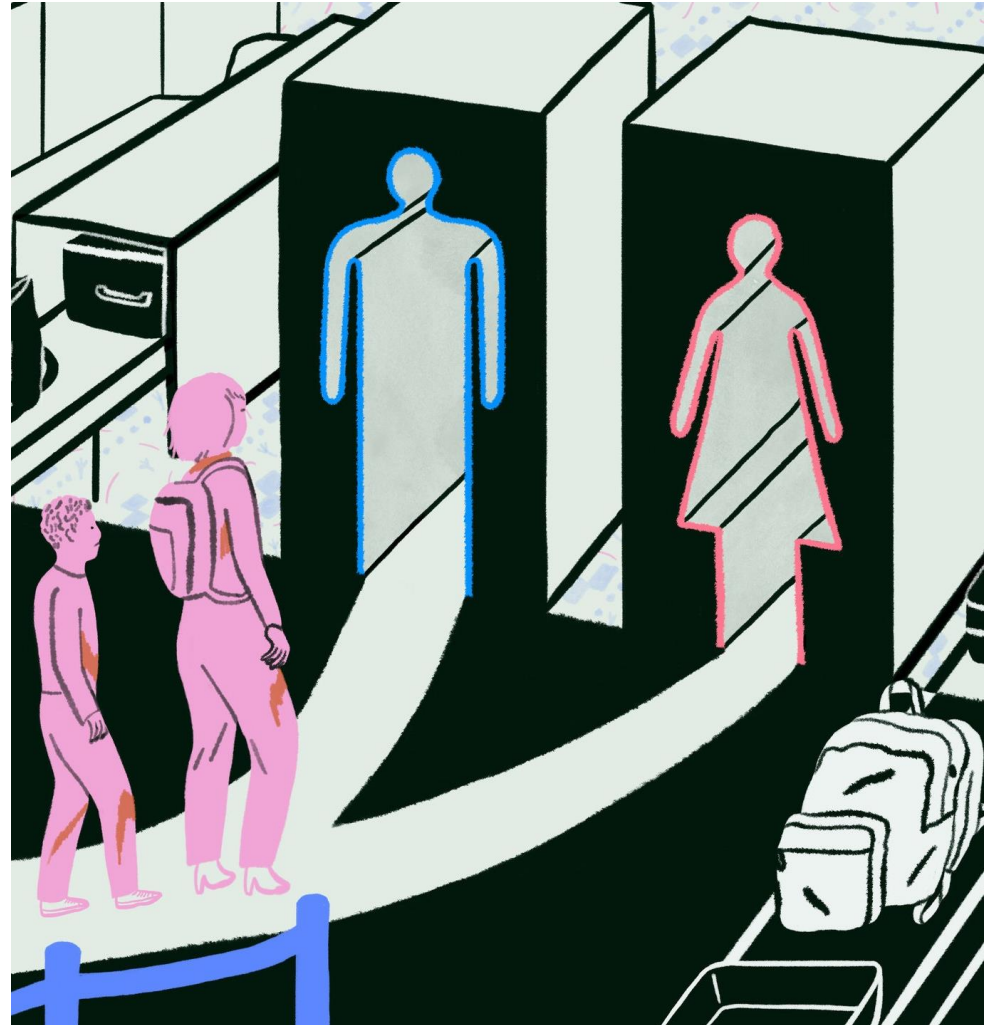AND HUMANITIES (IZEW)

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Lecture at Aalborg University
22 April 2020

"Diversity and Discrimination in Technology Design and Development"

Laura Schelenz,
University of Tübingen, Germany

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Why are we talking about diversity and discrimination?

© Paige Vickers

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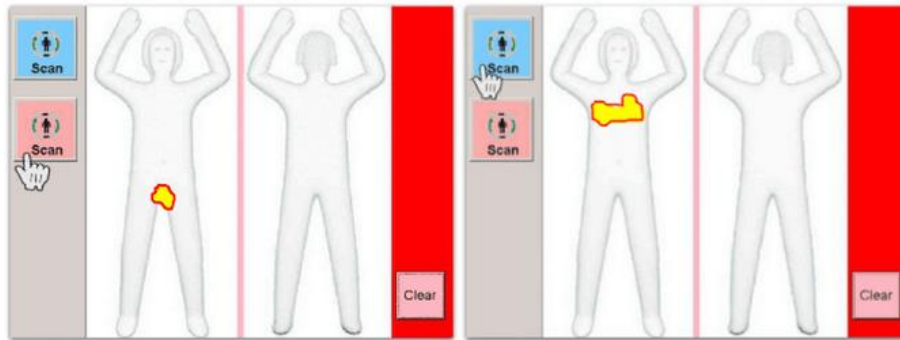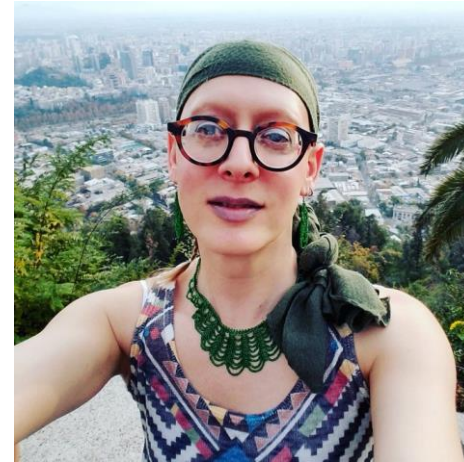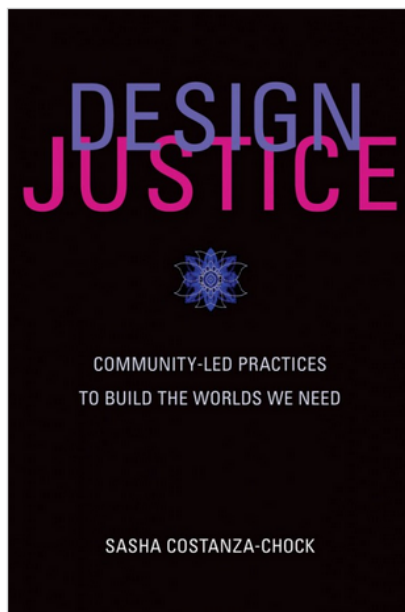
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Image: 'Anomalies' highlighted in millimeter wave scanner interface, by Dr. Cary Gabriel Costello [Costello, Cary Gabriel, 2016. "Traveling While Trans: The False Promise of Better Treatment," in Trans Advocate. http://transadvocate.com/the-tsa-a-binary-body-system-in-practice_n_15540.htm]

Twitter: @schock

From Information Policy

Design Justice 🔓

Community-Led Practices to Build the Worlds We Need

By Sasha Costanza-Chock

An exploration of how design might be led by marginalized communities, dismantle structural inequality, and advance collective liberation and ecological survival.

Algorithmic Bias

How technology reinforces and exacerbates gender and racial bias

Bias on the basis of sexual orientation

- Heterosexism
- Heteronormativity

The alert that Erin Abler received from Etsy. She doesn't want Valentine's Day gifts "for him"— her partner is a woman. (Erin Abler)

Source: Wachter-Boettcher 2017, p. 32

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Gender bias in word embedding, language software, translations

Gender
by Google Translate

he is a soldier
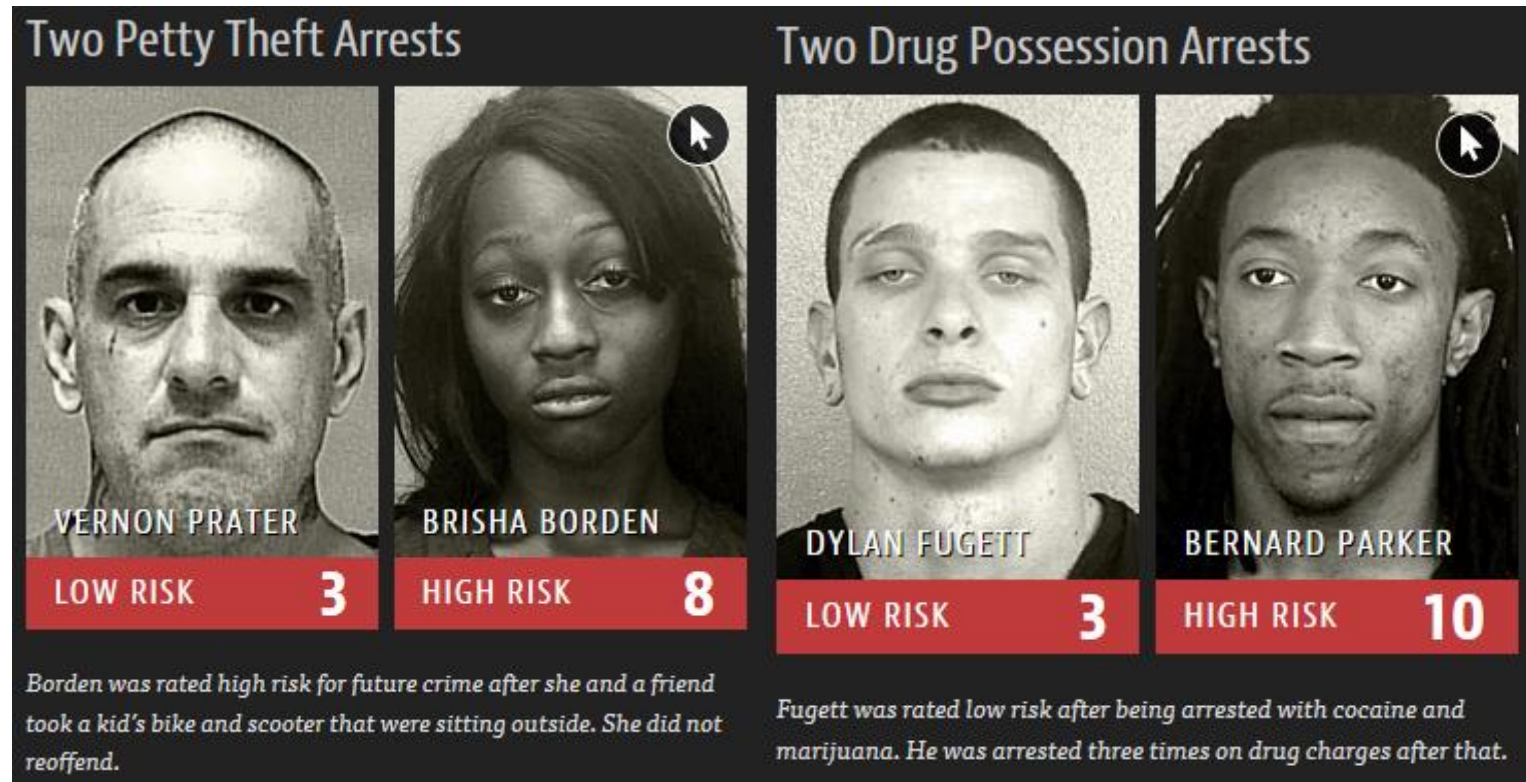she's a teacher
he is a doctor
she is a nurse

he is a writer
he is a dog
she is a nanny
it is a cat

he is a president
he is an entrepreneur
she is a singer
he is a student
he is a translator

he is hard working
she is lazy

Source: Sonnad 2017

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Racial bias in risk assessment software for the U.S. criminal justice system

Two Petty Theft Arrests

VERNON PRATER — LOW RISK 3

BRISHA BORDEN — HIGH RISK 8

Borden was rated high risk for future crime after she and a friend took a kid's bike and scooter that were sitting outside. She did not reoffend.

Two Drug Possession Arrests

DYLAN FUGETT — LOW RISK 3

BERNARD PARKER — HIGH RISK 10

Fugett was rated low risk after being arrested with cocaine and marijuana. He was arrested three times on drug charges after that.

Source: ProPublica Report 2016 „Machine Bias"

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Racial bias in facial recognition technology

Source: Buolamwini and Gebru 2018

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Causes of algorithmic bias

On data and design teams

Algorithmic bias – causes

Data bias
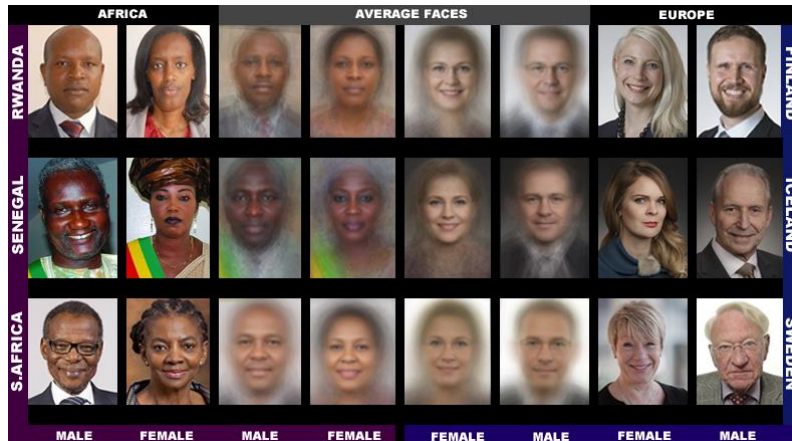
Personal bias

"Teams tend to be much whiter and more male than the general population, and the skew is strongest in leadership and technical positions." (Wachter-Boettcher 2017, p. 20)

"Due to phenotypic imbalances in existing benchmarks, we created a new dataset with more balanced skin type and gender representations." (Buolamwini and Gebru 2018)

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Diversity-aware technology

Solutions to algorithmic bias and discrimination

Preliminary solutions

Build ***diversity-aware technology*** = technology that takes into account the diversity of its users and is explicitly non-discriminatory.

1) Represent diverse users in datasets that are employed to build computer models.

2) Self-reflect our possible biases as system designers and question the assumption we hold.

3) Conduct diversity-awareness training in technology development teams.

Diversity-aware technologies

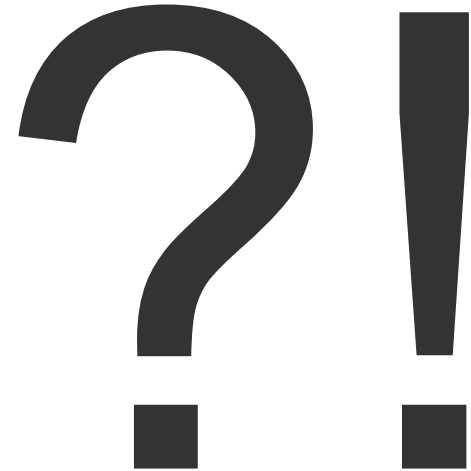"Centering marginalized communities"

other approaches

| Design Justice | Black Feminism | Postcolonia-lism |

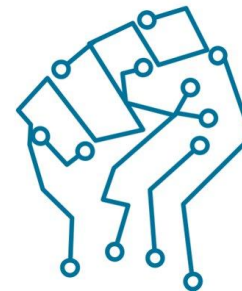# Centering marginalized communities means asking specific questions

- Whom are we designing *for*?
- What is our image of users and consumers?
- Who is benefitting from our technologies? Who is burdened?
- How are certain users devoiced, marginalized, or even erased by the design of our technologies?
- Whom are we not affording features that meet their needs and preferences (e.g. binary gender options in user profiles)?

?!

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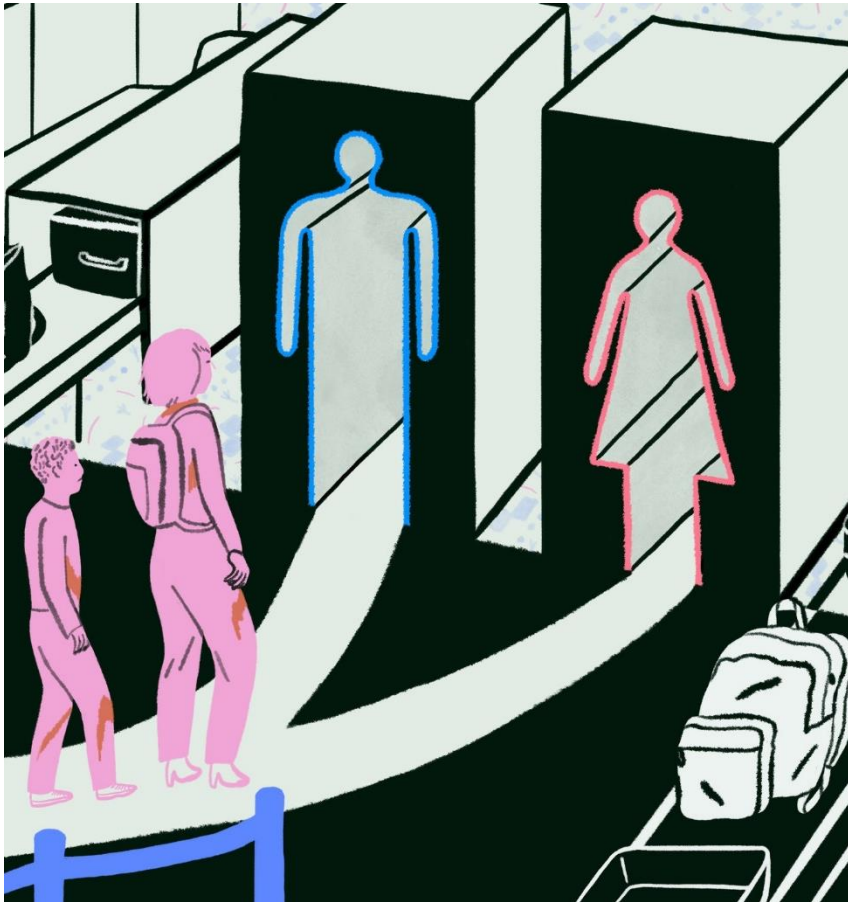# Theories and methods for centering marginalized communities

- Black feminism
- Intersectionality
- No single axis analysis, beyond individual fixes
- Building alliances with marginalized communities in a quest for social justice

Twitter: @black_in_ai

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Theories and methods for centering marginalized communities

- Rejecting oppression, countering systemic racism, sexism, and other systems of domination and subordination

- Going back to the roots, dismissing design, starting anew, imagining radical futures

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Intersectionality in technology design

"Intersectionality is increasingly finding its way into conversations around equity, diversity, and social justice within human-computer interaction (HCI)" (Kumar and Karusala 2019, p. 51).

"Intersectionality invites us to think deeply about for whom we design technology, the implications of deploying this technology in the world, and who it advantages or disadvantages" (Rankin and Thomas 2019).

Sources

Angwin, Julia; Larson, Jeff; Mattu, Surya; Kirchner, Lauren (2016): Machine Bias. ProPublica. Available online at https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing, checked on 6/12/2018.

Buolamwini, Joy; Gebru, Timnit (2018): Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification. In *Proceedings of Machine Learning Research* 81, pp. 1–15. Available online at http://proceedings.mlr.press/v81/buolamwini18a/buolamwini18a.pdf, checked on 8/18/2018.

Costanza-Chock, Sasha (2020): Design Justice. Community-led Practices to Build the Worlds We Need. Cambridge: The MIT Press (Information Policy).

Kumar, Neha; Karusala, Naveena (2019): Intersectional Computing. In *Interactions* 26 (2), pp. 50–54. DOI: 10.1145/3305360.

Rankin, Yolanda; Thomas, Jakita (2019): Straighten Up and Fly Right: Rethinking Intersectionality in HCI Research. In *Interactions*. Available online at https://interactions.acm.org/archive/view/november-december-2019/straighten-up-and-fly-right, checked on 2/18/2020.

Sonnad, Nikhil (2019): Google Translate's Gender Bias Pairs "He" with "Hardworking" and "She" with Lazy, and Other Examples. In *Quartz*, 11/29/2019. Available online at https://qz.com/1141122/google-translates-gender-bias-pairs-he-with-hardworking-and-she-with-lazy-and-other-examples/, checked on 10/18/2019.

Wachter-Boettcher, Sara (2017): Technically Wrong. Sexist Apps, Biased Algorithms, and Other Threats of Toxic Tech. First edition. New York NY: W.W.

Thank you.

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Discussion and Working Groups

How can you increase the diversity-awareness of *your* system?

How would you implement some of the suggestions in a concrete scenario?

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Recap: How can we center marginalized communities?

✓ Asking questions:
  Whom are we designing *for*? Who is benefitting from our technologies? Who is burdened?

✓ Self-reflection: What are our assumptions as designers?

✓ No single axis analysis, beyond individual fixes

✓ Going back to the roots, dismissing design, starting anew, imagining radical futures

✓ Building alliances with marginalized communities