

Critical Computing

CIS 7000

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Announcements

You'll be presenting in the last two classes of the course! Qs?

Today

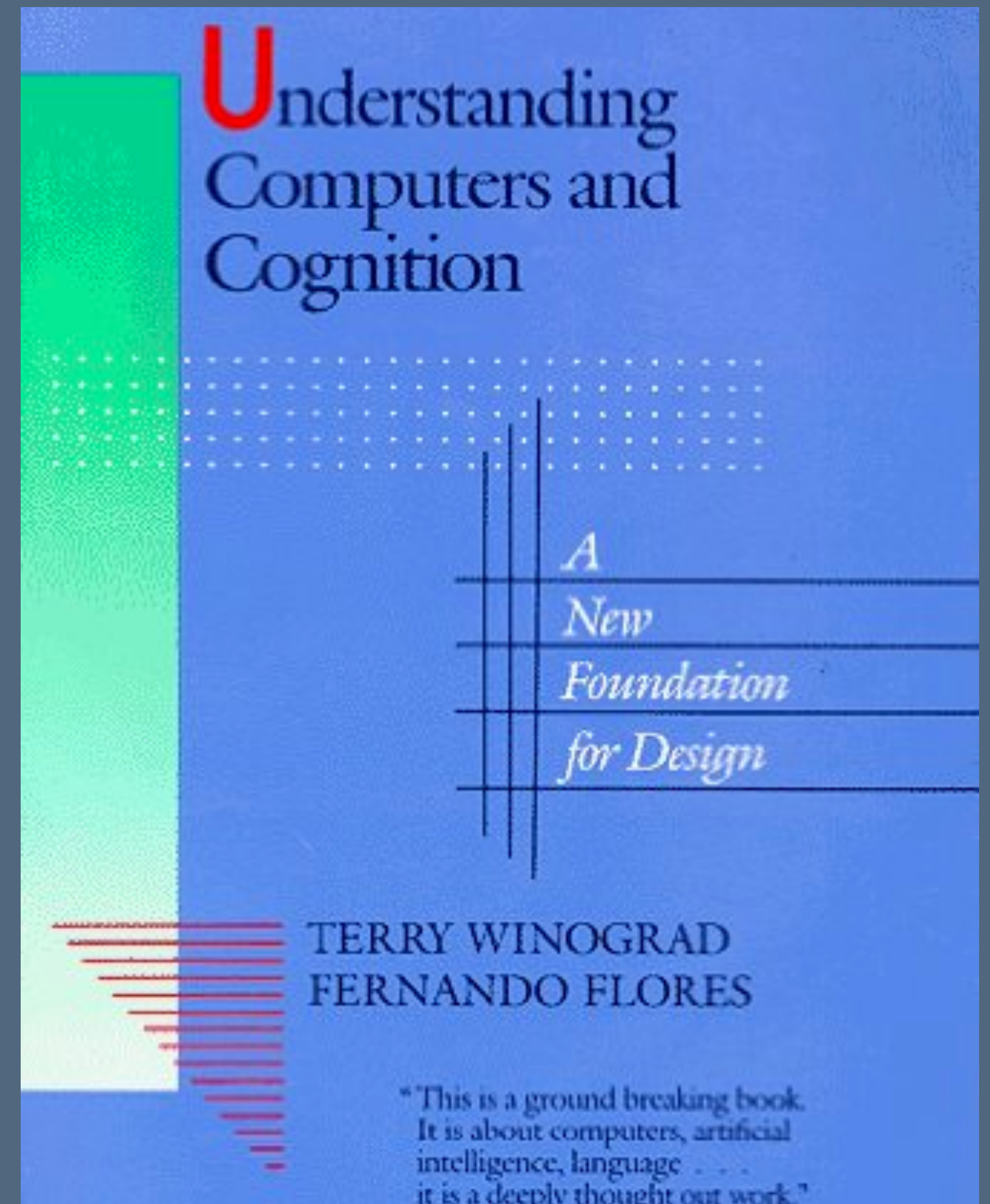
Critical design

Critical theory, criticism, and HCI

Critique is in HCI's DNA

We cannot blindly design ourselves into a bright future. What if that bright future is not what we think it is?

HCI was, in many ways, born out of a critical perspective on artificial intelligence [Winograd and Flores 1986]



What does 'critical' mean?

Not 'critical' as in *being mean*, or 'critical' as in a *design crit*

Critical computing research centers on analyzing and challenging systemic power relations

A strong critical HCI paper reorients us toward important problems, and pushes us to cast aside previous assumptions

We've already heard some examples of critical computing research in readings on Feminist HCI and in the ICT4D lecture

Critical design

Design to challenge us

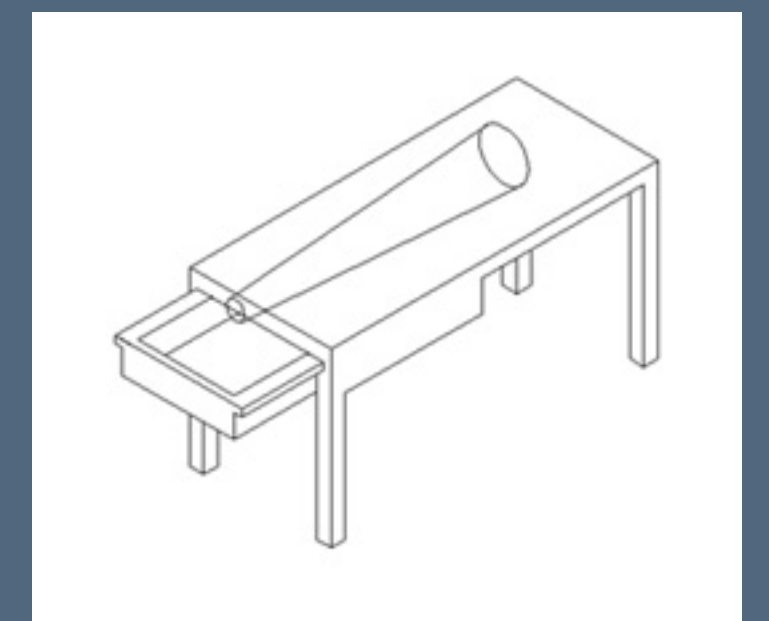
[Dunne and Raby, 2001]

Use design fiction and speculative design to cause us to re-evaluate our preconceptions about the role of those products in life

Product design but for promoting awareness and thinking rather than commercial ends

Not art (but ironically often exhibited in art museums)

E.g., a furniture line for legitimizing people's weird behaviors with their plants



“Cucumber table”

What's 'critical' about critical design?

[Bardzell and Bardzell, 2013]

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“Critical design is a form of research aimed at leveraging designs to make consumers more critical about their everyday lives, and in particular how their lives are mediated by assumptions, values, ideologies, and behavioral norms inscribed in designs.”

Related to two other kinds of “critical” work that aim to generate new modes of engagement: critical theory and metacriticism

Critical theory: skeptical sociocultural critique trying to change the world

Metacriticism: close reading of cultural texts

What are some examples?

What's 'critical' about critical design?

[Bardzell and Bardzell, 2013]

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What makes critical design critical? (Five reasons)

1. Perspective-shifting, holistic understandings (produce a unifying account that proposes a new way of understanding)
2. Theory as speculation (not "right" like science, but explaining the world with new conceptual models)
3. Dialogic methodology (it's about being in conversation that yields insight, not resolution or "solving" a question)
4. Improvement of the public's cultural competence (teach people to look beyond the surface)
5. Reflexivity (aware of own limitations, trying to self-improve)

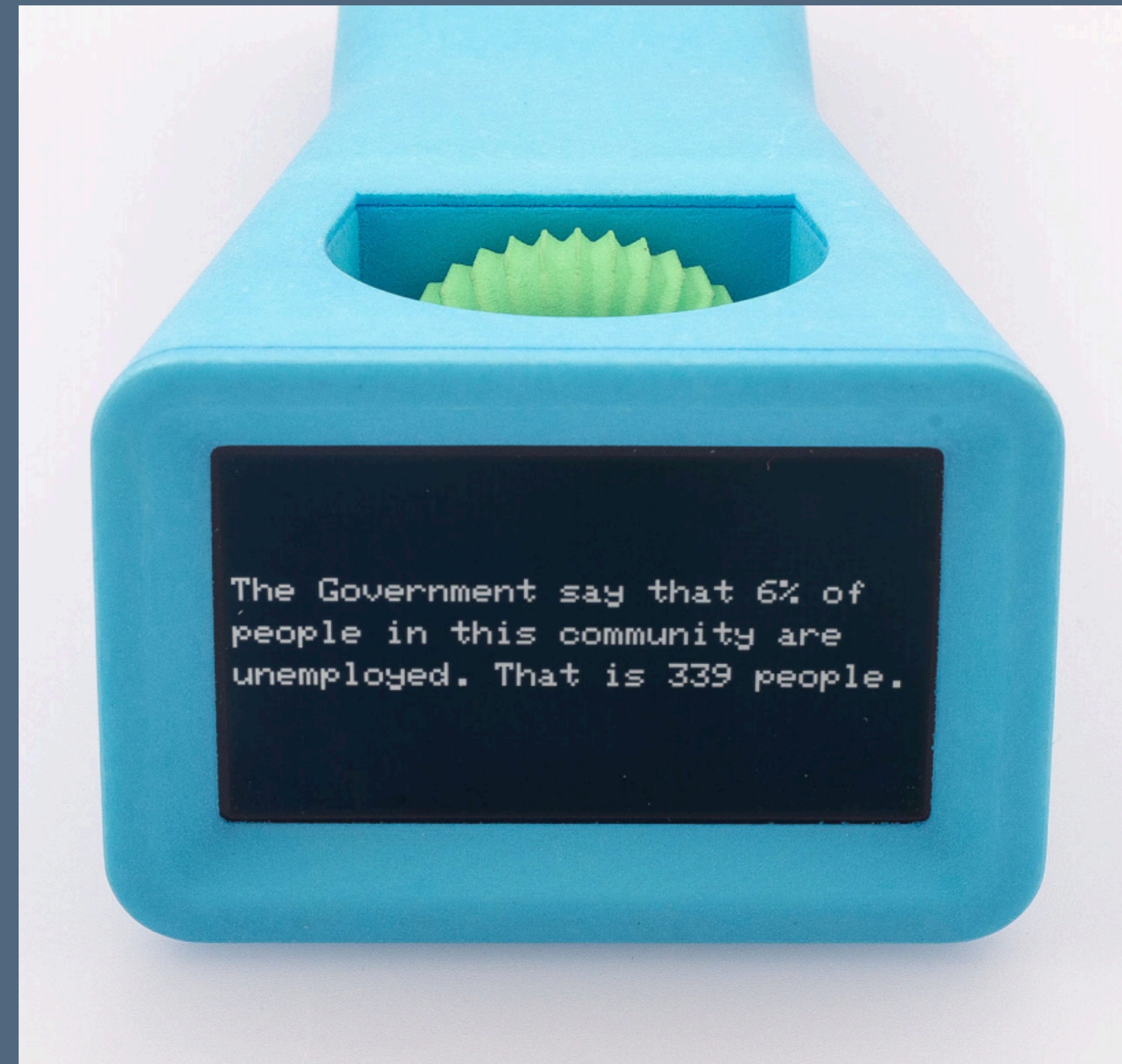
Datacatchers [Gaver et al., 2016]

IoT device that scrapes facts about the area you're in

“People around here earn £25,300 per year. A 4-5 bed house will cost £26,000 per year to rent.”

“People from New Cross are in the bottom 50% of health in England.”

“The Government say that 6% of people in this community are unemployed. That is 339 people.”



Research through design fiction

[Blythe 2014]

Describes a “cultural turn” in HCI in which design is being deployed not to create new commercial products, but to create knowledge (in other words, design as a form of research)

E.g., BinCam, a networked camera in a trash bin lid that posts photos online for people to judge wastefulness

Design fiction: imaginary abstracts for prototypes that don't exist and studies that never happened

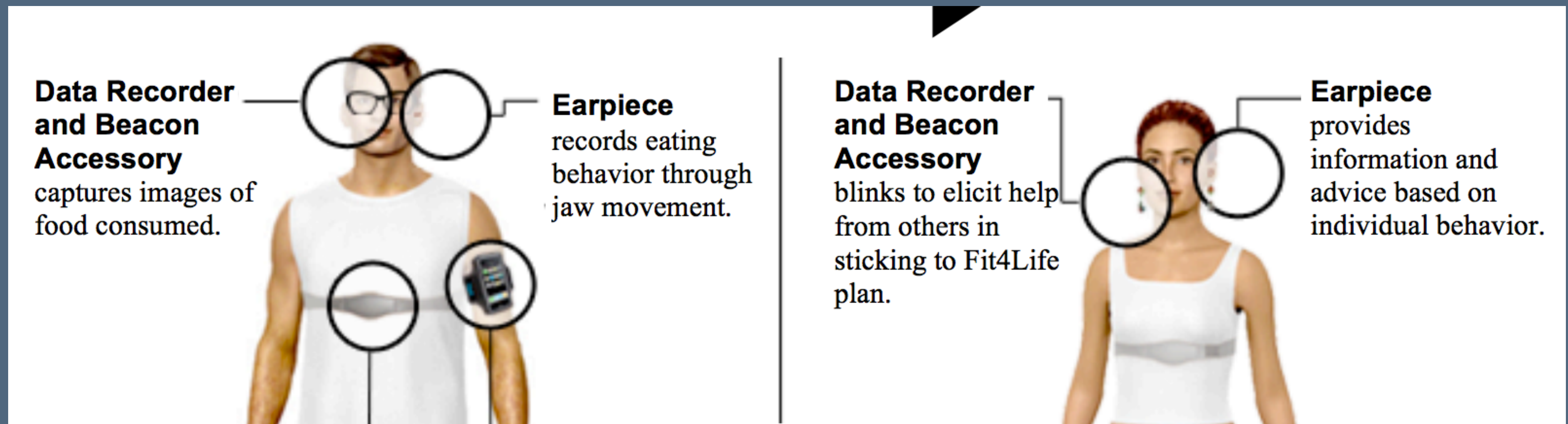
Goal is not to suggest a real tool but rather to promote discussion (sound familiar?)

Fit4Life

[Purpura et al., CHI 2011]

Critique of today's persuasive and behavior-change technology

Computer vision to estimate calories, LED beacon to tell others how you're doing, "metabolic lancet" to analyze blood, hourly Facebook posts if you're not tracking your behavior



A Mulching Proposal [Keyes et al, 2019]

Satirical piece describing how a system for turning the elderly into food meets standards:

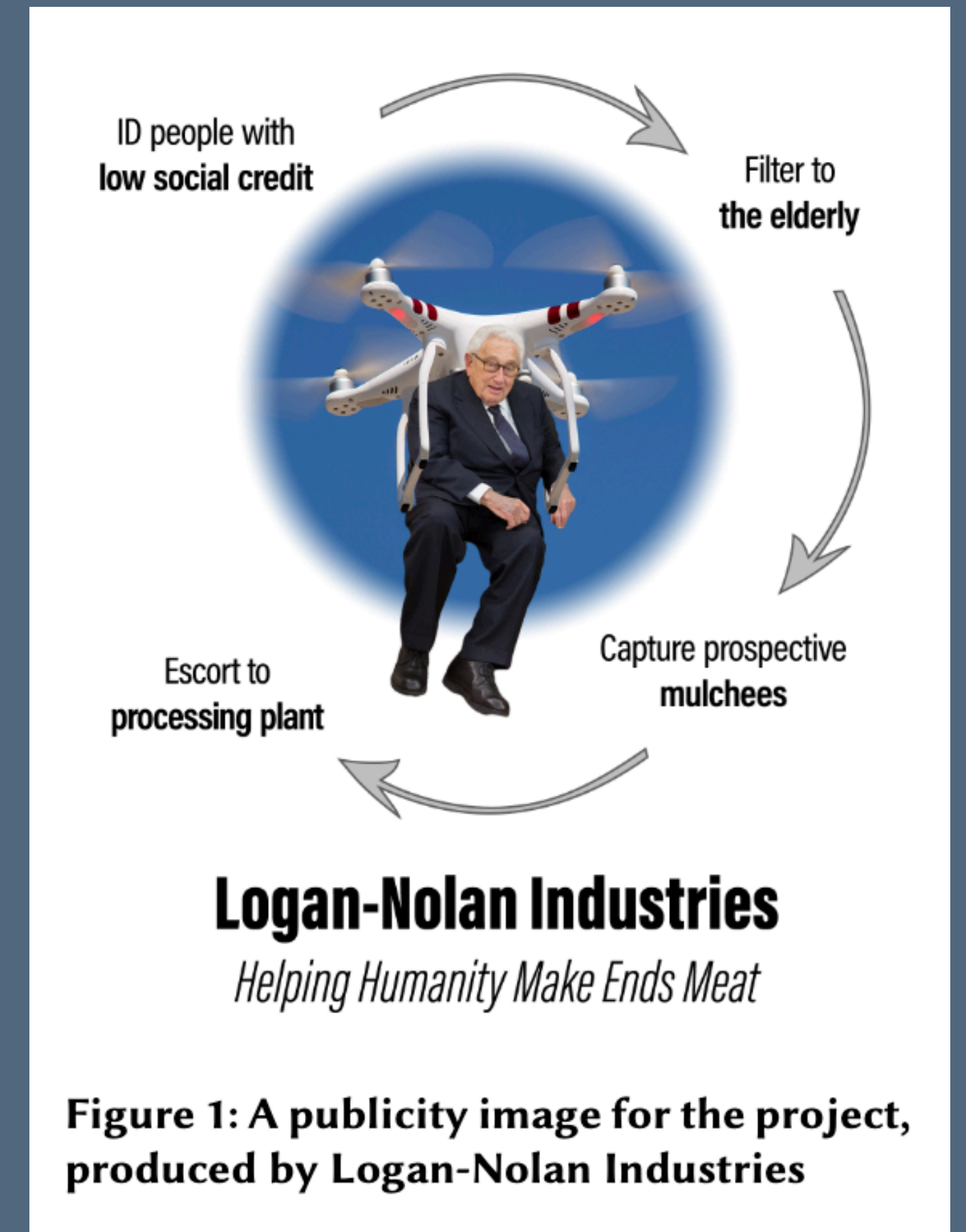
Fairness: lacking bias/discrimination

Accountability: answerable to people

Transparency: open about decisions

Everyone will be mulched equally, user feedback incorporated, etc.

“[We are sure] nothing data ethicists would ask of us has been missed.”



Design justice

[Costanza-Chock 2020]

Design can be a tool not just to solve problems, but to **resist structural inequalities**

Connects activism with notions of participatory design



Q Popular Latest *The Atlantic* Sign In

FAMILY

The Problems With Breastfeeding Go Way Beyond Breast Pumps

At an MIT hackathon last weekend, engineers, designers, and parents brainstormed ways to make feeding newborns easier.

When *not* to design?

[Baumer & Silberman, 2011]

“Just as the HCI community looks for situations that may be amenable to technological interventions, the community should similarly and simultaneously work to develop a reflective awareness for situations in which computational technologies may be inappropriate or potentially harmful.”

Ask questions like: *could the technology be replaced by a low- or no-tech solution? Does a tech intervention result in more harm than good? Does it solve the problem itself, or a computationally tractable transformation of one?*

Let's get divorced [Forlizzi et al. 2017]

Constructive design research (“research through design”) and critical design research (discussion/reflection) are increasingly at odds:

Constructive research: demonstrating preferred futures in the lab or field

Critical design research: polemicizing the current zeitgeist in a showroom

Suggestion: let's stop trying to connect these communities — they have extremely different values and might work better in parallel

This workshop itself is an example of critical work: stepping back from the research itself, proposal for the community on a meta-level

Critical theory, criticism, and HCI

And a few other critiques of HCI

(Again) What's 'critical' about critical design?

[Bardzell and Bardzell, 2013]

What is critical theory?

Schools of thought that are skeptical of current society/norms; that examine power relations; that are aimed at *changing* society

The term encompasses schools of thought like Marxism, feminist theory, critical race theory, postcolonial theory, queer theory, disability studies, and more

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Do artifacts have politics? [Winner 1980]

“In controversies about technology and society, there is no idea more provocative than the notion that technical things have political qualities.”

(Is this still true today?)

Winner rejects both the idea that tech deterministically changes society, but also the framing that it’s “just a neutral tool” that entirely reflects society

Robert Moses’ bridges as an example

Often the starting point for HCI work in this space

Interaction criticism and aesthetics

[Bardzell 2009]

Similar piece from Jeffrey Bardzell (same Bardzell as a couple slides ago)

He argues, in 2006, that HCI is increasingly incorporating theories from cultural studies but not very well

Instead, proposes the incorporation of critical theory and aesthetics to conceive of tech not strictly as a “tool” but also as a **work of rhetoric** (an argument about how to solve a problem)

Design is oriented to create change; speculative reasoning and other non-scientific ways of knowing should be welcomed

Third wave HCI [Bødker '06]

First wave: human-machine fit, human factors

Second wave: understanding cognition, groups working together in the context of applications

Third wave: non-work, non-purposeful, non-rational

“Conceptually and theoretically, the third wave HCI focuses on the cultural level (e.g., through aesthetics, expansion of the cognitive to the emotional, or a pragmatic/cultural-historical focus on experience.”

But are our techniques up to the task of the third wave? e.g., usability studies? design thinking?

Postcolonial computing

[Irani et al., 2010]

Applying **postcolonialism** to HCI: Is our drive to design ‘liberation technology’ or ‘ICT for development’ (ICT4D) just reinforcing old colonial legacies?

“We’re going to go help the fairly poor Indian resident who are getting water from the river by giving them our new water purifier system!”

Instead, they advocate for **engaging** bi-directionally with other cultures, specifically **articulating** how designs are framed, and seeing design as **translations** that change meaning in different places.

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Feminist HCI

[Bardzell CHI 2010]

Feminist theory examines the economic, political, social, and psychological oppression of women (and increasingly other marginalized gender groups too)

Who is the “ideal user” of your design? Is that person who you really want it to be? Do you assume **universality** of one type of user?

What assumptions are you making about users? Do you allow them to self-disclose? Does your work **advocate** for them?

How integrated are your users in the IxD process? See also: **participatory design movement** for workers

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Intersectionality and HCI

[Schlesinger, Edwards, and Grinter, 2017]

For the most part, HCI has considered representation in terms of one dominant axis: e.g., gender, nationality, expertise

Intersectionality emphasizes that experiencing multiple at these attributes simultaneously produces a substantively different experience than each attribute individually

How might we better engage with intersectionality in design and HCI? Especially given that design and computing have left race and ethnicity under explored

Design justice

[Costanza-Chock & Philip, 2018]

Part 1: Airport security as an example of how AI's "thousand [mundane] daily interactions" will erase those at the margins

Part 2: Connects design to the Matrix of Domination (interlocking systems of race, class, and gender)

Part 3: Design Justice principles

1. We use design to **sustain, heal, and empower** our communities, as well as to seek liberation from exploitative and oppressive systems.
2. We **center the voices of those who are directly impacted** by the outcomes of the design process.
3. We **prioritize design's impact on the community** over the intentions of the designer.
4. We view **change as emergent from an accountable, accessible, and collaborative process**, rather than as a point at the end of a process.
5. We see the role of the **designer as a facilitator rather than an expert.**
6. We believe that **everyone is an expert based on their own lived experience**, and that we all have unique and brilliant contributions to bring to a design process.
7. We **share design knowledge and tools** with our communities.
8. We work towards **sustainable, community-led and -controlled** outcomes.
9. We work towards **non-exploitative solutions** that reconnect us to the earth and to each other
10. Before seeking new design solutions, **we look for what is already working** at the community level. We honor and uplift traditional, indigenous, and local knowledge and practices.

Critical Race Theory & HCI

[Ogbonnaya-Ogburu et al., 2020]

Introduces **critical race theory** to the HCI community: a body of work that grew out of the civil rights movement and examines society and culture as it relates to race and racism.

Highlighted concepts relating to HCI include:

Interest convergence: those with power rarely concede unless it benefits them

Value of storytelling to challenge dominant narratives & raise awareness

Race and gender in facial analysis [Scheuerman et al., 2020]

Studying race and gender is super important; datasets are being curated to do so. But even these efforts are often “simplistic and lacking in critical and social theories”

Meta-analysis of 92 datasets for why and how they construct and annotate their datasets for race and gender

Findings: datasets are used for (1) individual face recognition; (2) image labeling; (3) diversity for model training.

Race is not measured or classified consistently and generally is usually binary male/female.

Is HCI interdisciplinary always effective?

[Dourish 2006]

Though HCI had started incorporating ethnographic methods, Dourish notices papers getting feedback saying “you need to address implications for design” or “this isn’t for an HCI audience”

He argues that HCI isn’t really deeply integrating social science deeply enough, and that ethnography’s main value is not design implications

Ethnography is reflexive, it’s about the subjects *and* the author; ethnographer is “not a tape recorder”

This view of ethnography also positions the subjects as “outside of the design process” and social sciences as subordinate to (in service of) computing

Roles for computing in social change

[Abebe et al., 2020]

Some critical scholars might claim that computing is always in opposition to fundamental social change

Abebe et al. outline four possible roles computing can play:

1. *Diagnostic*, measuring social problems with precision
2. *Formalizer*, shaping how social problems are defined
3. *Rebuttal*, illuminating the limitations of technical approaches
4. *Synecdoche*, raising public awareness

Critical Technical Awakenings

[Malik & Malik, 2021]

Philip Agre, UCLA CS professor, wrote a landmark piece called “Toward a Critical Technical Practice” in which he described beginning to “wake up” from a solely computational focus

Malik & Malik identify other examples of what they call **critical technical awakenings**, when technical people start seeing the world through a critical lens

They encourage people to consider critical theory, participatory, constructivist, and other philosophical frameworks

“Critical thinking means that you can, so to speak, **see your glasses**. You can look at the world, or you can back up and look at the framework of concepts and assumptions and practices through which you look at the world.”

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