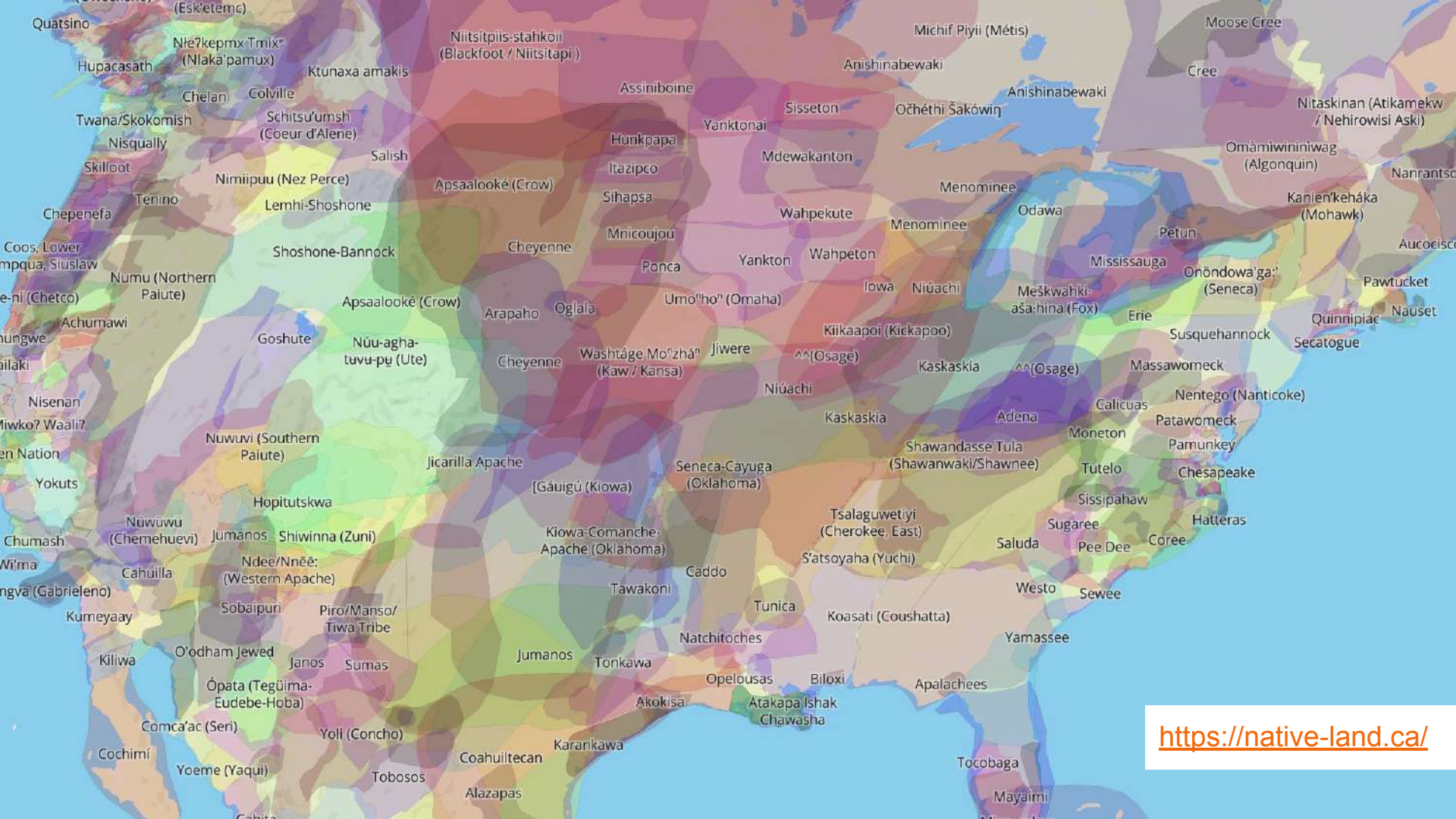


Christoph Becker

INSOLVENT

How to Reorient Computing
for Just Sustainability



<https://native-land.ca/>

critical friends

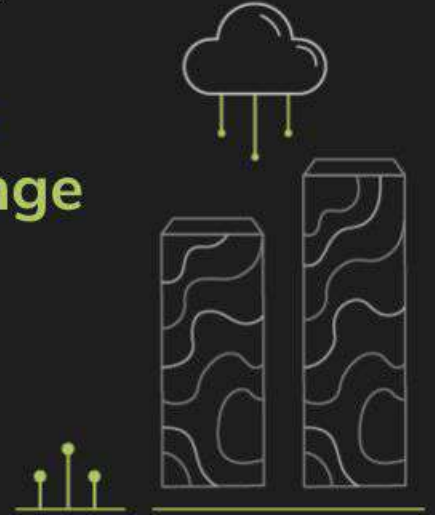
critique because they care

It takes two to form a friendship



From the 2023 State of Green Software report by Green Software Foundation
Find out more at stateof.greensoftware.org

92% of software practitioners are concerned about climate change





Record Heat Expected Again in 2024 as UN Warns Earth Is 'On The Brink'

ENVIRONMENT 20 March 2024 By NINA LARSON, AFP



(piyaset/Getty Images)

Global temperatures "smashed" heat records last year, as heatwaves stalked oceans and glaciers suffered record ice loss, the [United Nations said Tuesday](#) - warning 2024 was likely to be even hotter.

The annual State of the Climate report by the UN weather and climate agency confirmed preliminary data showing 2023 was by far the hottest year ever recorded.

European court rules human rights violated by climate inaction

3 hours ago



By Georgina Rannard, BBC climate reporter



Reuters

A group of older Swiss women have won the first ever climate case victory in the European Court of Human Rights.

Drought-stricken communities push back against data centers

As cash-strapped cities welcome Big Tech to build hundreds of million-dollar data centers in their backyards, critics question the environmental cost.

853.54 USD

+ Follow

+577.75 (209.49%) ↑ past year

Closed: Apr 9, 7:59 p.m. EDT • Disclaimer

After hours 847.30 -6.24 (0.73%)

1D 5D 1M 6M YTD 1Y 5Y Max



Subscribe

“AI revolution will be boon for natural gas, say fossil fuel bosses”



<https://www.nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344>



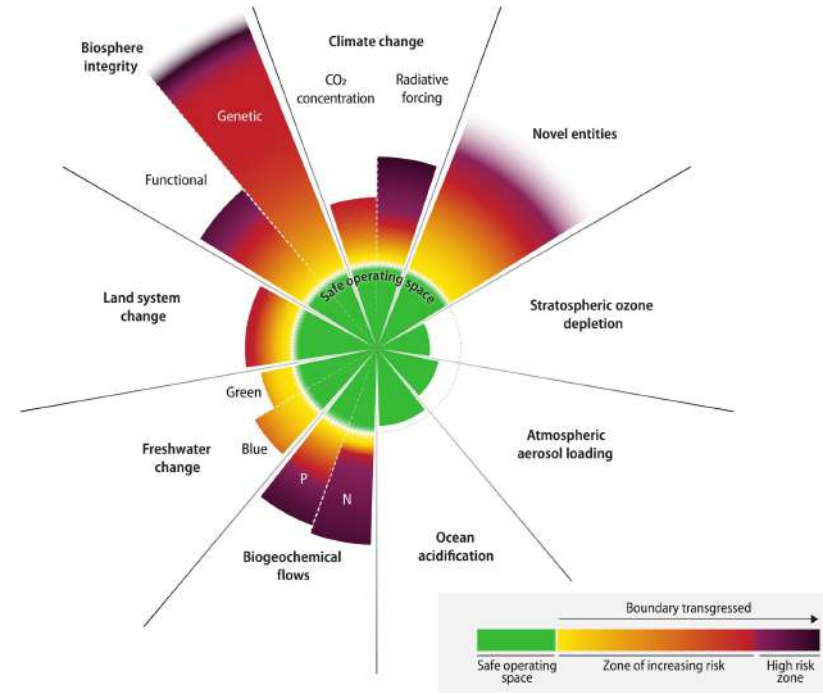
OpenAI and Microsoft Make Plans for \$100 Billion Data Center

We **have** to change things. What is the role of computing?

Sustainability is complex in several ways:

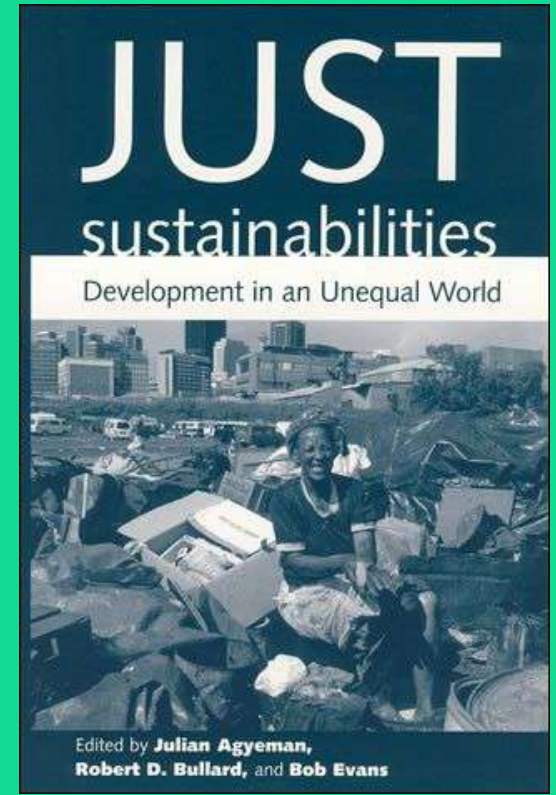
1. Complexity of the **subject** →
2. **Social** complexity
3. **Ethical** complexity

Computing and IT can help address #1 ...



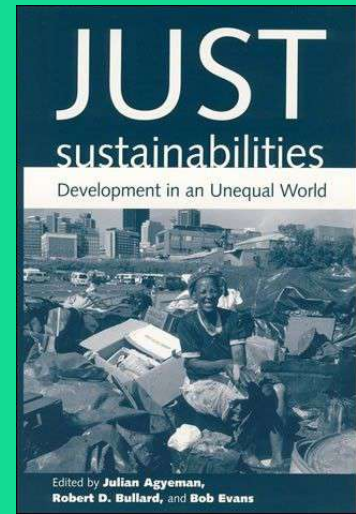
Earth beyond six of nine planetary boundaries.
<https://doi.org/10.1126/sciadv.adh2458>

“A poor environment is not only a symptom of existing injustice; rather, a functioning environment provides the necessary conditions to achieve social justice”



environmental
sustainability and
social justice are
always linked

1



IT has a conflicted
relationship with
Just Sustainability



2

We have to change things. **What is the role of computing?**

Computing has externalized its mounting debts.

Just Sustainability is complex in several ways:

1. Complexity of the subject
2. Social complexity
3. Ethical complexity



Computing can **help** address #1, **but what about #2 and #3?**

Just Sustainability: challenges in systems design

1. **Dispersal** of design effects
 2. **Uncertainty**
 3. **Ambiguity**
 4. **Asymmetric vulnerability**
-

The dominant discourses about the nature of the climate threat are scientific and economic. But **the deepest challenge is ethical**. What matters most is what we do to protect those vulnerable to our actions and unable to hold us accountable, especially the global poor, future generations, and nonhuman nature. (Gardiner 2014, xii)



**Just Sustainability
challenges our
ways of thinking**



Is the tech world ready
for Just Sustainability?

4

Computer science is problem solving

(pardon the simplification)

“Computer Science is the foundational discipline of computing that studies **the use of computers to systematically solve problems.**”

— *ACM/IEEE CS202X Vision Statement*


“**Computational thinking is a way humans solve problems**”

— Prof. Jeannette Wing, Director of the Data Science Institute at Columbia University and former Corporate VP of Microsoft Research

“The field of computer science has not yet come to the full realization that it deals with problems which exceed its traditional field of competency. “

— (Raji, Scheuerman, and Amironesei 2021, 523)

Is that changing?



The nature of
problems

The politics of
technology

The workings of
the human mind

What it
means *to design*

The myths of computing

(Insolvent ch 3)

1: “Technology is value-neutral”

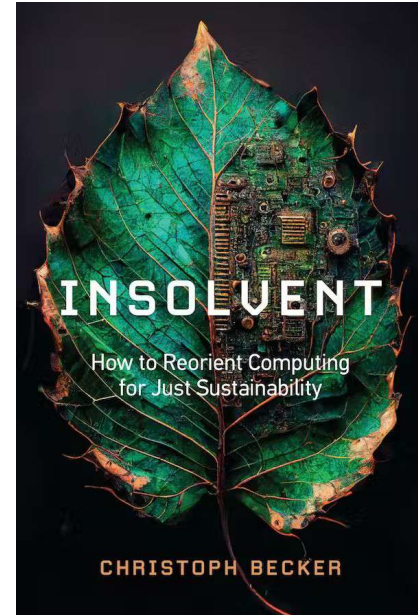
```
type gender: boolean;
```

```
// true = male, false = female ^\_(\ツ)\_/^
```

“Every line of code represents a moral decision...” Grady Booch, 2014

As Feenberg (2017) put it: “Values are not the opposite of facts . . . Values are the facts of the future” (8). Technology shapes social reality through its functions and affordances and effects, so the values that it embodies have significant reach. They do not anymore just reside in the persons who made the choices but live on in the technological artifacts that result from these choices. Therefore, “Technology designers and constructors cannot evade moral responsibility for the consequences of their products by arguing that they are morally neutral” (Miller 2020, 19).¹⁰ In more humorous terms, here is the second entry to the Devil’s Dictionary of Computing.

Software engineering, n.: the social practice that converts human values, politics and moral decisions into code, features, qualities, documentation, and other technological facts.



6

SOFTWARE IS NEVER NEUTRAL

HOW DO VALUES BECOME FACTS?

Designing computer artifacts is an inherently value-based activity, deeply implicated in longstanding political struggles of the wider society in which computer science is embedded. Rather than viewing this fact as a breakdown in what should be a disinterested project, this alternative position embraces the place of systems development as a critical arena for the expression and enhancement of values.

—Suchman (1998)

Table 6.2 Examples for techniques to surface explicit and implicit values

	Proactively, during design	Retroactively, given an artifact
Explicit values	<p>Value-sensitive design techniques such as <i>envisioning cards</i> help to orient design teams to values.</p> <p><i>Value-based engineering</i> processes such as IEEE P7000 introduce some values concepts into the engineering vocabulary and support systematic mappings.</p> <p><i>Value-based requirements engineering</i> similarly centers values, motivations and emotions in RE.</p>	<p>Technical investigations in VSD can be retroactively conducted to decipher the value suitabilities of existing artifacts (Friedman and Hendry 2019, 89).</p> <p>VBE techniques and models could in principle be applied retroactively.</p>
Implicit values	<p><i>Critical systems heuristics</i> can be deployed in ideal mode to orient a team toward reflecting on implicit value positions (Ulrich and Reynolds 2010): see chapter 10. Comparison between ideal (“ought”) and actual (“is”) brings value conflicts to light.</p> <p><i>Mindscriping</i> supports teams in surfacing values and negotiating value tensions (Allhutter and Hofmann 2012).</p>	<p><i>Critical systems heuristics</i> deployed in reflective mode can unearth further value conflicts, and in polemic mode, it can make value suppression visible (e.g., Ulrich 1981; McCord and Becker 2019).</p> <p><i>Deconstruction</i> more generally can bring to light the value commitments of engineering methods and artifacts (Allhutter 2012, Allhutter and Berendt 2020), and the contrast between espoused and manifested values (Beath and Orlikowski 1994).</p>

The myths of computing

“To design is to collaboratively solve objective problems using value-neutral technology through a series of rational decisions”

“**Technology** is value-neutral”

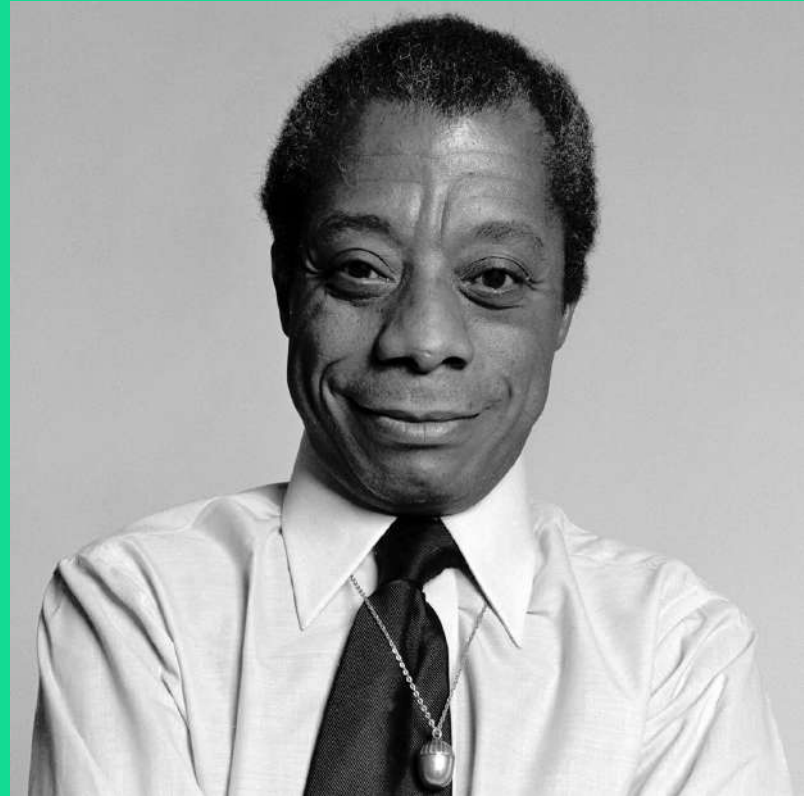
“The **human mind** is a (flawed) computer”

“**Problems** exist and can be discovered”

“**Design** is problem-solving”

'Not everything
that is faced can
be changed, but
nothing can be
changed until it is
faced.'

— James Baldwin

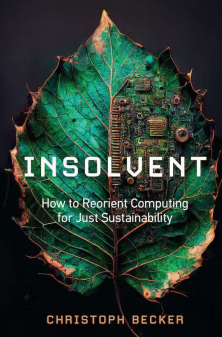




problemism

a socially contagious mindset that thrives in computing

→ *Insolvent*, ch. 4



“metaphors ... have the power to define reality. They do this through a coherent network of entailments that highlight some features of reality and hide others”

Reimagine: “interpret something in a new or different way that shows creativity or inventiveness” (OED)

Imagine: “form a mental image or concept of” (OED)

“Can ChatGPT radically reimagine our world?”

The New York Times

How Tech Giants Cut Corners to Harvest Data for A.I.

OpenAI, Google and Meta ignored corporate policies, altered their own rules and discussed skirting copyright law as they sought online information to train their newest artificial intelligence systems.

There are two primary reasons to ask this question. First, new generative tools like Open AI's ChatGPT promise to change the way people live and work, and such tools have been born and trained in a "growth as progress" world. It is important to be aware of how these tools portray alternatives to growth-based paradigms. The

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



birth

noun

the emergence of a baby or other young from the body of its mother; the start of life as a physically separate being.

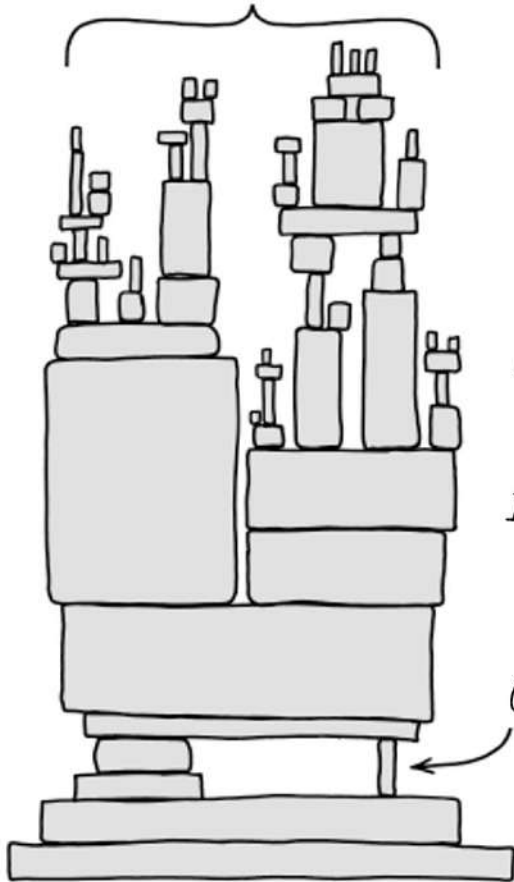
metaphor!



“metaphors ... have the power to define reality. They do this through a coherent network of **entailments that highlight some features of reality and hide others**”
(Lakoff&Johnson)

.. e.g. “life” as a “separate” “being” = conscious, creative, imaginative, etc.

That whole debate about "AI"



"Computers and
Thought:
Intelligence is ...
symbol
processing"
(~ Simon 1969)

Why is equating a computer and the human mind a **really bad idea**?

It leads to a **poor understanding**

1. **of ourselves** as flawed computers
2. **of computers** as human-like agents

Computing is stuck

Just Sustainability is complex in several ways:

1. Complexity of the subject
2. Social complexity
3. Ethical complexity

Computing can help address #1 and help with #2, but not #3.

The myths of computing prevent meaningful change.

We can work it out
with a little help from
**the critical friends of
computing**



5

Critical friends

tell us uncomfortable things we don't want to hear, but listen to



Intersectional feminist thought situates our knowledges and positionality and helps us recognize the matrix of domination

Critical Systems Thinking helps us with critical reflection, pluralism, and countering marginalization

Science and Technology Studies help us understand how science & tech come about and why

Embodied cognition helps us understand the nature of human judgment and decisions

...and more...

A critical approach

Here: Andrew Feenberg, 2014

“The illusion of pure rationality obscures the imagination ... by granting existing technology and rationalized social arrangements an appearance of necessity they cannot legitimately claim.

Critical theory demystifies this appearance to open up the future. It ... situates rationality within the political where its consequences are a challenge to human responsibility.”

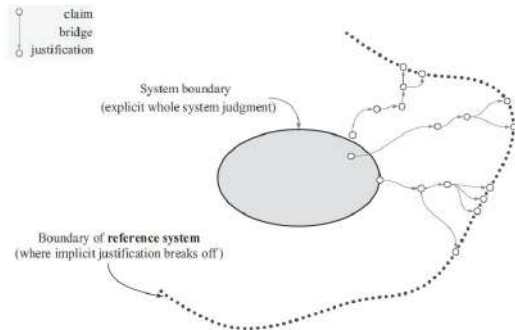
Some critical friendships

Critical Systems Thinking

shows us how to critically reflect on the boundaries and assumptions of technical approaches and embed them within an appropriate ethical frame

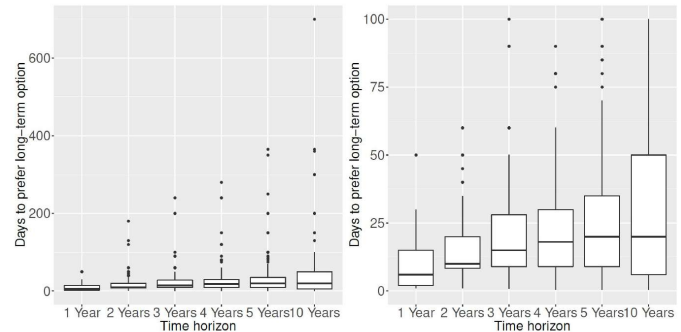
138

CHAPTER 5



Feminist Science and Technology Studies helped a community of requirements engineers and researchers to articulate hidden values and assumptions of their field, helping us to analyze our own political circumstances

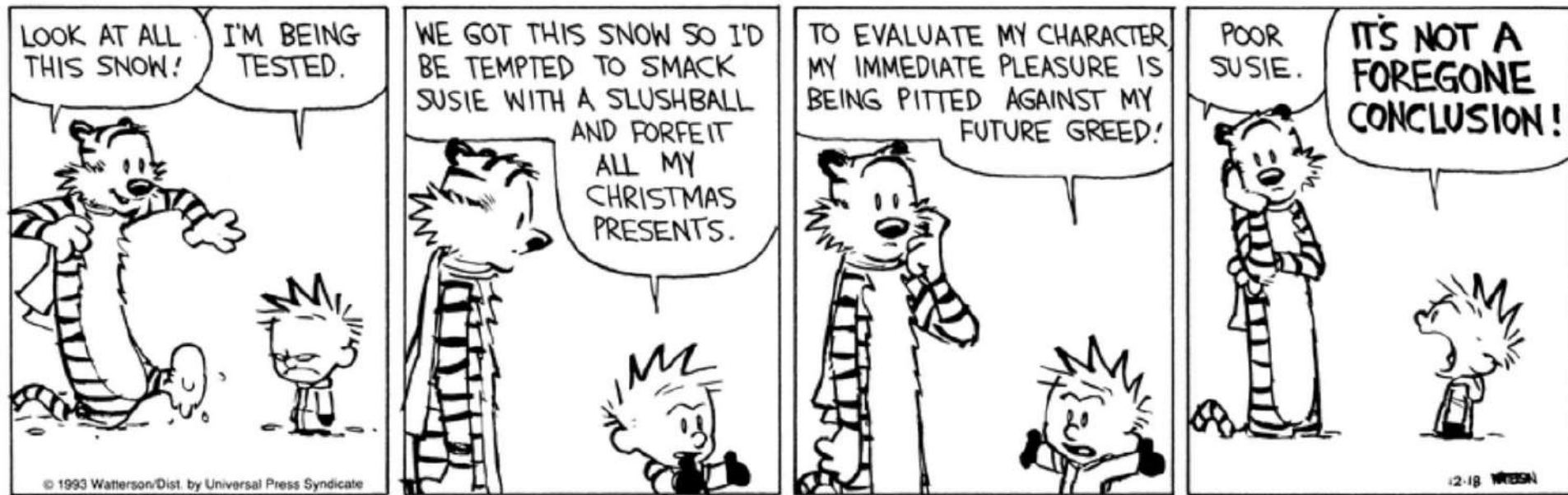
Judgment and Decision Making in the naturalistic tradition helped us recognize rationalist misinterpretations of behavioral decision making research on intertemporal choices in systems design



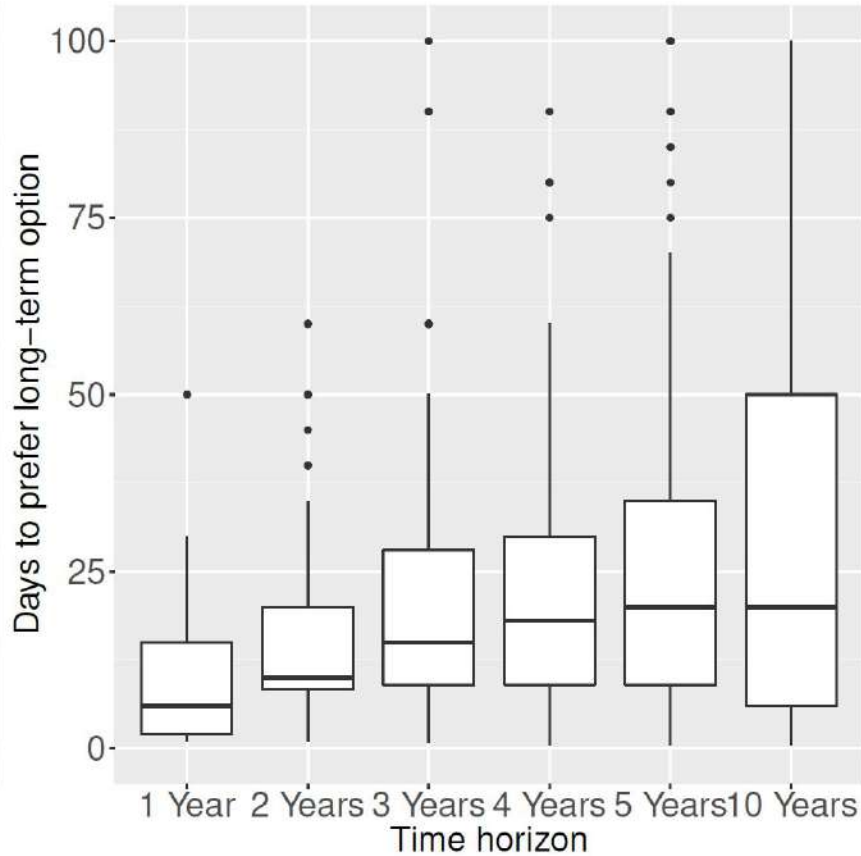
(a) Full data for all participants

(b) Zoomed view of data

Sustainability: the capacity to endure



Sustainability: the capacity to endure



Naturalistic decision making

A critical friend from Judgment
and Decision Making research

Some people 'discount', others
do not - why?

How can we learn from those
who act with foresight?

Which external factors
constrain foresight?

People are more-than-rational

Computing must account for
varied forms of human judgment

LITTLE HELP FROM
MY FRIENDS

Biology of Cognition

Embodied Cognition

Naturalistic Decision Making

Judgment and Decision
Making



The myths of computing

“Technology is value-neutral”

“The human mind is a (flawed) computer”

“Problems exist and can be discovered”

“Design is problem-solving”

Remember:

Technology is *never* value-neutral

The human mind is capable of reflection, judgment, empathy, foresight, and more

Problems are socially constructed frames

Design can be much more than problem-solving

Just Sustainability challenges

1. Dispersal of design effects
2. Uncertainty
3. Ambiguity
4. Asymmetric vulnerability

Just Sustainability Design

1. privileges the asymmetric and uneven effects of systems design choices at a distance
2. is *constructive and critical*
3. is technical, social & ecological
4. is a call for innovative computing work



Conclusions

We need to transform our societies to achieve Just Sustainabilities.

Computing and IT have a conflicted relationship with sustainability and justice.

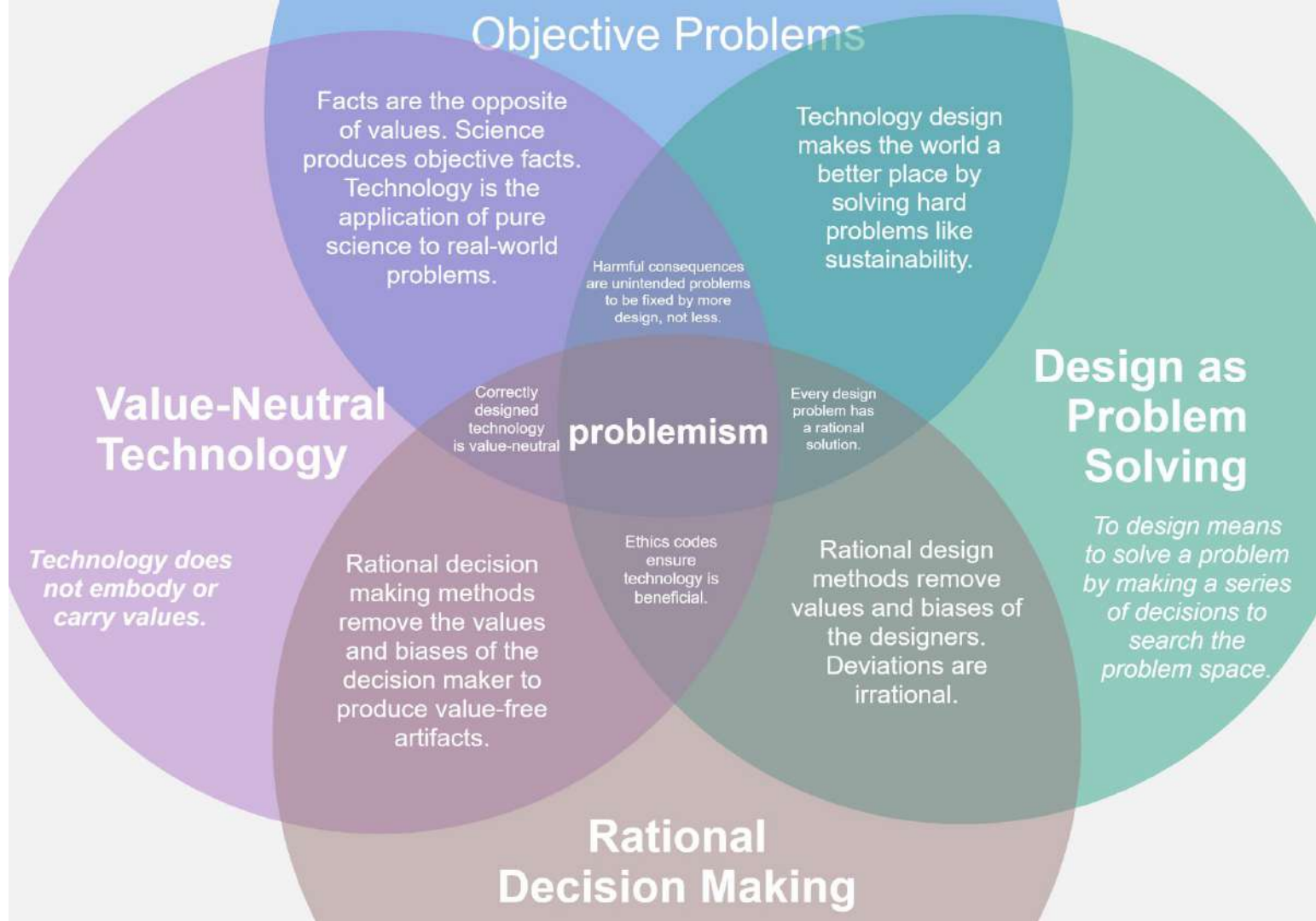
IT in principle has significant potential for enabling transformative change, **but not in the current computing paradigm.**

In partnerships with critical friends we can hope to **achieve the transformative change** necessary to turn IT into a force for sustainability and justice.



Christoph Becker, April 2024
<https://hci.social/web/@cbecker>

The Myths of Computing



The Need for a Critical Approach

“I had absolutely no critical tools with which to defamiliarize those ideas -- to see their contingency or imagine alternatives to them. Even worse, I was unable to turn to other, nontechnical fields for inspiration. ... I had incorporated the field's taste for technical formalization so thoroughly into my own cognitive style that I literally could not read the literatures of nontechnical fields ... The problem was not exactly that I could not understand the vocabulary, but that I insisted on trying to read everything as a narration of the workings of a mechanism... I believe that **this problem ... is characteristic of AI** in general and ... other technical fields ... (Agre 1997, 9)