Cybernetics and the AI Crisis:
A Bilingual Synthesis

WOSC 2021 | Section 1.1 | A World in crises
How can Cybernetics, Systems Thinking and new technologies help?
September 2021

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Cybernetics and the AI Crisis:
A Bilingual Synthesis

WOSC2021 MOSCOW

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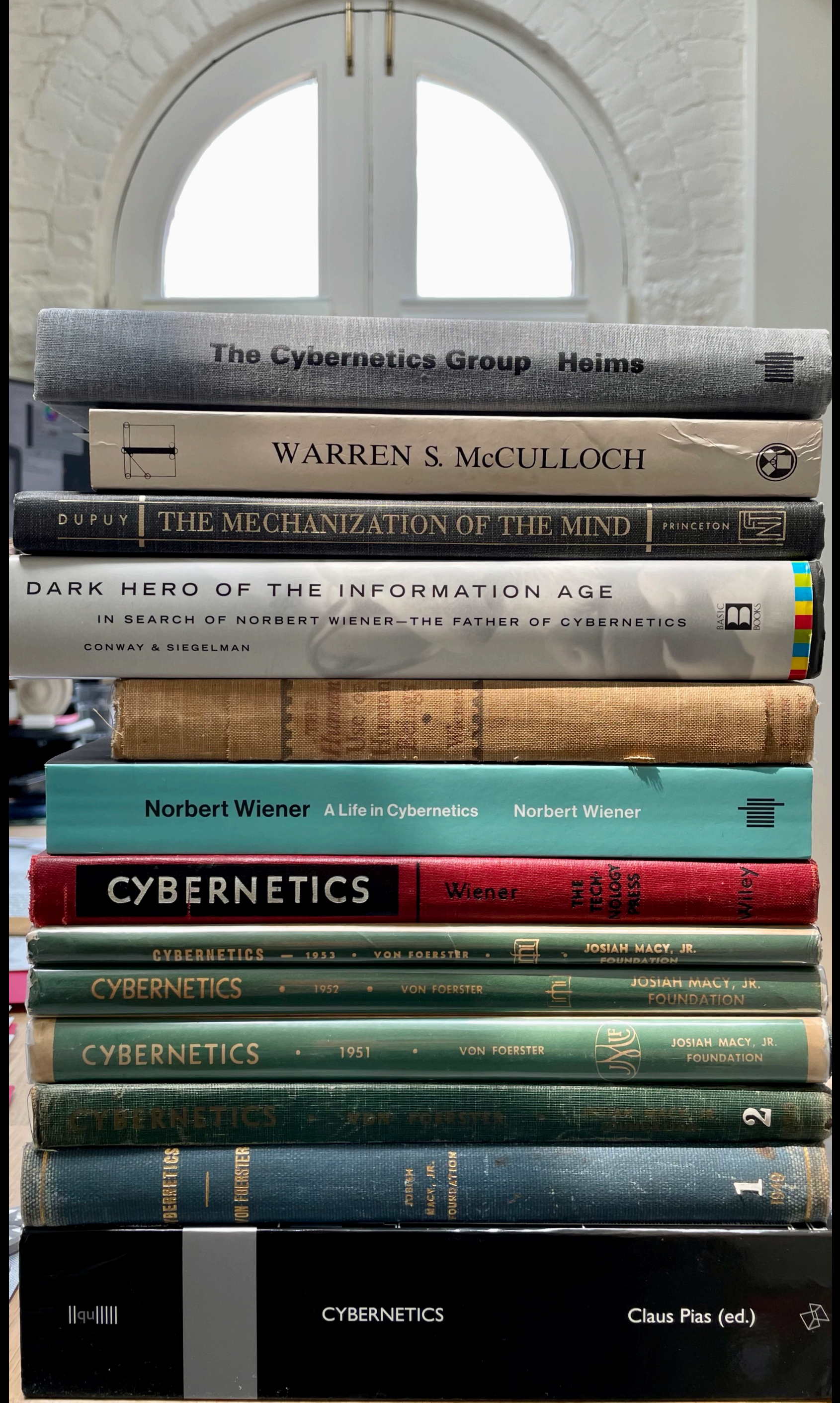
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1.1 A World in crises; how can Cybernetics, Systems Thinking and new technologies help?

COVID-19 caught the world unprepared. Yet, warnings of pandemics had been prominent for at least a decade. COVID-19 saw vaccines developed...
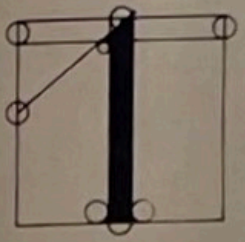
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Discussion points

- Are modern systems approaches and cybernetics ready to help adequately respond to the challenges and threats to humanity at the beginning of the 21st century?
- Civilizational differences in modern ideas about the systems approach and cybernetics. Integration of research and development in the interests of human development.
- Reflexivity and social responsibility as the most important factors in the development of cybernetics.
- Cybernetics in the organization and control of environments of hybrid reality (subject, digital, physical).
- Perspective directions of development of systems approach and cybernetics.

CYBERNETICS — Claus Pias (ed.)

Cybernetics — VON FOERSTER — JOSIAH MACY, JR. FOUNDATION

CYBERNETICS — VON FOERSTER

CYBERNETICS — 1951 — VON FOERSTER — JMF — JOSIAH MACY, JR. FOUNDATION

CYBERNETICS — 1952 — VON FOERSTER — JOSIAH MACY, JR. FOUNDATION

CYBERNETICS — 1953 — VON FOERSTER — JOSIAH MACY, JR. FOUNDATION

CYBERNETICS — Wiener — THE TECHNOLOGY PRESS

Norbert Wiener — A Life in Cybernetics — Norbert Wiener

The Human Use of Human Beings — Wiener

DARK HERO OF THE INFORMATION AGE — IN SEARCH OF NORBERT WIENER—THE FATHER OF CYBERNETICS — CONWAY & SIEGELMAN — BASIC

DUPUY — THE MECHANIZATION OF THE MIND — PRINCETON

WARREN S. McCULLOCH

The Cybernetics Group — Heims

Cybernetics + AI = Bilingual Synthesis
Governance in a post-crisis world

◎ How do we frame our views of crises as starting points for conversation?

◎ How do we design a cadence of conversations with a focus on variety?

◎ Given conversations and variety, how will we seek sufficient agreement to create a plan of action?

◎ Given agreement, by what processes might we act in concert toward our agreed but evolving intentions?

◎ How do we track the consequences of our actions, intended and otherwise?

◎ How do we adjust our actions and our intentions in a continuous flow of interactions in the world and in conversation with all stakeholders?

◎ What are our values?

◎ Who will we invite?

◎ How will we structure our process?

◎ What will we do?

◎ How will we monitor outcomes?

— that is, how will we govern?
— that is, what is our responsibility?

Pandemic of "Today's AI"

◉ Manipulation of attention by Internet platforms

◉ Manipulation of sentiment in politics & elections

◉ Loss of privacy through "surveillance capitalism"

◉ Bias in law enforcement algorithms

◉ Facial recognition leading to social control

◉ Overpowering of human capacity & "Human Downgrading"

—AI is making the world we see and the world we live in.
—Human purpose is lost.

Pandemic of "Today's AI"

Facebook & Instagram

Google & Youtube

Amazon

Twitter

...

Artificial Intelligence Inside (™)

Artificial Intelligence Inside (™)

Facebook & Instagram

Google & Youtube

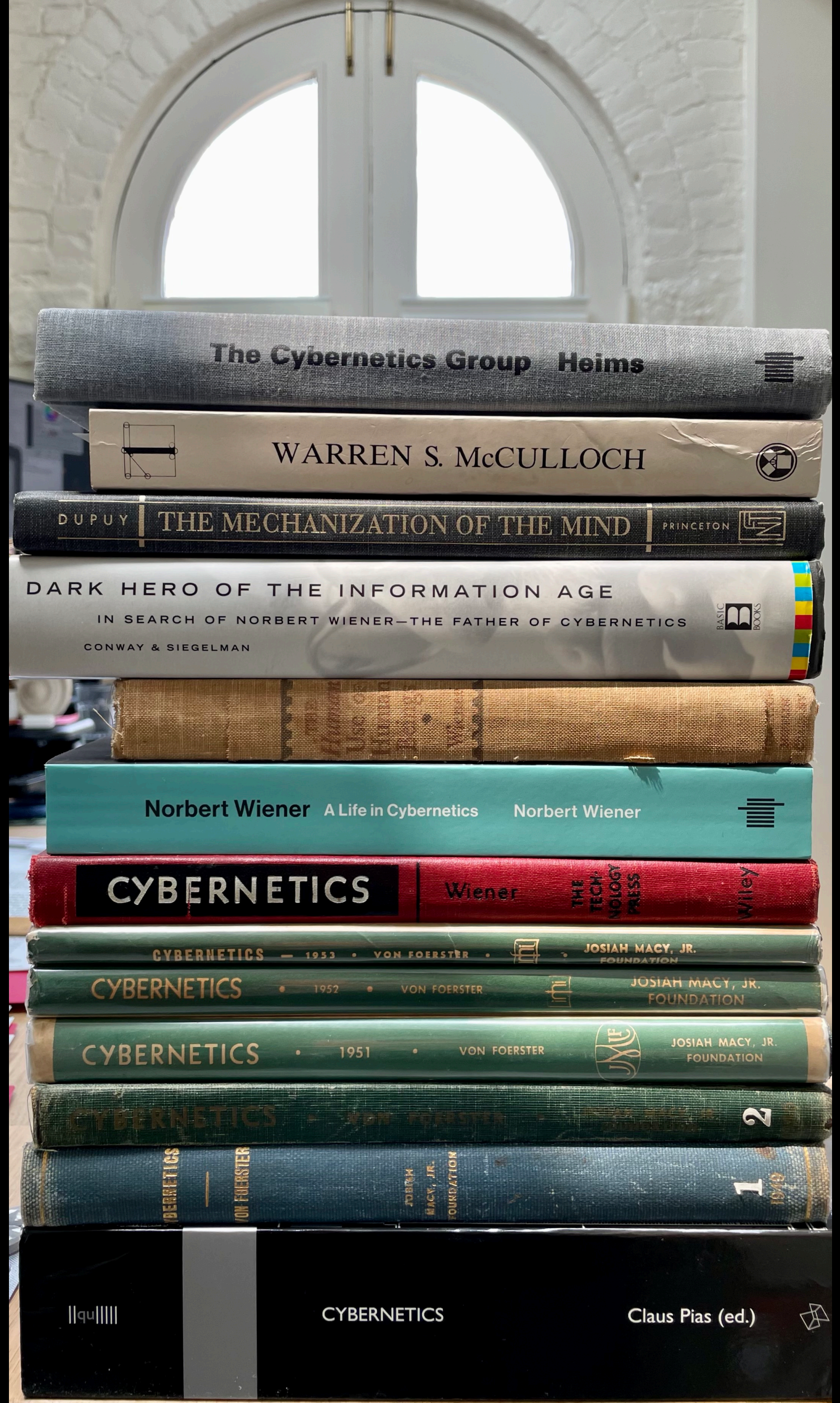Amazon
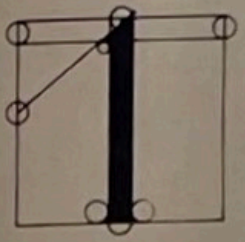
Twitter

…

CODE =

AUTOMATION =

CODIFICATION

PANDEMIC

1.1 A World in crises; how can Cybernetics, Systems Thinking and new technologies help?

COVID-19 caught the world unprepared. Yet, warnings of pandemics had been prominent for at least a decade. COVID-19 saw vaccines developed in record time, while simultaneously the planet suffered from an inability to properly deal with the ever present threat. Warnings of the impact of climate change have been with us for more than a quarter-century. Despite these foreshadowing, mankind allows crises to occur. The uniqueness of the threats of the COVID-19 pandemic and the threats of climate change lies in the fact that concerted actions of all mankind are required to effectively overcome them. At the present time, the historically established international political, legal and economic regulators have proved to be ineffective. For all mankind, the problem of overcoming individual egoism and the formation of planetary social responsibility is urgent. Scientists must offer the world community new models of the consolidation of civilizations, states, corporations and society for joint organizations to act in the elimination of global threats. Can the perspectives offered by systems and cybernetics make a difference? What might be the role for new digital technologies and artificial intelligence? Can mankind find a means to overcome its reluctance to cognize and confront long-term systemic risks?

CYBERNETICS

Claus Pias (e

CYBERNETICS

VON FOERSTER

JOSIAH MACY, JR. FOUNDATION

CYBERNETICS

VON FOERSTER

CYBERNETICS 1951

VON FOERSTER

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CYBERNETICS

Wiener

THE TECHNOLOGY PRESS

Norbert Wiener · A Life in Cybernetics · Norbert Wiener

The Human Use of Human Beings · Wiener

CONWAY & SIEGELMAN

DARK HERO OF THE INFORMATION AGE

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BASIC

DUPUY | THE MECHANIZATION OF THE MIND | PRINCETON

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The Cybernetics Group Heims

Cybernetics | Neural Nets | AI

McCulloch-Pitts neurons	1943	- "Neural Nets" are born
Macy Meetings on Circularity	1946-1953	- swarms the *Zeitgeist*
Cybernetics by Wiener	1948	- influences generations
Dartmouth AI Conference	1956	- *contra* Cybernetics
Symbolic AI rises	1956-1980	- AI swarms the zeitgeist
Perceptrons kills neural nets	1969	- Minsky denies von Foerster
Cybernetics languishes	1956-2010	- AI influences generations
Hinton brings back neural nets	1980s	- Expert Systems come & go
Internet brings Big Data	2000s	- NN swarm the *Zeitgeist*
"Surveillance Capitalism"	2000s-2020s	- "Wicked Problems" prevail

Cybernetics + AI = Bilingual Synthesis
Wicked Problems of "Today's AI"

◉ Manipulation of attention by Internet platforms

◉ Manipulation of sentiment in politics & elections

◉ Loss of privacy through "surveillance capitalism"

◉ Bias in law enforcement algorithms

◉ Facial recognition leading to social control

◉ Overpowering of human capacity & "Human Downgrading"

—AI is making the world we see and the world we live in.
—Human purpose is lost.

Are there alternatives to Cybernetics?

Science has failed to tame **Wicked Problems**.
Governance has failed.
Socio-technical systems have failed.
Today's AI has failed.
Engineering has failed.
Psychology has failed…

—Will society fail?

Cybernetics

Why us? Why Cybernetics?

Cybernetics | "Today's AI"

How / Why does Cybernetics move us forward?

◎ developed before AI—and was AI's foundation

◎ embodies "the art and science" of purposive systems

◎ offers detailed models of regulation in complex adaptive systems

◎ brings an ethical imperative to human action

◎ founded as transdisciplinary / antidisciplinary *

◎ applies across siloed disciplines

◎ embraces the unknowable and the unpredictable

* Andrew Pickering coined "antidisciplinarity" in "Ontology and Antidisciplinarity", 2010

Pandemic of "Today's AI"

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—AI is making the world we see and the world we live in.
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Premise—It's the "Digital Culture"

Digital technology forges a culture focused primarily on what computers can easily do. Most often for profit.

Values inherent in the code of Today's AI are so often at odds with being human.

Assumptions from Digital Culture

Digital Culture assumes:

◉ interaction is mechanistic

◉ information is objective

◉ intelligence is a process that sits inside a person or computer

So it "it becomes true" that:

◉ human behavior can be generalized and accurately predicted

◉ the same option offered at an interface has the same meaning for everyone

◉ machine prediction is intelligent—so the machine's selection need not be questioned or tested by the human

EXAMPLES

- **Google "Page Rank"**— Lack of Transparency of Intent
  You cannot learn why options were offered

- **Youtube "Up Next"**—Asymmetry of Control of Focus
  You cannot question or redirect options offered

- **Facebook "News Feed"**— Lack of Control of Choice
  You can decline options but not define them

Premise—It's not Technology

Technology itself is not at fault—it is how we fashion it and the traits we embed in it.
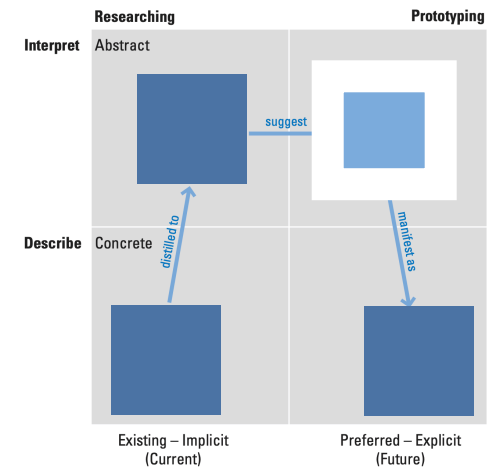
In pursuit of profit, we build engines that dazzle our brains and addict us to our human & biological vulnerabilities.

This is not the only option.

We can shift technology from digital assumptions and swing back toward our analog roots— our physical, organic, biological selves—using Cybernetics.

Novelty and choice, transparency and conversation can become the new core principles of Today's AI.

Countering with new frameworks

Digital Culture assumes:

◉ interaction is mechanistic

◉ information is objective

◉ intelligence is a process that sits
inside a person or computer

Cybernetics offers:

◉ interaction as conversational—
inviting interpretation & responses
from other contexts & understandings

◉ information as the triggering of ideas
and reactions—the opening of new
possibilities, ideas, & actions

◉ intelligence as relational—
an attribute of an interaction and not
something inside a person or a box.

A preferred future

To upset the dominance of the
pernicious algorithms of AI,
we must design and propagate
a set of humane, organic, and
analog interactional frameworks.

If we bring forth replacements for
the algorithms of **Today's AI**, we
can begin to have a positive effect
and better serve our social fabric.

Analogic Frameworks — Alternatives to Today's AI

DATA-ANIMATED

binary
discrete
deterministic
artificial
representational
specific
predictive
transactional

SOCIALLY-ANIMATED

biological
fluid
open-ended
organic
resonant
ambiguous
uncertain
conversational

Cybernetics
bilingual sensibility

Digital

Analog

A preferred future

To upset the dominance of the pernicious algorithms of AI, we must design and propagate a set of humane, organic, and analog interactional frameworks.
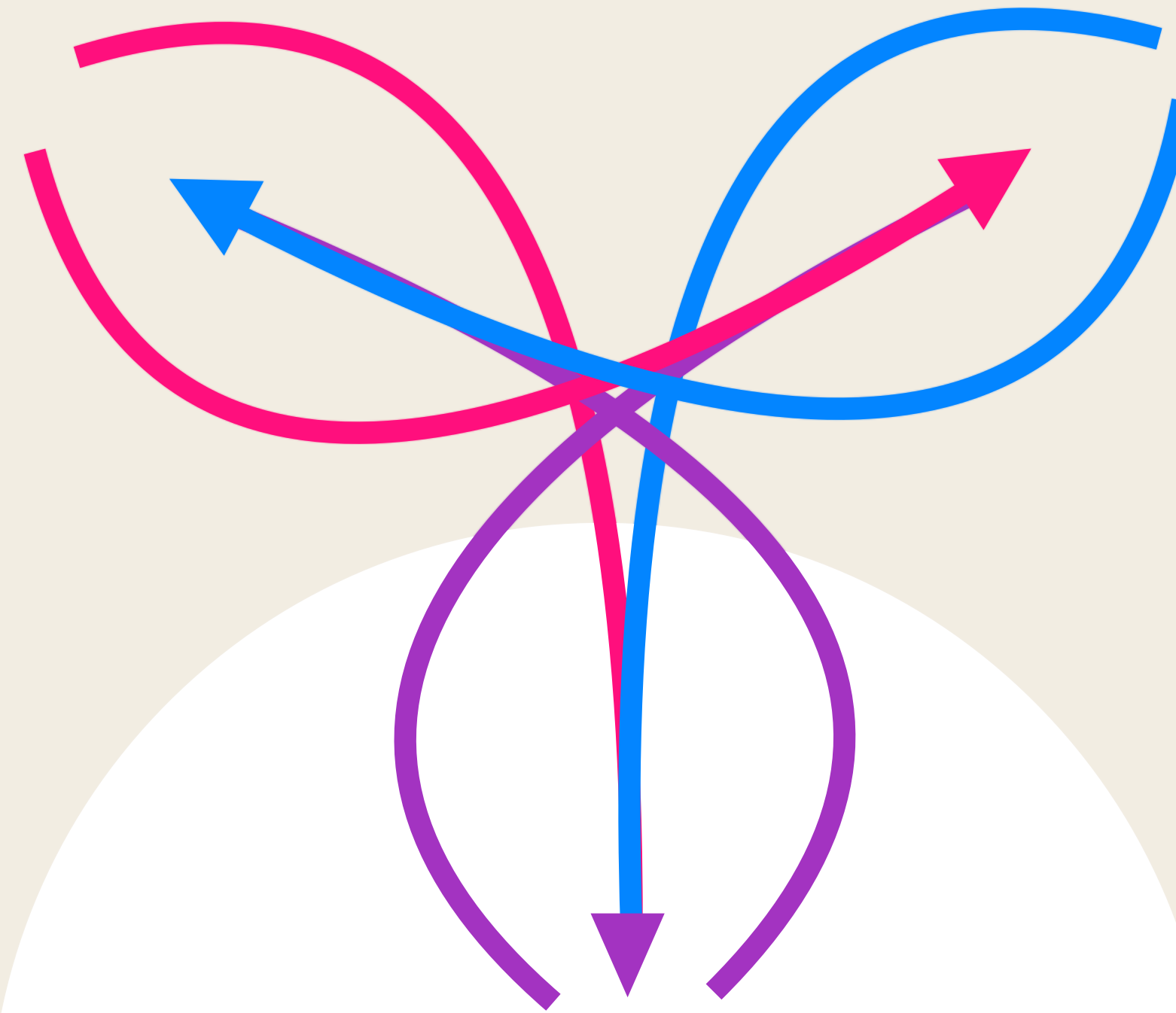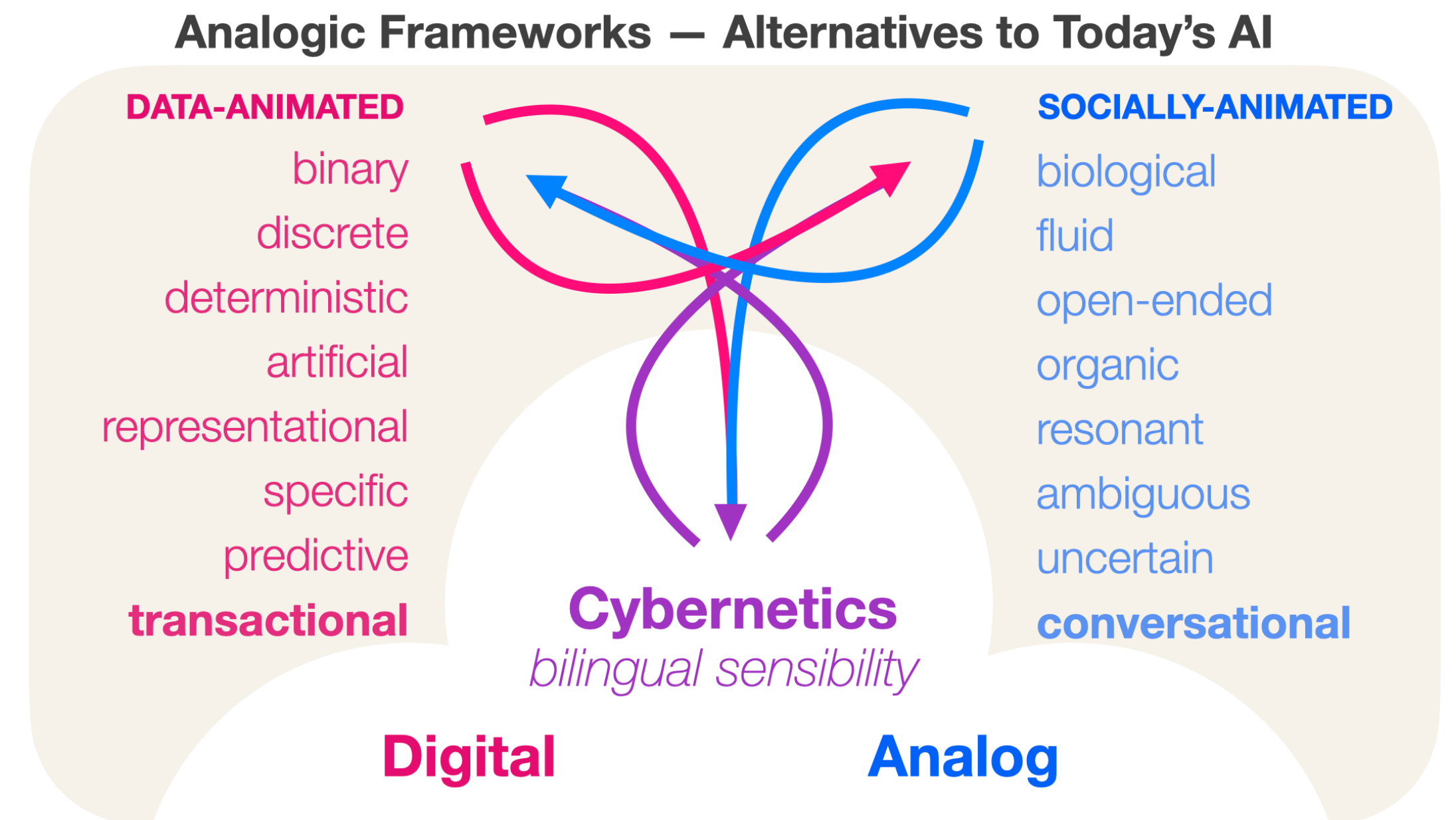
If we bring forth replacements for the algorithms of Today's AI, we can begin to have a positive effect and better serve our social fabric.

—Where to begin?

Analogic Frameworks — Alternatives to Today's AI

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Cybernetics
bilingual sensibility

Digital   **Analog**

Colloquy of Mobiles
ZKM
Karlsruhe 2020

Photo by Morgane Stricot, ZKM

Gordon Pask—Analog Interaction

Colloquy of Mobiles

Autonomous agents that converse and cooperate

Bilingual sensibility—analog & social, machinic & digital

Information triggers response, does not determine it

Intelligence in the interaction, not stand-alone
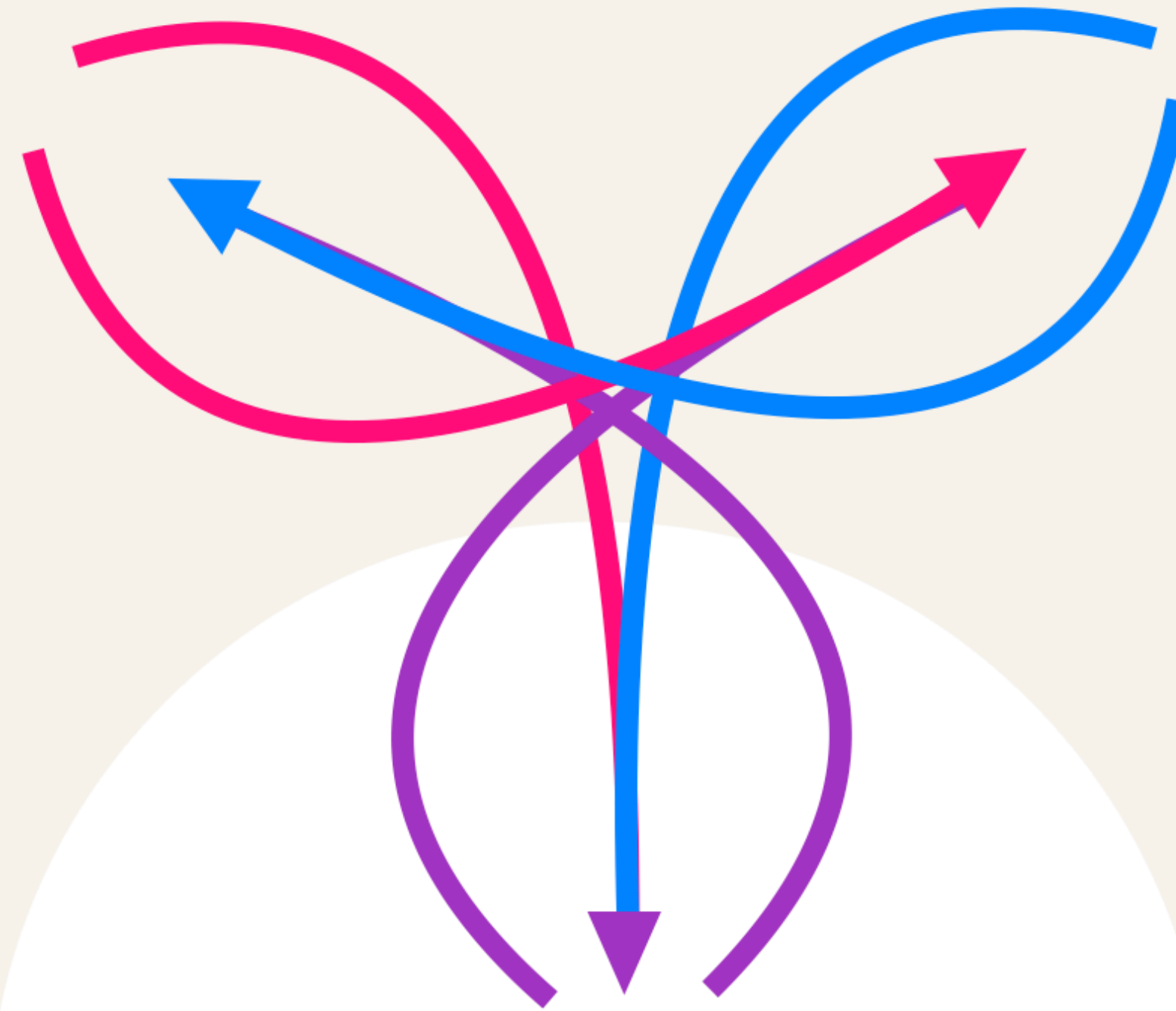
Gordon Pask

Goals of Conversation Theory

To rigorously understand what makes conversation work—and to make machines conversant like humans.

To rigorously understand how systems learn—and to makes machines that learn like humans.

Analogic Frameworks — Alternatives to Today's AI

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Cybernetics
bilingual sensibility

Digital

Analog

Bringing about a preferred future
A Bilingual Synthesis

Analogic Frameworks — Alternatives to Today's AI

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binary   biological
discrete   fluid
deterministic   open-ended
artificial   organic
representational   resonant
specific   ambiguous
predictive   uncertain
transactional   Cybernetics   conversational
                 bilingual sensibility

Digital   Analog

"What if an AI system could facilitate conversations among human participants across distances and times in a way that generates a continually changing configuration of ideas?

"These ideas could then be sources for conversations that could provide new input to the system…

"Perhaps it would better embody the emancipatory and participative epistemology that cybernetics has come to embrace."

— *Dr Larry Richards*

Bringing about a preferred future
A Bilingual Synthesis

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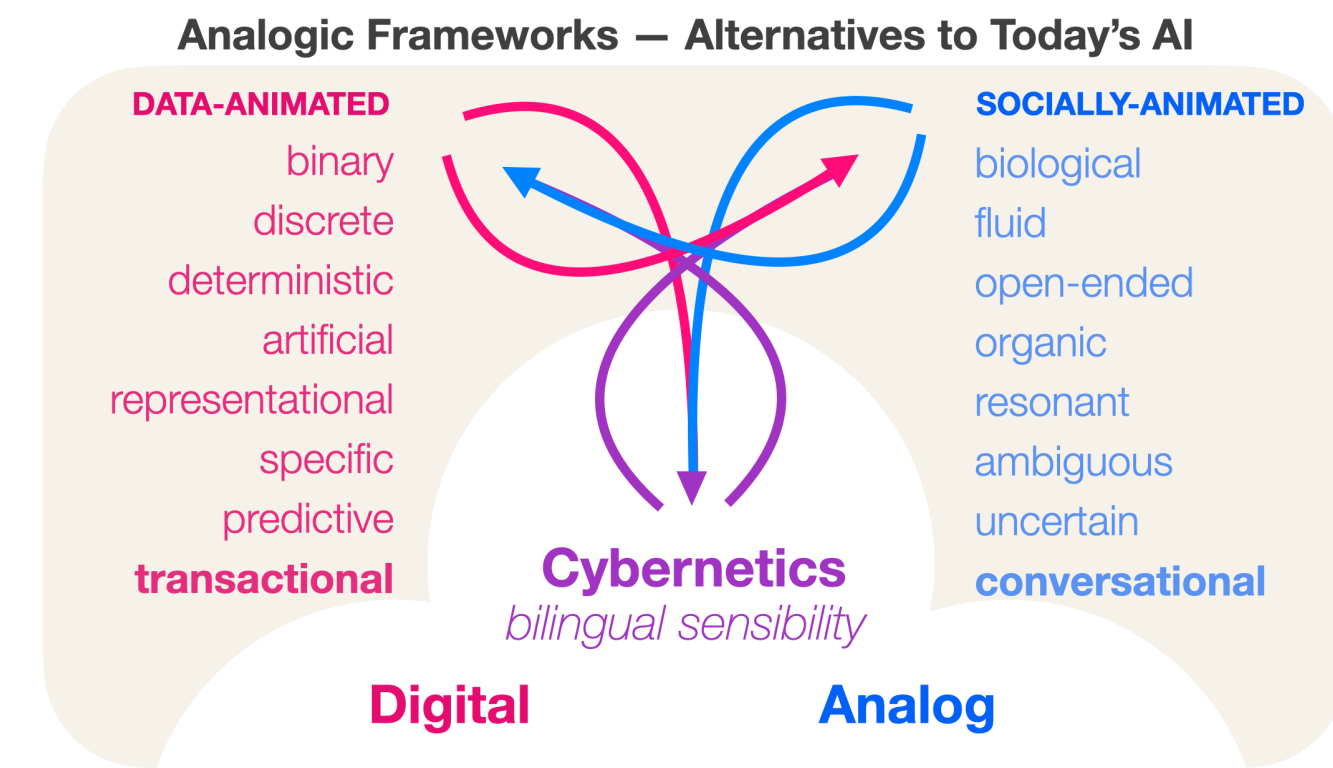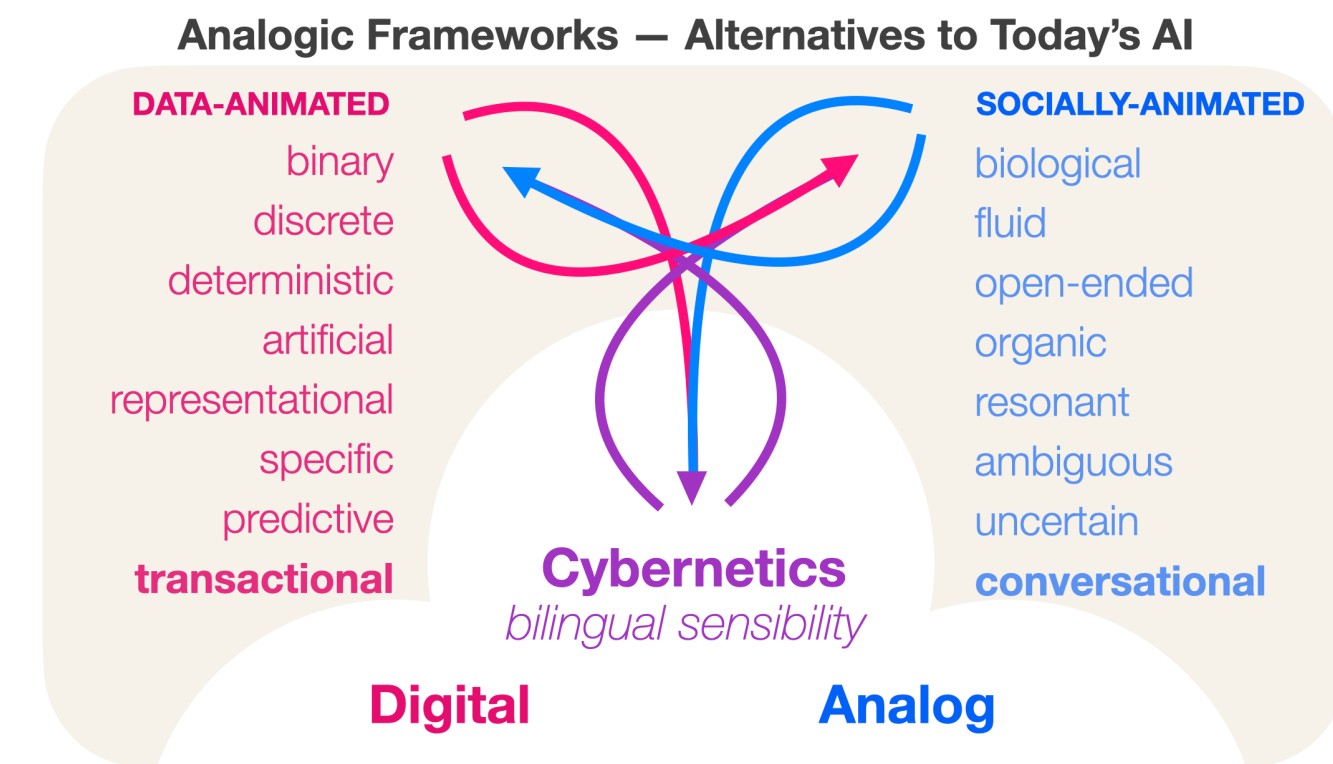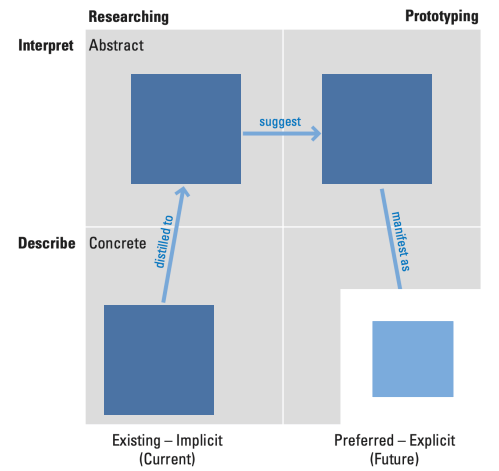organic
resonant
ambiguous
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Cybernetics
bilingual sensibility

Digital   Analog

Our purpose is to design and integrate
new classes of interactional systems
with today's AI and digital technologies
to **create and promote** a new category of
analog interactional frameworks.

Bringing about a preferred future
Piloting a New Course

Create and promote analog interactional frameworks

a. **Identify participants & examples**
   - find current examples
   - characterize their qualities
   - fan out to find related efforts
   - develop database
   - share openly and seek critique

b. **Characterize contexts where AI is now influential or prevalent**
   - gather types of AI algorithms
   - deconstruct search, recommenders, social…
   - build models of today's AI algorithmic types
   - share openly and seek critique

c. **Establish a new paradigm of analog interactional systems**
   - match AI contexts to new frameworks
   - prioritize for impact & importance
   - gather experts to evolve the frameworks
   - share openly and seek critique
   - produce and distribute outcomes as design patterns, toolkits, and workshops

d. **Code new systems & disseminate**
   - prototype these alternatives as open source
   - critique with sociologists, economists, MBAs…
   - add to curricula for designers, coders…

Cybernetics + AI = Bilingual Synthesis
Wicked Problems of "Today's AI"

To respond with variety, we must convene conversations that:

◎ move toward action—conversation alone is not enough

◎ are trans-disciplinary—cut across silos and vested interests

◎ are trans-global—cut across geographies, are inclusive and diverse

◎ are trans-generational—bring viewpoints & collaboration across ages

◎ engage all roles involved in bringing technology to society

So that we—of Systems + Cybernetics —bring about positive change

Cybernetics + Macy Meetings

In the 1940s and 1950s, a series of small conferences were funded by the Josiah Macy Jr Foundation.

Experts from a vast range of disciplines focused on purpose in understanding and designing complex systems. They created a new way of thinking and acting in the world and started a revolution.

They called this new field cybernetics from a Greek word meaning the art of steering toward a goal—acting with purpose.

These original Macy Meetings changed the worlds of science, engineering, and humanities.

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These original Macy Meetings changed the worlds of science, engineering, and humanities. We need such a revolution again to tame today's "wicked problems"—#NewMacy Meetings.

CYBERNETICS

CIRCULAR CAUSAL AND FEEDBACK MECHANISMS
IN BIOLOGICAL AND SOCIAL SYSTEMS

#NEW MACY MEETINGS

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Cybernetics + Macy Meetings

Original Macy Meetings
1943 – 1955

◎ post-WWII "world order"

◎ digital rising

◎ circular causal & feedback mechanisms

◎ closed selection of participants

◎ transdisciplinary

#NewMacy Meetings
2020 –

◎ post-COVID "wicked problems"

◎ digital supreme

◎ … + socio-technical entanglements

◎ open network of collaborators

◎ transdisciplinary
transglobal
transgenerational

#NewMacy Conversations

Summary of activities

◉ Launched at <u>Seminar</u> at Carnegie Mellon, March 2020

◉ On-going conversations in association with the American Society for Cybernetics, from April 2020

◉ <u>Cybernetics and Designing for Action</u>, September 2020

◉ <u>#NewMacy Meeting Experiment #1</u>, September 2020

◉ <u>Presentation at AIAgora</u> at TU Delft, December 2020

◉ <u>Manifesto</u> document, March 2021

◉ <u>Responding to the Pandemic of "Today's AI"</u> evolving draft

◉ <u>#NewMacy Meeting #2: "Urgent Questions"</u> in response to "Today's AI", ASC Series Event, September 2021

What's next

◉ Advancing the plan to respond to Today's AI

◉ Formulating Conversations for October 2021

◉ Interactive Session at RSD10 held at TU Delft

◉ Designing for variety in #NewMacy Conversations

◉ Reaching GenZ (18 to 25 year-olds) to represent their worldview and values on upcoming generations

◉ Seeking #NewMacy Network organizations

◉ Seeking #NewMacy Network individual participants

◉ Continuing to build #NewMacy Advisory Council

#NewMacy Advisory Council

Confirmed Members

- **Philip Beesley / U of Waterloo – Toronto**

- **Hugh Dubberly / San Francisco**

- **Deborah Forster / USA**

- **Omar Kahn / Carnegie Mellon – USA**

- **Guilherme Kujawski / São Paolo**

- **Delia Pembrey MacNamara / Australia**

- **Innocent Ndubuisi-Obi, Jr / USA**

- **Nga Nguyen / New York**

- **Despina Papadopoulos / New York**

- **Andy Pickering / UK**

- **Bernard Scott / UK**

- **Renee V. Wallace / Detroit**

—More to follow

Cybernetics and the AI Crisis
Piloting a New Course = #NewMacy

Today I have argued that:

◉ **Digital culture contributes to the Pandemic of "Today's AI."**

◉ **Human experiences of interaction, information, and intelligence are compromised.**

◉ **Analog interactional frameworks can be organic, conversational, and humane.**

◉ **Cybernetics offers bilingual sensibility to bridge the analog & the digital.**

◉ **Promoting new design patterns & working prototypes can bring positive change.**

◉ **Urgency of the need and scale of the challenge requires that we convene #NewMacy Conversations in a Network of #NewMacy Meetings.**

#NewMacy Network + #NewMacy Meetings
Piloting a New Course = #NewMacy

Let us bring about a rich mesh of collaborations
among individuals and organizations—
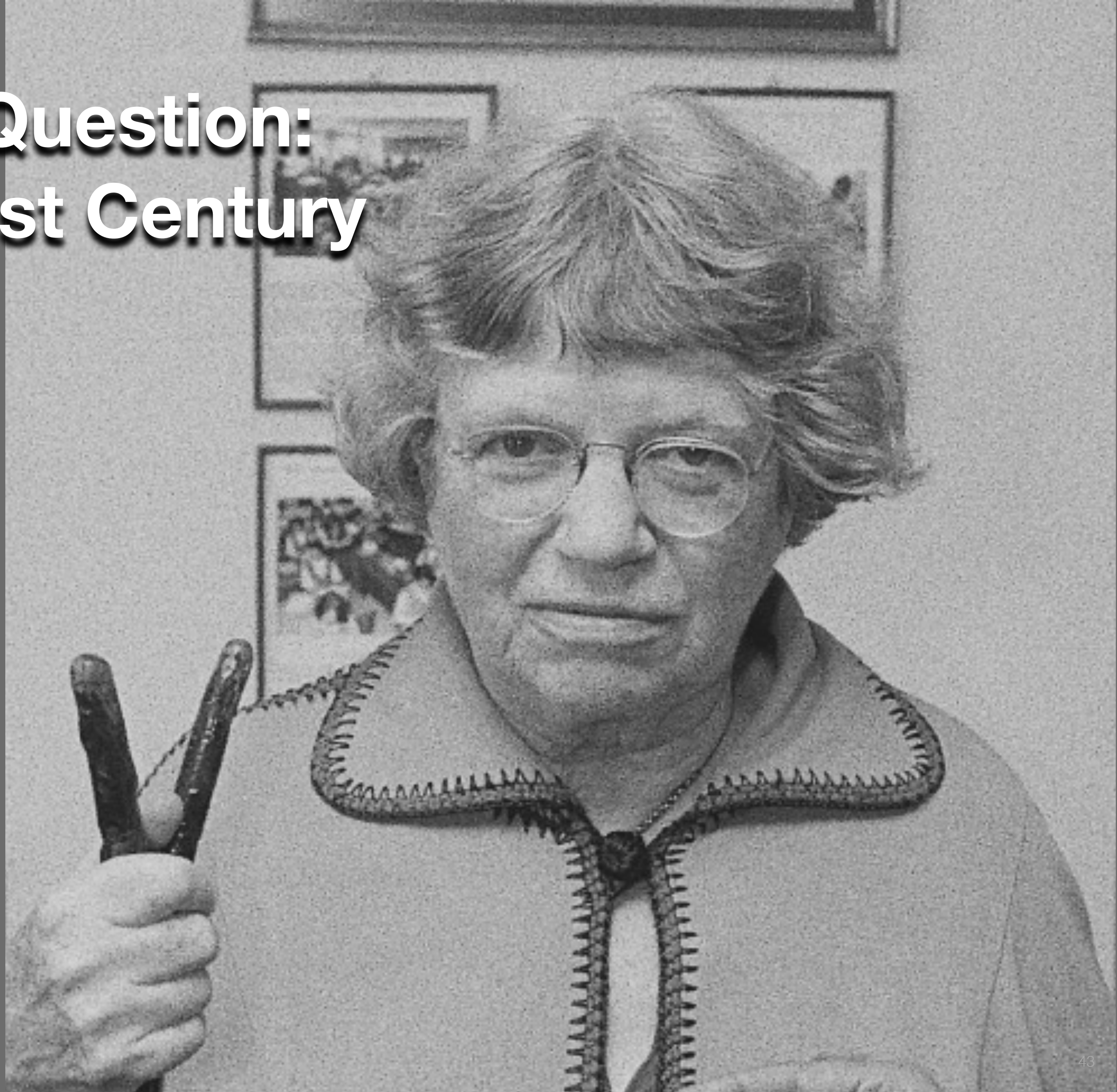across disciplines, geographies, and generations.

We will be deliberate about what we wish to conserve
as analog, biological, social beings—
and then use technology to serve our principles.

We are excited to see what can emerge.

Please join us. Write to <u>ppangaro@cmu.edu.</u>

Margaret's Elegant Question: #NewMacy in the 21st Century

WOSC 2021 Keynote
29 September 2021 — 16.00 Moscow

#NewMacy Meeting #3

October 16 2021 — 12.00 US Eastern

Paul Pangaro
ppangaro@cmu.edu
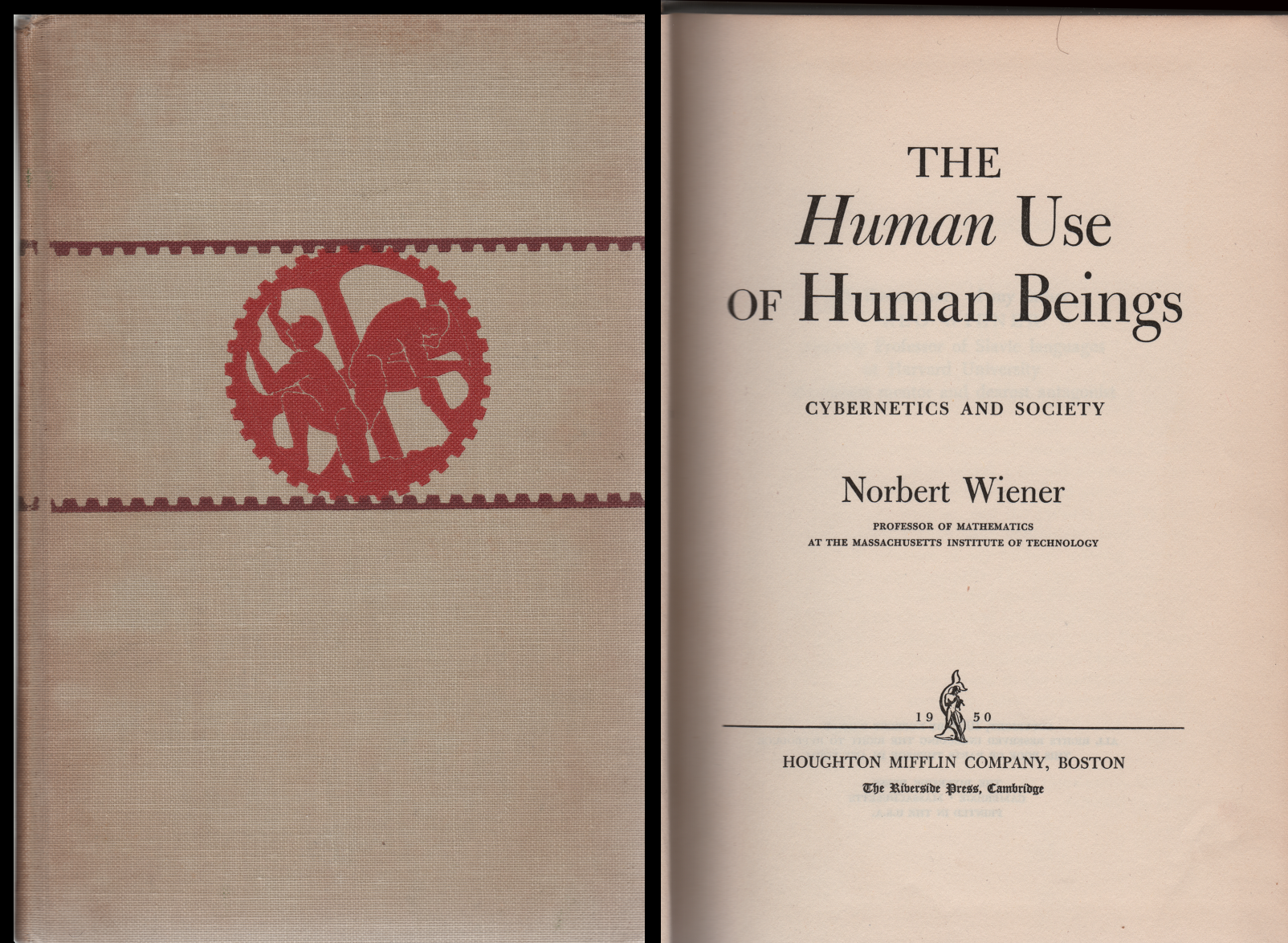
american society for cybernetics

#newmacy

Cybernetics and the AI Crisis
A Bilingual Synthesis

Thank you.

"The hour is very late,
and the choice of good or evil
knocks at our door."

—Norbert Wiener 1948

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Cybernetics and the AI Crisis
A Bilingual Synthesis

Thank you.

Special thanks to:
Igor Perko
Karen Kornblum
Deborah Forster
Andy Pickering
Larry Richards
Bernard C.E. Scott
Andrew Schmookler
Mark Sullivan
Ben Sweeting
Claudia Westermann

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—*Norbert Wiener 1948*

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Thank you.

Links

#NewMacy-Related Links

#NewMacyMeeting #1

Cybernetics, AI, and Ethical Conversations

Pickering, "The Next Macy Conference"

Pickering, "Ontology and Antidisciplinarity"

Wiener 1949, NYTimes article by John Markoff

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