

23 December 2022

# AGI Debate

on MONTREAL.AI's YouTube channel

[https://youtu.be/JGiLz\\_Jx9uI](https://youtu.be/JGiLz_Jx9uI)

WITH

Erik Brynjolfsson, Yejin Choi, Noam Chomsky, Jeff Clune, David Ferrucci, Artur d'Avila Garcez, Michelle Rempel Garner, Dileep George, Ben Goertzel, Sarah Hooker, Anja Kaspersen, Konrad Kording, Kai-Fu Lee, Gary Marcus, Francesca Rossi, Jürgen Schmidhuber, Angela Sheffield and Meredith Whitaker



**Memory slices by Anna Strasser**  
**DISCLAIMER: JUST MEMORIES – AIMING FOR CORRESPONDENCE WITH REALITY BUT CANNOT GUARANTEE IT.**



# FIVE QUESTIONS

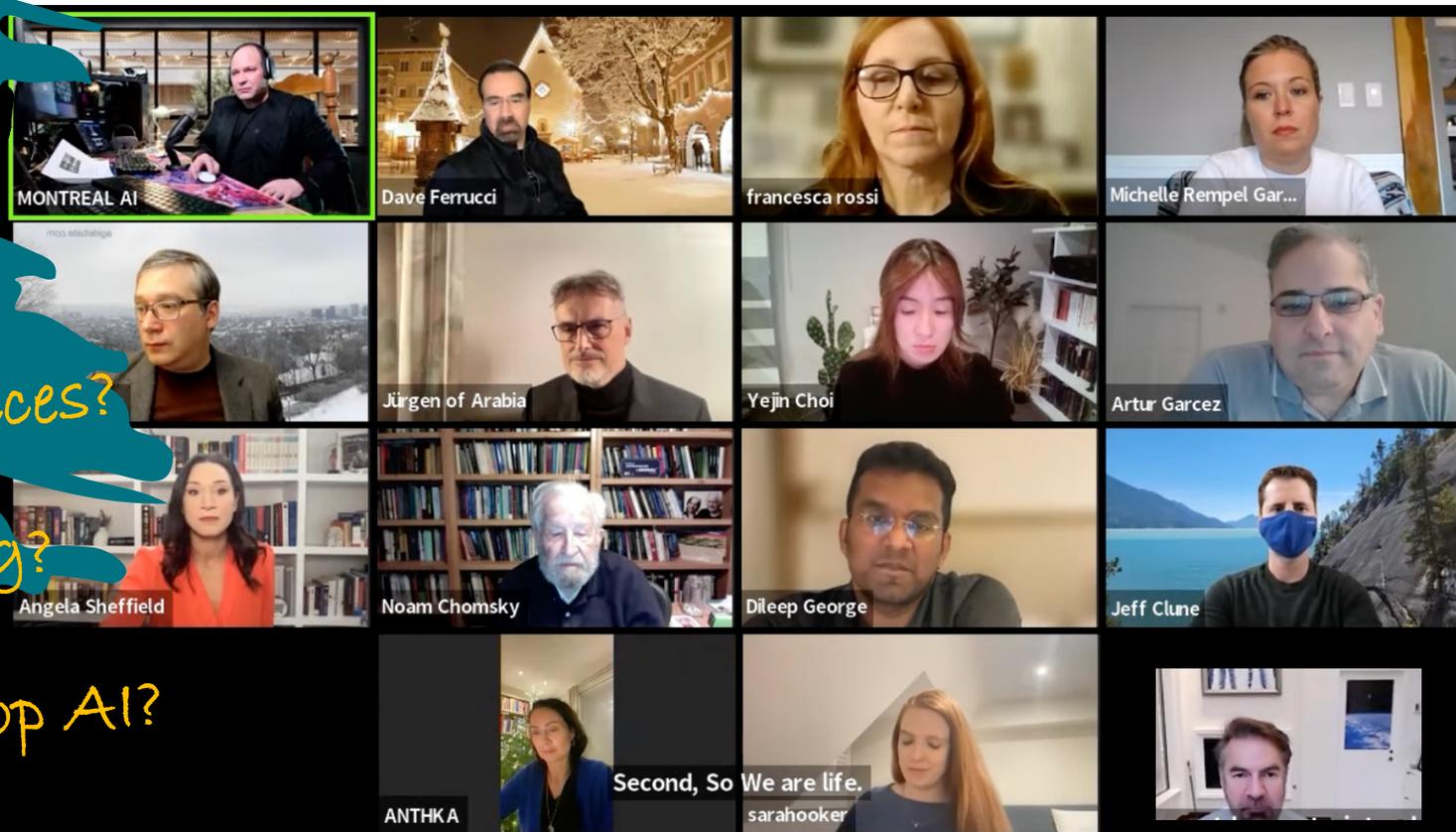
1 Turn to cognitive (neuro) sciences?

2 Get to commonsense reasoning?

3 Structure/develop AI?

4 Build AI system with human values?

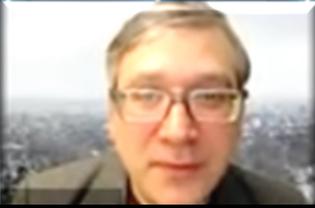
5 Moral & legal issues?



“It is hard to know where [AI researchers] have gone wrong: in underestimating language or overestimating computer programs”



NOAM CHOMSKY



GARY MARCUS



Konrad Kording



DILEEP GEORGE

DOES NOT TELL US ANYTHING ABOUT LANGUAGE

- systems make no difference between possible & impossible language
- even though there is utility such as transcriptions, translation, plagiarism

1. abstraction
2. reasoning
3. compositionality
4. factuality

- NOT TALKING ABOUT BRAINS
1. architecture
  2. learning rule
  3. objective function

- FUNDAMENTAL DIFFERENCES BETWEEN CURRENT MODELS & HUMAN-LIKE INTELLIGENCE
- data-efficiency & causality
  - learned world-models compatible with reasoning
  - grounding language with mental simulation
  - utilizing emergent insights from scaled-up models
  - utilizing insights from cognitive science & neuroscience

DISCUSSION

Marcus: Should AI spend more time on innateness?

Chomsky: any growth from initial state → steady state, involves 3 factors:

1. Internal/innate structure
2. Data coming in
3. General laws of nature

# 1. TURN TO COGNITIVE (NEURO) SCIENCES?

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YEJIN CHOI

COMBINING DEEP LEARNING & SYMBOLIC  
THINKING FAST & SLOW



BEN GOERTZEL

INTRODUCED THE TERM AGI



JÜRGEN  
SCHMIDHUBER

METALEARNING!!



FRANCESCA ROSSI

COMBINING DEEP LEARNING & SYMBOLIC  
THINKING FAST & SLOW

2. GET TO  
COMMONSENSE  
REASONING?

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### Four Pillars

1. Meta-learn architectures
2. Meta-learn learning algorithms
3. Generate effective learning environments
4. Leveraging human data



JEFF CLUNE



SARA HOOKER

**AVOID THE HARDWARE LOTTERY**  
➤ we can't just scale up

Several assumptions about deep neural networks that are arguably primitive:

- Very expensive to memorize the longtail. Majority of weights are dedicated to learning low frequency attributes.
- Backward and forward pass for every example
- All examples are treated equally, despite differences in capacity cost of learning a representation.
- Our model lacks collective intelligence
- Globalized updates lead to "catastrophic forgetting"



ARTUR D'AVILA  
GARCEZ



LIMITATIONS OF CURRENT AI

- FAIRNESS
- DATA/ENERGY EFFICIENCY
- CORRECTNESS, ROBUSTNESS
- EXTRAPOLATION / REASONING
- REUSE OVER TIME / ANALOGY
- TRUST

NEUROSymbolic AI

- elements of symbolic & subsymbolic
- learning from data & knowledge

main challenges: disinformation & not autonomous weapons

## 3. STRUCTURE/ DEVELOP AI?

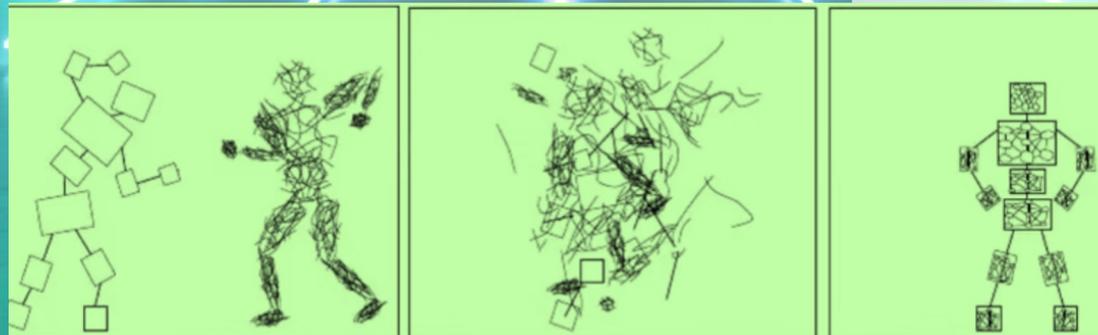
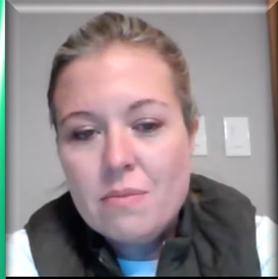


Figure 1. Conflict between theoretical extremes.



MICHELLE  
REMPEL GARNER



YEJIN CHOI

AI safety? Equity?  
Morality?



ANJA KASPERSEN

PRODUCTIVITY GAINS GET SPLIT BETWEEN  
CAPITAL AND LABOR.  
• But each time you replace labor  
with robot, productivity gains  
goes to owner of capital

- value-aligned
- beyond tech solutions
- inclusion
- trust



FRANCESCA ROSSI



DAVID FERRUCCI



ERIK BRYNJOLFSSON



KAI-FU LEE



ANGELA SHEFFIELD

4. BUILD AI SYSTEM  
WITH HUMAN  
VALUES?  
5. MORAL & LEGAL  
ISSUES?