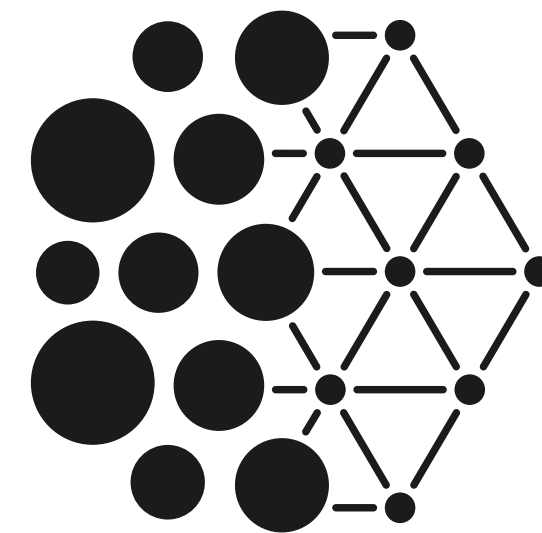


# ON THE WISDOM RACE

YOSHUA BENGIO

NeurIPS'2019 workshop on Fairness and Ethics  
December 13th, 2019, Vancouver BC



Mila

Université   
de Montréal

 McGill

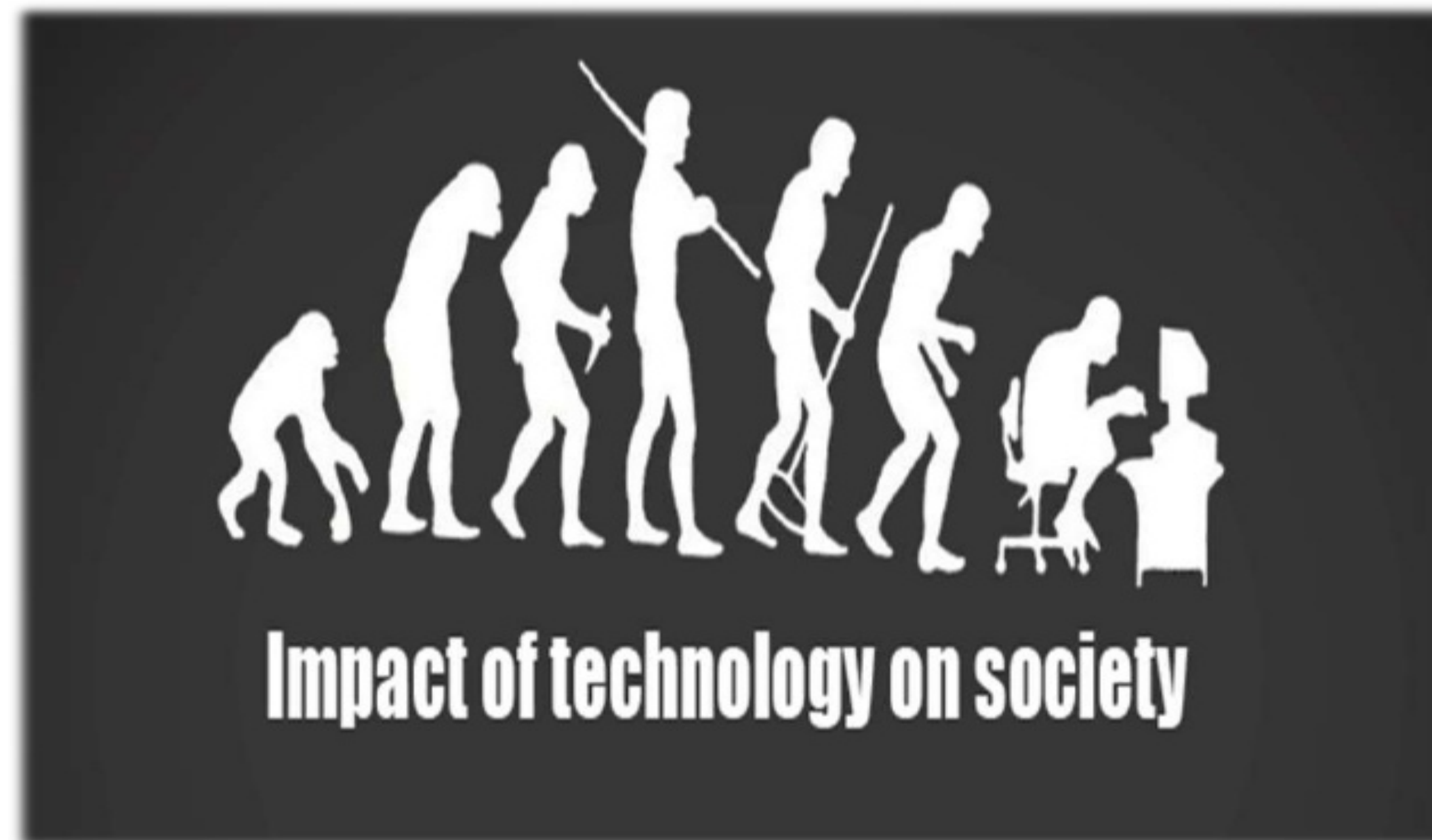
**CIFAR**

# AI GOING OUT OF LABS, INTO SOCIETY

AI is not just a research question anymore

AI-based products are being designed and deployed

➔ new responsibility for AI scientists and engineers



# AI POSITIVE POTENTIAL

- Economic growth
- Material progress for all
- Improving healthcare
- Improving and democratizing education and more (e.g. legal)
- Freedom from work as slavery
- Tools for a healthier democracy



# DANGERS AND CONCERNS WITH AI: **DEMOCRACY IN DANGER**



- Big Brother and killer robots
- Misery for jobless people, at least in transition
- Manipulation from advertising and social media
- Reinforcement of social biases and discrimination
- Increased inequality and power concentration in few companies





# APPLICATIONS I DON'T WANT TO WORK ON

How does it fit with my values? Ask

- How is this technology going to be used?
- Who will benefit or suffer from it?
- How much and what impact?

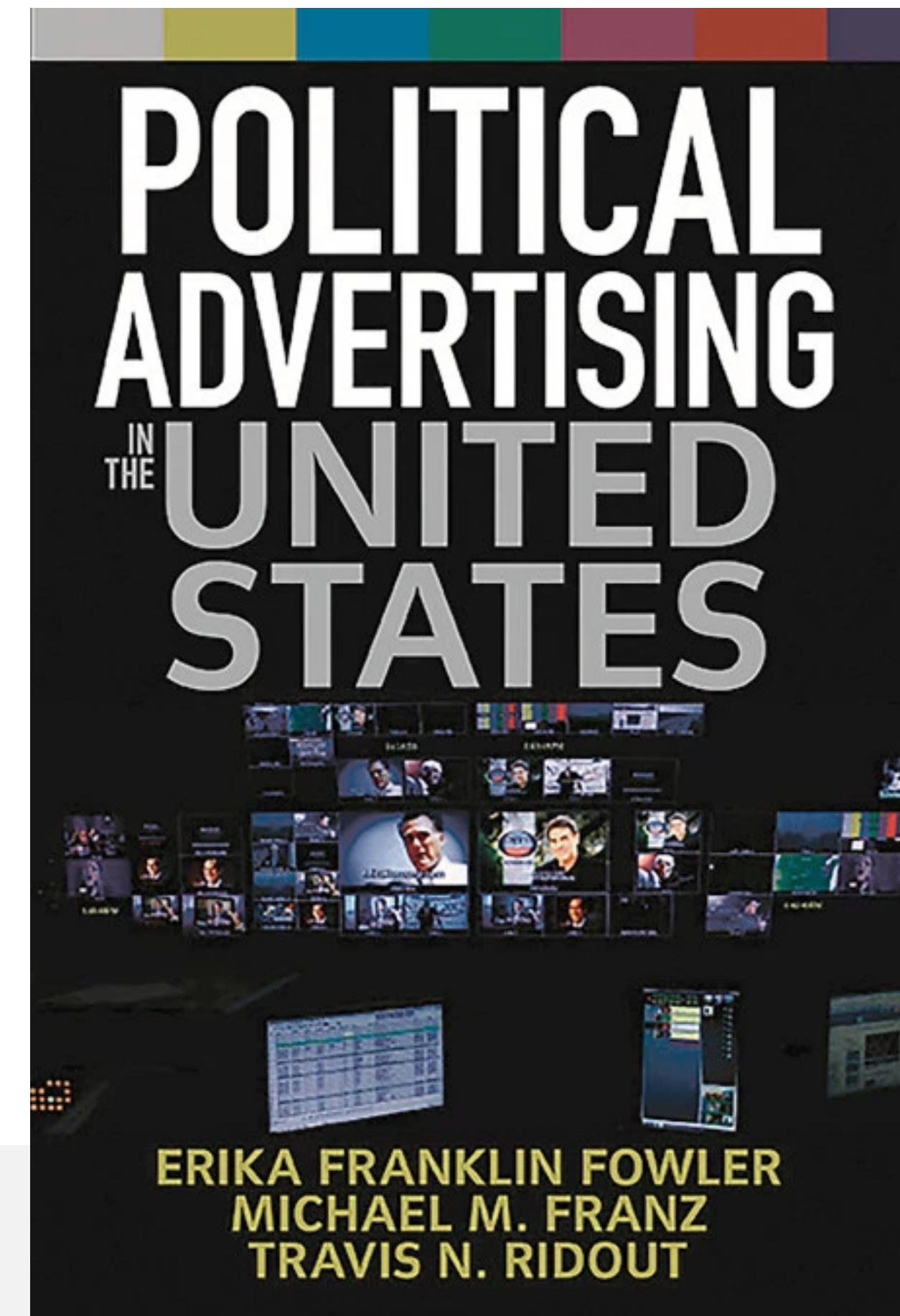
I do not wish to work on

- military applications, especially lethal autonomous weapons
- ML to beat the stock market
- increasing the efficiency of advertising or surveillance
- increasing the efficiency of oil & gas industry, meat industry...



# ADVERTISING AND SOCIAL NETWORKS CAN LEAD TO PSYCHOLOGICAL MANIPULATION & HURT INNOVATION

- **Moral hazard:**
  - Psychological manipulation: for who's benefit? The advertiser.
  - Targeting children forbidden in Canada because they are vulnerable
  - Political advertising
  - Need to draw a red line
- **Economic drag:**
  - favours large incumbents and thus slows innovation
- **Bad Nash equilibrium**





# KILLER ROBOTS: MORAL & SECURITY THREAT

- 62% worldwide in favour of a ban to limit LAWS
- UN Secretary General: "The prospect of machines with the discretion and power to take human lives is morally repugnant... could trigger new arms races"
- 28 states calling for an international ban
- Leading AI scientists signed letters to governments
- 4000 Google employees "Arms Control Person of the Year"
- Companies, countries, civil society must rise
- Example of landmines





# EVERYONE MUST BENEFIT OR ELSE

Think about what happens when any human (e.g. crazy person) can throw off major nuclear weapons on the face of the Earth. This is the threat of unbridled technological development.

**To reap the amazing benefits of technology, we also need to increase the pace of progress of collective wisdom, manage international AI governance, make sure every human is well-fed, well-educated and healthy**





# THE WISDOM RACE

**Collective and individual wisdom** has increased, e.g., the decrease in crimes, wars and extreme poverty

**But not fast enough** to catch up with the rise in power of the tools we are building, which enable power concentration and can be dangerous

***Urgent: get collectively wiser***

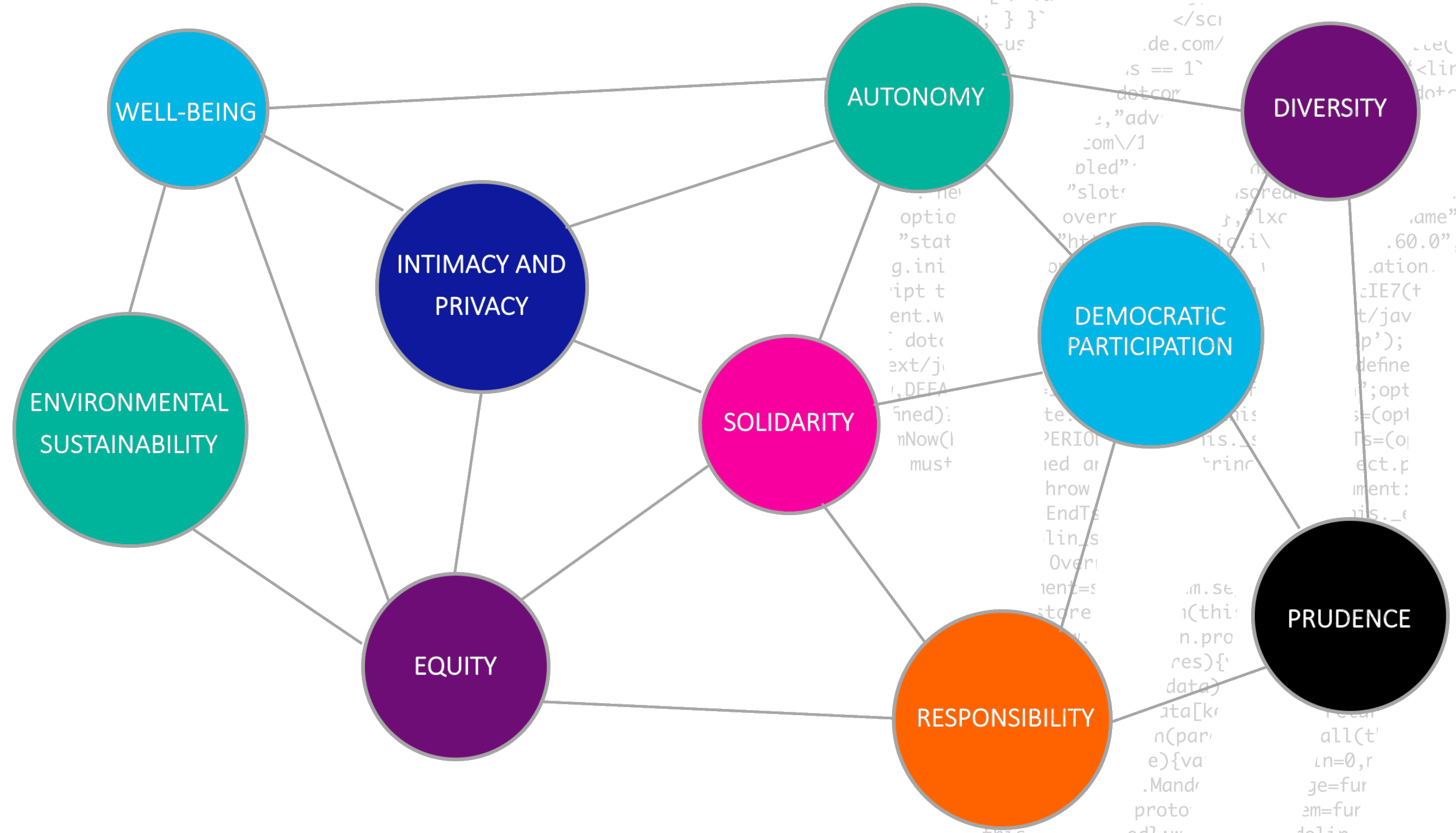


# AI & ETHICS



- What is right or wrong, social perspective
- Social norms need to be adapted to the availability of powerful tech, new lines need to be drawn
- Heart of ethics: manage conflict between values
- Students, both in STEM and humanities & social sciences, need to be educated about these questions

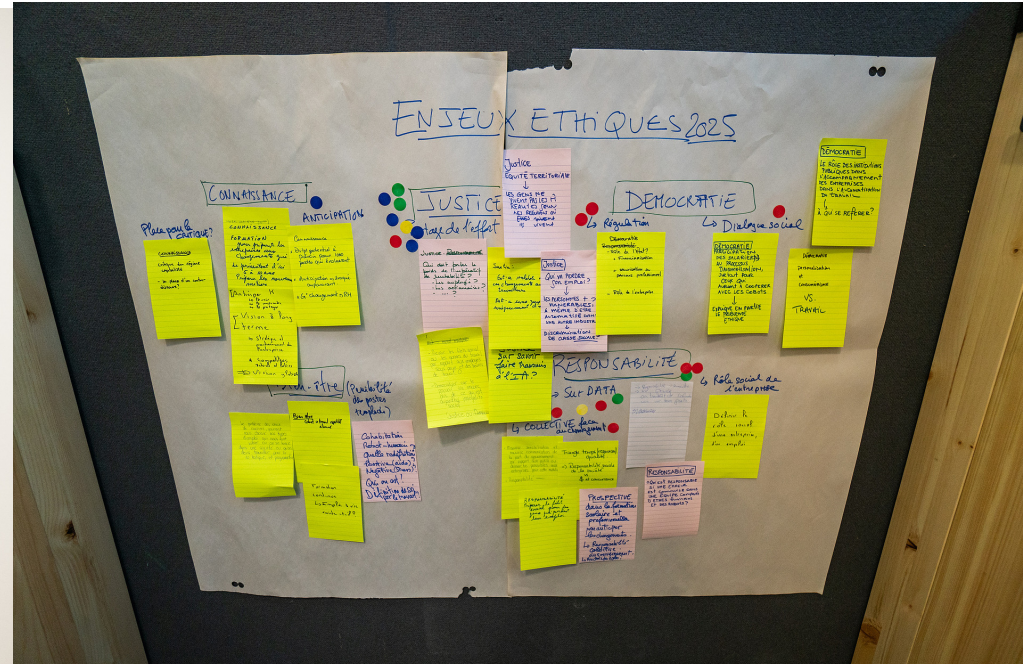
# The Montreal Declaration: 10 principles





# Why should we include citizens in the conversation on AI?

1. The development of AI is everybody's business.
2. It increases the epistemic quality of the deliberation.
3. It helps build trust towards AI systems and increase the acceptability of AI.
4. It has significant educational impact.





# AI FOR SOCIAL GOOD (workshop tomorrow)

Beyond developing the next gadget

AI is powerful, can be misused or bring much good

Actionable items:

- Favor ML applications which help the poorest countries, may help with fighting climate change, improve healthcare, education, etc.
- **AI Commons**: an organization in construction, which will coordinate, prioritize and channel funding for such applications



XPRIZE

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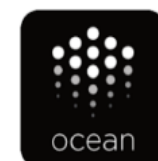


HEC  
PARIS

CHAI  
Center for  
Human-Compatible  
Artificial  
Intelligence

IEEE Standards

fondation  
BOTNAR



INSPIRED  
MINDS!



McGovern  
FOUNDATION

Amir  
Banifatemi



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# ENVIRONMENTAL APPLICATIONS OF AI

- Optimizing energy resources
  - Smart grids, demand forecasting, minimize transportation costs
- Climate modelling
  - Predicting effect of climate change
- Accelerated R&D of new materials
- Conservation efforts
- Visceralization: visualize future impact of climate change





# TACKLING CLIMATE CHANGE

## Tackling Climate Change with Machine Learning

David Rolnick<sup>1\*</sup>, Priya L. Donti<sup>2</sup>, Lynn H. Kaack<sup>3</sup>, Kelly Kochanski<sup>4</sup>, Alexandre Lacoste<sup>5</sup>,  
Kris Sankaran<sup>6,7</sup>, Andrew Slavin Ross<sup>8</sup>, Nikola Milojevic-Dupont<sup>9,10</sup>, Natasha Jaques<sup>11</sup>,  
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S. Karthik Mukkavilli<sup>6,7</sup>, Konrad P. Kording<sup>1</sup>, Carla Gomes<sup>12</sup>, Andrew Y. Ng<sup>13</sup>,  
Demis Hassabis<sup>14</sup>, John C. Platt<sup>15</sup>, Felix Creutzig<sup>9,10</sup>, Jennifer Chayes<sup>16</sup>, Yoshua Bengio<sup>6,7</sup>

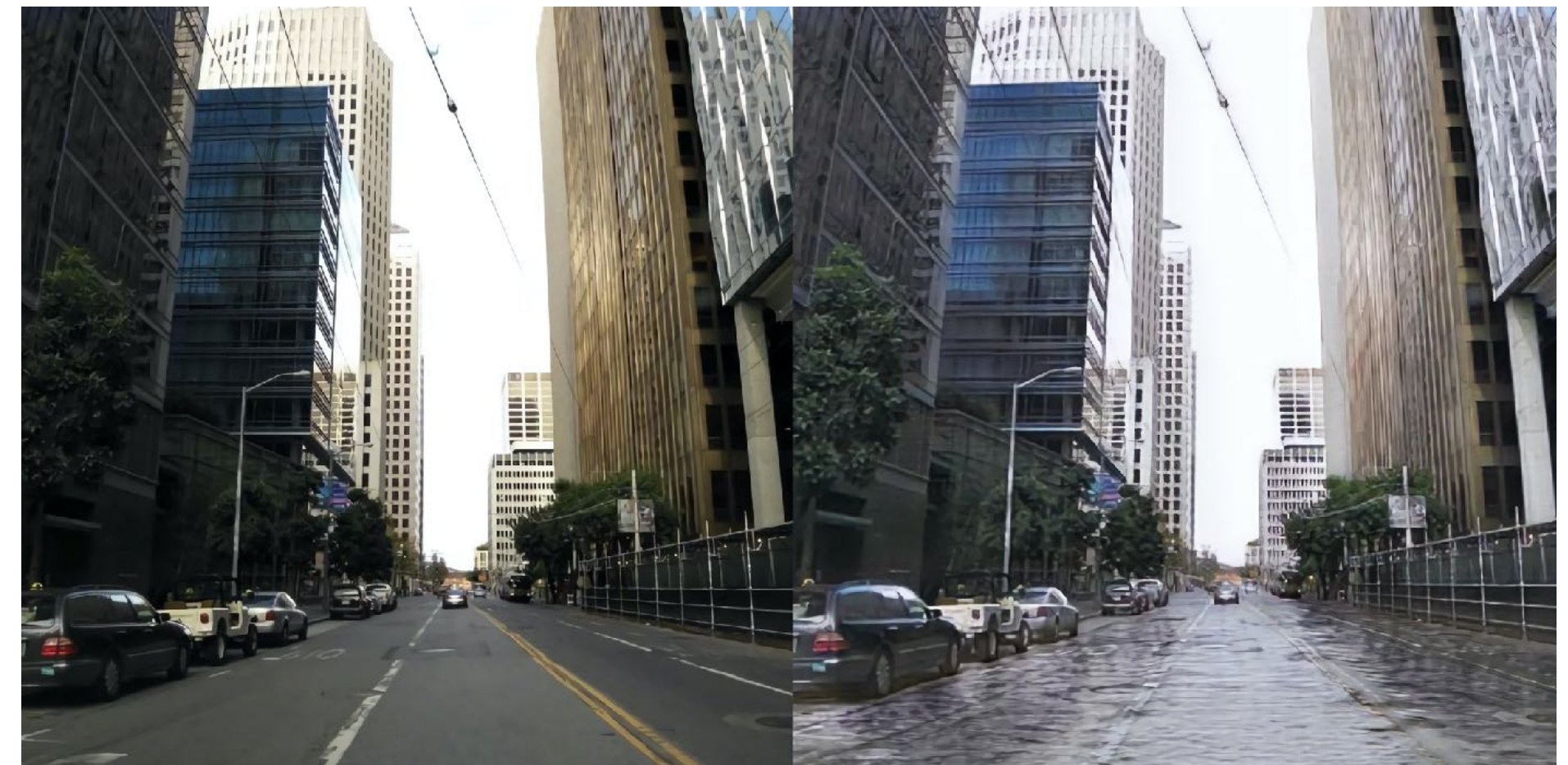
<sup>1</sup>University of Pennsylvania, <sup>2</sup>Carnegie Mellon University, <sup>3</sup>ETH Zürich, <sup>4</sup>University of Colorado Boulder,

<sup>5</sup>Element AI, <sup>6</sup>Mila, <sup>7</sup>Université de Montréal, <sup>8</sup>Harvard University,

<sup>9</sup>Mercator Research Institute on Global Commons and Climate Change, <sup>10</sup>Technische Universität Berlin,

<sup>11</sup>Massachusetts Institute of Technology, <sup>12</sup>Cornell University, <sup>13</sup>Stanford University,

<sup>14</sup>DeepMind, <sup>15</sup>Google AI, <sup>16</sup>Microsoft Research



# SUFFICIENT TO FIGHT CLIMATE CHANGE: POLITICAL WILL

- It may still technically be possible to limit warming to 1.5C if drastic action is taken now: Smith et al, Nature Communications, 15 jan 2019
- Politicians will act if there is sufficient priority given to climate change in the general population (dixit some politicians who want to do more but whose hands are tied by current opinions)
- How do we convince those who are not yet and increase the priority they give to this issue?





# THE CLIMATE CHANGE VISUALIZATION PROJECT

- We are working on a project that aims to generate **images** that depict **accurate**, **vivid**, and **personalized** outcomes of climate change using CycleGAN models.



Team members: Karthik Mukkavilli, Sasha Luccioni, Victor Schmidt, Vahe Vardanyan in collaboration with Jennifer Chayes (Microsoft Research)



# THANK YOU

