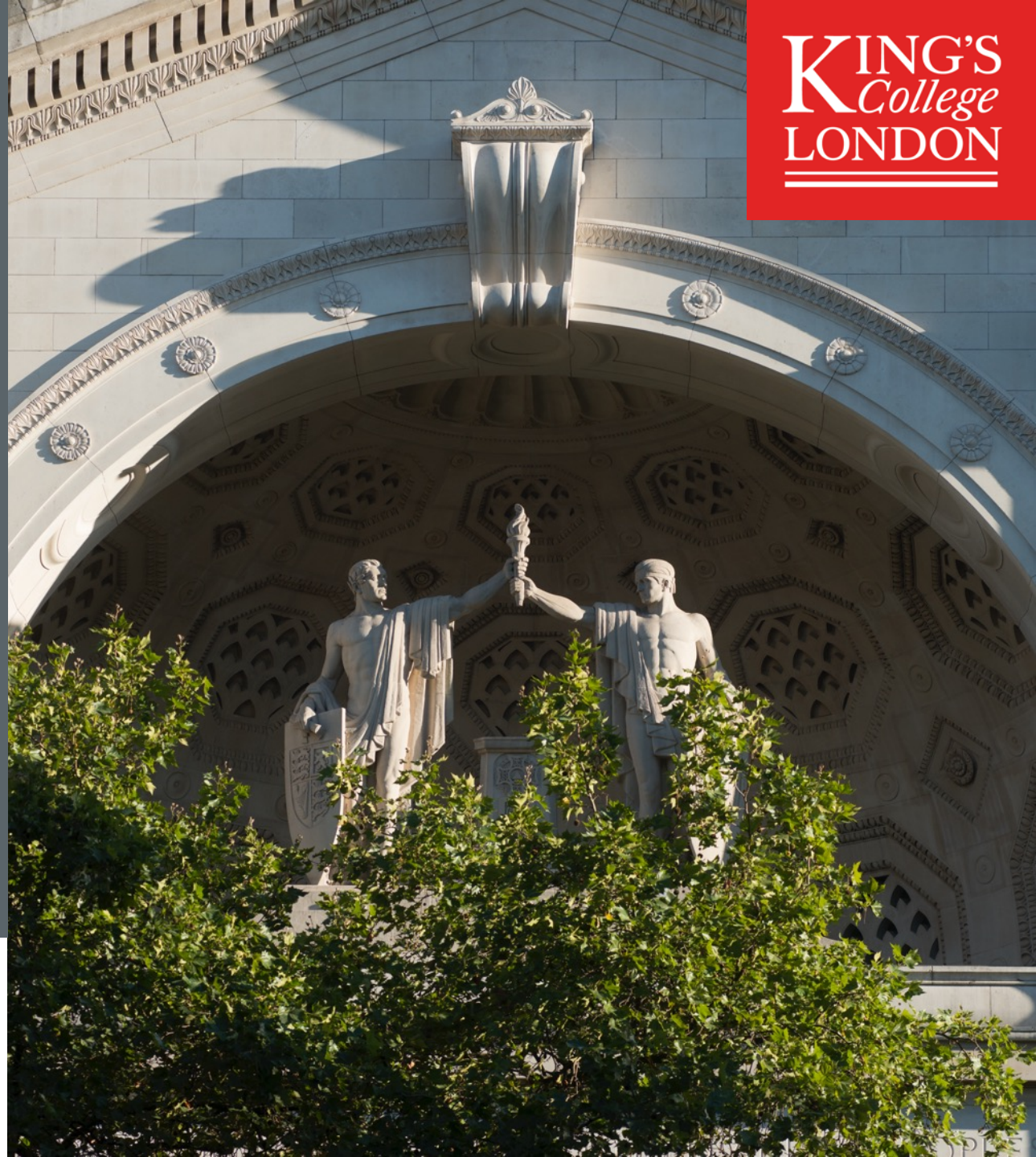


Re-framing research ethics frameworks to include environmental sustainability

Dr Gabrielle Samuel
Wellcome Research Fellow
Gabrielle.Samuel@kcl.ac.uk
[@gabriellesamue1](https://twitter.com/gabriellesamue1)



KING'S
College
LONDON



Format of talk

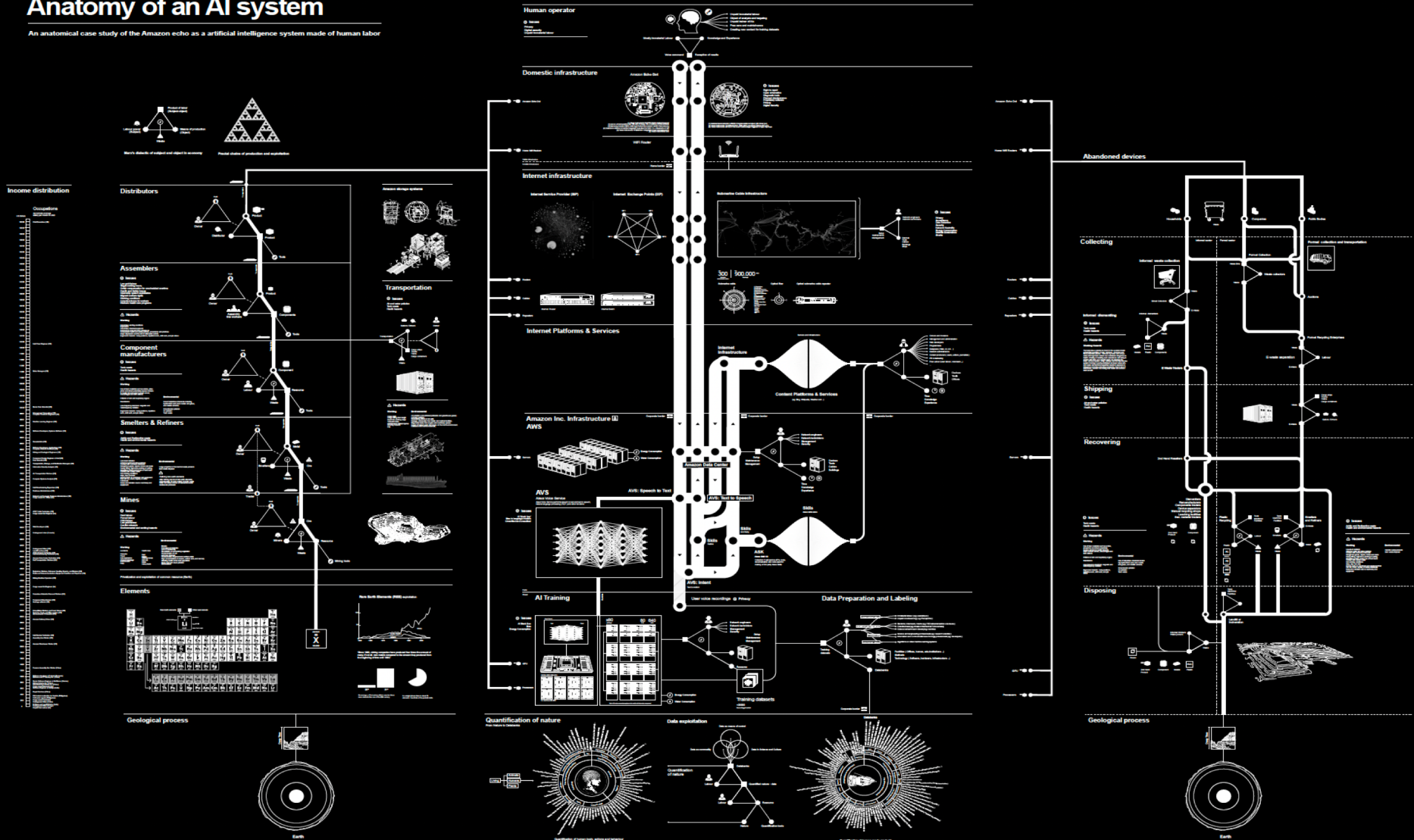
- Describe adverse environmental and health impacts of AI (health) research endeavours
- Need for normative consideration in research processes
- Historically, research ethics governance frameworks do not explicitly consider these impacts
- Propose modification of Emanuel et al.'s (2008) international research ethics framework
- Describe what this would look like in practice
- Limitations

Anatomy of AI (Kate Crawford, Vladan Joler)

AI based on digital technologies, which have physicality/materiality

Anatomy of an AI system

An anatomical case study of the Amazon echo as a artificial intelligence system made of human labor



AI methodologies: have high energy demands

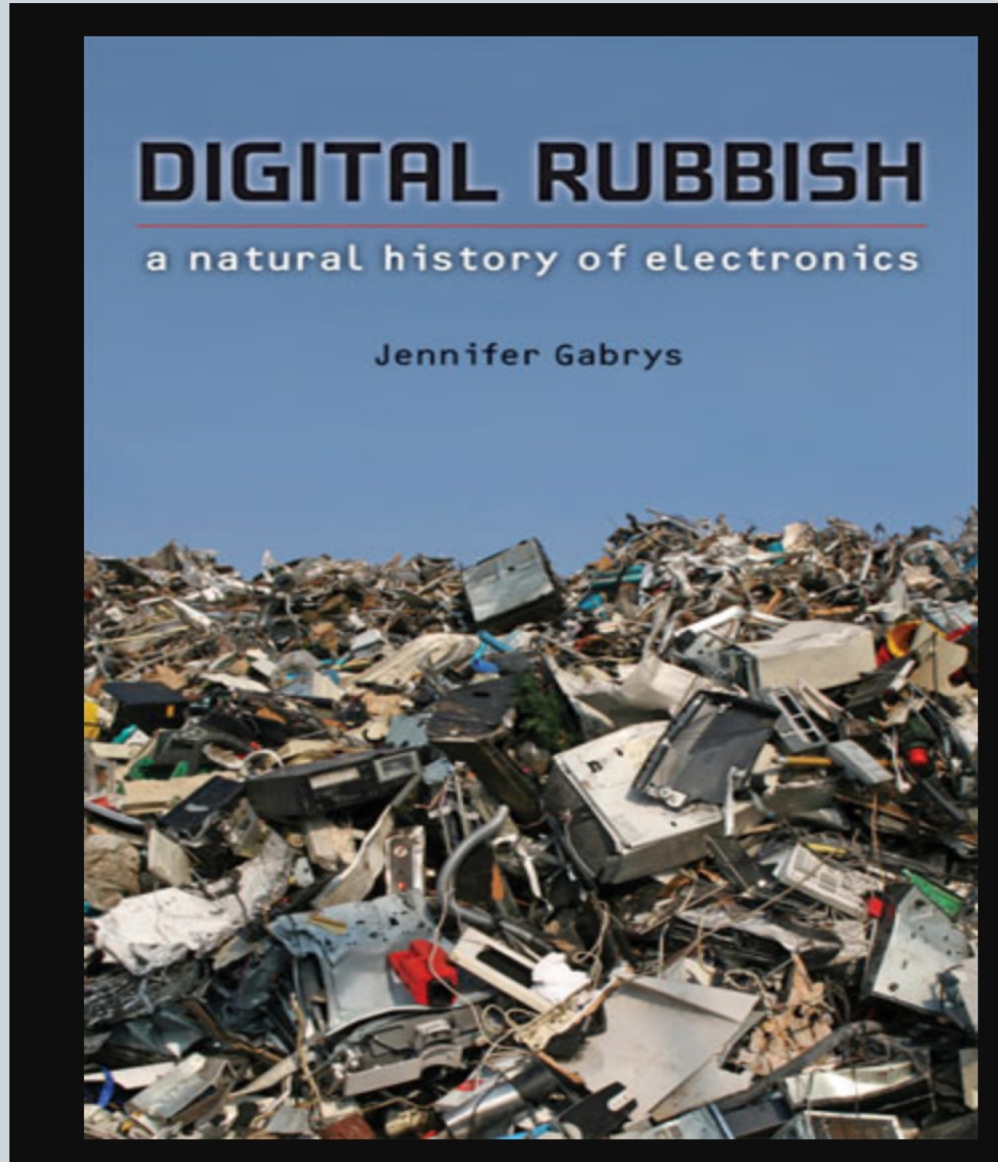


<https://www.orangewebsite.com/articles/data-center-pollution/>

AI methodologies: rely on mining



AI methodologies: associated with e-waste





REASSEMBLING RUBBISH

WORLDING ELECTRONIC
WASTE

JOSH LEPAWSKY

Moral imperative to consider these issues

- Adverse environmental and health impacts of AI (health) research is particularly problematic when these technologies are used in the health context because there appears to be an internal contradiction between the goal of improving health conditions and the environmental and health risks due to their environmental impact
- As such , AI (health) research has a special interest in addressing its adverse environmental and health impacts, not only as a matter of international priority, but also as a commitment to health

Current research ethics frameworks

- Historically revolved around ethics principles concerned with the protection, rights, safety, and welfare of individual research participants
- Respect for community emphasised to sit alongside individually focused principles
 - Community harms = more than the sum of individual values and interests (will communities be beneficiaries of the research/share the same goals)
 - e.g. how an AI algorithm to detect skin cancer was shown to have been optimised for fair skin, being less able to detect Melanoma on darker skin
 - e.g. using AI for diagnosis given issues with recognising certain faces
- Moral gaze focuses only on humans.
- Need for moral gaze to expand to include the environment (ecocentric ethics) OR remain on humans (anthropocentric ethics), but consider the harms caused by adverse environmental effects
- https://www.nature.com/articles/d41586-022-03050-7?error=cookies_not_supported&code=3e4d4a57-54e0-405d-bbf9-61d3bcf9aa2b&utm_medium=Social&utm_campaign=nature&utm_source=Twitter#Echobox=1666213670-1
- <https://www.theatlantic.com/health/archive/2018/08/machine-learning-dermatology-skin-color/567619/>

Research ethics framework: AI global health research

Emanuel et al (2008)	Modified research ethics framework
Social value: research must have reasonable potential to benefit participants, community, and/or society. Adverse effects must be minimised.	Social value: Adverse effects explicitly associated with the environment need to be considered.
Respect for participants; community partnerships: respecting all of those affected by the research (participants and community)	Respect for persons, communities, and environment: Respect for environment means being attentive to the adverse environmental impacts of using digital tech during research and taking steps to reduce them.
Fair participant selection: participants selected in a way that is fair, allows generation of reliable/valid data, minimises harm; communities involved in the research process and receive benefits.	Fair collection, storage and use of data: including linkage, and sharing of data, as well as attention to equity and benefit sharing of research outcomes. Fair consideration of those affected by the research: including those affected during the manufacture, use and disposal of digital tools used during research process.
Favourable risk/benefit ratio: determined by those affected by partaking in research and/or affected by research outcomes.	Favourable risk/benefit ratio: also includes those affected by the manufacture of digital products used during AI research, and subsequent disposal of digital products/e-waste.

Implementation of framework in practice

For researchers and research ethics committees	For research policymakers
<ul style="list-style-type: none">• Where data are stored?• Differential storage of data (long and short latency times) to reduce energy costs where possible.• Algorithms optimised for environmental considerations. Considerations of obsolescence.• See Lannelongue (2021) for more in-depth guidelines• Lannelongue L, Grealey J, Bateman A, Inouye M. Ten simple rules to make your computing more environmentally sustainable. <i>PLoS computational biology</i> 2021;17(9):e1009324-e	<ul style="list-style-type: none">• Not <i>solely</i> relying on the increasing efficiency of digital technologies to reduce the adverse environmental impacts Put constraints in place.• Constraining the level of resources provided to AI researchers.• Resources could be shared more equally with research proposals that use methodologies with lower environmental costs (e.g., research addressing social/political/economic determinants of health (which likely have bigger impact on health outcomes)).

Limitations

- Incomplete data associated with changing practices to address specific environmental impacts
 - Compounded by the often lack of transparency from private data storage and processing companies, or their incomplete knowledge.
- Nevertheless, the above changes could be implemented without this evaluative data with the driving goal of reducing consumption.



Thank you

Dr Gabrielle Samuel

Senior/Wellcome Research Fellow

Gabrielle.Samuel@kcl.ac.uk

[@gabriellesamue1](#)