Lecture 1, Sep 8, 2022

Worldview

- What is a worldview?
  - The lens through which we see the world
  - A set of assumptions we hold about the world
  - Implicit in almost every act, vital but invisible
  - Can be understood on the societal or individual level

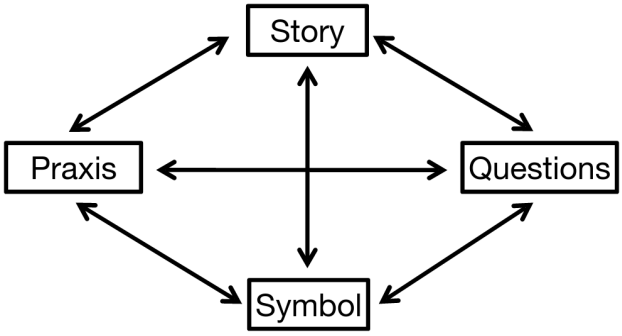

Figure 1: Wright's Model of World View

- Wright's Model of World View:
  - Questions
  - Story
    - Answers to questions are influenced by personal stories
  - Praxis
    - The behaviour that plays out, influenced by the worldview
  - Symbol
    - e.g. displayed certificates etc symbolizing values
- Confirmation bias: Our worldview inclines us towards motivated reasoning that seeks to confirm what we already believe
  - Positive bias: What can I believe? How can I affirm this position?
  - Negative bias: What must I believe? How can I reject this position?
- To reach a better world, we must face up to our challenges

Where is "Here"?

- Foundations of our era:
  - Secularism
  - Observable science
  - Colonialism
  - Industrialization
  - Capitalism
  - Consumerism
- After WWII, two competing ideologies appeared:
  - Keynesian Economics:
    - Government mitigates the market, prevents it from crashing
    - Government fills gaps in employment
    - Social responsibility to the disadvantaged
  - Neoliberalism:
    - Government frees the market by eliminating regulation
    - Government spends less

    * Freed capital will "trickle down" to all
    * IMF and World Bank are highly influenced and then influenced others

Neoliberalism

- Beliefs of neoliberalism in the West:
  1. Progress is inevitable
  2. Value is defined in the marketplace
  3. Human potential rests with the individual
  4. Capital freed of regulation will find its own best way forward
- Neoliberalism has become the dominant ideology in the recent era
- The legacy of neoliberalism:
  1. Increased tax burden on the individual rather than corporation
     – Corporate tax has fallen, payroll tax has risen
     – Less sense of corporate responsibility
  2. Increased wealth disparity (between and within countries)
     – Growth used to be more on the poor, but now the rich experience more growth
  3. Increased pace of extraction, production, and waste
  4. Unsustainable dependency on nonrenewable energy
- As a result there is a growing disillusionment with neoliberalism

The Crises of the Age

- The crises of the age proposed by MacLaren:
  1. Sustainability crisis
     – We're using resources too fast
  2. Equity crisis
     – Some of us are using far more resources are others
  3. Security crisis
     – People are radicalized by inequity
  4. Spiritual crisis
- How do we respond to them?

Lecture 2, Sep 9, 2022

The Big Ideas

1. Science-Technology-Society Studies (STS)
   - Understanding the relationship between technological and social development
   - Influenced by the environment & civil rights movements (more critical nature)
   - Encourage critique of dominant ideologies
2. (Breaking the) Sociotechnical Dualism
   - Science and mathematics is understood to be the basis of engineering expertise, which gives it a false objectivity
3. Sitting with Discomfort

Epistemology

- The philosophy of knowledge – how do we know things?
- Positivism: knowledge is objective
  – Single truth
  – Scientific
  – It can be proved, or it can't
- Interpretivism: Knowledge is socially constructed

  - Changes with time, context, culture
  - Qualitative observations and discussion
- Highlights from Nightingale's *What Is Technology*:
  - Complex understanding of technology beyond the physics of the artefact
  - How we define and think about technology impacts how we evaluate it
  - The two pathologies:
    1. Technology as a gadget: it's a system of artefacts and knowledge; thinking of technology as a gadget misses all the indivisible infrastructure
    2. Technology as a way of seeing the world: if technology becomes second nature, we can mistake it for being natural
       * Postman's technology becoming mythic

Lecture 3, Sep 15, 2022

Actor Network Theory Goals

- Goals: breaking the sociotechnical dualism (technology and society are not necessarily separate things), and making the invisible visible (technology is not just a gadget)
- Transitional approaches to the study of technology:
  - Technological determinism: Technology develops in a fixed sequence and imposes characteristics on society
    * Technology as a gadget – there is something inherent to it that impacts society and individuals
    * Example: Zoom
      - Inherent traits: low cost of reproduction, non-rival (doesn't get used up), taps into a global network which affords it usability – demands participation
      - Specific features: participant list, annotation, institutional account – refuses anonymity
      - Mute feature – refuses participant autonomy
      - Technological features of zoom influences the organization and relationships and activities of a class
  - Social construction of technology: Social groups shape technology
    * What matters is not technology itself, but the socioeconomic system it is embedded in
    * Example: Zoom
      - Grew from 10 to 200 million daily users in 3 months, based on human demand
      - Expanded to educational need (from mostly business), based on a human decision that was made
      - Broader set of users using technology in a myriad of ways
  - Technological momentum: Individuals and groups direct the development of new technologies, but investment in large sociotechnical systems makes them difficult to change
    * Initially society creates and influences technology as a gadget, but when it gets big it influences society and cannot be changed (except for innovation around the edges)
    * Reconciles TD and SCOT
    * Example: Teaching has always been the same; only limited innovation around the edges, e.g. better spaces like Myhal, mentimeter
  - Problems: Both TD and SCOT move only in one direction, doesn't acknowledge the interactions between the two; divides the social and technical
- Political: Arrangements of power and authority in human associations and the activities that take place within these arrangements

Actor Network Theory

- ANT views technology as an actor within a web of actors; the interactions produce meaning
- Looks at structure, relationships, and power
- What shapes human choices? The structure/agency divide:
  - Structure: the arrangements in our society, material or cultural, shapes our choices

  - Agency: humans act independently, free choice
- ANT puts humans and nonhumans together in a series of relationships
  - Nonhuman actors can be conceptual or artifacts
- Everything is generated by the interactions between actors
- Any node in the network can be expanded into its own network
- Artifacts mediate interactions between humans
- Human actors are not prioritised over nonhuman actors (generalized symmetry)
  - For both, power is generated through the network itself
  - ANT alone is not an ethical analysis, but it can be used to analyze power relations that lead to ethics
- ANT is a method; it does not provide you with an answer

Lecture 4, Sep 16, 2022

Relations Between Actors

- Relationships are never really "finished"
  - Law refers to this as power shifts
- Actors have resistances, but in a "functioning system" (i.e. when relations are working as we expect), these are overcome through relationships with other actors
  - Over time, these resistances can become more apparent and break down the system
  - Overcoming resistance is where power emerges
- Actors in relationships are more than the sum of their parts

Power

- Can be used to oppress or liberate
  - ANT allows us to see problematic systems of power
- Concentrated in large structures, but ultimately a component of all relationships, contexts, and situations
- Power is generated through relationships between actors
  - A power differential is not always present when power is created through a relationship
  - Relationships can have power over the system
    * We're not looking for the powerful actor, but the most influential relationship
  - How does a relationship stabilize? How do they overcome resistance? How do they generate effects?
- Resistance needs to be overcome or hidden to create a network
- This can help us dismantle a situation where power is problematic

Translation

- All the things that happen to bring actors together in a set of relationships to create a functioning system
- Involves a process (patterning, social orchestration, etc) and effects (devices, organizations, concepts)
- Creating convergence and hiding resistances
- Sometimes the network delegates work for humans to technology and vice versa
  - e.g. we delegate managing breakout rooms to Zoom, but the technology delegates managing technology to us

Patterning/Ordering

- Material durability: patterns are maintained over time
  - e.g. even though we're back in person, we're still sometimes using Zoom
- Pattern: a set of relationships
- Scope of ordering: when a pattern in a network works, it replicates

  - People's tendency to stick to patterns

Punctualisation

- When many actors with their own characteristics and resistances are concealed in a coherent entity
  - Abstraction
- When systems work effectively, they tend to become punctualised
- Things in the network can act contrary to the network as a whole, breaking down the network
  - Law refers to this as "leakiness"
  - Can be human or nonhuman actors, even conceptual actors
  - Can result in problems or shifts in the system
- When things break down, systems become depunctualised and networks are exposed
- Depunctualisation can happen due to things breaking down (unintentional), or when we explore something (intentional)
- Related to Postman's claim that technology tends to become "mythic"

Intermediaries and Mediators

- Intermediaries transport the force of another entity
- Mediators are actors for which outputs cannot be predicted by their inputs
- Another way of understanding power

Summary

Actors can act as mediators or intermediaries.
Translation describes the process of building relationships to create a system or technology. Resistances are overcome and as relationships solidify, ordering/patterning takes place, and actors/systems become punctualised.
Actors can break off from the system, which depunctualises it. We can also depunctualise something to understand it better.
This helps us understand locations and shifting of power.

Language of Affordances

- Affordances are the perceived and actual properties of the thing
- Mechanisms of affordance:
  - Request
  - Demand
  - Allow
  - Encourage
  - Discourage
  - Refuse
  - These are the "how" of human-technology relations
- Conditions of affordance:
  - Perception: people perceive a range of functions
  - Dexterity: people have varying skill in operating/interacting
  - Cultural/Institutional Legitimacy: people experience different levels of support due to cultural norms or institutional regulations
  - These are the "when" of human-technology relations
- Affordances are a good way to describe relationships between actors (but not necessarily all relationships)

Lecture 5, Sep 22, 2022

Ethics

- Branch of moral philosophy that addresses right and wrong actions
  - What is the best way for people to live?
  - What is right or wrong in a particular situation?
- Ethics can be codified e.g. religious texts
- Dilemmas are where ethical codes fail
- Morals are more personal concepts of right and wrong, whereas ethics define shared concept of right and wrong
  - Our moral foundations can shift due to changes in our worldview
    * Because they are about us, they are by definition subjective
    * "It does not mean unmalleable; it means organized in advance of experience"
    * Moral reasoning is always *post hoc* – "We reason to find the best possible reasons why somebody else ought to join us in our judgement"
- Two distinctions in Ethics:
  1. The micro/macro distinction
     - Microethics focuses on issues relevant to individuals and relationships within the engineering profession (personal decision)
     - Macroethics focuses on the social responsibility and societal decisions about technology (collective decision)
  2. The relative/absolute distinction
- The engineering code is a document framed in terms of microethics

Merit Goods

- Goods and services that should be accessible by all individuals in a society irrespective of their abilities
  - Individuals need them, and/or their universal coverage benefits society at large
- Decisions about merit goods involve macroethical decisions
- Ideals lead to principles to guide actions (absolute ethics)
  - Professional codes
  - Utilitarianism, duty ethics
  - A single account of the human good
  - Ethics as a universal aspiration
- On the other hand, situations can be compared to others' situations and actions to guide your own actions (relative ethics)
  - Relative to the aspirations of our culture
  - e.g. definition of success
  - Ethics as a social contract

Virtues

- One of the approaches to ethics
- The best is always the midpoint between contrary extremes (e.g. courage lies between foolhardiness and cowardice)

Lecture 6, Sep 23, 2022

Rawls' Veil of Ignorance

- What do you want in a society if you don't get to choose your role in it?
- A sense of principled "duty" – doing what is necessary

Reflexive Principlism

- Objective: Determine a pragmatic ethical approach for engineers
- Assumptions:
  1. Theoretical approaches do not sufficiently empower action
     - We make our ethical decisions before we apply ethical reasoning
  2. Case-based approaches do not enable flexibility in new situations

Principlism

- Originating from biomedical ethics
- Consider 4 principles:
  1. Autonomy
     - Supporting and respecting people making their own decisions
  2. Beneficence
     - How much good is the decision going to yield?
  3. Justice
     - Who takes the risks and who gets the benefits?
     - Those who benefit from something should also pay the costs
  4. Nonmaleficence
     - Avoiding the causation of harm

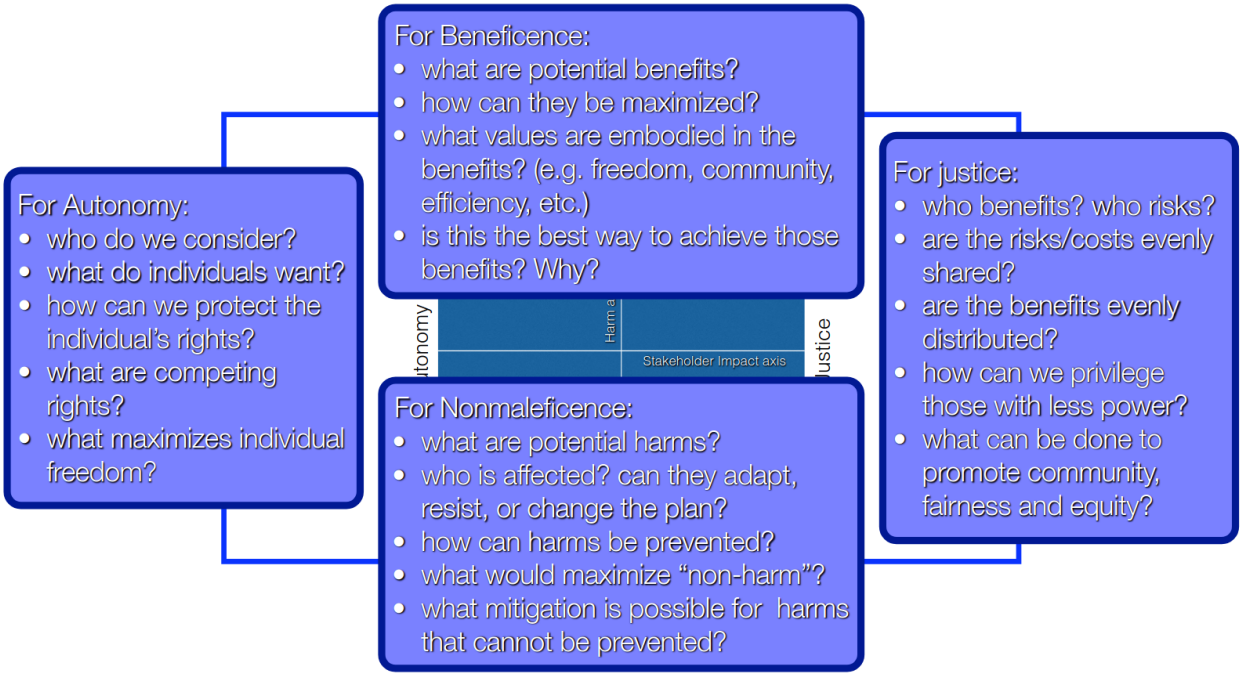

Figure 2: Questions to ask for each principle

- Principles guide ethical reasoning, allow for flexibility in ethical reasoning, and also provide a backdrop against which to evaluate codes and guidelines
  - Can be used in conjuction with codes
- Tries to satisfy the universal ethics, but also uses principles to negotiate an agreed course of action
  - Tries to reconcile relative and absolute ethics
- Autonomy and justice, and nonmaleficence and beneficence make up 2 axes

Reflectivity and Reflexivity

- Reflective is consciously reflecting between normative judgements and ethical principles
- Reflexive is unconsciously relying on ethical reasoning skills and intuition developed over time to reach ethical conclusions
- Reflexivity is needed because reflectivity is done after the fact as a process of justification

The Ethical Reasoning Process

1. Specification: narrowing the scope of principles and figuring out how they apply to a situation
2. Balancing: adjudicating conflicts between the principles (figure out which one to emphasize)
3. Justification: evaluating the coherence and completeness of an ethical reasoning decision

Core Premises of the Ethics of Care

1. Interconnectedness: awareness of one's place in a web of actors
2. Interdependence: relationships that motivate reciprocal responsibilities and beneficial care
3. Competence for care: virtues, skills and knowledge required for beneficial caring relationships to flourish
4. Attentiveness: to the context of moral questions and problems

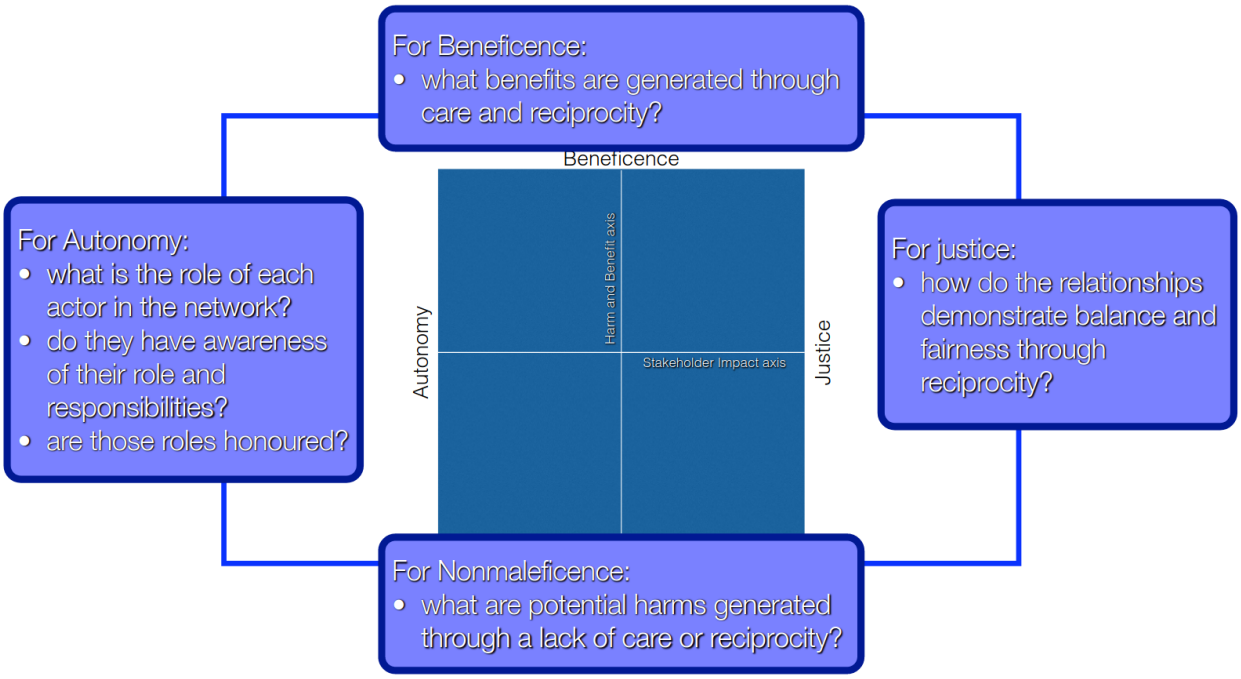

Figure 3: Additional questions to ask based on the Ethics of Care

Lecture 8, Sep 30, 2022

Why Policy?

- Allows distribution of benefits and harm
- Climate and health costs (externalities) need to be accounted for
- There is no natural market incentive because emitters don't pay for the costs of emissions

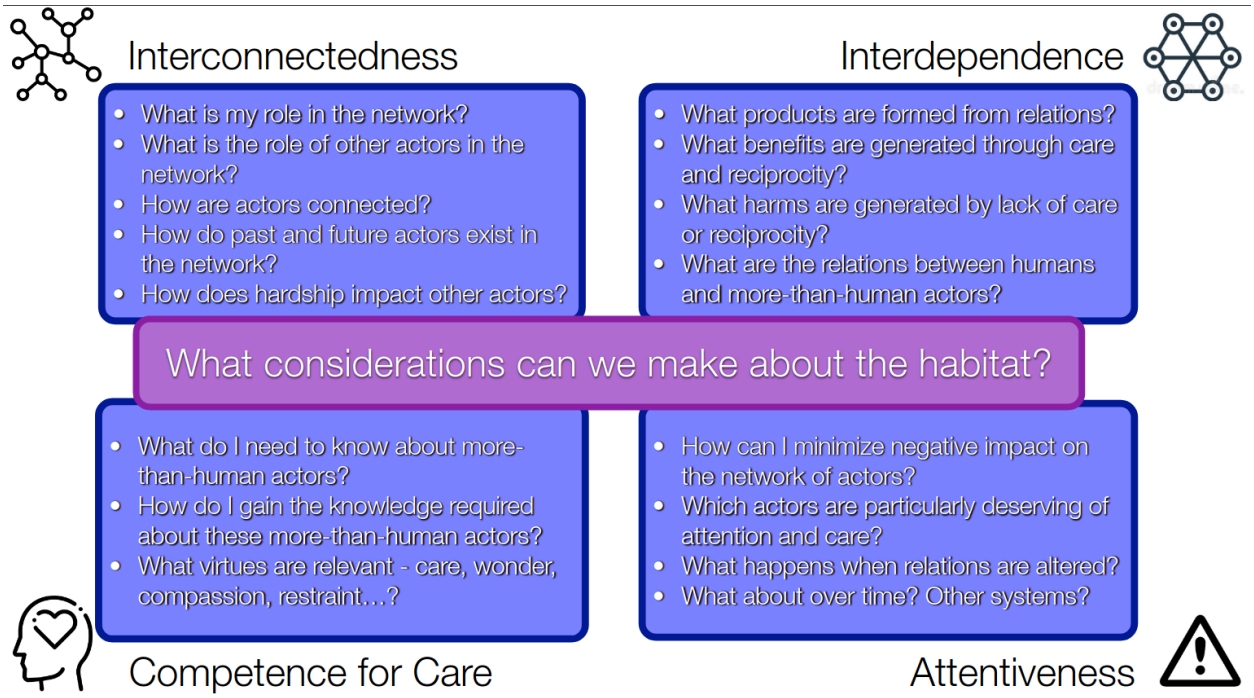

Figure 4: Ethics of Care questions

Key Policy Instruments

1. Feed-in-Tariff
   - Small scale clean energy producers are promised a higher price for heir output
   - Encourages small renewable enterprise
2. Carbon Pricing
   - Raises the cost of fossil fuels
   - Addresses externalities, but no control on total emissions
3. Carbon Permits
   - Emitters purchase permits for carbon emissions set by the government
   - Open market for permits
   - Very difficult to implement
   - Costs are passed onto the consumer

Post-Sustainability Trilemma

- Neoliberalist ideas work resists change
- What if we can only have two of environmental protection, economic growth, and participatory government?
- Techno business-as-usual (growth + participation)
  - Neoliberal ideals
  - Environmental care depends on people's tastes, which may come too late
  - Incremental changes, not transformative policies
- Environmental authoritarianism (growth + environmental protection)
  - Democratic societies can't impose effective limits
  - A small group of decision makers is more effective
  - Drastic redefinition of what's public and what's private
  - However environmentalism and growth can become incompatible after easy efficiency fixes
- Post-growth (environmental protection + participation)

  - Curbs material desires and explores other means of flourishing
  - Requires a different way of framing and controlling the market

Lecture 9, Oct 6, 2022

Petrocapitalism

- Expanded profit growth hinges on mass extraction of fossil fuels
- Dramatic growth is fostered by a policy framework established by the government
  - Petroleum shapes policy (technological momentum)

The Resource Curse

- A country rich in a natural resource becomes more and more dependent on that resource
- Country is rich in a natural resource → developing it raises value of currency → higher currency disadvantages other exports/industries (exports cost more) → other industries close → cost of imported goods increase → country becomes even more dependent on that natural resource
  - Ultimately dependence on a single resource makes the country more vulnerable to market volatilities of that resource (especially oil)
- Hits Canada unevenly – Alberta benefits from oil while Eastern provinces lose money

Case Study: Natural Gas

- Requires extensive extraction and transportation system (fracking, pipelines, specialized storage & transportation)
- Projected demand to increase (from 24% of world energy mix)
- 18 proposed natural gas export facilities in Canada (but currently none)
- TC Energy is building the Coastal GasLink pipeline at a cost of $11.2 billion
- BC offers subsidies totaling $5.35 billion
- Local economic benefits:
  - 10000 people employed at peak construction, 500-900 permanent employees
  - Secondary economic benefit to local businesses
  - Broad support
- Provincial economic benefits:
  - Natural gas is to be shipped out when there is high demand – if we don't sell ours, someone else will
  - Primary to Asian markets where coal electricity is commonly used, so ultimately this reduces GHG emissions
  - Royalties for the province to support products for the public good

Lecture 10, Oct 7, 2022

Case Study: Natural Gas (Continued)

- Environmental risks:
  - Emissions (from compressors)
  - Ecological disturbance
  - Failure to clean up and reclaim sites
  - Energy for construction and maintenance
  - Pipeline and well leaks, blowouts and burn-offs
  - Storage, processing and shipping risks
  - Risks with fracking
- Currently under construction, but not everyone is happy
  - Wet'suwet'en hereditary chiefs are resisting

Key Questions in Environmental Ethics

- Environment: natural world, as affect by human activity
- What is our ethical responsibility to the environment?
- What is the value and moral standing of the environment and its nonhuman actors?
- Is our responsibility ultimately to humans or to the environment itself?
- What is the value of an environmental actor when we take humans off the table?

More-Than-Human Actors and Their Rights

- If we view ourselves as part of the environment, maybe environmental health means human health
- In traditional Western philosophy we look at the environment as something distinct, separate from us
  - Values are either instrumental or intrinsic
- "Part of the value that we get from the environment is the knowledge of how to take care of it"

Lecture 11, Oct 13, 2022

How do We Move Away From Fossil Fuels?

- Need flexible, reliable and predictable alternatives
- Renewables require energy storage
- Robust long-distance transmission system
- A smart grid that balances generation and consumption
- Industries need to overcome sunk investments

Lecture 12, Oct 14, 2022

Lecture 13, Oct 20, 2022

What is Equity?

- Acknowledgement of the barriers to equal opportunities and working to eliminate them
  - Equal opportunities doesn't mean equal outcomes
- "Diversity is a fact. Inclusion is a practice. Equity is a goal."
- "Who" is in scope? rather than "what" is in scope?

Equity Theory

- The Four Propositions:
  1. People are hardwired to try to maximize their own pleasure and minimize pain
  2. Society has a vested interest in persuading people to behave fairly and equitably
     - Groups reward those who behave in ways that are appropriate and punish those that behave otherwise
  3. People are more comfortable when they perceive that they are profiting and getting what they deserve from a relationship
     - Over-benefiting from a relationship makes us uncomfortable (guilt, shame)
     - Under-benefiting makes us resent the relationship
  4. People in inequitable relationships will attempt to reduce their distress through a variety of techniques: restoring psychological equity, actual equity, or abandoning the relationship
- We can frame a situation as both over-benefiting and under-benefiting depending on your worldview

Disaffordances and Dysaffordances

- Disaffordance: failure to recognize the needs of a group

- Dysaffordance: forcing a group to identify as something that they're not in order to use the technology
- Where do they come from?
  - Sometimes things are explicitly designed to be oppressive; however most of the time it's not the intention that's bad
  - Biases contribute to this

Lecture 14, Oct 21, 2022

Lecture 15, Oct 27, 2022 (Guest Lecture: Prof. David Meyer)

Lecture 16, Oct 28, 2022

Lecture 17, Nov 3, 2022

Measures of Equity

1. Distribution of Wealth
   - Has problems – it's hard to find wealth
2. Income Inequality
   - Gini coefficient: how unevenly income is distributed (how far are we from everyone having the same income?)
     - Complete equity is 0
   - Gap between mean and median income is widening
3. Social Mobility
   - Can you change your opportunity in life despite the situation you're born into?
   - Equality of opportunity, not outcome
   - Number of generations it takes for those born in a low-income family to approach mean income

- *Economic spread*: Large and growing differences among people in income, wealth, and other circumstances of life
  - These might not be the only part of quality of life, but this is still a key indicator

Lecture 18, Nov 4, 2022

Intangibles and Technocapitalism

- Walled garden: the platform provider has total control over content, applications, etc
  - e.g. Netflix draws you in with low fees then raises them

Lecture 19, Nov 17, 2022

What is Security?

- Two schools of thought:
  - Freedom from fear: limited to protecting individuals from violent conflicts
  - Freedom from want: emphasizes development and other security goals
- 7 essential domains:
  - Food
  - Economic
  - Community
  - Health
  - Environmental
  - Political

  - Personal
- The UN definition principles:
  1. People centered
  2. Comprehensive
  3. Context-specific
  4. Prevention-oriented
  5. Focus on protection and empowerment
- Relates to the autonomy and justice principles

Personal Security

- Protection of individuals from physical violence
- Extension: Protection of privacy and autonomy
- Vulnerability to conflicts (war)

Political Security

- Protection of basic human rights and possible violation by the government
- Extension: freedom of expression, political interference, and misinformation

Surveillance Capitalism

- "Unilateral claiming of private human experience as free raw material for transition into behavioural data"
  - Personal details are used by Big Tech to turn profits
  - "Behavioural surplus"
- "An economic logic that has hijacked the digital for its own purpose"
- "If you're not paying for the product, you are the product"
- Saturate with convenience as a distraction
- 3 properties:
  1. Leverage economies of scale (as much data as possible)
  2. Leverage scope (data from various places)
  3. Producing action (getting user to click on an ad, etc)
- "To a person with a computer, everything looks like data"

Lecture 20, Nov 18, 2022

Targeted Advertising

1. Tracking on-site activity, e.g. likes, ads, device and location, internet connection type
2. Activity on other websites, e.g. "your off-Facebook activity"
3. Works with publishers to cross-share visitors
4. Data from marketing agencies that have built profiles

- This results in better consumer experience, but is often problematic depending on the type of the product
  - e.g. Precious metal scheme targeting retired Republicans that fuel conspiracy theories and distrust, and caused people to lose money
- Even when policies are brought into place it can still be very difficult to make sure ads aren't getting through holes

Predatory Micro-Targeting

- "Epistemic fragmentation": unlike big billboard ads that target lots of people at a time, which tend to be more moderate, targeted ads are an isolated experience

    - No opportunity to compare with others in a shared space
        * We can't look out for others since we don't know what ads they're getting
    - Targeted to the most receptive subset of people, so there are less complaints
- Programmatic advertising: automated buying and selling of ad space
    - If this is used for services such as gambling, it could be problematic
    - Vulnerable populations can be more easily exploited
- note: Third party cookies are no longer being supported
    - Google gets even more of an advertising share with Chrome tracking
- Trust with internal company controls – examples of overreach and breach

Smart Cities

- Data collected from various methods used to manage assets, resources and services, and improve operations across the city
- In the past we had sampled, occasional data (e.g. surveys), but big data is generated and processed in real time and is extensive
- City systems are more tightly interlinked and integrated, which makes them more vulnerable
- Promotes a "computational" understanding of city systems
- Privacy: to selectively reveal oneself to the world
    - Considered a basic human right in many jurisdictions, including a part of the UN UDHR
    - Types:
        * Identity privacy (personal data)
        * Bodily privacy (integrity of the physical person)
        * Territorial privacy (personal space and property)
        * Locational and movement
        * Communications
        * Transactions

Lecture 21, Nov 24, 2022

Smart Cities

- Collecting data generally without a specific purpose is prone to abuse
- Case study: Sidewalk Labs
    - Ambitious micro-city outfitted with smart technology on the waterfront
    - Use data to improve a bunch of aspects
    - A subsidiary of Alphabet
    - Cameras to analyze traffic patterns, occupancy sensors control temperature levels
    - What data should be considered public vs. private? How do we PII in the public sphere?
- The panopticon: the watcher ceases to be external to the watched; the feeling of being watched changes their behaviour, even when the watcher might not be there
- Policing is inherent to the smart city

Lecture 23, Dec 1, 2022

Lecture 24, Dec 2, 2022