Research line: Nature, Life and Human Intervention

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CHALLENGES

Some of the greatest challenges for humankind concern our relationship with nature and the environment. These include climate change, food insecurity, emerging diseases, and threats towards biodiversity and natural resources. Technological innovation will be essential to respond to and mitigate these problems. Such innovation sometimes must be disruptive in order to successfully change existing lifestyles, consumption, and economy to foster a sustainable society and circular economy. Yet, disruptive innovations give rise to many fundamental ethical questions, including: what changes to our ways of living and our relation to the natural environment are necessary and justified and how should benefits, risks and burdens be distributed globally and over generations? Moreover, these technological innovations challenge conceptual distinctions, such as between natural, unnatural, and man-made, and between technological and natural risk, which in turn raises fundamental questions in ethics.

Example: Climate engineering is the "deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change" (The Royal Society 2009: 1). Solar radiation management is an example of a climate engineering technology that can be deployed within years (Keith, Parson, and Morgan 2010). However, this approach could unintendedly cause regional climate change (like droughts in Africa) or have biological impacts on plants (Kortetmäki and Oksanen 2016). The occurrence of such impacts is uncertain and controversial and they will occur with a time lag (e.g. after decades). But if they do occur, such effects are likely to be irreversible. This raises questions about our moral responsibility to future generations as well as currently living people who are particularly vulnerable to the effects of climate change, such as those living in the small islands in the Pacific Ocean, or living in areas that will turn into deserts. It also raises the question of how to distribute the costs of possible negative impacts and – more fundamentally – the question of whether it is desirable to aim at this form of human control over the climate.

Climate engineering is a good example of how technologies could disrupt and transform our understandings of and relationships with nature (Stilgoe 2015, Preston 2016). Such new technologies are intended to give humans increased control over nature; yet they could lead to unpredictable and uncontrollable side-effects. Dealing with this control paradox requires new control paradigms, for example, based on resilience and adaptivity rather than predictability and direct control. While such paradigms have found their way into the environmental and social sciences, their philosophical and normative implications have not been systematically investigated.

This research line goes beyond traditional discussions about the normative status of nature, e.g., whether there is something intrinsically good or desirable in nature and something objectionable in changing nature. The technologies we study disrupt such understandings and force us to rethink the human-nature relationship and to develop new perspectives. We will analyse the normative implications of natural-unnatural-artificial distinctions comprehensively, aiming at a unifying vision of the role of the natural in relation to the technological.

RESEARCH QUESTIONS

1) How do new developments biological engineering and environmental and sustainable technologies challenge basic moral concepts and beliefs? Which disruptions are required to address global challenges like climate change and to foster a circular economy and how can they be morally evaluated?
2) How do these disruptions affect our relationship with nature and how do they challenge fundamental notions, such as the distinctions between natural/man-made; living/not-living; nature/culture; natural environment/societal environment? Do ethical frameworks, theories, and concepts in ethics of technology, bioethics, and environmental philosophy have to be adjusted given these disruptions? Do we have moral reasons to avoid some of those disruptions?

3) How can ethical and philosophical reflection contribute to a new model of the human-nature relationship and to new paradigms of control over nature? Under what conditions can natural processes and phenomena have normative implications? Which ethical frameworks and procedural approaches can guide technological design, responsible innovation, and governance of SDTs?

RESEARCH AGENDA

1. Disrupting control of nature and the nature of control

This sub-line studies and evaluates technologies that aim to control nature where it is threatening us, such as pathogenic microbes, and where it has the capacity to 'strike back' via ecological or evolutionary processes. The possibility that both technology and nature's response can be disruptive, challenges our understanding of what it means to control nature. Key examples are antibiotics leading to antibiotic resistance and gene-drive technology that can change natural populations but may lead to yet unknown ecological responses. Projects in this sub-line will not only unravel the ethical aspects of such technologies, but also explore how they call for novel understandings of our relationship with nature, of what it means to control nature, and what humanity's role in evolutionary processes can and should be. A central project will study the normative assumptions of the OneHealth movement which sees the health of humans, animals, and environment as deeply connected, and which fits well with ideas of resilience (Verweij and Bovenkerk 2016). In this we seek to reorient and align conceptions of nature and control, which will ground a moral framework for disruptive pathogen/vector control technologies.

2. The potential and limitations of value-sensitive design of life forms and novel food

Synthetic biology and CRISPR-CAS9 gene editing technology open up new possibilities to design and to change life forms and offer expanded possibilities for food production – areas where people's concerns and fears are easily triggered, as illustrated in the all-too-easy associations with Frankenstein or 'Frankenfood (Thompson 2007). These technologies may not only disrupt social, cultural, and agricultural practices, but also challenge our basic value assumptions, both in philosophy and in popular – though often philosophically questionable – assumptions (e.g. seeing 'natural' food as 'good'; seeing life as something that should develop naturally and not be man-made; or attributing moral worth to all living beings). This sub-line studies such challenges and subsequently explores how contested values can still provide a basis for a value-sensitive design approach (VSD). The sub-line involves subprojects in relation to food production, e.g. gene editing, *in vitro* meat (van der Weele and Tramper 2014), as well as synthetic biology aiming to develop new life forms. We set out to uncover the variety of moral concerns that may be implicit in common ideas of the 'natural' and the 'value of life' and critically review the possibilities to include these and other moral notions in an ethically grounded VSD approach for technology development in the life sciences (Düwell 2013).

3. Climate engineering

A separate sub-line is devoted to the ethics of climate engineering, given how this may disrupt the planet as whole and last for many generations to come. Climate engineering raises heated ethical debates. Positions vary between holding that there is an obligation to develop climate engineering because of the impact of climate change on the global poor, to rejecting the technology altogether because of unknown unknowns - which could be exacerbated when synergic effects take place with natural phenomena such as volcanic eruptions, earthquakes and tsunamis, and because of the political inertia that the promise of a quick fix could create for emission reduction. We will analyse the ethical issues raised by climate engineering, including global and intergenerational justice, gender, economic and age justice, obligations to the poor, control over nature, moral acceptability of risks, uncertainty, possibility of irreversible effects, political inertia, etc. The projects will study whether current normative principles of justice and risk acceptance (e.g. the precautionary principle) must be adjusted to address these moral issues. The analyses will result in a moral framework for evaluating climate engineering vis-à-vis other ways of dealing with climate change.

4. Reshaping our conceptions of nature and society in a circular economy

The necessary transition towards a circular economy will inevitably be disruptive and require many different technologies to be successful. In this sub-line, we will evaluate whether the ideal of a circular economy requires an alternative conception of nature and society and we explore the implications for specific technologies. We will explore and develop a variety of alternative conceptions of nature and its relation to society, culture, and economy. Particularly we will investigate systems-oriented conceptions of society and nature in which social institutions and functions are embedded in larger ecological systems. We explore to what extent the nature-culture and nature-society distinction can be abolished in such alternative conceptions and investigate how technology can fit, or fail to fit, into these alternative conceptions. We will investigate how those conceptions are able to take the different cultural conceptions of the nature-society-distinction into account. And we will ask whether or not on the basis of those conceptions basic concepts of morality and fundamental moral principles are intelligible, in particular, (inter- and intra-generational) justice, human rights and well-being. The projects will focus on different areas including energy technologies, water and sewage technology, livestock production, consumer products, industrial production processes, and material infrastructure and buildings.