



Neuroethics (and Beyond)—Towards Responsible Innovation

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At the end of a remarkably difficult year, the articles in the present December issue of *NanoEthics: Studies of New and Emerging Technologies* cover neither the current pandemic, nor, besides some remarks in passing, the symptoms of a global political crisis. Instead, the focus is on two topics that reflect the thematic core of our journal, namely the ethical, social and cultural aspects of new, emerging or visionary neuroscience—and often neurotechnologies more specifically—on the one hand, and the broader topic of responsible innovation on the other.

The ethical, social and cultural aspects of neuroscience and neurotechnology have often been analysed and discussed, not only in the context of the human enhancement controversy but also more broadly on the pages of *NanoEthics*. To the present issue, *Agnieszka Adamczyk and Przemysław Zawadzki* have contributed an important study on the fascinating topic of optogenetics, an emerging invasive neuromodulation technology, and its ethical relevance. The aim of much current research in this field is to develop novel brain stimulation treatments for a variety of neurological and psychiatric disorders. In their article, the authors focus on the truly fascinating (and disturbing) topic of the potential of optogenetics to modify memory; they provide a detailed discussion of the state of the art and future prospects of

memory modification technologies (MMTs), an analysis of safety issues and a neuroethical reflection on optogenetic MMTs in connection with other such technologies. One of the many thought-provoking aspects of this topic is that, as demonstrated by the #MeToo movement and, more recently, by the #BlackLivesMatter movement, certain intersubjectively shared types of traumatic experience and memory (such as sexual abuse or racial discrimination) may motivate people to join forces in order to combat systemic forms of maltreatment, which may make the removal of traumatic memories problematic. In their conclusions, Adamczyk and Przemysław now urge the neuroethics community, given that many optogenetic interventions are designed for therapeutic purposes and that the first human clinical trials using optogenetics are already underway, to systematically consider the ethical challenges arising with the emergence of optogenetic neuromodulatory technologies.

Among the *NanoEthics* articles dealing with the ethical and social aspects of neurotechnology, another highlight comes courtesy of *Johannes Kögel and Gregor Wolbring*, who provide us with one of the most thought-provoking and interesting accounts of intimate human-neurotechnology relations that I have read to date. Using Wolbring's theory of ability expectations, the authors analyse a wide range of requirements of users of therapeutic brain-computer interfaces (BCIs), including such explicit expectations as specific physical conditions and so-called BCI literacy. Other expectations that they have identified—above all in a series of interviews with therapeutic BCI users, from which they

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cite many instructive and engaging comments—are more implicit, such as motivation, a high level of concentration, pain tolerance, emotion control and resources. Kögel and Wolbring argue that these expectations may produce a conception of the human and a self-understanding among BCI users that objectify the body in line with a brain-centred notion of the subject that supports a problematic “normality regime”.

I am very happy that our December issue also includes a special section. At a time that many of us are still finding very challenging, it was guest-edited by *Christopher Nathan* to whose Introduction I refer you for a detailed description of the articles in this special section and a broader discussion of its topic, namely the present state and future prospects of responsible innovation. Contributors to this excellent special section are *Sven Ove Hansson*, who treats us to an illuminating analysis of the precautionary principle in this context, *Philip Nickel*, who compares the harm account with the qualified harm account in the face of moral uncertainty by examining them within the context of the introduction of mechanical ventilation and of organ transplantation technologies as well as of current mass data practices in the healthcare domain, *Christopher Nathan* and *Stuart Coles*, who present a potentially groundbreaking analysis of ethical aspects in life cycle assessment (LCA), an important formal system for assessing environmental impacts, and, last but not least, *Mrinalini Kochupillai*, *Christoph Lütge* and *Franziska Poszler*, who have taken a fresh look at the recently much-discussed moral dilemmas surrounding the emerging use of automated vehicles. Although I am, so to speak,

in a privileged situation as the editor of this journal in the sense that I often receive information and learn about ethical reflection on new and emerging technologies at an early stage, I fully agree with Christopher Nathan that reading his special section gives one a strong sense of how disorienting technological change can be. I am sure you will find it an interesting read too.

All that now remains for me to do is wish you happy holidays, if you can take any, and a good start to 2021! Let us hope it will be a good year in which the pandemic ends, the struggles against systemic oppression are successful, and everybody contributes to overcoming the global crisis according to his or her means and abilities.

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