



Engineering Life

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As long-term readers of this journal will know, *NanoEthics: Studies of New and Emerging Technologies* began regularly covering the field of synthetic biology, as well as the more recent advances in genome editing that followed the development of CRISPR/Cas9, from a very early stage.

The December 2009 issue, for example, contained an article by Henk van den Belt entitled ‘Playing God in Frankenstein’s Footsteps: Synthetic Biology and the Meaning of Life’. Widely read and cited, even beyond academia, it has had a major impact on the discussions about ethical and other philosophical aspects of synthetic biology. Two years later, in December 2016, an entire special section was dedicated to this field, and several other articles before and after have dealt with it.

In the August issue of the same year, Martina Baumann’s article ‘CRISPR/Cas9 Genome Editing – New and Old Ethical Issues Arising from a Revolutionary Technology’ already sparked a discussion about the ethical and societal implications of the recent breakthrough in genome editing technology. More recently, just over a year ago, news broke globally that the Chinese scientist Jiankui He was claiming to have created the first genetically edited human babies.

In the present issue of *NanoEthics*, this latter breach of a taboo is one focus of a very fine special section

guest-edited by Solveig L. Hansen and Maurizio Balistreri. In it, the new approaches to “engineering life” are discussed in the context of hypes, hopes and fears that have surrounded human reproductive cloning in the past. The special section is testament to several of our journal’s ambitions: it provides food for thought and discussion (including in two Discussion Notes); it allows for interactions of art and science (including but not limited to two Art-Science Interaction articles); it explores visionary aspects of current technoscientific discourse, and it thoroughly reflects on the merits and downsides of anticipatory and speculative ethics, making major contributions to a debate that was initiated by Alfred Nordmann in the very first issue of *NanoEthics* (in March 2007) and has in the meantime been continued in this journal as well as in many other publications and events. An overview of the contributions to the special section and their contextualisation in current and earlier pertinent discourses is provided by *Maurizio Balistreri and Solveig L. Hansen* in their excellent introductory article. Among other things, the guest-editors emphasize how science fiction can enrich bioethical discourse by adding to it new perspectives, arguments and approaches. Since their Introduction aptly summarizes the contents of the special section, I will make only a few further remarks on it in the following.

I am particularly happy that the special section also includes important historical perspectives, for example in the articles by *Robert Ranisch*, Ari Schick, and Fabrizio Rufo and Antonella Ficorilli. Though warning us about the dangers of embracing the “eugenics arguments” that are the subject of his discussion, Ranisch also reminds us

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how important it is for us to know the history of eugenics. This holds true not only for bioethics in a narrow sense but more broadly for the ethics of technology, as well as for any analysis of visionary discourse on a variety of technology fields. The ideas of pioneers of the eugenics movement – and indeed some of these pioneers themselves – already played important roles in discussions pursued by a new generation of biologists at the (in)famous CIBA symposium “Man and his Future” that was held in London in November 1962. Among them were visions of the human body being merged with technology that nowadays are often discussed under the banner of ‘transhumanism’.

Aline Ferreira has likewise made major contributions to the research on these historical aspects of biotechnology. In her contribution to the special section, however, she lucidly analyses the portrayal of human cloning and its ethical implications and societal ramifications in young adult science fiction. She argues that this genre, as well as other types of fiction, can be seen as a valuable ethics laboratory in which complex scenarios and issues are dramatized, allowing readers to extrapolate from those fictional scenarios and consider the consequences of the respective actions in ethical terms. Her article is an appeal to engage in anticipatory and indeed speculative ethics, and to recognize the importance of science fiction in this context. With respect to the latter, *Mirko D. Garasic* takes a very similar approach in his Discussion Note. In his discussion of visions about overcoming death, he outlines the real-life ambitions of the Italian surgeon Sergio Canavero to transplant a human head from one body to another and compares them with fictional visions of immortality, in particular those depicted in the television series *Altered Carbon*. Garasic argues that both the actual and the fictional visions are evidence of the dominance of hyper-individualism in our societies. In line with the critique of exaggerated technological enthusiasm put forward by Hans Jonas and his positive appraisal of mortality, he urges us to conceive of existence as being more than merely accumulated time. In their co-authored contribution to the special section, *Julia Diekämper and Solveig L. Hansen* also explore the interplay of reality and fiction in a way that is both surprising and eye-opening. Make sure to get the most out of their artful and philosophically rich piece by reading it from start to finish.

In his thought-provoking Discussion Note, *Ari Schick* takes a sobering look not only at further-

reaching exercises in speculative ethics but also at anticipatory ethics in a more general sense. His brilliant and historically-informed analysis can leave one with the impression that the main purpose of anticipatory ethics – and thus of much of the work done on responsible research and innovation (RRI) and on the ethical, legal and societal aspects (ELSA) of (bio)technoscience – has hitherto been to justify every instance in which a regulatory or normative obstacle to a particular biotechnological development or its application has been removed, even when the removal of such an obstacle was tantamount to the breach of a “taboo”. Schick proposes, in our view quite rightly, that the largely conceptual critique of certain instances and uses of speculative ethics should be complemented by a more empirical mode of analysis. He writes that we might be able to develop a grounded idea of how speculative ethics should (or should not) be pursued if we were able to retrospectively examine a particular stream of speculative ethics discourse in an attempt to identify its successes and failures.

The Discussion Note by Schick can be read very profitably together with an article that *Oliver Feeney* has contributed to the special section. In line with the profile of our journal, I sympathize with Feeney’s plea for social science to be included to a greater extent in ethical discourse on biotechnology and other technoscientific fields. As he emphasizes, this does not mean that ethicists or moral or legal philosophers should be replaced by social scientists, but that an even more intensive and broader dialogue is required between normative theorists, social scientists, and natural scientists – of the kind that is already being pursued in ELSA and similar research and dialogue activities. I also agree with him that a responsible approach is needed not only for technoscientific research and its application, but that the same is true when it comes to speculating about their future implications and prospects.

In their contribution, *Fabrizio Rufo and Antonella Ficorilli* further enrich the historical perspectives in this special section, comparing discourse on recombinant DNA in the Asilomar era with current discourse on genome editing by means of CRISPR/Cas9 technology. They use this comparison also as an opportunity to call strongly for what they describe as a “reticular” conception of knowledge politics. Referring to Sheila Jasanoff and J. Benjamin Hurlbut’s proposal for a global observatory for gene editing, Rufo and Ficorilli argue that perspectives from outside science and related expert

circles (that include academic bioethicists) should be taken into consideration – even those that do not conform to dominant Western culture – in order to highlight the variety of cultural and moral perspectives within the global human community. In their view, the right of access to and better understanding of all phases of the research process (including by means of citizen science) – and particularly the right of access to the evaluation of the results of scientific research and to information about how these results can be used – is increasingly becoming a frontier of social equity that can and must be included in a more general expansion of the rights of citizens. It would be very interesting to relate the findings of their analysis to ongoing discussions about the “right to science” at the level of the United Nations.

The special section ends with a particular highlight, namely the English translation of a wonderful text in the literal sense. In his short story, the renowned Italian science fiction writer *Francesco Verso* weaves elements of science fiction, fantasy literature and current concerns and activities about climate change into a truly fascinating, moving and beautiful narrative. I will tell you no more than that, so no spoiler alert is needed.

Dovetailing with the special section that deals with various facets of the ambition to engineer life, the present issue of our journal also features a comprehensive analysis by *Michael Funk, Daniel Falkner, Johannes Steizinger, and Tobias Eichinger* of the ways in which the term ‘life’ is used in the debates within and about synthetic biology. The authors argue not only that ‘life’ is used as a buzzword and, as a theoretical concept, in inhomogeneous ways, but that it can also be understood as a “burstword”, as they call it. This is their way of pointing out that such terms as ‘life’ can easily become nonsensical and, so to speak, can semantically detonate. On the other hand, they argue that the concept of life can fulfil the function of expanding an inadequately narrow disciplinary or conceptual focus in different discursive contexts and that, in this sense, ‘life’ may become an

important transdisciplinary research principle. This role of burstwords in technoscientific discourse resembles the one often played by umbrella terms such as ‘nanotechnology’.

Last but by no means least, the December issue of *NanoEthics* features a very instructive empirical study by *Jing Zhang and Guoyu Wang* on the perceptions of a long list of actual and potential specific benefits and risks of nanotechnology by Chinese researchers and the Chinese public. This alone would be a most welcome contribution to research and discussions on this topic; however, the authors go even further, comparing their findings with the results of earlier pertinent studies in Europe and the US. The authors hope that their study can also contribute to the creation of nano-ethical norms that are acceptable to both experts and the public in China; I wholeheartedly agree with them that such research, in our age of technological and economic globalization, is not only of significance for China’s nanotechnology policies but also for nano-ethical research and the governance of new and emerging technologies worldwide.

By happy coincidence, exploration of the topic of ‘engineering life’ will continue in the forthcoming April 2020 issue, which will feature a new special section on synthetic biology. It will be guest-edited by Miguel Prado Casanova and Darian Meacham, and several contributions have already been published in the “online first” section of our journal’s homepage, including an important analysis of ethical and ontological aspects of synthetic biology. So stay tuned, but above all enjoy the festive season and have a Happy New Year!

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