Controversies

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Published online: 9 August 2019
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Given how relevant science and technology are to our societies, it is no wonder that techno-scientific developments frequently trigger public debates on controversial issues. As readers of the journal will know, *NanoEthics: Studies of New and Emerging Technologies* often covers such issues – from questions of nanotoxicology via the ethics of human enhancement to the use of synthetic biology methods in food production and agriculture, to give but a few examples. Our new issue is thus no exception in affording considerable space to controversial aspects of techno-scientific developments, though it is special in that it covers a significant part of the wide spectrum of the kind of developments that are regularly discussed in the journal.

The August issue starts with an article by *Ellen-Marie Forsberg and Nico Groenendijk* on responsible research and innovation (RRI), thus continuing a long line of studies published on RRI in *NanoEthics*. It focuses on patenting, a topic that despite its crucial relevance to innovation is still not at the heart of RRI discourse. This is all the more surprising given that it is a key issue in innovation policies in general and, for that matter, one that is often the subject of heated debate and should thus also be of pivotal importance to scholars and practitioners in RRI. In their study, Forsberg and Groenendijk focus on European patent governance.

Pointing out the tendency in RRI discourse to emphasize the responsibilities of researchers and innovators, and to regard the design and workings of institutions like the patent system as political issues, that is to say beyond the scope of RRI, the authors argue that political questions should have a central place in RRI. Presenting a case study about the European Patent Office (EPO), they conclude in their article that RRI currently has no strong position in the organization of the EPO. Perhaps surprisingly to some, Forsberg and Groenendijk include in their study an analysis of the institution's engagement with its own staff and refer to and discuss conflicts between the EPO and the Staff Union of the European Patent Office (SUEPO). The authors thus take the working conditions of employees into account as a crucial aspect of RRI; and this is something that is increasingly argued for in RRI discourse, not only in contributions to this journal but also for example in the EU-funded project “Fostering Improved Training Tools for Responsible Research and Innovation (FIT4RRI)”, with respect to the working conditions of researchers. While some of the points made by Forsberg and Groenendijk may be controversial – and those criticized are, as always, invited to respond to the criticism in one of this journal's next issues – I fully agree with the authors that we as RRI scholars also have a responsibility to draw scholarly and public attention to such issues as the governance structures and practices within relevant institutions and organizations in the science and innovation systems.

In her article, *Marie-Gabrielle Surraud* looks at the controversies that have surrounded nanotechnology in France since the 2000s from a particular perspective.

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France has experienced unusually heated debates about nanotechnology and in some cases militant protests against it, making the country an exception in terms of political conflicts about nanotechnology. (Outside France, in general these have been much rarer and smaller than many had expected at the beginning of the century). The author does not analyse the political conflicts themselves in any detail, however. In particular the interview-based parts of her important study focus on the extent to which these conflicts have changed the French science and innovation system. Suraud describes and analyses how they have triggered a reconfiguration of the research-industry relationship in France and challenged the disciplinary structure of the French science system.

In their bibliometric study, *Elizabeth Duran, Katherine Astroza, Jaime Ocaranza-Ozimica, Damary Peñailillo, Iskra Pavez-Soto, and Rodrigo Ramirez-Tagle* draw attention to a topic of which a more visible discussion would be desirable, namely gender inequality in science. Their analysis, which focuses on the academic publication output of researchers, provides further evidence of serious gender inequality in the field of nanotechnology in Latin American countries. It reveals, for example, that the first half of the 2010s saw two instances of the gender gap widening significantly with respect to nanotechnology publications in a scientific online library important in Latin America, both to the detriment of women. Given how dynamically those academic fields that reflect on societal aspects of science and technology are developing in this part of the world – to which the forthcoming eleventh annual meeting of the Society for the Studies of New and Emerging Technologies (S.NET), to be held in Quito from 18 to 20 November, will be another testament – one may hope that such gender inequalities will be addressed in further studies; this is of course not only a desideratum with respect to the situation in Latin America.

A controversial issue of a very different kind is analysed by *De Leon Petta Gomes da Costa* in his article on technological singularities. The concept of a technological singularity is well-known from transhumanist discourse and the discussions about transhumanist visions of the future that have also been covered fairly often in our journal. Petta Gomes da Costa takes a fresh approach to this topic because he is less interested in the technological singularity that some people foresee with respect to the further development of artificial intelligence and more in the concept of technological singularities that he discusses in some

detail and then applies to human history. In his view, only four technologies to date are worthy of the name ‘singularities’: the control and manipulation of natural elements triggered by the manipulation of fire by early humans; mass energy production in a controlled environment thanks to farming; the ability to store and pass on knowledge to future generations made possible by writing; and, finally, large-scale automated production brought about by machinery. The author argues that we are still experiencing this fourth singularity and that the idea of the next singularity is a “myth” to the extent that the Internet, artificial intelligence and other technologies are in fact the result of the last singularity and appear to be merely variations or derivations of the large-scale automation typical of the Industrial Revolution. If this is the case, we might be well-advised to look more closely at earlier automation processes and the discussions about them in order to better understand current challenges posed by artificial intelligence, digitalisation and other techno-scientific developments.

Digitalisation brings us to another controversial topic covered in our new issue, namely how digitalisation influences our societies and particularly the questions of what it means to be human and how we want to live together. In a recent conversation, Aleksandra Kazakova of Bauman Moscow State Technical University (BMSTU) opened my eyes to the fact that social media can be deemed a prime example of the encompassing societal process that Jürgen Habermas terms the ‘colonization of the lifeworld’, a process in which our lives, social relations and cultures are increasingly shaped by economic and political ends and we lose our lifeworld and shared understandings of the world. While I do not claim to be an expert on the most recent developments in the sphere of social media and the Internet, it seems obvious to me that we have experienced in the last two decades a radical change of what it means to be in a society and how we interact with each other. In such an era of massive change, we would incapacitate ourselves as societies in terms of our reflective potentials if we were to exclude radical critiques of current digitalisation trends from academic discourse. I have thus decided to publish one of the most polemical Discussion Notes ever submitted to our journal, an essay by *Alexander Sieber* that discusses whether the company Facebook violates basic human rights of the users of its products, in particular also with respect to younger users. The article is an angry statement by a researcher who is young and thus a child of the digital age himself. He builds on Byung-Chul

Han's concept of 'psychopolitics', and at times on, as it seems, deliberately one-sided discussions of academic literature that warn about certain uses of the Internet, in both cases with a view to mounting an attack on what Sieber sees as a grave risk for the future of our societies. Given that the article, with its focus on human rights, has the potential to stimulate further discussions on the crucial question of how social media change what it means to be human and a social being, it well serves the purpose of a Discussion Note as defined in our journals.

I am particularly happy about the publication in this issue of another article on a similar topic: it is my great pleasure and honour that *Rafael Capurro* has accepted my invitation to have his essay on the enculturation of algorithms published in our journal. In it, he discusses this enculturation as a crucial desideratum of our times. I was especially impressed by the final paragraph in which he first questions the Marxian demand to change the world rather than merely interpreting it, arguing that the relationship between ourselves and the world cannot be changed unless this change is based on a previous recasting of it; and this recasting is possible because our "historical mind" is "our original and originating capacity for such recasting". Only if we acknowledge this capacity, Capurro writes, can we cope with the challenges of our age, concluding that the power of calculation might become a source of liberation through the enculturation of algorithms instead of stretching human mental creativity on the rack of algorithmically controlled computers. From my theoretical perspective, this appears to be a reflection from a utopian standpoint in the best sense of the word 'utopian', and I wonder how it

relates to the notion that we need to free our machines in order to become free ourselves.

Last but by no means least, our August issue includes a Discussion Note by *Karsten Bolz and Christine Volkmann*. It adopts a clear position in an ongoing controversy in the discourse on RRI in synthetic biology and adjacent fields, yet this position is a moderate one, likewise in the best sense of the word. The authors argue that four principles should be in the fabric of every biotech company and at the heart of every responsible bioentrepreneur, and for that matter of every civil society activist engaged in discourse on RRI and biotechnology. The four principles are to be transparent, to look for dialogue, to be aware of how one's products and processes affect or may affect society and the environment, and to be self-reflexive and thus to question oneself and the purpose of one's actions. Bolz and Volkmann are convinced that these principles are not only important because responsibility should be a fundamental trait of all human action but also because they can support solution-oriented innovation processes in biotechnology and the life sciences.

I hope that you will find the new *NanoEthics* issue stimulating reading and that you will enjoy (once again) the broad thematic scope of our journal and appreciate our ambition to support discussions of new and emerging techno-scientific fields in academia and beyond.

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