This special issue of the *International Journal of Social Ecology and Sustainable Development* (IJSESD) provides the reader with a state-of-the-art view of interdisciplinary research at the crossroads between synthetic biology, sustainability science and science and technology studies (STS). Its emphasis is on the boundary-crossing dimension of this research. For synthetic biology to develop on a sustainable trajectory, it will require the development of a technology assessment process that integrates upstream collaborations between different fields concerned with socio-ecological and socio-technical systems.

This special issue is based on a selection of key papers and contributions written as a follow-up to a major, transatlantic workshop on the implications of cutting-edge biotechnologies for sustainability science and policy. The workshop was organized by the Woodrow Wilson International Center for Scholars and the University of Virginia and held at the Wilson Center in May 2010. The workshop, sponsored by the National Science Foundation (SES-0925449), gathered experts from three emergent, boundary-crossing translational and transnational fields: STS, sustainability science and synthetic biology. The workshop provided a space where representatives of these diverse fields of research could discuss their views about the production of knowledge, the impact of research on policy-making, and the potential cross-national and cross-temporal differences in the way research cultures reproduce and interact with societies. In each field, researchers answered a different set of questions relating to the field’s formation and development, as well as its impact on thinking and policy-making. Researchers in each field also explored their different perspectives on science-society interactions.

The contributions in this issue are written by leading academic experts in the conceptualization and actual practice of STS, synthetic biology, and sustainability science. The issue also integrates editorial notes and reviews from leading public policy actors who took part in the workshop. Because of these contributions, the issue will be of interest for scholarship, curricula, and practices at the interface between the
life sciences, sustainability, and society. It will also fill critical knowledge gaps in understanding the role of interdisciplinary interactions within synthetic biology. Beyond the academic community, target audiences for this special issue are policy-making communities, which do not only need a clear perspective of the challenges posed by synthetic biology but also need to promote more reflexive, collaborative thinking about the social, sustainability, and normative dimensions of synthetic biology and its applications.

In creating this special issue, the editors had two goals: 1) to bring together a unique group of experts to examine the present challenges posed by synthetic biology to socio-technical and socio-ecological systems from different perspectives, ranging from the natural to the social sciences, and 2) to explore the potential for new forms of engagement between science, society, and policy-making to contribute to improving the practice of sustainable technology assessment.

This special issue opens with a reflection on the notion of cross-field collaboration written by the Co-Project Investigator (Co-PI) of the May 2010 workshop, Eleonore Pauwels. Pauwels builds on the metaphor of “cohabitation” introduced by Bruno Latour and reflects on what it takes to make co-production of knowledge happen between cross-field researchers. Pauwels’ discussion introduces the arguments developed further in the two research papers and in the expert interviews.

The main part of the special issue consists of two cross-disciplinary contributions, each written by a team of authors representing the three concerned fields: synthetic biology, sustainability science, and STS. The first contribution, written by Ana Delgado, Silvio Funtowicz, and Dorothy Dankel provides an excellent immersion into the synthetic biology laboratory, giving us an invaluable insight into the life sciences’ imaginaries. It is an empirical analysis in which the authors 1) map and explore the “imaginaries of the making of life” as they operate in the development of synthetic biology, and 2) discuss implications for sustainable governance. The second contribution, written by Arnim Wiek, David Guston, Emma Frow, and Jane Calvert, reflects on modes of cross-field collaborations for anticipating the future of synthetic biology. By focusing on the concepts of imaginaries, anticipatory governance and transformational sustainability science, the authors outline an approach for systematically incorporating sustainability considerations into the development of synthetic biology that addresses the challenges and opportunities presented by the field. The third contribution by experts takes the form of a series of cross-field interviews gathering the views of Andy Stirling, Kaustubh Balherao, and David Tabara. These interviews present new perspectives on the social and sustainability assessment of an emerging field like synthetic biology. When it comes to emerging technologies, only limited research effort has been devoted to understanding the socio-economic impacts resulting from the introduction of new technologies within society.

The special issue continues with two “policy perspectives” describing the policy context for cross-field research 1) within the life sciences, including synthetic biology, and 2) between the life sciences, sustainability science, and STS. The first policy perspective, from Jo Husbands, analyses how, in the United States, prestigious research policy institutions, including the National Research Council and the White House Office of Science and Technology Policy, have called for a “New Biology” approach—one that depends on greater integration within biology and closer collaboration with physical, computational, and earth scientists, mathematicians, and engineers. This integrated approach should be used to find solutions to four key societal needs: sustainable food production, ecosystem restoration, optimized biofuel production and improvement in human health. But as noted by Husbands, “There is little if any consideration of the need to engage a broader community of stakeholders in an upstream discussion of potential societal concerns and how to address them.” In terms of bridging the gap between what C. P. Snow called the “two cultures,” Husbands intelligently notices that “the
social sciences are apparently not seen as part of the conversations about bringing the visions to reality.” In that case, nihil sub sole novum?

The second policy perspective, from Lino Paula, presents the policy context that set the background for the development of life sciences in the European Union. Interestingly, in this case, the focus is not only on funding high-level scientific research, but also on promoting, through new policy and funding instruments, multi-disciplinary and multi-sectorial collaborations between the life sciences, social sciences, and humanities. For example, implementing the Europe 2020 strategy, the proposal for the Horizon 2020 program “recognizes the importance of ‘mainstreaming’ the social sciences and humanities in research to address societal challenges.” The European Commission also highlights the importance of promoting responsible research and innovation to be a key element of Horizon 2020.

This special issue ends with a short “research essay” written by Mike Gorman, the Project Investigator (PI) of the May 2010 workshop. Gorman develops his vision of the role of “trading zones” (as first coined by Peter Galison in 1997) and subsequently reflects on each of the governance concepts that have been addressed in the issue: the notion of “imaginaries,” technology assessment and adaptive management, and governance by anticipation.

To this end, one of the target audiences for this special issue is decision-makers, institutional experts and officials at funding agencies, who do not only need a clear perspective on the challenges posed by synthetic biology to sustainable development, but also need to promote more reflexive thinking about the social and normative dimensions of the concept of sustainability.

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