

Reimagining Responsibility in Synthetic Biology

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Synthetic biology is as yet a scientifically nascent field whose identity has taken shape primarily as a *vision*—a vision of a field that pivots from understanding living systems, to rendering life a repertoire of parts for use-inspired design. In practice, synthetic biology has thus far been defined less by actual uses, and more by an imagination of the eventual usefulness of synthetic biology's (future) achievements: it will engineer life to achieve forms of human benefit that would otherwise be unattainable. Thus the project of synthetic biology is, in a fundamental sense, predicated on its promise to address, and to take responsibility for, certain societal problems: the field has constructed itself as *able to respond*, and thus as *the right response*, to basic problems of human welfare and security. This move of linking (imagined) technological futures to responsibilities of governance is potentially highly consequential on three levels: first, for the way synthetic biology itself develops as a field; second for relations between synthetic biology and society, including especially in the forms of autonomy the former enjoys, the kinds of assessment and oversight it is subject to, and the expectations that underwrite public trust in and support for research; third, for the ways institutions of governance imagine and execute their own responsibilities.

In this short statement, I am primarily concerned with the last of the three. Many fields in the biosciences have taken to justifying research by reference to the putative benefits that will flow to society. This turn towards (promising) usefulness has become a powerful mode of self-justification. As the case of synthetic biology shows, it goes beyond the mere instrumentalization of knowledge production to positioning technoscience as an institution of governance; that is, not merely as a source of potentially useful technologies, but as supplying a conceptual frame—and the institutionalized authority—whereby responsibilities of governance are articulated. For instance, a recent NAS report on the future of the biosciences asserts that the “new biology” (for which synthetic biology is the exemplar) “would *enunciate and address* broad and challenging *societal* problems” (National Research Council 2009) This is not merely a vision of technoscience, but of *governance*: with the capacity to “address” societal problems, the New Biology likewise claims the authority to “enunciate” them, to designate what challenges warrant worry, and what sociotechnical futures are possible, desirable and good.

This represents not only a moment of transmutation in the biosciences, but a transfiguration of imaginations of responsibility: of science to society, but likewise of society to science, lest society stand in the way of the forms of technical advance that it ostensibly needs. These re-imagined responsibilities have potentially far-reaching effects. They may come to be (and to some degree already have been) codified in notions of how law, democracy and market should be configured in deference to the futures that the biosciences promise (e.g. (Presidential Commission on Bioethical Issues in Biomedical Research 2010; U.S. White House 2012). In this sense, the New Biology represents a significant intervention in orderings of democratic governance, irrespective of whether its technological promises (or risks) are actually realized. It is an intervention that touches upon how the public good is imagined, and upon what forms of deliberation and collective moral sense-making are called upon—or are silenced—in the work of governing science and technology.

Of course, the New Biology's ability to play this role depends on the willingness of democratic institutions to defer to such scientifically authorized accounts. In important respects, therefore, felt social insecurities over the project of synthetic biology are at once over the forms of collective sense-making and institutionalized modalities of public reasoning whereby research agendas are subject to democratic accountability.

On the whole, the forms of capacity for attending to "social and ethical issues" in scientific research that have been institutionalized since the 1970s are insufficient to address these problems, to a large degree because they have contributed to them in subtle and underappreciated ways. They have tended to treat society as always only able to react to the forms of novelty that science produces: science acts, and society reacts. Science makes revolutions, and society is revolutionized by them. Hence, ELSI research has generally focused on "impacts" and "consequences," chasing after the implications of technological futures that science has first declared to be plausible, and thus deferring to the scientific community to decree what forms of novelty warrant societal attention. This is *de facto* a programmatic vision of the right allocations of responsibility between institutions of governance, but one whose political and normative dimensions are occluded.

This has a number of implications for how "societal dimensions" of synthetic biology should be approached.

1. *Forms and fora of Deliberation.* Systematic attention should be given to understanding: a) what opportunities for deliberation exist, b) what institutional arrangements—both scientific and democratic—engender opportunities for, or deficiencies in deliberation, and c) what underlying norms of reasoning and participation configure deliberation and/or render existing regimes immune to democratic correction. I wish to emphasize in particular the quotidian spaces in which deliberation about the appropriateness of research takes place, from the micropractices of institutional biosafety committees, to the macro-scale roles of scientific experts, public bioethics bodies, etc. in addressing publicly controversial issues and in disciplining public discourse. These are sites in which the terms of controversy and the frameworks of adjudication take shape. Before we can ask whether they function well—whether they are democratic, reasonable and good—we must interrogate the notions of reasonableness, the visions of the good, and the imaginations of democracy that are incipient in them. Attention to deliberation requires not merely asking whether there could be more of it, but asking what institutionalized imaginations of how we should reason together about morally and technically complex matters discipline practices of democratic oversight, and with what consequent silencing of voices and occlusions of concerns.

2. *ELSI Research.* Since the 1970s, social and ethical issues have generally been approached in a reactive mode. They attach to particular technological domains as questions about impacts and implications. This is partly because particular emerging technologies have been treated as the warrant for raising ethical concerns, and scientific declarations about the (im)plausibility of particular technological futures has tended to initiate or close down normative deliberation. However, technological controversies have come and gone, but modes of reacting to them have come to be patterned and institutionalized. ELSI research has directed remarkably little attention to its own institutionalization, and the forms of power and authority it has thereby acquired. This

is a serious deficiency, both because it neglects a critical dimension of the landscape of the contemporary biosciences, and because it occludes a range of fundamental normative questions about how societies reason together about, evaluate, and govern their scientific and technological undertakings. Ethical and social issues must be attended to as *political and institutional* features of the biosciences, not as consequentialist epiphenomena of scientific creativity. The latter approach systematically occludes questions about the forms of authority that systemically configure science-society relations, and that have become powerful resources for the political and normative identities of bioscience domains. This applies particularly for a field like synthetic biology that claims the authority to enunciate and address *societal* problems.

3. *STS Research*. In the last several decades, the field of Science and Technology Studies (STS) has developed the most salient insights and powerful critical tools for addressing the kinds of issues outlined above. Yet STS remains relatively marginal in forms of ELSI capacity that public agencies have supported and nurtured. This should change. STS brings a critical repertoire for understanding the social, historical, institutional, political and moral underpinnings of contemporary technological societies. Given that the relevant object of analysis in synthetic biology is not a particular technique or technology, but the project and vision of the field itself, STS represents the most robust, existing intellectual capacity for attending to the social and ethical significance of this emerging field. Yet an additional strength of STS is that it is not issue-bound. That is, it attends not only to issues that are marked as “ethical,” but the processes whereby they come to be marked as such, the prior work that goes into differentiating domains of expertise and authority, for instance into issues of science and politics, or facts and values, and it examines these processes as features of institutions, rather than as epiphenomena circumscribed to particular scientific fields or technological developments.

The greatest, but most fragile achievement, of democracy is a social order in which the visions of progress and the good that underwrite imperatives of the present are products of collective imagination. Understanding the place of science in democratic societies requires attending to the ways democracies draw on science to know, reason together, and articulate what is right, in both the epistemic and normative sense of the word. A commitment to responsible research and innovation requires that such capacities of understanding are supported and nurtured.

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