

**The DIYBio network:
What kind of work we are doing now and what kind of work we want to do**

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What kind of work we are doing now: a brief review of the literature on the DIYbio network¹

The formation of the DIYbio network² was first analysed as a biosafety and a biosecurity concern (Schmidt, 2008a; Schmidt *et al.*, 2008b; Bennett *et al.*, 2009). These authors considered DIYbiologists and biohackers as yet another uncertainty attached to the emerging field of synthetic biology. An uncertainty that they propose to address by simply calling more attention to it, including by using alarmists claims based on the analogy between computer viruses and “‘bio-spam, biospyware and bio-*adware*' and other bio-nuisances” (Schmidt, 2008a, n.d); or by using the 'ethical tool-kit' known under the name of 'human practices' (Bennett *et al.*, 2010). This first analytical framework, although skewed towards biosafety rather than biosecurity, still marks more recent works, as for instance the one of Catherine Jefferson, who proposes to extend the framework Responsible Research and Innovation in Synthetic Biology to DIYbio members (Jefferson, 2013).³

A first departure from these works focusing on biosafety and biosecurity from a policy-oriented perspective, is produced by the arrival on the field of the science and technology scholars. Their first

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- 1 This review focuses on academic publications and does not cover how the DIYbio network has been described in governmental and think tanks report, nor on the role of STS scholars in the writing of these reports. Additional work on DIYBio and biosecurity has been done by Alex Hamilton, but at this stage his work is not available.
 - 2 I use the term 'DIYbio network' to indicate a loose group of individuals, mainly interconnected by Internet mediated communication and sharing a number of common interests and practices. Other commons terms used are: the DIYbio community, biohackers (and biohacking), and garage biology.
 - 3 This turn also marks governmental reports on the DIYbio network. Early reports considered DIYBio as a biosafety and biosecurity threat while later ones stressed the importance to engage with the network and recognise the practices of its members as positive 'citizen science' and 'science outreach' initiatives.

entrance is marked by the question of ethics and moral values within the DIYbio network. Sara Aguiton proposes that members of the DIYbio network participate in the replacement of *community norms* with what she names 'critical individualism.' This is a type of reflexivity according to which the submission or adaptation to moral or ethical criteria is no longer necessary, and 'difference and divergences are accepted and regarded as a possibility of new and innovative ideas' (2009: 40). Moral norms are also the point of entrance of Alessandro Delfanti's work (2010; 2013). He argues that a 'remix' of the Mertonian's norms and the hacker's ethic are brought into the life sciences, and that biohackers are an example of it. Citing Luc Boltanski and Laurent Thévenot's work on the 'imperative to justify' one's search for a new ethical norm, Delfanti understands such 'remix' as a symptom of a crisis in the proprietary regimes of biotechnology (Boltanski and Thévenot, 2006 cited in Delfanti, 2010:19).⁴

As Aguiton (2010) revisits her work on the DIYbio network, she focuses on 'doing DIY.' She proposes that doing as an amateur, meaning working outside the professional organization of labour, biology becomes a medium to express the pleasure of doing (Aguiton, 2010). The argument of pleasure is also taken up by Delfanti for whom hedonism is evidence that hacker culture is inspiring DIYbio members (Delfanti, 2010). The relation with craft and artisan practices is also central to Sophia Roosth's work. She proposes that after the 'genetic fetishism' of the 1980s and 1990s, we are witnessing the return of the biological as a crafted substance, and that the DIYbio network is an example of this return (Roosth, 2010: 14). While lasting only a chapter, Roosth's work greatly expands the interpretative framework through which to understand the DIYbio network. For her the DIYbio network is in a Foucauldian sense an *undisciplined* offspring of synthetic biology (2010: 113), a 'mode of political action' claiming biology as a right rather than a privilege (ibid.: 105), a tinkering practice as described by Claude Lévi-Strauss (ibid.: 110), a 'recursive public,' as defined by Christopher Kelty in his studies of the Free/Libre/Open Source Software movement (Kelty in Roosth, 2010: 110), but also a 'frontier' where what it means to do science is questioned (Gieryn in Roosth, 2010: 110). Roosth's analysis of the DIYbio network as redefining the contours of scientific practice is endorsed by Kelty, who, in a brief publication, concludes that the type of public composing and being gathered by the DIYbio network and related initiatives are 'aggressively active' and radically different from the 'public of opinion polls and scientific literacy' (2010: 8).

Concerned by similar questions on the relations between science and society, Joel Winston's Master's dissertation specifically describes the types of science communication and knowledge exchange practices taking place within the London Biohacking group (2012). He concludes that

4 In his most recent works, Delfanti proposes an additional interpretative framework by adapting the work on co-option of David Hess to the case of the DIYbio network (Delfanti, forthcoming).

biohacking widens the concept of citizen science and is a site where people with no formal education in science can learn more about biology. The notion of boundary work is also further explored in Morgan Meyer's work (2012), who, by situating the DIYbio network as part of an undistinguished continuity, including popular epidemiology, militant patient groups, patients associations and consumer engagement, concludes that what characterize the DIYbio network is the creative workarounds of tools and places resulting in the production of more permeable boundaries between professional scientists and amateurs. Stacey Kuznetsov and colleagues' work is also focused on practices, and speculates about the creative opportunities that DIYbio offers to the field of Human Computer Interactions (2012). Another scholar particularly interested in the type of objects DIYbio members produce is Ana Delgado, who mobilizes Heidegger's political theory of things, in order to interpret the type of production of the new undertaken by DIYbio member (2013). She concludes that the mundane and immediate doing of DIYbio members illustrate how their doing produces things rather than techno-objects. Lastly, turning away from US and Europe-centred analysis, Denisa Kera (2012) explores the specificities of similar emerging practices in East-Asia. She argues that, rather than simply enabling 'rebellion or utopian wish-fulfillment' the practices she witnesses reconfigure indigenous practices and recent technological transformations. More recently some of these scholars have begun authoring papers in collaboration with DIYbio members. This is the case of Meyer in Landrain *et al.* (2013) and Schmidt *et al.*, (2014) whose works are marked by a supportive discourse where the work of DIYbio members is described as a more participatory strand of citizen science.

If this literature review reads as a fragmented field, it is because these authors often write simultaneously, and only a minority actually cite and engage with each other's works. It seems that therefore, a recognized field of research has yet to be established. Additionally given the diversity of the analytical propositions made by these scholars, I wonder if such interpretative fragmentation mostly reflects scholars matters of concerns and their disciplinary position (as I am sure mine does) or actually also speaks about the DIYbio network as a composite sub-culture. As this literature only emerged during my research period (spanning between 2009 and 2013), my own research is not a radical departure from these interpretations, rather an attempt to locate each of these interpretations in more detailed descriptions based on field work analysis, while at the same time trying to figure out how the DIYbio network became such a composite sub-culture. For instance, in my research, the 'doing DIY' of Aguiton (2009) or the frame of 'craft' as used by Roosth (2010), is located in an analysis of the relationship between DIYbio members and the 'maker movement.' A contemporary 'movement' curated by O'Reilly Media Inc., an influential publisher in the field of computer and software engineering.

Following the tradition of the Whole Earth Catalog, the founders of the 'maker movement' designated itself as the advocate of a 'Modern DIY.' As part of this reconfiguration, I argue that the ideology of a personal technology has come to include biology and biotechnology, and that such ideology which is based on collaborative and creative work, non-hierarchical relations, small-scale technologies, has become a conformable refuge in times of social unrest.⁵

What kind of work we want to do: from a research experience to some propositions

The writing of the first proposition is informed by the Introduction to the edited book 'Dissenting Academy' that Theodor Roszak published in 1969.⁶ A work he begins with

'Dare to know!' So Kant defined the function of intellect in a day which pursued the critical examination of life and society neither as an amusing pastime nor as a lucrative career, but rather as an act of defiance and of risk (1969: 3).

A work that I read from a feminist perspective. One that questions what does it mean to make explicit the relationship between our subjectivities, the questions that we ask and the interpretations we produce as scholars (Haraway, 1991). In this respect therefore, it seems to me that the first **(1)** kind of work that 'we' might want to do is about making explicit the political composition of the 'we.' Roszak argues that one of the problems of the academic 'we' is that it is oriented towards the formation of international network of influence and the politics of academic careers, rather than on the establishment of 'local' alliances (i.e. within a university or a city) focused on matters of concerns. This is of course a much larger issue, but the literature review proposed in the first sector, and my experience as a researcher working in the DIYbio network, reflect this impression. That of a number of scholars who seem more interested in the production of their own interpretations of what is the DIYbio network (if not the endorsement of its practices as participatory 'citizen science'), than on making explicit why the DIYbio network matters to them in the first place. In this sense making explicit the political composition of the 'we' is also about making explicit what type of work does the DIYbio network (or synthetic biology) do for us as scholars. Therefore, in both cases (i.e. DIYbio network and synthetic biology) what is the 'partial perspective'⁷ from which we elaborate our 'concerns'? And how to make collectively explicit our partial perspective? It seems to me that this question remains mostly implicit, while to a certain extent

5 This work is available in the form of a PhD thesis awaiting for examination, if you might be interested please contact me.

6 As the book focuses on the 'American intellectual establishment' I merely respond to the way in which, more than forty years later, the book address me as a female and European ex-biologist not-yet-turned-into a science and technology scholar.

7 For an introduction on the politics of the 'partial perspective' and situated knowledge see Haraway (1991).

'we' are asked to 'work together.' Mine is not a desire for more factions and fragmentation, rather a desire for the establishment of collaborations that are not only meaningful professionally, but also politically.

In what follows I would like to make two additional propositions specifically related to the DIYbio network. A second type of work **(2)** that we might want to do is to better understand how DIYbio, to a certain extent, has become the public outreach arm of synthetic biology, as recent events organized by DIYbio members have been endorsed by national funding bodies and think tank alike. In doing this we might want to ask what type of persuasive work the techno-utopia of a personal and empowering relation to biology and biotechnology is doing for the field of synthetic biology and more generally biotechnology. To do so, we might want to look at what happened since its introduction to the 'human practices' (later 'practices') track and the ideal of 'public engagement' that its practices by iGEM participants, but also at the public outreach practices specifically concerning genetic engineering and synthetic biology as advocated by DIYbio members. This of course is tight to recent programs such as the Symbio4all lab aimed at 'extend[ing] the synthetic biology scientific endeavour to the public by harnessing its potential for identifying key research projects that will then be implemented in a certified research lab.'⁸

A third type of work **(3)** that we might want to do concerns the recent organization of hybrid forums of DIYbio community laboratories and start up incubators and accelerators. This is once more tight to the entrepreneurial track at iGEM and more generally to a tendency toward entrepreneurial discourses and practices among younger and younger post-graduated and graduates.⁹ What we might want to ask in this case is what is the formative role of entrepreneurship in undergraduate and graduate students in the field of synthetic biology and as members of the DIYbio network.

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⁸ Available at <<http://citizencyberlab.eu/portfolio/synthetic-biology/>>. Last accessed 8 October 2014.

⁹ In relation to this aspect see the ongoing fieldwork of Sarah Choukah.

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