

Experimental Collaborations

Jane Calvert and Emma Frow, University of Edinburgh

(Owing much to discussions with Andrew Balmer, Susan Molyneux-Hodgson, Claire Marris, Morgan Meyer and Matt Kearnes.)

We are social scientists who work closely with synthetic biologists, and in this short paper we argue for the value of a certain type of interdisciplinary collaboration: one that is experimental and emergent and has the potential to create new knowledge. We think that this type of experimental collaboration should be more actively supported and resourced.

As researchers in Science and Technology Studies (STS), our desire for more experimental collaborations is partly a response to our observation that discussion of the ethical, legal and social implications of synthetic biology in policy reports has become calcified around a pre-defined list of 'issues' (such as biosafety, biosecurity, intellectual property, and public engagement). This continued re-articulation of a small number of ELSI concerns has set up a division of labour and responsibility that we think does not encourage genuine interdisciplinary collaboration, but positions ELSI in a service role to scientists and research funders. Our proposal for slightly more radical, less instrumental collaborations may help to establish partnerships that can 'open up' entrenched problem-solution framings, and suggest more creative ways forward.

So what would these experimental collaborations entail? We are contributing authors on a forthcoming paper that proposes the following: "Much like experiment in science, we must be adventurous and playful, willing to explore the unknown, tinker with our practices and be resilient in the face of failure" (Balmer et al. forthcoming). Experimental collaborations are necessarily risky and carry with them high levels of uncertainty about both processes and outcomes, but an activity that is risky also has the potential to be thrilling.

We think that examples of such experimental collaborations can be found in the Synthetic Aesthetics project,¹ which brought together six synthetic biologists with six artists and designers in paired exchanges. The pairs were tasked with investigating design and synthetic biology, with the explicit freedom to take their work in any direction they chose. The artists and designers spent two weeks in the science laboratory, but, significantly, the exchanges were reciprocal, so the scientists and engineers spent an equal amount of time in the art/design studio.

The pairs had to identify questions that were of interest to them both. For example, one pair decided to look at synthetic biology from the perspective of geological time (the sweep of which extends from the beginning to the end of the Earth). This radical shift in our temporal perception of synthetic biology raises issues of humility and hubris in challenging and unconventional ways. Another pair made cheeses from the bacteria that grow on human skin. They used this playful project to argue that cheesemaking is a more appropriate metaphor for synthetic biology than computer engineering, since it draws attention to "complex living worlds performing incredible feats of metabolism" (Agapakis and Tolaas 2014, p.282).

These joint projects were between synthetic biologists and artists and designers, but we think that we can learn from them to inform collaborations between synthetic biologists and social scientists, although we may have to change some of our methodological habits.

We believe that to engage in experimental collaborations as social scientists it is necessary to think *with* scientists and engineers instead of making studies *of* them (see Ingold 2013). We will have to shift from seeing synthetic biologists as our 'informants', to thinking of them as our

‘epistemic partners’ (Holmes and Marcus 2008) – as people with whom we can create new objects, new practices, and new knowledge (Barry et al. 2008). This may require that we come to see ourselves as participants rather than spectators in synthetic biology, and face up to our complicity and the fact that we become part of the fields we study.

We do realise that there are considerable challenges to setting up novel forms of collaboration between social scientists and synthetic biologists. Rabinow and Bennett (2012) have shown how they had to confront issues of power, control over the research agenda, and divergent expectations from both scientists and research funders. Reflecting on their experiences, and our own, we think that for experimental collaborations to be successful they need to possess certain features.

First, time needs to be devoted to developing and articulating topics of shared interest. Being ‘tacked on’ to an already-defined synthetic biology research grant does not facilitate the kind of “inventive problem making” (Michael 2012, p.539) that we advocate here. Our experience in the UK suggests that developing shared concerns can happen through a process of spending extended periods of time with the same scientists and engineers. In our case, this was facilitated through our involvement in a multi-institutional UK research network called SynBioStandards (from 2008-2011),² which was funded to build relationships rather than produce specific outputs.

Second, experimental collaborations should not be primarily motivated by instrumental aims; they should not be driven by a top-down political agenda or demand pre-defined deliverables. If a large flagship research programme depends on the success of a collaborative activity, where ‘success’ has already been defined according to measures like industrial investment, patents, new biosafety proposals, etc., then there is little scope for experimentation.

Importantly, these types of collaboration also require certain dispositions on the part of all those involved. Social scientists, natural scientists and engineers need to be willing to challenge their own assumptions, and respect unfamiliar epistemologies and methodologies. Research funders also have to be open to investing in activities where the outcomes are not necessarily obvious from the outset, but emerge from the process of collaboration itself. Experimental collaborations may also require the creation of new physical (or virtual) spaces to facilitate discussions across disciplines and professions (Reardon 2013). These may have to be neutral spaces, not clearly associated with scientific (or social scientific) work.

We realise that these are not the only types of collaboration that we and other social scientists will engage in, and that they are not always necessary or appropriate. But we think that experimental collaborations have the most potential to challenge the narrow ways in which ELSI research is often framed, and stimulate more unexpected and creative thinking.

References: **Agapakis, C and Tolaas, S** (2014) ‘The inside-out body’ in Ginsberg, D et al. (2014) *Synthetic Aesthetics* Cambridge, MA: MIT Press; **Balmer A et al.** (forthcoming) ‘Reflections on working in post-ELSI spaces’; **Barry, A et al.** (2008) ‘Logics of interdisciplinarity’ *Economy and Society* 37:20-49; **Holmes, D and Marcus, G** (2008) ‘Collaboration today and the re-imagination of the classic scene of fieldwork encounter’ *Collaborative Anthropologies* 1:81-101; **Ingold, T** (2013) *Making* London: Routledge; **Michael, M** (2012) “‘What are we busy doing?’: engaging the idiot’ *Science Technology Human Values* 37:528-554; **Rabinow, P and Bennett, G** (2012) *Designing Human Practices* Chicago: Chicago University Press; **Reardon, J** (2013) ‘On the emergence of science and justice’ *Science, Technology and Human Values* 38:176-200.

¹ Funded by the NSF and the EPSRC. See www.syntheticaesthetics.org

² Funded by four UK research councils. See www.synbiostandards.co.uk