Living up to Expectations? Reflections on Responsible Research and Innovation in Synthetic Biology

Rob Meckin with RRI panellists Lalitha Sundaram, Michael Reinsborough, and Ken Taylor

Responsible research and innovation (RRI) was among the topics considered, in a plenary presentation and a parallel panel session, at the Synthetic Biology UK 2017, Conference, held in Manchester, 27-28 November, 2017. The conference brought together biologists, engineers, chemists, computer scientists, and others from research institutions, industry and government engaged in the synthetic biology domain. The conference's first keynote speech was delivered by Andrew Balmer, a Senior Lecturer in Sociology at the University of Manchester and a member of the Responsible Research and Innovation Group at the Manchester Synthetic Biology Research Centre.

Andrew Balmer speaking on "end-to-end" responsible research and innovation.

Dr Balmer presented work involving sociological investigation into the sensory perceptions of synthetic products in our everyday lives. This research, conducted with Research Associate Dr Rob Meckin and other colleagues in the Manchester RRI Group, examines public perceptions, and the implications, of making products, such as menthol, through synthetic and biological methods.[1] PhD candidate Xiao Liang also presented a poster on her work on the responsible commercialisation of synthetic biology the UK and China.

Alongside these contributions from the Manchester RRI team, the conference provided an opportunity for parallel panel discussion of the broader implications of synthetic biology and other emerging technologies. This panel, "RRI: Living up to expectations?" was held on November 28, 2017. Chaired by Rob Meckin, these group discussions featured presentations from Michael Reinsborough (University of the West of England), Lalitha Sundaram (University of Cambridge), and Ken Taylor (University of Newcastle). The panel reflected on the meaning of RRI and examined questions about roles and responsibilities for responsible research and innovation.

The (repeated) challenges of RRI

In discussion at the panel, concerns were raised about RRI's lack of clear boundaries and definition. Dr Barbara Ribeiro (University of Manchester) commented on the divergences and limitations of the framings of RRI that are put frequently forward. She contrasted the

ARIR (anticipation, reflexivity, inclusion and responsiveness) framework put forward by Stilgoe and colleagues[2] with the European Commission's "six keys" framework (engagement, gender equality, science education, open access, ethics, and governance).[3] There is a challenge, Ribeiro suggested, in dealing with amorphic and "muddy" pathways to responsibility.

Lalitha Sundaram used the example of the European Commission's "RRI-tools" website[4] to demonstrate that there had been positive progress in creating an "operational RRI". Sundaram maintained that there had been clear advancement in the area of gender and racial equality in lab environments. However, another panellist stated that beyond "responsible research" in universities, "responsible innovation" still had significant gender imbalances, remaining dominated by white males when moving through spin-out businesses and other areas of commercialisation.

Social scientists: Key players or forever on the bench?

The panel exchange also explored the roles of social scientists in fostering societal responsibility. Michael Reinsborough used the analogy of "RRI football" to raise questions about who the main players are, and whether social scientists are spectators, or "players in the game". This discussion transitioned into panellists and participants discussing their own experiences of working with other scientists. Ken Taylor outlined a worst-case-scenario, where scientists considered the social science contribution to their work as "parasitic" and the relationship between the interdisciplinary team had broken down beyond repair. Taylor noted how, in other situations, he found RRI being considered an "ethical fig leaf" to superficially enhance the prospects of a research and innovation project. He observed that RRI and ethical research could be brushed aside if monetary investment proved more enticing. Taylor's narrative prompted further questions regarding the role of social scientists in these processes. This included the extent to which the presence of social scientists in research and innovation processes could motivate scientific groups to behave more responsibly, and to what extent social scientists are willing to take up the mantle as instigators of change, as well as researchers of scientific process.

The panel discussion considered situations where probing questions by social scientists opened-up personal existential dilemmas for some scientists. RRI research was found to not only trigger questioning of the societal meaning of their work, but also other questions about how science is shaped by governments and associated funding bodies. It was noted that there can be an overall benefit for social scientists to support scientists to "look up" from their benches and consider societal implications beyond the grand challenge-centred promises that would have been mapped out in funding applications.

Addressing all stages of RRI

In a closing discussion, Andy Balmer extended the issue of social science intervention to ask how RRI research can now be targeted to address later stages of the research and innovation process. He noted that in his work on menthol, and in other projects conducted in the RRI community, there had been more emphasis on addressing anticipatory and reflective practice. Still, the processes of understanding deliberative and decision-making practices, and how to embed research by social scientists in these processes, remained a key challenge for the field of RRI.

Notes

1. R Meckin, A Balmer, 2017. Engaging the Senses, Understanding Publics: Research Methods, Science Engagement, and Synthetic Biology. *Trends in Biotechnology.* http://dx.doi.org/10.1016/j.tibtech.2017.07.005
2. J Stilgoe, R Owen, P Macnaghten, 2013. Developing a framework for responsible innovation, *Research Policy*, https://doi.org/10.1016/j.respol.2013.05.008.
3. *Responsible Research and Innovation. Europe's ability to respond to societal challenges*. 2012. https://ec.europa.eu/research/swafs/pdf/pub_public_engagement/responsible-research-and-innovation-leaflet_en.pdf
4. RRI Toolkit. https://www.rri-tools.eu/

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