

Track 9 – Innovation and culture

(Giovanni De Grandis, NTNU, Matthias Kaiser, UiB)

Thursday 29th 17:15-18:10 – Session 1

Friday 30th 13:15-15:00 – Session 2

Abstracts session 1

What Makes Study of Disagreements about Biotechnologies Responsible? Lessons from the Case of Golden Rice

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Although science and technology studies (STS) scholars often explore disagreements and controversies about the ethical and social acceptability of use of biotechnologies in specific contexts, there has been much less reflection about the norms and frames used by STS scholars and others when doing these types of studies (exceptions include Hesselmann's provocative 2019 exploration of understandings of scientific misconduct from a postcolonial perspective) or using them in the context of teaching scientists. Such controversies often become focal points for public or advocacy groups seeking to draw development or use of biotechnologies into question, but also by scientists who wish to emphasise the problematic nature of public involvement in technical issues or even how regulation and public opinion can derail scientific progress.

In this paper, we explore one such focal point, the processes and policies associated with the development and release of Golden Rice. Golden Rice (*Oryza sativa*) is a variety that has been produced through genetic modification to biosynthesize beta carotene (a precursor of vitamin A) in the edible parts of the rice. Its primary intended use is in fortified food which are to be consumed in locales with low levels of dietary vitamin A and higher levels of vitamin A deficiency which can cause a range of severe eye issues along with increasing risks of mortality in children from common diseases such as measles and diarrhea. Golden Rice provides an excellent example for an exploration of responsibility amongst STS and other scholars of biotechnologies because its development and application have received significant criticism from grass roots, environmental, and anti-globalisation activists, whereas the broad scientific community has been highly supportive of its use, advocating deregulation and rapid deployment due to the significant health issues that it could be used to address. We also have chosen to investigate Golden Rice because in our experiences it is frequently invoked by scientists in discussions of the socioethical, regulatory, and RRI-

related issues associated with genetic modification as a 'success story' of the triumph of science over what they view as politics and regulatory capture.

However the rich tapestry of stories about Golden Rice at various points in time and in the locales where deployment was desired are messy and complex. We consider how to enrich our understandings of this type of controversy, particularly for the purposes of training researchers about RRI considerations and STS and other social science researchers about teaching about RRI. We invert Latour's idea of an 'artificially maintained scientific controversy' (2004) to show how application of artificial pressures to shut down controversy can result in difficulties for those teaching about RRI. We sketch an approach to reclaiming Golden Rice as a useful case for considering issues relating to RRI in relation to both the responsibilities of scientists and scholars of science.

Cultured meat and responsible research when the future is an illusion for financial speculation

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Developments in cultured meat promise transformative societal and environmental impacts through remaking animals in the bioreactor. While STS is no stranger to speculative claims and transformative promises, there is a danger that research has yet to grapple with an important undergirding shift. The niche of cellular agriculture research and innovation is almost entirely sustained through private venture capital investment. Not just the ideologies but the financial infrastructure of Silicon Valley is the foundation upon which the creation of cultured meat – as a product and as a vision – is based. The envisioned futures of cultured meat are unfolding within a context of constantly shifting frontiers of hype and financial speculation. There are major incentives to sell a vision that is attractive within such dynamics and importantly deceive, in terms of technical possibilities, moral progress, and societal prospects, to sustain an illusion of imminent breakthrough and lucrative financial return on investment. Responding to such expectations, European countries, such as France and Italy, are now creating legal frameworks to 'defend' national agriculture against these hyped products.

The future of cellular meat is a frontier for financial speculation. The danger then is that good faith social science interest in innovation, science and technologies works to legitimate these speculative dynamics. In part, driven by our own incentives to get funding and publish novel research on the evolving frontier of science and technology. Furthermore, the credibility of start-up founders and their future visions is often derived from presumed due diligence on the part of investors. Investors, who have been shown by fiascos such as the collapse of Theranos Inc. and FTX/Alameda, to be readily taken in by aesthetic parlour tricks, fear of missing out, herd mentality, and blinded by greed. In this presentation we seek to reflect on the ethical and methodological consequences of these dynamics using cultured meat as a case to reflect on the challenges for researching emerging technologies and future promissory discourses.

