Track 2 - Brave new RRI: challenges for early career researchers and biotech

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Wednesday 28th 17:00-18:15 – Session 1 – Early career researchers challenges

Thursday 29th 17:15-18:30 – Session 2 – RRI in biotech

Abstracts session 2

The Research Ethics cards as a RRI tool: Reflections concerning power asymmetry

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Over the past ten years, the concept of Responsible Research and Innovation (RRI) has gained particular visibility, both in policy context as well as within academic discussions concerning science and technology. As a part of the main strategy of the Research Council of Norway's RRI framework, RRI is emphasized as a new attempt to mitigate the asymmetry between science and society (Forskningsrådet). However, the concept of RRI has been criticized for its unclarity in how the idea of RRI should or could be interpreted practically (Burger et al 2017; Owen et al 2012; Forsberg and Wittrock 2021). Here I present experiences of using the 'Research Ethics cards' (Millar et al. 2022) as a methodology of enhancing reflexivity in a research project using novel technology such as advanced microscopy and gene technology approaches to study if microplastics have biological effects. The methodology helped researchers identify and reflect on ethical aspects of their research and demonstrated the need for RRI in biotechnology projects. Yet, as a common problem concerning RRI work on reflexivity, the methodology was not able to address the ways power operates influencing knowledge production which may undermine scientific inquiry, RRIs overall aim and the goal of enhancing reflexivity. By considering three ways power influence knowledge production, I suggest that the methodology do have the potential in addressing problems of power asymmetries between the RRI facilitator and the participants, as well as within the research group. The third, however, call for a stronger framework and integration of RRI. First, in RRI work on reflexivity, employing expertise, such as including an 'embedded humanist' or 'social scientist' risk creating a power asymmetry where employing RRI in technology projects become a one-way discussion and that the 'expertise' owns the question and the answer. When using the Research Ethics cards, the cards provides both a definition and a question in a way that the questions from the cards dictate the topic of discussion and the definitions balances the power relations even further by ensuring that everyone start from the same point regardless of their prior knowledge of the concept. Second, in work on reflexivity, there is always a risk that hierarchies and power

within the research group influences who gets to take part in the conversation, as well as what perspectives are included in the reflections and discussions (Fricker 2007; Pohlhaus 2012). As of the Research Ethics cards today, the cards do not ensure that the conversation is equally shared between participants nor make visible the participants' social situatedness impacting how far a speaker is trustworthy, or the facts of hierarchies and power within the group. On the other hand, by adding cards addressing social situatedness, hierarchies within research groups and identity power, the methodology has potential to recognize power dynamics and thus ensure that all viewpoints will be voiced. The third relates to the overall aim of RRI, such as mitigating asymmetry between society and science. In doing so includes recognizing the power structures which scientists as a social group is embedded in. Yet, leaving the scientific community to both reveal and mitigate these structures are unreasonable. Instead, there is need for a stronger framework and integration of RRI. When keeping these power structures hidden undermines societies' trust in scientific knowledge and creates even more distance between science and society

Exploring ethical dimensions of AI therapy design tools in Precision Oncology through SPARK: The example of the NTNU DrugLogics

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Functional precision medicine offers a crucial opportunity in oncology, allowing treatment design and testing in patient companion models. The DrugLogics initiative at NTNU is working to create tailored computer cancer models to match specific cells, organoids, and potential patient profiles. This will allow us to simulate how different drugs might affect cancer models, helping us to choose the best possible treatments to be tested. A Ph.D. project has been allocated to carry out the computational aspects of developing an Artificial Intelligence (AI) therapy design or decision-support tool. However, the project may be subject to strong ethical implications, especially regarding issues related to patient safety and the dynamics of the doctor-patient relationship. The platform developed under this project can collect and analyze data directly from patients. Therefore, one of the focuses of the Ph.D. project is to address ethical concerns. One way to do so is by fostering an open dialogue around the functionality and potential of AI therapy design tools. The intention is to actively involve in these discussions the future communities that could be affected by precision medicine: patients and healthcare personnel. To this end, the SPARK (Sharing Perspectives and Reinforcing Knowledge) activity was developed to address societal needs and problems from the main research project and made possible with funding from the Center for Digital Life Norway (DLN). The activity consists of creating a card game about the ethical aspects of precision medicine and AI design tools. The game is a semi-structured group discussion designed for 4 to 8 players and played in three stages: information, discussion, and response. In the final stage, participants attempt to reach a consensus on the ideal policy position for research, development, and implementation of precision medicine using AI therapy design tools. The game is shared and played by the end users and the academic community in three different events taking place during 2024 in Norway. The information gathered during the events will inform the main research on opinions and perspectives from the public regarding AI therapy design tools. This will help shape the

future of precision medicine at NTNU DrugLogics and across the academic community. The insights could also be used to inform future policy making and decision-making processes, ultimately benefiting a wider range of stakeholders in medical AI research. By establishing collaboration with different communities outside academia and creating activities beyond the main computational tasks, the project takes a transdisciplinary turn, enabling Responsible Research and Innovation (RRI), Open Science, and participatory Research. Here, we present the main challenges and experiences of integrating the SPARK activity into the NTNU DrugLogics project.

Envisioning the Future of Foods: The Intersections of "Sustainability", Dietary Lifestyles and Gene Technology in Australia

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Our global food systems are facing "sustainability" concerns, heightened by the challenges of climate change. Popular and often sociopolitical movements, such as the move from animal to plant proteins, and scientific trends, such as crop development using gene technologies may foster greater social, ecological, and economic "sustainability". However, the perspectives of individuals living plant-based lifestyles towards gene technologies have yet to be explored. Animal-based proteins, particularly meat, have been identified as having detrimental effects on e.g., human health (Ferrari et al., 2022) and the environment (Cellura et al., 2022). High meat consuming countries like Australia are encouraged to embrace more "sustainable" food practices (Williams & Price, 2010). Studies highlighting the impacts of protein consumption on "sustainability" suggest reducing animal-based protein intake and moving towards a larger consumption of plant-based proteins (Cellura et al., 2022; Ferrari et al., 2022; Williams & Price, 2010). The potential roles of various types of biotechnology in improving the "sustainability" of food production have also been of increasing academic interest. A recent review published by Sharma et al. (2022) summarizes the use of genetic modification (GM) and gene editing (GE) in applications to promote "sustainability" and suggests that biotechnology has the potential to address climate change, food security, sustainable agriculture and forestry, food processing, and chemical manufacturing. Of relevance to this research, GM and GE technologies can e.g., help to increase crop yield while reducing the use of resources such as water, energy, and agricultural chemicals. However, concerns have been raised about the use of GM and GE in food production, including potential risks to human and environmental health (Sharma et al., 2022). Responsible research and inclusive innovation (RRII) in "sustainable" food production and consumption must involve publics, including those who follow alternative dietary lifestyles, like plant-based ones. While recent academic literature has highlighted gene technologies and plant-based proteins as "sustainable" food pathways, the views of individuals adopting plant-based lifestyles towards these technologies have not been explored. This is despite the possibility that the adoption of such lifestyles may be motivated by concerns about "sustainability". Exploring these perspectives could contribute to our understanding of the relationship between sustainability, food technologies, food values, and dietary lifestyles. In this presentation, I will contribute to track 6, "What is meaningful RRI in biotechnology and the life sciences?" I will examine the perspectives of individuals following plant-based lifestyles and those with 'conventional' dietary habits in Australia, focusing on their views on the use of gene technologies in food production and consumption. This analysis is based

on focus group research and will provide insights into a) the participants' understandings and knowledge of gene technologies, b) attitudes and perceived risks/benefits associated with the use of gene technologies in food production and consumption, and c) imagined futures of "sustainable" food production and consumption. Drawing on my analysis, I will illuminate perspectives from alternative dietary lifestyles and their contributions to general food values, definitions of "sustainability", value conflicts regarding food technologies, and the importance of exploring the interplay of values, conflicts and trade-offs for Responsible Research and Inclusive Innovation (RRII).

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Ferrari, L., Panaite, S.-A., Bertazzo, A., & Visioli, F. (2022). Animal- and Plant-Based Protein Sources: A Scoping Review of Human Health Outcomes and Environmental Impact. Nutrients, 14(23), 5115. https://doi.org/10.3390/nu14235115

Sharma, P., Singh, S. P., Iqbal, H. M. N., Parra-Saldivar, R., Varjani, S., & Tong, Y. W. (2022). Genetic modifications associated with sustainability aspects for sustainable developments. Bioengineered, 13(4), 9508–9520. Scopus. https://doi.org/10.1080/21655979.2022.2061146

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