

Reflections on individual advising sessions on responsible innovation with the first student cohort of the Centre for Doctoral Training in BioDesign Engineering

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As part of the EPSRC Centre for Doctoral Training (CDT) in BioDesign Engineering programme in responsible research and innovation (RRI), individual advising sessions were held with each member of the 2019-2020 student cohort. The CDT started in 2019 and this is its first student intake. The cohort comprises nine Master of Research (MRes) students based this academic year at Imperial College London (ICL). These 45-minute sessions, led by the CDT's University of Manchester and University College London RRI team (working in pairs), were held over the course of two weeks, from March 18th to March 31st 2020. Sessions were conducted online via Skype due to COVID-19 social distancing measures.

Prior to each session, participating students provided the RRI team with their mock grant proposals and were asked to read a scholarly article on RRI and to watch a short video explaining the RRI approach and its relevance to early career researchers. Previously, in the first term of 2019-2020, the cohort had also engaged in two in-class sessions at ICL which introduced them to the foundations of RRI.

In the individual advising sessions, students discussed their research in the context of RRI. The RRI team asked students questions and provided advice on themes of anticipation, reflection, engagement and action (see table below). These themes are contained in the [EPSRC's Framework for Responsible Innovation](#). Discussion on the themes was customised to each student's research topic. At the end of the session, each student was asked to provide the RRI team with a set of written reflections on RRI and their involvement in RRI programme components.

CDT RRI individual advising session protocol for student research projects

<i>Anticipation</i>	What implications are anticipated? What additional implications should be anticipated?
<i>Reflection:</i>	Are motivations and values explicit? What other motivations and values should be acknowledged?
<i>Engagement</i>	What engagement activities are proposed? What additional engagement activities should be considered?
<i>Action:</i>	What action steps are proposed? What additional action steps should be considered?

Overall, the sessions went well, with the students reporting enhanced insights about RRI and its significance to their research project and individual development. The students were interested, reflective, and open and keen to engage in conversation. We were impressed and encouraged by their willingness to consider their research as an opportunity to think about responsibility. The students demonstrated capacities to reflect on their work from ethical and societal perspectives, including through considering issues around intellectual property, data and open access, risk, sustainability, distribution of benefits, funding, and gender representation. Some students also were open to reflecting on deeper philosophical questions raised by their work such as the meaning and value of life.

Here are a few examples of (many) reflections by participating students on RRI and the value of their participation in the RRI programme component:

What does RRI mean to you?

"RRI is a formal representation of the moral regulation that we as scientists and engineers must apply to our work. It creates a framework through which we can rigorously discuss the ethical issues involved with cutting-edge science, both amongst our peers, and with the broader global community."

What are the benefits of participation with RRI?

"Having RRI present in the forefront of my mind, due to the engagement throughout these sessions, has helped to maintain consideration of the wider implications of the work throughout the development, and thus helped me to better recognise key issues as they arise."

"The RRI sessions have personally allowed me to apply these concepts to my own research. Before the RRI sessions, I did not consider the potential negative or positive impacts of my work as it is quite abstract."

However, the sessions have made me realise that there is always an impact and therefore we need to be aware of it and make sure is a good one."

"The discussion made me aware of the commercial implications of the project (to patent or to publish), considered who are the best people to discuss the project with to get their view on how it would impact them and lastly discussing RRI within the research teams and supervisors that I am a part of."

What do you hope to gain from future participation?

"The RRI programme would serve nicely as a forum within which to discuss the RRI implications of all our projects between CDT students. It might also be useful for the RRI programme to advise us about the proper manner by which to go about contacting stakeholders, and how to manage public communication of scientific ideas."

"While RRI will not be a main concern in terms of my day to day research, I intend to include more information on RRI within presentations, given that I have [experienced] high levels of interest when discussing this topic."

RRI team reflections

The advisory sessions and feedback from students prompted these key reflections by the RRI team:

- The individual sessions seemed to be good forums for conversations about RRI. Students were comfortable with online discussion and were relaxed, talkative and attentive. It was helpful to emphasise the informal nature of the discussion upfront and to not have a rigid set of questions.
- About half the students described their exposure and engagement with RRI as occurring solely through their participation in the RRI component of the CDT programme, with little to no RRI engagement within their department or with their supervisors.
- Students were aware of RRI's focus on stakeholder engagement and were able to identify who their research might impact, including publics. Most students seemed keen to participate in public engagement and were interested in learning more about the different ways and forums for doing so.
- Some of the most productive sessions were with those students who are doing some form of computational or predictive modelling in bioengineering, leading to discussions about the economic and societal impact of AI and the increasing use of AI approaches in the lab.
- Students were able to point to both societal and scientific benefits as key motivations for their research. However, most students did not necessarily see themselves as taking this translation on themselves as 'champions' or entrepreneurs. That said, students did seem keen to learn more about university resources geared toward research translation.
- Several students raised questions concerning industry involvement in their own research and in university research more generally – an awareness that industry involvement could exclude alternative, more beneficial research trajectories.
- Asking students to provide us with written reflections following their advisory session proved insightful, demonstrating student understanding of RRI (impressive in scope and depth) and on the value of their participation in the RRI programme component.

Resources

Students were asked to review the following items prior to the advising session.

- [Developing a framework for responsible innovation](#) (2013) by Jack Stilgoe, Richard Owen and Phil Macnaghten.
- [Responsible Research and Innovation](#), Claire Grierson, Professor of Biological Sciences at the University of Bristol, presents her perspectives on RRI in this video.

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