Transdisciplinary sensibilities in investigating nuclear research and innovation

Report of the ECOSENS panel at the EASST/4S conference 2024, Amsterdam 16-19 July

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Introduction

Every 4 years, the European Association for the Study of Science and Technology (EASST) and the Society for Social Studies of Science (4S) co-organize a joined conference to bring together a large amount of researchers working in the field of Science and Technology Studies (STS). From July 16th until July 20th 2024, the EASST/4S conference took place in Amsterdam, bringing together over 3000 STS-scholars. The focus of the conference was 'making and doing transformations', hence providing a strong potential connection to the ECOSENS project, which inter alia focuses on the potential deployment of nuclear technologies in a context of vast societal challenges. It was therefor decided to submit an ECOSENS panel to the EASST conference, in order to facilitate discussions and exchanges relating to topics relevant for the project with a wider range of (academic) stakeholders.

The panel was titled 'Transdisciplinary sensibilities in investigating nuclear research and innovation', and was co-chaired by Susan Molyneux-Hodgson (University of Exeter) and Robbe Geysmans (SCK CEN). It aimed to invite contributions on the challenges and opportunities for trans- and interdisciplinary collaborations in research, development, innovation, and decision-making in the nuclear realm. Attention was also directed at participants' experiences with, and conceptual and methodological approaches to inter- and transdisciplinary research in the nuclear field. A full abstract of the panel can be found in Appendix A.

This report provides a summary of the various contributions made to the ECOSENS panel, with a particular focus on the ensuing discussions held during the panel sessions.

Panel template

The panel was accepted by the conference organizing committee in November 2023, after which it was opened for contributions from potentially interested scholars. By the abstract deadline in February 2024, 5 contributions were received, which were all positively evaluated by the panel convenors. Of the five received contributions, 4 were more classical conference presentations, while one proposed to host a

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group discussion on experiences related to inter- and transdisciplinary projects in nuclear research and policy advice. In consultation with the conference organizers, it was decided to provide two sessions in the panel: one 1,5 hour session in which 4 presentations would be provided, and a second 1,5 hour session for a group discussion. Both sessions were organized on Wednesday July 17th 2024, from 9h00 until 10h30 and from 11h00 until 12h30 respectively. The detailed program can be found in Annex B. A total of approximately 25 conference participants attended the panel, both during the 1st and the 2nd session.

Panel report

Session 1 (Wednesday 17/07/2024 – 09h00-10h30 CET)

During the first session, 4 conference presentations were provided.

The first presentation, by Linda Marie Richards from Oregon State University, provided an account of the inequalities which tend to dominate the nuclear landscape, with a particular focus on nuclear weapons and the legacies of their development. Driven by a desire to better comprehend how such inequalities exist and came into being -with e.g. historic contaminations as perpetuating witnesses to the real-world effects of such inequalities-, an account was provided that argued how international institutions such as the United Nations and later on the IAEA have dominated the nuclear landscape and narrative, while sidelining other organizational actors (e.g. the WHO or the ILO). During the Q&A after the presentation, this view was backed by some participants, who shared a view that currently, the IAEA is working both as 'protector of safety' and 'promotor of nuclear', which might entail conflicts of interest.

The second presentation was provided by Jan Haverkamp from Nuclear Transparency Watch, WISE and Greenpeace, who reported on the civil society interactions which took place in light of the European Joint Programme on Radioactive Waste Management (EURAD). Particular attention was directed at experiences gained in the UMAN and ROUTES workpackages of the EURAD program. Interactions were based on a 'double-wing' model, in which a distinction was made between civil society 'experts' (with e.g. strong technical knowledge) and a broader civil society group. Besides reporting on some concrete activities undertaken in the UMAN and ROUTES WPs (e.g. the PEP serious game in UMAN), the presentation highlighted the positive assessment of the civil society interactions by the EURAD program, with the prolongment of the CS interaction model in EURAD2 as a testimony to this. Some of the challenges mentioned entail the differences between societal and technical understandings of certain issues, differing views regarding the 'consensus' around geological disposal (which was 'loosened' a bit due to CS interactions) and the challenge of continuity.

In presentation 3, Robbe Geysmans from SCK CEN presented some insights regarding socio-technical integration gained through experiences in an ongoing project on the development of heavy liquid metal nuclear systems (ANSELMUS). The presentation discussed attempts to facilitate reflections of techno-scientific researchers regarding the interactions between their research and broader society during the R&D phase. The various activities reported on entailed individual questionnaires, socio-technical integration research (STIR) and workshops, which were justified with an intention of enabling responsible research and innovation (RRI). The experiences revealed that techno-scientific researchers reflected (already or more strongly) on the socio-technical interactions shaping their work, but mostly considered these interactions in the immediate context of their work (e.g. organizational impacts, project communication, researcher agency), while in a lesser extent also drawing connections to broader societal

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impacts. Overall, the facilitation of socio-technical reflections entailed also some challenges, not in the least regarding the sometimes fuzzy role of the researcher her/himself.

Finally, presentation 4 entailed a joined presentation by Brandon Costelloe-Kuehn and James Olsen from Rensselaer Polytechnic Institute. In their contribution, they discussed experiences with an ongoing consortium on developing a community-centred toolkit for community engagement in the context of "Consent-Based Siting" (CBS) of nuclear waste facilities in the US. This consortium is one of 12 consortia which are currently active in this US effort towards CBS. Drawing on their different backgrounds and perspectives on the topic, they provided a wide range of questions and challenges that come with trying to set up a 'consent-based siting' process in the development of a nuclear project (e.g. how to avoid 'deficit-model', but also critically reflect on knowledge needed to have meaningful discussions, what could 'transdisciplinarity' mean in practice in contexts of consent-based siting?). Focus of the presentation is specifically on the process of inter/transdisciplinary work, rather than solely the outcome, arguing that this process is an essential feature in order to establish a new subject (instead of applying interdisciplinarity 'to' a subject).

Session 2 (Wednesday 17/07/2024 – 11h00-12h30 CET)

The second session consisted of a group discussion, in which participants were invited to share their experiences with and reflections on transdisciplinarity. The session started with a presentation by Gaston Meskens on the subject of transdisciplinarity.

In this introductory presentation, it was highlighted how science has evolved, due to societal challenges being of such a nature that 'traditional' science is not equipped to tackle societal challenges. Many of the grand challenges society faces are characterized by a wide variety of actors that are part of the complexity, with a responsibility shared among everyone concerned. This offers a key step towards transdisciplinarity, in which the involvement of various actors, with a problem-oriented focus, is a key aspect.

After a short introduction to the ECONSENS project, with a particular emphasis on the concept of sustainability and the diverse meanings and activities sustainability could entail, the floor is opened to a wider discussion on transdisciplinarity in the nuclear field.

The discussion started with some participants sharing experiences with transdiscipinarity which they considered as rather shallow or unsatisfactory, because they were short-lived, or because they excluded certain voices (e.g. some local community members in environmental remediation). While short-lived initiatives of collaboration might be a step towards more profound and durable collaborations, the issue of exclusion was recognized by some of the participants as a clear issue of power inequality, which risks to be at play in many transdisciplinary initiatives. The fact that in many collaborations or exchanges between researchers and other stakeholders, there is a power imbalance (e.g. in terms of financial resources, perceived 'expertise', access, …) means that in practice many collaborative initiatives are rather limited in what they can achieve.

Furthermore, and partly connected to the issue of power inequalities, transdisciplinary collaborations in (and beyond) the nuclear field are also characterized by a potential lack of trust. Those working in the nuclear field as technical experts (engineers etc.) sometimes feel that if broader publics are involved (SSH researchers, but also citizens) everything they say 'might be used against them', while to 'outsiders', the nuclear industry is often considered as a 'black box', in which a lot of decisions are taken without

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transparency or clear justifications. Some participants raised that a way to overcome such issues of trust/mistrust, could lie in emphasizing that different actors are working on a shared issue, which is by default characterized by uncertainties, which you need to accept, while also consolidating knowledge and moving forward.

The recognition of uncertainties, and that certain things are just 'not known' according to some also could serve as a way to handle the reality that in many collaborations a distinction persists between 'technical' and 'social' issues, at least in the thinking of people. Acknowledging and emphasizing that some things are just 'not known', helps dissolving the divide between 'knowing' and 'unknowing' actors. This was e.g. the starting point in the PEP serious game which was developed in the UMAN project (cfr. presentation J. Haverkamp in session 1), which starts from discussions originating in the inherent uncertainties connected to radioactive waste management.

A participant raises the point that recognizing uncertainties and things 'not known' could indeed be an interesting approach, but might also prove sometimes very difficult, as different stances have evolved over certain 'unknowns'. The example of the linear non-threshold model is given in this light, which in essence is an ethically motivated manner to deal with an unknown regarding the effects of very low doses of ionizing radiation.

Revolving back to discussions on the potential usefulness of transdisciplinarity in the nuclear field, a participant argues that transdisciplinary projects have become some kind of 'buzzword', and that the perception exists that nowadays things have to be 'transdisciplinary' just for the sake of transdisicplinarity, while in reality transdisciplinary collaborations might in fact not be needed, effective or desirable. The point is for example raised that some academics prefer not to collaborate in any way with nuclear industry actors, as their goals and objective are perceived to be too different to make any kind of meaningful research collaboration possible. Others agree that it is important to keep a critical distance towards the actors involved in transdisciplinary projects or the subjects of the collaboration, but that this should not de facto rule out any kind of collaboration.

It is recognized that transdisciplinary collaborations require that actors create some sort of 'new language' in which they also move beyond their own pre-conceptions and categorizations. In the nuclear field, moreover, some spaces seem to be fenced of from transdisciplinary encounters. It is for example remarked how discussions on new nuclear tend to be often (perceived as) excluding discussions on radioactive waste management (and vice versa). This also relates to comments by participants which emphasize the rather instrumental nature being attributed to many collaborations in the nuclear field, while transdisciplinary collaborations would essentially also require a recognition of the substantive nature of such collaborations: bringing together different knowledges, experiences, and/or frameworks can also/are a requirement for better outcomes.

Towards the end of the discussion, participant highlight again that transdisciplinarity should not be a goal in itself, and is also not an approach which should always be used. But if transdisciplinary collaborations take place, they require time, effort and care. In the current research landscape (in nuclear and beyond) this is often considered difficult, as a lot of the work conducted is project-oriented, and hence managed by strictly controlled timelines and resources.

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Appendix A – Panel abstract

Transdisciplinary sensibilities in investigating nuclear research and innovation'

Societal shifts away from fossil-fuel reliance, whether rhetorical or realisable, have opened larger spaces for discussion on the future energy mix to be aimed for and the ways in which this can be achieved. Alongside, and post-Fukushima, there has been a marked divergence in views on the place of nuclear in this energy mix, both in national policies and local debates. For some nations, a resurgence in nuclear innovation is the proposed solution to meeting future energy demand, for others, nuclear is off the table.

The engagement of STS scholars in nuclear debate has come and gone over time. Meanwhile, inter- and trans-disciplinary ways of working have come more to the fore in terms of thinking and acting in STS. This panel will consider the intersections of inter/ transdisciplinary policy and practice and nuclear energy presents and futures. We aim to ask:

-What matters of concerns are present or absent in nuclear discussion?

-What new forms of STS engagement with nuclear have emerged and what are the specific challenges around STS interaction with nuclear? are productive forms of societal interaction possible with the nuclear realm?

-Are emerging nuclear innovations (e.g. small modular reactors) shifting debate and/or presenting new challenges to STS, to stakeholder engagement and to public discourse?

The panel invites contributions on the challenges and opportunities for trans- and interdisciplinary collaborations in research, development, innovation, and decision-making in the nuclear realm via studies of, and experiences with, inter/transdisciplinary interaction with technological innovation, and with a focus on conceptual frameworks and methodological approaches to understanding and challenging such collaborations. We welcome academic papers/presentations (ethnographic encounters, policy analysis, citizen science), video essays, storytelling and interactive formats.

The panel is organised with the ECOSENS project and SHARE research platform and will also involve a Workshop session (to be submitted separately).

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Appendix B – Panel program

Session 1 Wednesday 17 July, 2024, 9:00-10:30

How the UN sustained the power of the nuclear haves: a transnational and transdisciplinary exercise

Maria Rentetzi (Friedrich-Alexadner-Universität Erlangen-Nürnberg) , Aske Hennelund Nielsen (Friedrich-Alexander-Universität Erlangen-Nürnberg) , Linda Marie Richards (Oregon State University) , Véronique Stenger

Lessons learnt from EURAD interaction with civil society (ICS)

Nadja Zeleznik (EIMV) , Alexis Geisler-Roblin (Ecole Normale Supérieure) , Jan Haverkamp (Nuclear Transparency Watch - WISE, Greenpeace)

Integrating social considerations in advanced nuclear reactor technology? Experiences from an ongoing interdisciplinary project

Robbe Geysmans (SCK CEN) , Catrinel Turcanu , Joke Kenens (SCK•CEN Belgian Nuclear Research Centre)

Developing a collaborative paradigm for engagement: towards transdisciplinary and community-engaged work at the intersection of STS and nuclear engineering

brandon costelloe-kuehn (Rensselaer Polytechnic Institute) , James Olson (Rensselaer Polytechnic Institute)

Session 2 Wednesday 17 July, 2024, 11:00-12:30

Making and doing session on transdisciplinarity in nuclear research and policy advice

Gaston Meskens (SCK CEN, the Belgian Nuclear Research Centre)

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