**11 JUNE 2025 09.00 - 11.00**

# Panel 79. Technoscience in War and Peace: (Dis-)entangling Ethics and Technoscientific Knowledge in Conflicts' (de)Construction

**Convenors:**

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**Keywords: war, peace, dual-use, ethics, military**

In recent decades, STS has highlighted the non-neutral nature of techno-scientific development by analysing the multiple and diverse entanglements of science and technologies in different contexts and uses, and the roles of human and non-human actors in these processes.

Several examples of entanglement of science with war have been provided in the last years. The current wars in Ukraine and the Middle East have opened up tensions and debates on how to renegotiate scientific collaborations in academic institutions with scholars from countries involved in conflicts. The involvement of emerging technologies, such as artificial intelligence and digital infrastructure, in these wars have also been discussed. Finally, ethical controversies on research collaborations between universities, governments, and industries have been once again brought to the fore. While opponents claim that academic research should not be aimed at developing tools of death and destruction, but rather at building peace and mutual respect through international cooperation, knowledge exchange, and education, academic research projects involving governments and military industries are widespread and often constitute a critical financial asset for universities – and the moral profile of the issue is far from being universally accepted.

How can we disentangle the complex relationships between technoscience, war, and peace? How can technoscience work to build peaceful and just coexistence on the planet (and beyond) and contrast the war and destruction of the Earth and its species? What might 'Technoscience for Good' mean in the context of university collaborations with military organizations, whether private, public, or both?

This panel aims to discuss how technologies and science can contribute to reconfiguring the equilibrium in a world of wars. To this end, we welcome theoretical and/or empirical research-based contributions on the following topics:

- Entanglement of science and technology with peace and war;
- Ethical arguments in favor / against / problematizing academic military research;
- Studies on current academic involvement in military or dual-use projects;
- Scientists' and non-scientists' movements against the development and spread of hightech weapons (different developments and integrations of robotics, A.I., biotechnology, autonomous weapons, precision atomic devices, etc.);
- Roles and responsibilities of scientists in building peace and social justice (RRI, technology assessment etc...);
- Technoscience to support to build more equitable societies and populations at risk of conflict or victims of ongoing or concluded conflicts.

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## ID 424 - Dual-Use Research in Academia. Ethical and Legal Issues

*Andrea Barca, Politecnico di Milano*

**Keywords: Dual-use, Weapon research, Research ethics**

In this presentation, I will not address the direct involvement of universities in military research projects. Instead, my analysis will focus on (academic) dual-use research, with particular attention to the responsibilities of researchers engaged in such projects.

As frequently noted in the literature, the concept of dual use is far from precise. This ambiguity stems from the fact that it is employed in different contexts, from various perspectives, and thus for heterogeneous purposes. I believe it is necessary to distinguish at least two notions of dual use: one explicitly morally charged and the other (seemingly) neutral.

According to the first notion – primarily used in discussions on research ethics and in the non-proliferation literature – research is considered dual use when, despite being originally conceived for peaceful and beneficial purposes, there is a concrete risk that its results could be misused by secondary actors (such as terrorist groups) to cause large-scale harm. The second notion, by contrast – predominantly adopted in the context of R&D support – defines research as dual use when, due to its intrinsic characteristics, it has the potential (often worth exploiting) to generate knowledge and technologies that can be applied both in the civil and in military/defence sector.

Although these two notions raise related issues, they remain conceptually distinct. In this presentation, I will focus on the second notion of dual use and, in particular, aim to provide tools to address questions such as: "Is the involvement of universities in research that, while originally intended for civil purposes, may yield results applicable to the military – viz., contributing to the development of new weapons systems or the improvement of existing ones – justified?"

Another relevant question is: "If a researcher considers weapons research morally unacceptable, should they adopt a similar stance toward dual-use research?" In other words, assuming a stance of moral disapproval toward weapons research, "If and under what conditions can academic dual-use research be considered morally justified?".

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## ID 501 - Integrating Digital Ethics into Dual-Use Technologies: A Taxonomy for the Evolving Defense Landscape

*Alger Sans Pinillos, Barcelona Supercomputing Centre*

**Keywords: Dual-Use Technologies, Digital Ethics, Research Centres, Ethical Taxonomy, Technology Life-cycle**

This talk will reflect on how research centres can integrate digital ethics into their dual-use technology research projects, ensuring that technological progress is aligned with the common good despite ethical complexities and dilemmas. In particular, I focus on the recent incorporation of digital ethics into the dual-use technologies project of the Barcelona Supercomputing Centre (BSC).

The relationship between research centres (R&D) and military research has been the subject of ethical scrutiny for decades. The connection between technoscience and warfare has become increasingly pronounced, particularly as academic and research institutions become more deeply involved in military projects.

Increasing digital acceleration and the convergence of the civil and military spheres have given rise to a new paradigm of dual-use technologies. These developments, driven by advances in areas such as artificial

intelligence, autonomous systems, cybersecurity, and quantum computing, not only present opportunities for progress in defense but also pose significant ethical challenges related to privacy, responsibility, and human rights. Research centres, committed to technological innovation, are increasingly involved in creating technologies that can be applied in both civil and military contexts, complicating the ethical evaluation of such research.

Following the electoral victory of new leadership, the recent geopolitical shift in the United States has altered the global defense landscape, underscoring the growing influence of civilian actors in developing weapon technologies. This has amplified ethical concerns regarding research centres' involvement in designing and deploying technologies that could be utilised in wartime contexts. This situation highlights the urgent need for an adaptive ethical framework to guide the development and application of dual-use technologies while safeguarding public welfare and ensuring compliance with fundamental humanitarian values.

From an ethical standpoint, this talk introduces the adaptive ethical taxonomy for dual-use technologies we are working on, specifically designed to address the evolving needs of defense sectors in the context of global challenges. This taxonomy will align with the need for comprehensive guidelines that balance innovation with moral responsibility. It emphasizes the importance of recognizing the gray areas where these technologies operate and how ethical norms must evolve as their applications and the actors involved change. In this context, moral responsibility is not solely placed on the technology designers but is seen as a shared, continuous process among all stakeholders throughout the technology's lifecycle – from its creation to its eventual use.

The concept of cognitive moral agency also plays a central role. Stakeholders involved in developing dual-use technologies should be viewed not only as beneficiaries of the applications but also as active moral agents influencing technological decisions. This approach recognizes that ethics must be integrated at every stage of the process in order to anticipate and mitigate the potential risks arising from the dual application of technology.

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## ID 679 - Attitudes towards AI Defence Research within the Responsible AI Community

*Jurriaan Van Diggelen, Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek*
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*Marc Steen, Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek*

**Keywords: Responsible AI, Military AI, Reflexivity**

Introduction: The integration of artificial intelligence (AI) into military applications presents complex challenges regarding ethical, legal, and societal aspects (ELSA). This research examines attitudes towards military AI research within the Responsible AI (RAI) community, particularly among researchers affiliated with the Dutch ELSA Lab network. Given the dual-use nature of AI – serving both civilian and military purposes – it is crucial to understand the ethical considerations guiding RAI researchers. Our objective is to practice reflexivity [3] within the RAI community by encouraging researchers to critically assess their ethical stances regarding military AI research and development.

Results: To explore these attitudes, we conducted an empirical study using a survey distributed to 100 RAI researchers from the Dutch ELSA Lab community, with a response rate of 27%. The respondents primarily worked in academia or research. Participants were drawn from various ELSA labs, including four from the ELSA Defence Lab and the remainder from other ELSA initiatives.

The study employed the War Attitude Scale [1] to measure participants' general stance on war, revealing that respondents did not strongly support the idea of war. These findings will be compared to related studies, such as on U.S. citizens' average war attitudes [1]. Additionally, the relatively new Attitudes Toward AI

in Defense (AAID) scale [2] was used to assess perceptions of military AI. While participants acknowledged some potential benefits of AI in defence, they expressed significantly stronger concerns about its negative implications.

Beyond general attitudes, we explored researchers' ethical considerations regarding military AI research. Participants were asked about the types of defence-related AI projects they would find ethically acceptable to work on. Many were open to contributing ELSA research and autonomous cyber defence. However, most were unwilling to engage in projects related to autonomous weapon systems, AI-driven cognitive warfare, or autonomous decision-support for targeting.

We also examined preferences regarding potential clients for defence-related AI research. While the majority expressed willingness to work with NGOs, there was strong reluctance towards collaborating with the defence industry or ministries of defence from non-NATO states. Opinions on working with the Dutch Ministry of Defence or NATO-aligned ministries varied significantly.

In addition to the survey, we conducted a guided discussion with 60 researchers (including survey respondents) to further explore perspectives on the topic. Participants expressed a range of views, from strong pacifist stances to acceptance that sometimes peace needs fighting for. These views directly influenced their moral stance on conducting AI research.

Conclusion: These findings indicate that the RAI research community generally avoids direct involvement in military AI research, raising important questions about its role in shaping the impact of AI in defence. Should RAI researchers focus on ensuring responsible operationalization of AI in defence, or is their aim to slow the adoption of AI in defence to avoid moral calamities? Or can a balanced approach be achieved? By fostering reflexivity within the RAI research community, we believe we can help navigate these dilemmas, promote awareness of ethical implications, and shape research projects accordingly. During the workshop, we will provide specific recommendations to guide responsible engagement in military AI research.

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## ID 746 - ‚A Careful Constructed Machine of Violence'. On AI-Driven Warfare and the Question of an Possible Ontology of Peace

*Jutta Weber, Universität Paderborn*

**Keywords: algorithmic warfare, epistemology, ontology, correlation paradigm, peace**

What might happen if AI were guided by an ontology of peace rather than violence, ane thic of care rather than control, an orientation toward forgiveness rather than suspicion? (paraphrasing sociologist David Lyon).

In my contribution I want to discuss the epistemic logic and materiality of algorithmic warfare and the consequences of the use of advanced AI-supported decision-making, targeting and killing systems using the example of the US "War on Terror" (Weber 2016) and especially the Gaza War (Weber 2024). I will analyse the epistemological premises of algorithmic warfare which are built on a correlation paradigm and fosters scientific approaches that concentrate mainly on the exploration of the unknown, experimentation and systematised trial and error. Automated procedures for recombining and linking data, which are largely provided via signal intelligence, form the epistemological basis for data analysis and risk management. This process is organised on the basis of predefined categories and is governed by imagination which means projecting more or less probable scenarios and correlations. Semi-automated technologies of predictive analysis and preventive action, real-time tracking and targeting are seen as appropriate means to deal with the challenge of unpredictable risks - an approach reminiscent of the desire to find a 'technological fix' and thus achieve technological superiority (Weber 2016: 119) which is common in the framework of network-centric warfare.

At the same time technoscientific approaches such as machine learning and big data mining are abandoning former values of accuracy and scientific rigor. What kind of society do AI-driven systems of warfare

express which is capable not only of bringing these systems into being but accept their highly problematic consequences? What kind of ontology underlies (not only) recent warfare and its concentration on our world mainly as incoherent, unpredictable and full of risks? And (how) could it be otherwise?

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## ID 882 - Sensor networks, digitisation of infrastructures, and autonomous/ AI weapons in current wars

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**Keywords: sensor networks, infrastructures, EAI Systems, post-human war**

Recent conflicts show how warfare continues to be based on traditional concepts and technologies, and at the same time has elements of profound innovation. In this contribution, we discuss the entanglements of war and technoscience to understand how technoscience is actively involved in the changing scenarios of war, and how it is (re)shaping war's meanings or imaginaries. To this aim we discuss the interweaving of different technological artefacts, in today's wars, as 1) civil and military sensor networks; 2) digitisation of infrastructure of command and control; 3) autonomous and AI systems. The availability of information has led to the development of the military doctrine known as network-centric warfare, aimed at using the information provided by these devices for a competitive advantage. Civilian networks are joining military networks, resulting in an increasingly interconnected information network capable of generating data used by military operators. This element is closely linked to the progressive and increasing digitalisation of infrastructures of command-and-control processes, which was one of the most important innovation factors in the operations conducted by the Ukrainian armed forces against the invasion of the Russian Federation. Weapons such as the Stinger, the Himars or the Leopard tank, that have attracted the headlines in recent months are extremely enhanced by the networks that can link them together. The software and algorithmic logic have multiplied the effectiveness of these weapons. The ever-closer integration of these three elements – sensor networks, digitalization of command infrastructure, and autonomous and AI (EAI) systems – on the battlefield is shaping new forms of war. In this scenario, we discuss the concept of post-human war, whose agency is distributed among human and non-human actors, infrastructures, and artificial intelligence systems. The relevant implications of post-human war for the near future are discussed in this paper, as well as the meaning of warfare and of its different dimensions.