Centre of Excellence
Defence Against Terrorism

Terrorist Use of Weapon Mass Destruction

NATO COE-DAT

Course Report

Centre of Excellence - Defence Against Terrorism
Ankara, Türkiye, 2025

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Published by
Centre of Excellence Defence Against Terrorism (COE-DAT)

Centre of Excellence
Defence Against Terrorism

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Centre of Excellence Defence Against Terrorism.

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Terrorist Use of Weapon Mass Destruction Course
05-09 May 2025

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A little about NATO COE-DAT

NATO COE-DAT provides key decision-makers with a comprehensive understanding of terrorism and CT challenges, in order to transform NATO and Nations of interest to meet future security challenges. This transformation is embedded into NATO's three declared core tasks of Collective Defense, Crisis Management, and Cooperative Security.

As a strategic level think tank for the development of NATO DAT activities sitting outside the NATO Command Structure, COE-DAT supports NATO's Long-Term Military Transformation by anticipating and preparing for the ambiguous, complex, and rapidly changing future security environment. COE-DAT is able to interact with universities, think tanks, researchers, international organizations, and global partners with academic freedom to provide critical thought on the inherently sensitive topic of CT. COE-DAT strives to increase information sharing within NATO and with NATO's partners to ensure the retention and application of acquired experience and knowledge.

Director’s Opening Remarks

Dear Ambassador, Dear Ladies and Gentlemen, Distinguished speakers and participants.

It is a great pleasure and honor for us to welcome you here in Ankara, Türkiye, on the occasion of our course "Terrorist Use of Weapon Mass Destruction".

Weapon Mass Destruction (WMD) are armaments capable of inflicting catastrophic harm across large populations and vast geographical areas. Their use often results in immediate and large-scale death, long-term health implications and severe environmental problems, making containment and remediation extremely challenging. Due to their largely uncontrollable and unpredictable effects, WMDs are often perceived as more potent instruments of warfare or terrorism compared to conventional weapons. Despite existing international legal and ethical prohibitions, such weapons have been employed throughout history—to compel an end to conflict, achieve strategic dominance, deter adversaries, or assert psychological superiority.

The threat posed by WMDs becomes even more alarming when these weapons fall into the hands of terrorist organizations, given their potential to incite mass casualties, societal panic, and enduring ecological damage. In this context, NATO is fundamentally committed to preserving international peace and security. A key objective of the alliance is to prevent the proliferation and potential use of WMDs, particularly by terrorist entities.

I am confident that the insights generated here will contribute meaningfully to our collective efforts in addressing the proliferation of weapons of mass destruction and enhancing international security through coordinated, multilateral strategies and I sincerely hope that this training will greatly assist all participants in in gaining information and increasing awareness. I would like to express my sincere gratitude to our distinguished lecturers, academic advisor Dr. Serkan YENAL, course director Maj. Sgt. Gökhan BOZAN whom have done an outstanding job in providing you with the latest insights on the WMD. Also, I would like to take this opportunity to express my sincere appreciation to all our distinguished participants for attending this course.

I wish you all a productive and fruitful training experience. Thank you for your attention!

Day 1

“Keynote Speech” by Amb. (R) Ahmet ÜZÜMCÜ

Ambassador ÜZÜMCÜ, provided a comprehensive presentation of activities around the world to prevent chemical and biological terrorism, specifically with weapons of mass destruction (WMD). He emphasized the point that although the threat of WMD use by non-state actors was still relatively low, the impact would be immense. Previous attacks, such as the 1995 Tokyo subway attack and the chemical weapons use during the Syrian civil war, were referred to in order to underscore the seriousness of the threat.

Ambassador ÜZÜMCÜ emphasized the focal role of the Chemical Weapons Convention (CWC) and OPCW in dismantling chemical weapons and developing preparedness. While the principal focus of the CWC lies with state parties, the OPCW led efforts to establish methodologies to address terrorist threats, including capacity development, rapid response teams, and support to national law. The 2017 field exercise in Romania was pointed to as proof of rising global preparedness.

The speech made reference to the increased focus on biological threats, as it was noted that biological agents existed and could have enormous consequences. The Biological Weapons Convention (BWC) was noted to lack proper verification, as there were gaps in global preparedness. An example of the value of preventive infrastructure and early warning systems was seen with the COVID-19 pandemic.

New technologies, such as synthetic biology, artificial intelligence, and the darknet, were termed as expanding the threat horizon. The Ambassador ÜZÜMCÜ emphasized greater, more

solid ethical standards and regulatory measures. In response, organizations such as the OPCW invested in education, ethics, and scientific outreach to promote a culture of responsibility in the life sciences.

As a concluding remark, Ambassador ÜZÜMCÜ reiterated that robust global cooperation, proactive national implementation, and reactive policy arrangements were required in order to prevent chemical and biological terrorism effectively. He reiterated persistent investments in education, rapid response capabilities, and technological forward vision as indispensable factors for the maintenance of global security.

“Introduction, History, Development, Identification and Classification of WMD-1” by Dr. Barış ÇAĞLAR

In his lecture, ÇAĞLAR provided an in-depth analysis of Weapons of Mass Destruction (WMDs) in terms of nuclear, biological, chemical, and radiological weapons, and discussed their nature, effect, and the feasibility of defense against them.

He began by explaining how nuclear weapons derive their explosive energy from nuclear reactions—fission or fusion—and produce disastrous instant impacts, including blast, thermal radiation, and initial ionizing radiation. The delayed impacts are electromagnetic pulses (EMPs) and radioactive fallout, and can result in long-term environmental and health issues. Protection against nuclear assault is extremely challenging with the diversified delivery systems and sheer destructive potential of the weapons.

From the aspect of biological weapons, ÇAĞLAR noted that they involve spreading toxins or pathogens to ill or kill people. Their effectiveness is based on factors including the agent's

virulence, the route of entry, and the environment. He referred to historical incidents, such as the use of plague during the siege of Kaffa and Japanese experimentation during World War II. More recent advances in biotechnology threaten the potential for more virulent and harder to eradicate biological agents. Defense is high-tech and costly, with early warning and rapid medical response being crucial but difficult to mobilize.

On chemical weapons, ÇAĞLAR discussed agents that are toxic in any form—gaseous, liquid, or solid—and cause immediate harm through mechanism like choking, blistering, or nerve disruption. Although their employment has been less frequent in the last few decades, extensive employment was seen in the Iranian-Iraqi War. There are defensive mechanisms like protective gear and decontamination, but they are primarily effective for military forces and are not easy to employ on a large scale for the civilian population.

In his analysis of radiological weapons, ÇAĞLAR defined them as conventional explosives-delivered devices for releasing radioactive material that cause localized contamination and long-term health risk. While as yet not used in war, the potential to do so exists, with limited protection in the form of radiation detection and medical treatment that is not always available.

Finally, ÇAĞLAR addressed the means of missile delivery, the distinction between ballistic and cruise missiles, and the changing role of unmanned aerial vehicles (UAVs). He pointed out the increasing precision and range of these means, which exacerbate the WMD threat. Countermeasures, such as missile defense systems, are under way but are still costly and not yet functioning.

In his speech, ÇAĞLAR highlighted the sophistication and complexity of defending against WMDs and the extent to which international cooperation, advanced technology, and comprehensive defense efforts were necessary in order to offset these threats.

“Motivations and Incentives Behind Terrorist Attacks” by Muhammad Athar JAVED

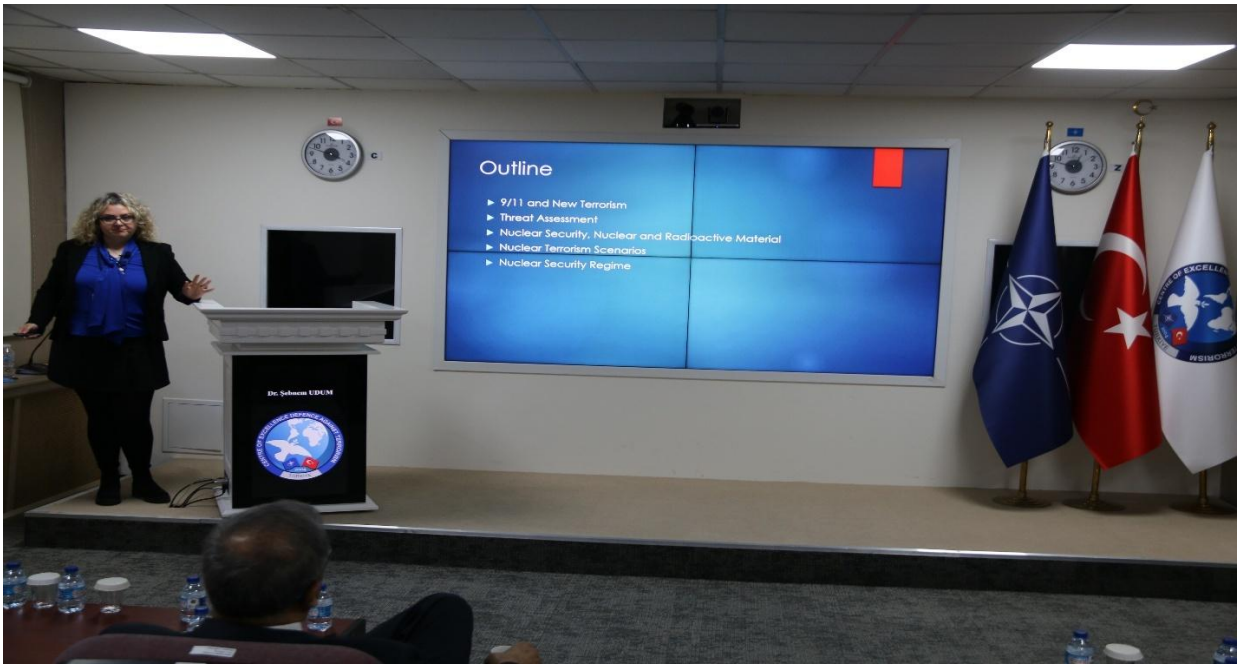
In this presentation discusses strategic and tactical motivations for terrorist organizations' fascination with weapons of mass destruction (WMDs), and specifically nuclear material. It emphasizes the necessity to understand ideological drivers and psychological incentives to better detect and disrupt attacks. Right-wing extremists, neo-Nazis, and violent religion inspired networks are most likely to pursue nuclear capability. These actors are ideologically motivated, organizationally coherent, and operationally competent, with some aiming for not only mass violence but also political control of territory.

The three main types of nuclear terrorism that are contemplated are nuclear explosives, nuclear sabotage, and dirty bombs. Nuclear explosions and sabotage are technically challenging, but dirty bombs are relatively easy to deploy and can cause enormous disruption. The future direction of terrorism will favor techniques that produce the most psychological and fear effect, as opposed to mere physical damage. The symbolic use of CBRN materials illustrates the preference for unconventional attacks and more subtle techniques to instill terror, destabilize societies, and attract media attention.

Motives for terrorist use of WMDs range from ideological objectives, lust for mass casualties, revenge, prestige, and the desire to elicit overreactions from states. Incentives also encompass acquiring access to black markets and recruiting like-minded scientists. The possession of such material by some groups tends to suggest intent to use it, particularly against infrastructure that is crucial to society, and detection of motivation and capability at an early stage is essential.

To thwart such threats, the presentation focuses on global intelligence sharing, technological advancement (e.g., AI-driven tracking systems), deradicalization at the local level, and enhanced border security. The protection of nuclear facilities from cyber threats and the integration of advanced detection technologies are essential. Ultimately, a combined approach of ideological insight, global cooperation, and proactive technology investment is paramount to counter the evolving threat of WMD terrorism.

“Nuclear Terrorism and Nuclear Security” by Şebnem UDUM



UDUM stated that the September 11 attacks marked a watershed in the history of terrorism, as they announced the arrival of transnational, ideologically driven non-state actors. She spoke about how such actors are drawn to symbolic, high-casualty attacks that instill fear, challenge state power, and attempt to reshape the global order. In this new landscape, concerns about nuclear or radiological material being utilized by terrorists have increased exponentially.

She accentuated that nuclear security involves preventing, detecting, and responding to criminal activities with nuclear or other radioactive material and associated facilities. She indicated that the International Atomic Energy Agency (IAEA) defines nuclear security as the protection of people and the environment from these threats. These include a broad array of dangers such as theft, sabotage, illicit trafficking, and the intentional release of radioactive materials.

UDUM presented several scenarios of nuclear terrorism, including the use of Radiological Dispersal Devices (RDDs), attacks on nuclear facilities, or the acquisition and detonation of Improvised Nuclear Devices (INDs). She highlighted the increasing challenge of insider threats, cyber-attacks, and the dual-use nature of most nuclear-related technologies. She further identified the widespread civilian use of radioactive sources as a vulnerability that needed to be addressed.

She presented that the international architecture for nuclear security is based on legal instruments such as the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment of 2005. She also mentioned relevant UN Security Council Resolutions, namely

1373 and 1540. She concluded by highlighting national implementation actions such as legislation, regulation, technical infrastructure, a robust nuclear security culture, and sustained international cooperation

Day 2

“Threat Assessment: Is WMD Terrorism a Hype or Reality” by Andrew WEBER

WEBER showed that WMD terrorism threat is typically underestimated. He emphasized that due to constraints in the public information and analysis, academia tends to miss or undervalue the possibility of using weapons of mass destruction (WMD) by terrorists. As WEBER suggested, this blindness leads to a serious threat to international security.

WEBER wrote that there are certain state actions that bear resemblance to actions of terrorism.

He regretted that certain state-sponsored activities—specifically in WMD development or use—are frequently indistinguishable from terrorist acts. He argued that having knowledge of state capabilities and intentions matters because they are most likely to influence or drive terrorist strategies.

WEBER warned that WMDs in state hands may find their way into the hands of terrorists. He cited Syria and Libya, where chemical weapons in the state stockpiles were vulnerable to theft or diversion to non-state actors. This, Weber contended, heightens the need for tight international monitoring and control.

WEBER invoked past examples of WMD terrorism to remind us of the ongoing danger. He referred to incidents such as the 2001 anthrax attacks in America, Japan's Aum Shinrikyo chemical and biological weapons initiative, and Al-Qaeda's alleged interest in acquiring WMDs. Those incidents, he asserted, demonstrate that the threat is no hypothesis.

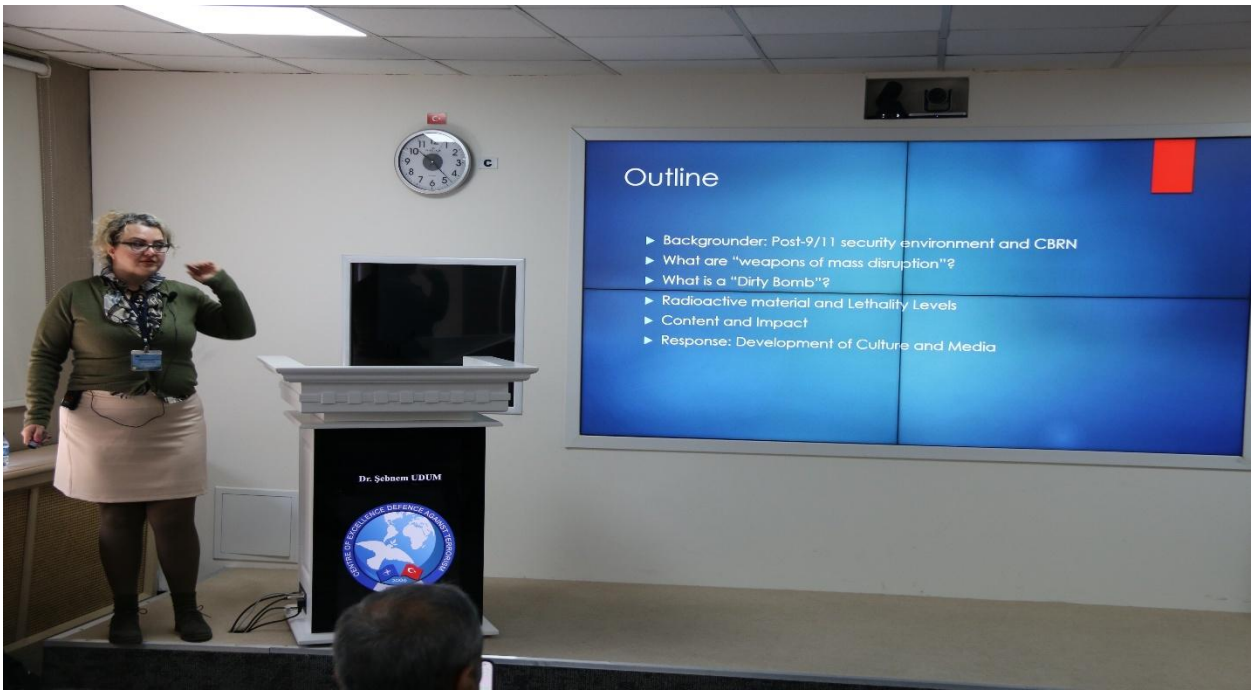
He cited UN investigations that said DAESH had made at least eight chemical weapons and used them in multiple attacks. Weber employed this as proof that terrorists can achieve high-level WMD capability.

WEBER stressed that artificial intelligence is changing the landscape of WMD threats. He noted that AI technology conceivably could be used to assist in the design, production, or use of chemical weapons, and therefore make them more accessible to nefarious actors. He referenced recent reports showing how AI is being misused for this end.

WEBER referred to past U.S. attempts to procure dangerous materials. He referred to operations like Project Sapphire, a successful mission for retrieving nuclear materials from Kazakhstan. Weber mentioned this as an example of how international cooperation can prevent WMD proliferation before the fact.

WEBER concluded with a quote from the 9/11 Commission. He quoted the Commission's conclusion that the attacks were the result of failures of imagination, policy, and preparedness. He warned that the same complacency could bring about another WMD terrorism tragedy in the future if the world remains so complacent.

“WMD and Radiological Security” by Dr. Şebnem UDUM



The 9/11 attacks ushered in a revolutionary shift in the world's threat environment, as a new era of mega-terrorism with ideological motivation and a focus on mass casualties started, Dr. UDUM said. She explained that the threat transformed in the direction of transnational non-state actors who seek to destabilize political and social orders by conducting spectacular and symbolic acts. Within this changed threat environment, the potential use of CBRN (Chemical, Biological, Radiological, and Nuclear) material became increasingly relevant.

She highlighted the growing concern over the alleged "weapons of mass disruption," namely radiological dispersal devices (RDDs), or dirty bombs. Although such weapons may not

cause extensive loss of life, Dr. UDUM noted that they can inflict long-term contamination, economic disruption, and severe psychological effects. She emphasized that conventional explosives and radioactive material are used primarily for spreading panic and fear rather than physical damage.

Dr. UDUM explained that radiological terrorism targets radioactive sources widely used in civilian practice, including medicine, industry, and research. These sources are transported around the globe every year, sometimes with less regulatory control than nuclear material. She warned that unsecured radioactive sources, or "orphan sources," would be vulnerable to terrorists. She mentioned sources like Cs-137, Co-60, and Ir-192, referring to their availability, radiation emission, and ease of weaponization. Plutonium, in particular, poses a grave danger if inhaled in even minimal quantities.

She explained the categorization of radioactive sources on a scale of five according to the level of danger by the International Atomic Energy Agency (IAEA). Though Category 1 sources can cause death with brief exposure, even lessor-category sources need to be strictly regulated. Should a dirty bomb be exploded, the immediate health impact might be small, but the resulting environmental contamination would require costly and time-consuming decontamination, she said. She stressed that the psychological and social effects—among them panic by the public, economic paralysis, and long-term mental health consequences—would likely far surpass the initial physical harm.

Passive defense measures such as evacuation, decontamination, and quarantine of areas are necessary, Dr. UDUM stressed, but can also be disruptive to state functions and expose critical infrastructure to cascading hazards. She advocated a strong nuclear and radiological security culture built on legal infrastructures, technical systems, and operational readiness. Most importantly, she said, human factors—leadership, responsibility, professionalism, and continuous learning—must be prioritized. She mirrored the IAEA stance that an effective security culture relies on the shared belief that the threat is real and security matters.

Finally, she talked about the role of public awareness and perception in radiological security. Dr. UDUM explained that mass media like the TV series 24 and films like Dirty War and Right at Your Door have made the public comprehend and prepare. She emphasized the role of media in shaping how society perceives and responds to radiological terrorism.

“IAEA's Effort to Prevent Terrorist Use of Radiological and Nuclear Weapons”
by Ms. Heather LOONEY

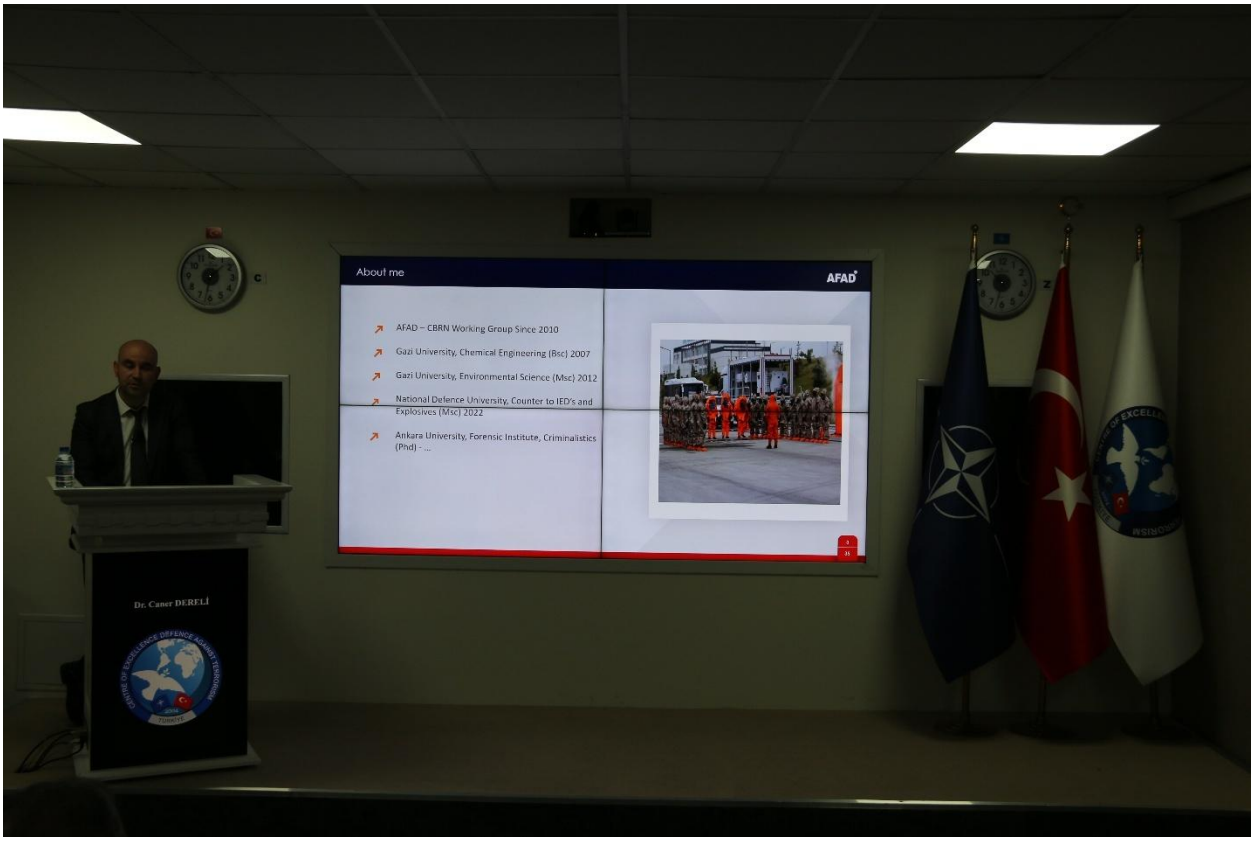
Ms. LOONEY testified that the global civil nuclear infrastructure is extensive, with over 400 nuclear power reactors operating, hundreds of research reactors, and widespread use of radioactive materials in medicine, industry, agriculture, and research in more than 150 countries. These materials, she highlighted, are essential to these sectors, with over 15 million radioactive shipments being transported each year. This global extent, she stated, is what makes strong nuclear security systems essential.

She pointed out that the incidents reported to the IAEA's Incident and Trafficking Database (ITDB) include theft, sabotage, and attempted use of radiological devices. These actions, she went on, can inflict severe health, environmental, economic, and societal harm. She stressed that nuclear security is first a national responsibility, which binds each state to prevention, detection, and response measures related to nuclear or radioactive material and facilities.

Ms LOONEY highlighted the IAEA's support to its member states via its integrated nuclear security programme. This includes the promotion of international legal instruments, training and technical guidance, and the encouragement of international cooperation. She noted the IAEA Nuclear Security Series (NSS) as a systematic source of principles and technical guidance for improving national nuclear security systems.

She also highlighted the importance of peer review mechanisms such as IPPAS and INSServ, mobile support tools for field officers such as TRACE and PAAT, and the Nuclear Security Training and Demonstration Centre (NSTDC), which has welcomed over 1,000 participants since 2023. These tools and initiatives, she concluded, are indicative of international efforts to enhance preparedness, resilience, and a strong nuclear security culture.

“Chemical Warfare Agents and Their Probable Use in Terrorist Attacks” by Dr. Caner DERELİ



DERELİ began his presentation defining terrorism as the use of violence against civilians for political or ideological goals. He defined chemical weapons as harmful chemicals used knowingly to cause death or harm, and gave their classifications, i.e., toxic chemicals, munitions to deliver them, and equipment specifically associated with them. He stressed that such weapons function by interfering with life processes and have the capability to result in death, incapacitation, or enduring harm, irrespective of their place of manufacture.

He gave a historical overview of the use of chemical warfare dating back from ancient times using examples such as poisoned arrows and poisonous smokes, to World War I and II when chemicals like chlorine, phosgene, mustard gas, and nerve gases were used. He explained how these developments resulted in global conventions, such as the Geneva Protocol. He continued to explain severe non-state chemical attacks, such as the Aum Shinrikyo sarin attack in Tokyo (1995), sarin attacks in Syria (Ghouta 2013, Khan Sheikhoun 2017), and DAESH sulfur mustard use in Marea (2015).

He covered high-profile chemical agent assaults, such as Kim Jong-nam's VX nerve toxin murder (2017) and Novichok poisonings of Sergei Skripal in Salisbury (2018), Amesbury death due to the same agent, and Alexei Navalny's poisoning (2020). DERELİ noted how the attacks demonstrated the intentions and capabilities of non-state actors and state-sponsored operatives to use chemical agents, illustrating gaps in response and prevention measures.

Next, he discussed chemicals that can be misused by terrorists, such as chlorine (used in Syria and Iraq), fentanyl (most notably in the 2002 Moscow theater hostage crisis), and riot control agents such as CS gas that are claimed to have been employed in the Russia-Ukraine conflict. He concluded with a warning regarding the danger of artificial intelligence facilitating it so much easier to design chemical weapons, touching on the dual-use problem and requiring global vigilance and cooperation to prevent chemical terrorism.

“Improvised Explosive Devices Used in Syria Civil War” by Dr. Carol Teodor PETERFI

PETERFI began by explaining various dissemination methods of chemical warfare agents (CWA) including bursting weapons and spray-type devices and emphasized the role of delivery systems like rockets, missiles, drones, and aircraft. He also made a distinction between Improvised Explosive Devices (IEDs), which inflict injury primarily through explosion, and Improvised Dispersion Devices (IDDs), which spread injurious agents like chemical or biological ones. He described both types of devices being frequently used during the Syrian Civil War by state and non-state players, varying in delivery from man-portable to vehicle-borne and remotely controlled attacks.

PETERFI described the improvised CWA delivery system used in Syria, with some being manually placed and others being fired with improvised artillery or IRAMs. He described the improvised chemical weapons as being constructed with materials such as explosive charges, detonation cords, and liquid containers. He indicated the use of such weapons in areas inhabited by civilians to create widespread fear and confusion, and questioned whether pinpoint attribution was possible in these situations of a loud and dynamic battlefield with many shifting coalitions.

He examined the strategic and tactical motivations for their application, emphasizing that CWAs are traditionally considered agents to drive a wedge into logistics or halt enemy mobility but were fired mainly at civilians in Syria to terrorize populations and intimidate rebel forces. He asked important questions about accountability, adherence to international treaties, and political will to prevent chemical warfare. He also pondered the challenges facing international investigators, including those of the OPCW, to document and verify the use of chemical agents in such complexity.

Lastly, PETERFI discussed the harsh psychological and social impacts of chemical attacks, supplementing that the survivors usually suffered long-term health complications and acute trauma. He underlined that the use of CWAs was not just a war crime but also an international norms violation that undermines public confidence and world security. He called for a more aggressive international reaction, transitioning from disarmament to non-proliferation, enhanced civil-military relations, and greater readiness against new CBRN threats. He concluded with a warning on the political side of chemical weapons, underlining that defense must not only be technologically feasible but also politically ready.

“Strategic Responses to Terrorism” by Dr. Jean Pascal ZANDERS

Dr. ZANDERS, delivered a well-covered address on strategic responses to terrorism employing chemical and biological weapons. He emphasized that while the terrorist employment of CBW has hitherto been rare, the threat remains due to advancements in technology and loopholes in preparedness. All NATO members are bound by international disarmament treaties such as the Geneva Protocol (1925), BTWC (1972), and CWC (1993), which prohibit the creation and use of CBWs. However, preparedness and response continue to remain a national domain,

assisted by measures such as the UN Secretary-General's Investigative Mechanism and INTERPOL's capacity for assistance.

ZANDERS analyzed the actual and perceived threat from terrorist organizations. While there have been notable instances such as Aum Shinrikyo, Al-Qaeda, and DAESH that have sought to utilize CBW, most of the attempts were technically inadequate or unsuccessful. But incidents such as the anthrax letters (2001) and Novichok-nanocyte-based targeted assassinations show that low-casualty, high-impact incidents are possible. New technologies such as synthetic biology, AI, 3D-printing, and nanotech can render future CBW attacks more available, precise, and effective. He warned terrorism will evolve from releasing microbes to interfering with human immunity or degrading genes.

Last but not least, ZANDERS advocated that "prevention is the best cure." He detailed how states can tap into provisions in the BTWC and CWC to seek and receive help, build response capacity, and collaborate through training, technology sharing, and intelligence gathering. Much still prevents this, though: how do international organizations respond to claims of CBW when they begin from non-state sources (e.g., NGOs, media) or occur in zones outside state control? How are the authors held accountable in these complex political and legal environments? The future of CBW counter-terrorism, ZANDERS had argued, depended upon multilateral coordination, legal clarity, and scientific vigilance.

“Türkiye's Contribution to Disarmament Efforts Against CBRN Threats” by Ela Beşkardeş KARAGÖL

KARAGÖL stated that the promotion of international arms control, disarmament, and non-proliferation has always been one of Türkiye's main foreign policy pillars. She emphasized that Türkiye is a signatory to almost all-important international instruments on weapons of mass destruction (WMD) and Chemical, Biological, Radiological, and Nuclear (CBRN) threats. In addition, she noted that Türkiye is a member of all relevant export control regimes.

She explained that such tools include both legally and politically binding obligations and cover a wide range of international and multilateral agreements, conventions, arrangements, and initiatives. She further stated that the strategy of Türkiye is not only focused on the prevention of proliferation of WMD but also on the protection of civilian populations and the assurance of defense against their use, especially in light of growing global challenges.

She urged that the utility of such tools has expanded in the context of today's complex global security environment. She warned of the risks of further escalating ongoing conflicts and highlighted the growing overlap of CBRN threats and emerging technologies. She stressed that the constant threat of WMD use by terrorists makes multilateral cooperation more crucial than ever. In conclusion, she reaffirmed that non-proliferation, protection, and defense through multilateral mechanisms should still be the priority in the future. She emphasized the need to maintain coordination, cooperation, and consultation at the national and international levels. She closed by thanking the participants and opening it up for questions.

Day 3

“Countering Bioterrorism Activities on the Darknet” by Boban CEKOVIC

Emphasizing the potency of Novichok agents, CEKOVIC described them as highly toxic organophosphate compounds that block acetylcholinesterase with ensuing severe physiological consequences such as convulsions, respiratory arrest, and fatality. Emphasizing their resilience in so many diverse environments, he added that they are particularly hard to detect and decontaminate. Deployment of the agent in gel or liquid form also makes containment even harder.

CEKOVIC examined the intricate challenges of decontaminating contaminated city areas from chemical agents. He described the challenges of high population density, intricate infrastructure, and the presence of spaces that are closed in but open out, facilitating the spreading of contaminants. There is a need for long-term and diligent decontamination for persistent agents like Novichok, and this usually involves demolishing contaminated structures and disposing of harmful waste.

Characterizing the steps of the incident response—notification, response, stabilization, and restoration— CEKOVIC highlighted the importance of collaborative action by various agencies. He emphasized the importance of rapid detection, effective containment, and speedy decontamination to reduce the impact of such attacks. The functioning of specialized gear and trained personnel is crucial in managing the short-term as well as long-term impacts of chemical incidents.

Consideration of the events, CEKOVIC stressed the necessity of all-round readying measures. These include the routine training of first responders, chemical threat awareness among citizens, and the development of uniform decontamination procedures. He encouraged tougher inter-agency coordination and the use of clear communication channels to enable proper response to future events.

“Countering Bioterrorism Activities on the Darknet” by Dr. Zoran SANDEV

In his article SANDEV, addressed the unique challenge posed by biological agents. He emphasized that the agents occur naturally in the environment, which makes them difficult to detect and control. SANDEV addressed the fact that advances in biotechnology, particularly in synthetic genomics, have increased the stakes for such agents to be misused for terror. He mentioned the difficulty law enforcement agencies face when intercepting the purchase of such agents that have potential for future harm.

SANDEV characterized the Darknet as being a portion of the internet that is intended to be secretly hidden and often used for criminal activities, but not always. Pages on the Darknet contain a URL and require special software to access. He explained how the anonymously traded online black markets of the Darknet, traversing TOR and I2P privacy technologies, make the hidden trade of sensitive material possible, which poses extreme biosecurity threats.

He identified significant indicators of bioterrorism in the Darknet, including equipment procurement, knowledge sharing, and commercialization of biological agents. SANDEV cited availability of high-impact bioagents, weaponized pathogens with pandemic potential, DIY synthesis technologies, bioengineering devices, and encryption communication on Tor forums and discussion boards. He emphasized such players as terrorists, extremists, and lone actors use such platforms to develop a multi-dimensional threat scenario.

SANDEV discussed the challenges of finding and monitoring threats on the Darknet, including legal and jurisdictional issues, and data privacy versus public safety. He discussed detection and monitoring methods, such as web crawling, scouring Darknet forums and markets for bioterrorism terms and trending topics, monitoring anomalous behavior, posing undercover in Darknet communities, and using a risk assessment model to analyze technical feasibility and operation intent.

He mentioned a case study where the UN had issued a report that terrorists were using the Dark Web as part of their search for weapons of mass destruction, demonstrating the tangible use of such threats. SANDEV highlighted the importance of law enforcement action in the area of interagency collaboration, information sharing, public-private partnership, and training and awareness campaigns. He concluded by highlighting INTERPOL's support for member countries through capacity-building activities focused on prevention, preparedness, and response, including Darknet investigation training to counteract bioterrorism activity.

“When Every Second Counts: The Reality of Mass Evacuations in CBRN Incidents” by Dr. Veda Duman KANTARCIOĞLU

Dr.KANTARCIOĞLU emphasized that mass evacuation in CBRN incidents is significant in terms of saving military troops and ensuring operational continuity. She emphasized that mass evacuations avoid degrading missions by casualties or contamination and ensure clear zones of military response and recovery.

She defined evacuation as the rapid removal of people from immediate risk to safety, with provision of necessary care like transportation, shelter, and support services. Mass evacuation, she said, is the removal of entire communities or districts, which overloads emergency capacity and demands multicounty coordination.

Dr. KANTARCIOĞLU discussed some of the delivery methods for CBRN weapons, including airborne particulates or contaminated surfaces to disseminate biological agents and radiological dispersal devices (dirty bombs), improvised nuclear devices, and chemical agents disseminated by aerosols or contaminated food and water.

Dr. KANTARCIOĞLU discussed that likely attack sites for these would be urban centers, key infrastructures, and mass events. She stressed that in CBRN incidents, speed is of the essence. Rapid exposure brings rapid harm, especially because of chemical and radiological agents. Delay leads to casualties, long-term health effects, and causes panic and misinformation. Prompt area isolation and instant medical response are essential.

To neutralize the impact of a CBRN terrorist attack, Dr. KANTARCIOĞLU established some basic steps of response: rapid threat identification, fast isolation of the incident location, deployment of specialist units, alerting of emergency response infrastructures, neutralization or containment of the threats, and real-time risk communication. Decontamination processes, pre-

wired evacuation paths, area security, evidence preservation, and support operations like communications networks and engineering support were also emphasized by her.

She explained that mass evacuation is necessary on the basis of high risk of deaths, widespread contamination, rapid overloading of health systems, and risk of panic and chaos. The aims of mass evacuations following CBRN attacks are to preserve lives, restrict secondary hazards, alleviate pressure on healthcare, prevent panic, minimize long-term health risks, protect critical infrastructure, and improve public faith and morale.

Dr. KANTARCIOĞLU presented key principles of mass evacuation in CBRN emergencies: speed and efficiency, security and safety, and coordination. She identified challenges of mass evacuation: complex human behavior, rapid threat assessment, public knowledge and behavior, protection and decontamination, transport and logistics, inter-agency cooperation, sheltering and medical care, evacuation sustainability, psychological impacts, legal and ethical issues.

She provided examples of CBRN incidents requiring large-scale evacuation, including the Bhopal disaster in India, accident in the Fukushima nuclear power plant, and atomic bombing in Hiroshima. In each, one could witness the complexity and long-term consequences of poor planning for evacuation.

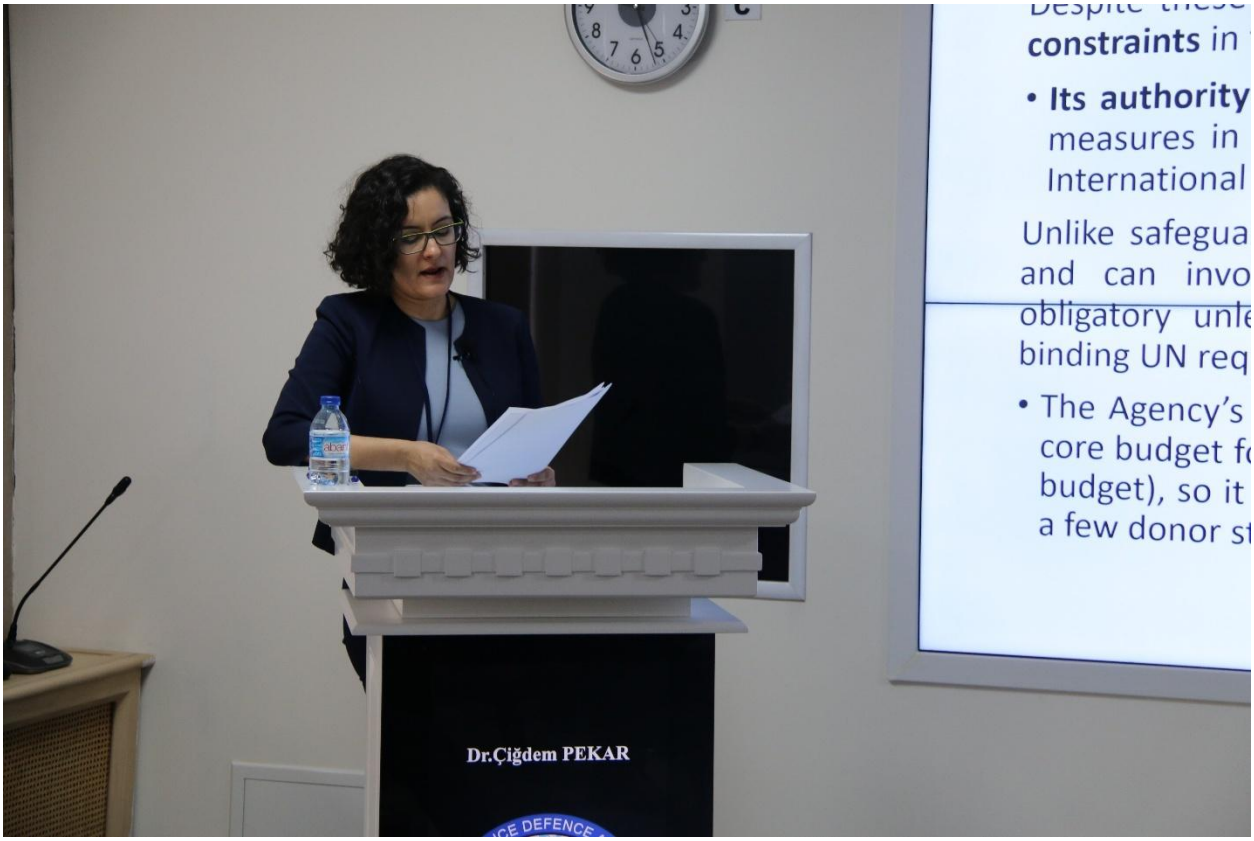
Dr. KANTARCIOĞLU described the process of evacuation timeline by emphasis on prompt and accurate evaluation of the risks, transparent and credible communication, coordination and resource mobilization between agencies. She introduced the emergency management approach of mass evacuation in a CBRN incident, which comprises detection and first evaluation, decision to evacuate and area delimitation, sheltering and logistics support, security and order enforcement, and monitoring and recovery operations.

She talked about controlling fear, panic, and crowds during massive evacuation, indicating that emotional reaction in CBRN events can trigger fear, anxiety, and confusion. Control and calm measures emphasized are clear, honest, and repetitive messaging, use of credible messengers, public display of organized staff, preplanned evacuation routes, deployment of trained staff for crowd management, and integration of mental health staff in evacuation areas.

Finally, Dr. KANTARCIOĞLU highlighted the role of military troops in mass evacuation operations in the context of CBRN. She pointed out the requirement of force protection, operational continuity, command chain and field coordination, interaction with the population, fear and crowd management, medical and decontamination support, and logistics and infrastructure support. She concluded with key takeaways: the value of pre-planned evacuation drills for risk areas, the role of soldiers in bringing peace and clear instructions, the value of interagency coordination, and the value of regular evacuation and CBRN drills to build military readiness and boost collaboration with civilian responders.

Day 4

“Nuclear Non-Proliferation Strategies and Challenges” by Dr. Çiğdem PEKAR.



PEKAR provided an overview of the international legal instruments to prevent nuclear terrorism, pointing out that although treaties like the Nuclear Non-Proliferation Treaty (NPT) form the pillars of international nonproliferation efforts, they are state-oriented and not adequately equipped to tackle the new threat from non-state terrorist organizations. The NPT, through promoting peaceful use and disarmament, does not directly cover the criminalization or protection of nuclear material against theft or terrorist misuse. Additionally, major nuclear weapon states such as India, Pakistan, Israel, and North Korea are excluded from its scope, creating huge blind spots in global nuclear regulation.

PEKAR also explained the Convention on the Physical Protection of Nuclear Material (CPPNM) and the 2005 Amendment, which make states legally responsible for protecting nuclear material when used and transported. The convention is directly targeting nuclear terrorism by imposing national protection regimes. However, she identified some of the difficulties, such as limited international enforcement mechanisms, no specific standards, and exclusion of nuclear material for military use under the treaty. The efficacy of CPPNM is also discredited by asymmetrical implementation by member countries and the absence of verification or inspection mechanisms.

Lastly, PEKAR talked about ICSANT (International Convention for the Suppression of Acts of Nuclear Terrorism) and UN Security Council Resolution 1540. ICSANT binds states to criminalize nuclear terrorism and cooperation in enforcement but has weak prevention provisions

and limited participation. The majority of countries need to redesign their legal structures and institutional capacities. Chapter VII adopted UNSCR 1540 commits all members of the UN and complements treaty efforts by demanding controls over WMD-related materials and excluding proliferation through non-state actors. Despite its broader application, PEKAR observed that ICSANT and UNSCR 1540 both remain largely dependent on state implementation, which is extremely heterogeneous and limits international standardization of counter-terrorism readiness.

PEKAR pointed out the critical role played by UN Security Council Resolution 1540, which mandates every UN member state to enact legislation and controls to prevent non-state actors from acquiring weapons of mass destruction (WMD), nuclear weapons included. While there have been successes—national legislative reform and improved port security—there has been patchy implementation. The 1540 Committee, which is responsible for monitoring and offering assistance, lacks enforcement powers. It is based on political pressure, not sanctions, and possesses a loophoped gap in international implementation and long-term continuation.

Referring to institutional mechanisms, PEKAR characterized the International Atomic Energy Agency (IAEA) as a critical technical agency for nuclear security. Even though the IAEA provides advice, training, and peer review, its leverage is restricted—it has the ability to enforce measures only if states voluntarily undertake commitments. Its limited budget and lack of authority over weapons nuclear materials restrict its contribution to nuclear-specific threats, though. She also quoted the UN Office on Drugs and Crime (UNODC) that helps states implement treaties like ICSANT through model legislation and training. Its broad mandate and limited resources restrict its contribution to threats that are nuclear-specific, though.

In order to bridge these loopholes, PEKAR laid down a list of recommendations. She called for universalization and fortification of key treaties like ICSANT and CPPNM, increased implementation of UNSCR 1540, as well as more integration of nuclear security language into the NPT review process. Further, she called for more funding and political backing for the IAEA and suggesting mandatory peer review missions (IPPAS) and more sharing of data. She concluded by calling for strengthening legal and institutional capacity, observing that although there has been improvement, there are weaknesses in the global regime that could be exploited by nuclear terrorists if not addressed in an expeditious fashion.

“Linking Clandestine Network with Money Trail and Financial Mechanism of how the Sale/Purchase is being carried out” by Muhammad Athar JAVED

JAVED, provided a grim overview of clandestine WMD proliferation networks during his presentation in Ankara on May 8, 2025. He detailed how global terrorist groups—such as DAESH and Al-Qaeda—have tirelessly pursued weapons of mass destruction, such as chemical, biological, and nuclear material. Drawing on IAEA and intelligence reports, he cited over 4,200 incidents of radioactive trafficking and noted how modern conflict zones, failed states, and emerging technologies have all amplified these risks. Specifically, DAESH deployed chlorine and mustard gas as weapons, and Al-Qaeda experimented with anthrax, showing a clear and ongoing threat from non-state actors.

JAVED described the structure of illegal proliferation networks, which are polycentric, broker-mediated, and often involve criminal syndicates, corrupt state officials, and insurgents. These networks employ darknet websites, cryptocurrency (particularly Monero), and practices like escrow wallets to exchange chemical precursors, lab equipment, and even nuclear blueprints anonymously. Smuggling routes—through the Balkans, Eastern Mediterranean, and through Syrian and post-Soviet territories—are exploited by utilizing cargo containers, migrant flows, and bribed customs officials. The 2000s nuclear black market, with its centrifuge technology sold to states including Libya and North Korea, was presented as a case study of how illegal sales evade global controls.

He concluded by outlining priority governance gaps and making specific policy recommendations. Existing treaties like the NPT and CWC are largely applicable to states and ill-suited to deal with non-state actors. A number of states have yet to implement UNSCR 1540 fully.

To address WMD supply chains, which continuously evolve, Javed demanded more regulation of crypto exchanges, increased investment in darknet monitoring and forensics, and more cross-border intelligence sharing. Prevention, he emphasized—through the securing of vulnerable sites, targeting of brokers, and reform of border policies—is more effective and more humane than response to a successful WMD attack.

“CBRN Incident Management-Roles, Responsibilities and Challenges” by Ulviye Ersoy YALÇIN

YALÇIN, in her presentation, pointed to the complexity of responding to chemical, biological, radiological, and nuclear events. She emphasized that these events require an integrated, multi-agency response and underlined the importance of clearly defined roles, coordination mechanisms, and interoperability of different actors. She highlighted the evolving threat landscape, which not only encompasses traditional CBRN threats but also emerging threats like synthetic drugs, gene-editing technologies, AI-driven weapon delivery systems, and cyber-attacks on CBRN facilities.

She presented the distinction between CBRN terrorism and conventional HAZMAT incidents, explaining that while operational concepts may coincide, terrorist incidents require more tailored approaches due to their deliberate nature, use of exotic or persistent agents, and amplified public impact. She noted that terrorist attackers can exploit detection lag times and public vulnerabilities to enhance harm.

YALÇIN outlined the main phases of incident management—information gathering, scene management, life-saving, and post-incident treatment—and enumerated main actors involved,

including civil government, medical and military personnel, police, intelligence agencies, non-governmental organizations, and international organizations like NATO and WHO. She highlighted the essential role of public information and psychological counseling in response and recovery management.

Furthermore, she discussed issues such as limited resources, coordination gaps, misinformation, and legal and ethical challenges. She showcased best practices such as harmonized SOPs, regular joint exercises, investment in PPE and training, and CBRN integration within national emergency response systems. She also explained Türkiye's national system under AFAD, including roles such as coordination, early warning systems, drills, public awareness, and equipment development.

She concluded by pointing out that CBRN threats are emerging and variable and require continuous learning, interagency coordination, and scenario-based preparedness. She emphasized that NATO provides precious support in doctrine and capacity-building and that proactive and integrated planning is the way to move ahead in reducing harm and saving lives.

“New Technologies CBRN Training: VR” by Massimo MIGLIORINI

MIGLIORINI began by pointing out the dire necessity to train personnel for high-risk situations such as chemical, biological, radiological, and nuclear (CBRN) events. She stated that conventional training is thwarted by logistical, ethical, and safety limitations, which is the reason why Virtual Reality (VR) has been revolutionary.

He explained that the Third Wing of the Italian Air Force developed the VR4CBRN project, in collaboration with Fondazione LINKS and Politecnico di Torino. She explained that the goal

was to convert NATO-standard CBRN procedures into virtual reality models. She continued that three key simulations were developed: RECCE TEAM, CCA STANDARD, and CCA MED.

The speaker indicated that the simulations are designed with real tasks, roles, and environmental conditions such as contamination types and wind direction. he added that the simulations were co-designed with CBRN experts for doctrinal accuracy.

He explained that VR has a number of advantages: exposure to dangerous situations in safety, repeatability, standardization, and multi-user interaction. For her, VR reinforces procedural memory so that users can practice and master activities without consequences in the real world.

To describe the RECCE TEAM simulation, he stated it covers several operational phases—from PPE planning to decontamination—and integrates actual detection equipment into the virtual environment. A virtual instructor role was also implemented for real-time feedback.

For CCA STANDARD and CCA MED, she outlined that these simulations walk users through step-by-step decontamination processes, medical triage, and equipment operation. She highlighted the inclusion of hand tracking, providing more intuitive interaction, though controllers remain more precise.

He reported that the VR system was presented at NATO's "Toxic Trip 2023" and also debuted at the COE-DAT course on Terrorist Use of Weapons of Mass Destruction in Ankara in May 2025. he said that the VR4CBRN project was a success and was well-liked for its innovation.

In conclusion, he mentioned that the system is already operationally in use and under consideration for integration into formal CBRN certification courses. He concluded by stating that VR4CBRN is an immersive, scalable training solution that increases readiness and public safety at no cost to trainee welfare.

Day 5

“Dual Use AI in CBRN Contexts Threat Amplifier or Strategic Asset” by Dr. Veda Duman KANTARCIOĞLU

Dr. KANTARCIOĞLU began her presentation by separating Chemical, Biological, Radiological, and Nuclear (CBRN) threats into three broad categories: direct attacks on the population or the environment, cyber or explosive attacks on infrastructure and supply chains containing CBRN materials, and accidental leaks due to natural disasters or negligence. She noted that such threats are increasingly diverse and complex in nature.

She talked about data collected from 1990 to 2020 and reported that 565 CBRN incidents had been recorded globally. The events involved one agent in 89.4% of the time and more than one agent in 10.6%. She reported that chemical agents were the cause of the greatest number of injuries, with 965 deaths and over 7,500 injuries. Biological events caused 19 fatalities and 59 injuries, and radiological and nuclear agents caused no fatalities but 50 injuries. Those numbers, she underscored, are indicative of the persistent danger posed by chemical threats.

Dr. KANTARCIOĞLU addressed nuclear material trafficking next, citing the IAEA's Incident and Trafficking Database (ITDB), which had registered 4,390 incidents between 1993 and 2024. Of these, she reported, 353 were related to trafficking or malicious purposes, 13 involving highly enriched uranium (HEU) and several others involving plutonium and neutron sources. Dr. KANTARCIOĞLU stressed the urgent need for increased international monitoring and cooperation to prevent illicit CBRN material transfers.

A key point of her presentation was the exponential growth of Artificial Intelligence (AI) technologies. She cautioned that we can expect to see the rise of Artificial General Intelligence (AGI) in the next five years and Artificial Super Intelligence (ASI) in the next ten years. She stressed that these developments, though exciting, present unprecedented risks when adapted for CBRN scenarios.

She explained that AI may be utilized to plan and execute CBRN attacks more effectively. For instance, AI-powered cyberattacks can disable emergency systems, synthetic biology can aid in the design of undetectable pathogens, and autonomous drones can be used for the delivery of toxic agents. She added that large language models (LLMs) now allow non-experts to obtain and use complex scientific information, such as instructions for creating harmful agents.

Dr. KANTARCIOĞLU established the challenges that hinder effective CBRN response, particularly in the developing world. She identified that traditional detection and decontamination methods are costly and time-consuming. In addition, high costs, regulatory complexity, and immature technologies—especially for detecting biological threats—further restrict effective and timely interventions.

She detailed ongoing trends in research, listing mass spectrometry, simulation methodologies, and machine learning as essential tools for modern CBRN preparedness. She referred to increased use of autonomous systems, mobile sensor networks, and data fusion technologies. These, she argued, are shifting the paradigm towards faster, real-time threat detection and response.

Dr. KANTARCIOĞLU discussed AI transforming CBRN forensics and decision-making. She mentioned AI-enabled tools with the capacity to analyze isotopic signatures, DNA and RNA tracing, and identification of chemical residues using mass spectrometry. AI-enabled drones and mobile platforms, she went on, also introduce new possibilities for reconnaissance, sampling, and monitoring in contaminated areas.

She continued to outline the integration of AI into training and simulation technologies like augmented reality (AR), virtual reality (VR), and digital twins. These capabilities, she stated, permit realistic and adaptive training environments, which enhance readiness and situational awareness.

Near the conclusion of her remarks, Dr. KANTARCIOĞLU addressed the dual-use dilemma—the fact that technologies such as AI, LLMs, and synthetic biology have both beneficial and malicious uses. However much these innovations help with early warning and crisis management, she warned that they can also be used by non-state actors to maximize CBRN attacks.

Finally, she provided some policy recommendations. She highlighted the necessity of promoting intelligence sharing and cross-sectoral collaboration among governments, academia, and industry. She suggested developing explainable and controllable AI systems to facilitate human oversight, and for establishing international norms for responsible management of dual-use risks. She finished by pointing out that only through international cooperation and forward-leaning governance can the new threats at the intersection of AI and CBRN be effectively countered.

“Threat Assessment: Is WMD Terrorism a Hype or Reality” by Honorable Andrew WEBER

WEBER, began his presentation by citing the ongoing and growing threat of biological warfare and bioterrorism in the contemporary world. He referred to a 2010 issue of Al-Qaeda's Inspire magazine, which explicitly called for individuals with scientific expertise to develop weapons of mass destruction. He also cited the Aum Shinrikyo cult's use of anthrax, along with Bill Gates's statement that bioterrorism would be more deadly than nuclear war—while the world, for the most part, is not prepared for such an attack.

WEBER depicted the devastating possibilities of biological weapons through stark examples. He cautioned that an attack of smallpox—even where vaccines are present—would kill up to 110,000 people, with much greater casualties should the virus be bioengineered for resistance. He further referred to a frightening example of 100 kg of bioengineered anthrax released in the vicinity of Washington, D.C., which would lead to between 130,000 and 3 million deaths. He pointed out the environmental stability of anthrax spores and the previous Soviet Union's production of antibiotic- and vaccine-resistant strains.

WEBER then brought up concerns from the U.S. Department of State 2025 compliance reports, and specifically named countries such as North Korea (DPRK) and Russia as potential violators of weapons of mass destruction treaties. These were cited as examples of threat at the state level in addition to that by non-state actors.

WEBER underscored the dual-use challenge posed by the rapidly developing technologies, particularly in artificial intelligence. Weber explained that AI-supported bio-design and predictive capabilities are developing at a record pace, which has foreboding implications for

the ease with which individuals could design or engineer biological agents. This technological advancement, he explained, exponentially expands the threat spectrum for bioterrorism.

In summary, then, WEBER's remarks were a forward-looking and ambitious agenda for the future: the complete elimination of biological weapons as a class of WMDs and the prevention of future pandemics. He cast this not only as a strategic security goal but also as a global humanitarian necessity. Finally, he directed participants to additional resources from the Council on Strategic Risks to explore more in-depth mitigation strategies and policy recommendations.

Academic Advisor Recommendations

• Increase regional balance among lecturers. While the course was well-balanced with respect to academic and operational experience, there was little South American and African representation.

• Continue inviting lecturers from the field (e.g., AFAD experts, OPCW-affiliated lecturers) since they provided operational credibility and real-world context that resonated well with students.

• Look at creating a lecturer sub-database specific to WMD and CBRN courses, noting each lecturer's expertise and appropriateness for specific modules (legal, operational, technical).

• Encourage lecturers to incorporate more interactive features—polls, simulations, or tabletop exercises—to expand on student engagement.

• Emphasize the value of case studies and cross-referencing historical events with current frameworks (e.g., UNSCR 1540, NPT gaps, and AI risks in CBRN threats).

• Newer topics such as AI misuse in WMD proliferation, synthetic biology threats, and digital forensics should be included in future course iterations, based on keen interest shown during Dr. Veda Duman KANTARCIOĞLU's and Muhammad Athar JAVED's presentations.

• Continue the policy of providing presentations to course attendees after the course, with the lecturer's consent, as this aids retention and post-training application.

Conclusion

The five-day presentations collectively have pictorially illustrated the dynamic and contemporary menace of weapons of mass destruction (WMD) to the modern world security picture. From the historical use and application of WMD to the new emerging menace by cutting-edge technologies such as artificial intelligence (AI), the debates intertwine an elaborate tapestry of threats that need sustained worldwide attention and cooperation.

Historically, WMDs have caused devastation, and examples can be referenced from Hiroshima, Bhopal, and Fukushima, referencing not only the direct human loss of life but also global long-term social and environmental impact of CBRN attacks. They highlight the sheer necessity of meticulous pre-event planning of mass evacuation, threat detection in good time, and multi-agency response organization to minimize casualties as well as maintain operational continuity. The use of military personnel, as highlighted by the presentations, is still an essential component of order maintenance, augmenting civilian agencies, and providing for effective response and recovery operations.

In future years, the threat profile will increasingly become more complex and diversified. With advances in dual-use technologies such as AI and synthetic biology, there are new training, detection, and forensic analysis capabilities and new threats—namely, because non-state actors can now acquire technology that enables more targeted, clandestine, and destructive attacks. Autonomous delivery systems and AI-enabled cyberattacks merely compound the strategic difficulties of prevention and response to CBRN threats.

Underpinning all the presentations is the insatiable demand for robust international legal frameworks and institutional collaboration. Even though such treaties such as the Nuclear Non-Proliferation Treaty (NPT), Chemical Weapons Convention (CWC), and institutions such as UNSCR 1540 are the very foundation of nonproliferation and antiterrorism, there are loopholes that are too yawning. They include low coverage of non-state actors, differential treatment application, absence of enforcement provisions, and insufficient monitoring capacity for new threats. These frameworks must be strengthened in terms of universalization, harmonized standards, and increased openness if vulnerabilities proliferators are using need to be closed.

The importance of awareness continuity and capability development was equally highlighted. There is a useful role that institutions like the NATO Centre of Excellence for Defence Against Terrorism (COE-DAT) can play in encouraging doctrine development, interagency cooperation, and scenario training. Virtual Reality (VR) training programs, for instance, were identified to be of unparalleled potential for simulating safely high-risk situations, thus enhancing readiness at the cost of no trainee well-being.

Generally, this report asserts that the fight against WMD threats—most directly in the CBRN field—needs to be preventive and collective in nature and utilizes technological innovation, legal toughness, and complete global cooperation. Fighting against such problems not only ensures national and international security but also ensures humanitarian values by preventing mass killings and enabling mobility of response to new threats.

Future calls for unyielding commitment by states, international bodies, scientists, and the private sector. Transparence sharing of intelligence, funding cutting-edge technology, and an international culture of responsibility and vigilance alone can realistically confront the next decades' high-tech, highly dynamic WMD threat.

I would like to express my genuine thanks to Director Halil Sıddık AYHAN and Course Director Gökhan BOZAN for their outstanding leadership and motivation throughout the COE-DAT course. I further appreciate all the dedicated staff at COE-DAT whose efforts facilitated this learning opportunity. Moreover, I greatly appreciate the expertise and commitment of all the instructors who instructed the course sessions. Finally, I am grateful for the opportunity to be a part of this invaluable program and the opportunity to work with such a professional and qualified team.

Biography of Lecturers

Ahmet ÜZÜMCÜ

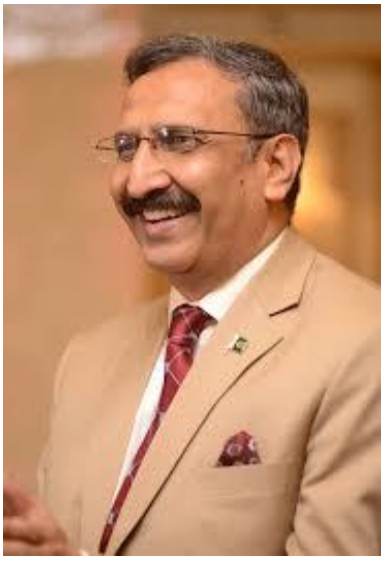
He is a career diplomat with vast experience in multilateral diplomacy and disarmament and non-proliferation issues. Prior to joining the OPCW, he was Türkiye's Permanent Representative to the UN Office in Geneva, where he chaired the Conference on Disarmament in March 2008. Ambassador (R) Üzümcü has also served as Deputy Undersecretary of State for Bilateral Political Affairs at the Ministry of Foreign Affairs, Türkiye's Permanent Representative to NATO and Ambassador to Israel, in addition to earlier postings to NATO, Aleppo and Vienna.

Ambassador Üzümcü received the Nobel Peace Prize on behalf of the OPCW in December 2013. In December 2015, H.E. Mr. Laurent Fabius, Minister of Foreign Affairs and International Development of France, decorated Director-General Üzümcü with the Légion d'honneur (rank of officer). In 2019, he was made honorary CMG, Order of St Michael and St George, by the British Government for his services to international diplomacy and the rule of law. During his tenure as Director-General of the OPCW, he was decorated by the Federal Republic of Germany and Austria for his contributions to the success of the OPCW. He was also recognized by honorary doctorates from four universities in the UK, Argentina, Russia and Italy. He holds a Bachelor's Degree in International Relations from Ankara University and speaks English and French fluently.

Barış CAĞLAR

Barış ÇAĞLAR is a faculty member in the Department of Political Science and International Relations at MEF University, Istanbul, Türkiye where he lectures as an Assistant Professor since 2014. He holds a Ph.D. from International Relations, Bilkent University, Ankara, Türkiye. Despite having been institutionally unaffiliated, he conducted part of his dissertation research and consultations in Yale University and Harvard University in 2005. He got published in Middle East Policy (SSCI), Orient (GEOBASE, BAS, IPSA, PAIS, SCOPUS), and The Journal of Security Strategies. He also represented Türkiye as an advanced trainer on weapons of mass destruction in NATO seminars, courses and exercises in Türkiye, Georgia and Greece. Baris Caglar is a faculty member in the Department of Political Science and International Relations at MEF University, Istanbul, Türkiye where he lectures as an Assistant Professor since 2014. He holds a Ph.D. from International Relations, Bilkent University, Ankara, Türkiye. Despite having been institutionally unaffiliated, he conducted part of his dissertation research and consultations in Yale University and Harvard University in 2005. He got published in Middle East Policy (SSCI), Orient (GEOBASE, BAS, IPSA, PAIS, SCOPUS), and The Journal of Security Strategies. He also represented Türkiye as an advanced trainer on weapons of mass destruction in NATO seminars, courses and exercises in Türkiye, Georgia and Greece.

Muhammad Athar Javed



Muhammad Athar Javed was a program fellow with New America's International Security program. He is the Director General, Pakistan House, a Denmark/Pakistan based think tank of international affairs.

He is a visiting lecturer at the Centre for Excellence Defence against Terrorism (COEDAT), (NATO), Ankara – Türkiye. Muhammad taught courses on Terrorist use of WMD (COE-DAT-2016/18/19) and also specializes in technical and critical analysis in the area of policy for countering chemical, biological, and radiological terrorist attacks. He has been a visiting faculty at Royal Danish Defence College (RDDC), University of Rome Tor Vergata, National Defence University (NDU) in Islamabad, and the School of Politics and International Relations at Quaid-e-Azam University. He has also served in numerous capacities at various governmental and inter-governmental organizations including Canadian Council for Peace and International Security in Ottawa, Copenhagen Peace and Research Institute (COPRI), University of Copenhagen, People's University of Denmark, and the Centre for Future and Strategic Studies at Kuwait University. He regularly appears on domestic and international TV channels including RT and Al-Jazeera International, and gives commentary on International security issues. He also writes columns for domestic and international English dailies

Şebnem UDUM

Şebnem Udum earned a BSc. in international relations with a minor in international economics at Middle East Technical University, an MA in international policy studies and a Certificate in nonproliferation studies at MIIS, and an MA and PhD in international relations at Bilkent University. She was a research associate at the James Martin Center for Nonproliferation Studies (2002-2003) and former chair and member of International Nuclear Security Education Network (INSEN) at the IAEA. She is an associate professor in the Department of International Relations, Hacettepe University, Türkiye and Director at the Center for Strategic Research at Hacettepe University.

Andrew WEBER

The Honorable Andrew “Andy” Weber is a Senior Fellow at the Council on Strategic Risks’ Janne E. Nolan Center on Strategic Weapons. Mr. Weber has dedicated his professional life to countering nuclear, chemical, and biological threats and to strengthening global health security. Mr. Weber’s decades of U.S. government service included five-and-a-half years as the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs. He was a driving force behind Nunn-Lugar Cooperative Threat Reduction efforts to remove weapons-grade uranium from Kazakhstan and Georgia and nuclear-capable MiG-29 aircraft from Moldova, to reduce biological weapons threats, and to destroy Libyan and Syrian chemical weapons stockpiles. In addition, he coordinated U.S. leadership of the international Ebola response for the Department of State.

Prior to joining the Pentagon as Advisor for Threat Reduction Policy in December 1996, Mr. Weber was posted abroad as a U.S. Foreign Service Officer in Saudi Arabia, Germany, Kazakhstan, and Hong Kong. Mr. Weber is an independent consultant and a Strategic Advisor for Ginkgo BioWorks. He serves on the Board of Healthcare Ready and the James Martin Center for Non-proliferation Studies International Advisory Council.

He taught a course on Force and Diplomacy at the Georgetown University Graduate School of Foreign Service for seven years, and was a Senior Fellow at the Harvard Kennedy School’s Belfer Center for Science and International Affairs. Mr. Weber graduated from Cornell University and holds a Master of Science in Foreign Service (MSFS) degree from Georgetown University. He is a member of the Council on Foreign Relations.

Heather LOONEY

Heather Looney is the Senior Advisor in the U.S. Department of Energy/National Nuclear Security Administration’s Office of Defense Nuclear Nonproliferation. Looney has twenty years of specialized experience in nuclear nonproliferation and security, Weapons of Mass Destruction counterterrorism, and nuclear incident preparedness and response. She has served on several U.S. interagency negotiating teams for nuclear treaties and agreements on the security of nuclear and radiological materials and is an expert on multilateral nuclear policy issues. Other key positions held include serving as Visiting Faculty to the National Defense University’s College of International Security Affairs and Director of the Office of Nuclear Incident Policy and Cooperation at NNSA. Looney began her nuclear policy career while stationed in Moscow, Russia, and holds a B.A. in International Studies from the University of South Carolina and an M.A. in Russian and Eastern European Studies from Georgetown University.

Caner DERELİ

Dr. Caner Dereli is a Turkish chemical engineer and CBRN defense expert. He has been involved in planning and preparing CBRN-related activities and research projects. Interestingly, he was also the Congress Secretary of the III International CBRN Congress, held from November 20 to 22, 2024, by the Disaster and Emergency Management Authority (AFAD). His area of professional interest involves the development of strategies and solutions for countering CBRN threats with an emphasis on the imperatives of international collaboration and exchange of knowledge in this area. In addition, Dr. Dereli is a CBRN specialist, and he makes contributions towards research and discourse on chemical and biological security. He is heavily sought after in platforms where the issues of weapons of mass destruction and related security matters are under debate.

Carol Teodor PETERFI

Accomplished and highly educated professional with a demonstrated track record of achievements in the fields of Chemical, Biological, Radiological, and Nuclear (CBRN) Defense, Non-proliferation of Weapons of Mass Destruction (WMD), Health Physics, Crisis Management, International Relations, and Education and Training. Strong leadership skills demonstrated in leading various arms control, demilitarization, and non-proliferation missions under various International Organizations' mandates worldwide, including war and conflict zones. Well published author and respected analyst in the fields of non-proliferation and security. Strong education professional pursuing a PhD program focused on Religion and Security at the University of Tartu, Estonia.

Jean Paul ZANDERS

Dr Jean Pascal Zanders is founder of The Trench and an independent researcher and consultant.

He specialises in questions of chemical and biological armament and disarmament. Using foresighting strategies, he researches the meaning of disarmament in a fast-evolving security context, including the longer-term future of the Chemical and Biological and Toxin Weapons Conventions, the preconditions for new global and regional disarmament initiatives, and related security developments. He participates in working groups studying opportunities for non-conventional weapon disarmament in the Middle East. His interest also goes to the internal dynamics of a terrorist or criminal entity seeking to acquire a chemical or biological weapon capability. He furthermore develops educational strategies and courses for security, disarmament and technology transfer controls, and designs and runs tabletop exercises.

He has published extensively on chemical and biological weapon and other security issues in English, Dutch and French since 1986.

Ela Beşkardeş KARAGÖL

Ela Beşkardeş KARAGÖL is a seasoned Turkish diplomat with experience in arms control, disarmament, and international security. She is the Deputy Director General for Organization for Security and Co-operation in Europe (OSCE), Arms Control, and Disarmament at the Turkish Ministry of Foreign Affairs as of December 2022. She has served the position representing Türkiye at various global forums, including the United Nations Disarmament Conference, where she contributed to discussions at the exchanges of global endeavors in non-proliferation.

Boban CEKOVIC

Boban CEKOVIC is an expert in CBRN defense with nearly three decades of professional practice in both military and international contexts. He graduated at the top of his class from the Serbian Military Academy with a specialty in Nuclear, Biological, and Chemical Defense.Adding to his academic credentials, Čeković possessed a Master's degree in Technical Sciences from the University of Belgrade, and his thesis focused on the chemistry of organophosphorus compounds, a significant area regarding chemical weapon agents. Throughout his working career, Čeković held significant operational and command positions, including a decontamination platoon commander and later the Head of Decontamination and Detection Phenomena Department at the Serbian Military Technical Institute. From 2006 to 2015, he worked for the Organisation for the Prohibition of Chemical Weapons (OPCW) in the capacities of Inspector, Leader of an Inspection Team, and Chief of Demilitarization Inspections.Notably, he served with the OPCW-United Nations Joint Mission in Syria, which carried out field investigations into alleged use of chemical weapons, thereby supporting international non-proliferation and disarmament objectives. He is the current General Manager for Hotzone Solutions, a CBRN and hazardous materials (HAZMAT) products, training, detection, and decontamination services company. He remains an active member of the global CBRN community through engagement with global symposia, including the III International CBRN Congress in Ankara in 2024, where he addressed problems of urban chemical decontamination following attack scenarios.His experience includes scientific research, operational field operations, as well as policy-making at the CBRN defense level.

Zoran SANDEV

Dr. Zoran Sandev is an expert in Chemical, Biological, Radiological, and Nuclear (CBRN) defense and bioterrorism prevention.He has been serving as Specialized Officer in INTERPOL's Bioterrorism Prevention Unit since September 2017, with the aim of international cooperation for prevention of CBRN threats and enhancing global security. Before joining INTERPOL, Dr. Sandev served as a CBRN Officer at North Macedonia's Ministry of Defence from 2001 to 2017. In this role, he participated in a range of activities related to CBRN defense, such as policy formulation, strategy development, and operational preparedness. Dr. Sandev has also actively participated in global platforms such as the CBRNe Summit Europe, where he has presented on emerging CBRN threats and counter-terrorism against chemical and biological terrorism on the darknet. His spheres of expertise involve assessing unconventional threats and creating tactics to undermine possible risks associated with CBRN incidents. His contributions in the field of CBRN defense and counter-bioterrorism have been central to shaping international security policies and enhancing global preparedness against CBRN threats.

Veda Duman KANTARCIOĞLU

Veda DUMAN KANTARCIOĞLU completed her undergraduate (2007), graduate (2010), and doctorate education (2018) at Hacettepe University Nuclear Energy Engineering Department. She worked as a research assistant in the same department between 2007 and 2013. At the end of 2013, she started to work as an Assistant Expert in the Prime Ministry Disaster and Emergency Management Presidency. She served as Head of CBRN Group and Head of Civil Defence Services Group between 2013-and 2017. She worked on “Evacuation Time Estimation Methods during Severe NPP Accidents” as the institutional thesis. During her tenure, she carried out many studies and projects on the modeling, planning, and development of a response system for CBRN incidents and the development of institutional/equipment/human resources capacities. By taking part in the preparation of the Türkiye Disaster Management Strategy Document and the Türkiye Disaster Response Plan, she coordinated the studies carried out with TAEK for the development of the Radiological Emergency Plan. Between March 2017 and July 2018, she worked as an expert at the Undersecretariat of the Prime Ministry. She has been working as an Expert at the Presidency of Defence Industries since 2018. In her working life, she mostly specializes in project development, project management, and presentation.She continues to participate in international conferences with her academic studies. Although her research interests were nuclear reactor thermal-hydraulic analyzes in the early years of her career, she focused on Probabilistic Risk Assessments (PSA/PRA) and off-site emergency management. In addition, she has academic studies in the fields of CBRN and Forensic Sciences. She is married and has one child.

Çiğdem PEKAR

Associate Professor Çiğdem Pekar has a BA degree from the Department of International Relations at Ege University, Türkiye, an MA degree on ‘European Studies’ from the University of Exeter, UK and her PhD degree in International Relations from Çanakkale Onsekiz Mart University. She has spent one academic year at the Center for Non-Proliferation Studies, Monterey, US as a Fulbright researcher. Dr. Pekar’s research areas include nuclear nonproliferation regime, The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), Türkiye’s nuclear policy and nuclear history.

Ulviye Ersoy YALÇIN

Ulviye ERSOY YALÇIN graduated from Istanbul University Chemical Engineering Department in 2011 and continued her master study at Middle East Technical University Chemical Engineering Department. She started working at Ministry of Interior Disaster and Emergency Management Presidency (AFAD) in 2013 as AFAD Assistant Specialist. In 2017, she submitted her proficiency thesis “Risk Assessment of Chemical Weapons on Human Health and Environment” and obtained her AFAD Specialist degree. She has worked in many national and international CBRN related projects. During 2018-2019, she contributed to the development of “Non-Binding Guidelines for Enhanced Civil-Military Cooperation to Deal with the Consequences of Large Scale CBRN Events Associated with Terrorist Attacks” as NATO CBRN Working Group member. Since 2018, she has been working as the Head of CBRN Working Group at AFAD Civil Defense Department.

Massimo MIGLIORINI

Massimo Migliorini has been working at LINKS Foundation (formerly SITI) since 2004. Currently, he is Head of the Extended Reality Laboratory (XR Lab), a research unit within the "Innovation for Culture, Society, and Public Administration (ICS)" domain. The XR Lab aims to explore and enhance the potential of immersive digital technologies (Virtual Reality, Augmented Reality, Mixed Reality, Metaverse, Holograms, etc.) within different sectors including Cultural Heritage, First Responders Training, Health, Education, Military Defense.

He has been coordinator of several European projects, and since 2018 he has been appointed member of the European Scientific and Technology Advisory Group (E-STAG), established by the European Commission (DG-JRC) and the United Nations (UNDRR) to support European governments in promoting the application of global principles for the prevention of risks from natural disasters.

Serkan YENAL

Assoc. Prof. Dr. Serkan Yenal is a Turkish scholar of international security and terrorism studies, cyber warfare specialist, and intelligence specialist. He is an academic at the Turkish Military Academy within the National Defence University in Ankara. His interdisciplinary expertise includes public administration and international relations with a special emphasis on national and international security dynamics.

Yenal received his Bachelor and Master of Science degrees in Public Administration from Gazi University. He also received a second Bachelor of Arts degree in International Relations from Anadolu University. In 2012, he received his doctorate in International Security and Terrorism at the Institute of Defence Sciences at the Turkish Military Academy. His doctoral research and subsequent research work have been centered around asymmetric warfare, counter-terrorism, and intelligence operations' strategic dimensions.

He authored some scholarly books and some peer-reviewed scholarly articles on topics such as asymmetric threats, cyber defense, state defense rights, and the evolving nature of terrorism. Yenal has participated in international and national academic conferences, been a peer reviewer, and been a member of editorial boards. His recent work deals with pandemics and cyber-attacks and the security implications of emerging global crises.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