Abstracts for Open World Conference 2025:

An Open World? The Contemporary Relevance of Niels Bohr's Open Letter to the United Nations of 1950.

Setting the Scene

Frank Niels von Hippel: *How Evgeny Velikhov's Nuclear Glasnost Facilitated the End of the Cold War Nuclear Arms Race*

Evgeny Velikhov, a Soviet fusion physicist, President of the Kurchatov Institute of Atomic Energy, and Vice President of Academy of Sciences of the Soviet Union, was Mikhail Gorbachev's leading technical advisor on nuclear arms control. I shall discuss Velikihov's role in initiating several "glasnost" initiatives during 1986-89 that opened up the Soviet Union's nuclear weapons and ballistic-missile defense programs to international scrutiny. These initiatives allowed:

1) In-country monitoring of the Soviet Union's main test site in Kazakhstan by a team of US seismologists, unfreezing the negotiations that resulted in the 1996 Comprehensive Test Ban Treaty; 2) A group of US scientists, Congressional Representatives and journalists to inspect the under-construction Krasnoyarsk early-warning radar, whose location and orientation violated the 1972 Soviet-US ABM Treaty, setting the stage for its dismantlement; 3) A similar group to visit a shut-down plutonium-production reactor in the secret city of Ozersk in the Urals, facilitating Soviet and US support for a Fissile Material Cutoff Treaty; 4) That same group to visit the Soviet anti-ballistic missile test site in Sary Shagan, Kazakhstan to inspect a laser facility the US Department of Defense incorrectly claimed was capable of destroying satellites and potentially even incoming nuclear warheads; and 5) The "Black Sea Experiment" of July 1989 in which Soviet and US groups demonstrated different techniques for detecting gamma rays and neutrons emitted by an actual nuclear warhead on a Soviet cruise missile in a launcher on a Soviet warship off Yalta.

The first of these initiatives was proposed to me by Velikhov at the first Copenhagen conference on Bohr's Open World proposal in October 1985, and I participated in all of the intitiatives but one. The impact of these initiatives show that Bohr was right: openness is required to build the trust necessary for serious nuclear disarmament.

Setting the Scene

Matilde Kimer: *Burning the bridges*

Since tearing down the wall we spent 30 years in believing that we could align our interests and even to some extent our values. Russia and Europe had a strong focus on building new, connecting infrastructure both physically and metaphorically. We agreed to join efforts in spheres ranging from trade and tuition to abolishment of torture and reduction of nuclear weapons. But the appeal of common institutions and mutual rules is lost. The bridges between us are burning.

The Russian word for trust is doverie – directly translated to before faith. Russian society has no abundance of trust. Not in other people. Not in the state. And certainly, no trust in western countries. Perhaps looking at the Gorbatjov Era will provide us with some reasons for this. The time of glasnost and perestroika (transparency and reconstruction) was a bubble of optimism. Though the optimism in the west was fairly lengthy, it was short lived in the East where the bill for this reconstruction was paid in poverty, despair and unprecedented corruption. The announced transparency turned out to be a window slowly changing into one-way tinted glass. The Russian state increasingly monitors and corrects all levels of public and even private life. Whereas the right to observe and control powers are shrinking every day.

After Russia's full-scale invasion of Ukraine 2022 it was excluded from the Council of Europe and later that year withdrew from the European Convention on Human Rights. We no longer share the rules on how people have a right to be treated.

Session 1: The Legacy of Bohr's Open Letter

Tomas Bohr: *The Atomic Nucleus, the War, and the Open Letter*

In the 1930s the focus of physicists shifted from the atom to its tiny nucleus. The discovery of the neutron made it possible to induce nuclear reactions and study artificial radioactivity. By the beginning of World War II, it was known that neutrons could even split heavy nuclei and, if this could be used in a chain reaction, it would liberate energy of an unprecedented magnitude. When Niels Bohr fled Denmark in 1943, the Manhattan Project was already well under way and the realization that nuclear bombs could soon be a reality shifted his attention – for the rest of his life – toward dealing with the nuclear threat. The ideas that he developed during the war, in a process described by Christian Joas in the next lecture, were most clearly expressed in an open letter (i.e., a letter made public) to the UN in 1950, where he promoted the idea that only a radical transnational openness could prevent the world from plunging into a nuclear catastrophe. Niels Bohr's ideas were inspired by his experience in science, where scientists, despite their competitiveness, had realized that openness is the most efficient way to make progress. These ideas will be described more thoroughly in the lecture by Ole Wæver and their relevance today is the main topic of the present conference.

Session 1: The Legacy of Bohr's Open Letter

Christian Joas: *Niels Bohr and the Making of the Open Letter*

The history of Bohr's 1950 Open Letter to the United Nations can be understood as unfolding on at least three different timescales. From a longue-durée perspective, Bohr's decades-long commitment to scientific internationalism and the advancement of Danish science were driving forces behind his activities during the interwar period and formed the basis of the convictions expressed in the Open Letter. On an intermediate timescale, geopolitical considerations regarding a potential postwar order and the rapidly evolving realities of the early Cold War prompted what Finn Aaserud refers to as Bohr's "Diplomatic Mission" during and after World War II, shaping the contents of the Open Letter. Finally, on an even shorter timescale, efforts to rebuild scientific collaboration in postwar Europe, particularly the founding of CERN, provided an immediate context for the Open Letter. In my talk, I will explore how these three interrelated timescales contributed to the making of Bohr's Open Letter.

Session 1: The Legacy of Bohr's Open Letter

Ole Wæver: *Bohr's Theory of Secrecy and Insecurity Applied to New Challenges: AI, quantum computing and climate engineering*

Niels Bohr's campaign for openness – first directly and secretly(!) to leading Western politicians, then culminating in the Open Letter to the United Nations – contained an intriguing analysis of the relationship between secrecy, security and science. Bohr's deep understanding of the new science and technologies around nuclear energy and weaponry, made him predict that narrow national pursuit of 'first mover' advantages would prove pointless and trigger an arms race, destructive not only in the narrow domain of military security but this competition in secrecy would also be thoroughly harmful to societies (which in addition forfeited possible gains from the new technologies). For half a Century, the Cold War proved him right on a grand scale. Today, leading centres of power in research and geopolitics are again raising barriers for free exchange of knowledge based on competitive security concerns, even in areas where the technologies contain collective dangers for humanity: artificial intelligence, quantum computing and sensing, climate engineering and possibly others including synthetic biology. Applying a Bohr-like analysis to currently emerging transformative technologies demands a similar insight into each field. It cannot a priori be concluded that openness about rapidly evolving knowledge domains will always be either good or bad to security. For each domain, it is necessary to analyse specifically, whether dangers multiply if technological possibilities are available to more, or the risks are better avoided with transparency. The emerging constellations of destructive and defensive instruments should be assessed both regarding their short-term stability (crisis stability) and long term stability (arms races), and it is then possible to identify realistic forms of openness for the different areas of research and technology.

Session 1: The Legacy of Bohr's Open Letter

Klaus Mølmer: *An appraisal and defense of Niels Bohr's ideal of an open world of science*

In his famous letter to the United Nations and on several other occasions, Niels Bohr praised research as one of humanity's greatest triumphs and a domain where progress was driven by the exchange of ideas between the best researchers – despite their origins in countries with vastly different cultures and which could simultaneously be embroiled in heated geopolitical conflicts. Niels Bohr created his own institute as an open international research environment, and it is indisputable that the institute's reputation from the outset was due to the many young international researchers who developed quantum physics in Copenhagen from the 1920s onwards. Today, this academic model is universal, and there is a healthy competition between universities to recruit and nurture the elite among international students and postdocs. This has also contributed to the worldwide adaption of common scientific standards and values, including trustworthy and open dissemination of research results. While Bohr's letter offered an appraisal of the international scientific collaboration, it was foremost an expression of his concern that the nuclear arms race was running out of control because of the mistrust and lack of information shared among the political decision makers.

It is a sad experience to read through Bohr's letter and replace the reference to nuclear technologies by current research themes such as quantum, AI and genetics. While the threats of these technologies are of course not as imminent as the one posed by thousands of nuclear missiles, and are also of a very different nature, long passages of the letter fit perfectly to the present days, where politicians' mistrust and lack of understanding of the workings of science, are currently undermining international collaborations and turning these very important research fields into domains of conflict.

I will discuss my own research area, quantum science and technology, as an example, where restrictions and security measures are already standing in the way for progress in the same science and development that they intend to protect.

Session 2: Legitimate Limits of Openness Today

Rebecca Slayton: *What is "open" about the internet? Affordances, vulnerability, and power in cyberspace*

Today the internet's openness appears as a source of both power and vulnerability. Advocates of internet openness argue that it enables innovation, economic growth, democratization, and other human freedoms. Critics worry about misinformation, political warfare, and a loss of national sovereignty. But what exactly is open about the internet? I argue that the internet's openness is not an intrinsic characteristic of technology, but an affordance—something that emerges from relationships between technology and agents. The same technology affords different things to different agents, and these relationships can be configured differently. From this perspective, we can identify at least four different meanings of internet "openness." First, internet standards are developed through an "open" process; second, the internet's defining protocols are open source and thus freely available; third, the protocols enable intercommunication between any machines and users that can access the network; and fourth, the internet can be implemented in ways that favor open borders, in the sense of free trade and free speech. Each of these forms of openness is based on provisional and particular relationships: standard development and protocol implementation is effectively closed to non-experts, open source protocols do not allow communication between individuals without affordable access to telecommunications, and states can implement internet protocols in ways that restrict access and limit speech. I argue that choices about what kinds of openness to create are also choices about what kinds of vulnerability and power to accept, and for whom.

Session 2: Legitimate Limits of Openness Today

Michela Massimi: *Science and the ideal of an open world: Philosophical reflections on Bohr's letter to the UN*

I will take my cue from Bohr's letter at the UN and highlight its historical and philosophical significance within the context of Bohr's life-long engagement and reflections on the philosophy of nature. Bohr's letter provides also a timely springboard for wider contemporary reflections on the role of science for democratic societies and the wider participatory nature of the scientific endeavour.

Session 2: Legitimate Limits of Openness Today

Sabina Leonelli: *Science for an Open Society: The Rational and the Humane*

Openness has long been heralded as a fundamental value to scientific inquiry. This talk examines the multiple meanings of this notion and articulates a specific interpretation ('humane openness') as the best way forward for scientific and technological developments. I briefly sketch the history of philosophical debates on openness and the role of inquiry in an open society, focusing on a fundamental contrast between the versions of openness championed by Henri Bergson and Niels Bohr, and its rational counterpart as famously advocated by Karl Popper. I consider the legacy of these views within contemporary understandings of Open Science, analysing the epistemologies of research presupposed by these views as well as their implications for scientific practice. I argue that while Popper's take on open inquiry has so far won the day in inspiring research policy and governance, contemporary debates on open science and its role in society would benefit from considering a humane version of openness. I conclude by proposing a version of humane openness that scientific research should incorporate to support societal advancements and planetary health.

Session 3: Data and Artificial Intelligence

Serge Belongie: *Generative AI & Magical Thinking*

Recent advances in Generative AI have given rise to strong emotions among the general public, including excitement, fear, wonder, and disbelief. To be sure, the emergence of Large Language Models (LLMs) marks a significant milestone in the history of AI. But are systems like ChatGPT actually intelligent, and are we at the threshold of so-called Artificial General Intelligence? In this talk, I will provide an overview of how LLMs work, where they excel, and where they fall short, with a special emphasis on opportunities for the complementary strengths of humans and machines.

Session 3: Data and Artificial Intelligence

Isabelle Augenstein: *Closed AI? On the Impact of Large Language Models on Natural Language Processing Research*

Natural Language Processing (NLP) has existed as a field of research since the late 1940s, with the current paradigm of Large Language Models (LLMs) having their roots in n-gram language models, developed in the 1980s. For decades, the field has been relatively obscure, with first prominent commercial applications in the area of Machine Translation being released in the late 2000s. Subsequently, commercialisation reached a whole new scale with the release of LLMs from 2019 onwards, triggering a type of gold rush and resulting in a flurry of LLM-based startups. This new scale of commercialisation, in addition to the high resource requirements for developing LLMs, have dramatically changed research practices within NLP, leading to an influx of research building on artefacts about which little is known to everyone barring a small group of model developers. Yet, scientific breakthroughs cannot be achieved without reproducibility, allowing the scientific community at large to critically evaluate new findings — for instance to debunk misleading and overinflated reports of LLM performance, spurred on by the LLM arms race. Not all hope is lost though — with coordinated community efforts, open NLP research will continue to thrive, and develop the scientific basis for the paradigm shift, whatever it may be.

Session 4: Nuclear Threat

Tong Zhao: *How Can Openness Prevent Nuclear Catastrophe?*

This presentation examines how the decline in open access to information and free exchange of ideas has increased the risks of nuclear arms racing and nuclear conflict among nuclear powers such as China and the United States. It explores how scientific and expert communities in open societies can constructively engage with their counterparts from rival and authoritarian countries to address nuclear risks. The presentation also discusses how these communities in open societies can set an example by mitigating internal polarization within their own countries on critical nuclear policy issues. Nuclear deterrence is intended as a temporary measure to allow time for the resolution of underlying rivalries. Yet, the sense of security provided by mutual deterrence has often discouraged nations from actively seeking to resolve these rivalries, resulting in widening information and perception gaps that hinder meaningful dialogue between adversaries. Using nuclear security as an example, this presentation proposes how the international community can promote principles of openness to restore confidence in persuasion and an international security order based on shared rules.

Session 4: Nuclear Threat

Hans Kristensen: *Challenges for nuclear transparency in an era of renewed nuclear competition*.

"Truth is the first casualty of war." That is a widely known expression that was coined decades before the explosion of the first nuclear bomb in 1945. Since then, special laws and policies have been created to withhold specific nuclear weapons information from the public. Some information about nuclear weapons and operations must rightfully be classified because of the serious specific harm that release of the information could reasonably be expected to cause. But complete secrecy or too much of it is incompatible with both democracy and deterrence. The history of nuclear secrecy is not as straight-forward as one might think. During the Cold War, a wealth of nuclear weapons related information was declassified and released in some countries. Even more information was released during the first decade after the Cold War ended. But the discovery of proliferation of nuclear weapons related information and the terrorist attacks on September 11, 2001, curtailed access to information; some declassified information was even re-classified. With the deterioration of international relations over the past decade and the resurgence of military competition and growing animosity between nuclear-armed states, excessive nuclear weapons secrecy is on the rise again. While such reactive secrecy may be understandable to some, balancing nuclear secrecy and transparency is actually *more* important when relations deteriorate. Too much secrecy can result in dangerous policies, mis- and disinformation filling the void, and fuel misunderstandings and unnecessarily worst-case assumptions that increase nuclear risks.

Session 4: Nuclear Threat

Pavel Podvig: *Are nuclear weapons obsolete? Nuclear policy lessons from the Russian war against Ukraine*

The role that nuclear weapons played in shaping the conflict in Ukraine after Russia's invasion in February 2022 raise important questions about nuclear deterrence and the utility of nuclear weapons as a military and political tool of war. The evidence suggests that this utility is extremely limited. More broadly, nuclear weapons do not provide the states that possess them with tangible national security benefits and the reliance on nuclear weapons ultimately undermines national security.

Session 5: Being a Young, Hopeful, and Open-Minded Scientist

Casper Andersen: *International Science Contested – A Generational Challenge in Science Diplomacy*

The current crisis in the geopolitical order presents a generational challenge for science - in a double sense. First, it is generational in scale: the magnitude of global transformations unfolding today demands long-term, systemic responses that will shape the conditions of knowledge-making for decades to come. Second, it is generational in its effects: this moment is being felt acutely by early-career scientists, who are in the formative stages of building their international networks, collaborations, and research trajectories – at a time when the infrastructures of international cooperation are becoming increasingly fragile and unpredictable. In this talk, I offer some reflections on this generational challenge by thinking through two distinct and often competing modalities of international science - what I will refer to as cosmopolitical internationalism and Olympic internationalism. These modes offer contrasting orientations to the role of diplomacy within the sciences. This talk is also meant to serve as an introduction to the panel debate, and as an invitation to collectively consider how science diplomacy might respond to, and reshape, the generational challenges we face today.

Session 6: Science and Openness

Gundo Weiler: *Health as a Driver for Turning Crisis into Solutions*

In a time marked by converging existential threats—from climate disruption to geopolitical instability—health emerges not merely as a casualty, but as a catalyst for transformation. Drawing inspiration from Kierkegaard's existential urgency and his insight into suffering as a gateway to action, this keynote explores how health uniquely translates global crises into personal experience, awakening the moral and political imagination. In the spirit of Bohr's call for openness, this is a call to action: to place health at the heart of our response to crises, and to harness its power to turn suffering into solutions.

Health is no longer a closed domain; it is an open system—interdisciplinary, intersectoral, and intergeographical. It mirrors the megatrends of our age, from the objective devastation of war to the subjective anxiety of climate change, making abstract threats tangible and urgent.

This presentation will explore three dimensions: (1) Health as a personalized manifestation of existential risk; (2) Health's transformative power to drive systemic solutions—through "Health in All Policies," "One Health," and the "Economy of Well-being"; and (3) Health as a frontier for open research, capable of uncovering realities, proposing actionable solutions, and guiding implementation in a world where facts alone no longer suffice.

Session 6: Science and Openness

Ana María Cetto: *Pushing the Boundary Between Openness of Science and Political Closure*

The year 2025 marks the anniversary of three historically significant open letters that are of critical relevance today.

In 1925, a group of Italian intellectuals denounced Mussolini's regime in an open letter. By defying the imposition of fascist ideology at great personal risk, the signatories revealed that not only was opposition possible, it was also necessary.

In 1950, Bohr wrote a poignant open letter to the United Nations expressing concern about increased distrust and anxiety caused by barriers to the free flow of scientifically valuable information between countries. Bohr was clearly aware of the potential for competition over weapons of mass destruction and the resulting need to radically adjust international relationships.

In 1955, amid the dangerously escalating weaponization, Russell and Einstein issued an open letter to warn the world about the dire consequences of nuclear war. Recognizing this profound danger to our species' existence, the Einstein-Russell Manifesto called for an equally profound revolution in international politics.

Bohr concluded his 1950 letter by urging individuals and nations to demand an open world. A central aim of the open science movement, guided by the 2021 UNESCO Recommendation, is to promote openness in all forms of science and encourage respectful dialogue between scientists and all sectors of society, including politicians and decision-makers. In the spirit of Bohr, open science strives to make scientific knowledge accessible, available, and reusable by all in an atmosphere of transparency and collaboration.

We must continue to strive for openness in the spirit of Bohr, in the face of ongoing violence and war that is resulting in massive loss of life and destruction of livelihoods. As scientists and citizens of the world did in 1925, 1950, and 1955, we gather here today to explore new ways to further push the boundary between openness in science and political closure.

Session 6: Science and Openness

Zuoyue Wang: *Reflections on US-China Scientific Exchanges from the Cold War to the Contemporary World*

This talk examines the history of US-China scientific exchanges from the Cold War era to the present, with a focus on how these interactions have helped the world deal with global problems such as climate change, nuclear weapons, and the struggle for democracy. Besides state-sponsored science diplomacy, this study also highlights the roles of transnational, non-governmental scientists and scientific institutions, including Chinese American scientists and the Niels Bohr Institute, in facilitating US-China scientific exchanges and in promoting an open world through open science.

Session 6: Science and Openness

Jahnavi Phalkey: *Open World to Open Science: Lineages of the Twenty-First Century*

Niels Bohr, in his Open World letter, spoke about "openness as a primary condition for the progress and protection of civilisation." Bohr wanted protection for humanity and research from the "formidable means of destruction" that were atomic weapons. I want to imagine the content of his plea were he alive today in the context of today's formidable "means of surveillance, manipulation, and control." Towards this, I will explore the trajectory from Bohr's Open World to today's world of Open Science through the geopolitical transition from the end of WWII and the Cold War to a wobbly world order in the twenty first century; from state-led science to market owned research infrastructure; and finally, the declining cultural authority of scientists as against the rise of cultural authority of the engineer as the knowledge bearer in contemporary society. If Bohr wanted to protect the conditions under which knowledge grows in the immediate aftermath of WWII, what is the path we today tread in the context of the three transitions named above to care for an openness that redefines a tenable idea of progress and protection of civilisation.