

## TRANSLATE

# Making Sense of Science Anticipation for Concrete Impact

### Abstract

Anticipating breakthroughs in science and technology is of little use if you can't act on that foresight. Putting ideas into practice is complex and requires properly framing the challenge and need for action, tapping innovative solutions and finding resourceful partners. Bringing all of these functions together in one place could create a powerful new model for translating anticipatory science into benefits for humanity. Geneva and GESDA are ideally placed to act as such a hub that can bring together businesses, innovators, academics, citizens and diplomats to share their knowledge and resources and develop solutions to tomorrow's most pressing challenges.

- Drawing on two examples from GESDA's Breakthrough Radar, how are the anticipated scientific advancements in quantum and neuroscience most relevant for society?
- What roles can business, government, philanthropy and civil society play?
- What type of actions are needed to facilitate the process from labs to solutions?

### Participants

*Moderated by:*

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*With:*

**Patrick Aebischer**, President Emeritus, EPFL, Vice-Chairman GESDA, Switzerland

**Anousheh Ansari**, CEO, XPRIZE Foundation; Member, GESDA Diplomacy Forum, US/Iran

**Maria Cattai**, Global Board Member, Open Society Foundations, Greece/Switzerland

**Joseph D'Cruz**, Special Advisor, Strategic Planning & Innovation, Executive Office of the Administrator, United Nations Development Program, Malaysia

### Highlights

The Swiss and Geneva governments created GESDA out of a belief that the speed at which technology evolves due to the convergence of different scientific fields and the number of technological advances that we need to keep an eye on, pose huge challenges. With international treaties under attack – small nations rely on international law for protection – the Swiss focused on anticipatory science diplomacy as the best way to renew multilateralism and position Switzerland, and especially Geneva, as a neutral place where diplomats, politicians, and scientists can think together about the future.

Swiss neutrality, and Switzerland's geographic location and scientific environment, also were important factors in why CERN, the European Organization for Nuclear Research, which also uses science as a tool for peace diplomacy, was built on the outskirts of Geneva, along the French border. The Swiss know there are strong links between the economy and science, and hope that anticipatory science diplomacy can rebuild trust towards the scientific community in a dystopic age of disinformation.



Putting these ideas into practice, however, means translating the expected scientific advances highlighted in the GESDA Science Breakthrough Radar® into actions that serve society well in a global, inclusive and ethical framework. Rather than rely on top-down regulations, GESDA was created to be an “honest broker” and neutral platform for tailor-made solutions shaped by an inclusive process and discussions. “It’s to bring the discoveries of laboratories to us, so that they can be used by the society in general,” said Patrick Aebischer, GESDA's vice-chairman, citing quantum computing and cognitive enhancement – which, in a few years from now, could impart a degree of something like consciousness to robots – as among the most challenging and important of potential advances. “In universities we have three missions: typically to discover, which is the research part; the transmission of the education; but I think we have this third very important mission, which is translation” and a

central theme in GESDA's “philosophy” that all such efforts must give back to society. He suggested that another part of GESDA's reason for being – convening stakeholders to find solutions – is easier to accomplish in Geneva where many multilateral institutions are “just a couple of hundred meters away”.

With the launch of the GESDA-XPRIZE Quantum competition, the two foundations aim to democratize quantum technologies by enabling broader involvement among scientists and researchers, accelerating the pace of discoveries, and improving inclusiveness and SDG alignment of quantum applications with the aims of the United Nations 17 Sustainable Development Goals, or SDGs, for 2030. Moonshot competitions like this drive innovation, raise awareness and have a multiplier effect, as XPRIZE has demonstrated through competitions over the last 25 years. Ansari said GESDA's mission “aligned with our work perfectly” to engage teams, universities, and partners globally. Quantum software is developing much faster than its hardware, and its applications, particularly when joined with AI, will be far-reaching in fields such as health and climate, material sciences, and encryption, she said, which is why it is important “we're not left with our entire banking system and financial system and governments in jeopardy. And these are the areas that we're considering for a quantum competition”. Peter Brabeck-Letmathe, GESDA's chairman, called the partnership a “wonderful” example of how anticipatory science can drive concrete impacts because it will help ensure quantum technology “doesn't stay in the hands of two or three multinationals or three or four governments”.

Anticipating science and technology advances and figuring out how to apply their emerging uses locally is a big challenge for the UNDP's operations in 170 locations worldwide, according to one of its top strategic planners, Joseph D'Cruz, whose background is in political economy and management consulting. “Science needs to understand what society values and what society aspires to. Society needs to better understand what the potential of science is so we can make the choices collectively about how to use that. Neither of those is happening right now,” he said. Three years ago, UNDP published an update to its “Foresight Manual” to apply the uses of strategic foresight methodologies towards public service and the implementation of the SDGs. “The reason we find the work of GESDA and initiatives like this really interesting, is because one of our biggest challenges is being able to contextualize, in those local contexts, what's coming at us as a result of the technological developments in the pipeline, so that we have the ability to build those conversations in the solution

spaces on the ground, before these technologies overwhelm them,” said D’Cruz. “Not just in tech hubs, but you know, in Sudan, and in Chad, and in Somalia, and in Bolivia and Colombia. The thing that always excites me is the unexpectedness of it. Given the capacity, given the connection, people on the ground find problems to solve [things] that we had never even seen” which is demonstrated proven by the results of UNDP’s Accelerator Labs.

Governance can be strengthened by including more people in all phases in science and technology development. The Open Society Foundations, which promotes economic development that advances social and racial justice, sustainability, and democracy, partnered with GESDA in a preliminary grant. “We certainly will be continuing such support in the future. But even more important, we want to work very closely with GESDA in exactly this area, the translation,” said Maria Cattai, a former secretary general of the International Chamber of Commerce and ex-managing director of the World Economic Forum. “Quantum is not a purpose. It’s a use. It’s a powerful, powerful tool. And its interface with AI is probably going to be extremely important. We mustn’t forget the other side, which is called the software side, and which is the interface with something that we do have some experience about, and which I think that we also know some of the problems involved in.” Cattai said one of the worst results would be if vastly more powerful computing power were to lead to more central planning. Recalling the long history of nuclear physics research that preceded World War II, Ansari pointed out that not only quantum computing and AI but “any of the exponential technologies we talk about can have a negative impact on the world. If we look at the development of the nuclear bomb and nuclear weapons, it was not intended – but it was an unintended consequence of research that happened. But until everyone understood the potential destructive nature of it and could personalize it, it was still something that was okay”. This is why anticipating the positive and negative impacts of the future breakthrough technologies is so important to give society more time to prepare effective framing mechanisms.

Less-wealthy nations often have to focus their limited resources on basic problems even if the idea of fostering global standards and consensual understandings is appealing, said Maricela Muñoz, a former diplomat at the Costa Rican mission to the United Nations in Geneva from 2016 to 2021. “Coming from the developing world, I can tell you that that’s a big challenge because, of course, we have other priorities at hand,” she said, adding that it is “sometimes very difficult to sell this idea of foresight planning”. There also are lessons to draw from wealthy nations like Switzerland, which tends to entrust its citizens with making complicated decisions through its frequent initiatives and

referendums that are an essential part of the Swiss system of direct democracy, according to Bernhard Fuhrer, director of the Swiss Network for International Studies, which promotes academic research in the interdisciplinary area of international studies with an interest in phenomena that transcend traditional nation-state boundaries. He suggested that GESDA might want to take a cue from the Swiss approach by ensuring that the “translation” part of the mission becomes a genuine two-way dialogue undertaken with openness and humility among all sides. “Translation could be re-baptized dialogue, couldn’t it?” he asked. “It isn’t just about getting people to know what you know. It may be also about listening.”



## Takeaway Messages

The expected scientific advances highlighted in the GESDA Science Breakthrough Radar® must be translated into actions that serve society well in a global, inclusive, and ethical framework.

Science needs to understand what society values and what society aspires to; society needs to better understand the potential of science to make better choices collectively about how to use it.

Closing the governance gap to bring everyone to the table means creating opportunities for scientific, diplomatic and public communities to be part of a dialogue at all phases.

Powerful new technologies often have unforeseen implications, including negative consequences, that could be mitigated through a more anticipatory and inclusive process of development.

So-called “moonshot” competitions like the GESDA-XPRIZE Quantum competition can drive innovation, raise awareness and have a multiplier effect by drawing major investment in research and its application.

Anticipatory science can drive concrete impacts on democracies because it will help ensure quantum technology does not remain in the hands of a few multinationals and governments and is also geared towards use cases with a high societal relevance (e.g. health, food, climate).

Not all nations have the resources to focus on anticipatory science diplomacy; GESDA would benefit from more emphasis on dialogue that includes listening by all sides.

### More information

[Session recording on YouTube](#)

[Related interviews: Patrick Aebischer, Anousheh Ansari](#)

[Tweets related to the session](#)

[Related content in the 2021 Science Breakthrough Radar®](#)

[Getting Value from Science Anticipation – essay by the Advisory Board to the Science Breakthrough Radar®, Taking the pulse of Diplomacy – Tackling the](#)

[global challenges of multilateralism, Anticipatory Science Diplomacy in Practice – Examples of International Organizations](#)

[Quantum Technologies and related breakthroughs at five, ten and 25 years: Full breakthrough brief](#)

[Cognitive Enhancement and related breakthroughs at five, ten and 25 years: Full breakthrough brief](#)

[Consciousness Augmentation and related breakthroughs at five, ten and 25 years: Full breakthrough brief](#)