



GESDA's 2021 Flagship product: The Science Breakthrough Radar®

Abstract

The GESDA Science Breakthrough Radar® is a new tool for multilateralism, informed discussions, and concerted action. It gives a neutral overview of the forthcoming possible breakthroughs in science and technology at five, ten and 25 years. Its purpose is to share this knowledge among diplomats, philanthropists, entrepreneurs and the general public for the benefit of all.

Participants

Moderated by:

Nanjira Sambuli, Policy Analyst, Advocacy Strategist; Board Member, Digital Impact Alliance, Development Gateway and The New Humanitarian, Kenya; Member GESDA Diplomacy Forum, Kenya

With:

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

Michael Hengartner, President, ETH Board, Switzerland

Marie-Laure Salles, Director, Graduate Institute Geneva, France

Discussion

Introduction

Nanjira Sambuli started by presenting the topic of the discussion:

"According to GESDA's vision ("Use the future to build the present") and GESDA's mission, which is to anticipate, accelerate and translate the benefits of science and technology, the GESDA Science Breakthrough Radar® is designed to inform discussions and to prompt concerted action ahead of forthcoming science advances. This is to be achieved through a process that involves scientists, diplomats, philanthropists, entrepreneurs, civil society leaders and the general public right from the start.

This inaugural edition of the Radar extends science anticipation to the hot topic issues that societies are debating. It is complemented by assessments from eight leading scholars in philosophy, humanities and the arts. Their job is to assess how science breakthroughs reshape the ways we see ourselves,

relate to each other and care for our environment. They also examine the significance of GESDA's chosen topics, synthesizing humanity's challenges.

It contains what GESDA calls the pulse of society, scanning social networks for comments on GESDA's themes.

It also addresses opportunities by answering the question: "What can we do with science anticipation?" That offers insight into global challenges such as the Sustainable Development Goals and some of the trends affecting multilateralism, including the spread of science anticipation among selected international organizations.

The Radar was developed through a strategic partnership with the Fondation pour Genève. Accompanying its development was a high-level scientific advisory board composed of:

- Prof. Michael Hengartner, President of the ETH Board, Zurich
- Sir Peter Gluckman, President of the International Science Council (ISC), outgoing Chair of the Advisory Group to International Network for Government Science Advice (INGSA)
- Prof. Marie-Laure Salles, Director of the Graduate Institute Geneva
- Prof. Michel Mayor, Professor Emeritus at the University of Geneva, 2019 Nobel Prize Laureate in Physics, and the Fondation pour Genève's representative to GESDA.

I am now happy to welcome on stage Michael Hengartner, Marie-Laure Salles and Patrick Aebischer, Vice-Chairman of GESDA."

Interview of the three panellists by Nanjira Sambuli

Nanjira Sambuli: What are the reasons that led GESDA to conceive of a Science Breakthrough Radar®? And what is GESDA trying to achieve with it?

Patrick Aebischer: "First, it came from the observation, as a scientist, that the pace of scientific development is increasing every year. There is a phenomenal acceleration. A second thing is the convergence of technologies: information technology, nanotechnology, biotechnology, cognitive sciences. Science lives no more in silos, but is interacting. It is even harder for scientists to

really grasp the whole breadth of what is going on. The third point is geographical: a hundred years ago, everything [in science] was probably happening in Europe and in the United States. Today, it is much more broadly distributed. We need to bring all those actors together. Look at the scientific development of Asia, for example, of China: you cannot do without it today. This is going to develop even further in the years to come. And the fourth and last element concerns the actors: a lot of the breakthrough disruptive discoveries are still happening in academic settings, with public resources. But some of it, for example in artificial intelligence (AI), is now also happening in big private institutions, in the GAFAs, that have recruited some of the top AI people. They need to be brought into the discussion. This is what we have done through the Radar.

“While we, scientists, are very comfortable in saying what we do and what we might do next year or the following year, it is far less usual and comfortable for us to say where we see our disciplines going in five, ten, or 25 years. But we have to give those trends. And probably some of those top scholars [who appear in the Radar] are the best people to tell us where trends are going, so that society can prepare to integrate them, to frame them, in order for them to be useful to the largest number. There are also things that we should probably prevent to do, prevent to use, prevent to apply. But I think scientists are not the right people to decide: we, scientists, are critical in saying what is happening today and what the trends are. But we have to share this knowledge with the society in general, the policymakers, the philanthropists, the entrepreneurs. That was really the rationale behind the Science Breakthrough Radar®. What we want to do is to provide what I call the ‘raw material for the policy people and society’ to be aware of and come sufficiently early with policies that can ensure the good utilization of science discoveries. What we want to be is an honest broker between the science and societies in general, and with the policymakers. And there is probably no better place to do it in the world than Geneva with the United Nations, the international organizations, the NGOs and world class research institutions.

“Also, science does not stop, but continuously evolves. That is why we have the concept of a rolling system. Once a year, we will re-adapt the Radar. Some fields may go faster, some slower. Some things, maybe unexpected, will happen, because this is also part of science. This first Radar is a beta version. More than 500 top scholars have contributed. It is never perfect, and will never be perfect, but that is the status of today. We have to increase the number of scientists that will participate, and we will have to adapt it continuously. But it is already a very critical tool for the world to be prepared about the discoveries that are happening, about what is cooking in the laboratories of science today so that we can use it for the best of our species.”

Nanjira Sambuli: Michael, 216 breakthroughs predicted within five, ten and 25 years are listed. The science evolves really rapidly. How do we ensure this Radar stays up to date?

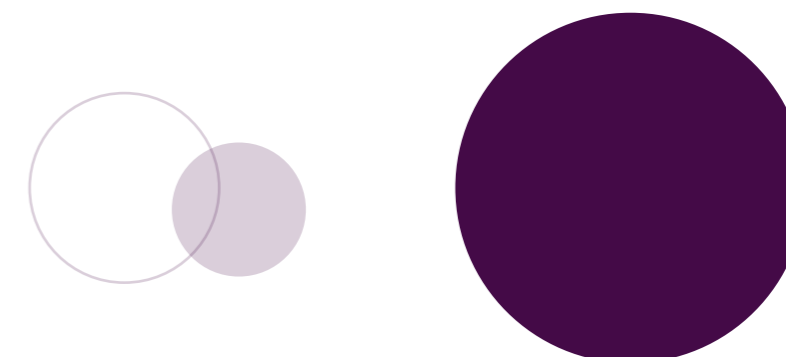
Michael Hengartner: “Patrick already mentioned we plan to have an annual update. We will see what happens. There might be new things that will pop up on the horizon. Some things might take more time. Some things might rush towards us at a much faster pace. And so, we need to keep our eyes open and continuously question ourselves and our hypotheses. It’s important to realize we are not making predictions about the future. We are simply looking up potential scenarios. But because these scenarios have such tremendous potential impact on humanity, it is important that we start discussing them now and seeing what the implications could be. So, the GESDA Science Breakthrough Radar® simply sketches out the possible scenarios, the tools that might become available to humanities, for good or bad, in the years to come.”

Nanjira Sambuli: Marie-Laure, the Radar describes how scientists in the field anticipate impactful advances at five, ten and 25 years. But science does not happen in a vacuum, and it evolves in broader societal and political contexts. How can the Radar take this into account for GESDA to translate the science anticipation into meaningful initiatives?

Marie-Laure Salles: “Let me actually go back to what technology is, what science is. Technology and science are a construction of humanity. And from the very beginning, science and particularly technology have been gifted with two sides. A side that has been about increasing the well-being of humanity – think about fire which, mastered by humans, becomes a technology, by bringing warmth, by allowing to cook food. On the other hand, fire can burn the village of the guy next door. So, technology has always had this double face. But today, we are reaching a moment when we have to really rethink all this. Why? Because over the last decades – at least in words, maybe not yet in reality – we have heard this notion that scientific breakthroughs would become the means to overcome humanity, to get beyond humanity. Transhumanism is really this idea. We are suddenly actually moving to a very different world where scientific breakthroughs are envisioned as a way to overcome our mind. Going back to the notion that science and technology must be inclusive tools for the well-being of the largest possible group of humans on Earth, I think this is really why it is very important to address these questions very seriously and very collectively.

“Now I want to point to what is dear to my heart, which is the role of social sciences in all this. Between on the one hand those breakthroughs, and on the other hand the well-being of humanity and the Sustainable Development Goals, we have valleys of

translation. And this is where social sciences are key. Those valleys have been described: it is about trust, governance, ethics, etc. We are not talking about politics yet, but about social scientific innovations that need to be brought in order to interact with the tool that is the Radar. We need to bring those two fields together in certain ways. We need to find the mechanisms where we have social scientists talking with [natural] scientists. A further step will be when will be able to bring this hybridization in the production of the science from the start – and this will actually accelerate the overcoming of the valleys. This implies obviously a lot in terms of education of the next generation, both of [natural] scientists and social scientists, but also diplomats, etc. And for me, this is where we really have to go – as I like to say – from ‘tech for good’ to ‘good in tech’. This is a major revolution, and it will hopefully be the next step for GESDA.”



Takeaway Messages

The idea for the Radar came from the observation that the pace of scientific development is accelerating, and that many fields in science are converging (info-, nano-, bio- and neuro-technologies).

Scientists are accustomed to speaking about the near future. They are unaccustomed to talking about where their disciplines may be headed in five, ten, or 25 years – but this needs to change.

The Radar does not make predictions about the future, it looks at potential scenarios. Because of the high stakes involved, it is crucial to discuss the implications of those scenarios now.

The scientific community must share its knowledge with policymakers, philanthropists, entrepreneurs and society at large.

This first Radar is a beta version, continuously adapted, but it will never be perfect.

Many discoveries occur in academic settings with public resources and, increasingly, in well-funded private institutions that should be part of broader discussions GESDA envisions in its science diplomacy.

Social science and natural sciences must be partners from the start to maximize the benefits of breakthroughs.

The Radar has the potential to shape multilateralism and the future of International Geneva.

More information

[Direct access to the interactive GESDA Science Breakthrough Radar®](#)

[Session recording on YouTube](#)

[Related interviews: Patrick Aebischer](#)

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