Newsletter Interview

LARGE RESEARCH INFRASTRUCTURES PLAY A LEADING ROLE IN THE G7 AGENDA

Interview with Fabio Fava, full professor at the School of Engineering of the University of Bologna and Senior Official of the Ministry of Education and Research for the Italian G7 Science and Technology presidency

The G7 *Conference on Large Research Infrastructures. Synergies and Impact on Science and Society* was held in Sardinia, in Oliena, in the province of Nuoro, from 28 to 30 October. It brought together ministerial delegates from G7 countries and representatives of European and global political and scientific institutions for a two-day working session on the topic of research infrastructures. The conference was sponsored by the Ministry of University and Research (MUR) within the scope of the Italian G7 Presidency and was organised in collaboration with INFN. The event opened with the greetings and institutional speeches by the Minister of University and Research Anna Maria Bernini, the President of the Autonomous Region of Sardinia Alessandra Todde, INFN President Antonio Zoccoli, the President of National Research Council Maria Chiara Carrozza, who is coordinating the Research 7+ initiative, OECD representative Carthage Smith, and delegates from the G7 countries. The conference, divided into plenary and parallel sessions, both of which provided ample space for discussion, was intended as an opportunity to discuss the role of large research infrastructures in addressing major contemporary challenges, considering their impact at scientific, economic, social and geopolitical levels. We talked about the conference and the main issues addressed and emerging from the working sessions with Fabio Fava, full professor at the School of Engineering of the University of Bologna and Senior Official of the Ministry of Education and Research for the Italian G7 Science and Technology presidency.

Why did the MUR advocate for a conference on large research infrastructure within the scope of the G7?

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In the light of their importance, Italy has adopted its own national strategy to support large research infrastructures with an investment, from 2010 to date, of more than 2.5 billion euros, 1.5 of which came from the National Recovery and Resilience Plan (NRRP). The goal is to promote the creation and strengthening of infrastructures of excellence in Italy, also of international level. One example is the Bologna Technopole, an infrastructure resulting from a virtuous collaboration between the Emilia-Romagna Region, the Italian Government and the European Union, which today is already a reference point in Europe thanks to CINECA's Leonardo supercomputer, one of the most powerful in the world, the European Center for Medium-term Weather Forecasting (ECMWF) and INFN National Computing Center (CNAF). Another example is the Gran Sasso Science Institute, a world-class research and training centre founded after the 2009 L'Aquila earthquake, that is helping to rebuild the region's socioeconomic fabric. Therefore, large research infrastructures also contribute to the regeneration of disadvantaged areas and to regional, national and international development. For all these reasons, Italy is strongly committed to promoting Sardinia's candidacy to host the future gravitational waves detector, the Einstein Telescope, one of the main research infrastructures to be built in Europe in the coming years, also recognised by the European Strategy Forum on Research Infrastructures (ESFRI).

During the conference, some crucial issues for research infrastructures were addressed. What are the main topics that emerged in the proceedings and discussions?

First of all, it was presented the report "G7 Large Research Infrastructures: Synergies and Impact on Science and Society", commissioned by the Italian presidency to a leading national think tank, The European House - Ambrosetti. The report provides insights into the scientific, economic, social and geopolitical impact of large research infrastructures, particularly in the G7 countries, and outlines the desired prospects for large research infrastructures from representatives of the scientific communities, research institutions and funding agencies, and innovative companies in said countries.
The socioeconomic benefits of large research infrastructures as facilitators of new knowledge and of the training of younger generations of scientists, generators of high-quality FAIR (Findable, Accessible, Interoperable and Reusable) research data and strategic technology transfers for industry and local areas were also discussed.
We delved into the role of large research infrastructures as catalysts for new international collaborations, interconnections and scientific diplomacy among the various countries, and as shared assets without borders, where those who participate openly contribute with their resources and expertise.
Finally, through dedicated workshops, we focused on how to improve the management of large research infrastructures, sharing best practices already validated in the experiences of G7 countries, how to intensify coo velopment and implementation of artificial inte ow to build a global network of research infr lar of cosmic exploration.
The oposal to host the Einstein Telescope in the are s and international representatives visited the unc on of the local area are already underway, as wel nental physics experiment Archimedes cur

What are the main outcomes of the conference and the message toward ICRI 2024, the International Conference on Research Infrastructures to be held in Australia on 3-5 December next?

The conference confirmed the strategic role of large research infrastructures, but also the need for them to be increasingly interconnected so that, while being internationally competitive, they can cooperate more at the level of the G7 countries and beyond, in order to be more functional, sustainable, resilient, and better updated to address new challenges. Sharing proven best practices, such as those related to user access to tools and stored data, remote access to user services, energy and environmental impact management, upgrade planning, and internationalisation, is crucial for large infrastructures that are only possible if they are connected. A connection between computing infrastructures, for example, makes it possible to manage the potential of Artificial Intelligence for the public good in the most appropriate manner, and to safeguard the universal values of publicly funded research and FAIR knowledge and innovation.
These topics will be presented within the scope of the last meeting promoted by Italy among the Sherpas of our G7 Science & Technology Presidency, and will be among the strategic priorities for the next year of G7 activity led by Canada.

What did the European House - Ambrosetti study cover and what are the most interesting aspects that emerged?

The study G7 Large Research Infrastructures: Synergies and Impact on Science and Society, conducted by the TEHA Group at the request of the MUR and INFN, with support from Hewlett Packard Enterprise, produced new and updated confirmation that large research infrastructures are a key enabler for the creation of new knowledge and its transfer, and for long-term scientific progress in a world that often prioritises short-term gains and rapid innovation cycles. Research infrastructures ensure the scale, resources, and platforms needed to reshape entire sectors and address future challenges, providing continuity and foresight and ensuring progress well beyond immediate trends. Nevertheless, there is a substantial gap in potential and impacts between research infrastructures, due in part to the uniqueness and complexity of each one of them, to overcome which increased collaboration is needed to maximize the return in terms of scientific and technological competitiveness. By sharing a single set of values, such as transparency, good governance, and commitment to ethical research practices, large infrastructures position themselves as natural leaders in fostering broader and deeper international collaboration that can promote equity and stability on a global scale.

What were the main initiatives promoted by MUR in the year of the Italian G7 presidency, and how does the conference on research infrastructures fit into their context?

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advanced solutions to monitor and preserve the health and productivity of the seas and oceans, another

priority of the G7 communiqué (“Seas, Oceans, and their Biodiversity”), but also to prevent, monitor, and manage adverse and extreme environmental events, as well as pandemics, and to invest in energy innovation (“Nuclear Fission and Fusion Energy”).
Large infrastructures can strengthen cooperation with developing countries, the African continent and the Mediterranean region, and contribute to the reconstruction of Ukraine, for example by facilitating the exchange of young researchers and talent (“Research and Innovation Cooperation with Africa”).
Large research infrastructures therefore have a central role in this year’s G7 Science&Technology as facilitators of science-based, sustainable and wise innovation, the preservation, restoration and regeneration of our planet and the well-being of our communities, along with the training of young scientists, because scientific diplomacy and peer-to-peer cooperation between researchers are among the noblest and most effective tools for promoting dialogue between countries in a world beset by increasing conflict.

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