GESDA 2026 Science Breakthrough Radar® Maps Next 25 Years of Transformative Science and Technology Futures

The major new report from the Geneva Science and Diplomacy Anticipator highlights groundbreaking science trends in fields such as AI, geopolitics, ecology and human health.

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The Geneva Science and Diplomacy Anticipator (GESDA) has released its 2026 Science Breakthrough Radar®, an anticipatory tool providing unique intelligence about potential scientific and technological advances anticipated over the next 5, 10, and 25 years. This year's edition expands its scope to include new topics like engineering human biology, ecology, language, and mathematics, while offering deep dives into crucial areas of global importance.

Drawing on insights from 2390 leading researchers globally since its original release, and through GESDA's science anticipation methodology, the 2026 Radar serves as an indispensable resource for decision-makers worldwide. The report identifies critical areas where transformative advances are not merely theoretical possibilities, but imminent realities poised to fundamentally reshape humanity, societies, and the planet. The release marks the opening of the fifth Geneva Science and Diplomacy Summit, cementing GESDA's role as the world's premier forum for science diplomacy.

Highlights

- **Science as a Geopolitical Asset:** The report reveals how science and technology have become a primary currency in international affairs. With nations increasingly controlling the flow of knowledge and expertise as strategic assets, fields like AI, biotechnology, and space have emerged as new battlegrounds for global influence, creating unprecedented challenges for scientific governance and collaboration.

- **The Future of AI:** As AI revolutionises all sectors while dominating global discourse, the GESDA Science Breakthrough Radar suggests we are at a pivotal moment for its future development. With current AI trajectories unlikely to continue smoothly, new approaches to building AI systems will be required to achieve more data-efficient, trustworthy platforms capable of understanding the real physical and social world, and ready for broader societal deployment. The report emphasizes the critical collaboration between researchers, businesses, and policymakers needed to ensure AI's benefits are distributed widely while mitigating negative impacts.

- **The Future of Ecology:** The GESDA Science Breakthrough Radar highlights how climate shifts are reshaping Earth's ecosystems and forcing unprecedented species interactions that increase pandemic risks as organisms undergo rapid evolution in response to human activity and species are forced into new habitats. Advanced tools, from genetic analysis and satellite monitoring to AI-powered genomic sequencing and ecosystems modelling, are providing insights into planetary health threats. However, significant challenges remain in developing biological modification tools without unintended consequences and creating models capable of predicting complex phenomena such as climate tipping points and cascading effects of migration and socioeconomic changes.

- **Pathogen Biology, a Call for Planetary Preparedness:** Drawing on lessons from COVID-19, the GESDA Science Breakthrough Radar emphasizes that breakthroughs in mRNA vaccines, rapid genome sequencing, immunological profiling, phage therapy and decentralized health intelligence can forge a more effective global response to future crises. AI is proving particularly valuable in characterizing pathogen infectivity molecules and analyzing genomic data to predict infection outcomes, while experts emphasize that effective global pathogen resistance requires decentralized approaches built on mutual trust, partnership across nations, and equitable access to breakthrough technologies beyond wealthy countries' borders.

- **Engineering Human Biology at a Crossroads:** The GESDA Science Breakthrough Radar explores the immense potential of engineering human biology. As synthetic human genomes, lab-grown miniature organs, and human embryo replicas transition from science fiction to reality, the convergence of AI, tissue engineering, and genome editing is poised to deliver unprecedented benefits for human health and wellbeing. These emerging technologies offer promising new approaches to combat cancer, cardiovascular disease, fertility challenges, and immune system disorders through revolutionary techniques such as cell reprogramming to reverse age-related decline, organoid development for transplantable kidneys and bone marrow, and mini-brain cultures to unlock dementia pathways. These transformative advances require careful ethical, legal, and regulatory consideration to ensure responsible development of the next quarter-century's most groundbreaking biological engineering innovations.

- **The Redefinition of Humanity:** As science and technology advance at a rapid pace, the future of our human condition and social and planetary coexistence is poised for radical transformation. Building on anticipatory insights from the social sciences and humanities, the GESDA Science Breakthrough Radar introduces "Planetarised Humanity" as a framework to capture and shape these transformative shifts toward flourishing futures from a planetary perspective.

- **Cognitive Enhancement**: Breakthroughs in this field, such as brain-computer interfaces, promise to deepen our understanding of the human mind while delivering life-changing therapeutic effects. These technologies can bypass damaged neurological systems for people with paralysis, turning unexpressed intentions into digital commands. Future developments could enable "exogenous cognition," offloading mental tasks to external processors to significantly augment memory, decision-making, and learning capabilities.

- **Language and Communication**: Language is a core human capacity that is rapidly changing due to social and technological pressures, particularly from generative AI and large language models. The GESDA Science Breakthrough Radar highlights opportunities, such as preserving threatened languages and enhancing cross-cultural understanding, alongside threats, including the potential for AI to exacerbate social and economic inequalities by favoring majority languages over vulnerable linguistic minorities facing suppression worldwide.

- **Mathematics**: Mathematical innovation underpins today's world, from managing global economies to the development of AI and the internet and unlocking the secret of life and the universe. The GESDA Science Breakthrough Radar notes that existing mathematical models cannot adequately describe complex systems like the ocean-climate-human interactions, suggesting AI will assist researchers to invent new approaches, theories and concepts.

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About GESDA

The Geneva Science and Diplomacy Anticipator (GESDA) is an independent Swiss foundation that connects scientific anticipation with global diplomacy. Its mission is to anticipate emerging scientific breakthroughs and help translate them into inclusive, ethical, and cooperative solutions to global challenges.

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Please also visit the websites for the Radar at https://radar.gesda.global/ and for GESDA at https://gesda.global.