



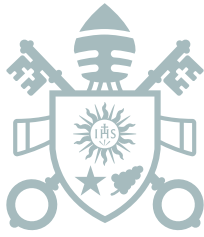
THE PONTIFICAL  
ACADEMY  
OF SCIENCES

BIENNIAL PLENARY

# SCIENCE FOR SUSTAINABILITY AND WELLBEING IN THE ANTHROPOCENE – OPPORTUNITIES, CHALLENGES, AND AI



Wednesday, 23-25 September 2024  
Casina Pio IV, Vatican City



*"As we know, artificial intelligence is an extremely powerful tool, employed in many kinds of human activity: from medicine to the world of work; from culture to the field of communications; from education to politics. It is now safe to assume that its use will increasingly influence the way we live, our social relationships and even the way we conceive of our identity as human beings.*

*The question of artificial intelligence, however, is often perceived as ambiguous: on the one hand, it generates excitement for the possibilities it offers, while on the other it gives rise to fear for the consequences it foreshadows. In this regard, we could say that all of us, albeit to varying degrees, experience two emotions: we are enthusiastic when we imagine the advances that can result from artificial intelligence but, at the same time, we are fearful when we acknowledge the dangers inherent in its use.*

*After all, we cannot doubt that the advent of artificial intelligence represents a true cognitive-industrial revolution, which will contribute to the creation of a new social system characterised by complex epochal transformations. For example, artificial intelligence could enable a democratization of access to knowledge, the exponential advancement of scientific research and the possibility of giving demanding and arduous work to machines. Yet at the same time, it could bring with it a greater injustice between advanced and developing nations or between dominant and oppressed social classes, raising the dangerous possibility that a "throwaway culture" be preferred to a "culture of encounter". The significance of these complex transformations is clearly linked to the rapid technological development of artificial intelligence itself....It is precisely this powerful technological progress that makes artificial intelligence at the same time an exciting and fearsome tool, and demands a reflection that is up to the challenge it presents.*

*In this regard, perhaps we could start from the observation that artificial intelligence is above all else a tool. And it goes without saying that the benefits or harm it will bring will depend on its use. ...*

Pope Francis addressing the G7 session on artificial intelligence (13-15 June 2024).  
Borgo Egnazia (Puglia), Friday, 14 June 2024

# Concept Note

It has become ever more evident that humankind deeply impacts Earth systems. The Anthropocene, understood as the growing and lasting human influence on the global environment, was identified by our esteemed PAS Academicians Paul Crutzen (1933–2021), and also Mario Molina (1943–2020) contributed to related insights. PAS has addressed Anthropocene issues at various workshops before.<sup>1</sup> As the Anthropocene is showing its increasingly dramatic consequences for nature and for people, especially through climate crisis and loss in biodiversity, PAS addresses this in its Plenary 2024. At the same time, the Plenary addresses emerging new science and innovations, in particular Artificial Intelligence, and related opportunities for science and planetary health, and regulatory options to address risks. As always in PAS Plenaries, we shall provide perspectives for future science policies and strategies.

The Anthropocene represents the cumulative effect of human activities on nature and its life forms. The Anthropocene is the age we live in, characterized by heavy imprints of human activities on nature by, for instance, industrial revolution based on fossil fuels, nuclear arms and nuclear energy, urbanization, consumption, and communication technologies. Sciences are not independent from the forces that created the Anthropocene. Actually, we must note that past science and the innovations facilitated by science, were among key drivers of the Anthropocene. Examples are energy systems based on fossil fuels, transport systems, construction, consumer goods, and agriculture and land use related innovations, causing greenhouse gas emissions, pollution, and land and water systems degradation.

At the same time, science and innovations are progressing and serving human betterment providing also opportunities to mitigate and manage the Anthropocene. The sciences, including the life sciences and medical sciences, have made child survival, longevity and coping with diseases possible and led to the growth of the human population, yet combined with expanded consumption and lifestyles with big environmental foot print. Science-based innovations of the past, often with time lags, are part of the root causes of the Anthropocene.

Current and future science is now challenged to mitigate and help to adapt humanity to the Anthropocene. It is not new, that science-based innovations are posing ethical challenges for scientists and society at large. This is nowadays particular so with Artificial Intelligence (AI) impacting on society and many aspects of the sciences and innovation processes. We are challenged to explore AI developments and applications, as well as other innovations, as accelerators in the making of the Anthropocene, but we shall also ask if artificial intelligence may help human intelligence in achieving a sustainable Anthropocene.

Furthermore, the emerging sciences in chemistry, physics, biology and life sciences, and medicine are already aided in new ways by AI. Quantum physics and computing may be another field that offers innovations to turn the Anthropocene onto sustainable pathways. The Pontifical Academy of Sciences has addressed related themes with its consultations, publications, and public statements before,<sup>2</sup> and is committed to address the protracted challenge for sciences as both, causes and cures of the adverse elements of the Anthropocene. Since the Plenary Conference in 2022, the Pontifical

<sup>1</sup>

- [Resilience of People and Ecosystems under Climate Stress](#) Workshop | 13–14 July 2022
- [Science and Survival. A Focus on SARS-CoV-2 and Connections Between Large-Scale Risks for Life on This Planet and Opportunities of Science to Address Them](#) Plenary Session | 7–9 October 2020
- [Science and Sustainability. Impacts of Scientific Knowledge and Technology on Human Society and its Environment](#) Plenary Session | 25–29 November 2016
- [Climate Change, Health of the Planet and Future of Humanity](#) Workshop | 15 November 2018
- [Biological Extinction: How to Save the Natural World on Which We Depend](#) Workshop | 27 February – 1 March 2017

<sup>2</sup>

- Robotics, AI, and Humanity: Science, Ethics, and Policy. Conference Workshop 16–17 May 2019 and Publication <https://www.pas.va/en/publications/scripta-varia/sv144-springer.html>
- Big Data and Science: Relevance of Computational Sciences for Data Collection, Data Storage and Data Management in Basic and Applied Scientific Investigations. Proceedings of the Working Group 17–18 November 2015 <https://www.pas.va/en/publications/scripta-varia/sv133pas.html>
- Power and Limitations of Artificial Intelligence. Workshop 30 November – 1 December 2016. <https://www.pas.va/en/events/2016/artificialintelligence.html>

Academy of Sciences has held workshops addressing important aspects of this broad agenda. For instance, the massive health and societal problems caused by the COVID pandemic and by the chronic disease of cancer, the climate crisis and resilience challenges, the health of oceans, stem cell science, neurotechnology, quantum physics and computing, the growing humanitarian and food crises. We identified specific science opportunities in each of these areas and issued related statements urging policy and societies to act. The Plenary Conference 2024 partly draws on the insights from these workshops and puts them into the broader context of science and science diplomacy opportunities.

We emphasize that basic sciences remain ever more important for understanding and addressing the complex Anthropocene processes. Curiosity-driven science has big payoffs that often come about in unpredictable ways, mostly in the longterm, but increasingly even in the short term.

The Pontifical Academy of Sciences continues to address issues of science skepticism in society and media. It is necessary to further consider at the Plenary 2024 the determinants of these trends, the role that religion may play in openness to sci-

ence, and the opportunities of science education to make a difference. The 2024 Plenary Session includes discussions with leaders from various global academy and science policy networks. This shall continue our Academy's strong track record to identify scientific solutions and engage with political and societal actors, including faith-based communities, and the Church in particular, to implement innovative actions for overcoming the most serious problems facing humanity. This is especially important when crises, wars, and growing risks trouble people and planet, as is currently the case. Purposeful sciences must have peace as a goal, as peace is a precondition for sustainable development.

*We ask speakers to give **presentations of 15 minutes max.** For the presentations, PPTs are welcome. We request all speakers to **contribute a paper** of not more than 3500 words, latest by **August 30<sup>th</sup> 2024.** **Accepting to contribute a paper is a condition for the invitation.** The papers will be published in the PAS publications series "Acta" following PAS editorial guidelines [https://www.pas.va/en/about/editorial\\_guidelines.html](https://www.pas.va/en/about/editorial_guidelines.html)*

# Programme

## DAY 1 | MONDAY 23 SEPTEMBER, 2024

09.00-10.30	<b>Audience with Pope Francis</b> (including welcoming new PAS Academicians)
10.30-11.00	<b>Coffee Break at Casina Pio IV</b>
11.00-13.00	<b>Guided tours in Vatican</b> (options such as Library, or Museum, or St. Peter's Dome)
13.00-14.30	<b>Lunch at Casina Pio IV</b>
17.00-19.00	<p><b>Ethics and AI - Challenges and Regulations in Europe and beyond</b></p> <p>A Panel session <b>followed by a reception</b> organized by the French and German Embassies to the Holy See, in collaboration with the Pontifical Academy of Sciences, the Decastery for Culture and Education, and with the support of the Delegation of the European Union to the Holy See, held at <b>Curia Generalizia della Compagnia di Gesù, Borgo S. Spirito, 4.</b></p> <p><b>Moderator:</b> Archbishop Paul Desmond Tighe</p> <p><b>Speakers and Panelists:</b></p> <ul style="list-style-type: none"> <li>• <b>Prof. Frances Hamilton Arnold</b> ■ PAS Academician Professor of Chemical Engineering, Bioengineering and Biochemistry at the California Institute of Technology (Caltech), External co-chair of President Biden's Council of Advisors on Science and Technology</li> <li>• <b>Sir Demis Hassabis</b> ■ PAS Academician Co-Founder &amp; CEO, Google DeepMind</li> <li>• <b>Prof. Paul F. Nemitz</b> Principal Advisor for Digital Transformation in the Directorate-General for Justice and Consumers of the European Commission</li> <li>• <b>Rev. Fr. Eric Salobir</b> President, Human Technology Foundation, Paris, France</li> <li>• <b>Prof. Bernhard Schölkopf</b> Director at Max Planck Institute for Intelligent Systems &amp; ELLIS Institute Tübingen and Professor, ETH Zürich</li> </ul>

## DAY 2 | TUESDAY 24 SEPTEMBER, 2024

09.00-09.10	<p><b>OPENING SESSION</b></p> <p><i>Chair: President Prof. Joachim von Braun: Words of Welcome and Concept of the Plenary</i> <i>Cardinal Peter K.A. Turkson: Words of welcome</i></p>
09.10	<b>Session I – The Anthropocene – concept, measurement, human adaptation, and role of the sciences as cause and cure</b>
09.10-09.30	<p><i>Science for the Anthropocene – an introduction</i></p> <p><b>Prof. Jürgen Renn</b> Max Planck Institute for Geanthropology, Jena, Germany</p>
09.30-9.50	<p><i>Anthropocene stratigraphy</i></p> <p><b>Prof. Francine M.G. McCarthy</b> Professor, Earth Sciences, Brock University, Canada, and Anthropocene Working Group, International Commission on Stratigraphy</p>
9.50-10.10	<p><i>On human anthropology – looking back into human adaptation and evolution</i></p> <p><b>Prof. Tekklu Zeresenay Alemseged</b> ■ PAS Academician Donald N. Pritzker Professor in the Department of Organismal Biology and Anatomy at the University of Chicago, USA</p>
10.10-10.30	<p><i>Religion, the sciences and the Anthropocene</i></p> <p><b>Cardinal Peter K.A. Turkson</b> PAS Chancellor</p>
10.30-10.40	<b>Discussion</b>
10.30-11.00	<b>Coffee Break</b>
11.00	<p><b>Session II – Climate crisis, biodiversity loss, and human contexts – outlook and needed actions for a habitable earth</b></p> <p><i>Co-Chairs: Prof. Hans J. Schellnhuber</i> ■ PAS Academician <i>and Prof. Veerabhadran Ramanathan</i> ■ PAS Academician</p>
11.00-11.20	<p><i>An historic down payment of actions to tackle the interacting triple crises of climate change, loss of biodiversity, and inequity</i></p> <p><b>The Honorable Jane Lubchenco, PhD</b> ■ PAS Academician Deputy Director for Climate and Environment, White House Office of Science and Technology Policy; and University Distinguished Professor and Valley Professor of Marie Biology, Oregon State University</p>

11.20-11.40	<i>Building a strong inclusive AI driven global commons for development impact at the nexus of climate, people, landscape health and food security</i> <b>Dr. Éliane Ubalijoro</b> Chief Executive Officer, CIFOR-ICRAF, Kenya
11.40-12.00	<i>Challenges in Climate Change Research and Bending the Curves towards a Sustainable Stewardship</i> <b>Prof. Örjan M. Gustafsson</b> ■ PAS Academician Professor Stockholm University, Department of Environmental Science, Bolin Centre for Climate Research
12.00-12.20	<i>Air Quality, Health, and Climate in the Anthropocene</i> <b>Prof. Ulrich Pöschl</b> Director at the Max Planck Institute for Chemistry and professor at the Johannes Gutenberg University (JGU) in Mainz, Germany
12.20-12.40	<i>Challenges to habitability and multi-level responses</i> <b>Dr. Kira Vinke</b> Head of the Center for Climate and Foreign Policy at the German Council on Foreign Relations (DGAP)
12.40-13.00	<b>Discussion</b>
13.00-14.30	<b>Lunch</b>
14.30	<b>SESSION III – Quantum physics, and -computing – science perspectives, emerging applications and implications for AI</b> Co-Chairs: <b>Prof. Vanderlei Bagnato</b> ■ PAS Academician and <b>Prof. William D. Phillips</b> ■ PAS Academician
14.30-14.50	<i>The Fundamental Message of the Quantum</i> <b>Prof. Anton Zeilinger</b> University of Vienna, Institute for Quantum Optics and Quantum Information, Austria
14.50-15.10	<i>Exploring the Quantum World using Quantum Simulations</i> <b>Prof. Immanuel Bloch</b> Scientific Director, Max Planck Institute of Quantum Optics, Germany
15.10-15.30	<i>Global Environmental Measurement and Monitoring (GEMM)</i> <b>Prof. Donna T. Strickland</b> ■ PAS Academician Professor at the University of Waterloo in Ontario, Canada, Chair of Optica's Presidential Advisory Committee
15.30-15.50	<i>Quantum Simulation and New Quantum Phases with Long-Range-Interacting Ultra-Cold Atoms</i> <b>Prof. Dr. Francesca Ferlaino</b> Professor of Physics, University of Innsbruck (Austria); Research Director of the Institute for Quantum Optics and Quantum Information (IQOQI), Austria
15.50-16.10	<i>Quantum systems open to the world</i> <b>Prof. Ana Asenjo-Garcia</b> Associate Professor of Physics, Columbia University, USA
16.10-16.30	<b>Discussion</b>
16.30-17.00	<b>Coffee Break</b>
17.00	<b>SESSION IV – Artificial Intelligence for sciences, innovations and sustainability – opportunities and risks</b> Co-Chairs: <b>Prof. Klaus von Klitzing</b> ■ PAS Academician and <b>Prof. Vanderlei S. Bagnato</b> ■ PAS Academician
17.00-17.20	<i>Accelerating scientific discovery with AI</i> <b>Sir Demis Hassabis</b> ■ PAS Academician Co-Founder & CEO, Google DeepMind, UK
17.20-17.40	<i>AI and the Forces Changing Science in the 21st Century</i> <b>Prof. Frances Hamilton Arnold</b> ■ PAS Academician Professor of Chemical Engineering, Bioengineering and Biochemistry at the California Institute of Technology (Caltech), External co-chair of President Joe Biden's Council of Advisors on Science and Technology
17.40-18.00	<i>Beyond the AI hype: Balancing Innovation and Social Responsibility</i> <b>Prof. Virginia Dignum</b> Professor of Responsible Artificial Intelligence at Umeå University (Dept of Computing Science) and director of the AI Policy Lab. Member of United Nations High Level Advisory Body in AI
18.00-18.20	<i>Materials for the quantum age</i> <b>Prof. Cristiane Morais Smith</b> Chair Condensed-Matter Physics, Utrecht University, ITP
18.40-18.45	<b>Discussion</b>
19.00-21.00	<b>Dinner at Casina Pio IV</b>

### DAY 3 | WEDNESDAY 25 SEPTEMBER, 2024

9.00	<b>SESSION V – Live sciences innovations, and new approaches</b> <i>Co-Chairs: <b>Edward M. De Robertis</b> ■ PAS Academician and <b>Frances Hamilton Arnold</b> ■ PAS Academician</i>
09.00-09.20	<i>The Future of Genomic Medicine</i> <b>Prof. Eric Lander</b> ■ PAS Academician Professor of biology at the Massachusetts Institute of Technology (MIT), and professor of systems biology at Harvard Medical School
09.20-09.40	<i>Interplay of oxygen, carbon dioxide and peroxide metabolism in mammalian cells</i> <b>Prof. Rafael Radi</b> ■ PAS Academician Professor Departamento de Bioquímica, Facultad de Medicina and Director of Centro de Investigaciones Biomédicas (CEINBIO), Universidad de la República, Montevideo, Uruguay
09.40-10.00	<i>Design of new metabolism for increasing carbon fixation</i> <b>Prof. James C. Liao</b> President of Academia Sinica, Taiwan, Professor and Chair of the Department of Chemical and Biomolecular Engineering at the University of California, Los Angeles
10.00-10.20	<i>Marine Science with AI for Sustainability and Wellbeing</i> <b>Prof. Takashi Gojobori</b> ■ PAS Academician Vice-Director of the National Institute of Genetics (NIG) in Mishima, Japan and Distinguished Professor at King Abdullah University of Science and Technology (KAUST), Saudi Arabia
10.20-10.30	<b>Discussion</b>
10.30-11.00	<b>Coffee Break</b>
11.00	<b>SESSION VI – Health and Medical Sciences – emerging science incl. AI to address pandemics and chronic diseases</b> <i>Co-Chairs: <b>Prof. Chien-Jen Chen</b> ■ PAS Academician and <b>Prof. Edith Heard</b> ■ PAS Academician</i>
11.00-11.20	<i>Development of drugs for Multidrug Resistance Bacteria: the role of artificial intelligence</i> <b>Prof. Tebello Nyokong</b> ■ PAS Academician Distinguished Professor of Chemistry and the Director of Institute for Nanotechnology Innovation at Rhodes University, South Africa
11.20-11.40	<i>Biological Clocks, Thermotolerance, and Fitness: Seeing Through the Eyes of a Fungus</i> <b>Prof. Luis F. Larrondo C.</b> Full Professor, Fac. Biological Sciences, Pontificia Universidad Católica de Chile, Chile
11.40-12.00	<i>AI research and infrastructure for the life sciences – The EMBL perspective</i> <b>Dr. Rolf Apweiler</b> Joint Director of European Molecular Biology Laboratory (EMBL) European Bioinformatics Institute (EBI), UK
12.00-12.30	<b>Discussion</b>
12.30-14.00	<b>Lunch</b>
14.00	<b>SESSION VII – Astronomy and changing world views</b> <i>Co-Chairs: <b>Prof. Ewine van Dishoeck</b> ■ PAS Academician and <b>Brother Guy Joseph Consolmagno, SJ</b> ■ PAS Academician Perdurante Munere</i>
14.00-14.20	<i>Astrobiology and the Anthropocene: How Searching for Life Elsewhere Can Help Us Sustain Life on Earth</i> <b>Prof. David Grinspoon</b> NASA
14.20-14.40	<i>Vera C. Rubin's Legacy Survey of Space and Time: The Greatest Movie of All Time</i> <b>Prof. Zeljko Ivezic</b> Professor of Astronomy University of Washington, Director of the Vera C. Rubin Observatory Construction Project
14.40-15.00	<i>Advancing Sustainability with Space Technology</i> <b>Prof. Maria T. Zuber</b> Presidential Advisor for Science and Technology Policy and E. A. Griswold Professor of Geophysics at MIT; Co-chair of President Biden's Council of Advisors on Science and Technology
15.00-15.20	<i>"Life in the Universe", Astrophysics perspectives</i> <b>Prof. Didier Patrick Queloz</b> ■ PAS Academician Director of the Center for the Origin and Prevalence of Life at ETH Zurich and Professor of Natural Philosophy at the University of Cambridge
15.20-15.40	<i>New Advances in Exoplanet Science with JWST</i> <b>Prof. Nikku Madhusudhan</b> Professor of Astrophysics and Exoplanetary Science, University of Cambridge, UK

15.40-16.00	<b>Discussion of the presentations</b>
16.00-16.30	<b>Coffee Break</b>
16.30	<b>SESSION VIII – Sciences and AI linking with traditional &amp; indigenous knowledge for addressing Anthropocene issues</b> <i>Co-Chairs: Prof. Mohamed Hassan ■ PAS Academician and Prof. Joachim von Braun ■ PAS President</i>
16.30-16.50	<i>Developing country problems, reducing the environmental impact of crops, equitable use of new technology as part of holistic innovation of agriculture and food production systems</i> <b>Prof. David Baulcombe ■ PAS Academician</b> Emeritus Regius Professor of Botany, Cambridge University
16.50-17.10	<i>Ancestral Wisdom and Artificial Intelligence: Pathways for a Sustainable Planet and Well-Being of Humanity</i> <b>Prof. Octaviana Trujillo</b> Professor Emerita, Northern Arizona University; JPAC, Commission for Environmental Cooperation, USA
17.10-17.30	<i>Coupling technology with traditional knowledge for health and wellness</i> <b>Dr. Subarna Roy</b> Director, ICMR National Institute of Traditional Medicine, Belagavi, India
17.30-17.45	<b>Discussion</b>
18.00	<b>SESSION IX – IX Science-Policy perspectives – a high level panel session with brief introductory statements by panellists related to aspects of the themes of Anthropocene and AI (12 minutes each, interactive in panel and with audience)</b> <i>Chair: Prof. Joachim von Braun ■ PAS President</i>
	<b>Prof. Quarraisha Abdool Karim</b> President of The World Academy of Sciences for the advancement of science in developing countries (UNESCO-TWAS), South Africa
	<b>Prof. Carlos Gilberto Carlotti Jr</b> Rector of Universidade de São Paulo, Brazil and Professor Faculty of Medicine, Neurosurgery
	<b>Georg Schütte</b> Secretary General of Volkswagen Foundation, Germany
	<b>Francesca Cesari</b> Chief Editor with Journal Nature (Biological, Clinical and Social Sciences), United Kingdom
	<b>Prof. Willie E. May</b> Vice President for Research and Economic Development & Professor of Chemistry. Morgan State University and President, American Association for the Advancement of Science (AAAS)
19.00-19.30	<b>Open discussion of panellists with participants</b>
19.30	<b>SESSION X – Commemorations and Self-Introductions of PAS Academicians</b> <i>Co-Chairs: President Joachim von Braun and Chancellor Cardinal Peter K.A. Turkson</i>
19.30-19.45	<b>Commemorations of Academicians that passed since Plenary 2022 [Speakers in (...)]</b> <b>Ignacio Rodríguez-Iturbe</b> (Edward de Robertis, PAS) <b>Yuri Ivanovich Manin</b> (Daya Reddy, PAS) <b>Paul Berg</b> (Eric Lander, PAS) <b>Albert Eschenmoser</b> (Rafael Radi, PAS) <b>Hans Tuppy</b> (Stefano Piccolo, PAS) <b>Sergey Petrovich Novikov</b> (Mohamed Hassan, PAS) <b>Maxine F. Singer</b> (CJ Chen, PAS)
19.45-20.00	<b>Self-introductions of new Academicians</b> <b>Örjan Gustafsson</b> Stockholm University, Sweden <b>Demis Hassabis</b> Google DeepMind, UK <b>Mauro Mantovani</b> Vatican Apostolic Library, Vatican City <b>Masashi Mizokami</b> National Center for Global Health and Medicine, Japan <b>Tebello Nyokong</b> Rhodes University, South Africa <b>Didier P. Queloz</b> ETH Zurich, Switzerland <b>Rafael Radi</b> Universidad de la República, Montevideo, Uruguay <b>Daya Reddy</b> University of Cape Town, South Africa <b>Rocco Ronzani</b> Pontifical Archive, The Vatican City
20.00-21.30	<b>Dinner at Casina Pio IV</b>

# List of Conference Participants

**Prof. Joachim von Braun**

President  
The Pontifical Academy of Sciences,  
Bonn University, Germany

**Cardinal Peter K.A. Turkson**

Chancellor  
The Pontifical Academy of Sciences,  
Vatican City

**Prof. Teklu Zeresenay Alemseged** ■ PAS Academician

Professor at University of Chicago  
University of Chicago, USA

**Dr. Rolf Apweiler**

Joint Director of European Molecular Biology Laboratory  
(EMBL) European Bioinformatics Institute (EBI), UK

**Prof. Frances Arnold** ■ PAS Academician

California Institute of Technology  
USA

**Prof. Ana Asenjo-Garcia**

Associate Professor of Physics  
Columbia University

**Prof. Vanderlei S. Bagnato** ■ PAS Academician

University of Sao Paulo and Texas A&M University  
Brazil /USA

**Sir David Baulcome** ■ PAS Academician

Regius Professor of Botany Emeritus  
Cambridge University  
UK

**Prof. Immanuel Bloch**

Scientific Director  
Max Planck Institute of Quantum Optics  
Germany

**Prof. Carlos Gilberto Carlotti Junior**

Rector  
Universidade de São Paulo  
Brasil

**Dr. Francesca Cesari**

Chief Editor, Nature, Biological, Clinical and  
Social Sciences, United Kingdom

**Prof. Chien-Jen Chen**

PAS Academician, Distinguished Research Fellow  
Academia Sinica  
Taiwan

**Brother Guy Consolmagno S.J.** ■ PAS Academician PM

Director, Vatican Observatory  
Vatican City

**Prof. Edward De Robertis** ■ PAS Academician and Council Member

UCLA, USA

**Prof. Virginia Dignum**

Professor and Director of the AI Policy Lab  
AI Policy Lab - Umeå University  
Sweden

**Prof. Ewine van Dishoeck** ■ PAS Academician

Leiden University  
The Netherlands

**Prof. Francesca Ferlaino**

Professor and Institute Scientific Director  
University of Innsbruck and Austrian Academy of Sciences- IQOQI  
Austria

**Prof. Takashi Gojobori** ■ PAS Academician

Distinguished Professor  
King Abdullah University of Science and Technology  
Japan

**Dr. David Grinspoon**

Senior Scientist for Astrobiology Strategy  
NASA  
USA

**Prof. Örjan Gustafsson** ■ PAS Academician

Stockholm University  
Sweden

**Sir Demis Hassabis** ■ PAS Academician

Co-Founder & CEO, Google DeepMind  
UK

**Prof. Mohamed Hassan** ■ PAS Academician and Council Member

Sudan

**Prof. Zeljko Ivezic**

University of Washington  
USA

**Prof. Quarraisha Abdool Karim**

President, The World Academy of Sciences  
The World Academy of Sciences (TWAS)  
South Africa

**Prof. Dr. Jürgen Knoblich** ■ PAS Academician

IMBA – Institute for Molecular Biotechnology  
of the Austrian Academy of Sciences  
Austria

**Dr. Eric S. Lander** ■ PAS Academician

Broad Institute of MIT and Harvard  
USA

**Prof. Luis F. Larrondo C.**

Full Professor, Fac. Biological Sciences, Pontificia  
Universidad Católica de Chile  
Chile

**Prof. James C. Liao**

President of Academia Sinica, Taiwan, Distinguished Professor  
Emeritus of the Department of Chemical and Biomolecular  
Engineering at the University of California, Los Angeles.  
Taiwan

**The Hon. Jane A. Lubchenko, PhD** ■ PAS Academician

Deputy Director for Climate and Environment  
White House Office of Science and Technology Policy,  
and Professor at Oregon State University  
USA

**Prof. Nikku Madhusudhan**

University of Cambridge  
UK

**Rev. Prof. Mauro Mantovani** ■ PAS Academician PM

Prefect, Vatican Apostolic Library  
Vatican City

**Prof. Willie E. May**

Vice President for Research and Economic Development  
President, American Association for the Advancement of Science, USA

**Prof. Francine McCarthy**

Professor, Earth Sciences  
Brock University, Canada

**Prof. Masashi Mizokami** ■ PAS Academician

Project leader  
National Center for Global Health and Medicine, Japan

**Prof. Rudolf Muradyan** ■ PAS Academician

Armenian National Academy of Sciences  
Armenia

**Prof. Cristiane Morais Smith**

Full Professor, Chair Condensed-Matter Physics  
Utrecht University, ITP  
The Netherlands

**Prof. Tebello Nyokong** ■ PAS Academician

Distinguished Professor  
Rhodes University  
South Africa

**Prof. Jose Onuchic** ■ PAS Academician

Professor, CTBP – Rice University  
USA

**Prof. William Phillips** ■ PAS Academician

Katharine Blodgett Gebbie Fellow  
National Institute of Standards and Technology  
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**Prof. Stefano Piccolo** ■ PAS Academician

Università degli Studi di Padova  
Italy

**Prof. Ulrich Pöschl**

Director Max Planck Institute of Chemistry  
Germany

**Prof. Didier Queloz** ■ PAS Academician

Professor ETH Zurich  
Switzerland

**Prof. Rafael Radi** ■ PAS Academician

Professor and Chairman, Departamento de Bioquímica,  
Facultad de Medicina and Director of Centro de  
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**Rev. Prof. Rocco Ronzani, OSA** ■ PAS Academician PM

Prefect of the Pontifical Archive  
The Vatican City

**Dr. Subarna Roy**

Director  
ICMR-National Institute of Traditional Medicine, Belagavi, India

**Prof. Carlo Rubbia** ■ PAS Academician

CERN, Italy

**Prof. Hans Joachim Schellnhuber** ■ PAS Academician

Director General IIASA  
Austria

**Prof. Bernhard Schölkopf**

Director at Max Planck Institute for Intelligent Systems &  
ELLIS Institute Tübingen and Professor, ETH Zürich

**Dr. Georg Bernard Schütte**

General Secretary  
Volkswagen Foundation  
Germany

**Prof. Donna Strickland** ■ PAS Academician

Professor, University of Waterloo  
Canada

**Prof. Octaviana Valenzuela Trujillo**

Professor Emerita, Northern Arizona University;  
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**Prof. Maria T. Zuber**

Presidential Advisor for Science and Technology Policy and E. A.  
Griswold Professor of Geophysics at MIT; Co-chair of President  
Biden's Council of Advisors on Science and Technology  
USA

# Accompanying Persons

**Dr. Silvia Bagnato**

Accompanying Prof. Vanderlei Bagnato  
Brazil /USA

**Dr. Silvina Bartesaghi**

Accompanying Prof. Rafael Radi.  
Associate Professor, Facultad de Medicina, Universidad de la República  
Uruguay

**Dr. Barbara von Braun**

Accompanying Prof. Joachim von Braun  
Germany

**Ana Paula Carlotti**

Accompanying Prof. Carlos Gilberto Carlotti Junior  
Brasil

**Mr. Thomas Casciato**

Accompanying Dr. Francine McCarthy  
United States

**Ms. Gail Cobus**

Accompanying Prof. Tebello Nyokong  
Administrator and Personal Assistant.  
Rhodes University  
South Africa

**Mrs. Ana De Robertis**

Accompanying Prof. De Robertis.  
Los Angeles, California  
USA

**Dr. Douglas Dykaar**

Accompanying Dr. Donna Strickland  
Canada

**Jennifer Goldsmith-Grinspoon**

FEMA  
Accompanying Prof. David Grinspoon  
NASA, USA

**Mrs. Maria Gustafsson**

Accompanying Prof. Gustafsson  
Sweden

**Ms. Kathleen A. Hughes**

Accompanying Dr. Francine McCarthy  
United States

**Prof. Franciscus Kempen**

Accompanying Prof. Cristiane Morais Smith  
The Netherlands

**Mr. Jerry Kupfer**

Accompanying Dr. Francine McCarthy  
United States

**Mrs. Lori Lander**

Accompanying Prof. Eric S. Lander  
USA

**Ms Mayibongwe Desiree Mashazi**

Rhodes University  
South Africa

**Prof. Philani Mashazi**

Associate Professor of Inorganic-Analytical Chemistry, Rhodes University  
South Africa

**Dr. Jeannie May**

Accompanying Prof. Willie E. May  
USA

**Ms. Angela Wilson Meela**

Accompanying Dr. Francine McCarthy  
United States

**Mr. John (Jack) Mizerak**

Accompanying Prof. Maria T. Zuber  
USA

**Ms. Patt Morrison**

Accompanying Dr. Frances Arnold  
USA

**Mrs. Diana Muradyan**

Accompanying Prof. Muradyan  
Armenia

**Teresa Niccoli**

Accompanying Sir Demis Hassabis  
UK

**Mrs. Mayra Onuchic**

Accompanying Prof. Onuchic  
Rice University  
USA

**Ms Tina Queloz**

Accompanying Prof. Didier Queloz  
Switzerland

**Mrs. Shaada Reddy**

Accompanying Prof. Daya Reddy  
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**Ms. Gini Reticker**

Accompanying Dr. Francine McCarthy  
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**Dr. Giacomo Roati**

Accompanying Prof. Vanderlei Bagnato  
CNR-INO & LENS,  
University of Florence - Italy

**Dr. Delia Salmieri Rubbia**

CERN, accompanying Prof. Rubbia  
Italy

**Dr. David Spiegel**

Stanford University  
Accompanying Prof. Blau  
USA

**Selam Teklu**

Accompanying Zeresenay Alemseged Teklu  
USA

**Prof. Dr. Denise Maria Zezell**

Accompanying Prof. Vanderlei Bagnato  
Center for Lasers and Applications  
Nuclear and Energy Research Institute IPEN - CNEN  
São Paulo - Brazil

## General information

- › Dress code is business attire.
- › Accompanying persons are invited to the events on Sept. 23rd including the Papal Audience, and to the conference if meeting room space allows and to share the meals.
- › Please remember to bring a valid ID.
- › In case of any problems, please call the Academy on +39 0669883195 or +39 0669881441.
- › On travel days, the mobile phone number +393420026216 will be available.
- › Please refer to [www.pas.va](http://www.pas.va) for further information on the Academy, the Academicians, and current and past events.

## Access instructions to the Vatican and the Casina Pio IV

- › Your name is already communicated to the Vatican Security. The person at the gate will check your Identity and let you in. If you are willing to bring someone in, kindly let us know, and we shall add their name.
- › You can come through the closest entrance called Perugino (Via della Stazione Vaticana, no number, it's a very short street). Instructions to the Casina Pio IV, headquarters of the Pontifical Academy of Sciences, can be found in the following link: <http://www.casinapioiv.va/content/accademia/en/about/contacts.html>
- › For all eventualities the telephone numbers of the Academy are the following: 06 69883195 or 06 69883451. A Mobile number is also available +39 3420026216

- › **IMPORTANT: Please check your PPT presentation with the conference technicians before your talk.**
- › Papal Audience photos will be published here: <https://photo.vaticanmedia.va/en/10366-09Settembre.html> and can be ordered by writing to **ordini.photo@spc.va**

## WI-FI

**WI-FI network:** academy-guest

**Password:** will be available in the Casina PIO IV

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