

Mathematics and Hope, levers of Innovation at the π day in 2026

At the proposal and initiative of the International Mathematical Union (IMU), the UNESCO General Conference, at its 16th plenary meeting on 25 November 2019, proclaimed March 14th of each year as the International Mathematics Day, also called the π day.

Among the considerations underlying this decision is the recognition that “global awareness of, and enhanced education in, mathematical sciences are vital to addressing challenges in areas such as artificial intelligence, climate change, energy and sustainable development, and to improving the quality of life in both the developed and the developing worlds” and that “the applications of mathematical sciences are vital for advances in all types of engineering and computer science, while responding to the growing needs of automation and providing access to information via the Internet (the World Wide Web) for the wellbeing of society”.

Last year, for the first time, the Academy of Sciences of Lisbon celebrated the π day, dedicated to Mathematics and Creativity, with a conference promoted by the its Young Scientists Seminar and the presentation of the awards of the Competition on the five missing *Symmetries of Lisbon's Calçada* to the laureate students in grades 9 to 12. In 2025, the Academy also established collaboration agreements with the *Centro Internacional de Matemática* and with the University of Porto. So, this year, it was natural to organise with these two institutions the π day to celebrate this challenging association between Mathematics and Hope as essential levers of Innovation.

We know that Mathematics, as the science of numbers, patterns and proofs, is the essential foundation for the progress of knowledge and innovation. We see today how many modern technologies and innovations were generated from mathematical ideas that once seemed purely theoretical and even useless. Number theory, once viewed as a pure intellectual conundrum, now secures global communication through cryptography. Linear algebra is the engine of machine learning and artificial intelligence. Optimisation theory propels logistics networks, energy systems, modern engineering and economics.

Mathematics offers not only the technical solutions and the formal approaches for the engineering and economic problems but also provides the foundations for evidence-based decisions and policies. Mathematics does not only describe the world, it is also a foundation for creativity, discovery, and progress to help create the future.

Hope, as a proactive state of mind, combines a desire for a beneficial outcome with the belief that it is possible, even when it is not certain. It is not just an emotion or wishful thinking; it is an active *raison d'être* that drives people to plan and work toward a better future, often acting as a key to resilience and perseverance during adverse times.

Mathematicians work on a model or in a proof for months or years because they believe that the structure of truth is there to be discovered and to solve the problem. Innovators build new prototypes and iterate new designs because they believe that a better solution is within reach. For mathematicians and innovators, hope is the confidence that complex problems, through careful reasoning and creative thinking, can eventually have solutions.

Mathematicians work on the language and the tools to understand complexity. Innovators provide the courage and the skills to apply that understanding in new ways and daring initiatives. The collaboration between mathematicians and innovators has never been more important.

We hope that new mathematical ideas will produce breakthroughs in science and technology.

We hope that creative innovation will transform abstract ideas into practical and successful development.

We hope that future generations will inherit tools and knowledge to solve problems we cannot yet solve today.

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