# Between mathematics and computer science: Stéphane Mallat is awarded the 2025 CNRS Gold Medal

- Created in 1954, the CNRS Gold Medal rewards scientific careers that have made exceptional contributions to the dynamism and influence of French research.

- This year it was awarded to Stéphane Mallat, recognised the world over for his research on mathematics applied to signal processing and artificial intelligence.

- His discoveries on the geometry of data have been crucial to modelling and understanding the properties of massive multidimensional data.

**The CNRS Gold Medal, one of the most prestigious French scientific distinctions, has been awarded this year to Stéphane Mallat. Globally recognised for his research on wavelets – a method that can store data using little memory and analyse it efficiently [1] – he has become a leading actor in artificial intelligence. A Professor at the Collège de France and member of the ENS Computer Science Department, he has developed research on neural networks, deep learning, and generative AI. His pioneering research has had a considerable and lasting influence in the scientific fields of mathematics and computer science, also leading to developments in physics and chemistry. He will be awarded the CNRS Gold Medal, along with an endowment of 50,000 euros from the CNRS Foundation, during a ceremony to be held on 17 December 2025 in Paris.**

Mallat, who founded the Data Science Chair at the Collège de France, is known in particular for building a continuum between mathematics, applied mathematics, and computer science. He has combined scientific rigour, technological impact, and interdisciplinary vision throughout his career: his research has had a major and lasting influence, and his contributions have formalised foundational concepts, all while opening new fields of research quickly explored by a large scientific community.

The CNRS Chairman & CEO Antoine Petit praised the winner's achievements: "*From wavelet theory to generative AI, Stéphane Mallat's innovative research has profoundly transformed signal and image processing, in addition to modern AI. In awarding him the 2025 Gold Medal, the CNRS recognises his exceptional career at the intersection of mathematics and computer science, that of a visionary scientist of international renown. This distinction is a reminder that all of today's developments in artificial intelligence stem from basic research. It highlights the young discipline of data science, which relies on algorithms, and is based on the French tradition of mathematical excellence.*

Mallat's career path at the intersection of mathematics and computer science is exemplary: setting out from truly disruptive theoretical research, he developed its application up through industrial transfer, notably filing 10 international patents. For many years, Mallat has been fascinated by the concrete applications of his work, and has always maintained active dialogue with the world of innovation, founding in 2001 the Let It Wave start-up, which he led until 2007. The company transforms his major theoretical advances into industrial technologies, such as the development of super-resolution chips for high-definition video. His career, marked by transitions from academic research and entrepreneurship, illustrates his commitment to linking basic science and technological impact.

Born in 1962 in Suresnes, Mallat first studied at École Polytechnique in 1981, before completing a PhD at the University of Pennsylvania in the United States in 1988. He defended his authorisation to supervise research thesis in mathematics at the Université Paris-Dauphine in 1992, before becoming Professor of Mathematics and Computer Science at New York University's Courant Institute from 1995-1998. Having spent years in the United States, Mallat returned to France, where he headed the Applied Mathematics Department at Polytechnique from 1998 to 2001. He served there as a professor until 2012, before joining the Computer Science Department of the École Normale Supérieure. He was subsequently named Professor at the Collège de France in 2017, where he holds the Data Science Chair.

Mallat now works on the mathematical modelling of neural networks, with a view to explaining the foundations of artificial intelligence. He is also a member of the French Academy of Science, the French Academy of Technologies, and the National Academy of Engineering in the United States. An outstanding teacher, Mallat has trained multiple generations of students in engineering schools and universities in both France and abroad, and has supervised over 20 doctoral theses.

Mallat is highly committed to the transmission and sharing of knowledge at the interface between artificial intelligence, mathematics, and computer science. He has initiated multiple structuring projects, including Challenge Data, an online platform offering competitions in data processing for students and scientists [2]. At the same time, he launched MathADada, an initiative targeting secondary school students to motivate and teach them mathematics via concrete data analysis problems in artificial intelligence.

Mallat has been recognised throughout his career by numerous remarkable awards, including the EADS Grand Prize from the French Academy of Science in 1997, the 2004 CNRS prize for the most widely-cited French researcher in engineering science, and the Milner Award from the Royal Society in 2023. The winner of the 2013 CNRS Innovation Medal [3], he was made an Officer of the Legion of Honour in 2024, in which year he also won the Sustained Impact Award over 20 years from the Institute of Electrical and Electronics Engineers (IEEE).

Stéphane Mallat, winner of the 2025 CNRS Gold Medal.
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Photos of the winner are available on the CNRS Images platform, along with his portrait in CNRS News.

## Notes:

1- The scientist endeavours to represent big data by combining the minimum number of elementary structures, known as wavelets. This serves in particular as a highly effective technique for image compression.

2- Since 2021, as part of his Chair at the Collège de France, Stéphane Mallat has developed this initiative into a unique platform in which challenges are proposed by public organisations, companies, and research laboratories based on concrete issues in climate science, biology, etc.

3- **More information is available here.**

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