

Jacob Ziv wins the BBVA Foundation Frontiers of Knowledge Award in Information and Communication Technologies

- His work has revolutionized the world of information and communication science, and played a large role in enabling file systems like MP3, JPG or PDF, pervasive in the daily lives of personal computer users
- Computer memories or modems are among the other technologies based on the ideas of this Israeli engineering professor
- On receiving the news, Jacob Ziv declared: *“I am especially delighted that, in the midst of a world economic crisis, the foundation of a financial institution like BBVA has chosen to uphold the importance of the scientific spirit”*.

January 29, 2009.- The Information and Communication Technologies Award in this inaugural edition of the BBVA Foundation Frontiers of Knowledge Awards has gone to Israeli engineering professor Jacob Ziv. Born in Tiberias (now Israel) in 1931, Ziv is one of the *fathers* of discoveries enabling such vital applications as the compression of the data, text, image and video files used in all personal computers.

The BBVA Foundation Frontiers of Knowledge Awards seek to recognize and encourage world-class research at international level, and can be considered second only to the Nobel Prize in their monetary amount, an annual 3.2 million euros, and the breadth of the scientific and artistic areas covered.

The awards, organized in partnership with Spain’s National Research Council (CSIC), take in eight categories carrying a cash prize of 400,000 euros each. The Information and Communication Technologies award, the fifth to be decided, is to honor outstanding research work and practical breakthroughs in this area.

Files that get smaller and smaller

Jacob Ziv’s work has enabled the compression of all kinds of information, so it occupies less space and can be transmitted at ever greater speeds. Ziv developed an algorithm (a set of instructions for accomplishing a given task), known as *LZ*, with the power to identify the most frequent redundancies in the language. Hence, for instance, the algorithm could convert a three-letter word like “and”, occurring

in every text, into a single unit, saving storage space without any loss of meaningful information.

This principle is what has enabled the creation of hugely popular compression standards such as *mp3* (for sound), *gif* or *png* (image) or *pdf* (text). Also, Ziv's ideas have been instrumental in improving the capacity of hard drives and optimizing fax retransmission.

Aside from this algorithm, Ziv has authored numerous works of Information Theory addressing aspects of “lossy” compression. These have proved of major influence in video compression as well as finding applications in DVD and high-definition television technologies.

Championing the scientific spirit

On receiving the news, Jacob Ziv declared himself “deeply honored” by the award. “I am especially delighted” he went on “that, in the midst of a world economic crisis, the foundation of a financial institution like BBVA has opted to uphold the importance of the scientific spirit.”

Jacob Ziv considers himself “fortunate” to form part of a “relatively new branch of science, Information Theory, which has laid the foundations for modern communication technologies”.

Inventions for day-to-day living

The jury deciding the BBVA Foundation Frontiers of Knowledge Awards in the Information and Communication Technologies category cited the following merits in its award certificate: “Jacob Ziv's ground-breaking innovations in data compression have had a deep and lasting impact on both the theory and practice of communications and information technology”.

It also reserved mention for the applied side of his activities: “Ubiquitous in everyday life, Ziv's contributions enable efficient storage and transmission of text, data, images, and video. Computer memories, modems, software distribution, and file compression techniques all rely on Ziv's ideas and inventions. His seminal contributions to information theory have inspired generations of researchers and practitioners alike”.

“This award” – the jury continues – “recognizes the fundamental role of his work in creating technologies that widely and deeply impact the information age”.

Chairing the jury was **Andrea Goldsmith**, Professor of Electrical Engineering at Stanford University and president of the Information Theory Society of the IEEE (Institute of Electrical and Electronics Engineers), which has about 3000 members

worldwide. Other members were **Ronald Ho**, a Distinguished Engineer with the VLSI Research Group of IT company Sun Microsystems; **Oussama Khatib**, a leading specialist in robotics working at the Artificial intelligence Laboratory of Stanford University; **Nico De Rooij**, Head of Laboratory in the Institute of Microtechnology, University of Neuchâtel (Switzerland); and Spaniards **Ramón López de Mántaras**, director of the Artificial Intelligence Research Unit (CSIC) and **Sergio Verdú**, Professor of Electronic Engineering at Princeton University (United States).

The Information and Communication Technologies award is the fifth to be decided in this first edition of the BBVA Foundation Frontiers of Knowledge Awards. It follows on from the awards in Climate Change (granted to U.S. scientist **Wallace S. Broecker**, who predicted climate warming due to human activity more than three decades ago); Development Cooperation (**Abdul Latif Jameel Poverty Action Lab** at the Massachusetts Institute of Technology (MIT)); Biomedicine (cancer researcher **Joan Massagué**, Spain's most internationally cited working scientist); and the Arts (U.S. architect **Steven Holl**).

The BBVA Foundation supports knowledge generation, scientific research and the promotion of culture, relaying the results of its work to society at large. This effort materializes in research projects, human capital investment, specialization courses, grants and awards. Among the Foundation's preferred areas of activity are basic sciences, biomedicine, ecology and conservation biology, the social sciences and literary and musical creation.

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