

## VLADIMIR K. ZWORYKIN

### The Founder-President of the IFMBE

#### Sketches for a Biography

*"I hate what they've done to my child...I would never let my own children watch it."*

Vladimir Kozma Zworykin (1889 – 1982), the first President of the IFMBE, is best known to the public through his invention of the cathode-ray tube, at that time called the kinescope, in 1929. Zworykin was one of the first to demonstrate a television system with all the features of modern television tubes. In 1923 he also invented the iconoscope, a tube used in the first television cameras. In the 1930's Zworykin experimented with infrared rays in order to develop devices that could "see" in darkness and in the night. Another application of television technology resulted in the invention of the electronic microscope in 1940 by a team at the RCA Laboratory in Camden, New Jersey, which was led by Vladimir Zworykin. In 1954, he was appointed director of the Medical Electronics Center at Rockefeller University and concentrated his research and development efforts on medical electronic circuits and devices. He was aware of the potential and importance of Biomedical Engineering (at that time more often referred to as Medical Electronics) and therefore worked out a platform for joint operations of scientists and professionals, an international organization in this new science. When the organization was finally founded in Paris in 1959, he became the first and the Founder-President of the International Federation for Medical Electronics and Biological



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Engineering, today the IFMBE. In his honor, the IFMBE established the Vladimir Zworykin Award in 2000. The first awardee was Prof. P. Åke Öberg who received the award in 2003 in Sydney at the World Congress in Medical Physics and Biomedical Engineering.

Vladimir Zworykin was born in Murom, 200 miles east of Moscow, Russia. He studied Electrical Engineering at the Imperial Institute of Technology in St. Petersburg. His tutor was Boris Rosing, a professor in charge of laboratory projects, who introduced him to experiments of transmitting pictures by wire. They made experiments with a primitive cathode-ray tube that was developed in Germany by Karl Ferdinand Braun. In 1910, they demonstrated a television system using a mechanical scanner in the transmitter and the electronic Braun tube in the receiver. After graduation in 1912 Zworykin received a scholarship and went to study X-rays at the College de France in Paris in the laboratory of a French theoretical physicist Paul Langevin, who was nominated for the Nobel Prize 25 times between 1910 to 1946. After the Russian Revolution, Zworykin emigrated to the United States in 1919, where he first worked at the Westinghouse laboratory in Pittsburgh on the development of radio tubes and photocells. In that

period he defended his thesis on photoelectric cells and earned his Ph.D. in Physics at the University of Pittsburgh, Pennsylvania. But his main attention was devoted to the development of television and he patented the iconoscope in 1923 – the first of 120 patents. A little bit later he patented the kinescope, too. In 1929 he was appointed the new director of the Electronic Research Laboratory for the Radio Corporation of America (RCA) in Camden, New Jersey. In the same year, at a convention of radio engineers, Zworykin demonstrated the newly developed television receiver with the kinescope and applied for the first patent in color television.

Vladimir Zworykin is worldwide known as "the father of television" since his fundamental inventions and improvements are the basic technologies of modern, electronic television.

In the early 1930's, Zworykin started working on projects in sensorics, extending the human limits of sensing. It was recorded that he always wanted to "see what you normally cannot see". That research aroused his interest in applications of electronics in medicine. Together with G.A. Morton, he experimented with infrared rays and infrared image tubes in order to develop night-seeing devices. This research enabled the development of first text readers and was used in electric eyes for security systems and garage door openers. Some of the results were also applied to electronically controlled missiles and vehicles. During World War II, he was an advisor of the allies' defense organizations. The other touch with medicine was the application of TV technology to microscopy and improvements in electron multipliers that resulted in development of the electron microscope.

In 1954 he retired from RCA but due to his achievements while working in the company, Zworykin was named their honorary vice president. He was also appointed director of the Medical Electronics Center at Rockefeller University, New York City, where he worked on electronically based medical applications. One of the well known inventions from that period is the radio endosonde, a pill-like transmitter of measurement data from the intestines in 1957. He also developed the ultraviolet color-translating television microscope in 1957. One of the projects he was working on was a telemetric system which transmitted signals from the moving body surface. That system was one of the first applications of transistors in biomedical measurements and though there are no records of a great success of the project, the engineers learned from the difficulties of early transistor applications in instrumentation, particularly medical instrumentation. He was experimenting with electroacupuncture too. One of the conclusions was that the cells under the influence of the electric field are changing their permeability. In the 1970's he acted as researcher at Princeton University and as a visiting professor at the Institute for

Molecular and Cellular Evolution, University of Miami, from 1970 until his death in 1982.

In addition to the office of the first President of the IFMBE, he was the National Chair of the Professional Group on Medical Electronics, Institute of Radio Engineers, and the Governor of the International Institute for Medical Electronics and Biological Engineering, Paris.

Most of the numerous awards and honors Zworykin received in his life were related to his most popular inventions i.e. to television. From a very long list, we name only a few:

Institute of Radio Engineers' Morris Liebmann Memorial prize in 1934;  
American Institute of Electrical Engineers' highest honor in 1952, the Edison Medal;  
University of Liege Medical Electronics Medal, 1963;  
National Academy of Sciences' National Medal of Science in 1967, for his contributions to the instruments of science, engineering, and television and for his stimulation of the application of engineering to medicine.  
He was also named to the National Inventor's Hall of Fame in 1977.

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