Professor Yakov S. Shifrin from Kharkiv, Ukraine, was selected by the IEEE AES Society to receive the 2015 Pioneer Award (Figure 1). The citation reads “For fundamental contributions to modern radio physics and statistical antenna theory.”

The awards celebration was held at the International Conference on Modern Problems of Radio Engineering, Telecommunications, and Computer Science (TCSET-2016), in Lviv-Slavsko, Ukraine on February 23, 2016. Prof. Shifrin could not attend the conference due to his state of health so the award celebration took place at the conference with his disciple, Dr. Sci. Vladimir Pavlikov, standing in for him (Figure 2). Subsequently, Dr. Sci. Pavlikov personally traveled to Kharkiv and delivered the award Plaque to Prof. Shifrin.

**LIFE AND ACCOMPLISHMENTS**

TCSET-2016 Chairman, Prof. Ivan Prudyus, at a special plenary session, presented to the Conference participants the main stages of life and scientific achievements of the awardee. Dr. Viktor Hoblyk and Dr. Sci V. Pavlikov shared their memories related to the high human principles and morality of Prof. Yakov S. Shifrin.

Prof. Shifrin was born on April 23, 1920 in the Belarusian town of Mstislavl. In 1926, the family moved to Leningrad (now known as Saint Petersburg). After graduation from school, he entered the Physics Faculty of the Leningrad State University and graduated in June 1941, just before the beginning of the Great Patriotic War (GPW).

During the first days of the GPW, Yakov joined the Leningrad people's militia army and then was selected to study at the S. M. Budyonny Military Red Banner Academy of Telecommunications (VKAS). In 1943, he participated in the battles for liberation of Ukraine at the 3rd Ukrainian Front.

In 1944, after graduating with honors from the Radio faculty VKAS, including courses on radar, he was assigned as a commander of one of the new gun guidance station batteries. This battery participated in combat operations until the end of the Second World War.
Starting in 1946, Yakov served at the Sevastopol Flak School. In 1948, he joined the Artillery Radio Technical Academy (ARTA) in Kharkiv. From then, until 1980, his life was connected with this Academy. In 1964, Yakov defended his thesis for the Dr. Sci. degree, which was focused on the statistical antenna theory. He received the academic title of Professor in antennas and propagation in 1966.

After his discharge from the Armed Forces in 1980, he worked with the Kharkiv National University of radio Electronics (KNURE).

**STATISTICAL ANTENNA THEORY (SAT)**

Prof. Shifrin has made fundamental contributions to a number of areas of modern radio physics. He is a founder of a new scientific direction – Statistical Antenna Theory (SAT). This theory is defined as the theory of antennas with random sources. For the first time, investigating fully the properties and potentials of real antenna that are (in essence) radiating systems with random sources was permitted. Of special importance is the application of SAT to the analysis and assessment of possibilities of large reflector antennas (RA) and phased antenna arrays (PAA). First, because of the increased antenna sizes and complication of their design and the randomness in antennas caused by internal and external factors, there are noticeable increases in the deterioration of antenna characteristics. Second, large RA and PAA are expensive and their cost could be as high as 50 to 90 percent of total cost of the radio technical systems. It is very important, therefore, to be aware of the reasons and character of randomness in them and their influence on antenna parameters, and to know how to decrease this influence. Namely, the solution of those issues constitutes the essence of SAT.

Professor Shifrin's investigations in the field of SAT covers almost 55 years. His research started in the late fifties – early sixties. His monograph, *Issues of Statistical Antenna Theory* (1970), gives a deep and systematic exposition of the foundation of SAT. In 1971, his book was translated and published in the United States and became, therefore, known around the world.

After 1970, a series of investigations by Prof. Shifrin and his disciples was accomplished directed at developing the general fundamentals of SAT. Concurrently, significant attention was paid to applications of this theory in practice. During that period, several dozen research efforts were accomplished at the request of various scientific-research institutions, aimed at finding the influence of randomness on characteristics of radio technical systems they were developing.

In general, one has every reason to attribute Shifrin's SAT investigations as the cornerstones of general antenna theory and practice. As experience has shown, designing large expensive antennas is unthinkable without using the latest knowledge of SAT, its approaches, and results.

**LONG DISTANCE TROPOSPHERIC RADIO WAVE PROPAGATION (LDTP)**

The second direction of the fundamental research of Prof. Shifrin and his disciples was concerned about the effects of the long distance tropospheric radio wave propagation (LDTP). These long-term investigations (1956-1962) had been accomplished for 40 different path lengths and at 3 cm, 10 cm, and 1.5 m-wavebands, during different seasons of the year. The high-quality RLSs of a country antiaircraft system were used in this research that covered a wide range of issues related to the LDTP.
phenomenon. Special attention was paid to researching the characteristics of a receive antenna that functioned in the random LDTP field. The SAT concepts were widely used to interpret correctly the observed effect. The monograph Experimental Investigations of Long-Distance Tropospheric Ultra-Short Wave Propagation (1964) summarized the results of this research and appeared to be the first monograph in the world to address this problem.

**THEORY OF ANTENNAS WITH NONLINEAR ELEMENTS (ANE)**

The third directions of Prof. Shifrin's pioneering research and that of his disciples was the development of the theory of Antennas with Nonlinear Elements (ANE). Creation of this theory was necessitated by the introduction of different ANE types into the practice of radio engineering. One important result of his work was a detailed elaboration of the theory and practice of building antenna systems. The key results of the investigations are published in the Handbook on antenna engineering (1997).

**PHASED ANTENNA ARRAYS (PAA)**

The fourth directions of Shifrin and his disciples' research focused on phased antenna arrays (PAA). Two new efficient methods for phase-less PAA diagnostics were proposed. Of practical importance is the experimental method they developed for finding a matrix of PAA radiators' reciprocal influence. By knowing this matrix, it is possible even at the stage of developing the PAA, to foresee the algorithmic compensation of effects of radiators' interaction, which will result in allowing the widening of the scanning sector for PAAs.

**CONTRIBUTIONS TO EDUCATION**

For over 50 years, Prof. Shifrin has been a lecturer at ARTA and KNURE and for 30 years, he has been the Head Chair at these institutions. Prof Shifrin is an author or co-author of over 370 scientific publications including 16 monographs. Under his supervision, about 25 of these for Dr. SCI degree and about 50 theses for PhD were defended. He deserves high recognition for his scientific and organizational activities and the help he rendered to a number of higher schools of post-USSR countries. He is an Honored Professor of 5 Universities of the Ukraine and Russia.

After the collapse of the USSR, he organized the Ukrainian antenna workshop in 1991 and the Ukrainian National antenna association in 1993 with the aim of uniting Ukrainian antenna specialists. By facilitating the creation of the IEEE East-Ukrainian Chapter in 1995 and the Kharkiv IEEE Chapter in 2000, he aided the integration of Ukrainian scientists into a single unit. Prof. Shifrin chaired the East Ukrainian Chapter for several years and he was the driving force behind the establishment of the Kharkiv Chapter.

Especially noteworthy is Prof. Shifrin's organization of the international antenna conferences ICATT in the Ukraine. So far, 10 conferences have been held.

The international scientific community recognizes the scientific and organizational merits of Prof. Shifrin. In 2014, the European Microwave Association conferred him the “EuMA 2014 Outstanding Carrier Award”. This, such an award was granted, for the first time, to a scientist of the former USSR.

Y. S. Shifrin's service to Motherland and science was marked by 23 orders and medals; the A.D. Popov Prize AS USSR (1983); and the title of Honorary Worker of Science and Technology of Ukraine (1991).