Professor Leszek Filipczyński

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Scientific biography is an accumulation of facts and titles, often so numerous, and so swiftly each other that it is not easy to understand, how a single individual might be able to initiate and perform so much work. Scientific profile should contain more than such a biography: apart from listing the achievements, titles, and awards, it should reflect individual features of a man, and first of all his virtues which should be regarded as a source of his scientific achievements. In the case of Professor Leszek Filipczyński — full member of the Polish Academy of Sciences — there is such a lot of both scientific and organizational achievements, that it is easy to guess what stands behind them: unusual mind, unusual industry, rare ease to contact people, and an exceptional organizational skills.

Leszek Filipczyński was born 23-th of December 1923 in Łódź. The outbreak of the war forces the 16 years old secondary-school pupil to undertake a manual work; he chose a profession of metalworker. Five years of occupation spent in a mechanical workshop developed certain attitude of the future scientist's mind: a sense of pragmatism and awareness of importance of experiment, which is to verify a theory. This attitude of Prof. Filipczyński is to be detected throughout all his further scientific activity; his every scientific discovery involved a definite application: elaborated research methods were always implemented in practice together with an instrumentation to their practical realization.

After the war, in 1945, L. Filipczyński began his study at a Faculty of Physics of the Łódź University. He continued his studies at the Gdańsk University during the years 1945–1948 (mechanics, electrotechnology), and completed in 1949 at the Warsaw Technical University, obtaining his master's degree in radiotechnical engineering.

He started his work before completing studies as an assistant at the Telecommunication Faculty of the Warsaw Technical University, at the Radiolocation Chair, and afterwards as a research worker at the State Institute of Telecommunication (1948–1949). Then L. Filipczyński became a close collaborator of Prof. Ignacy Malecki — the pioneer of acoustics in Poland. They organized together the Laboratory of Acoustics at the Central Institute of Technical Physics in Warsaw (1950–1951), which was in 1952 transformed into the Department for Vibrations Research, and in 1953 incorporated into the Institute of Fundamental Technological Research of the Polish Academy of Sciences. L. Filipczyński has been linked with this institute ever since till now; he held the positions of a head of the Laboratory of Passive Applications of Ultrasounds (1953–1969), a head of Ultrasonic Department, a deputy director for scientific problems (1969–1994), and a general director of the institute (1969–1974).

Organization of the ultrasonic technology in Poland, first for industry and afterwards, for medicine as well as designing new types of ultrasonic instrumentation, was harmonized with the scientific analysis of the foundations of this technique. The L. Filipczyński's research studies, being original, world-wide unique, and always performed at the highest scientific level, were the ground of his quick scientific career.

In 1955 he obtained a doctor's degree, the title of his thesis being: Electroacoustic transformation and radiation of acoustic waves for the purpose of ultrasonic defectoscopy (Prof. I. Malecki conferred the degree). In 1957 L. Filipczyński was given a title of an associate professor for his research publications on ultrasonic scattering in solids, in 1962 a professor, in 1969 a full professor and a corresponding member of the Polish Academy of Sciences (at the age of 46). Since 1976 professor L. Filipczyński is a full member of the Polish Academy of Sciences, and since 1993 also a member of the New York Academy of Sciences.

Prof. L. Filipczyński is an author, coauthor or editor of 12 monographs, and over 240 original publications and scientific reports, printed in Polish and foreign periodicals (among others: Acustica, Ultrasound in Medicine and Biology, IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, Archives of Acoustics, Journal of Technical Physics) and in Conferences Proceedings. These works concerned the following subjects:

1. Theory and experimental research of piezoelectric and magnetostrictive ultrasonic transducers.
2. Radiation of elastic waves into a solid medium, reflection of waves on inclusions, waves in spiral systems, ultrasonic focussed Gaussian beams.
3. Materials fatigue testing using ultrasonic frequencies.
4. Theoretical and experimental foundations of ultrasonic defectoscopy and determination of the strength of concrete by ultrasonic method.
5. Studies on electroacoustic parameters of ultrasonic transmitting-receiving systems.
6. Absolute methods of measuring of displacements, acoustic velocity and intensity of elastic waves of various types.
7. Visualization of internal organs by means of ultrasounds.
8. Echoencephalographic examination of the brain.
9. Ultrasonography and ultrasonic ophtalmoscopy.
10. Ultrasonography of the heart.
11. Ultrasonic methods of measuring of liquid flows and blood flow.
12. Detectability of pathological structures by means of ultrasonography (e.g. microcalcifications in female breasts, etc.).
13. Thermal effects generated by ultrasonic beams of low and extremely high pressures.
14. Investigation of ultrasonic shadow.
15. Generation and propagation as well as development of metrology of shock waves for lithotripsy (non-invasive disintegration of renal stones).

Beside the works listed above, which have been in line with the basic scientific activity in the field of ultrasonics and its applications. Prof. L. Filipczyński is an author of numerous designs of ultrasonic instrumentation, namely: ultrasonic defectoscopes and concretoscopes, ultrasonic spectroscopes, an unique ultrasonic device for testing fatigue of materials by means of ultrasonic flexural waves, ultrasonograph for visualization of abdominal cavity, ultrasonic ophtalmoscopes for examination of the eye, echoencephalograph for examination of the brain, ultrasonocardiograph for examination of the heart, ultrasonic detector of the pulse of the fetus and the state of the placenta, instrument for disintegration of kidney stones by shock waves lithotripsy.

The mentioned instruments, and also a number od measuring and diagnostic methods (applied in medicine), have been created on the ground of 62 patents of Prof. L. Filipczyński. These instruments, unique throughout Poland and the world, have been manufactured for the home industry and medicine by the enterprises: INCO, RADIOTECHNIKA, TECHPAN, SONOPAN. The users of the instruments were the following: metallurgy, aviation, mining and, first of all, numerous medical institutions, hospitals, clinics, and many others. All home manufacturers which produce ultrasonic diagnostic instrumentation for medicine have their roots in the activity of Prof. L. Filipczyński and his followers.

The initiating and creative contributions of Prof. L. Filipczyński, his scientific and organizational achievements were arwarded many times; he obtained: (twice, in 1966 and 1978) the Collective Second Class State Prize, the Prize of the Chairman of the Committee for Science and Technology (1967, 1968), five times the Prizes of the Scientific Secretary of the Polish Academy of Sciences (1971, 1975, 1977, 1980, 1984), and the PAS department prizes (1977). He was also awarded several high state prizes, among others: the Commander's Cross, the Officer's Cross, the Cavalier's Cross of the Revival od Poland. He was also distinguished by the Nicolaus Copernicus Medal of the Polish Academy of Sciences, by Medal of the Mining and Metallurgy Academy in Cracow, and recently by the Medal of the Naval Forces of the Polish Republic.

The high scientific and organizational dignities achieved, and the necessary duties involved, have not lowered the scientific activity of Prof. L. Filipczyński. On the contrary, his talent and passion for science resulted in a dynamic idea of creating foundations of ultrasonic medical diagnosis. After a few years this difficult task has been completed, and its creator was a member-promotor and a member of the Technical Council of the International Society for Ultrasonic Diagnostics. He was honored during the International Congress for Acoustics in London in 1974 with the task of delivering the plenary lecture on the ultrasonic medical diagnosis.

The outstanding output of Prof. L. Filipczyński, his discovering achievements in application of ultrasonics to medicine have been once more appreciated in 1988, when he obtained in Washington the Diploma of Pioneer of Ultrasonics in Medicine, granted by the American Institute for Ultrasonic in Medicine.

Recognized by the world-wide scientific authorities as a pioneer in this branch, Prof. L. Filipczyński is also considered a „father" of the Polish School of Ultrasonic Medical Diagnosis'.

He promoted 10 doctors, his closest collaborators and continuators of his activity in Poland. A special emphasis should be placed upon the fact that Prof. L. Filipczyński, using his knowledge and authority, pushed forward in home medical environment a notable group of specialists physicians (including 3 professors, 4 associated professors, 10 doctors). Ultrasonic medical diagnosis became to grow as an avalanche; and Prof. L. Filipczyński's merits were also the organization of the First International Conference on Ultrasonics in Medicine and Biology UBIOMED-1 in Jabłonna (1972), continued afterwards in several countries of the Central Europe, co-organization of scientific societies — the Section of Ultrasonics in Biology and Medicine at the Polish Acoustical Society and the Polish Ultrasonographic Society.

Prof. L. Filipczyński is a Polish acoustician particularly estimated abroad. Apart from the above mentioned membership of the International Society for Ultrasonic Diagnosis, he was granted Honorary Medals of the Technical Universities in Prague and the University in Brno twice, a Honorary membership since 1972 of the American Institute for Ultrasonics in Medicine, the Yugoslavian Society for Ultrasonics in Medicine, and the German Society for Ultrasonics in Medicine. He is since 1974 a member of advisory editorial board of the periodical „Ultrasound in Medicine and Biology" (Pergamon Press) and was also a member of the Commission for Standardization of the International Electrotechnics Society. In years 1975–1979 he was a vice-chairman of the European Federation for Ultrasonics in Medicine, and also a member of the International Commission for Acoustics ICA (1974–1980).

He has been always active and full of initiatives, the duties he was performing in Poland might be an evidence of it: a member of the Polish Committee for Acoustics of the Polish Academy of Sciences, and its chairman since 1972, memeber-founder of Polish Acoustical Society, and its vice-chairman in years 1975–1978, acutally its Honorary Member (since 1992), also a Honorary Member of the Polish Ultrasonographic Society (since 1992) a chairman of the Scientific Council of the Institute of Fundamental Technical Problems of the Polish Academy of Sciences in years 1989–1993, a chairman of the Scientific Council of the Institute for Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences since 1982 till now. In former years a member of scientific councils of the Center for Medical Technology and the Tele-radiotechnical Institute.

The obligation of scientist is to bring up his deputies and successors. Prof. L. Filipczyński, since the beginning of the sixties, has been lecturing at the Warsaw Technical University, Department of Electroacoustics of the Faculty of Communication (later Electronics) the following subject: ultrasounds and, later on, at the Department of Fine Mechanics of the Warsaw Technical University, the subject: ultrasounds in medicine. He lectured also at the Doctor's Studies at the Institute of Fundamental Technical Problems of the Polish Academy of Sciences. He looks after the recruitment of talented people to his team, he is also exquisite in scientific co-operation, organizes and conducts seminars, confers and reviews scientific work form the branch of ultra-acoustics at the Institute of Fundamental

Technological Research of the Polish Academy of Sciences, and outside the Institute.

He is a man of high erudition and modesty, theorist and experimentator, exacting and just as a boss, cordial colleague and friend for many ones, respected by everyone who knows him, and respecting others.

Prof. L. Filipczyński beside his virtues, so typical for representatives of exact sciences, is a man of personal charm — he is a humanist, suscepptible to beauty, connoisseur of arts, playing piano with deep feeling...

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J. Etienne and J. Ranachowski

Doctors conferred by Prof. L. Filipczyński

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3. Jerzy Kopeć, *Elaboration of ultrasonic method of brain testing utilizing instrumentation with type B presentation* (1973).
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5. Tadeusz Powałowski, *Measurements of flow of liquids by means of ultrasonic Doppler Continuus wave method* (1976).
6. Jerzy Etienne, *Selected problems of application of ultrasounds in obstetrics* (1977).
7. Anna Markiewicz, *Analysis of impulse transmit-receiving ultrasonic systems for the purpose of medical diagnosis* (1978).
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