In Memoriam: Faydor L. Litvin (1914–2017)

Faydor L. Litvin, world-renowned scientist, scholar, and educator, passed away on Apr. 26, 2017, at the age of 103. The Distinguished Professor Emeritus in the Department of Mechanical Engineering and Director of the Gear Research Center of the University of Illinois at Chicago (UIC) was widely regarded as the founder of the modern field of gearing and made significant contributions to the development of the theory of mechanisms.

Professor Litvin was born in Russia during WWI and left home at the age of 14 to seek an education in Leningrad (now St. Petersburg). He received a degree with honors at Leningrad Polytechnic Institute in 1937, earned his Ph.D. at Tomsk Polytechnic University in 1944, and his ScD at Leningrad Polytechnic University in 1954. He continued to research and teach at Leningrad Polytechnic Institute until 1964, when he joined the faculty of the Institute of Precision Mechanics and Optics in Leningrad, serving as Department Head and Professor of Mechanical Engineering. At the age of 65—an age at which most consider retiring—he started a new chapter in his life by emigrating to the U.S. In 1979, he joined the faculty of UIC where he served for another three decades as Professor of Mechanical Engineering and Director of the Gear Research Center.

Over the course of his prolific career, Litvin was an innovative researcher, scholar, inventor, and mentor. Litvin contributed 35 manuscripts to the *Journal of Mechanical Design* alone (see list below), and altogether authored more than 350 publications, including ten monographs. His work led to 25 inventions, three of which are U.S. Patents. As author of some of the most comprehensive and most cited works in the field of gearing, *Theory of Gearing* (NASA, 1989) and *Gear Geometry and Applied Theory* (Prentice Hall, 1994), Professor Litvin's name is synonymous with an entire era in the theory of gearing and kinematics.

Professor Litvin was also a dedicated educator and mentor to generations of students and professors. Throughout his career, he trained and supervised 100 Ph.D. students and visiting scholars, many of who went on to prominent teaching and research positions around the world.

Professor Litvin's monumental contributions also extended to the rotorcraft industry. For more than 25 years, he collaborated with NASA, the U.S. Army, and industry on numerous university research grants and contracts. One of his most important contributions to rotorcraft technology was in the development of spiral bevel and face gears. This work produced revolutionary lightweight, low-noise, high-strength, spiral-bevel gears with low transmission errors through careful consideration of the gear tooth machine tool settings during the manufacturing process, a practice now adopted across the aerospace gearing industry. He also made valuable contributions to the development of face gear grinding technology. Together with his Ph.D. students he developed a manufacturing technique that provided the lightweight, high-accuracy gearing necessary to achieve major operational improvements in helicopter gear systems.

Professor Litvin received many awards and honors, including 12 NASA TechBrief Awards, the Thomas Bernard Hall Prize Award from the Institution of Mechanical Engineers (Westminster, UK), the IFToMM Merit Award (International Federation for the Promotion of Mechanism and Machine Science), an Honorary Doctorate of Miskolc University in Hungary, the 2001 Inventor of the Year award from UIC, and ASME's Thomas A. Edison Award. He was also honored by the Citizenship Council of Metropolitan Chicago as "Outstanding New Citizen of 1984–1985," for his work at UIC in the area of mechanical engineering.

Professor Litvin was an ASME Fellow, a member of the Gear Power Transmission Committee and the American Gear Manufacturers Association, served on the editorial board of *Computer Methods in Applied Mechanics and Engineering* and was a member of the honorary editorial advisory board of *Mechanism and Machine Theory*.

Professor Litvin was greatly admired by his students, colleagues, and friends as a kind, distinguished, and cultured Renaissance man, with interests ranging from art, literature, philosophy, and religion, to politics. I was a colleague of Professor Litvin on the University of Illinois at Chicago (UIC) faculty from 1998 to 2003. I remember him as a cheerful and energetic faculty member, and a loving father figure to all of his students. (Remarking on the longevity of his career, he once told me the secret to good health is eating a lot of fish!) Although he is dearly missed, the mechanical design research community has been immeasurably enriched by the legacy of Professor Litvin's innovations, intellectual generosity, and spirit. His contributions to our field, and to science and education, ensure his memory will live on for generations of scientists.

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Journal of Mechanical Design Publications

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