

PROFESSOR ZENON WASZCZYSZYN

BRIEF SCIENTIFIC CURRICULUM VITAE

Professor Zenon Waszczyszyn was a scientist with unique achievements and wide recognition in Poland and abroad. He had a record of 55 year career and service at the Cracow University of Technology (CUT) and Rzeszów University of Technology. He was a full member of the Polish Academy of Sciences (PAS), an active member of the Polish Academy of Sciences and Arts (PASA) in Cracow, and Doctor *honoris causa* of Budapest University of Technology and Economics (BUTE).

Professor Zenon Waszczyszyn was born in Lwów, Poland (now Ukraine) on July 12, 1935. He graduated with MSc degree in Civil Engineering at Cracow University of Technology in 1956. In years 1957-1962 he worked at a design office in Cracow and became a licenced engineer. In 1959 he was employed as an assistant at the Chair of Strength of Materials and Structural Statics of CUT. Under the supervision of Prof. M. Życzkowski he embarked on the research into restricted support movability of beams in bending. His dissertation on the subject resulted in the PhD degree with honours in 1964.



He then embarked on scientific cooperation with Prof. A. Sawczuk from the Institute for Fundamental Technological Research of PAS (IPPT PAN) in Warsaw. On the basis of dissertation on finite displacements of elastic-plastic plates and shells of revolution he was awarded the DSc degree (called in Poland *habilitacja*) in 1970, thus becoming associate professor. In years 1973-78 he was the Head of the Computer Center of CUT. He was nominated full professor in 1978 and then till 1992 he was the Head of the Laboratory of Structural Stability and Computational Methods at the Institute of Structural Mechanics of CUT.

In 1989 he got elected a Corresponding Member of the Polish Academy of Sciences and in 1990 he became a Full Member of the Polish Academy of Sciences and Arts (the oldest Polish Academy of Sciences reactivated in Cracow in 1989). In years 1991-93 he served as Vice-Rector for University Staff and International Relations of CUT.

In 1992 he initiated the Institute of Computer Methods in Civil Engineering, where he was the Head of the Chair of Computational Structural Mechanics until 2005 and also the head of the Institute in years 1997-2005. He then worked for 9 years as full professor at the Chair of Structural Mechanics of Rzeszów University of Technology.

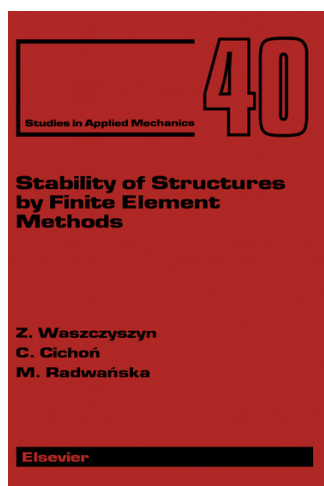
In years 2007-10 Professor Waszczyszyn was Vice-President of the Cracow Branch of PAS. In 2011 he was elected vice-president of Department III Math-Phys-Chem of PASA. In 2012 he was elected the

head of the Commission of Technical Sciences of PASA. Last year he finished his service in Rzeszów and at present he divides his time between the two Academies he is involved in, Cracow University of Technology, where he cooperates mainly with Prof. E. Pabisek and Dr M. Słoński, and AGH University of Science and Technology, where he cooperates with Prof. T. Uhl.

In his career Professor Z. Waszczyszyn has had several occasions to work abroad, first at the Tbilisi University, Georgia in 1966, then at the Lomonosov University, Moscow in 1969/70 and at Politecnico di Milano in 1976/77. Then, with DAAD scholarship, he visited German technical universities in Munich, Hanover, Stuttgart and Bochum in 1982. In 1987 he won a competition for the position of visiting professor at Aerospace Faculty of the Delft University of Technology (TU Delft), the Netherlands, and spent a year there doing research and lecturing on computational plasticity. His lecture notes on *Computational Methods and Plasticity* were published in 1989 as TU Delft Report LR-583 (214 pages). Later he lectured on various occasions at University Clermont-Ferrand II, TU Delft, Heriot-Watt University, Edinburgh, Universita di Firenze, BUTE i TU Wien.

Professor Waszczyszyn's research activity was primarily related to the modelling and analysis of problems of nonlinear mechanics of structures and materials. His interest in the theory of elasticity and plasticity and, especially, in nonlinear stability of plates and shells opened for him the door to the cooperation with scientists in mechanical and aerospace engineering. He enjoyed long term cooperation with Prof. G. Maier from Politecnico di Milano, Prof. S. Kaliszky from BUTE, Prof. J. Arbocz from Delft University of Technology, Prof. H. Mang from Vienna University of Technology, Prof. V. Zarudsky from the Institute of Mechanics of the Ukrainian Academy of Sciences in Kiev and Prof. U. Lepik from Tartu University, Estonia.

He concluded his activity in the field of structural stability by publishing the book on *Stability of Structures and Finite Element Methods*, Elsevier, Amsterdam, 1994 (468 pages), co-authored by his associates Cz. Cichoń and M. Radwańska, and co-authoring and editing volume 3 of the book in Polish *Mechanika budowli. Ujęcie komputerowe* (Structural mechanics. Computational approach), Arkady, Warsaw, 1995 (327 pages).

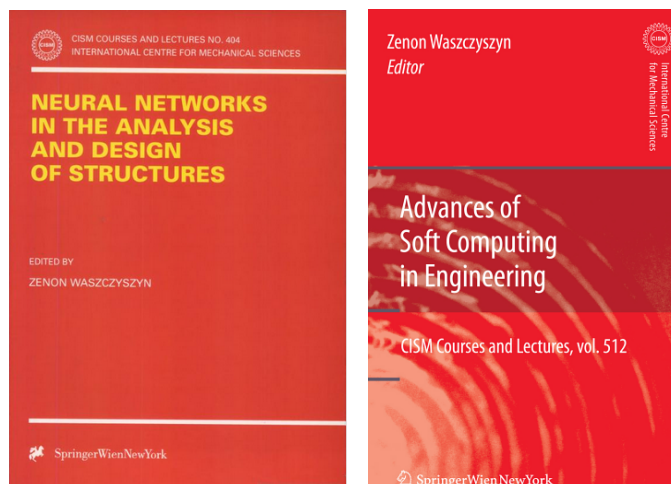


Around his 60th birthday he decided to change the focus of his interests and started investigating the applications of artificial intelligence methods in civil engineering. Initially, he was interested in deterministic artificial neural networks (ANN). Next, he extended the scope of his work to hybrid systems combining neural networks with the finite element method, fuzzy sets and Bayesian inference concept. Such approaches are especially suitable for efficient inverse analyses of engineering problems, including parameter identification. Recently, he has also been interested in so-called health monitoring of structures, and in particular in the assessment of their resistance to random imperfections.

Prof. Waszczyszyn's research was strongly related to the standing Seminar on Applications of Artificial

Neural Networks and Soft Computing in Civil Engineering, which has been organized under his supervision at CUT since 1997. The Seminar gathered up to 30 participants from several Polish universities. As a result some research teams were formed to introduce the applications of soft methods in the research projects developed at the participants' universities. With time, this joint effort became the second scientific school of Professor Waszczyszyn, after the school of structural stability and numerical methods he had founded in the eighties.

In 2001 Professor Waszczyszyn won a so-called professor's subsidy of the Foundation for Polish Science, awarded every year to 15 prominent scientists. It helped him to develop the research on the applications of ANN in civil engineering and support financially the research of 5 young investigators. The results of the research were presented at numerous scientific conferences and, most importantly, in his lectures delivered at the following CISM Advanced Schools in Udine, Italy (two of which he coordinated): *Neural Networks in Mechanics of Structures and Materials* in 1998, *Parameter Identification of Materials and Structures* in 2003 and *Advances of Soft Computing in Engineering* in 2007. Two valuable books edited by Professor Waszczyszyn were published by Springer after the courses: *Neural Networks in the Analysis and Design of Structures*, CISM Courses and Lectures, vol. 404, Springer, Wien - New York, 1999 (307 pages) and *Advances in Soft Computing in Engineering*, CISM Courses and Lectures, vol. 512, Springer, Wien - New York, 2010 (336 pages).



Prof. Waszczyszyn directed many research projects related to modelling and computer simulation of materials and structures. He was the principal investigator of 23 Polish grants in the field of mechanics and civil engineering. In his career he supervised fifteen doctoral projects, including seven completed with honours. From among his associates three obtained professor nominations (Cz. Cichoń, K. Kuźniar and L. Ziemiański), and six scientists got the DSc degree (W. Łakota, B. Miller, J. Pamin, E. Pabisek, E. Pieczara, M. Radwańska). He also was the initiator of granting *honoris causa* doctorates of CUT to renowned professors Herbert Mang from TU Wien and Michał Kleiber from IPPT PAN.

Altogether, he was an author and co-author of over 270 publications, including 7 books/monographs and 6 textbooks, over 170 original papers published in scientific journals, several chapters in books, state-of-the-art papers and published plenary and keynote lectures. The results of his research were presented at a multitude of scientific congresses, symposia and conferences. He reviewed over 70 PhD and DSc dissertations and served as a member of examination commission at TU Delft, Herriot-Watt University Edinburgh, TU Helsinki and TU Wien. He was a member of editorial boards of several scientific journals.

He has always paid a lot of attention to the educational problems related to graduate, post graduate and PhD courses. In years 1992-99 he was a member of the SEFI (Société Européenne pour la Formation des Ingénieurs) Curriculum Development Working Group. In this body he focused on the necessity of introduction of humanities into engineering curricula. In 1992 he was elected an expert of the Polish

Ministry of Higher Education in the field of Civil Engineering and has served in this capacity since then. In the 90s he coordinated 2 European TEMPUS projects.

Starting in 1987, at first together with Prof. S. Kaliszky from the Department of Mechanics, BUTE, he co-organized 14 bilateral Budapest-Cracow Inter-Institute Seminars on Numerical Analysis of Structures, mainly devoted to the discussion of the doctoral projects of young scientists. In 2000 Prof. H. Mang and his team from the Institute for Strength of Materials, TU Wien, joined the initiative and the Seminars are continued in a trilateral form under the name Inter-Institute Seminar for Young Researchers. In years 1980, 1985 and 1990, within his activity as the chairman of the Section of Structural Mechanics of the Committee for Civil Engineering of PAS, Prof. Waszczyszyn organized schools of structural stability, and in 1996 a Summer Course on Mechanics of Concrete.

Prof. Waszczyszyn's scientific and educational activity has been well appreciated. In 1997 he was elected SEFI Fellow. In 2001 he was distinguished by the title of Doctor *honoris causa* of Budapest University of Technology and Economics. In 2006 he received the title of IACM Fellow from the International Association for Computational Mechanics. As one of the founders of the Polish Association for Computational Mechanics (PACM) he was awarded the Zienkiewicz Medal of PACM for all his activity in 2006. From among numerous Polish honours the F. Jasiński award of Branch IV (Technical Sciences) of PAS in 1972 and the award of the Minister for National Education and Sport for all achievements are worth mentioning.

He was the chairman of the 2nd European Conference for Computational Mechanics, ECCM, Cracow 2001, and of the International Symposium on Neural Networks and Soft Computing in Structural Engineering NNSC, Cracow 2005. More recently, he co-organized with Professors T. Burczyński and Z. Mróz a series of ECCOMAS thematic conferences on Inverse Problems in Mechanics of Structures and Materials IPM, Rzeszów 2009, 2011 and 2013. These conferences focused on advanced mathematical methods for modelling and analysis of inverse problems in mechanics, intelligent computing strategies, structural health measurement and material parameter identification. These were the fields of the last years of research of Professor Zenon Waszczyszyn until he retired in 2015.