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In Memoriam – Professor Erwin Stein

(1931 – 2018)

Erwin Stein passed away on 19th December 2018 at the age of 87, a few days after he had lost consciousness when working at his desk. He was a mentor and a dear friend to many of us in the community of computational mechanics.

Professor Erwin Stein was a nationally and internationally highly renowned scholar with outstanding achievements and important contributions to the development of computational mechanics. With his passion for scientific research and a positive attitude to life, he was able to gather around him many talented students and to create a leading research centre – the so-called "Stein-School". He supervised 57 PhD theses and 6 habilitation theses. Many of his pupils and co-workers have become full professors at universities in Germany and abroad. He built up a worldwide scientific network of co-workers from many countries, including China, Poland, Russia and Ukraine. In recognition of his significant accomplishments and activities Professor Stein received many prestigious awards and honorary degrees, inter alia, the Gauss-Newton Medal – the highest award given by the International Association for Computational Mechanics (IACM), and the Ritz-Galerkin Medal – the highest distinction awarded by the European Community on Computational Methods in Applied Sciences (ECCOMAS).

It should be also emphasized here that Professor Stein contributed a lot to the development of computational mechanics in Poland. He established and maintained effective co-operation with Polish research institutions in the 1980s, mainly with the Institute of Fundamental Technological Research and the Poznan University of Technology. He visited the institutions, gave lectures there, and invited Polish colleagues for research stays at his Institute of Structural Mechanics and Numerical Mechanics in Hannover. In recognition of his great merits and profound contributions to the Polish community of mechanics he was awarded the honorary doctorate degree of PUT (1977) and the O.C. Zienkiewicz Medal by the Polish Association of Computational Mechanics (2009). It can truly be said that he was a friend of Poland.

Erwin Stein was born on 5 July 1931 in Altendiez near Diez/Lahn, Germany. He studied civil engineering and mathematics at the Technische Hochschule Darmstadt (1951–1958), which he completed with his diploma in civil engineering (Diplom-Ingenieur mit Mathematik-Tauschfächern). During his studies (1956–1957) he additionally worked part-time on the static analysis and design of engineering structures, which he continued after finishing the studies in 1958 by working for a consulting firm in bridge engineering (design of a composite bridge of steel and prestressed concrete). In 1953 he got married and on 4 November 2018 Erwin and Giesela Stein celebrated their iron wedding anniversary – 65 years side by side. They had two daughters and a son.

His academic career Erwin Stein began in 1959 at the Technische Hochschule Stuttgart, where he worked and defended his doctorate (1964) and "Habilitation" (1969). He carried out intensive studies into computational techniques of mechanics, in particular into an emerging-then computer-oriented method of approximation for boundary value problems in elasticity – the finite element method. His doctorate thesis, which he defended with honours, was titled "The Trefftz method for beams, plates and shells" ("Die Trefftz-Methode für Balken, Platten und Schalen"). His habilitation thesis was titled "Coupling of FEM and extended Trefftz method for plates and shells with boundary perturbations" ("Kopplung von FEM und erweiterter Trefftz-Methode für Platten und Schalen mit Randstörungen").

The principal part of Erwin Stein's professional activities is associated with the Technische Universität Hannover (now Leibniz Universität Hannover). In 1971 he accepted a call and moved to the LUH where he was offered the position of a full professor at the Chair of Structural Mechanics (Lehrstul für Baumechanik), which was later, in 1979, renamed the Institute of Structural and Numerical Mechanics. Professor Stein directed the Institute of Structural and Numerical Mechanics (IBNM) in the years 1979–1998, and developed it to one of the worldwide leading research centres, conducting cutting-edge research in the field of computational mechanics. The next twenty years he remained at the Institute as Professor Emeritus, working as intensively as before to his very last days.

The spectrum of topics investigated by Prof. Stein and his team is very rich: from non-linear elastic, elasto-plastic behaviour of solids and structures taking into account cracks, buckling, unilateral contact, to martensitic phase transformations, and to estimation of approximation error and adaptive finite element techniques, to name the main ones. He (co)authored or (co)edited over three hundred papers and books, including the monumental reference work in computational engineering – *Encyclopedia of Computational Mechanics*. His contributions demonstrate the synergy of mathematics, numerical analysis and mechanics, and many of them are directly oriented towards solving practical problems in engineering. As a test engineer for structural analysis (Prüfingenieur für Baustatik), he had a profound understanding of the functioning and response of structures. He conducted his scientific research and lectured at conferences and also at the home University to students with dedication and enthusiasm. Inspired by his passionate studies on Gottfried Wilhelm Leibniz and innovations of this last universal scholar, he was also interested in the historical and philosophical aspects of scientific cognition and invention. The studies and activities led to the permanent Leibniz-exhibition at the LUH in Hannover and Prof. Stein was its curator. "Theoria cum praxi" and "commune bonum" were the mottos often mentioned by Prof. Erwin Stein. In the face of adversity Erwin used to say "never give up".

We mourn the passing of Professor Erwin Stein. The community of computational mechanics has lost a highly esteemed scholar and many of us have lost a dear friend. Through his profound scientific contributions and valuable initiatives he will further influence the development of computational mechanics and will remain in our minds and hearts. We express our words of sorrow and sympathy to his wife Gisela und their children.

Mieczysław Kuczma
Poznan University of Technology