

Obituary Professor Jiequan Li

On May 14, 2023 the sad news went around the world that in Beijing our cherished friend and colleague Jiequan Li had died of a stroke. He was still very far from a retirement age. So this came as quite a shock to those who were close to him. He was a very well established and respected member of the international community of researchers in the field of hyperbolic conservation laws, which is an important branch of the much larger mathematical field of partial differential equations. He worked on various aspects of mathematical analysis, numerical methods and applications related to these equations.

Jiequan Li studied mathematics at the prestigious Beijing Normal University from 1991 to 1994. He then joined the Institute of Mathematics at the Academia Sinica in Beijing. There he obtained his PhD under the supervision of Professor Tong Zhang in 1996. As a post-doc he spent some time in Jerusalem at the Hebrew University with Professor Matania Ben-Artzi, at the Academia Sinica in Taipei with Professor Tai-Ping Liu as well as in Magdeburg with Gerald Warnecke. He became a professor of mathematics at the Capitol Normal University in Beijing in 2002. In 2010 he switched to the Beijing Normal University and in 2015 he joined the Institute of Applied Physics and Computational Mathematics in Beijing. In 2022 he returned to the Capitol Normal University to join its Academy of Multidisciplinary Studies.

He made important contributions to our understanding of shock wave structures in solutions to the two-dimensional Euler equations. With his thesis advisor he published a book on this topic. He pursued this topic throughout his career. Another lasting strand of his research was dedicated to the numerical analysis of second and higher order schemes. Further, he introduced a sticky particle criterion that gives uniqueness for the zero pressure gas system. He made numerous contributions to our understanding of a very broad spectrum of numerical schemes. An interesting joint work was the discovery that the Lax-Friedrichs scheme allowed oscillations in solutions. This comes despite the fact that it is a total variation diminishing (TVD) scheme. The damping is so strong, that the oscillations do not increase the total variation. Prior to this discovery it was widely believed that the TVD property in a numerical scheme guaranteed the absence of unphysical oscillations. The result was supported by a modified equation analysis, another topic he was very interested in.

Our personal encounters with Jiequan began in 1999 when he spent 9 months in Magdeburg as a post-doc. Five years later he came again for one year. We regularly met in various places. Jiequan was very enthusiastic in supporting Chinese-German research

collaboration. Under his guidance the Sino-German collaboration group "Advanced Numerical Methods for Hyperbolic Balance Laws and their Application" supported by the DFG and NSFC was initiated. Our last meeting was a joint NSFC-DFG workshop on conservation laws in Beijing. It was held in September 2019, just a few months before international travel was completely shut down by Corona. We were just in the process of organizing a follow up meeting for September 2023 in order to get our scientific exchanges going again. We were eagerly looking forward to meet again in person. The workshop was an occasion to honor and remember Jiequan Li.

He is survived by his wife Yu Chen and adult daughter Jintong (Tongtong) Li.

Mária Lukáčová-Medvid'ová, Gerald Warnecke