

## Jinghai LI

Chancellor, Vice-Chancellor, Colleagues and friends, graduates and graduands and their families - today the University will award an honorary doctorate to Prof Jinghai LI. He graduated from the Department of Thermal Engineering of the Harbin Institute of Technology in 1982 and undertook a master's degree program at the same institution. For those who don't know, Harbin is a city in the far north of China, famed for Harbin International Ice and Snow Sculpture Festival, with quite enormous ice and snow recreations of buildings and other structures. The daily average winter temperature there is around -15 Celsius. I can testify that it is a very long way, at least for a European, from Beijing, and the climate is very, very different. But it was to Beijing that the then Mr Li travelled to study for his PhD at the Chinese Academy of Science Institute of Process Engineering. He obtained his PhD in 1987, and then continued his travels even further afield, again to very different climate zones, conducting post-doctoral research at the City University of New York and the Swiss Federal Institute of Technology. These early journeys in some ways set the tone for his career, and he has come to be widely known and respected around the world. After returning to China in 1990, he served as assistant professor, associate professor, professor, vice director and director of the Institute of Process Engineering. In February 2004, he was appointed a vice president of the Chinese Academy of Science.

Prof. Li's early work was in the field of particle / gas interactions, looking particularly at the effects of particle aggregation, which is of course extremely important in chemical engineering, but also to Civil Engineers who study water and air quality. This work was based on the simple physical principles of the conservation of mass, energy and momentum, which I am sure most of you here know and love, but in Prof Li's research the application of these principles led in a quite revolutionary direction, and he established what has become known as the Energy-Minimization Multi-Scale model for gas-solid systems. This looks at the interaction between detailed small scale flow modelling and larger system modelling, across a very wide range of scales. The model has been extended to many different complex systems, and generalized into the EMMS paradigm of computation that investigates, through some very large scale simulations (using computer rated in Petabytes) the structural similarity between problem, modeling, software and hardware, and has been used widely in the chemical and energy industries. Coming out of this work, Prof Li advocates the establishment of what he terms "meso-science" – a science and engineering discipline that considers the interaction between large scale systems and their individual components, and the complexity of the interactions on the scales in between the large and the small. It is one of the joys of doing the job of Public Orator that occasionally one comes across concepts that can be of use in one's own discipline, and in Prof Li's work I can personally see major possibilities in my research areas of wind and railway engineering, linking the small scale wind loading on structures with large scale meteorological flows, and the detailed interactions of trains and railways with the performance of whole railway systems. I suspect the same may be true in many areas of science and technology.

For this ground breaking work, Prof Li has been made the vice chairman of the China Association of Science and Technology, the president of the Chinese Society of Particuology, and the vice president of the Society of Energy Research. He sits on editorial committees or international advisory boards for several international periodicals and is a member of the Chinese Academy of Sciences, the Academy of Sciences for the Developing World and the

Swiss Academy of Engineering. In the UK he is a Fellow of the Royal Academy of Engineering and an Honorary Fellow of the Institution of Chemical Engineers. He has received a variety of prizes and honours, both national and international, including a Young Scientist Prize in 1996 in China, two National Natural Science Awards in 1989 and 1995, Hong Kong Qiu Shi Young Scientist Prize in 1996, the Particle Technology Forum Award in 2010, and the Medal Lecture Award from the Academy of Sciences for the Developing World in 2012.

Chancellor, Vice Chancellor, for a lifetime spent in pushing the bounds of engineering and technology, for his persistence in pursuing novel and complex concepts, for his insights that enabled him to turn the solutions to a very specific problem into something of general applicability, and for the inspiration he gives to young scientists and engineers, I present to you and to the University Prof Jinghai LI, for the degree of Doctor of Engineering, *honoris causa*.