

Thomas J.R. Hughes won William Benter Prize in Applied Mathematics 2022



Professor Thomas J.R. Hughes

Professor Thomas J.R. Hughes, Peter O' Donnell Jr. Chair in Computational and Applied Mathematics and Professor of Aerospace Engineering and Engineering Mechanics, University of Texas at Austin, US, won the William Benter Prize in Applied Mathematics 2022.

Professor Hughes, a phenomenal leader in the field of computational science, engineering and mathematics, created isogeometric analysis, a novel approach to integrating computer-aided design (CAD) and computer-aided engineering (CAE). The ingenious idea is to derive finite element basis functions from CAD, which has revolutionised numerous engineering applications. His fundamental paper on this topic has been cited over 6,000 times on Google Scholar and is widely referred to throughout industry, national labs and academia.

Variational multiscale methods (VMS) and stabilised methods are the groundbreaking results of Professor Hughes' research in computational fluid dynamics (CFD). They overcome a fundamental mathematical obstacle, the Babuska-Brezzi condition, and have enabled the construction of widely used methods for simulating viscous compressible flows. VMS is leading to new turbulence models and multiphase flow algorithms.

Additionally, Professor Hughes applied his expertise in computational mechanics to a different

field: blood flow modelling. This work has evolved into the concept of "predictive medicine". The underlying methodology has been commercialised to provide non-invasive, patient-specific, coronary disease diagnosis based on CFD.

Among his many prestigious awards, Professor Hughes has received the ASME Medal from the American Society of Mechanical Engineers (ASME), the John von Neumann Medal from the U.S. Association for Computational Mechanics (USACM), and the Gauss-Newton Medal from the International Association for Computational Mechanics (IACM).

There are two awards under the name of Professor Hughes: the Thomas J. R. Hughes Medal of USACM, and the Thomas J.R. Hughes Young Investigator Award of ASME.

Professor Hughes is a member of the US National Academy of Sciences, the US National Academy of Engineering, and the American Academy of Arts and Sciences, and is a foreign member of the Royal Society of London. He has been a plenary lecturer at the International Congress of Mathematicians.

The William Benter Prize will be presented during the opening ceremony for the International Conference on Applied Mathematics (ICAM 2023), which is co-organised by CityU's Liu Bie Ju Centre for Mathematical Sciences (LBJ) and the Department of Mathematics.

The William Benter Prize in Applied Mathematics was set up by LBJ in honour of Mr William Benter for his dedication and generous support to the enhancement of the University's strengths in mathematics. The prize recognises outstanding mathematical contributions that have had a direct and fundamental impact on scientific, business, finance and engineering applications. The cash prize of US\$100,000 is given once every two years.