

## **Professor Dudley Brian Spalding, FRS, FEng**

It is with sadness that we report the death of Professor Brian Spalding FRS FEng after a short illness on 27th November 2016. Brian Spalding was born on 9<sup>th</sup> January 1923 in New Malden, England. He graduated with a BA and MA in Engineering Science at Oxford University in 1944 and after one year with Shell spent the year 1945-46 with the UK Rocket Propulsion Establishment in Germany near Braunschweig. In 1948 Brian accepted an ICI Fellowship at Cambridge University to study for a PhD, which he obtained in 1952. The subject of his thesis was the combustion of liquid fuels and this is where he developed his lifelong interests in fluid flow, combustion and heat and mass transfer. Brian Spalding joined the Department of Mechanical Engineering at Imperial College as a Reader in Heat Transfer in 1954, was promoted to Professor of Heat Transfer in 1958 and subsequently also became Head of the Computational Fluid Dynamics (CFD) Unit. He held both positions until his retirement in 1988. He became a Fellow of the Royal Society in 1983 and a Fellow of the Royal Academy of Engineering 1989. At various times, he has been visiting Professor at MIT, the University of California, Berkeley, and the University of Minnesota; in the late 1970's he was Reilly Professor of Combustion at Purdue University.



Brian and Colleen Spalding, Palermo, Sicily September 2016,  
courtesy of Valerie Kaufmann

Brian Spalding was a truly outstanding researcher and teacher who was widely recognised as being one of the leading authorities in his field and who made many important and innovative contributions in a broad range of subjects. His contributions to science and engineering were wide ranging and ground breaking. For example, his early research, circa 1950, led to a model for evaporating and burning liquid fuel droplets that is still used today. However, his greatest contributions were probably in the area of what is now termed Computational Fluid Dynamics, CFD. In the mid 1960's Brian was amongst the very first to realise that the developing power of the 'digital' computer could be used to devise discrete methods for solving the partial differential conservation equations describing fluid motion, combustion and heat and mass transfer. Moreover, the solutions could take into account the myriad complexities of geometry and boundary conditions which would provide engineers with the means to analyse problems in detail far beyond the limited scope of analytical solutions. Brian and his group devised a suite of computer programs for solving, first the thin-shear-layer equations and then extended them to solve the equations describing recirculating flow, in both two and then three dimensions. Together with S Patankar the SIMPLE

algorithm was devised to simultaneously determine the pressure and velocity fields. Brian Spalding and the Heat Transfer group revolutionised the analysis of fluids in motion through computer modelling and he initiated the application of CFD to problems of interest to engineers. He was one of the most influential persons in the development of CFD, which stimulated the parallel development of 'mathematical models of turbulence' and combustion. Indeed, most of today's commercially available CFD software tools trace their origins to the work Brian Spalding and his group carried out in the decade spanning the mid-60s and mid-70s.

In 1974 Brian Spalding founded Concentration Heat and Momentum Limited (CHAM), a world-leading consulting company, which specialised in computer simulation of fluid-flow and heat-transfer processes, with offices in more than 25 countries. CHAM's clients continue to use Brian's pioneering software to obtain computer simulations of fluid flow. Brian was Chairman and Managing Director of CHAM and, until his death, he was actively engaged in devising models for combustion, heat and mass transfer and fluid flow and the development CFD software.

Brian was a prolific contributor to education in terms of writing textbooks, organising short 'post-experiences' courses and delivering an inspirational MSc course. This attracted students from all over the world to a stimulating environment and led to many of these pursuing doctoral studies with him.

Brian Spalding's awards include the Institution of Mechanical Engineers' James Clayton Prize, the American Society of Mechanical Engineers' and the American Institute Chemical Engineers' Max Jakob Memorial Award, the Institute Francais de l'Energie's Medaille d'Or, the Combustion Institute's Bernard Lewis Medal, The International Centre for Heat and Mass Transfer's Luikov Medal, the Global Energy International Prize and the Benjamin Franklin Medal (Franklin Institute). Brian is survived by his wife Colleen and two sons and a daughter.

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