

***A Summary of the Research Interests and Professional Activities  
of  
Peter W R Beaumont BSc (Hons) MA (Cantab) DPhil DSc  
University of Cambridge, UK***

Peter Beaumont obtained the DPhil degree at the University of Sussex, England in 1970 and immediately accepted the position of assistant professor at the University of California at Los Angeles (UCLA). In returned to England in 1973 to take up an appointment at the University of Cambridge in the Department of Engineering.

His research has resulted in 175 scientific publications, (with more than 50 different co-authors from many countries), in leading international scientific and engineering journals, as well as a text book on the "Failure Analysis of Composite Materials". He has made many contributions to scientific and engineering encyclopaedia, advanced research treatise, engineering design books and material design guides. Also, he has presented many invited key-note papers at prestigious international conferences in Europe, USA, Asia (including China and India), and the Pacific Basin countries (including Japan and Australia), and Central America.

Throughout his research, Dr Beaumont makes strong inter-disciplinary links between engineering principles and other applied sciences to the study engineering materials behaviour and the prediction of structural performance. Some of this work has led to a new formulation of the principles of damage mechanics of composite materials, for which Dr Beaumont was honoured recently by the American Society of Mechanical Engineers (ASME).

The aims and objectives of his research include the identification and the understanding of problems that limit the performance and reliability of non-metallic engineering materials including ceramics and duplex polymer systems, adhesives and composite material systems. Part of this work includes the development of physical models of the structural changes (microscopic processes) that limit the performance of the material and component. These models, when applied to solving engineering problems, lead to innovation in material design at the nano and micro levels of size, and the successful exploitation and commercialisation of a wide range of materials across a broad spectrum of engineering applications, from aerospace and defence on the one hand, to the reconstruction of the ailing human frame on the other.

His research interests in the manufacture of composite materials focus on the quantitative descriptions of polymeric and ceramic-based systems and processing routes, together with a sound understanding of the physical processes and mechanisms that occur in the polymer and composite material during manufacture.

His work on the integration of composite selection and mechanical design relates to issues at the nano and micro levels of structure that lead to the optimisation of material properties and component performance. This is accomplished by applying the mechanics of material behaviour using the "working tools" of engineering science - elasticity, plasticity, kinetics, fracture mechanics and

damage mechanics, and so forth, in addition to the whole of polymer science and composite materials science, engineering and chemistry, and includes medicine.

His papers show a knowledge and understanding of reactions between fibre and matrix in processing and between polymer, ceramic or composite and environment in service. Such understanding is being applied to the design of the material system and the control and management of changes in microscopic and macroscopic structure from the material's conception through to its obsolescence.

Most recently, his research includes a major study of the construction of maps from physical modelling (micro-mechanics), which can be used to define the conditions of safe operational stress and environment. From this, we can optimise structure of the material to maximise performance and the component's resistance to fracture. It is based on a new micro-mechanical theory of stress corrosion cracking of fibre-polymer composites. In a second new project, the physical modelling approach is being applied to the design of composite patches for the repair of damaged and cracked ageing aircraft structures.

His most recent academic distinctions and awards include: Distinguished Research Award presented by the American Society of Mechanical Engineers for research in the field of Damage Mechanics of Composite Materials; Distinguished Teaching Award presented by University of California (UCLA) for Dedication to the Teaching of Engineering, and he was awarded the prestigious degree of Doctor of Science of the University of Sussex.

The Royal Society, Engineering and Science Research Council (EPSRC), NATO, European Office of Aerospace Research & Development (EOARD), The Daiwa UK-Japan Foundation, and The Royal Academy of Engineering (RAE), have all supported Dr Beaumont's many international Research Fellowships for Collaboration in Science including:

The Peoples' Republic of China (Chinese Academy of Sciences, Beijing), Japan (University of Tohoku); NATO Senior Research Fellowships to the USA (University of California, Santa Barbara, and MIT), and EOARD "Window-on-Science" programs to many different government agencies and defence centres in the USA.

Some other examples of his professional activities include: directing and presenting short courses programs for industry on all aspects of composite materials technology at universities, government institutions and industrial establishments throughout the USA, Europe, Australia, Mexico, India, China, about 75 in total.

In scientific journalism, Dr Beaumont is Founder and Editor-in-Chief of the international journal *Applied Composite Materials*, in addition to being on many other editorial boards of leading international journals in composite materials.