Research Interests – Dr. Xiaoying Zhuang

The development of new materials, devices and systems has been the research focus in engineering and materials science for decades and our society has seen a tremendous advancement of many current technologies thanks to the advancements made in materials science and nanotechnology. Many of our today's products such as car and airplane are made of composites. In a new car, an oil module can be made of pure polymer and over 50 percent of aeroplane fuselage made of polymer for Airbus and Boing.

While nanocomposites have brought advantages of lighter structures and higher strength, they also have many practical issues unsolved such as light striking due to low electric conductivity and electronic components failure due to cyclic thermomechanical effects. Our knowledge on understanding the mechanism are crucial for future development and improvement.

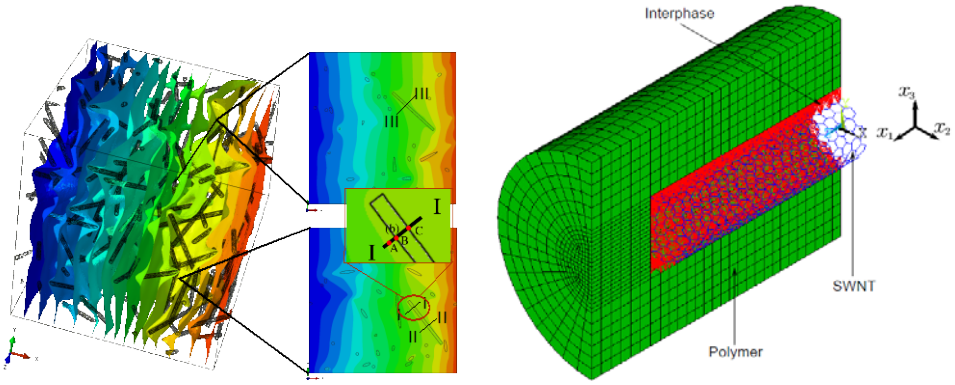

Figure 1: Carbon nanotube reinforced polymer composites

In Leibniz University Hannover, Dr. Xiaoying Zhuang is developing a multiscale virtual materials design and testing platform that will enable the characterisation, modelling and optimisation that will support the innovation and generation of new types of nanocomposites. Figure 1 shows an example of carbon nanotube model and how they are distributed inside a polymer materials and their influence on the interface with the polymer. Through the modelling of new materials at nanoscale, microscale and macroscale, and compared the computer simulation with experimental phenomenon at different scales, the scientists will obtain an insight of the material properties and devise a smart way to optimisation the performance and functions of the materials.