Research directions in computational mechanics across length-scales

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Abstract: Computational mechanics plays a crucial role in understanding man made and natural objects across different length scales. Examples include large structures such as bridges, aircrafts to extremely small structures such as nanotubes and DNA. Equations of motion governing these systems can be obtained and solved using numerical techniques such as the finite element method. In this talk, I will show recent advances in atomistic scale finite element method and its applications in nanotubes, graphene sheets and DNA molecule. While using computational methods, often simulation results do not match with experimental observation. One way to address such discrepancies is to consider uncertainties in the model and its parameters. I will discuss some recent developments in uncertainty quantification in the context of complex multiscale finite element models.

Short Bio:

Professor Adhikari is the chair of Aerospace Engineering in the College of Engineering of Swansea University. Currently he is a Wolfson Research Merit Award holder from the Royal Society. He received his PhD in 2001 from the University of Cambridge (in Trinity College). He was an Engineering and Physical Science Research Council (EPSRC) Advanced Research Fellow and winner of the Philip Leverhulme Prize (2007). He was a lecturer at the Bristol University and a Junior Research Fellow in Fitzwilliam College, Cambridge. He was a visiting Professor at the Carleton University, University of Johannesburg and a visiting scientist at the Los Alamos National Laboratory. His research areas are multidisciplinary in nature and include uncertainty quantification in dynamic systems, computational bio & nanomechanics (nanotubes, graphene, nano-bio sensors), dynamics of complex systems, inverse problems for linear and non-linear dynamics and vibration energy harvesting. He has published more than 170 international journal papers and 100 conference papers in these areas.