

BOSE INSTITUTE COLLOQUIUM

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Main Auditorium, Unified Academic Campus
Bose Institute

Prof Peter Coveney

*Professor of Physical Chemistry
Honorary Professor of Computer Science
Director of the Centre for Computational Science (CCS)
University College London, 20 Gordon Street, 132, London,
WC1H 0AJ, United Kingdom*

Title and Abstract :

Digital You: The Virtual Future of Medicine

The virtual human concept is a compelling one, offering an in-silico environment — now known as a digital twin — within which truly personalized medicine can be implemented, taking into account the specific features of every one of us as an individual, from our personal genome to the anatomy of our connected organ systems, and beyond into human populations and clinical trials. Such virtual humans will not only support medical and clinical treatment and decision making, they will also reduce the need for animal testing and serve as personal avatars which will assist every one of us in making healthcare and lifestyle choices. The theory, modelling, software, and computational challenges associated with the virtual human are immense and will require many years of intensive research effort to bring to fruition. However, the modern principles of modular assembly of tried and tested components will take advantage of the considerable progress already being made in many aspects of the overall virtual human. Indeed, building virtual humans presents a multiscale challenge, as we must integrate data and models at every level ranging between molecular, subcellular, cells, tissues, and organs (and even beyond the single human to population health to address epidemiological issues). My talk will exchange recent breakthroughs in HPC and make comparison with other ambitious digital twin projects underway today and outline several biomedical issues which are being addressed today, based on various components of the future virtual human. These examples illustrate how future patient-specific medical treatments will draw increasingly on the massive power of modern IT systems, including big data, artificial intelligence, and supercomputing.



Prof Peter Coveney

