4th International Symposium on
Energy Challenges & Mechanics
- working on small scales

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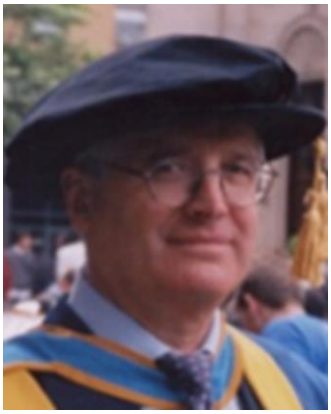
Opening Plenary Speaker of the

4th INTERNATIONAL SYMPOSIUM ON ENERGY CHALLENGES AND MECHANICS



Professor Kornyshev, by background a theoretical physicist, is renowned for his works at the interface of physics, chemistry and biology. His Masters degree was in Theoretical Nuclear Physics (1970, MIFI), PhD in Theoretical and Mathematical Physics (1974, Acad. Sci. USSR), and DSc in Physical Chemistry and Electrochemistry (1986). His career started in 1974 at the Frumkin Institute in Moscow, were he worked for 19 years. Then, for 10 years he was leading a theory division in one of the Institutes of Research Centre "Jülich", Germany, later combined with Professorship of Theoretical Physics at the University of Düsseldorf. Since 2002 he holds a Chair of Chemical Physics at Imperial College London.

He is known specifically for his pioneering and seminal works in the theory of electrochemical interfaces, solvation, hydration forces, electron and proton transfer in solutions and in complex environment (from membranes to nanodevices and single molecules), fuel cells and supercapacitors. His 2007 work on electrified interfaces of ionic liquids has lead to a paradigm change in understanding of the features of electrical double layer in these new systems, the area important for supercapacitors, where he worked consistently on both equilibrium and dynamic properties of charge storage at flat and nanostructured electrodes. Another hot area of his studies has opened new directions in self-assembled ultra-low voltage electrovariable optics, important for electrotuneable lenses, mirrors, windows, optical filters and switches. Since 1997 one of his main research areas has been the theory of interactions of helical biomolecules in solution. As a result, together with S. Leikin (NIH) he has laid foundations of the theory of DNA-DNA interactions and DNA aggregation. This work led them to a prediction in 2001 of a protein-free, electrostatic mechanism of recognition of homologous genes from a distance without unzipping prior homologous recombination, the existence of which was approved experimentally in 2008 by Imperial/NIH team and in 2009 by a consortium of researchers at Harvard University.

Through his career, Alexei Kornyshev has been cooperating with many researchers in USA, Europe, Israel, and China. He was a recipient of prestigious awards: 1991 Humboldt Prize in Physical Chemistry and Electrochemistry, 2003 EFCF Christian-Friedrich Schönbein Contribution-to-Science medal, 2003 Royal Society Wolfson Merit Research Award, 2006 RSC Geoffrey Barker Electrochemistry Medal, 2010 RSC Interdisciplinary Prize, Medal, and Lectureship. He is an elected Fellow of 4 learned societies: Institute of Physics (UK), IUPAC, ISE, RSC, and is a Foreign Member of Royal Danish Academy of Science.

He is also known for his synergetic activities: he organized and directed many conferences devoted to 'intervention' of physics into chemistry, biology and Engineering, and vice versa (c.f. just five such conferences at the International Centre for Theoretical Physics, Trieste, the last one - "From DNA inspired Physics to Physics Inspired Biology"). A series of books and special issues that he had edited and his own chapters in books and encyclopaedias where all across the borders of classical disciplines. His >250 original papers in refereed journals and > 30 monographic articles where published in chemical, physical, biophysical, and energy research journals. He is on Editorial Boards of the IOP J. Physics: Condensed Matter, ChemElectroChem (Wiley), Advances in Physical Chemistry (Hindawi), and is a Senior Panellist for Chemical Physics of Scientific Reports (Nature Publishing Group).