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Semiconductor and graphene nanoelectronics for bio-molecule sensing and manipulation

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Abstract

In the recent years there has been a tremendous interest in using solid-state membranes with nanopores as a new tool for DNA and RNA characterization and possibly sequencing. Among solid-state nanoporous membranes the use of mono-layer graphene is particularly attractive because of its electric versatility, physical robustness and good electronic properties. In this talk I will review progresses made with semiconducting membranes for manipulating and sensing bio-molecules. In this context, I will present a scenario that integrates biology with graphene-based nano-electronics for probing the electrical activity of DNA molecules during their translocation through a graphene membrane nanopore, thereby providing a mean to manipulate them, and possibly identify electronically their molecular sequences.

Biography

Dr. Jean-Pierre Leburton is the G. Stillman Professor of Electrical and Computer Engineering and a full time Research Faculty in the Beckman Institute at UIUC. He joined the University of Illinois in 1981 from Siemens A.G. Research Laboratory in Munich Germany. He is author and co-author of more than 300 technical papers in international journals and books, and served in numerous conferences committees. He is Fellow of IEEE, APS, OSA, the American AAAS, ECS and IOP. In 2004 he was the recipient of the ISCS Quantum Device Award. In 2011 he was elected to Royal Academy of Sciences of Belgium.