

Abstract Submitted
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Bionanoelectronic devices based on 1d-lipid bilayers on nanotube and nanowire templates¹ ALEKSANDR NOY, Lawrence Livermore National Laboratory — Biological molecules perform sophisticated functions in living systems with complexity often far exceeding most of man-made devices and objects. Direct integration of biological components with electronic circuits could drastically increase their efficiency, complexity, and capabilities and result in novel sensing and signaling architectures. Yet, one of the obstacles for this vision of a bionanoelectronic circuit is the absence of a versatile interface that facilitates communication between biomolecules and electronic materials. We have been building platforms that integrates membrane proteins with one-dimensional inorganic materials such as carbon nanotubes and silicon nanowires. In our devices, a nanotube or nanowire is covered by a lipid bilayer that serves both as a universal membrane protein matrix and an insulating shield. We will discuss the fabrication and properties of these “shielded” nanowires and of their use in bionanoelectronic devices that incorporate working membrane proteins in an electronic circuit.

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