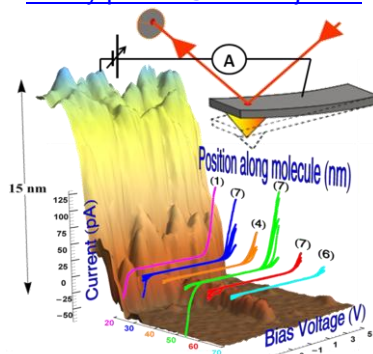


## Charge Transport in single DNA-Based Molecules

Danny Porath

Institute of Chemistry and Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, 91904 Israel

[danny.porath@mail.huji.ac.il](mailto:danny.porath@mail.huji.ac.il)



DNA is primarily and with no doubt the most important biological molecule. But its double-strand recognition, as well as the ability to control its sequence and manipulate its structure open a multitude of ways to make it useful for molecular electronics. Step by step we improve the synthesized constructs and the measurement methods of single DNA-based molecules. In this lecture I will report on our progress in producing and measuring DNA-based building blocks towards the construction of DNA-based programmable circuits.

- [1] "Direct measurement of electrical transport through DNA molecules", Danny Porath, Alexey Bezryadin, Simon de Vries and Cees Dekker, **Nature** **403**, 635 (2000). Cited 1312 times
- [2] "Charge Transport in DNA-based Devices", Danny Porath, Rosa Di Felice and Gianaurelio Cuniberti, Topics in Current Chemistry Vol. **237**, pp. 183-228 Ed. Gary Shuster. Springer Verlag 2004. Cited 193 times
- [3] "Direct Measurement of Electrical Transport Through Single DNA Molecules of Complex Sequence", Hezy Cohen, Claude Nogues, Ron Naaman and Danny Porath, **PNAS** **102**, 11589 (2005). Cited 201 times
- [4] "Long Monomolecular G4-DNA Nanowires", Alexander Kotlyar, Nataly Borovok, Tatiana Molotsky, Hezy Cohen, Errez Shapir and Danny Porath, **Advanced Materials** **17**, 1901 (2005). Cited 70 times
- [5] "Electrical characterization of self-assembled single- and double-stranded DNA monolayers using conductive AFM", Hezy Cohen et al., **Faraday Discussions** **131**, 367 (2006). Cited 42 times
- [6] "High-Resolution STM Imaging of Novel Poly(G)-Poly(C)DNA Molecules", Errez Shapir, Hezy Cohen, Natalia Borovok, Alexander B. Kotlyar and Danny Porath, **J. Phys. Chem. B** **110**, 4430 (2006). Cited 24 times
- [7] "Polarizability of G4-DNA Observed by Electrostatic Force Microscopy Measurements", Hezy Cohen et al., **Nano Letters** **7**(4), 981 (2007). Cited 56 times
- [8] "Electronic structure of single DNA molecules resolved by transverse scanning tunneling spectroscopy", Errez Shapir et al., **Nature Materials** **7**, 68 (2008). Cited 93 times
- [9] "A DNA sequence scanned", Danny Porath, **Nature Nanotechnology** **4**, 476 (2009).
- [10] "The Electronic Structure of G4-DNA by Scanning Tunneling Spectroscopy", Errez Shapir, et al., **J. Phys. Chem. C** **114**, 22079 (2010).
- [11] "Energy gap reduction in DNA by complexation with metal ions", Errez Shapir, G. Brancolini, Tatiana Molotsky, Alexander B. Kotlyar, Rosa Di Felice, and Danny Porath, **Advanced Materials** **23**, 4290 (2011).
- [12] "Quasi 3D imaging of DNA-gold nanoparticle tetrahedral structures", Avigail Stern, Dvir Rotem, Inna Popov and Danny Porath, **J. Phys. Cond. Mat.** **24**, 164203 (2012).
- [13] "Comparative electrostatic force microscopy of tetra- and intra-molecular G4-DNA", Gideon I. Livshits, Jamal Ghabboun, Natalia Borovok, Alexander B. Kotlyar, Danny Porath, **Advanced materials** **26**, 4981 (2014).
- [14] "Long-range charge transport in single G4-DNA molecules", Gideon I. Livshits et. al., **Nature Nanotechnology** **9**, 1040 (2014).
- [15] "Synthesis and Properties of Novel Silver containing DNA molecules", Gennady Eidelstein et. al., **Advanced Materials** **28**, 4839 (2016).