# Functional DNA origami nanotubes for nanoelectronics

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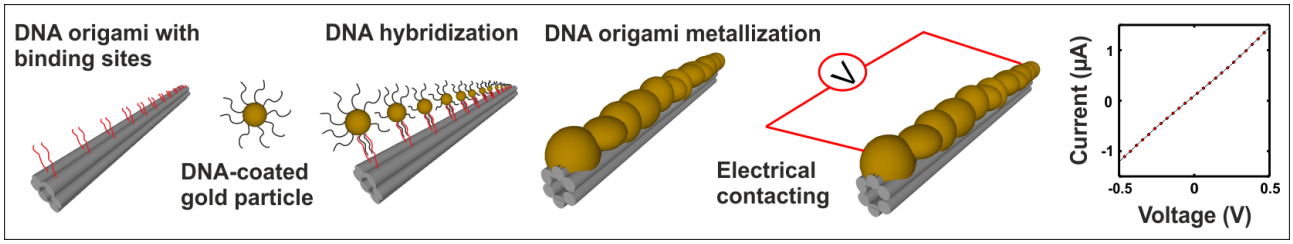
DNA origami [1] has become a key technique for designing well-defined nanostructures with any desired shape [2] and for the controlled arrangement of nanostructures with few nanometer scales [3]. These unique features of DNA origami make it a promising candidate for use as a scaffold for nanoelectronics [4] and nanophotonics [5] device fabrication.
In this work, we first demonstrate a compelling alternative approach to generate ordered arrays of DNA nanotubes on topographically patterned surfaces [6]. To this end, we combine two bottom-up techniques for nanostructure fabrication, i.e., DNA origami self-assembly and self-organized nanopattern formation on silicon surfaces during ion sputtering, thus avoiding the necessity of lithographic processing or chemical modifications. Then, we present the high-yield synthesis of high-density gold nanoparticle (AuNP) arrangements on DNA origami nanotubes with few unbound background nanoparticles and fabricate large arrays of aligned DNA origami nanotubes decorated with a high density of AuNPs [7]. The high yield of AuNP assembly was achieved by careful control of the buffer and the AuNPs concentrations and the hybridization time on Si surface. In addition, we optimize the metallization of DNA origami nanotubes to create DNA origami-templated nanowires and develop a platform for electrical contacting of those nanowires. We also demonstrate the assembly of heterogeneous nanostructures on a single DNA origami nanotube.

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