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Seeks to make bottom-up biomolecular devices. What kind of electronic properties and structures does DNA have? DNA is a very good scaffold for construction, 2nm width, 1D chain. Expect conductivity because of base stacking, but no consensus on its conductive properties. Placed Poly(dG)Poly(dC) on SiO_2/Si. XPS spectra, 5 eV difference between HOMO and LUMO, appears to acts as a wide gap semiconductor. To control electrical conductivity, must dope with hole or electron injection. Chemical, electrical or photo-doping. Scheme of the controlled conjugation of Au nanoparticles. Complementary strands with cobalt particles make nanoscale magnetic memory. Recently made 5-nm gold nanoparticle arrays on surface, using stepped surface of sapphire (0001) substrate and gold particles align with DNA and steps.