PI Name	Institution	Title	Grant	Years Awarded	Funding Institute
Makrides, Savvas C	EIC Laboratories, Inc.	Synthetic Nanostructures For Single Molecule Sequencing	R41 HG002342	2 years	NHGRI

The overall goal of this project is to fabricate and isolate single nanopore structures in a robust polymeric support membrane and to demonstrate their use for the high speed sequencing of single molecules of single stranded nucleic acids. Au nanopores nominally approximately 50Angstroms in diameter will be prepared in polycarbonate with a molecularly engineered "lip" of controlled inner diameter of < 20Angstroms and < 10Angstroms long. Single stranded polynucleotides will be driven electrophoreticaly through isolated single pores and transient current blockades measured as the individual nucleotide moieties pass through the lip. The magnitude of the blockades will be used to develop the nucleotide sequence. Such a device could sequence >l0.3 bases/sec. PROPOSED COMMERCIAL APPLICATION: DNA sequence/diagnostic analysis technologies have applications in biomedical research, including pure and applied biology, drug discovery, infectious agent monitoring; clinical diagnosis and pathogen detection; quality control in the food industry; environmental monitoring, industrial processing, including the monitoring of biological processes, and animal husbandry and agriculture.

Williams, John G	Li-Cor Biosciences, Inc.	A Synthetic Approach To Single Molecule DNA Sequencing	R44 HG002066	3 years	NHGRI

A new approach to single molecule DNA sequencing is proposed. Single molecule methods can be applied to DNA isolated directly from a subject organism, eliminating the need to clone, map and sort DNA fragments prior to sequencing. The need for electrophoretic separation is eliminated and reagent consumption is minimal, promising unprecedented low cost. Single molecule detection has been developed and practiced by physicists and chemists for over 10 years. The crucial optical and detection systems needed for single molecule sequencing now exist. In the Phase I proposal, enzymes and novel labeled nucleotides were identified for use in single molecule sequencing. In Phase II, a nanofabricated flowcell and associated single molecule optics will be developed for monitoring nucleotide incorporation by polymerase. The success of this project will create a new paradigm in DNA sequencing technology. PROPOSED COMMERCIAL APPLICATIONS: A genomic DNA sequencing technology that eliminates the need for cloning, physical mapping and electrophoresis would have great appeal to the academic and industrial genomic research community.