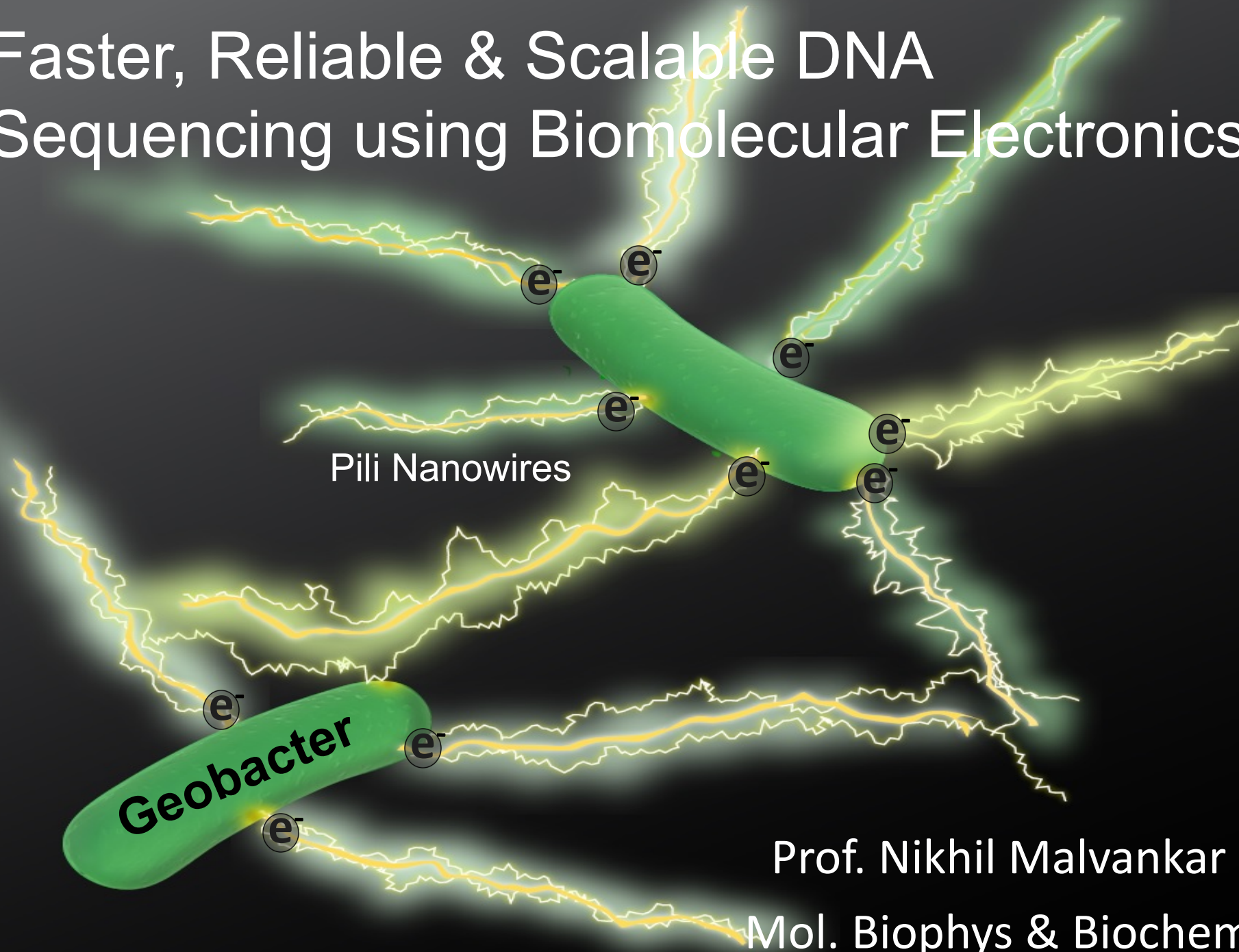


Faster, Reliable & Scalable DNA Sequencing using Biomolecular Electronics



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Mol. Biophys & Biochem

DNA is the **Software of Life**

DNA holds the fundamental information on how all biology works, in health and disease, in individuals and populations, and across the entire ecosystem

Reading DNA, on a vast scale, is the key to converting DNA into knowledge, applications, and creating the new DNA economy

The Problem

The Cost of Reading DNA is too high to unlock major new markets

- Point-of-Care Molecular Testing: \$37B by 2021
- Digital Data Storage: \$50B by 2025
- Genome for Precision Medicine: \$25B by 2025

\$100B+

Existing genome sequencing technology

The Market is based on an aging platform

Optical

Indirect detection using
fluorescent labels.














Current platforms are mature, aging and not designed for the needs of Global Precision Medicine

Market Precedents for DNA Sequencing

Valuations driven by \$25 B market projections - “the genomics of things”

Optical detection

Target	Acquisition	Value (M)	Acquirer
	2005	\$140	
	2006	\$120	
	2007	\$600	
Avantome	2009	\$60	
	2010	\$725	
	2014	\$350	

Competition: Noisy changes in *ionic* current

Milestone: Sequence Application

Milestone: Sequence Detection



2011

IPO

\$500M



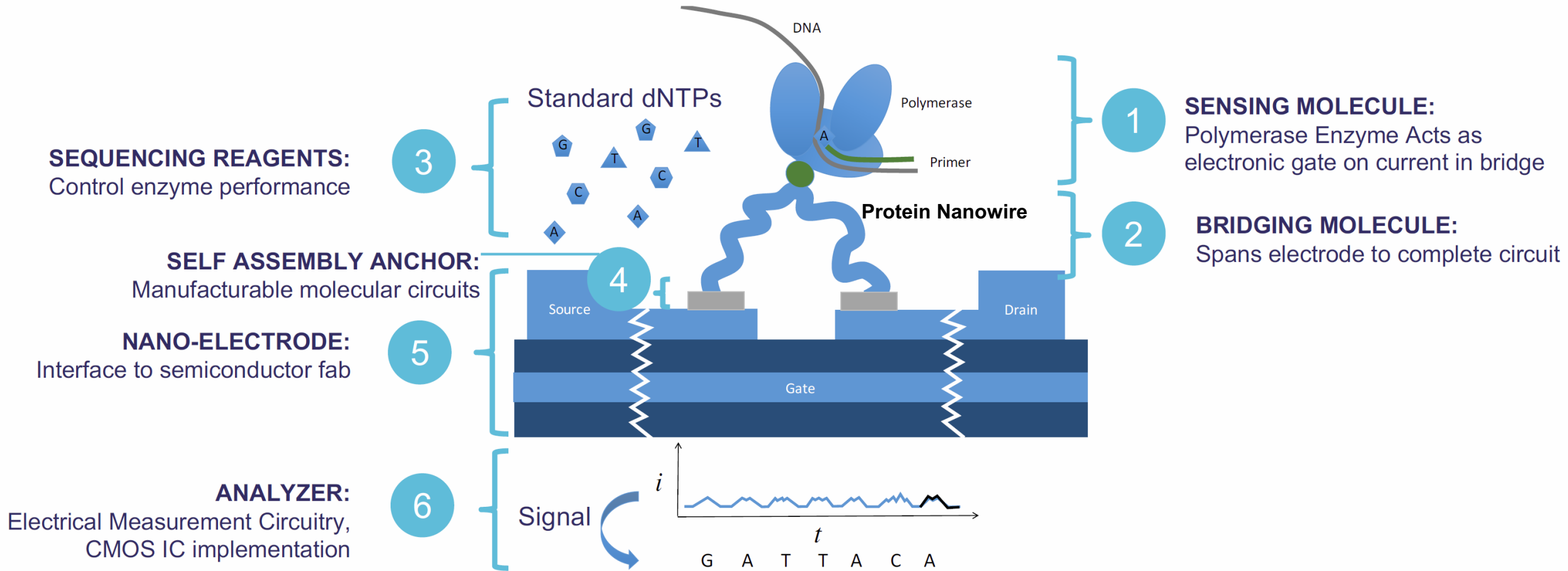
2016

Enterprise Valuation

\$2B

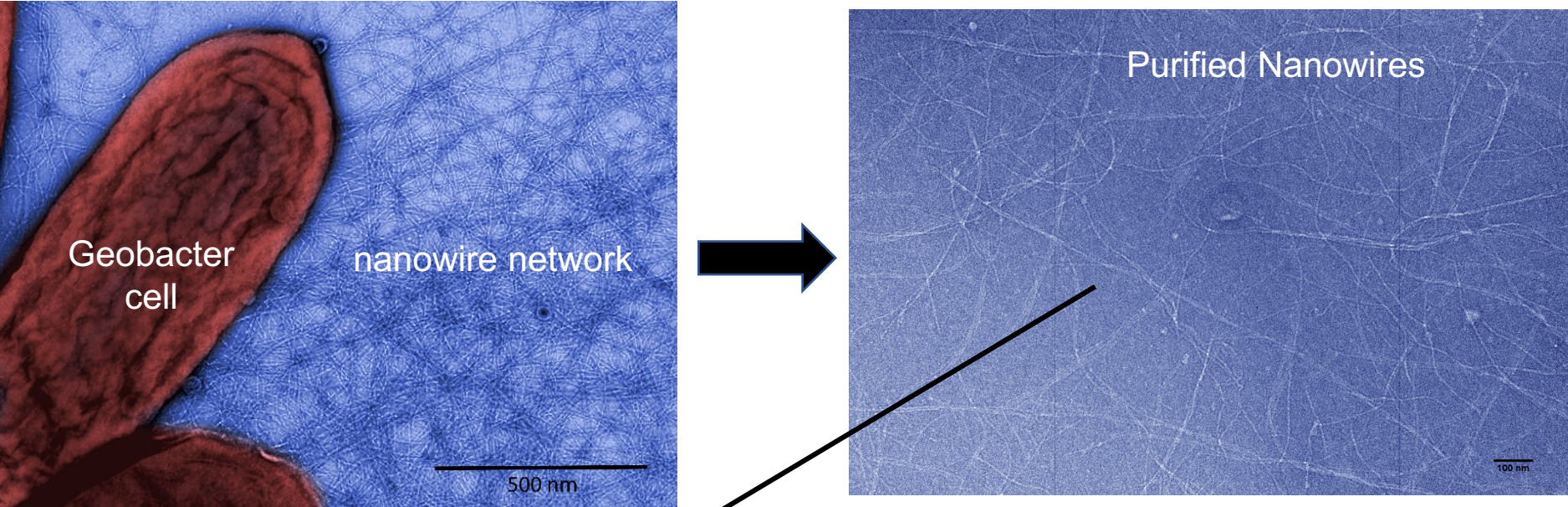
Long Read platforms associated with substandard levels of accuracy

Faster, Reliable, Scalable DNA Sequencing using Protein Nanowires

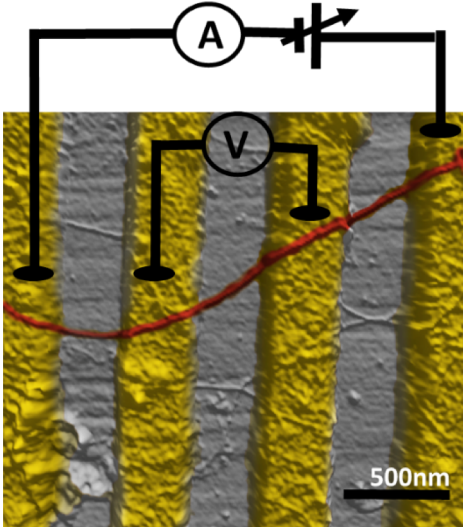
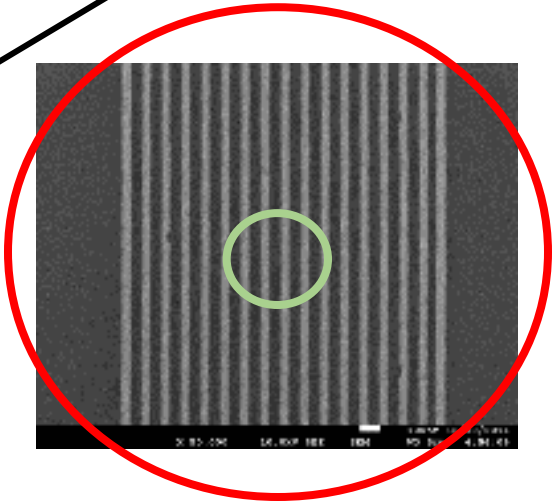
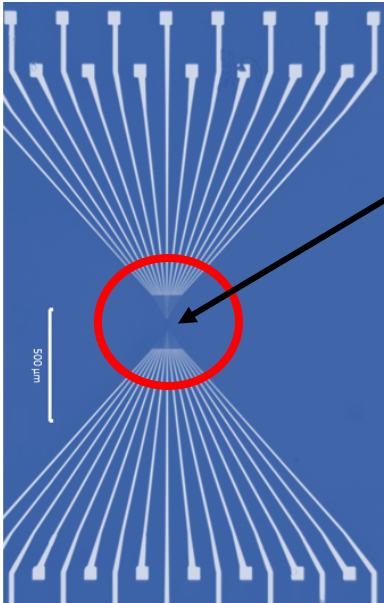


1. DNA to be sequenced will pass through polymerase enzyme which will sense electronic current unique to each base.
2. Protein Nanowires will serve as a bridge to collect this current from polymerase and pass it to nanoelectrodes.
3. Reagents will control the rate of sequencing reaction by tuning the enzyme performance.
4. Thiols will serve as anchor molecules to connect the protein nanowire to gold nanoelectrodes.
5. Nanoelectrodes will be synthesized using CMOS integrated chip (IC) technology.
6. One billionth of 1 amp of current can be detected using analyzer.

Lab Prototype: Sensing trillionth of a current with nanowires



Nano
Electrode
platform



Funds will be allocated towards:

- Sensor Development
- Chip Development
- Chemistry Development
- Systems Integration
- Application demonstration
- Instrument development

Biomolecular Nanoelectronics Team

Prof. Nikhil Malvankar (Inventor of Pili Electronics)

Prof. James Tour (Molecular Electronics Pioneer)

Technology Partner – Roswell Biotechnologies