Conformational Correlation Times for a Tethered Polymer

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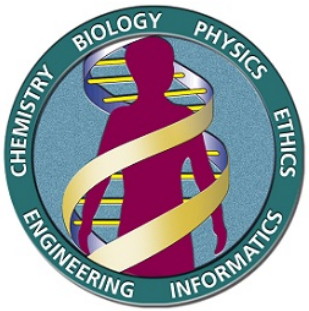
Motivation
The Human Genome
DNA Sequencing
Nanopore Sequencing
Tethered Polymer
Models and Methods
Hydrodynamics
Correlation Times
Results
noHD
HD

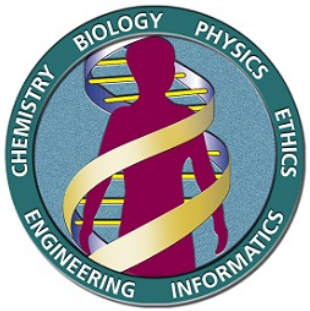
The Human Genome Project



An international scientific research project which...

- mapped approximately 30,000 human genes,
- launched major advancments in medicine and biotechnology,

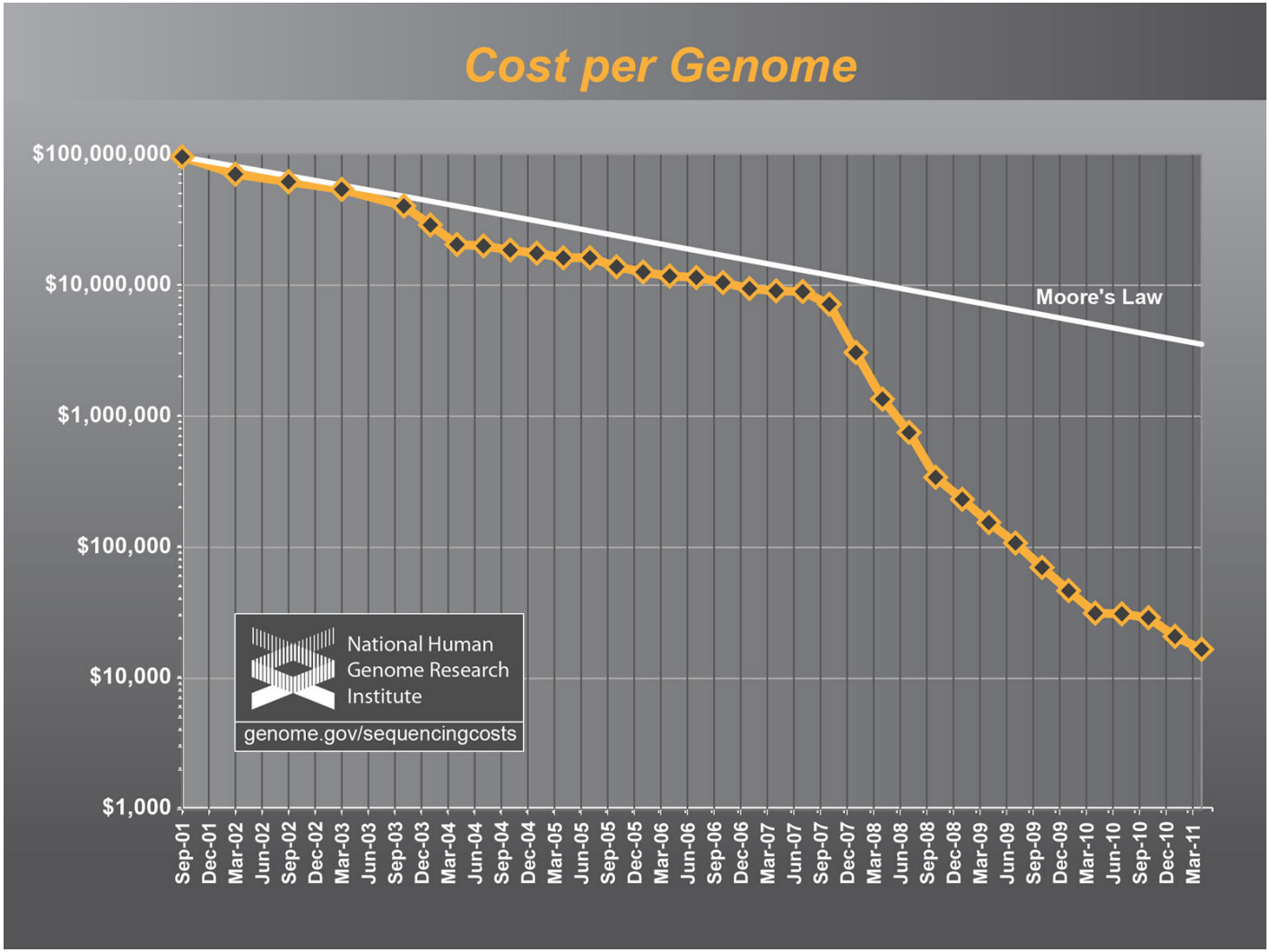
The Human Genome Project



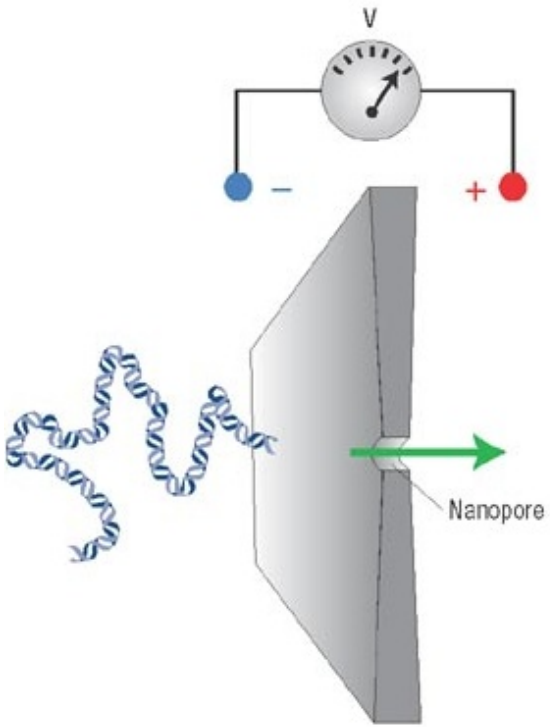
An international scientific research project which...

- mapped approximately 30,000 human genes,
- launched major advancments in medicine and biotechnology,
- took 13 years,
- cost approximately $3 billion.

DNA Sequencing



Nanopore Sequencing



Definition

A nanopore is a small (nanoscopic) hole that can be used as a single-molecule detector.

Nanopore Sequencing

Tethered Polymer

Hydrodynamics

Definition

HD

- Presence of HD interactions
- Fluid force present

Definition

noHD

- Absence of HD interactions
- Uncorrelated random force

Correlation Times

Definition

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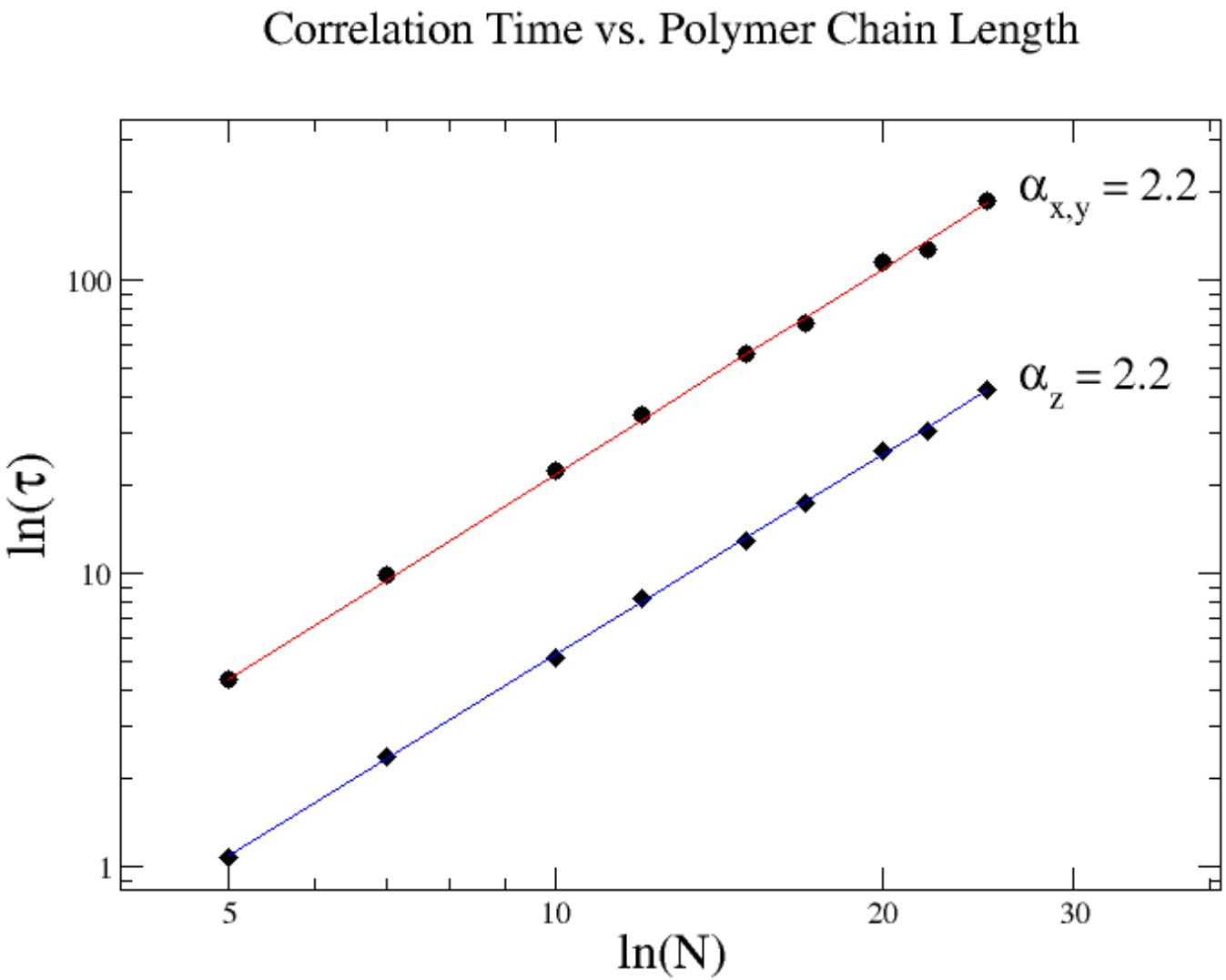
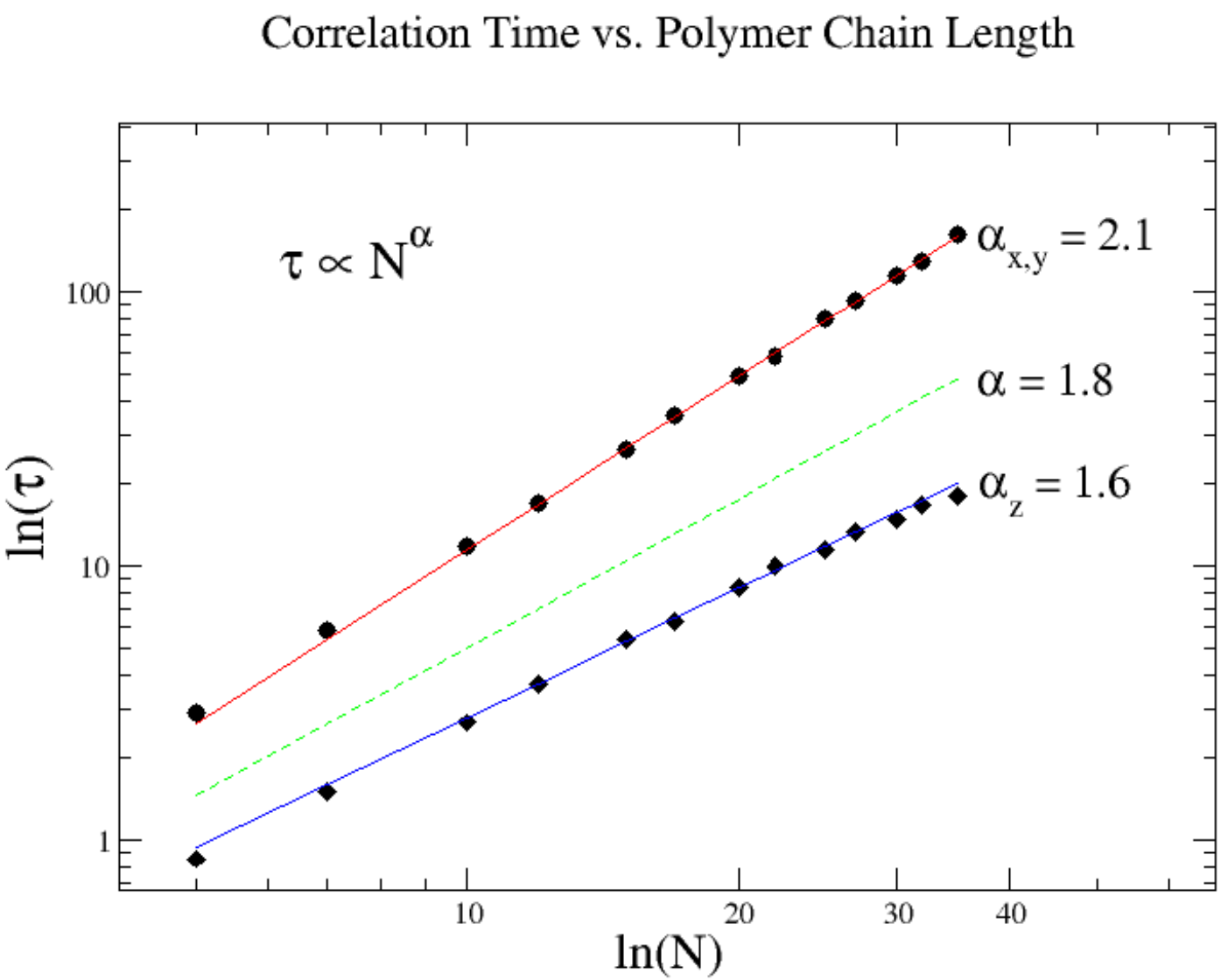
noHD: $\tau_{x,y} \propto N^{2.2}$ $\tau_z \propto N^{2.2}$

HD: $\tau_{x,y} \propto N^{1.8}$ $\tau_z \propto N^{1.8}$

No Hydrodynamics



With Hydrodynamics