Next Gen Science

Structural Biology

Bioinformatics

Genome Informatics

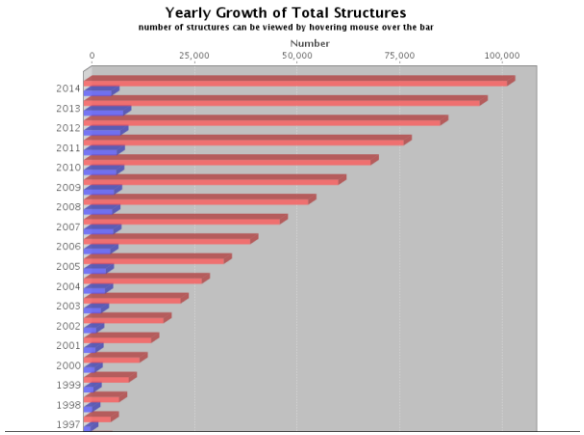
"I will put you through into Looking-glass House. How will you like THAT" said Alice..

In "Through the Looking-glass and what Alice found there" by Lewis Carroll

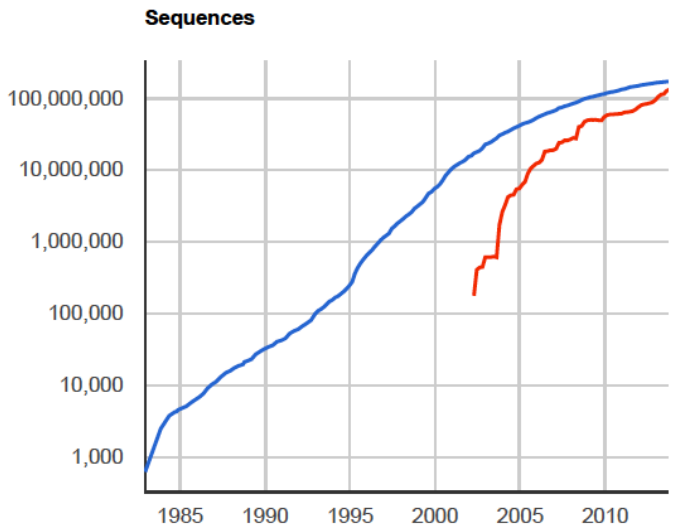
S. Krishnaswamy MKU
mkukrishna@gmail.com

Growth of Technology and Science

- X-ray crystallography
  - Synchrotrons and lasers
  - Robotics
  - Phasing methods
- NMR Spectroscopy
  - Magnets
  - Assignment recipes
  - Model building
- Bioinformatics
  - Storage, analysis
  - Networks
  - Sequences to organisms



10^5



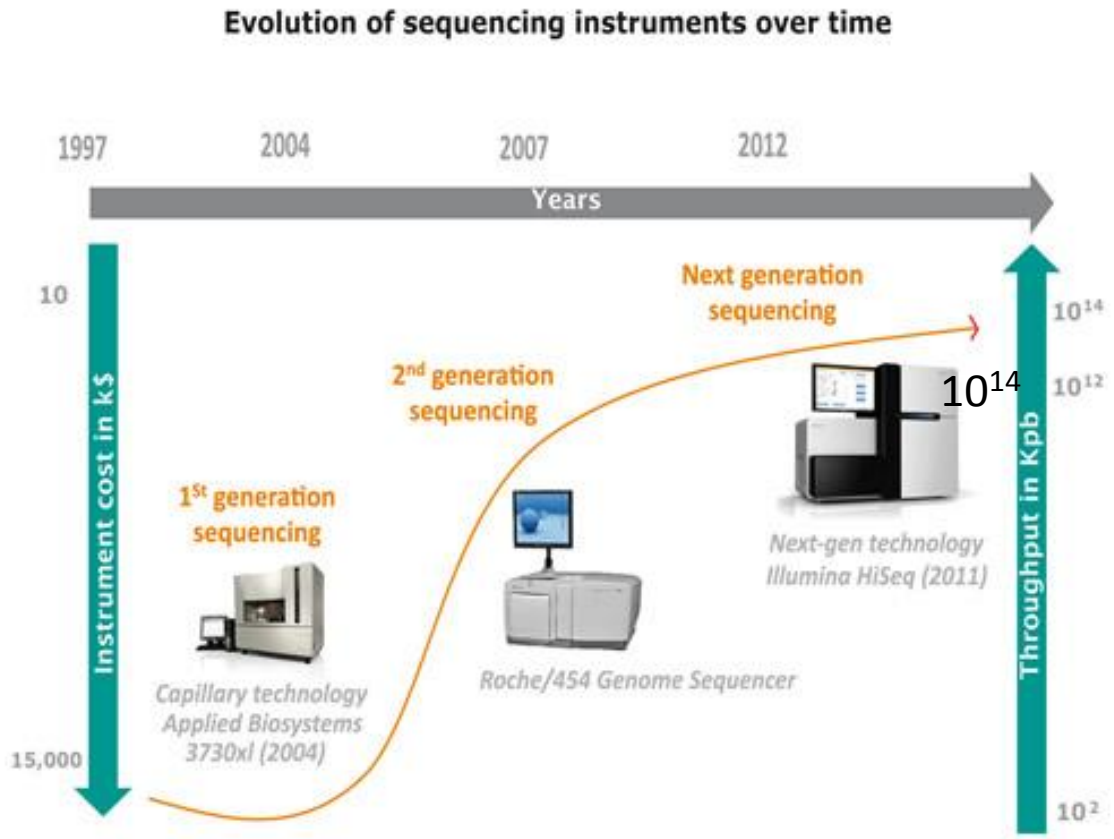
10^8

‘“What matters it how far we go?” his scaly friend replied.
“There is another shore, you know, upon the other side.

S. Krishnaswamy MKU mkukrishna@gmail.com

Growth of Technology and Science

- Sequencing



Mock Turtle:
‘“Will you walk a little faster?” said a whiting to a snail.
“There’s a porpoise close behind us, and he’s treading on my tail.

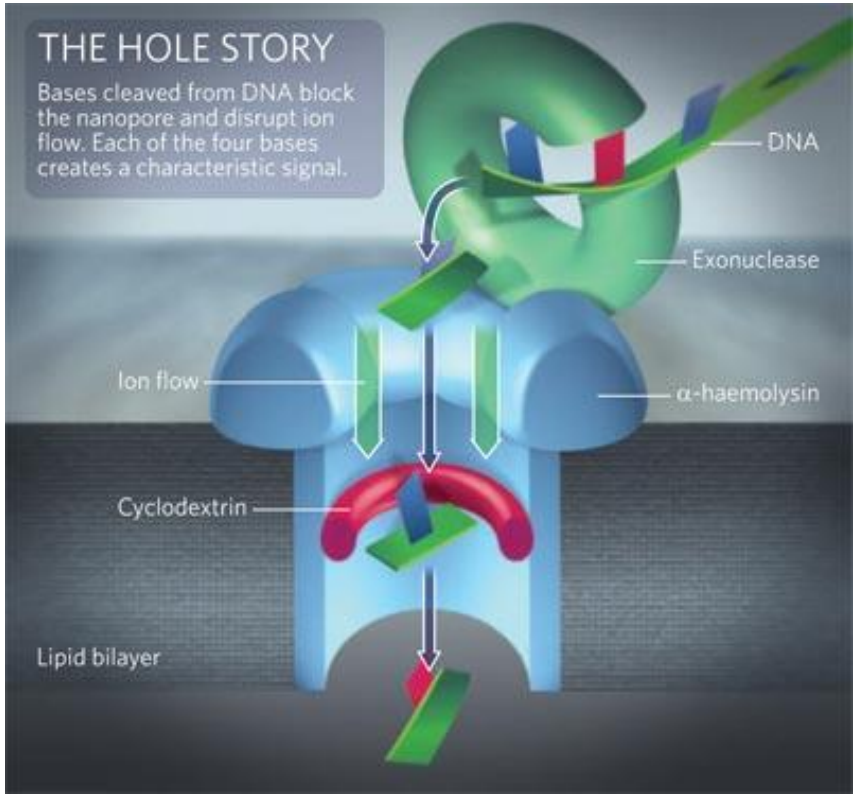
S. Krishnaswamy MKU mkukrishna@gmail.com

'And hast thou slain the Jabberwock?
Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!'
He chortled in his joy.

Structural biology meets NGS

- Nanopore sensing

Proposed 1996



available now

P. aeruginosa O6: single 8.5kilobase read

Oxford Nanopore Technologies
MinION portable USB
GridION stacked hts

S. Krishnaswamy MKU mkukrishna@gmail.com

‘ It seems very pretty,’ she said when she had finished it. ‘but it’s RATHER hard to understand!’ (You see didn’t like to confess, even to herself, that she couldn’t make it out at all.)… in “Through the Looking Glass and What Alice found there”

What lies ahead? Who knows!

- Data generation not so much an issue
- Population ensemble to single molecule
- Applications:

  eg 100K genome project UK,

  Microbiome in animals and plants,

  Systems synthesis
- Questions to be asked:

  evolution; life at the edge; memory; cognition
- New paradigms in biology and computing