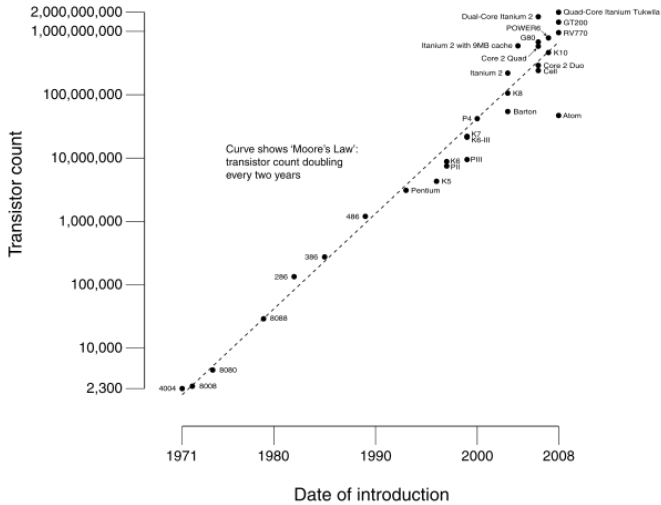# Who will make computers faster?

David Lazar

Moore's Law

CPU Transistor Counts 1971-2008 & Moore's Law

Electrical Engineers?

- 65 nm and 45 nm chips in computers now

- 32 nm this year

- 22 nm expected in 2011

- 16 nm as early as 2013

- 11 nm by 2015 claims Intel
  - marks the beginning of nanoelectronics

Computer Scientists?

- ▶ Computer science is inherently sequential

- ▶ More cores means more pressure to write parallel programs

- ▶ Very high hopes for Haskell
    - ▶ Greatly simplifies parallelism
    - ▶ NASA rumors!

- ▶ Benchmarks are the primary source of data
    - ▶ Compare parallel and non-parallel Fibonacci programs

Chemists?

- Silicon is at its limit

- Carbon-based semiconductors capable of speeds near 1 THz
    - Graphene nanoribbons

- Gallium arsenide is another possibility

- Theoretical benchmarks, research funding, cost analysis