LIGO

Preparing for Life After High School

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14-Sep-2010

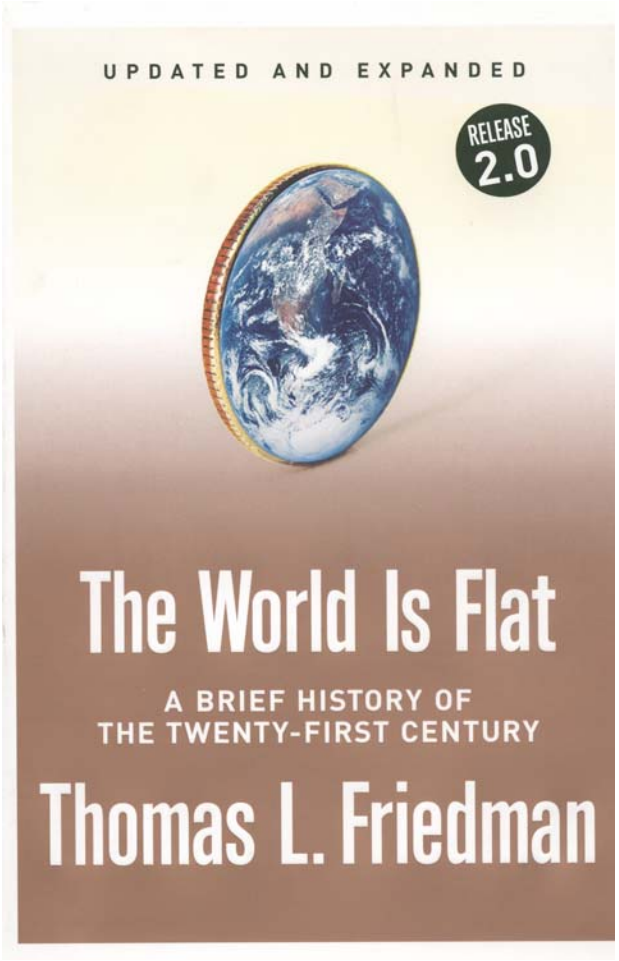
LIGO, a glimpse of the future

- Most sensitive scientific instrument on Earth, built to hunt down the births of black holes hundreds of millions of light years away
- World-leading basic scientific research but also a pathfinder for future technologies: quantum optics, quantum engineering, metrology, large-scale computing, etc.
- Pathfinder for large, collaborative projects: over 1000 scientists and engineers on four continents work as a team to build these complex detectors and analyze the astrophysics data
- Since its birth in 1989, relied on high-speed communications, world-wide web and pervasive digital protocols and software to enhance international collaboration
- Similar techniques have also transformed the world of markets and work and will continue for the forseeable future

What class seat do you want in your trip through the future job market?

- First class?
  - » Roomy seating and lots of choices (dinner with wine!)
- Coach?
  - » A bit tight, but you get to choose your seat (most of the time)
  - » A lot fewer choices (Coffee or pop? Peanuts or a cookie?)
- Freight?
  - » No choices about your handling
  - » Not all that goes in comes back out in good shape
  - » Some of what goes in just gets lost

Required reading for anyone in high school



Globalization 1.0, ca. 1500-1800:
"Where does my country fit into global competition?"

Globalization 2.0, ca. 1800-1990:
"Where does my company fit into global competition?"

Globalization 3.0, since 1990:
"Where do I (we) fit into global competition?"

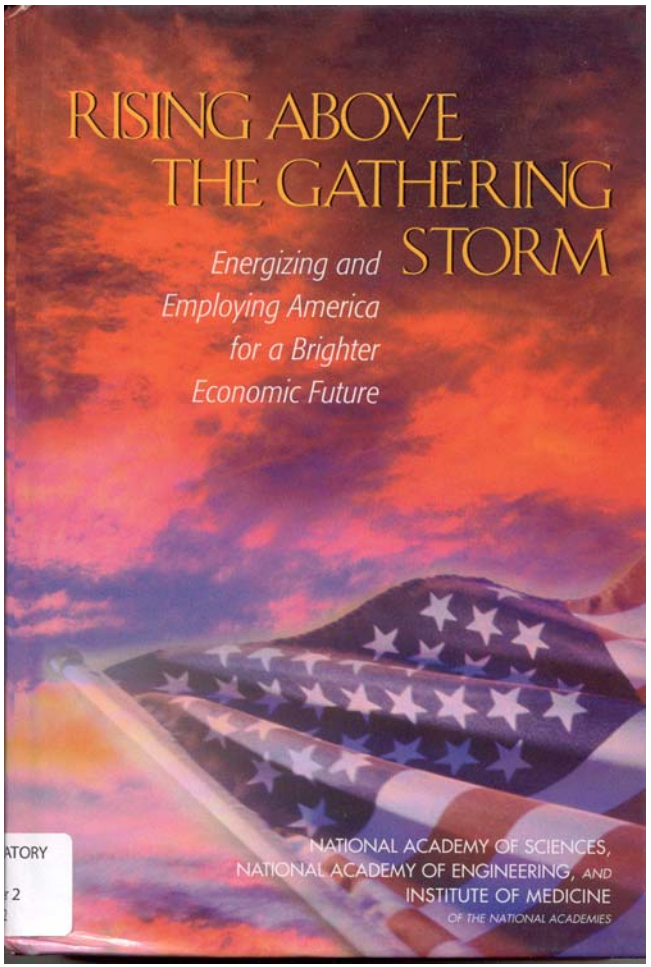
Important numbers to focus on

- The most important number to focus on is 3,000,000,000
  - » This is number of people you will need to compete with for jobs once you enter the job market
  - » Approximately half the world's population today
  - » Most of the other half are younger than you, but they will start looking for jobs during your working years
- Another important number is 5
  - » This is, on average, the predicted number of times you will be changing employers and/or careers before retirement

Some important points to make

- All honest work is honorable
- Unfortunately not all workers are honored
- All workers are in a market
- Many of our elders and ancestors did not have many great opportunities to choose from, but you do
- History is not destiny

What is needed for national prosperity in the future



"Without high-quality, knowledge intensive jobs and the innovative enterprises that lead to discovery and new technology, our economy will suffer and our people will face a lower standard of living." – Executive Summary

"If you can solve the education problem, you don't have to do anything else. If you don't solve it, nothing else is going to matter much." – Alan Greenspan

Possible strategies (more than one can apply)

- First class:
  - » Prepare to ride the innovation wave, since it will affect you anyway, no matter what class you choose
  - » Find or create a niche for your unique talents and dreams
- Coach:
  - » Prepare for local non-out-source-able opportunities
  - » Hard to outsource teachers, fire-fighters, police, welders, isn't it?
  - » Well, remember that 50 years ago most welders were not robots; today's non-robotic welders need a 2-yr college degree (tomorrow's welders may well need a 4-yr college degree)
  - » In some fast-food drive-in facilities the person taking your order and processing the bill may not be in the same state as your car
  - » Robotic surgery over the internet may be just around the corner…
- Freight:
  - » try to out-compete the world by working for less

Innovation is …

- Increasingly rapid in diffusing across society
  - » Automobile - 55 years to spread to 25% of population
  - » Telephone - 35 years
  - » Radio - 22 years
  - » PC - 16 years
  - » Cell phone - 13 years
  - » World Wide Web - 7 years
  - » Current product innovation to market time in electronics industry is 18 months
- Increasingly multidisciplinary and technologically complex
- Collaborative and diverse
- Global

Preparing to compete in the world economy

- In a flat, multidisciplinary world, *subjects don't matter; analytical ability and the creation, integration and concise expression of ideas matter*; isolation of subjects is an industrial-age anachronism
- Content was king until about 1990; *in the "Google age", content is cheap and abundant*: "Education is what's left after you forget everything you learned in school" has never been more true. It's all about learning to learn and learning to think critically.
- A creative, innovative environment *values diversity as an engine of ideas and communication ability as the highway;* being different is now an asset and working with different people is a key skill
- *Integration between culture, education and business is essential* in a global economy

Thanks for the big picture, but what do I do now?

- Become literate and learn to excel
  - » Literacy in Science, Math and Writing/presentation skills will be key to any occupation in the future
- Build imagination and expressive ability
  - » Do something hard; take some risks
  - » Develop skill in Art, Music, Drama or Dance
- If you are not already bilingual, become bilingual
  - » If you are bilingual, consider becoming trilingual
  - » Learn histories and cultures as well as how to order dinner
  - » You will need to “get inside the skin” of many people from many cultures to succeed in future workplaces
- Find your dream and follow it
  - » If you think going to school for 9 months straight is tough, try going to work every day for the next 50 years!

A final thought: "Why does math matter?"

- Larry Page & Sergey Brin, co-founders of Google
- Age: mid-30s
- Net Worth: ~ $18B/ea
- Discipline: computer science
- Creation: mathematical algorithm behind most efficient internet search engines

Google ranked 213th on Forbes 2000 list of the world's largest companies; ranked 33rd in market value ahead of all auto manufacturers, except Toyota; ahead of Boeing, Caterpillar, Dow Chemical, Duke Energy, Florida Power & Light, Monsanto, PepsiCo, …