

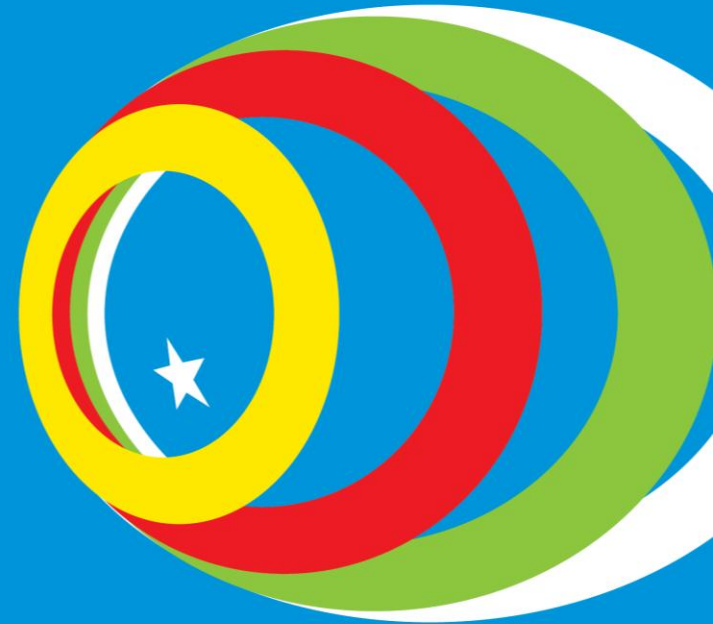


Engineering 2014
Latin America and the Caribbean
Congress and Exhibition

Building a Sustainable
Regional Future

November 4 - 6, 2014 - Centro Costa Salguero - Buenos Aires - Argentina

Exponential Technology Implications for Industry, Humanity's Challenges, and Society

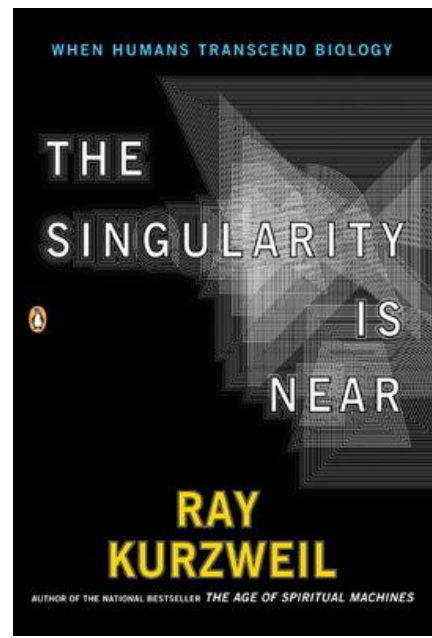
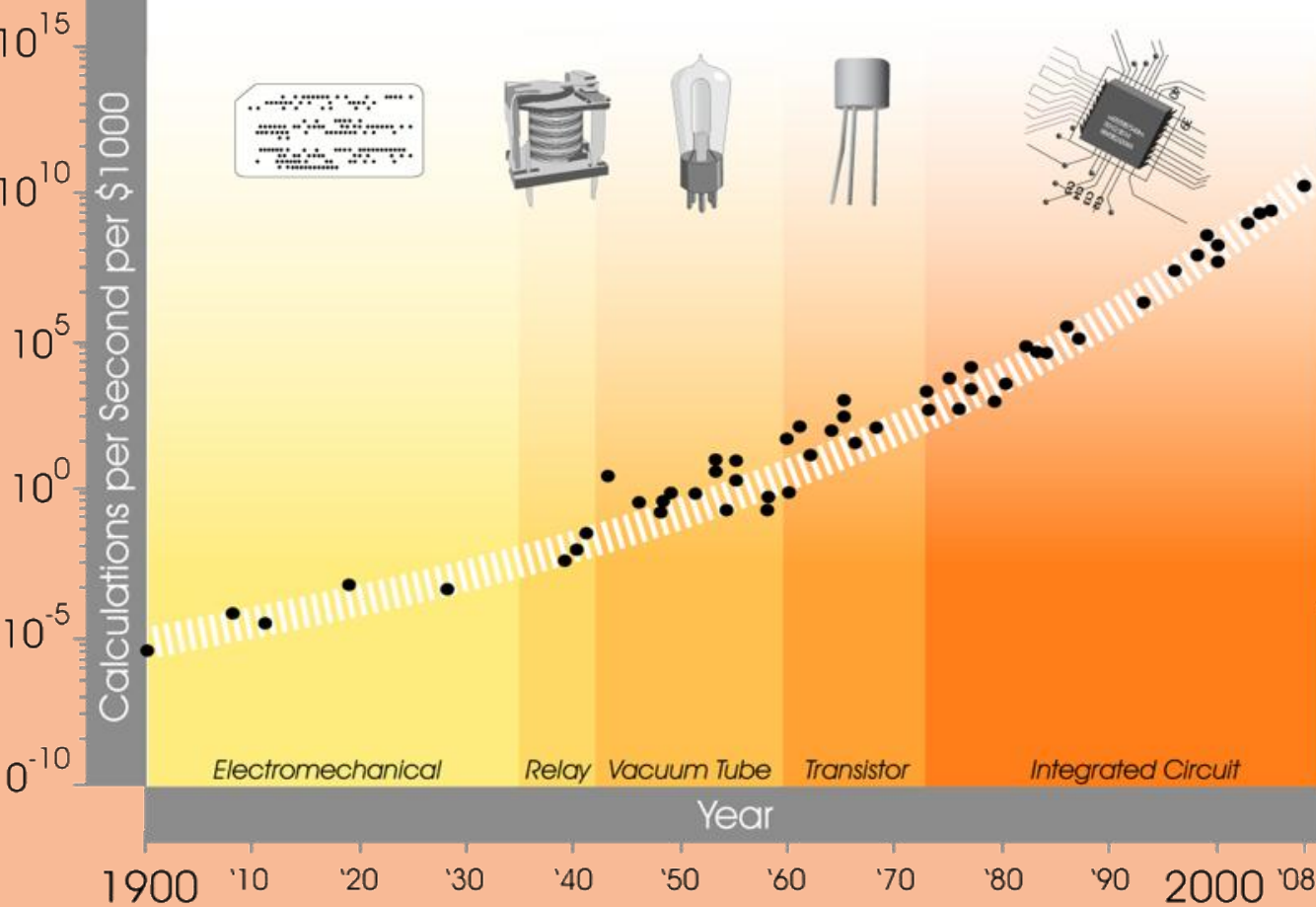


Nicholas Haan
Director of Global Grand Challenges
Singularity University

Exponential Growth of Computing for 110 Years

Moore's Law was the Fifth, not the First, Paradigm to Bring Exponential Growth in Computing

Logarithmic Plot



Exponential Technologies

As technology is digitized, it gets the characteristics of information and can develop exponentially.

Faster,
Cheaper,
Computing
Power



Ubiquitous Networks/Sensors

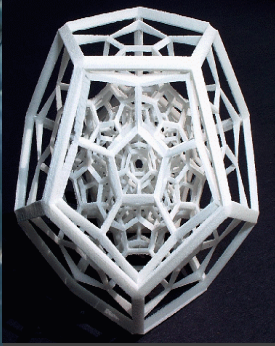
Artificial Intelligence

Robotics

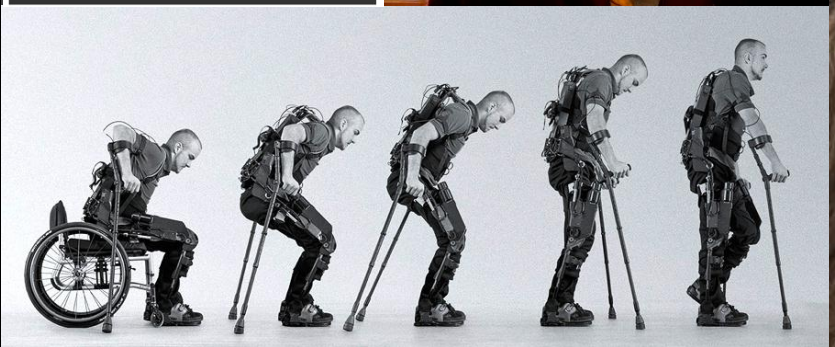
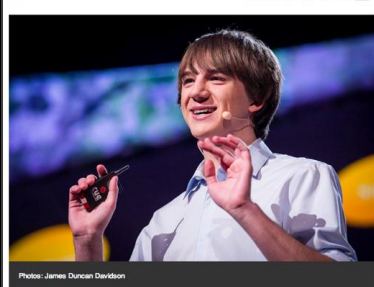
Digital Manufacturing

Synthetic Biology

Materials Sciences



LIVE FROM TED2013
An early detection test for pancreatic cancer:
Jack Andraka at TED2013
Posted by Kate Torgovnick
February 07, 2013 at 9:00 pm EDT



We're programmed to think linearly

30 **Linear**
Steps

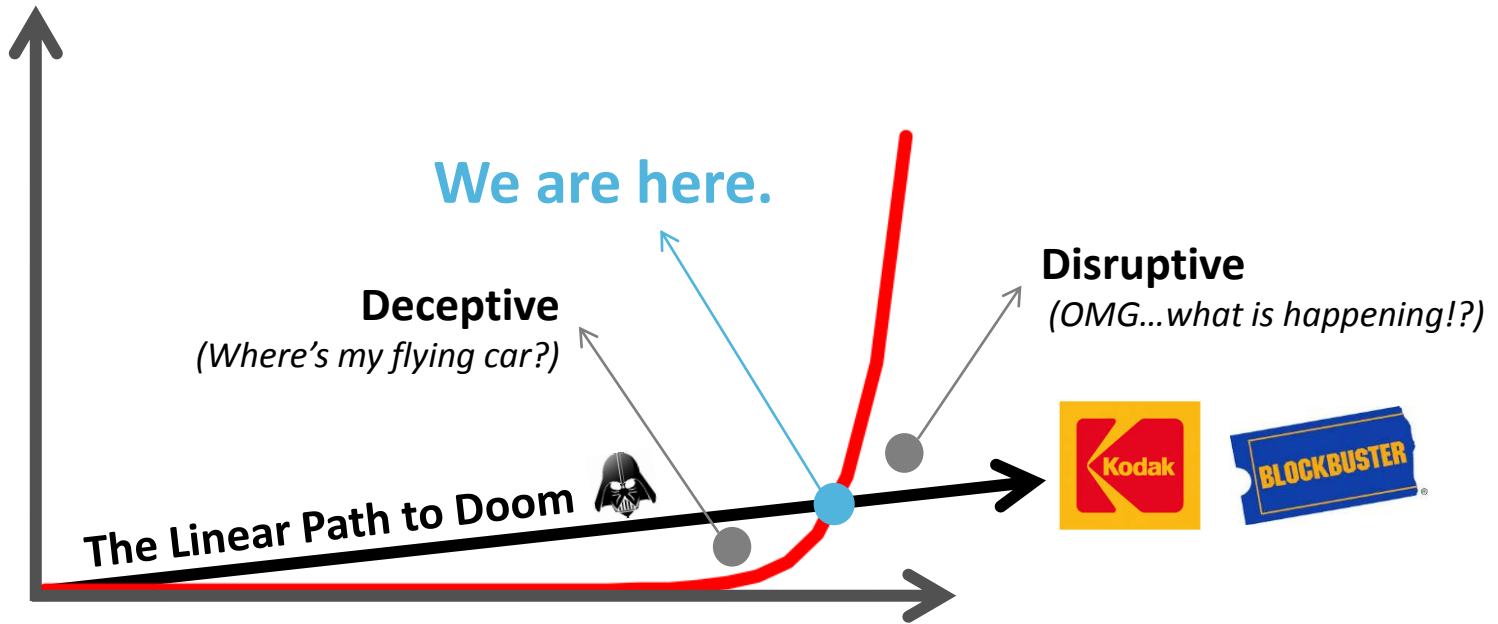


30 **Exponential**
Steps



26X
around
the Earth!

Exponentials are deceptive & disruptive



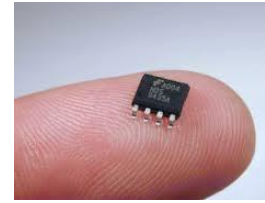


Ray Kurzweil

The Law of Accelerating Returns & Exponential Technologies



Artificial Intelligence



Nano-technology



Robotics



Medicine



Bio-technology



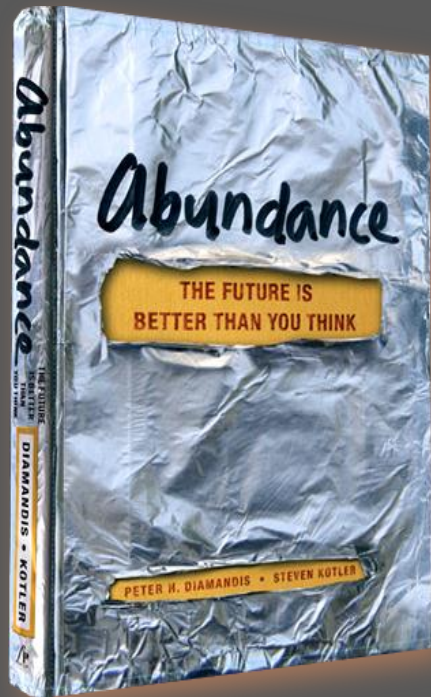
Neuroscience



Computing



Energy



Technology is a
“Resource
Liberating
Force...”



Peter
Diamandis
CoFounder, Exec
Chairman
SingularityUniversity

SCARCITY → ABUNDANCE



Peter Diamandis

The Exponential Framework:
the 4 D's + A Connected World

➤ **Digitized**

➤ **Demonetized**

➤ **Dematerialized**

➤ **Democratized**

**Global &
Connected**



Implications of Exponential Technology

- **Industry & Corporations**
- **Humanity's Grand Challenges**
- **Society**

Implications: Industry

- **'Warp-drive' Opportunities**
- **Disrupt or be disrupted**
- **Innovation at the edge**

Conditions are enabling billion \$ companies

Time to reach \$1B:



46 years



8 years



5 years



18 months

*With lower barriers to entry,
the metabolism of the economy is increasing*

LINEAR



EXPONENTIAL



1996

MarketCap: **\$28B**

Employees: **140,000**



2012

MarketCap: **<\$100M**

Employees: **17,000**



April 2012

MarketCap: **\$1B**

Employees: **13**

Implications: Humanity's Grand Challenges

- **Abundance Mindset**
- **Innovation Empowerment For All**
- **Industry Transformation for Humanity**
- **System-Centered Design**

The State of the World Today





ABUNDANCE THROUGH TECHNOLOGY

Extraordinary Century of Progress

Human life-expectancy more than doubled

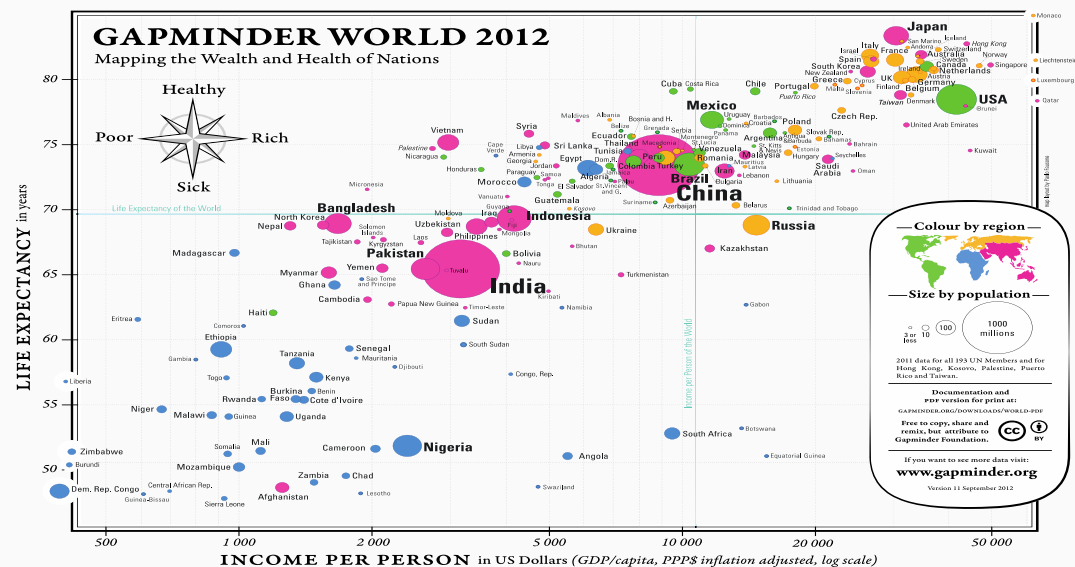
Infant mortality reduced by 90%

Maternal mortality reduced by 99%

Cost of electricity reduced by 20-fold

Cost of transportation reduced 100-fold

Telecom, information reduced by 1000-fold



HANS ROSLING | Swedish Statistician | Gapminder



How will you positively impact
1 billion people in the next decade?

Global Health

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Water

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Energy

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Environment

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Food

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Education

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Security

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Poverty

Singularity University
Preparing humanity for accelerating technological change
How will you improve the lives of a billion people?



Example SU Startup--Miroculus



DISEASE DECODED

Imagine a simple blood test that can tell you, at the molecular level, the exact type of disease you have and its severity before presenting any symptoms.

Imagine using the same test to monitor the success of the treatment

[LEARN MORE](#)

Example SU Startup—Modern Meadow



[HOME](#)

[ABOUT](#)

[TEAM](#)

[NEWS](#)

[CAREERS](#)

[CONTACT](#)

IT TAKES OVER
**75 SQUARE FEET
OF LAND** TO MAKE
ONE HAMBURGER

Capper et al, 2011



News & Updates

June 18, 2014

[Modern Meadow Grazes on \\$10M to Grow Leather Without Cows](#)

June 18, 2014

[Modern Meadow Raises \\$10M to Grow Leather in Labs, Not from Livestock](#)

June 18, 2014

[Modern Meadow Raises \\$10 Million in Series A Funding](#)

February 8, 2014

[Modern Meadow CEO keynoted GFIA 2014 in Abu Dhabi](#)

Making Leather and Meat Better

Modern Meadow applies the latest advances in tissue engineering to develop novel biomaterials to address some of our most pressing global challenges. We develop cultured leather and meat products which require no animal slaughter and much lower inputs of land, water, energy and chemicals.

Corporate-Startup Mashup

Lowes announces partnership with Fellow Robots



Arenas for Industry Transformation

- ✓ Extra Bandwidth
- ✓ Protect Business Ecosystem
- ✓ Harnessing Abundance
- ✓ Policy, Lobbying, Leverage

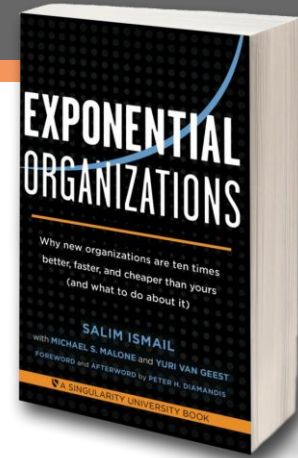
'System-Centered' Design Principles

- ✓ Problem-solving, not product development
- ✓ Technology in context
- ✓ System-wide empathy
- ✓ Engage system components in design process
- ✓ Sustainability

Implications: Society

- ➔ Organizations & Governance
- ➔ Ethics
- ➔ Unemployment
- ➔ Existential—Artificial Intelligence

Elon Musk warns against unleashing artificial intelligence 'demon'; humanity's biggest existential risk.



Thank you!



www.singularityu.org

HANGAR ONE AT NASA AMES RESEARCH CENTER