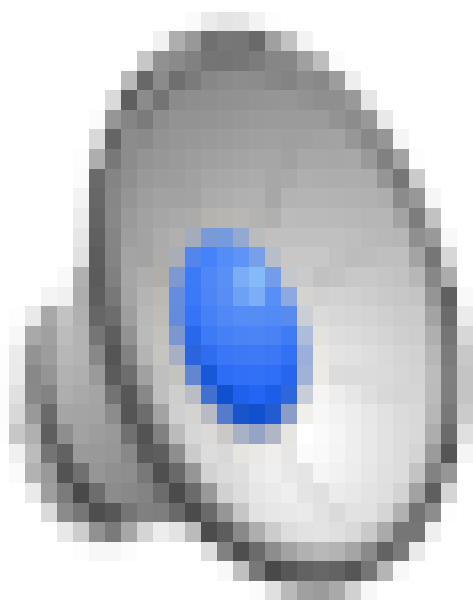


# NAP JUBILEUMCONGRES

**Yuri van Geest**  
*Singularity University*



The Process Industry Competence Network





Singularity  
University





# Founders

Singularity University was jointly founded by Dr. Peter H. Diamandis and Dr. Ray Kurzweil in the fall of 2008.

## The Founders

Singularity University was jointly founded by Dr. Peter H. Diamandis and Dr. Ray Kurzweil. The concept of Singularity University was proposed by Diamandis to Kurzweil and to International Space University colleagues Dr. Robert D. Richards and Michael Simpson, who became Founding Trustees in mid-2007.

## Associate Founders

- |                      |                     |
|----------------------|---------------------|
| Moses Znaimer        | Reese Jones         |
| Keith Kleiner        | David S. Rose       |
| Barney Pell          | Peter L. Bloom      |
| Klee Irwin           | Geoffrey Shmigelsky |
| Sonia Arrison Senkut | Georges Harik       |
| Dan Stoicescu        | Rob Nail            |

## Corporate Founders

- |          |   |
|----------|---|
| Autodesk |  |
| Google   |  |
| KAUFFMAN | NOKIA   |



# 10<sup>9</sup>+

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



*peripheral*



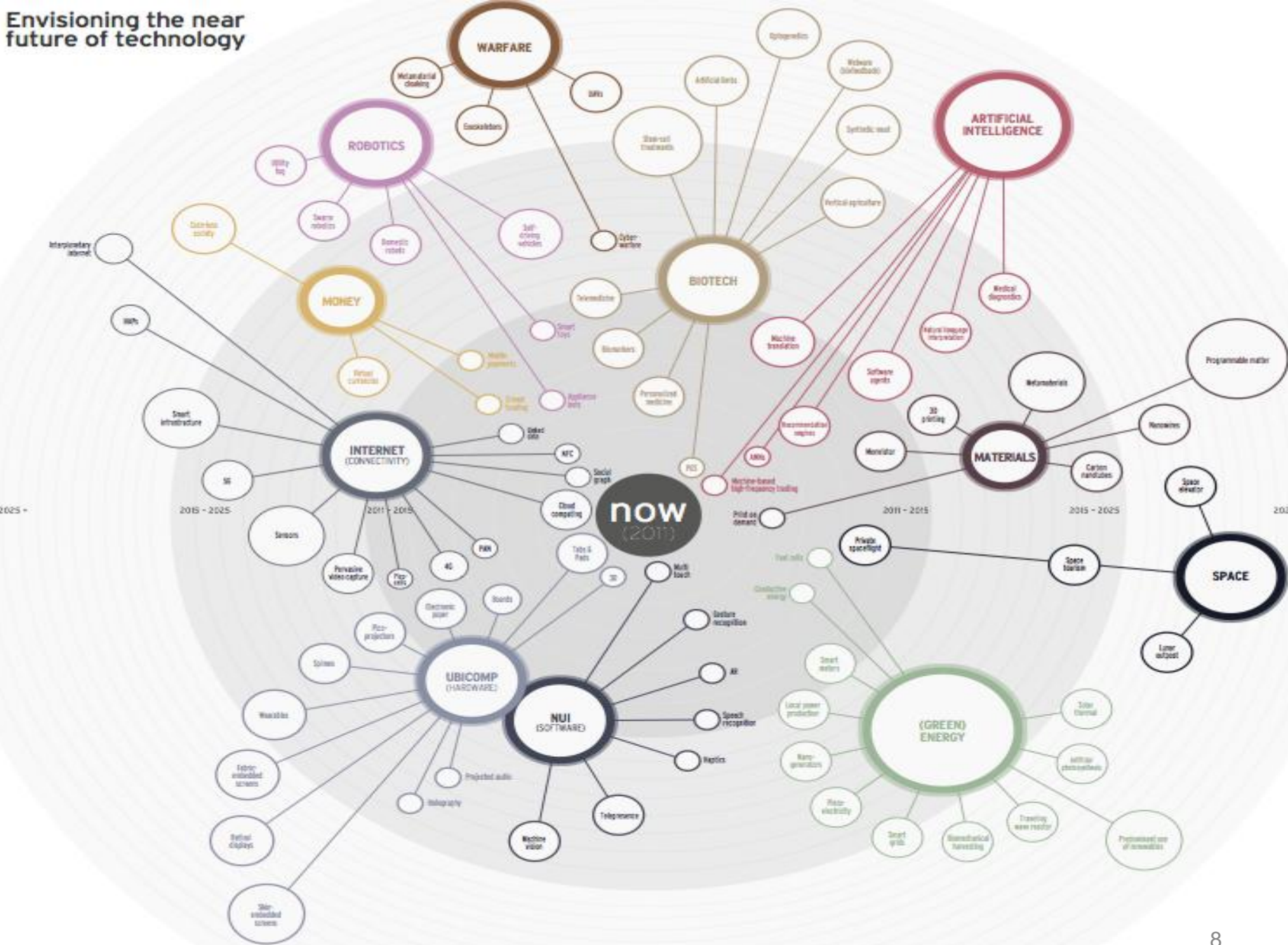
# Accelerating Technologies

AI  
Robotics  
Biotech  
Nanotech  
Medicine  
Neuroscience  
Energy  
Computing



Singularity  
University

Envisioning the near future of technology





# Why information » exponential

// zero friction to move/copy

// zero marginal cost

// apply computation

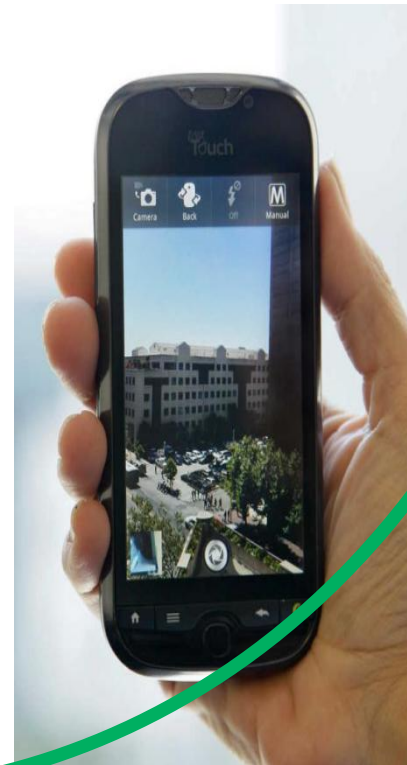
// data correlations

// machine learning

// modeling

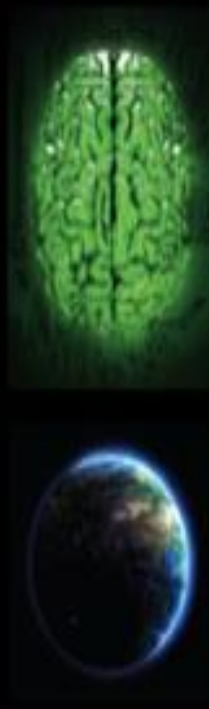
// simulations

// **100%** democratization  
of effort/innovation



# Accelerating Technologies

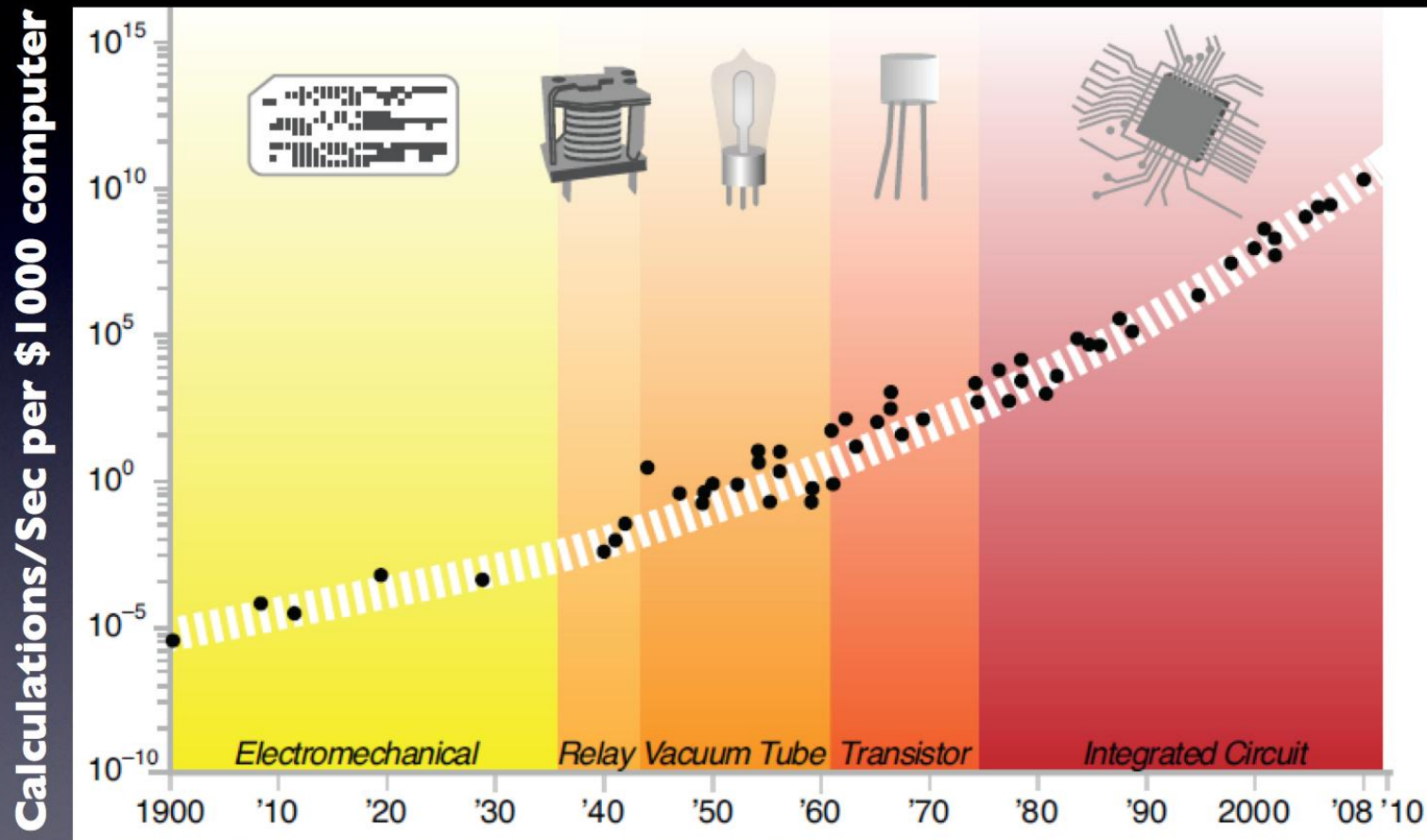
AI  
Robotics  
Biotech  
Nanotech  
Medicine  
Neuroscience  
Energy  
Computing



Singularity  
University

# EXPONENTIAL GROWTH & THE LAW OF ACCELERATING RETURNS

## Moore's Law – 5<sup>th</sup> Paradigm of Exponential Growth





# Exponential Technologies

	<b>Cost (averages) for equivalent functionality</b>	<b>Scale</b>
<b>3D printing</b>	\$40,000 (2007) to \$100 (2014)	400x in 7 years
<b>Industrial robots</b>	\$500,000 (2008) to \$22,000 (2013)	23x in 5 years
<b>Drones</b>	\$100,000 (2007) to \$700 (2013)	142x in 6 years
<b>Solar</b>	\$30 per kWh (1984) to \$0.16 per kWh (2014)	200x in 20 years
<b>Sensors (3D LIDAR sensor)</b>	\$20,000 (2009) to \$79 (2014)	250x in 5 years
<b>Biotech (DNA sequencing of one whole human DNA profile)</b>	\$10 million (2007) to \$1,000 (2014)	10,000x in 7 years
<b>Neurotech (BCI devices)</b>	\$4,000 (2006) to \$90 (2011)	44x in 5 years
<b>Medicine (full body scan)</b>	\$10,000 (2000) to \$500 (2014)	20x in 14 years

Declining Costs

Increasing  
Capabilities

# Facebook's internet.org - Internet Access Globally



ABOUT PROJECTS PRESS CONTACT

Learn about developing for Internet.org



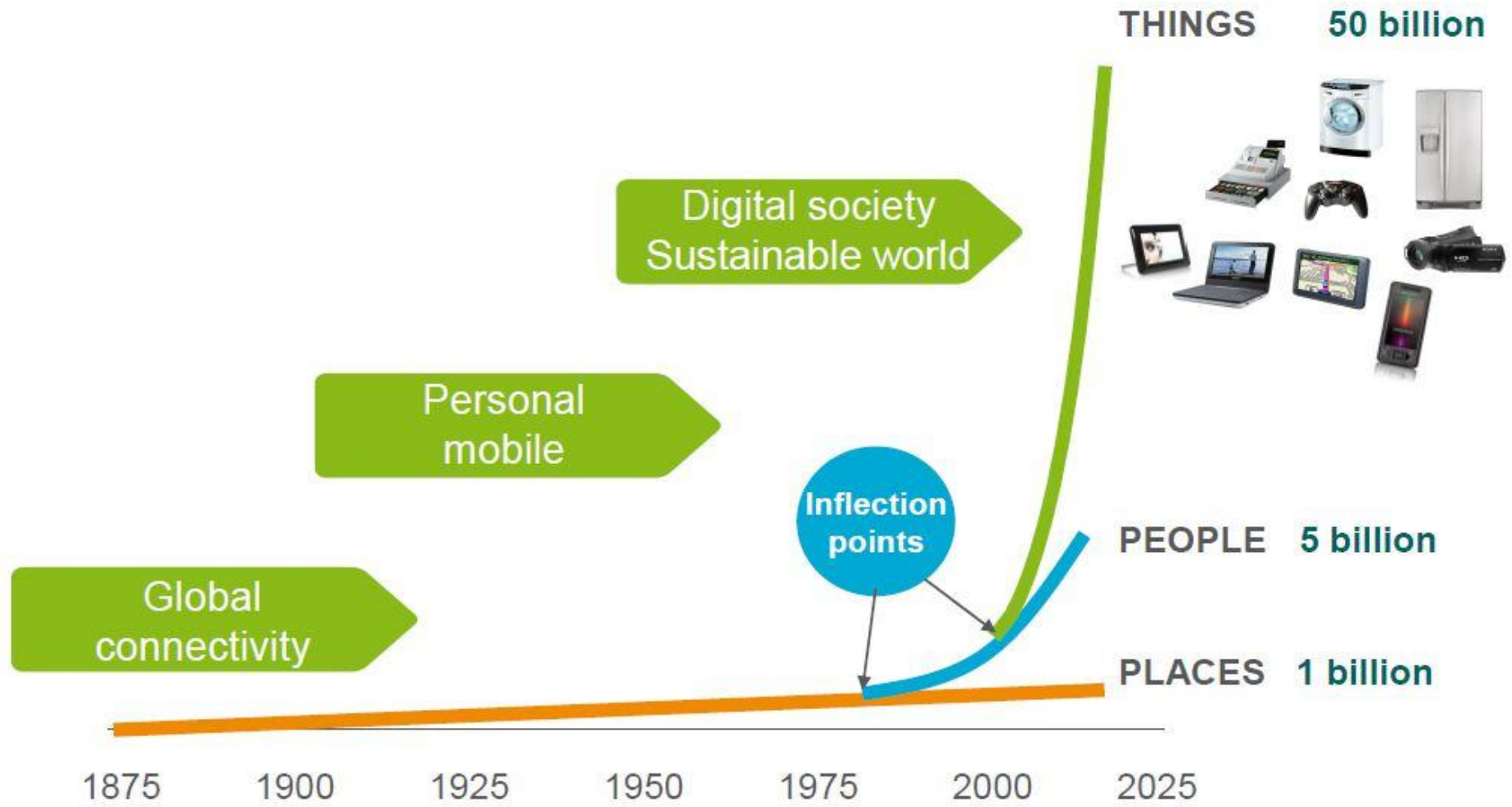
THE MORE WE CONNECT,  
THE BETTER IT GETS



## Others:

- Google's Project Loon (with Titan Aerospace) - Drones & Balloons
- Virgin Galactic's LauncherOne - Satellites
- SpaceX - Satellites

# Key developments





# Hyperspectral Imaging



**Apple & Foxconn** - Apple plans to bring hyperspectral imaging to the new Apple Watch. Enables: cancer detection, retinal imaging, blood flow & oxygen levels, food composition insights (to enable food safety)

# Scanadu Scout - Medical Tricorder



heart rate



skin/core body  
temperature



SpO2  
(oxymetry)



respiratory  
rate



blood  
pressure



ECG

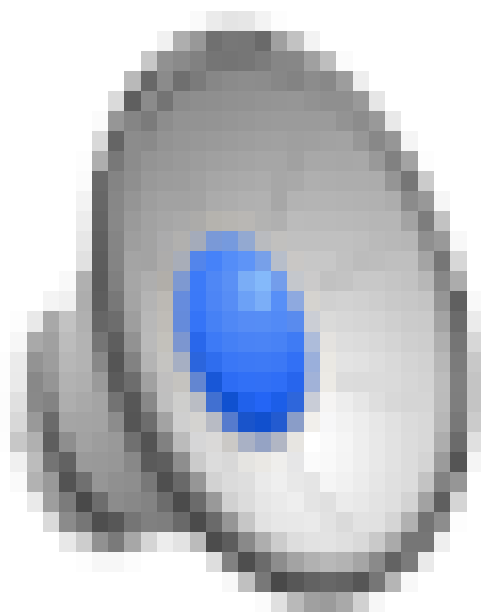


emotional  
stress

Scanadu Scout™



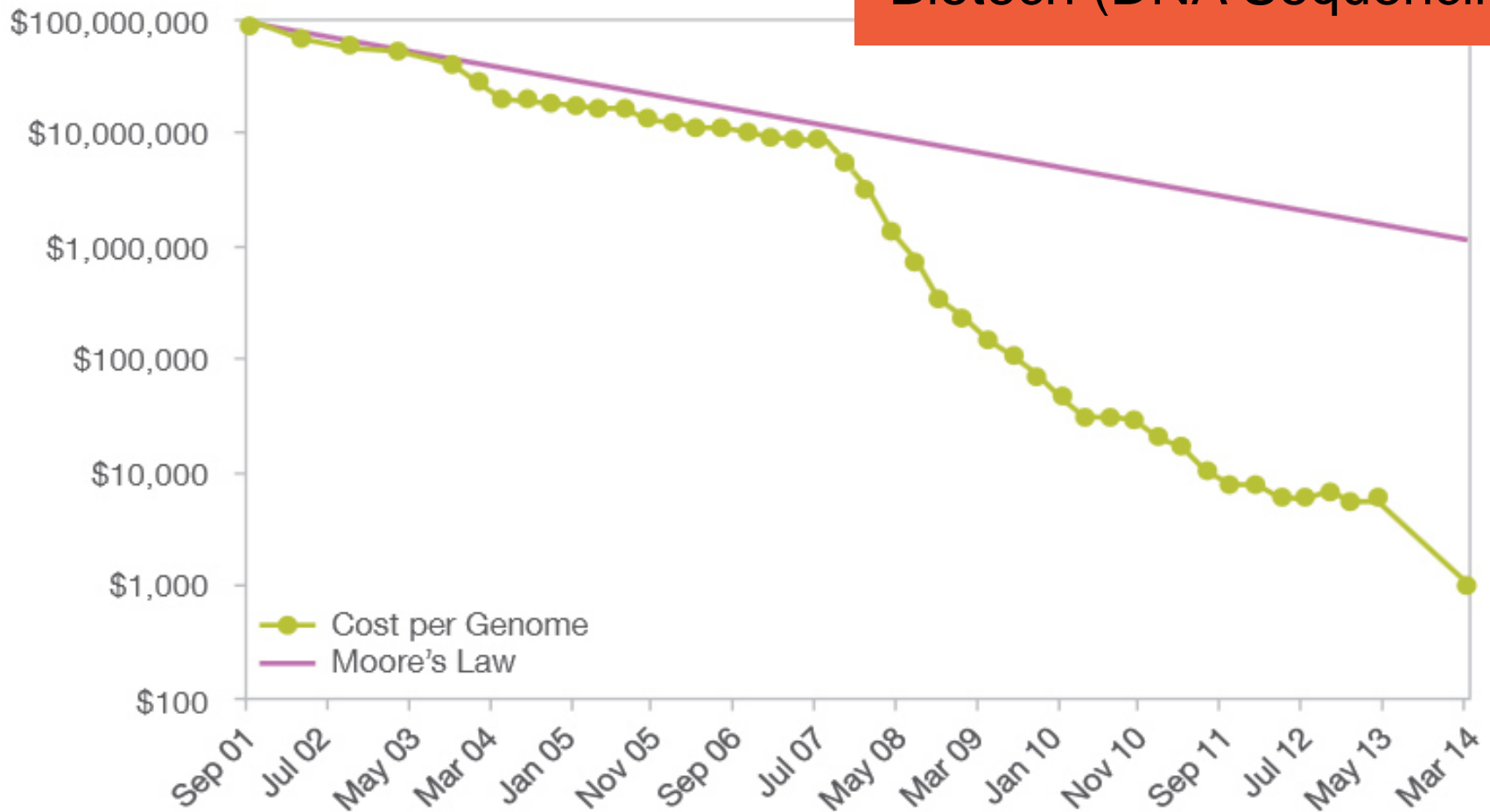
Towards the Medical Tricorder





# Exponential Technologies

## Biotech (DNA Sequencing)



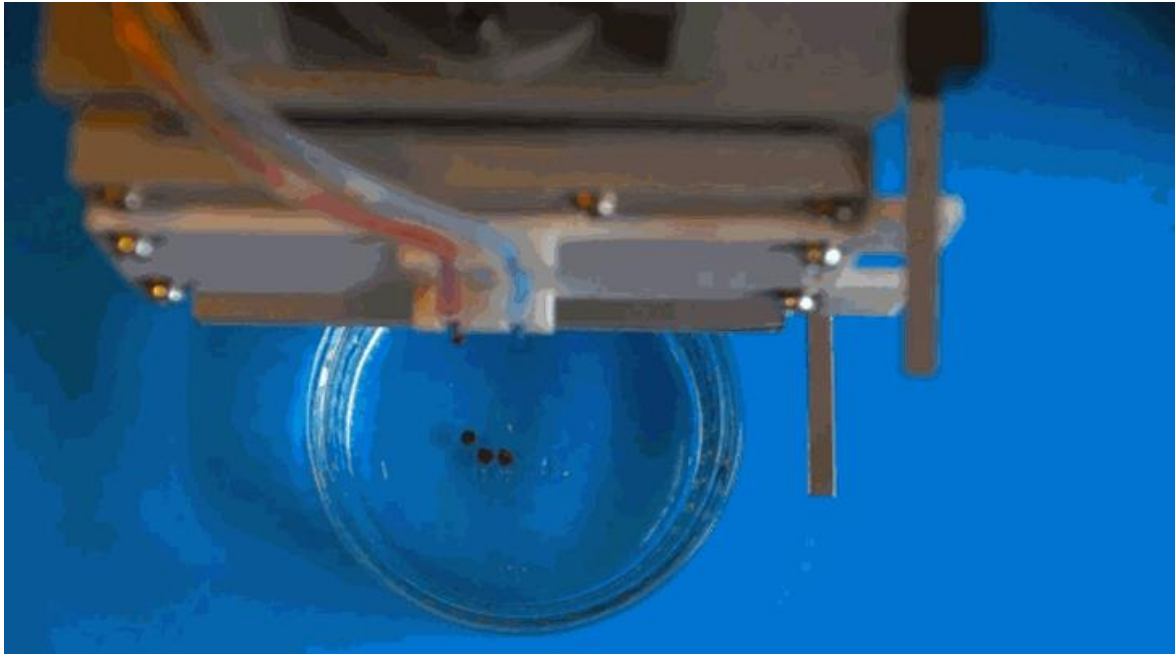
**10,000x cheaper in 7 years**



# Bucosini - 3D Food Cartridges



# Nufood Robot 3D Printer - 3D Printed Fruit



Using a process called spherification - creating a gel-like skin around liquid - color, taste, texture, size and shape are fully customizable.





# Nano-Fridge Concept



**Haier** - Chinese Consumer Electronics manufacturer

**Alibaba** - Chinese eCommerce and distribution company

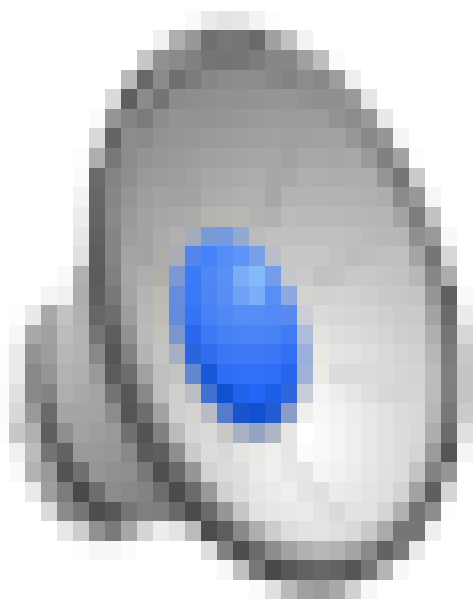
**Syngenta** - Swiss seed producer and biotech company

# Roaches, Mosquitoes and Birds: The Coming Micro-Drone Revolution

Drones

Posted: 04/17/2013 12:48 pm





# ACCESS YOUR PLANET

## Applications


Planet operates the largest ever fleet of earth-imaging satellites. Our frequent, broad-coverage imagery is ready to support your humanitarian, environmental, and business needs.



**Planet Labs** - Builds nano-satellites to provide real-time data from space to better understand the changing planet and ecosystems. Raised \$183M so far. Others: Skybox Imaging (acquired by Google), Spire and Satellogic.



# Ubiquitous Energy - Glass Solar Panels

A hand is holding a thin, transparent rectangular panel over a black smartphone on a wooden table. In the background, a green plant in a yellow pot sits on the table, and a window shows a blurred outdoor scene with trees and a car. The text "Truly Transparent Solar" is overlaid in white.

Truly Transparent Solar

An inset image showing a modern living room with a white sectional sofa, green cushions, and a coffee table. Large windows in the background offer a view of trees and a building. A green banner with white text is overlaid on the left side of the image.

Smart Glass

Clear, Clean Energy

Welcome to Kaggle, the leading platform for predictive modeling competitions. Here's how to jump into competing on Kaggle —

[New to Data Science? Visit our Wiki »](#)  
[Learn about hosting a competition »](#)  
[In-Class & Research competitions »](#)



## Enter

Find a competition & download the training data. You don't need new software/skills to submit.

## Artificial Intelligence

### Build

Build a model using whatever methods you prefer and upload your predictions to Kaggle.





### ...Win!

Kaggle scores your solution in real time and you'll see your place on the live leaderboard.

### Active Competitions

### Active Competitions

### All Competitions

			<b>Flight Quest 2: Flight Optimization</b> Optimize flight routes based on current weather and traffic.	<b>15 days</b> <b>87 teams</b> <b>\$250,000</b>
			<b>Belkin Energy Disaggregation Competition</b> Disaggregate household energy consumption into individual appliances	<b>50 days</b> <b>94 teams</b> <b>\$25,000</b>



## Predicting liability for injury from car accidents



Artificial Intelligence

Many factors contribute to the frequency and severity of car accidents including how, where, and under what conditions people drive, as well as what they are driving. Bodily injury liability insurance covers other people's bodily injury or death, for which the insurer is responsible. The goal of the Claim Prediction Challenge was to predict bodily injury liability, based solely on the characteristics of the insured vehicle.

202 in 107 + \$10k = 271%

players teams in prize money improvement to prediction

Model Year	Blind Make	Blind Subcat
2001	P	P.24.0
2001	P	P.24.0
2003	Y	Y.29.0
2003	Y	Y.29.0
2006	AU	AU.14.1

### Data Privacy/Competition Structure

Players were given a data set that included three year's worth of coded data about what cars people were driving (i.e. code names of cars vs. the real makes and models), 26 coded variables for different vehicle characteristics, and the dollar amount of bodily injury liability for each vehicle. Using these three years of data to train their models, players submitted injury claim predictions for two





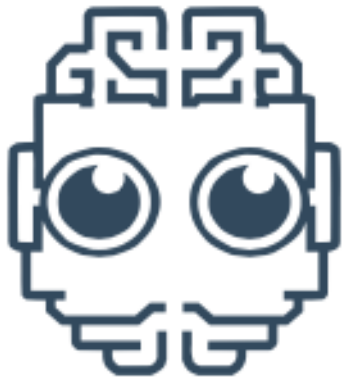
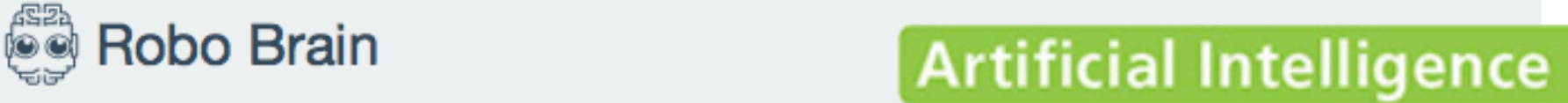
## THE GLOBAL BRAIN

Viv radically simplifies the world by providing  
an intelligent interface to everything.





# RoboBrain - Knowledge Database for Robots



Hey there! I'm a robot brain. I learn concepts by searching the Internet. I can interpret natural language text, images, and videos. I watch humans with my sensors and learn things from interacting with them. Here are a few things I've learned recently...

Build by  
Stanford &  
Cornell using  
AI

**cup** has **handle** which can **held** using **hands** .

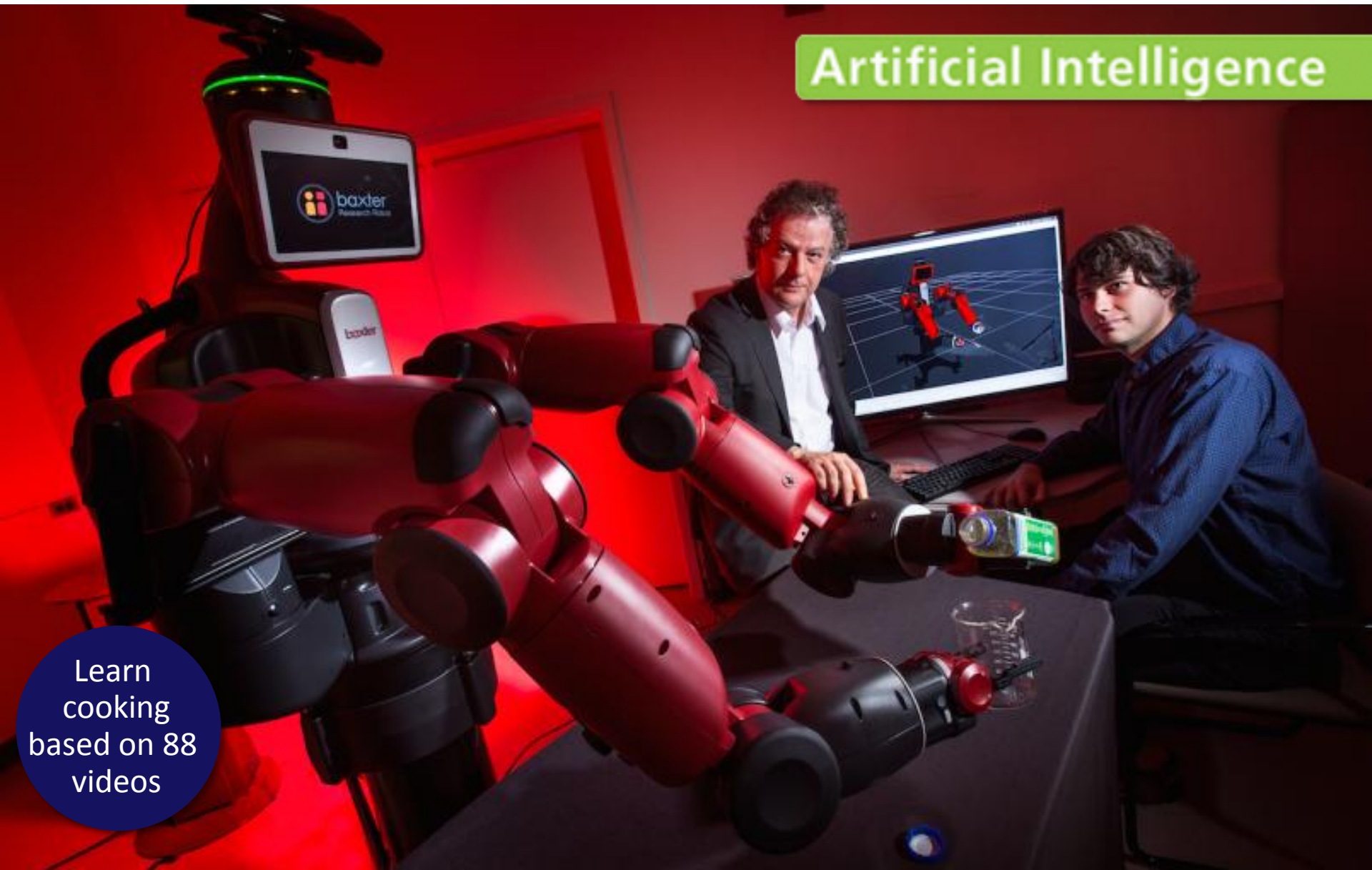
POG1

50  2  

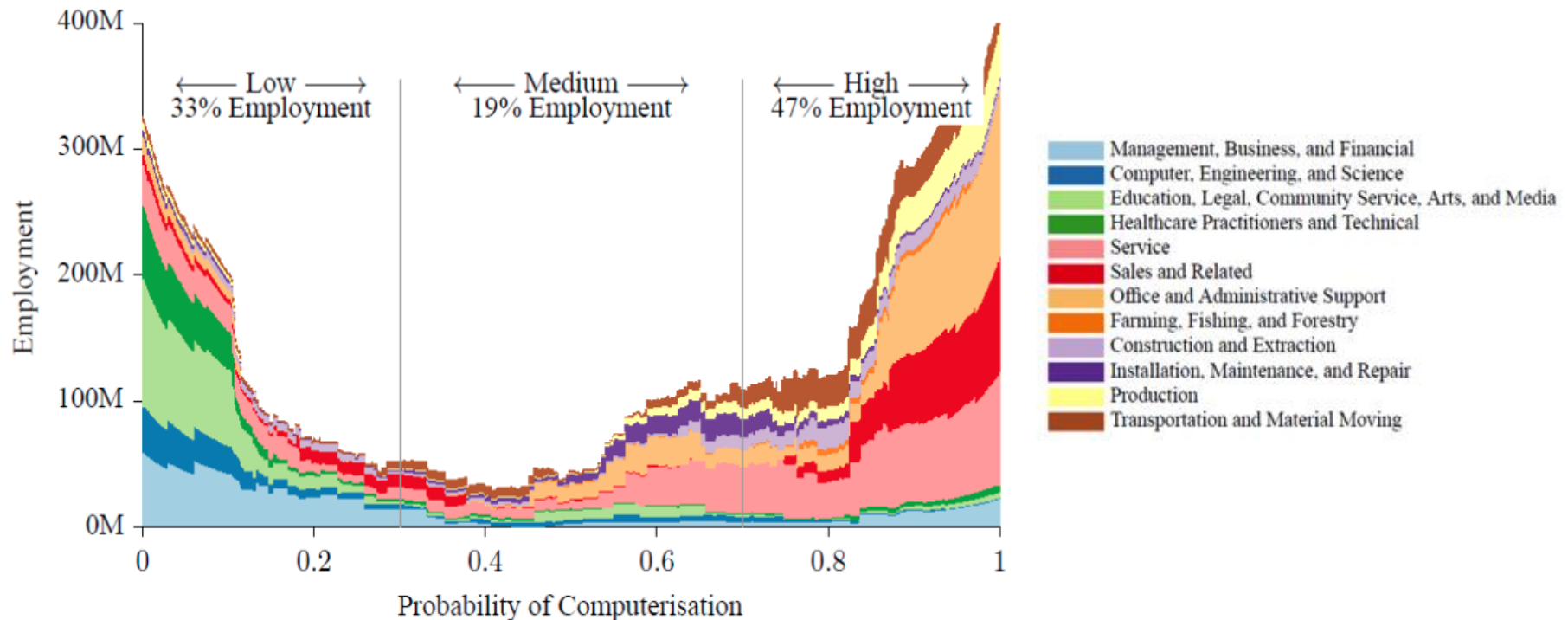
# University of Maryland - Baxter & Deep Learning

Artificial Intelligence

Learn  
cooking  
based on 88  
videos



# University of Oxford: 47% of all jobs at risk in the next 20 years

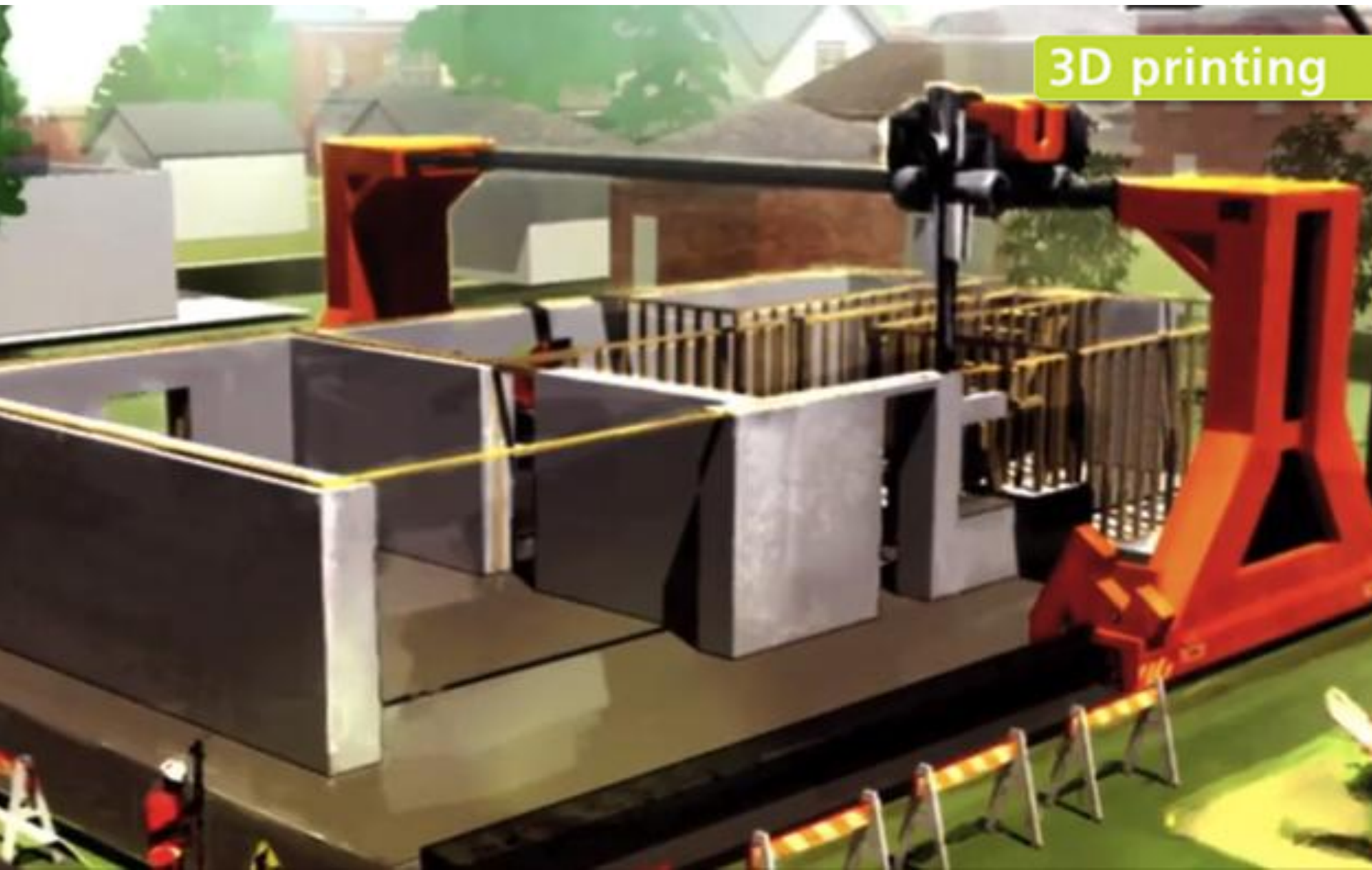


*The probability of computerization (0 =none; 1=certain) for the U.S. Bureau of Labor Statistics 2010 occupational categories, along with the share in low, medium and high probability categories. The probability axis can also be seen as a rough timeline, where high-probability occupations are likely to be substituted by computer capital relatively soon. Note that the total area under all curves is equal to total U.S. employment. (Credit: Carl Benedikt Frey and Michael A. Osborne)*

**Transport, logistics, retail and office roles most likely to come under threat**



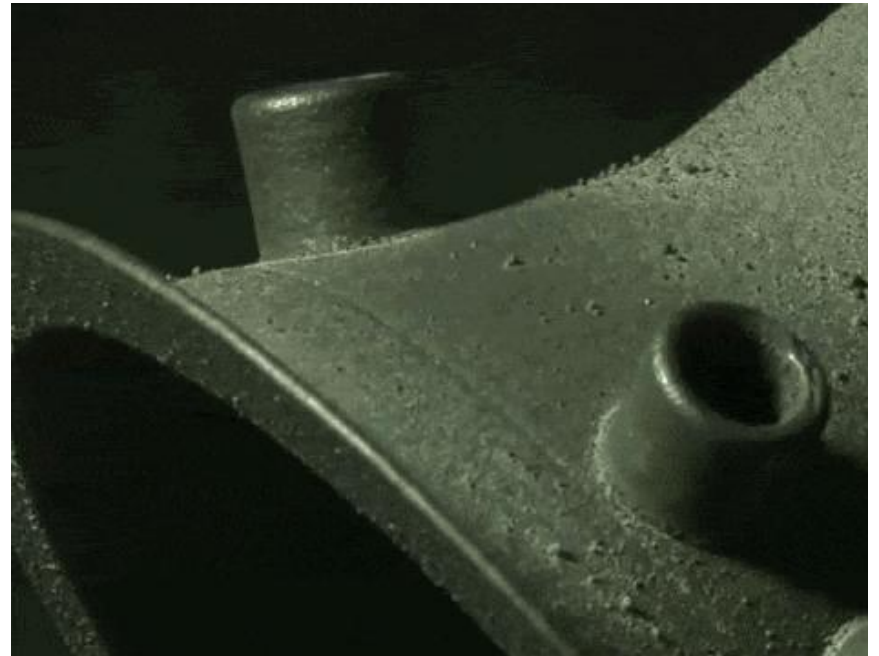
# Contour Crafting & MIT - 3D/4D manufacturing



# DMG Mori Lasertec - 3D Printer & Miller



3D printing

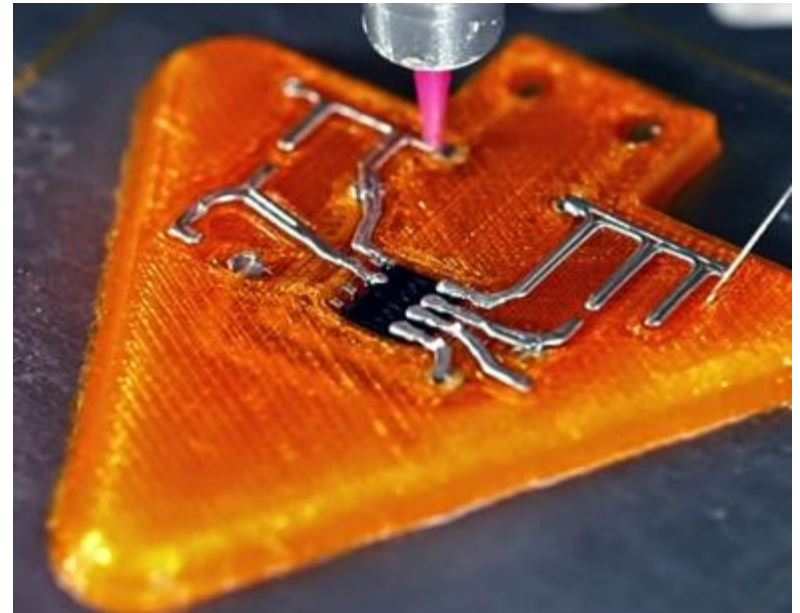


# Voxel8 - 3D Electronics Printer

3D printing

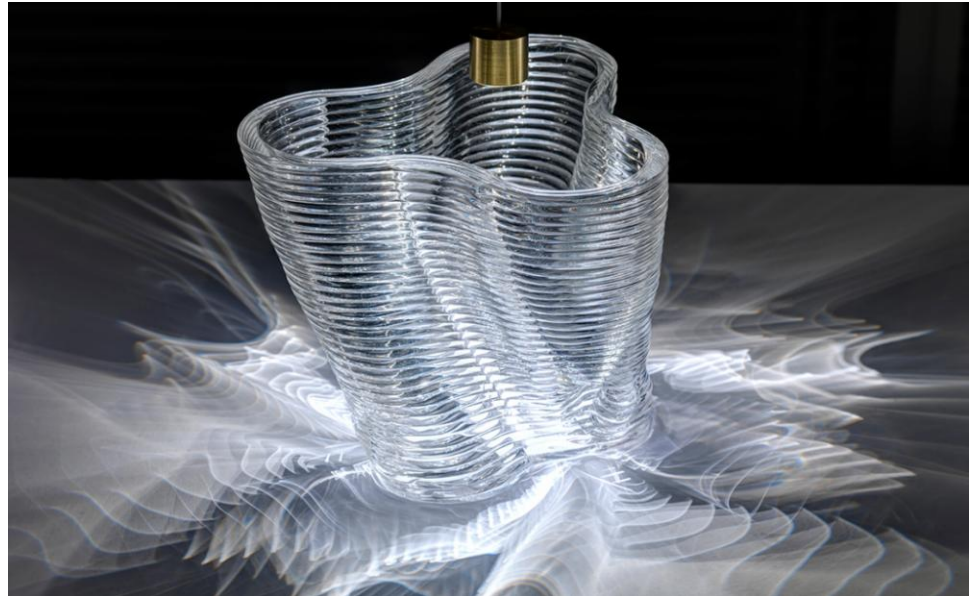
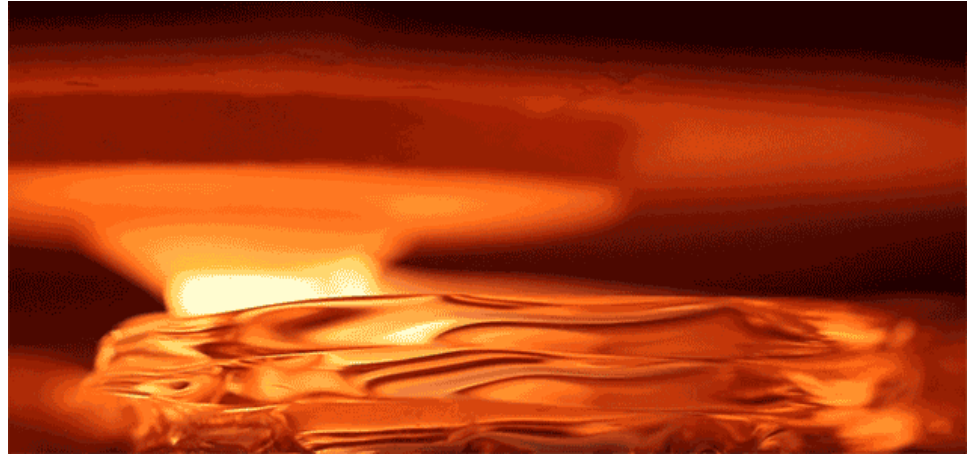
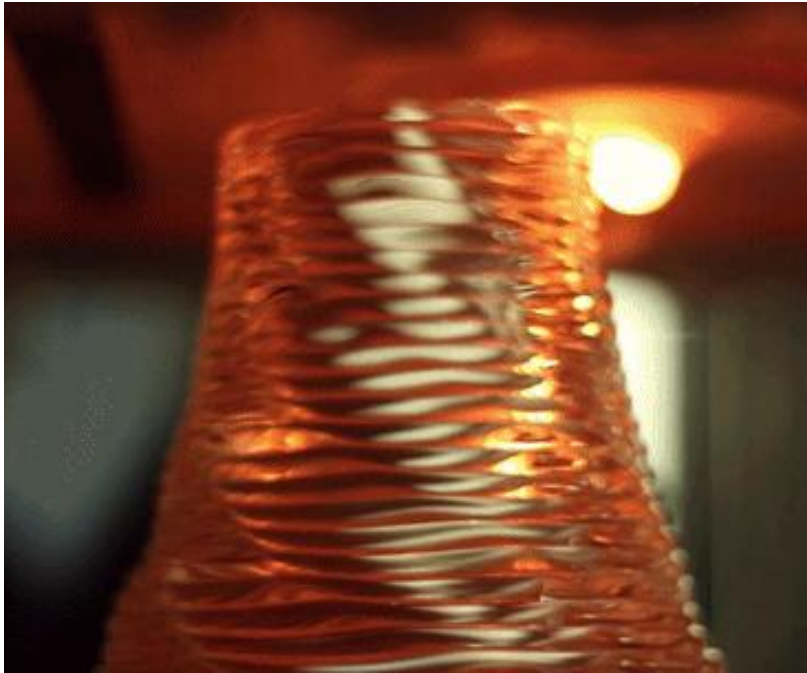


Available  
for  
**\$9000**





# MIT's Mediated Matter Group - Glass 3D Printing





# Local Motors - 3D Printed Car

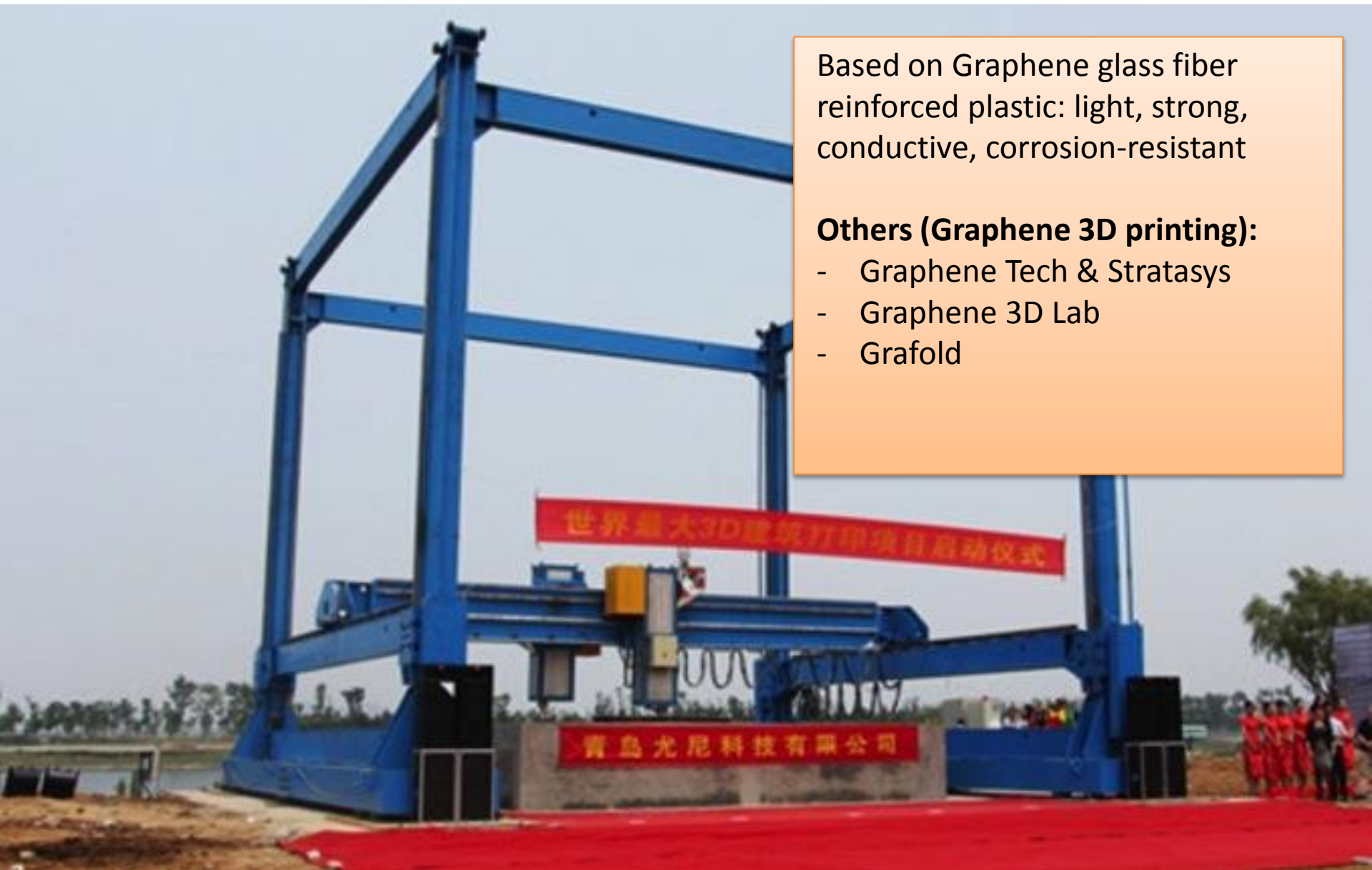


# Qingdao Unique Products - House 3D Printer

Based on Graphene glass fiber reinforced plastic: light, strong, conductive, corrosion-resistant

**Others (Graphene 3D printing):**

- Graphene Tech & Stratasys
- Graphene 3D Lab
- Grafold





# Oculus Rift - Heads-up Display



ICT & mobile technology



acquired by  
Facebook for  
**\$2B**



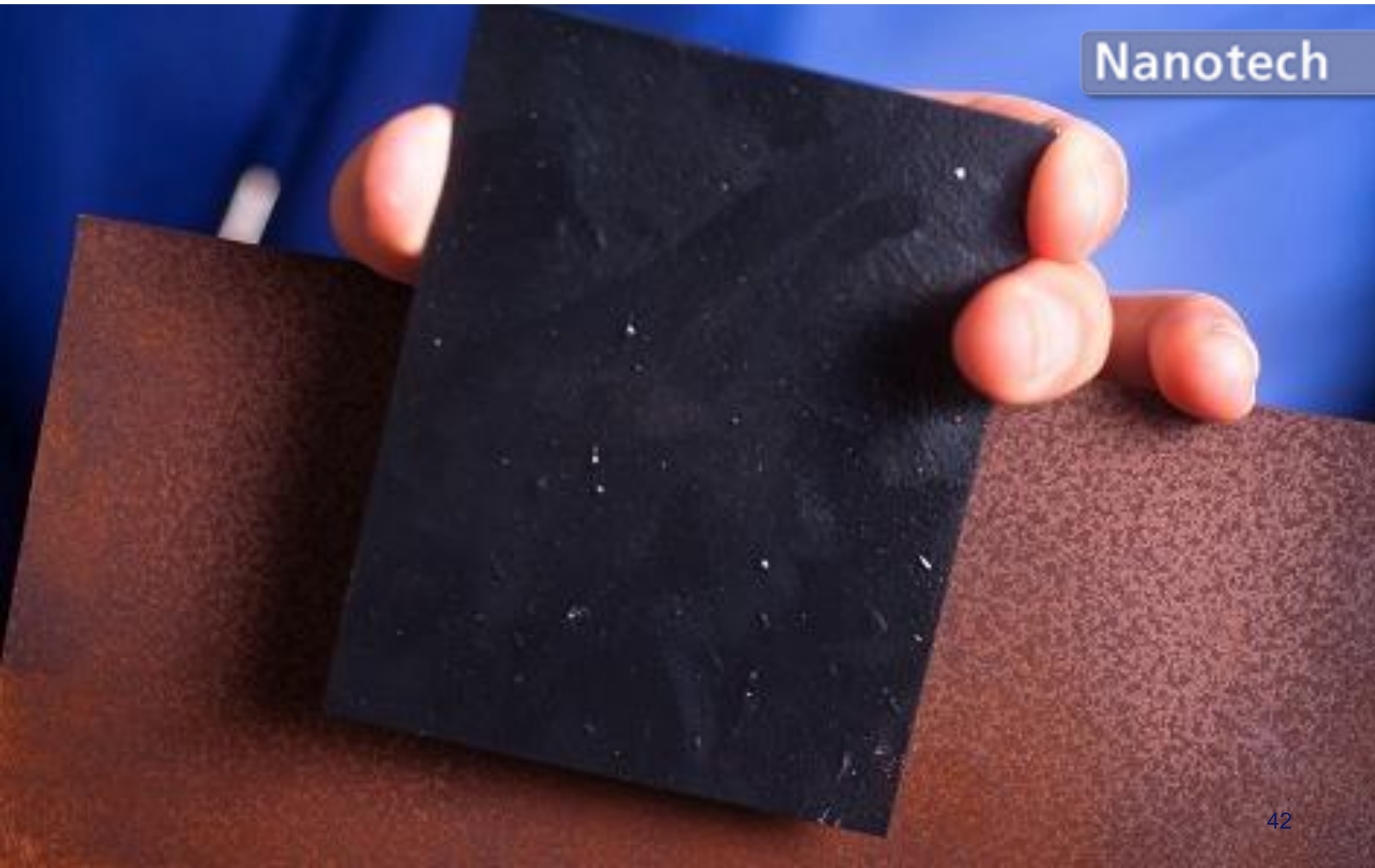
# Magic Leap - AR & VR combined

ICT & mobile technology

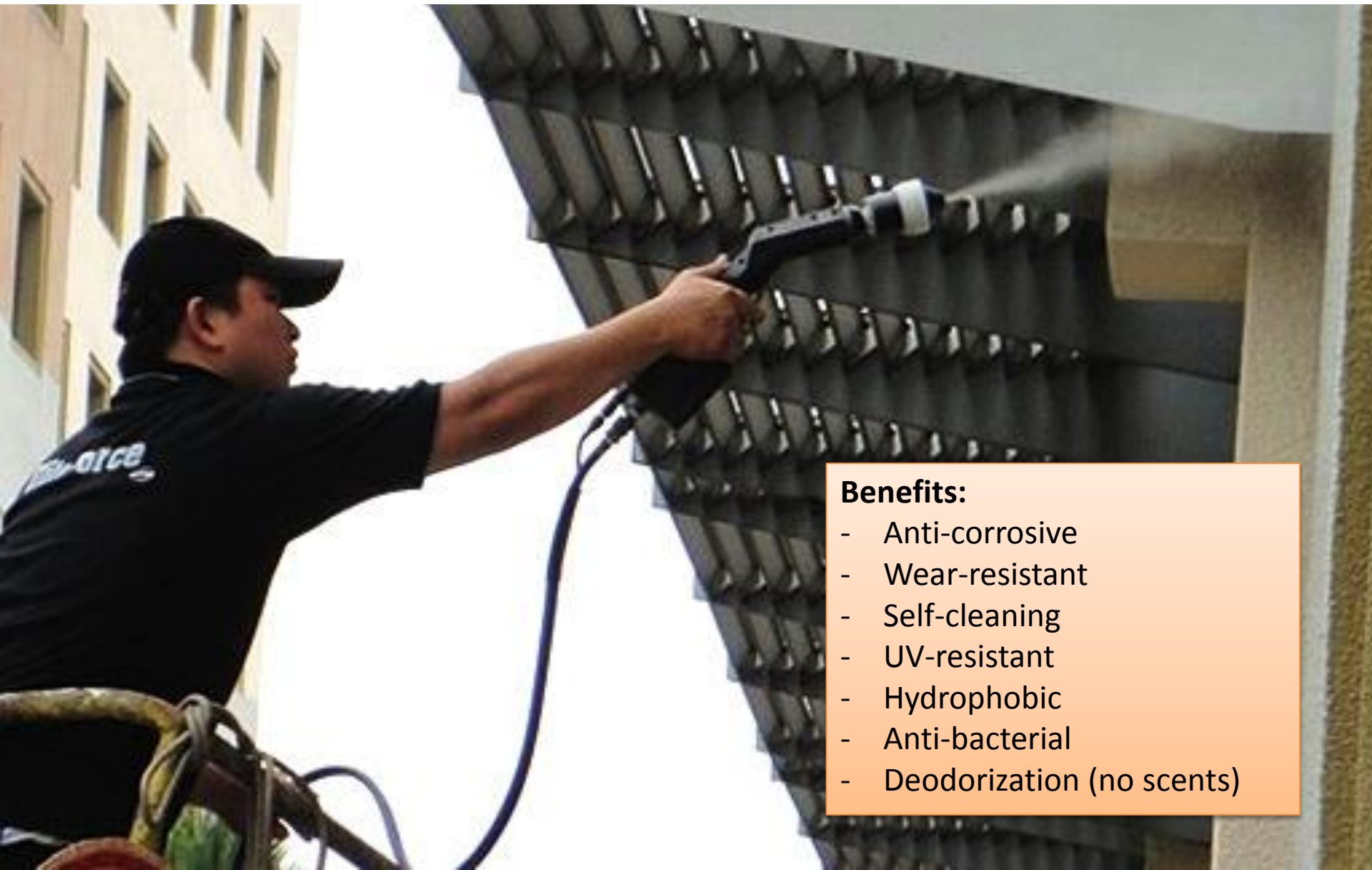
received  
**\$592M**  
in funding



# Graphene + TitaniumDioxide - Nano Materials



# Titanium Dioxide (TiO<sub>2</sub>) Nanocoating



## **Benefits:**

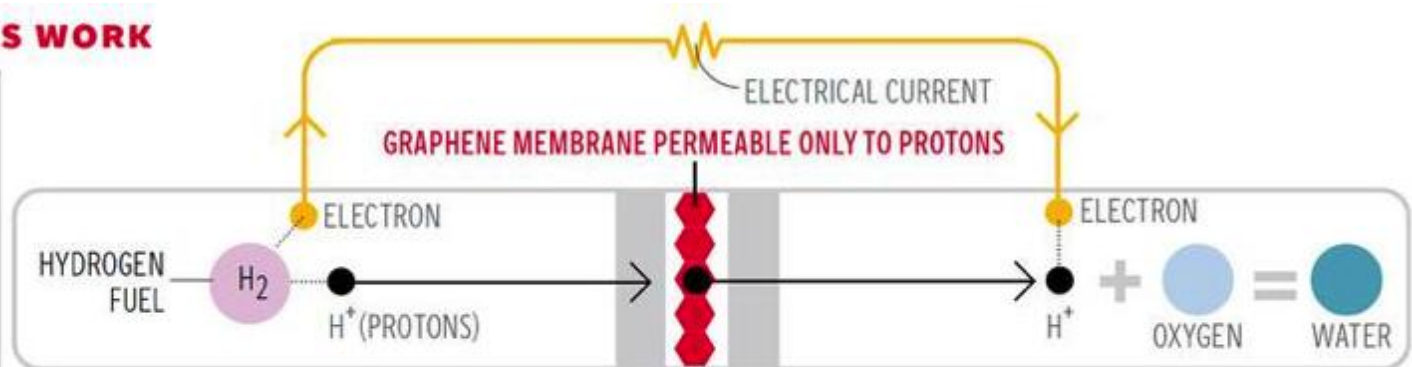
- Anti-corrosive
- Wear-resistant
- Self-cleaning
- UV-resistant
- Hydrophobic
- Anti-bacterial
- Deodorization (no scents)

# Manchester University - Graphene for Fuel Cells

Nanotech

## HOW FUEL CELLS WORK

FUEL CELLS OPERATE IN A SIMILAR WAY TO A BATTERY BUT DO NOT RUN DOWN OR REQUIRE RECHARGING. INSTEAD THEY CONVERT CHEMICAL ENERGY FROM A FUEL INTO ELECTRICITY THROUGH A CHEMICAL REACTION WITH OXYGEN.

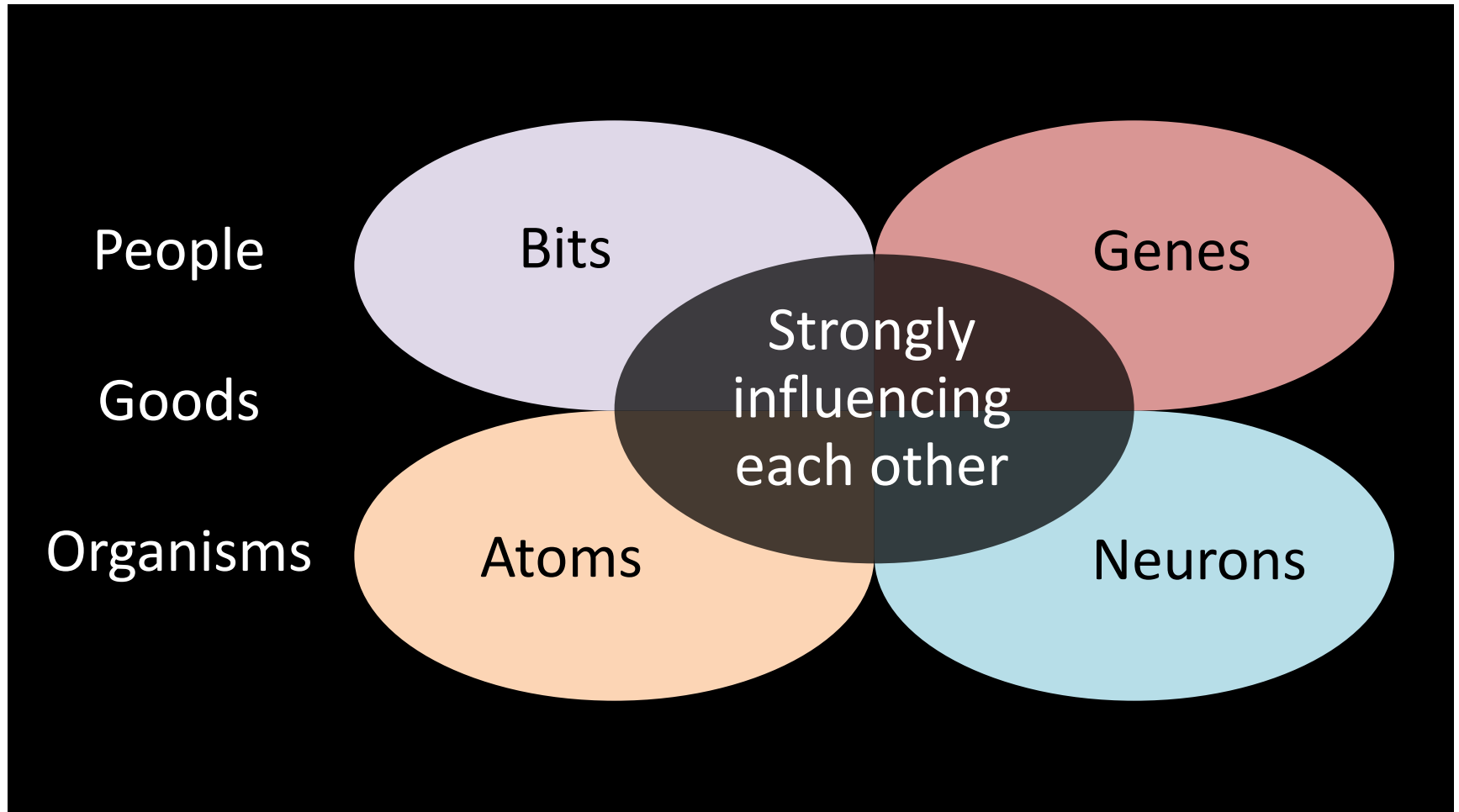


**1** Hydrogen is split into protons and electrons.

**2** Only protons can pass through the thin layer of graphene to reach the oxygen. Electrons pass along an external circuit creating an electrical current.

**3** Protons and electrons combine with oxygen to form water.

# Everything Becomes Information!





**SALIM ISMAIL  
YURI VAN GEEST**

**MET MICHAEL S. MALONE EN EEN VOORWOORD VAN PETER H. DIAMANDIS**

# **EXPONENTIËLE ORGANISATIES**

**WAAROM NIEUWE ORGANISATIES TIEN KEER BETER, SNELLER  
EN GOEDKOPER ZIJN – EN HOE JIJ DAT OOK WORDT**



**A SINGULARITY UNIVERSITY BOOK**



# EXPONENTIAL ORGANIZATIONS

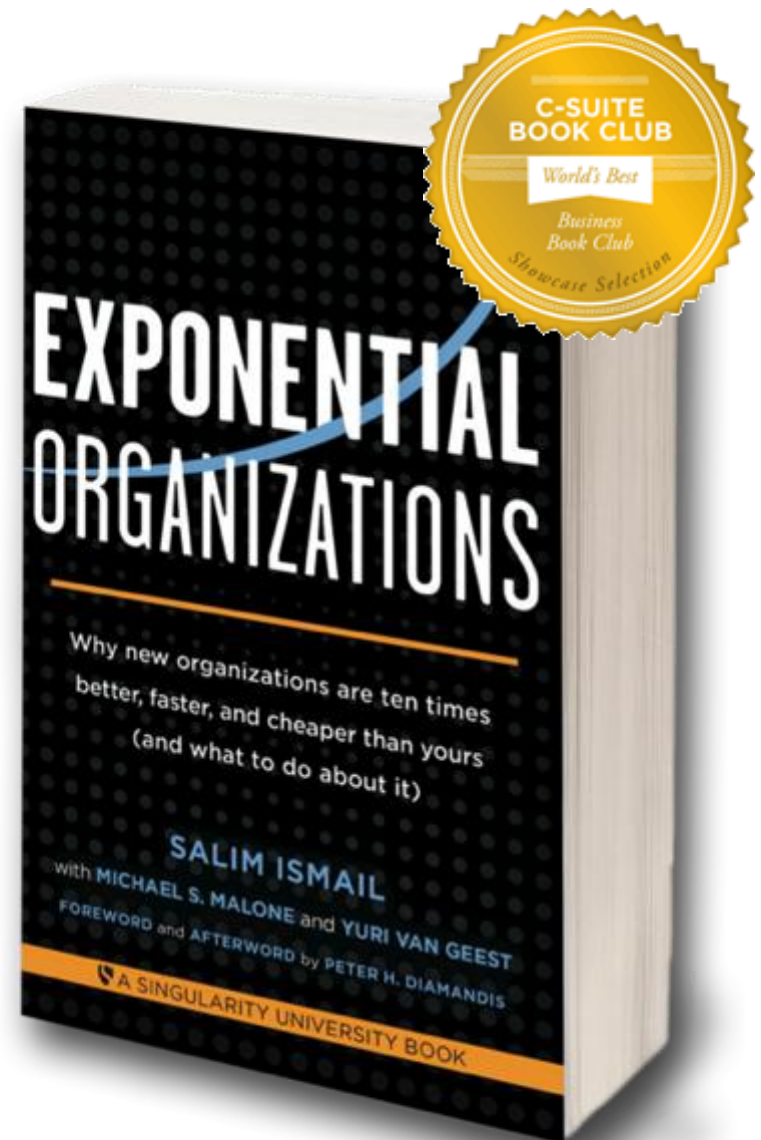
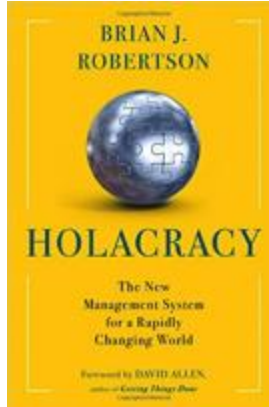
Why new organizations are ten times  
better, faster, and cheaper than yours  
(and what to do about it)

**SALIM ISMAIL**

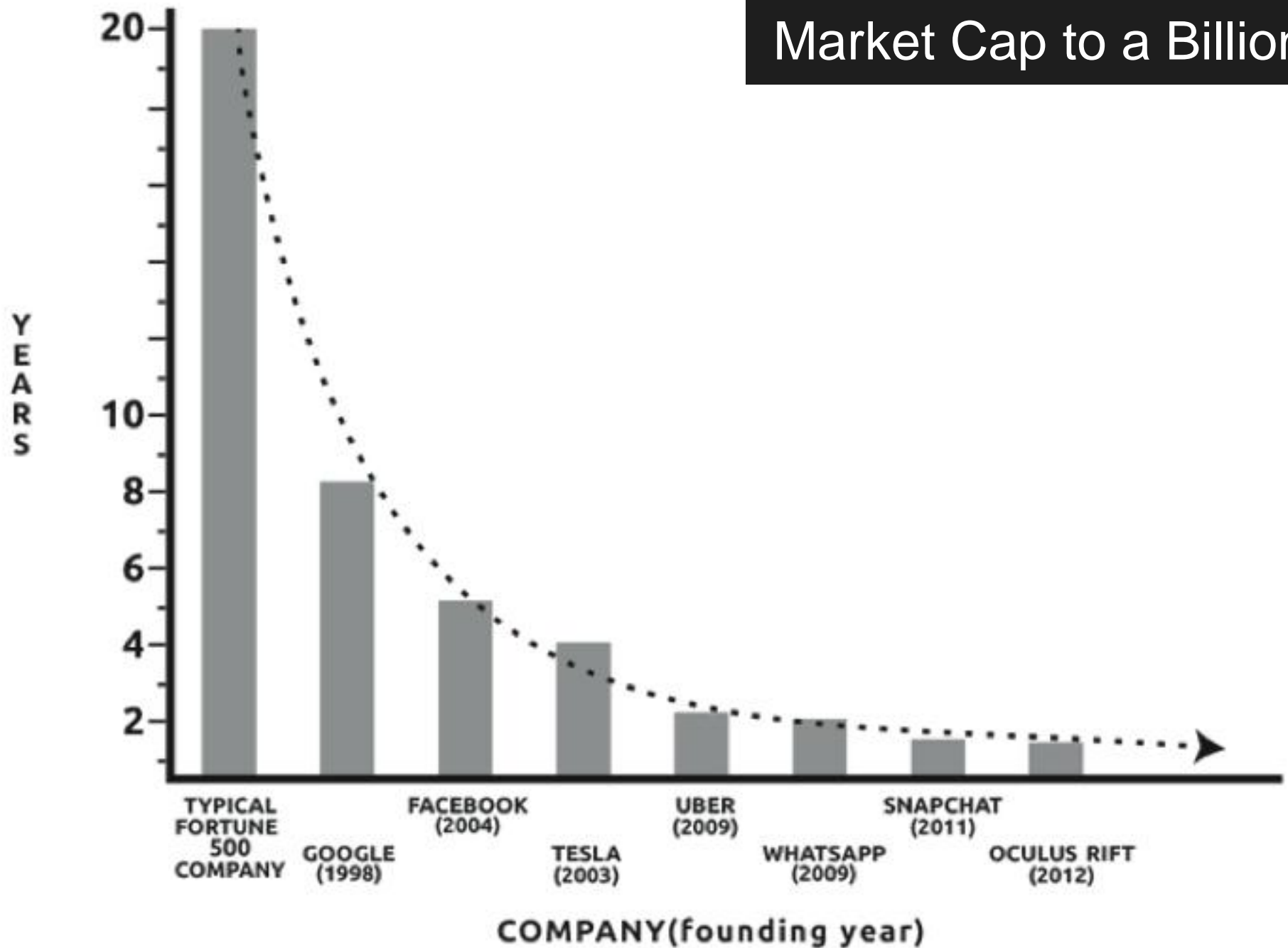
with **MICHAEL S. MALONE** and **YURI VAN GEEST**  
FOREWORD and AFTERWORD by **PETER H. DIAMANDIS**

A SINGULARITY UNIVERSITY BOOK

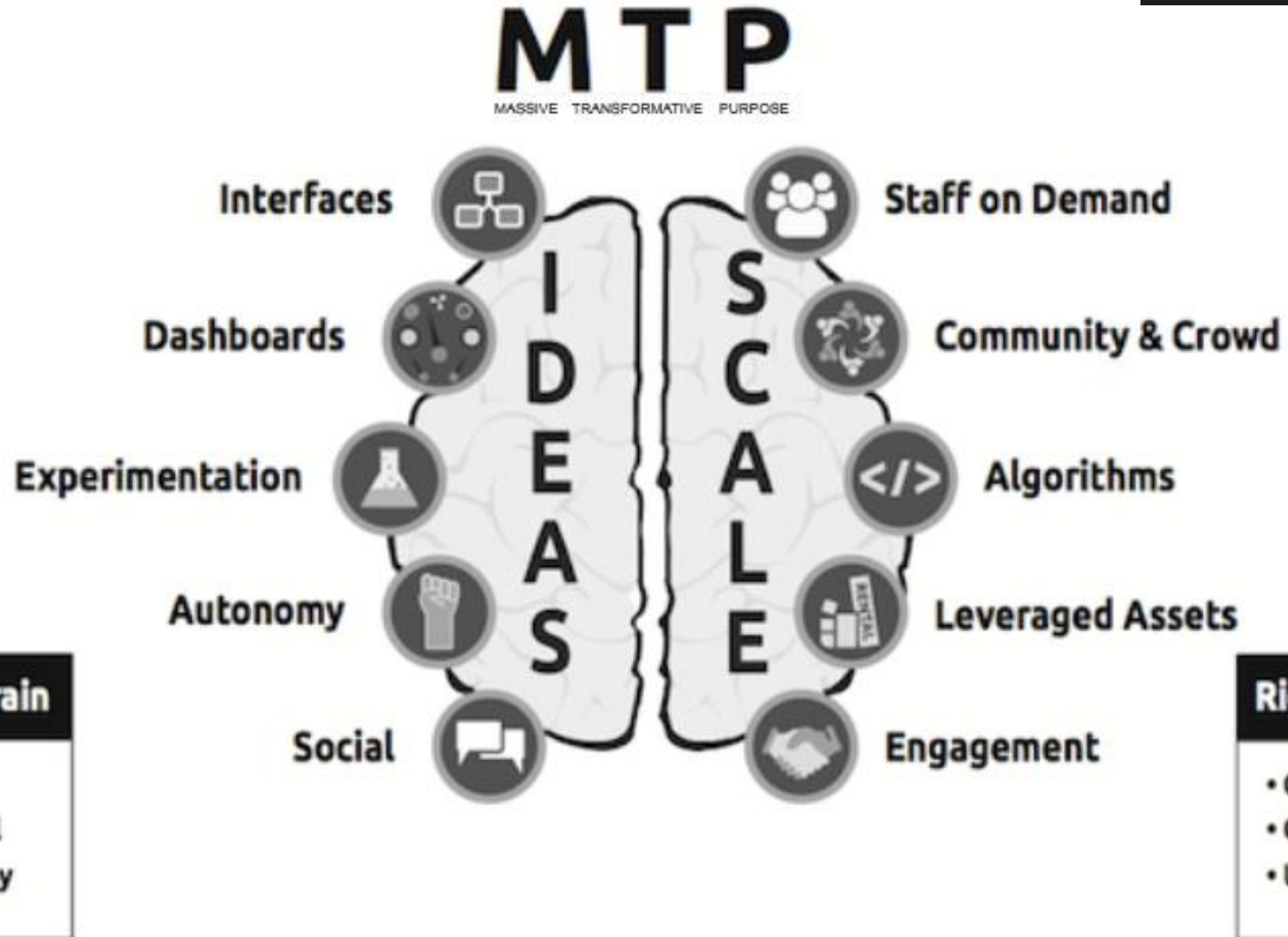
# Oscars of Management Books



# Market Cap to a Billion









**Yuri van Geest**

[Yuri.vangeest@singularityu.org](mailto:Yuri.vangeest@singularityu.org)

[www.exponentialorgs.com](http://www.exponentialorgs.com)

