



# Technological Entrepreneurship

## Chapter 1 –Introduction to TE and to some Entrepreneurs

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# Technological Entrepreneurship

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Inventions and applications of new technologies often change the world in very profound ways. The invention of the practical steam engine in 1765 James Watt drove the following industrial revolution and remade transportation systems eventually creating the steam ship and the steam locomotive.

Like all inventors, Watt built on earlier, but less practical work by others like Newcomen and Savery. There was even a crude version of a steam engine created by the Greek scientist Hero of Alexandria in the first century CE.

- <http://www.livescience.com/44186-who-invented-the-steam-engine.html>
- <http://www.history.com/topics/industrial-revolution>

The invention of the steam engine and other mechanical devices kicked off the industrial revolution. This was most apparent in Britain which used its industrial might and naval prowess to create an empire and change the world forever.

# Technological Entrepreneurship

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Development of the first electrical generators, by Faraday and improved by others, was quickly followed by methods of distribution and widespread deployment of electrical motors and other systems. The world we live in was much shaped by these scientific discoveries.

<http://instituteforenergyresearch.org/history-electricity/>

The invention of radio by Guglielmo Marconi, an Italian Inventor, in 1895-1899, (also Nikola Tesla who got the first patent!) launched a new wave of technological entrepreneurship and this was quickly followed by the invention of television by Philo T. Farnsworth in 1927.

- <http://inventors.about.com/od/rstartinventions/a/radio.htm>
- <https://www.nyu.edu/classes/stephens/History%20of%20Television%20page.htm>

The automobile began in the late 19<sup>th</sup> century with steam power, but after Rudolph Diesel invented the first petroleum fired engine and Karl Benz used it to power an automobile, the automobile began to become more widespread. Henry Ford applied the principles of “**Mass Production**” to enable the automobile to be afforded by many. Mass production required that the product be very standardized in order to reduce cost and increase output efficiency. It was claimed that Ford said that you could “*have any color that you wanted –as long as it was black.*”

We will see that modern computing has helped to turn that paradigm around and now offer “**mass customization.**”

# Technological Entrepreneurship – Computing and Networks.

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Two major related events have converged to create the boom in technological entrepreneurship in the 90's -which inflated a bubble that burst at the beginning of the new millennium, but which created a medium in which new kinds of industries grew to dominate our economy.

The first of those two events was the invention of personal computing marked by the introduction of the Apple II computer in 1976, created by Steve Wozniak in partnership with Steve Jobs, ([https://en.wikipedia.org/wiki/History\\_of\\_Apple\\_Inc.](https://en.wikipedia.org/wiki/History_of_Apple_Inc.) ) and the introduction of the IBM PC in 1981 created by a team of IBM “skunk works” engineers in a Boca Raton, FL site under Bill Lowe.

([https://www-03.ibm.com/ibm/history/exhibits/pc25/pc25\\_birth.html](https://www-03.ibm.com/ibm/history/exhibits/pc25/pc25_birth.html) )

Most notably, the PC needed an operating system and, rather than license the popular CPM system, IBM contracted with Harvard drop-out Bill Gates to write a near clone of CPM.

The second event was driven by the first. Computers needed to find a way to speak to one another. Networking was created to allow them to communicate and then the internet was created (first as ARPANet in 1969) by the Boston based BBN consultancy for the Defense Advanced Research Programs Agency (DARPA) in order to create a communication protocol that would allow worldwide communication that could survive even nuclear warfare. That network was then extended to the National Science Foundation and then became the internet we know today.

<https://en.wikipedia.org/wiki/ARPANET>

# Do these people look like entrepreneurs?



← Apple Founders -1978  
Steve Jobs and  
Steve “Woz” Wozniak

Microsoft Founders -1978 ->  
Top-Steve Wood, Bob Wallace, Jim  
Lane  
Mid- Bob O’Rear, Bob Greenberg,  
Mark McDonald, Gordon Letwin  
Front – Bill Gates, Andrea Lewis,  
Marla Wood, Paul Allen



# The Boom in BioTech

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Discoveries in the areas of biology, biochemistry, biophysics, and related fields have driven another wave of technological entrepreneurship.

## **Biotech: The High Stakes Table of Entrepreneurship**

- *“Science and entrepreneurship are both acts of experimentation. Both involve taking risks to reach a positive end, changing course when needed, and attempting the never-been-done. While many start-ups now are focused on creating the next Facebook or some genius e-commerce play, there are also scientists tinkering in labs. Biotechnology is sometimes forgotten about, but the field leads to real products -- new drugs and medical devices that aid human health. Want to cure cancer? These people will be the ones to do it. Biotech is also risky. It’s a high cost, high stakes field. These entrepreneurs ask for large sums (\$3 to \$5 million just to start) without knowing the final outcome. The visions are lofty -- eliminating rare diseases, shrinking tumors, curing cancers.”*
- <http://www.forbes.com/sites/lorikozlowski/2012/03/23/biotech-the-high-stakes-table-of-entrepreneurship/#1a88ae6b40e9>

Indeed the figure of \$ 3 to 5 million is “just to start.” Bringing a new drug to market generally reaches to single digit billions.

Internet start-ups can often be bootstrapped or begun with very low funding. Biotech start-ups require far more resource and are thus far more difficult.

# Social Media

Social media began almost as soon as the internet was invented. At first it was a way for scientists and engineers to exchange ideas, but then the internet went mainstream and applications like MySpace and Facebook caught fire. These enabled groups to develop online who could make their opinions known, seek out others they wanted to interact with, and create communities of interest.



That has quickly changed the way people live their lives, communicate, and even date. Politicians and others combined social media with behavioral psychology to find ways to manipulate opinions and sell products, service, and even ideas to others. In the last half decade, countries have even used social media to try to drive opinions and influence policies and even elections.

# Online retail

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- People started selling things on the internet almost as soon as it was developed, but Amazon took this idea and ran with it further than anyone could have imagined.
- At first Amazon was a bookstore. In a few short years, they came to dominate the market and push the former leaders like Barnes and Nobel and Borders into the shadows.
- That was just a start. Now Amazon sells almost everything and dominates all retail markets.
- The result is sometimes call “the retail apocalypse.”
  - [https://en.wikipedia.org/wiki/Retail\\_apocalypse](https://en.wikipedia.org/wiki/Retail_apocalypse)
- Large numbers of malls have already closed, and economists are estimating that another 25% will close in the next few years.
  - <https://www.cnbc.com/2020/08/27/25percent-of-us-malls-are-set-to-shut-within-5-years-what-comes-next.html>
- Technology does indeed create opportunities, but it also creates challenges.



# Technological Entrepreneurship creates social changes.

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Inventions and applications of new technologies often change the world in very profound ways.

Like all technologies, before and since, there were those who resented and resisted the new ways. In the early days of the industrial revolution, powered by the invention of the steam engine and other mechanical devices, the Luddites in England often attacked factories and destroyed equipment. Today we often refer to those who resist new technologies as “**Luddites**.”

In 1936, Charlie Chaplin, made a film depicting the challenges of living in “**Modern Times**” that captured the angst of those who found technological change difficult.

Today we have seen how social media has changed the way we live, work, play, and socialize with one another. Facebook, Twitter, Tinder, Tik Tok and countless other social media platforms give users a way to interact with like minded individuals. They may spread more misinformation than information! People and politicians have been known to call for regulating or even closing social media channels.



# What is Entrepreneurship?

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Most of you will come to this course with some understanding of what entrepreneurship is, who entrepreneurs are, and what those entrepreneurs do. We develop those understandings because of the things we read and see in the media and the people we meet in our lives. As with so many things, our personal experience is often a small window into the field and may or may not reflect the larger picture that could be developed with more extensive experience.

In order to create that larger picture, we need to draw upon both a larger set of experiences (primary research) and upon the research and study done by others (secondary research) who have taken a systematic look at the field. This research has also shown that there are some widely held misconceptions (often termed “myths”) about entrepreneurs and entrepreneurship.

We will consider some example entrepreneurs. We will confront the myths, and we will try to develop a more accurate and evidence driven insight into entrepreneurship and entrepreneurs.

Let us begin by considering how three great thinkers in entrepreneurship defined it.

# What is Entrepreneurship?

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- Entrepreneurship is seen as new combinations, which include the introduction of new goods, new methods of production, opening of new markets, new sources of supply, or a new organization.
  - Joseph Schumpeter -Austrian Economist who became a Harvard Professor
  - [http://en.wikipedia.org/wiki/Joseph\\_Schumpeter](http://en.wikipedia.org/wiki/Joseph_Schumpeter)
- Entrepreneurship is an act of innovation that involves endowing existing resources with new wealth producing capacity. –
  - Peter Drucker, Professor and Management Consultant
  - Called “Founder of modern management” by Forbes Magazine
    - <http://www.forbes.com/sites/stevedenning/2014/07/29/the-best-of-peter-drucker/>
  - Aside: start thinking about how you and others might define “wealth.”
- Entrepreneurship is a way of thinking, reasoning and acting that is opportunity obsessed, holistic in approach and leadership based. –
  - Jeff Timmons Professor at Harvard and Babson
  - Author: “New Venture Creation,” “The Entrepreneurial Mind,” and others.
  - [http://www.inc.com/mike-hofman/2008/04/remembering\\_an\\_entrepreneurial.html](http://www.inc.com/mike-hofman/2008/04/remembering_an_entrepreneurial.html)
  - <http://uir.unisa.ac.za/bitstream/handle/10500/2050/01dissertation.pdf?sequence=2>

Those definitions are helpful, but I think we need to flesh out at least a skeleton (or framework –if you prefer) of how an entrepreneur operates.

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- Spots an Opportunity (see a problem)  
When an entrepreneur sees a problem, he or she often quickly moves to the next step and sees an opportunity in the problem. We will see later that this is an aspect of **“entrepreneurial awareness.”**
- Has New Idea (find a solution)  
The problem, which has become an opportunity, generates an idea for a solution in the mind of the entrepreneur.
- Is an Innovator  
Most problems are not new. They are usually problems because others have failed to find an adequate solution. There are often a litany of failures. There may be partial solutions. Innovators are not daunted by the failures. They may ask “now why did this fail?” Or ask “what has changed in the world (technology regulations, demographics, economics, etc.?) that might allow a new approach to the problem.
- Takes Well Thought Out Risks,
  - Calculated risks not wild gambles.
- Creates and builds a business or other enterprise
  - It could be a non-profit or a charity or some other social enterprise as well
  - We all define “wealth” and “profit” differently.
- Changes the world
  - The change could be profound (the internet) or narrow (Velcro or post-it notes)

We will spend much of the rest of this course looking at examples of this process and understanding it in much better detail.

# Interesting Entrepreneurs: Bill Gates

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- Bill Gates –Microsoft
- Harvard Dropout
- Computer whiz
- Wrote operating system for IBM
  - Because IBM was too cheap to license CPM
- Signed Giving Pledge and Created the Gates Foundation
- Microsoft wanted to enter China, but faced formidable challenges in intellectual property protection and government regulation.
- Entered anyway with 500 engineers in a building on the Tsinghua University Campus.
- Why? They had to be close to an important source of intellectual capital and they wanted to maintain some position in the fastest growing market in the world.



<http://www.jackmwilson.net/Cases/Case-BillGates.pdf>

# Mother Theresa

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- **Mother Theresa**
- Born Agnes Gonxha Bojaxhiu
- Albanian -born in Macedonia
- Father an entrepreneur in construction and trading
- Social entrepreneur in India
- Founder - the Order of the Missionaries of Charity
- Jim O’Keefe, GE, Image systems, ILINC President, visited her during GE period and called Jack Welch to tell him how she had created an incredible charitable enterprise with amazing entrepreneurial skill.
- “As the ranks of her congregation swelled and donations poured in from around India and across the globe, the scope of Mother Teresa's charitable activities expanded exponentially. Over the course of the 1950s and 1960s, she established a leper colony, an orphanage, a nursing home, a family clinic and a string of mobile health clinics.”
- “By the time of her death in 1997, the Missionaries of Charity numbered over 4,000 -- in addition to thousands more lay volunteers -- with 610 foundations in 123 countries on all seven continents.”
  - <http://www.biography.com/people/mother-teresa-9504160>

# Gururaj “Desh” Deshpande

- Born in India
- Indian Institute of Technology
- PhD Queens University, Ontario
- Motorola
- 1990 Founded Cascade Communications
  - (networking devices)
- Sold Cascade to Ascend Comm. for \$3.7 billion in 1997
- Founded Sycamore Networks in 1998 (\$18 B in 1999)
- Founded Tejas Networks and A123 Systems
- Founded MIT Deshpande Center with \$20 million donation
- The Deshpande Education Trust (DET) -the Master of Social Entrepreneurship
  - The Master of Social Entrepreneurship (MSE) is a two-year residential program affiliated with Karnatak University Dharwad India
- Founded the Merrimac Valley Sandbox at UML (now eForAll)
  - Great source of help for student entrepreneurship projects
  - They recently changed the name to “Entrepreneurship for All” or “E for All.”
- Founded the *Deshpande Symposium for Innovation & Entrepreneurship in Higher Education* at UML.
  - <http://www.deshpandesymposium.org/>
- *Case: Desh Deshpande*
  - <http://www.jackmwilson.net/Cases/Case-GururajDeshpande.pdf>



# Larry Ellison

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- Larry Ellison
- Founder of Oracle
- Dropout of both the University of Illinois and the University of Chicago
- Worked at various computing companies in California and then founded Software Development Laboratories -> Relational software ->Oracle.
- Signed Giving Pledge along with Bill Gates, Warren Buffet and others.
- “Oracle Corporation has had a tremendous international growth since its inception in 1977. As of today they have a global presence in over 90 countries and deployments in over 145 countries.”
  - <https://vnrayana.wordpress.com/2012/04/25/oracle-international-strategy/>
  - [International and Global Oracle Implementations Myths and Reality](#)





# Richard Branson

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- Sir Richard Charles Nicholas Branson
  - born July 18, 1950 in London
- Branson is the seventh richest citizen of the United Kingdom,
  - estimated net worth of \$4.9 billion (U.S.)
  - <http://www.forbes.com/profile/richard-branson/>
  - [http://en.wikipedia.org/wiki/Richard\\_Branson](http://en.wikipedia.org/wiki/Richard_Branson)
- Severe Dyslexic (like me!)
  - on his last day at school, his headmaster, Robert Drayson, told him he would either end up in prison or become a millionaire
    - Richard Branson. "At school I was dyslexic and a dunce.", *The Times*, London, 11 September 1998, pg. 19
- Virgin Records -> Virgin Megastore
- Virgin Atlantic Airline
- Virgin Trains, Virgin Galactic
- Helped form and fund "The Elders" with Nelson Mandela and others who were devoted to helping to solve world problems.



<http://www.jackmwilson.net/Cases/Case-RichardBranson-Virgin.pdf>

# Mubarak Muyika --Zagace Company

- Orphaned by ten years old
- Nairobi Kenya
- Turned down Harvard full scholarship in 2011
- Hype Century Technologies and Investments Ltd, (Jan. 2012)
  - web-design and domain registration
- Won Anzisha Prize in South Africa in 2014.
  - (Sh1.1 million).
  - African entrepreneurs aged between 15 and 21 who have developed innovative businesses which have positively impacted on communities.
- Sold HCT in May 2014
- Founded Zagace Company soon thereafter
- <http://www.businessdailyafrica.com/Investor-shuns-Harvard-to-pursue-tech-dream/-/1248928/1976952/-/12p6bopz/-/index.html>
- <http://www.forbes.com/sites/mfonobongnsehe/2015/02/05/30-most-promising-young-entrepreneurs-in-africa-2015/4/>



# Teresa Mbagaya, EcoSchool

- Teresa Mbagaya, Zimbabwe
- Born in Kenya
- Graduate of Cambridge and Yale
- Worked at Google on Education Services and Emerging Market Outreach teams
- 2013 left Google and joined Econet Wireless
- Econet Zero targets 5 million Econet Broadband subscribers offering them free access to 50+ education websites including Coursera, EdX, Wikipedia, Codecademy and others
- launched EcoSchool Academy to all 9 million subscribers, an interactive mobile learning environment which provides 50 short courses covering a range of topics.
- Econet Education has reduced the costs for Medical Students in Zimbabwe, providing tablets on which they can access their text books at significant savings.

- <https://www.ecoschool.co.zw/>
- <http://www.techzim.co.zw/2014/10/everything-need-know-econets-ecoschool/>
- <http://www.forbes.com/sites/mfonobongnsehe/2015/02/05/30-most-promising-young-entrepreneurs-in-africa-2015/2/>
- <http://www.aworldatschool.org/news/entry/eco-school-pilot-scheme-slashes-cost-of-learning-in-zimbabwe>

<http://www.jackmwilson.net/Cases/Case-EcoSchool-Africa.pdf>



# John Pulichino '67

- John Pulichino-Joy Tong Building
- Industrial Management
- Polaroid
- American Tourister (President and CEO)
- Founded Innovation Luggage in 1993
  - bankrupt in 2001
- Joy Tong, wife,
  - founded Group Three International Limited (1984).
  - He joined her and became CEO and she became Creative Director
- 2003 licensing agreement between Group III and Wenger, maker of the 100-year-old Genuine Swiss Army Knife brand,
  - has generated a company that, since 2003, has done more than \$400 million in sales. With offices in Florida, Taiwan and Mainland China, Group III now distributes more than 60 products through Target Stores alone.
  - Recently (circa 2012) sold firm to private equity group.
  - In 2015, they bought the company back from the private equity investor who had bought it a few years before!
- Donated about \$5 million to UML for scholarships and building



<http://www.jackmwilson.net/Cases/Case-Pulichino-Tong.pdf>

# Robin Lee (Li Yanhong) and Eric Xu (Eric Xu Yong) -Baidu

- Robin Lee- born Shanxi Province, China attended Peking University then SUNY Buffalo to study Computer Science. Now serves as CEO of Baidu.
- Eric Xu Young –born in China, attended Peking University (BS and MS), PHD in Biology from Texas A&M and post-doctoral research at University of California Berkeley. Now founded YIFANG Group Holdings Limited, a venture capital company, and several charitable organizations. Worked in two California start-ups before returning to China to found Baidu in 1999.
- Baidu 百度, Inc. (Chinese: 百度; pinyin: Bǎidù, pronounced "BY-doo" in English), incorporated on January 18, 2000, is a Chinese web services company headquartered at the Baidu Campus in Beijing's Haidian District.[5]
- Baidu offers many services, including a Chinese language-search engine for websites, audio files and images. Baidu offers 57 search and community services including Baidu Baike (an online, collaboratively-built encyclopedia) and a searchable, keyword-based discussion forum.[6] Baidu was established in 2000 by Robin Li and Eric Xu. Both of the co-founders are Chinese nationals who studied and worked overseas before returning to China. In March 2015, Baidu ranked 4th overall in the Alexa Internet rankings.[7] During Q4 of 2010, it is estimated that there were 4.02 billion search queries in China of which Baidu had a market share of 56.6%. China's Internet-search revenue share in second quarter 2011 by Baidu is 76%.[8] In December 2007, Baidu became the first Chinese company to be included in the NASDAQ-100 index.[9]
- Baidu provides an index of over 740 million web pages, 80 million images, and 10 million multimedia files.[10] Baidu offers multimedia content including MP3 music, and movies, and is the first in China to offer Wireless Application Protocol (WAP) and personal digital assistant (PDA)-based mobile search.
  - <http://en.wikipedia.org/wiki/Baidu>
  - [http://en.wikipedia.org/wiki/Robin\\_Li](http://en.wikipedia.org/wiki/Robin_Li)
  - [http://en.wikipedia.org/wiki/Eric\\_Xu](http://en.wikipedia.org/wiki/Eric_Xu)



<http://www.jackmwilson.net/Cases/Case-Baidu.pdf>

# Marcos Galperin -Mercado Libre

- Marcos Galperin was born in Buenos Aires
    - Colegio San Andres in Olivos, Buenos Aires
    - Attended Wharton School at Univ. of Pennsylvania but left
    - Returned to Stanford for MBA (1999).
  - Founded Mercado Libre in 1999 assisted by Prof. Jack McDonald
    - John Muse, Muse private equity fund, first investor
    - funding from JPMorgan Partners, Flatiron Partners, Hicks Muse Tate and Furst, Goldman Sachs, GE Capital and Banco Santander Central Hispano.
    - In September 2001 eBay acquired 19.5% of MercadoLibre
  - MercadoLibre.com (literally "free market" in Spanish) or *MercadoLivre* in Portuguese (Brazil, Portugal) is an Argentine online marketplace dedicated to e-commerce and online auctions.
  - Latin America's number-one e-commerce site.
    - present in Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Mexico, Ecuador, Peru, Panama, Portugal, Uruguay and Venezuela.
- 
- <http://en.wikipedia.org/wiki/MercadoLibre.com>
  - [http://en.wikipedia.org/wiki/Marcos Galperin](http://en.wikipedia.org/wiki/Marcos_Galperin)

<http://www.jackmwilson.net/Cases/Case-MercadoLibre.pdf>



## Harish Hande '98 '00

- UML MS '98 renewable energy engineering
- UML PhD '00 in mechanical engineering (energy)
- co-founded Solar Electric Light Co. India in 1995.
  - As SELCO's managing director, he has pioneered access to solar electricity for more than half a million people in India, where more than half the population does not have electricity, through customized home-lighting systems and innovative financing.
- Hande received the 2011 Magsaysay Award, widely considered Asia's equivalent of the Nobel Prize,
- One of 21 Young Leaders for India's 21st Century by Business Today
- Social Entrepreneur of the Year for 2007 by the Schwab Foundation for Social Entrepreneurship and the Nand and Jeep Khemkha Foundation.



<http://www.jackmwilson.net/Cases/Case-SolarElectricLight-HarishHand.pdf>

# Muhammad Yunus

- Bangladesh
- Chittagong College
- Dhaka College
- PhD Economics Vanderbilt
- Professor Economics in Bangladesh
- Founded profitable packaging company
- Invented microcredit and microfinance
- Nobel Peace Prize
- Founder of Grameen Bank
  - In the late 1980s, Grameen started to diversify by attending to underutilized fishing ponds and irrigation pumps like deep tube wells.
  - In 1989, these diversified interests started growing into separate organizations. The fisheries project became Grameen Motsho ("Grameen Fisheries Foundation") and the irrigation project became Grameen Krishi ("Grameen Agriculture Foundation").
  - In time, the Grameen initiative grew into a multi-faceted group of profitable and non-profit ventures, including major projects like Grameen Trust and Grameen Fund, which runs equity projects like Grameen Software Limited, Grameen CyberNet Limited, and Grameen Knitwear Limited, as well as Grameen Telecom, which has a stake in Grameenphone (GP), the biggest private phone company in Bangladesh.
  - From its start in March 1997 to 2007, GP's Village Phone (Polli Phone) project had brought cell-phone ownership to 260,000 rural poor in over 50,000 villages.[24]
  - The success of the Grameen microfinance model inspired similar efforts in about 100 developing countries and even in developed countries including the United States. Many microcredit projects retain Grameen's emphasis of lending to women.
  - More than 94% of Grameen loans have gone to women, who suffer disproportionately from poverty and who are more likely than men to devote their earnings to their families



<http://www.jackmwilson.net/Cases/Case-MuhammadYunas.pdf>



- Jack Ma (Ma Yun) born in 1964 in Hangzhou, Zhejiang Province, China.
  - Richest man in China (18 in World)
  - failed the university entrance exam three times
  - 1988 graduated from Hangzhou Normal University in English
- In 1999, Jack Ma founded the website Alibaba.com, a business-to-business portal to connect Chinese manufacturers with overseas buyers.
- provides consumer-to-consumer, business-to-consumer and business-to-business sales services via web portals. It also provides electronic payment services, a shopping search engine and data-centric cloud computing services.
- In 2012, two of Alibaba's portals handled 1.1 trillion yuan (\$170 billion) in sales.
- Alibaba's market value was measured as US\$231 billion at its historic initial public offering (IPO) on September 19, 2014.
  - <http://en.wikipedia.org/wiki/Baidu>
  - [http://en.wikipedia.org/wiki/Jack\\_Ma](http://en.wikipedia.org/wiki/Jack_Ma)
  - <http://www.bloomberg.com/news/articles/2014-11-09/ma-says-alibaba-shareholders-should-feel-love-not-no-3>
  - <http://www.bloomberg.com/bw/articles/2012-06-14/jack-ma-is-the-loneliest-billionaire-in-china>
  - <http://www.economist.com/news/leaders/21573981-chinas-e-commerce-giant-could-generate-enormous-wealthprovided-countrys-rulers-leave-it>



<http://www.jackmwilson.net/Cases/Case-Alibaba.pdf>

# Manijeh Nazari Goldberg

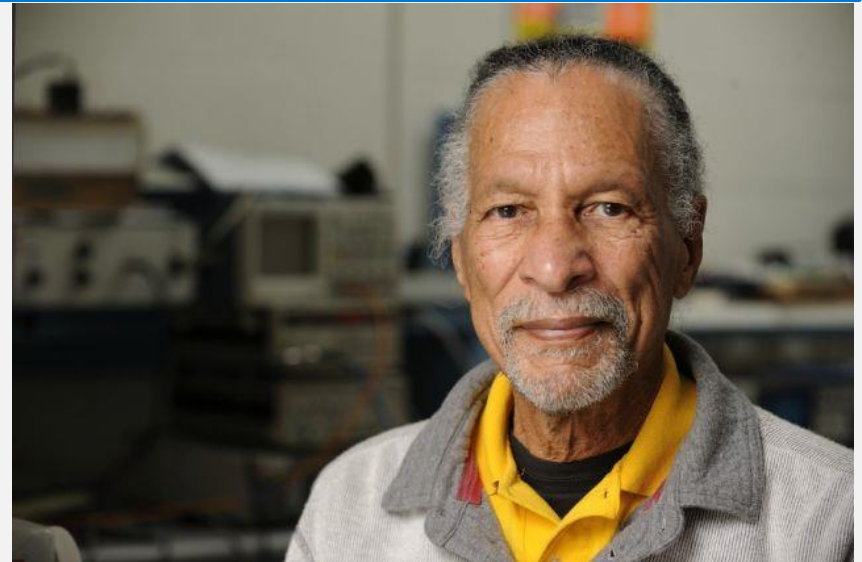
- Emigrated from Tehran, Iran
- Was unable to study Nuclear Engineering as she had planned.
- UMass Lowell BS Engineering (Civil)
- UML MS Computer Science
- MIT MBA
- Privo Technologies
  - MIT 100 K Award winner
    - Nano delivery of insulin by chewing gum
  - Nano Drug Delivery



- They are in the early stages of development of a company offering a platform for nano-delivery of drugs.
- They are working in a very tough area of raising money to commercialize an emerging technology.
- Case: Privo -<http://www.jackmwilson.net/Entrepreneurship/Cases/Case-Privo.pdf>  
[http://www.jackmwilson.net/Cases/Case-Privo-BEAT-THE-ODDS\\_UML.pdf](http://www.jackmwilson.net/Cases/Case-Privo-BEAT-THE-ODDS_UML.pdf)

# James West

- James West attended Temple University to study Physics over his father's objections.
- He never graduated because he took an internship at Bell Labs where he essentially invented the electret microphone.
- He returned to Temple, but did not bother to graduate. He was accepted into the doctoral program and started working on his doctorate.
- Then Bell labs called and asked him to come back since his microphone stopped working and they could not understand why.



- He and Gerhard Sessler started working together and found out what was going on –leading to the invention of the microphone that nearly everyone uses today.
  - West never finished his doctorate and never finished his BS. Today he is a professor of both Mechanical Engineering and Electrical and Computer Engineering at Johns Hopkins' Whiting School of Engineering.
  - He holds more than 40 US and over 200 international patents. He has been inducted into the National Inventors Hall of Fame and the National Academy of Engineering. His many awards include the Acoustical Society of America's Gold Medal, the George Stiglitz Trophy from AT&T, the Benjamin Franklin Medal Award in Electrical Engineering, and the US National Medal of Technology and Innovation.
  - West has received honorary doctorates from the University of Pennsylvania, Temple University, Michigan State University, and the New Jersey Institute of Technology –but has no earned degrees other than his high school diploma!
- <http://arstechnica.com/information-technology/2016/05/listen-up-james-west-forever-changed-the-way-we-hear-the-world/>

# Steve Jobs

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- *Don't let the noise of other's opinions drown out your own inner voice. And most importantly, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.*
  - Steve Jobs
- Cofounder of Apple, NeXT, and Pixar
- Visionary of iPod, iPhone, iPad, iTunes, Macintosh, Apple II, etc.
- *"You've got to start with the customer experience and work back toward the technology - not the other way around."*
- *"A lot of times, people don't know what they want until you show it to them."*

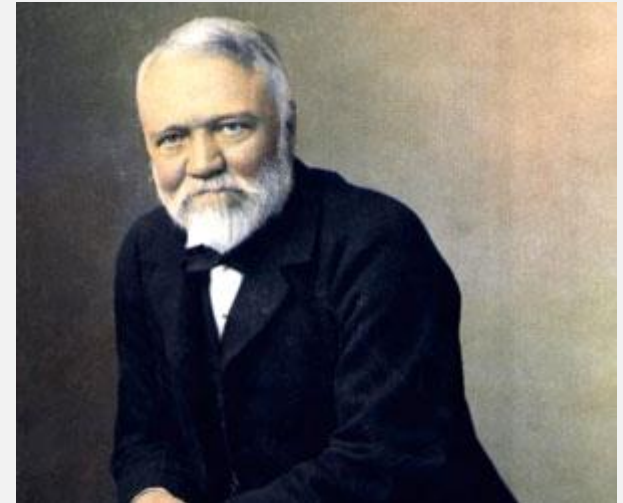


<http://www.jackmwilson.net/Cases/Case-Apple-Supplychain.pdf>

# Andrew Carnegie

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- Born in Scotland
  - Moved to Pittsburgh, PA
  - Worked for what became the Pennsylvania Railroad.
  - Carnegie Steel Corporation -> US Steel
  - Made his wife sign a pre-nuptial agreement in which she acknowledged that he intended to give away his fortune rather than keep it in the family.
  - Carnegie Libraries
  - Carnegie Institute of Technology ->Carnegie Mellon University
  - Carnegie Endowment for International Peace.
- Notice that Andrew Carnegie fore-shadowed the practice of entrepreneurs signing the giving pledge over a century ago!



# Mark Zuckerberg

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- Harvard dropout
- FaceMash
- Always a computer geek
- Gamer
- Some say socially inept
  - Others disagree
- Signed the Giving Pledge
- \$100 million to Newark Schools



# Mary Kay Ash

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- Born in Texas
- Successful in sales, but angry when men were promoted over her
- 1963 - business plan for **Mary Kay Cosmetics**
- Founded with two sons
- Pyramid models of sales representatives.
- More than 100,000 Pink Cadillacs given out.
  - I saw one in Lowell!
- 6<sup>th</sup> largest direct sales company
  - \$2.9 billion
- Wanted to help women to advance by helping them to help others.



# Mark and Elisia Saab

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- Mark and Elisia Saab ->
- UMass Lowell '81,  
Plastics Engineering
- Advanced Polymers -1989
- In 1988, Mark Saab '81 had a vision. A vision of a product that no one in the market was making: an ultra-thin walled medical tubing. Saab believed he could produce it and was confident the market would be there.
- And his wife Elisia believed in him.
- Sacrificing nights and weekends, while working two day jobs, she helped Mark turn his vision into one of the most respected companies in its field.
- Donor of over \$ million to UML Scholarships





## Jim Dandeneau '80

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- Jim Dandeneau – CEO & Owner
- UMass Lowell '80 Plastics Engineering
- Hockey Player as an undergraduate!
- Jim founded Putnam Plastics in 1984 and serves as President and CEO. Under Jim's guidance, Putnam Plastics has established itself as the leading source for complex extrusions and co-extrusions for the medical device industry
- Co-owner Connecticut National Golf Course
- Donor of over a \$ 1 million to UML scholarships



# Robert “Rob” Manning ‘84

- Chairman and CEO of MFS Securities
- Credited with saving a company that nearly expired!
- “For the rare comeback story among money managers, look to MFS Investment Management, one of the oldest names in the mutual fund business but also one of the most battered after the Internet bubble popped in 2000.” –Institutional Investor
- “CEO Manning described his approach as the opposite of the star system used by some rivals. Employees are expected to work closely together and sacrifice their egos as necessary; even fund managers with terrific performance records will face bonus cuts if they do not treat other employees respectfully, he said.”
- MFS provides financial services and products to Asia, the Middle East, Europe, Latin America and the United States.
- Rob and Donna (Nursing ‘84) are \$5 million donors to UML



# Charles Hoff '66

- Charlie and Josephine Hoff
- Shown (right) with \$23 million donors Jack and Shelly Blais
- Hoff received a bachelor's degree in industrial management at UMass Lowell and a master's degree from Northeastern University.
- He has been a senior vice president of operations for Bausch & Lomb and held senior management positions with Wang Laboratories, Polaroid and Gillette.
- From 1983 to 1986, he was president, CEO and owner of ARL Analytical Instruments Co., which generated more than \$100 million in worldwide sales.
- He then became owner, chairman and CEO of Universal/Univis, Inc., a group of designer eyewear companies.
- He and Josephine have donated over \$5.5 million to scholarships



# Jack Blais

- Jack and Shelly Blais
  - With Nobel Prize winner Craig Mello, Chancellor Lazare, and President Wilson
- Private Investor in Precision Optics
- Founded 15 companies,
  - many of which he has since sold.
  - optical and optical-interference technologies for military, medical and commercial applications
- In 2001 Corning paid \$2.1 Billion to acquire NetOptix from him.
- Founder and president of Blais Co. of Framingham, a holding company specializing in high-technology firms, and an active partner in Capital Risk Management Inc., a management consulting firm.
- Founded a bank in Florida
- Now does Philanthropy with low profile
  - \$23 million to UMass Medical School for the Aaron Lazare Building and Blais Chair of Molecular Medicine for Nobel Prize winner Craig Mello.
  - \$21 million to Dana Farber by buying naming rights to Patriots Training Facility and donating them to Dana Farber.



# John F. Kennedy UML '70 UMass Amherst '76

- UMass Lowell, BS, 1970
- UMass Amherst, MBA, 1976
- Nova Ventures Corp.
  - President and Chief Financial Officer (retired)
  - <http://www.novavg.com/history.html>
- January 2010, Nova Analytics owned nine (9) operating companies with over 750 employees in 8 different countries worldwide, focus on: electrochemistry, optical measurement, temperature measurement, respirometry, and viscometry.
- On February 17, 2010 ITT Corporation announced the purchase of Nova Analytics
- Director, Datacom Systems, Inc.
- Director, Harvard Biocience, Inc.
- Donor for Scholarships to both UMass Amherst and UMass Lowell



- John F. Kennedy is the retired President and Chief Financial Officer of Nova Ventures Corporation the management company for Nova Analytics Corporation a manufacturer and marketer of analytical instruments and Nova Technologies Corporation a manufacturer and marketer of equipment and services to water collection networks. These are companies he was a co-founder of in 2003 and 2005, respectively with revenues in excess of \$170 million for 2007. He has over 30 years of financial and technology management experience. He was formerly Sr. Vice President Operations and Chief Financial Officer of RSA Security Inc, a NASDAQ security software company. He served as the Chief Financial Officer and Vice President, Finance of deCalog NV, an international investment management software company and as Chief Financial Officer of Natural MicroSystems Corporation, a NASDAQ telecommunications hardware and software company.
- Mr. Kennedy serves on the board of directors and audit committee chairman of Harvard Bioscience, Inc. a NASDAQ supplier of tools to accelerate drug discover and was formerly on the board of directors and audit committee chairman of Net Perceptions, Inc. an internet software company where he was the audit chair.
- He is a member of the advisory boards for the Isenberg School of Management at UMass Amherst, the College of Sciences and the Center for High-rate Nanomanufacturing both at UMass Lowell.
- He is a certified public accountant having worked with the Boston office of KPMG.

# Joe Lane

- Founder and CEO of SafePath Medical
- BS Engineering UMass Lowell
- MBA Babson



SafePath Medical, Inc. Patent applications		
Patent application number	Title	Published
20130041388	<a href="#">APPARATUS AND METHOD FOR SUTURING TISSUE</a> - A suturing device of the present invention is in the form a compact, light-weight handheld device that includes a needle and suture assembly, a mechanism for gripping and releasing the needle/suture (a "needle transfer mechanism" or "needle shuttle mechanism"), safely capturing the needle/suture upon exit from the patient's tissue, and returning the needle to a position such that the process of delivering additional sutures to the patient can be repeated. A safety shield mechanism ensures the user is protected from the needle at all times. The device of the present invention accommodates the right or left-handed user, rests comfortably in the user's hand, allows sufficient visualization of the procedure site, and permits the user to either control penetration depth of the needle or default to a device-determined depth. The present device permits the user to utilize a wrist-rotation (pivoting) suture delivery technique.	02-14-2013

# Nonspec -A student generated company

- Nonspec (previously known as Developing Nation Prosthetics) provides low cost, high functionality replacement limbs with an acceptable amount of customization for children in other nations.
- The team consists of Katherine Cain, Jonathan De Alderete, Brendan Donoghue, Sean Gibson, Olivia Keane and Erin Keaney with majors in plastics and mechanical engineering, as well as minors in business administration and history.
  - <https://www.uml.edu/Innovation-Entrepreneurship/DifferenceMaker/Meet-the-DifferenceMakers/DM-Nonspec.aspx>

SPORTS — PAGE 11 LOCAL — PAGE 3

# THE SUN

WEDNESDAY

\$1.00 June 10, 2015 Lowell, Massachusetts

## Two floors, no ceiling on invention

UML business incubator opens in rehabbed canal district building

By Robert Mills  
rmills@lowellsun.com

LOWELL — Catherine Pujol-Baxley started on Tuesday about 9 a.m., the first scientist to work in the new research space at UMass Lowell's business incubator in the Hamilton Canal District.

The incubator is the first commercial property to open its doors in the Hamilton Canal District, a prominent part of the city at the edge of the downtown, long home to little but abandoned buildings and vacant lots. It makes its home on the top floor of the former Freudenberg Non-wovens mill at 110 Canal St.

Pujol-Baxley is director of research and development for KnipBio, a start-up that is engineering micro-organisms to improve the quality of food used in aquaculture, also known as fish farming.

UMass Lowell leases the top



**A PLACE TO EXPLORE:** Erin Keaney, co-founder and CEO of Nonspec, and Brendan Donoghue, right, a 2015 UML graduate who is an intern at Nonspec, show a prosthetic foot to UMass President Emeritus Jack Wilson at UML's new incubator at 110 Canal St. Below, from left, Steve O'Riorden, UML associate vice chairman for financial services, UML Government Relations Associate Colleen Brady and Director of University Events Rick Sherburne take in the view.

SUN PHOTOS / JULIA MALAKIE

two floors of the building, with 11,000 square feet of space on each floor meant to help grow start-ups in the biotech and medical-device fields.

The facility is home to two separate but related programs — the UMass Lowell Innovation Hub, on the fourth floor, and an extension of the university's Massachusetts Medical Device Development Center.



Please see **INCUBATOR/10**

SEE THE VIDEO  
lowellsun.com

## UML Students have developed business ideas in

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- Real estate
- Restaurant
- Medical device
- Composting
- Vending machine
- GPS application
- Cell phone apps
- Campus transportation
- Day care center
- ecommerce website
- Retailing
- Consider the [DifferenceMakers](#) Program at UML



# Who ARE these people?

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Think back for a moment about the entrepreneurs that you just read about. What did you notice? What do they have in common? How are they different?

Compare this group to the image that you previously had in your mind of an entrepreneur based upon your past experiences. What kinds of differences did you see? Which of your previous impressions were changed and which remained the same or were reinforced.

Consider your own ideas of what “wealth” and “profit” means to you. Did this mean the same thing to all of these entrepreneurs? If you had to guess, based upon what little you know of these individuals, do you think that they were all motivated by the same things?

Is there any way you could describe their motivations that might fit all of them?

Did they all want to

- Make money?
- Change the world?
- Make a difference?
- Do their own thing?
- Be their own boss?
- Be a widely recognized public figure?
- Take tremendous risks?

## Next steps

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- In the next chapter, we will look at the characteristics that seem to define an entrepreneur.
- We will consider the widely held public “Myths of Entrepreneurship”
- We will try to find the common characteristics of so many entrepreneurs.
  
- I am going to guess that you are already making your own opinions about that.
  
- But before we leave this chapter of our work, we will do two more exercises.
  - 1. We will look at the case study of John Pulichino and Joy Tong.
    - The new building for the Manning School of Business is being named the Pulichino-Tong building in their honor and in gratitude for their generosity.
  - 2. Please go to the discussion board and answer the questions posed there. Read the thoughts posted by your fellow students, and feel free to comment and debate various issues. Please be courteous and civil in your discussions with other students, but please do not hesitate to disagree with one another –in a constructive fashion.