The Impact of Research and Technology Commercialization

By
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Recognition from Highest Levels of Government

President Obama:

"We've got to make sure that the technological breakthroughs that come to define the 21st century take root .."

"Our government has to invest in innovation"

"That's how we are going to build the industries of the future … because we make smarter products using better technology"

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Good News, Bad News

Good News - The visibility of technology transfer continues to increase

- Greater awareness & participation
- More resources allocated

Bad News - The visibility of technology transfer continues to increase

- Increased awareness generates increased expectations
- Lack of understanding of T2 creates problems
  - Proposed patent legislation

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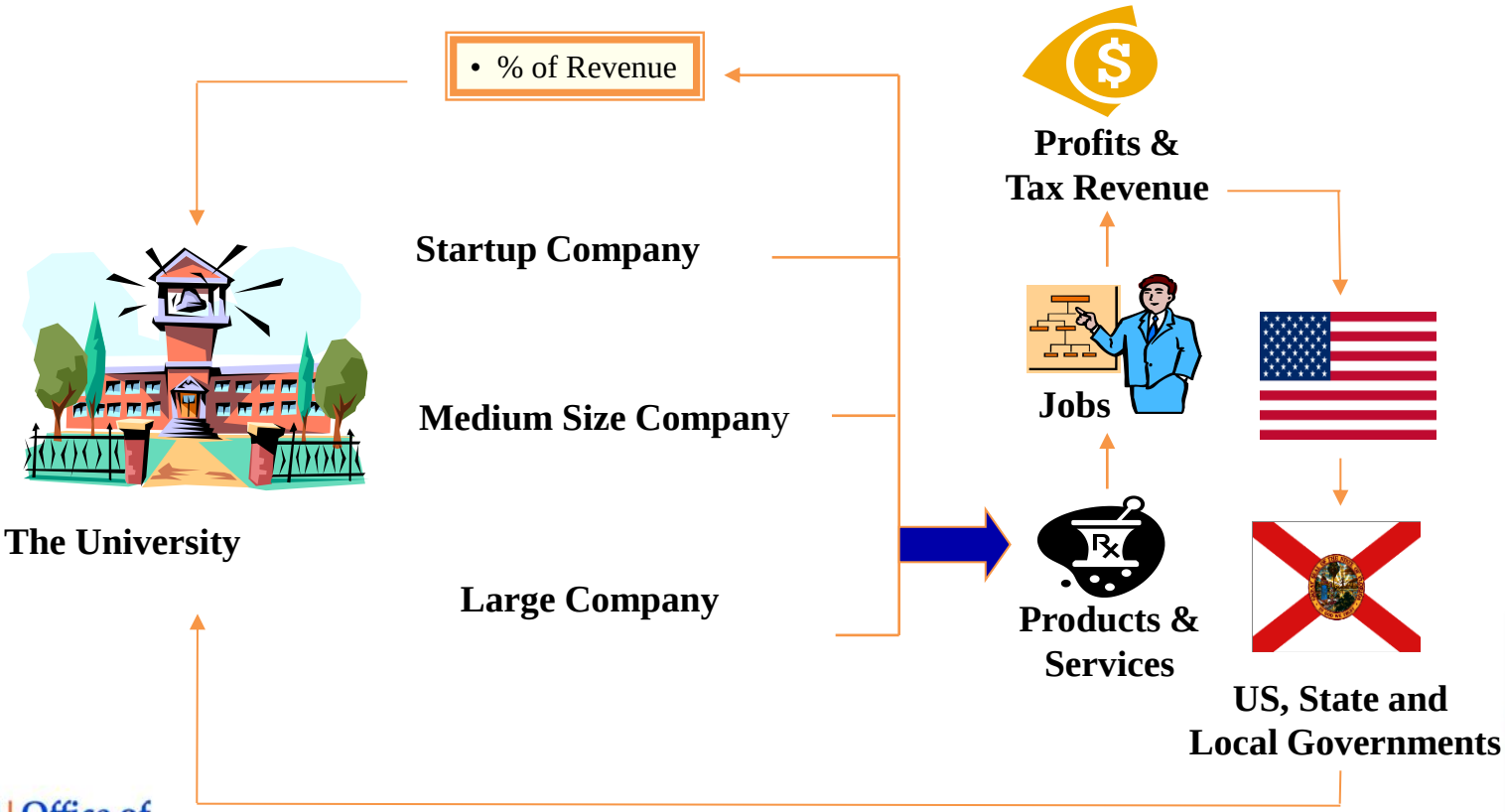
Lab to Market – It Works !

A Very Virtuous Cycle



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Gainesville, FL

Population:
City: 127,488
Alachua County: 253,451
Median Age: 25

Largest Employers:
-University of Florida
-Publix Supermarkets
- UF Health
-Nationwide Insurance

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University of Florida Office of Technology Licensing

- 14th Largest Research University in U.S.
- In FY 2014 UF OTL ranks in top
  - Licenses Executed
  - Patents Filed
  - Startups Created

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Largest Employers in Florida

#	Employer	City	Number of Employees
1	University of Florida	Gainesville	35,000
2	Florida Hospital Orlando	Orlando	16,000
3	Pensacola Naval Air Station	Pensacola	15,000
4	Orlando Health	Orlando	14,000
5	University of South Florida	Tampa	13,584
6	University of Central Florida	Orlando	10,554
7	Memorial Regional Hospital	Hollywood	10,000
8	West Kendall Baptist Hospital	Miami	10,000
9	Gimbel & Associates	Fort Lauderdale	9,999
10	Disney Quest	Lake Buena Vista	9,000

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UF Patents & Licensing

	Research Awards	Invention Disclosures	Licenses/Options Executed	Start-ups
2013/14	$702M	295	87	17
2012/13	641	297	84	16
2011/12	644	324	79	15
2010/11	619	298	78	12
2009/10	678	279	67	9
2008/09	574	271	72	10
2007/08	562	299	75	14
2006/07	583	327	74	9
2005/06	519	260	73	10
2004/05	494	274	66	13
2003/04	475	280	64	8

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Gatorade launched a whole new industry

Trusopt is a treatment for glaucoma - Merck

Sentricon is a colony elimination technology for termite control

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Innovation R&D Hotbeds

MIT, Caltech – And the Gators?

How the University of Florida moved to the Major league of technology startups

BusinessWeek May 21, 2007

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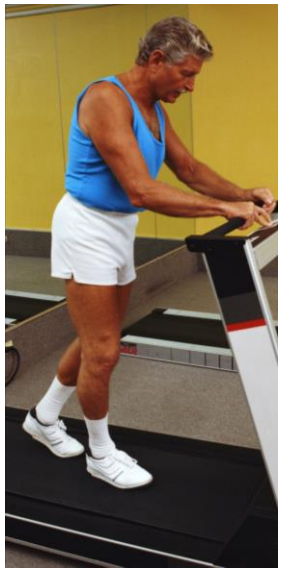
UF Spinoff -RTI

Genetics/Cancer Research Institute

- Regeneration Technologies, Inc. is a UF spin-off and the leading provider of sterile biological implants for surgeries around the world – enabling people to stay active longer
- Currently employs 1100 people
- Sale of RTI stock provided $30 million each for new research buildings at UF

Orthopaedics & Sports Medicine Institute



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UF TechConnect

- UF Tech Connect – an EDA University Center housed in OTL located in the universities incubator connects:
  - New discoveries
  - Entrepreneurs
  - Investors
  - Facilities
- Since 2002 TechConnect client companies have:
  - Created over 2300 jobs
  - Generated over $1 Billion in private investment
  - Garnered over $600 million In public funding

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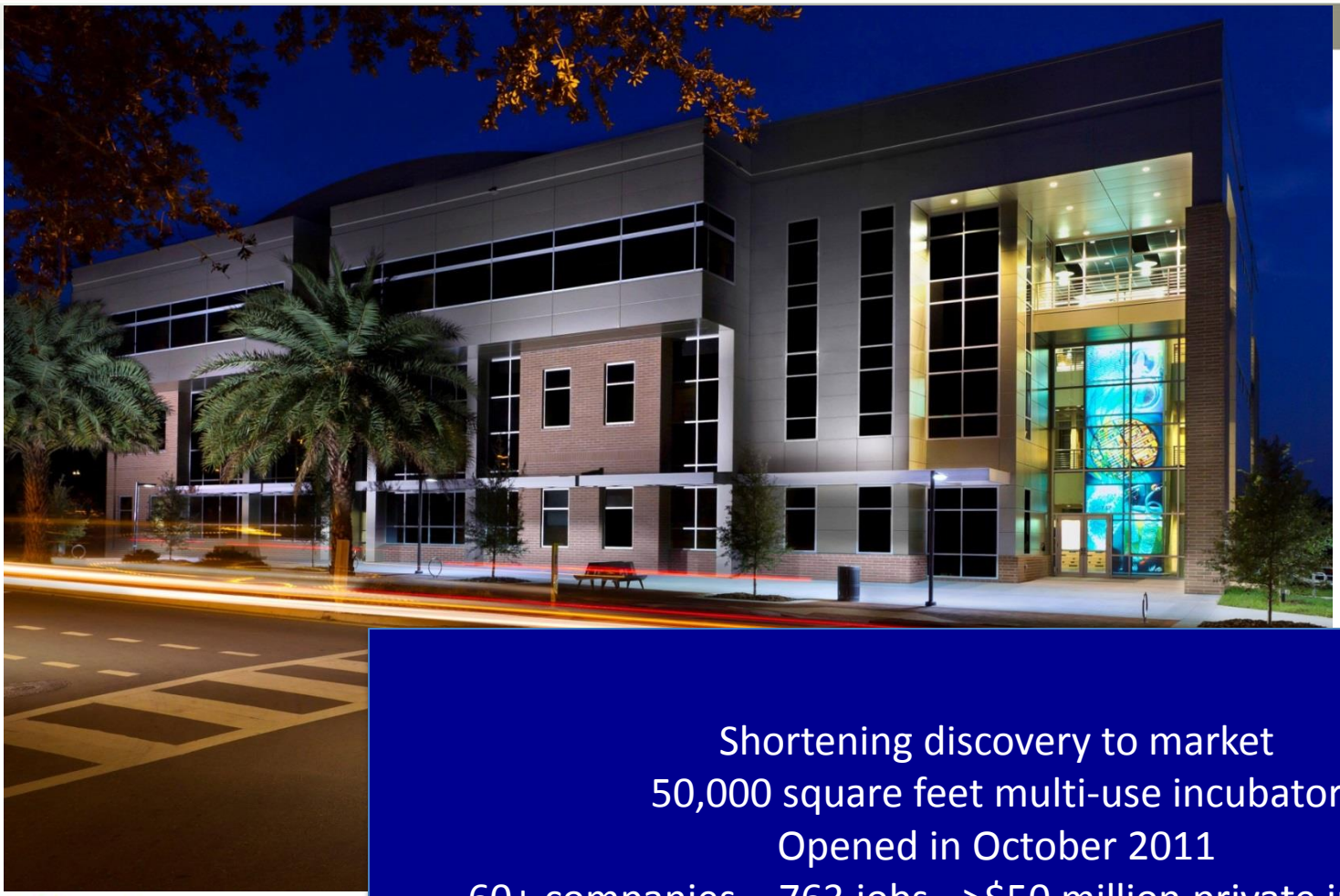
Florida Innovation Hub at UF



Shortening discovery to market
50,000 square feet multi-use incubator
Opened in October 2011
60+ companies – 763 jobs - >$50 million private investment

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UF Annual Financial Report

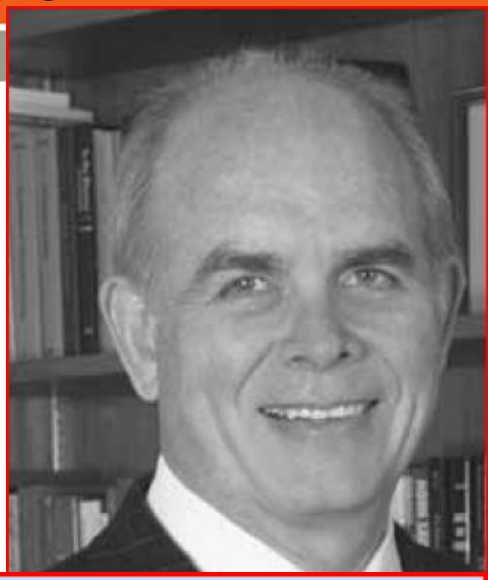
The Office of Technology Licensing

Where science meets business

Much of the credit for UF's remarkable success in technology transfer must go to our Office of Technology Licensing. The office works with UF inventors to transfer discoveries to the commercial sector, and at the same time coordinates with industry to help identify technologies that can expand product lines, improve manufacturing processes and provide a competitive edge in the marketplace.

Housed within Technology Licensing is UF Tech Connect, a unit that fosters the creation of new business by developing programs, sponsoring events, and facilitating mutually beneficial connections in collaboration with public and private organizations. Because of the tremendous volume of research that UF generates, UF Tech Connect has become a magnet for entrepreneurs and investors seeking new opportunities.

Tech transfer, startup companies highlighted as drivers of the economy in 2009-10 UF Annual Financial Report



President's Message

When it comes to moving innovations and ideas from the laboratory to the marketplace, it is not surprising that the University of Florida has a strong track record. We have been committed to technology commercialization for three decades.


A Celebration of Innovation
President Kent Fuchs
University of Florida

Bayh-Dole Act of 1980

- Gave universities/researchers the opportunity to **patent** and reap **financial rewards** from technologies
- Gave industry a mechanism to generate return on investment for developing and marketing university technologies
- Has stimulated industrial productivity and innovation in the U.S.
  - Federal agencies prior to Bayh-Dole had a dismal rate of success
  - 28,000 inventions disclosed; less than 5% commercialized

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AUTM

- Association of University Technology Managers (AUTM)
  - nonprofit organization
  - international membership
    - more than 3,000 technology managers and business executives
    - Representing more than 300 universities, research institutions and teaching hospitals as well as numerous businesses and government organizations

AUTM Annual Survey

www.autm.net/metrics

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Tech Transfer Nationwide

- 26,014 invention disclosures
- 6,554 total licenses and options executed
- $65.1 billion total sponsored research expenditures
- $2.8 billion total licensing income
- 24,555 total U.S. patent applications

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***Based on responses to AUTM FY2013 Licensing Survey**

Tech Transfer Role in U.S. Economy

- AUTM's statistics for 2013:
  - U.S. institutions formed 818 startup companies
  - Seventy institutions reported 15,741 employees by 1,383 operational startups
    - Average of 11.38 employees per startup
- Startups are going to have the biggest impact on the health of U.S. economy
  - Multipliers of 2 – 7 depending upon who you believe

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University Inventions Changed the World

Georgetown University
CAT Scan

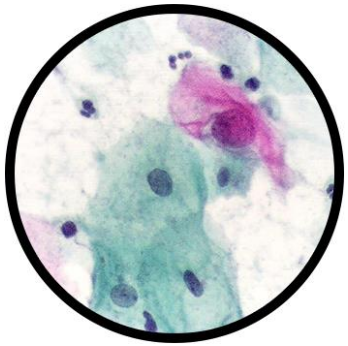
Indiana University
Fluoride Toothpaste

University of Toronto
Electron Microscope

University of Toronto
Insulin

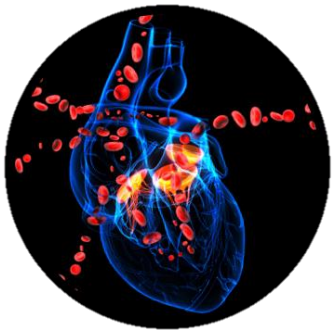
University of Pittsburgh
Polio Vaccine

University Inventions Changed the World



Cornell University

Pap Smear



University of Minnesota

Heart-Lung Machine

University of Minnesota

Pacemaker

University of Florida

Trusopt

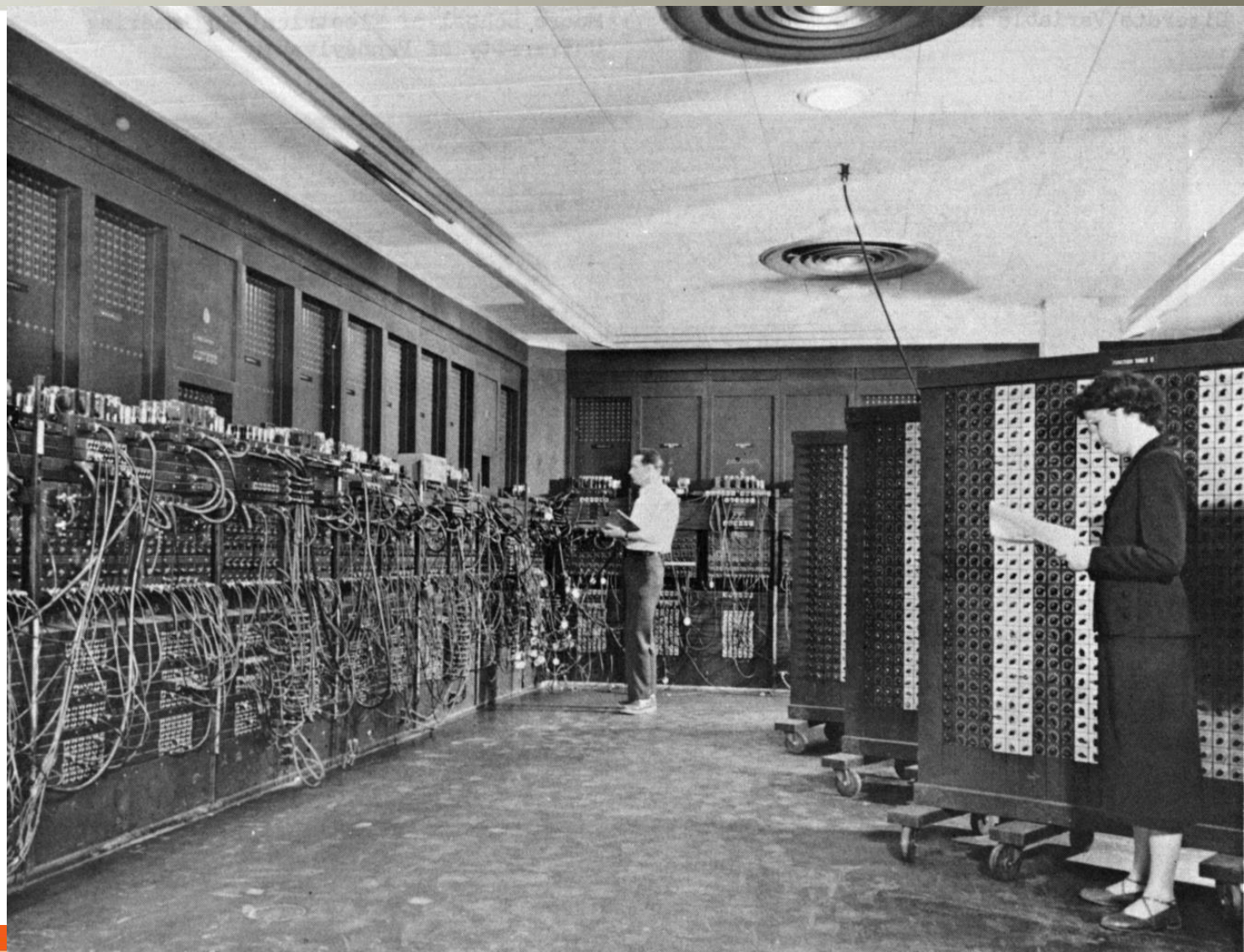
State University of New York

MRI Scanner

University Inventions Changed the World

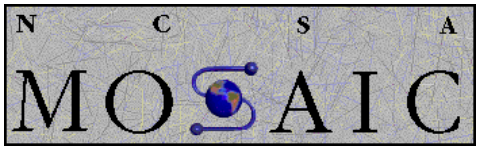
University of Pennsylvania

- Electric Computer -

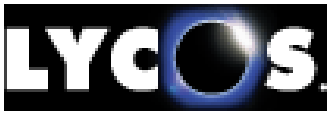


University Inventions Changed the World

University of Illinois



University of Illinois



Carnegie-Mellon

Stanford

Stanford

MIT


Happy
60th
Anniversary!

They invented a patient simulator for medical education

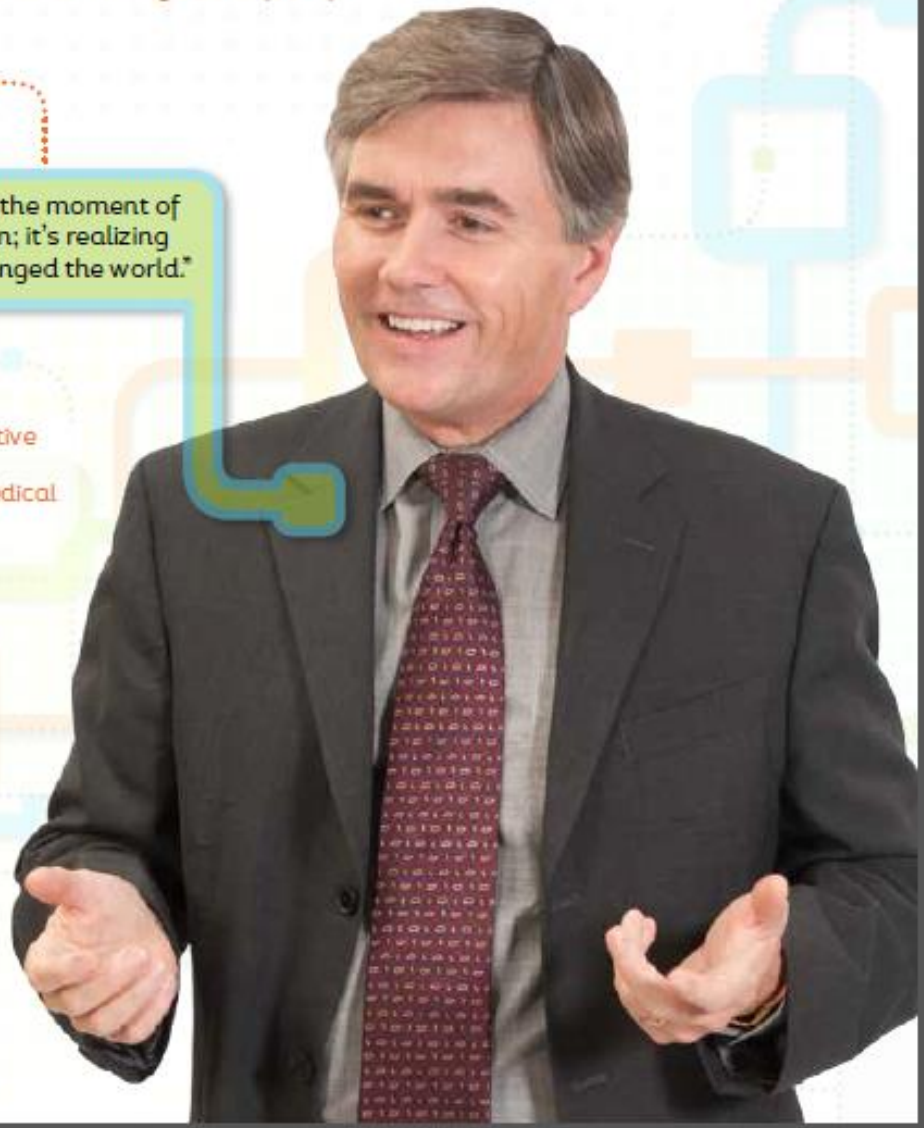
- Licensed by Medical Education Technologies, Inc. (METI)

"It's not the moment of invention; it's realizing you changed the world."

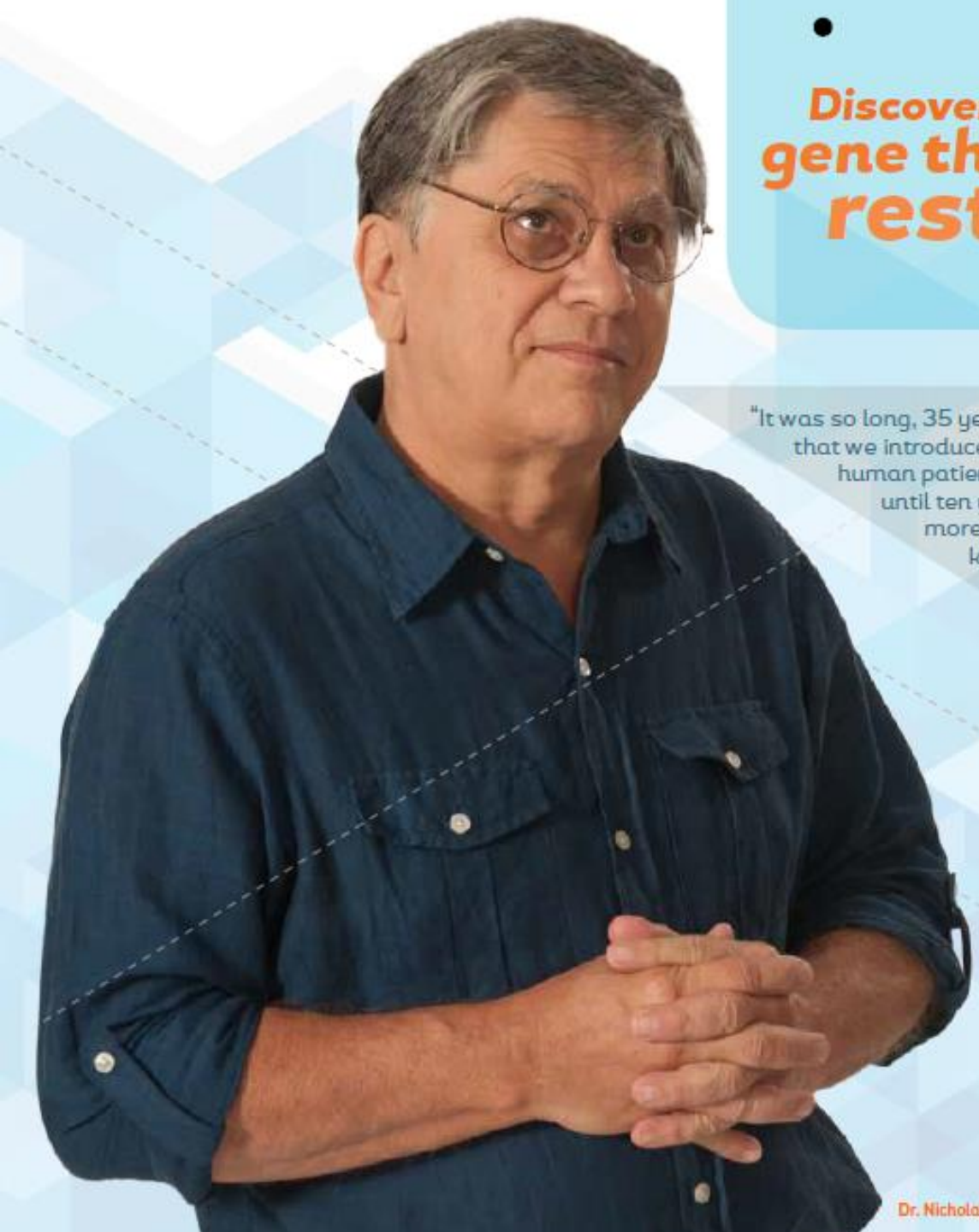
- Produced interactive human patient simulators for medical education

"It was a long gestation for me."

- Acquired by CAE Healthcare for $130M in 2011



Dr. Samsun Lampotang, Professor of Anesthesiology; Dr. Michael Good, Dean of the College of Medicine



Discovered a gene therapy that restores patients' sight

"It was so long, 35 years ago, that we introduced it into human patients. It wasn't until ten years later when two more labs showed it would keep working over time, that I knew we had something."

- Licensed by Applied Genetic Technologies Corporation (AGTC)
- Creates gene therapies for preventing and treating a wide range of diseases
- Holds more than 40 US and foreign patents with five products in active development
- Has raised more than $90 million in venture capital

Dr. Nicholas Muzyczka, Eminent Scholar in the Department of Molecular Genetics & Microbiology

He discovered a nerve-regeneration technology

- Licensed by AxoGen ®, Inc.
- Restoring sensation to thousands of patients with peripheral nerve damage
- Completed more than $38 million in financing through 2013

"Our society wants to grant funds for research aimed to improve the human condition. Sound science and, then, keen entrepreneurialism can bring this to fruition."

Dr. David F. Muir, Professor of Pediatrics and Neuroscience

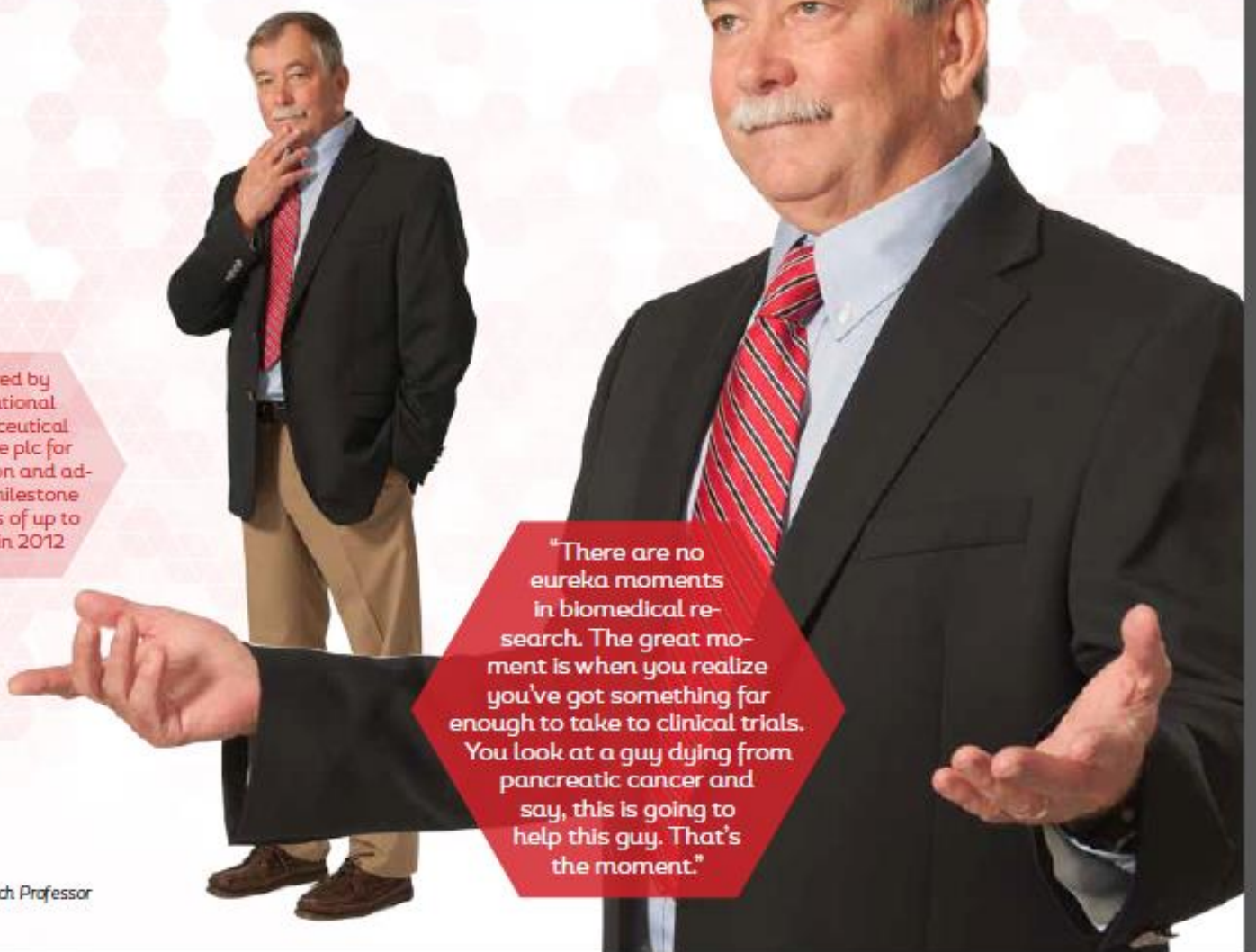
GrooveShark – music streaming co.

- Licensed Technology in 2006
- 50,000 million users
- Grew to 165 employees
- Offered $80 million – said NO
- Sued and closed doors in 20015

Discovered and **brought six drugs to clinical trials**, including an **iron-binding compound** that **removes heavy metals** from the **blood** of patients who **receive** regular **transfusions**

Licensed to FerroKin Biosciences, Inc.

Acquired by international pharmaceutical firm Shire plc for $100 million and additional milestone payments of up to $325M in 2012



"There are no eureka moments in biomedical research. The great moment is when you realize you've got something far enough to take to clinical trials. You look at a guy dying from pancreatic cancer and say, this is going to help this guy. That's the moment."

Dr. Raymond Bergeron, Emeritus Graduate Research Professor

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THE SPIRIT OF INNOVATION

January

sunday	monday	tuesday	wednesday	thursday	friday	saturday
			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20 Martin Luther King Day	21	22	23	24	25
26	27	28	29	30	31	

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The Spirit of Innovation

www.otl.ufl.edu

Melanie Campos, Licensing Associate
April Kilburn, Assistant Director

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"We're part of something big. It's like putting together a puzzle, the pieces coming together for a greater purpose."

Kathy Sohar, UF Tech Connect® Coordinator
Carla Buddensieg, StartUpQuest Coordinator
Sarah Gravina, Entrepreneurial Outreach Program Coordinator

"Working here is a great learning experience. We're on the cutting edge of research conducted at UF, and we're making a difference."

Interns : **Quentin Thomas, Cole Sullivan, Helie Dharia, Cameron Murphy, Mitchell Herring**

"It is an honor to have the opportunity to work with a company and watch it reach its milestones one step at a time, and finally to achieve its first commercial sale! We feel like part of the company team!"

Patti Reineke, Contracts Administrator
Amber Allen, Accountant

"We are fortunate to have the most amazing team working with the most brilliant faculty at the most incredible research institution. Doesn't get much better."

David Day, Director
Jane Muir, Associate Director


UF
WOMEN
INNOVATORS
RISING
UF UNIVERSITY of FLORIDA
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2015
CALENDAR

- American entrepreneurship lacks diversity:
  - 87 percent of U.S. venture capital-backed business founders are white
  - 12 percent are Asian
  - less than 1 percent are African American
  - Less than 3 percent of companies that receive venture capital funding have a woman CEO

Empowering Women in Technology Startups®

Mission: *Educate, inspire and empower women to pursue leadership roles in technology-based companies worldwide*

- Experiential learning program
- Launched in 2012 by the University of Florida
- Four programs conducted to date
- Over 200 women empowered
- Goal: 50 women in 50 states in 50 weeks

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Empowering Women in Technology Startups®

- Prequalified 7 patented technologies
- Virtual teams with an experienced woman entrepreneur mentor
- Provide entrepreneurial training over ten weeks
- Participants develop a business plan and investor presentation
- Planning to replicate this program around the country
- www.ewits.org

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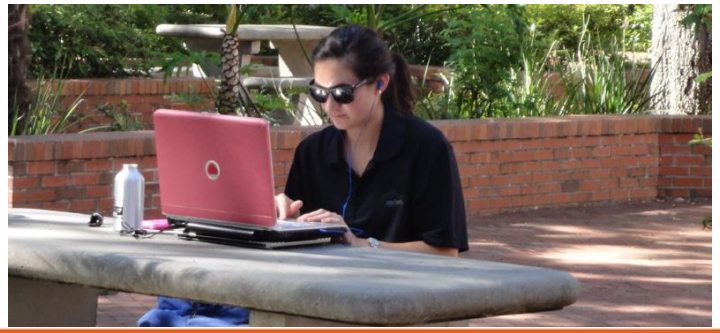
Entrepreneurs Play an Important Role in U.S. Economy

- 99.7% of companies in U.S. have fewer than 100 employees
- Those same companies provide 82.4% of all jobs
- 62.9% of businesses employ between 2 and 9 people

Source: Florida Trend January 2011



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How These Companies Start?

- Identify compelling problem your technology solves
- Identify how it is better than current solutions
- Identify who will pay for your solution
- Find entrepreneur to create a business plan
- Find someone willing to invest in the opportunity

Critical Components for Creating Technology-based Companies - Technology

- Technology – Most abundant resource
  - AUTM's statistics for 2013 = 26,014 disclosures

- Vast majority of early stage discoveries require additional development before they become products in the market

Critical Components for Creating Technology-based Companies - Entrepreneurs

- Two Fundamental Approaches to Finding Entrepreneurs to Start Companies
  - Recruit experienced entrepreneurs
  - Implement programs to grow our own
    - Entrepreneurial Boot camps
    - Capstone projects
    - eWiTS: Empowering Women in Technology Startups

Critical Components for Creating Technology-based Companies - Funding

- Funding – Follows opportunity appropriately matched with an experienced entrepreneur
  - Catch 22 for new entrepreneurs
- Today's funding environment has changed
  - Fewer VCs investing later stage
  - New forms of bootstrapping
    - Crowdfunding
  - More government funding programs
    - Both federal & state

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Critical Components for Creating Technology-based Companies - Facilities

- Facilities – Incubators provide space for companies to start and a venue to foster connections among critical components
  - Programmatic component is more important than facility
- NBIA: 80% of companies getting their start in an incubator are still thriving 5 years later

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Critical Components for Creating Technology-based Companies – Technology Transfer

- Technology Transfer focused on new business creation:
  - Expertise
  - Resources
  - Support from government, community & research institution

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Critical Components for Creating Technology-based Companies

- Technology
- Entrepreneurs
- Funding
- Facilities
- Technology Transfer expertise

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Measuring Success

Major Challenge Everywhere

- Many studies on the topic
- Some good, some????

Tech Transfer has Many Masters

Many masters with competing interests

- Faculty = sponsored research money
- Industry = technologies close to market for free
- VC's = technologies that can generate minimum 10x return
- University administration = licensing revenue
- Government = jobs and taxes

Measuring Success

- Revenues
- Taxes
- Companies
- Jobs
- Private Investment

= Economic Impact

Unfortunately the companies who license the technologies have far more control over these impacts than the Technology Transfer Offices

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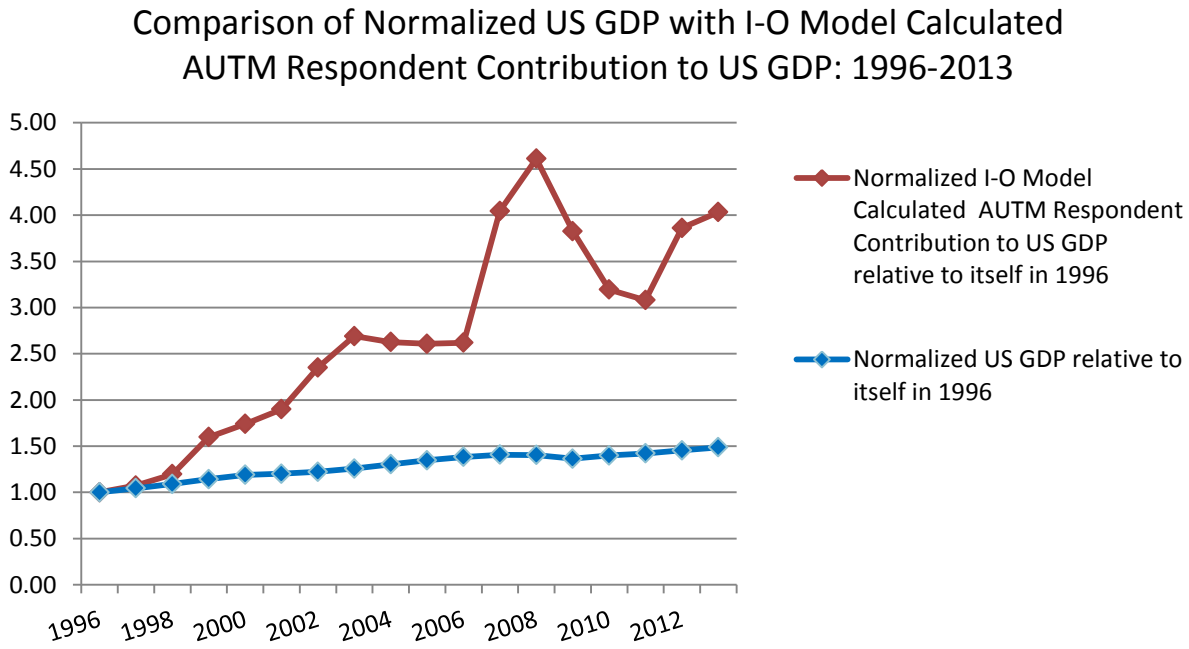
Biotechnology Industry Organization Study

Estimates between 1996-2013 university patent licensing bolstered:

- U.S. gross industry output by *$1.18Trillion*
- U.S gross domestic production by *$518 Billion*
- supporting *3,824,000 jobs*

Economic Impact



Growth in economic impact of university patent licensing is significantly greater than US GDP for same period

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Measuring Success

Social Impact =

- Whole New Industries
- Cures for Diseases
- Reduction in Healthcare Costs
- Increased Food Supply

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Gatorade developed to reduce heat-related conditions --launched a whole new sports drink industry

U.S. Market Alone
= $7.4 Billion

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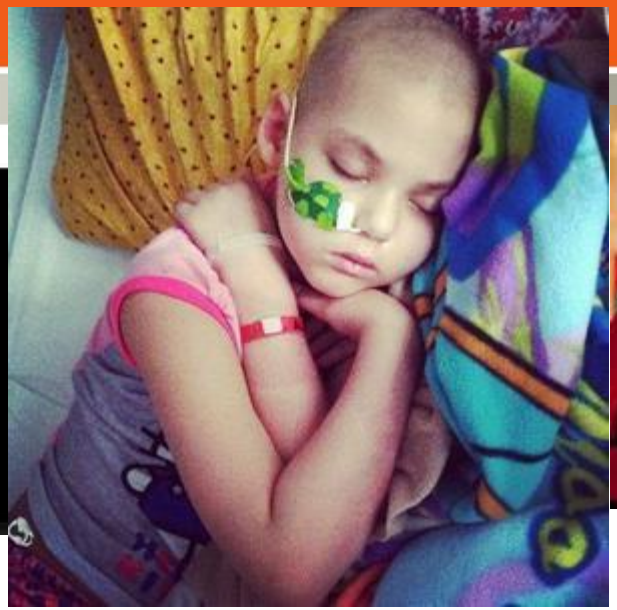
Cures for Diseases



Emma Whitehead has her Leukemia cured by HIV cells.

The University of Pennsylvania and St. Jude's.

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Reduced Health Care Costs

Hospital Acquired Infection Estimates in the U.S Alone:

- 1.7 million hospital-associated infections
- Over 100,000 deaths each year
- Economic impact is billions of dollars

Michael Skolnik - March 1979-June 4, 2004 – Died from hospital acquired infection.

Tracey of California - life devastated by hospital acquired infection.

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Technologies to Prevent Hospital Acquired Infections

Xhale's HyGreen technology – a hand-hygiene system to safeguard health during hospital visits

Sharklet Technologies – a topographical pattern of shark skin prevents hospital acquired infections from growing

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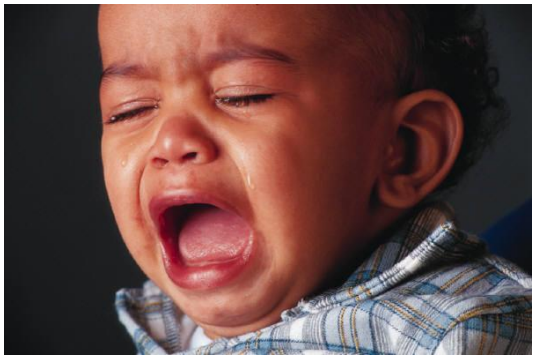
Technologies for Reducing Hunger

3.5 Million Children Die Each Year From **Hunger**



Dr. Borlaug at Purdue University developed successive generations of wheat varieties with disease resistance and exceedingly high yield potential - "saved more lives than any other person who has ever lived."

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Measuring Success

Impact On Real People = Making the world a better place

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AUTM Better World Project

Aims to promote public understanding of how academic research and technology transfer benefit the public.

www.betterworldproject.org

also“PUT A FACE ON IT” campaign

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Making the World a Better Place

The Pacifier Activated Lullaby (PAL)

Exo-skeleton is worn on the back and legs, making it possible for some wheelchair users to walk again

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Making the World a Better Place

Purdue crop storage system designed to prevent insects from destroying stored grains

Fighting Childhood Obesity - Coordinated Approach to Childhood Health (CATCH)

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Making the World a Better Place

Keys to Success

- Support from the highest university officials
  - Resources
  - Recognition
- Clear established goals agreed upon by TTO and TTO Management
- Recognition by all that T2 success takes a long time
- Regular communications with all constituents
- Regular updates on successes achieved
  - Human Nature to Complain
  - Must Balance Complaints with Successes

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Important to Remember:

What is easy to count isn't always important and what is important isn't always easy to count.

Our Future is so Bright - We wear shades!

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Thank You!

Jane Muir
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