

*Translational R&D –
The Driving Force of Job Creation
(A University Perspective)*

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What is Innovation?

(Especially in this context)

*Research is the transformation
of money into knowledge.*

*Innovation is the transformation
of knowledge into money.*

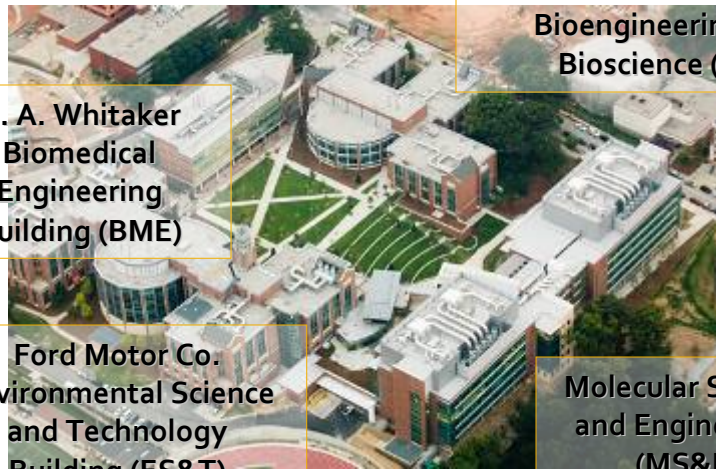
*—Dr. Geoffrey Nicholson, 3M
(inventor of the Post-it note)*

Georgia Tech

- GT's Vision : Defining the technological research university of the 21st century
- Science and engineering-driven
- Policy implementation
- Industry-friendly
 - Substantial industry funding
 - Tech-transfer knowledgeable
 - Economic development



Research Neighborhoods: Enhancing GT's Research Culture



Parker H. Petit Institute for
Bioengineering and
Bioscience (IBB)

U. A. Whitaker
Biomedical
Engineering
Building (BME)

Ford Motor Co.
Environmental Science
and Technology
Building (ES&T)

Molecular Science
and Engineering
(MS&E)



Tech Square
College of Management
Enterprise Innovation
Institute
TSRB



Christopher W. Klaus Advanced Computing Building

US universities are near the top in rankings...



Producer of engineers in the U.S.



Producer of African-American engineers at the Master's degree level.



Enrollment in a voluntary cooperative program.

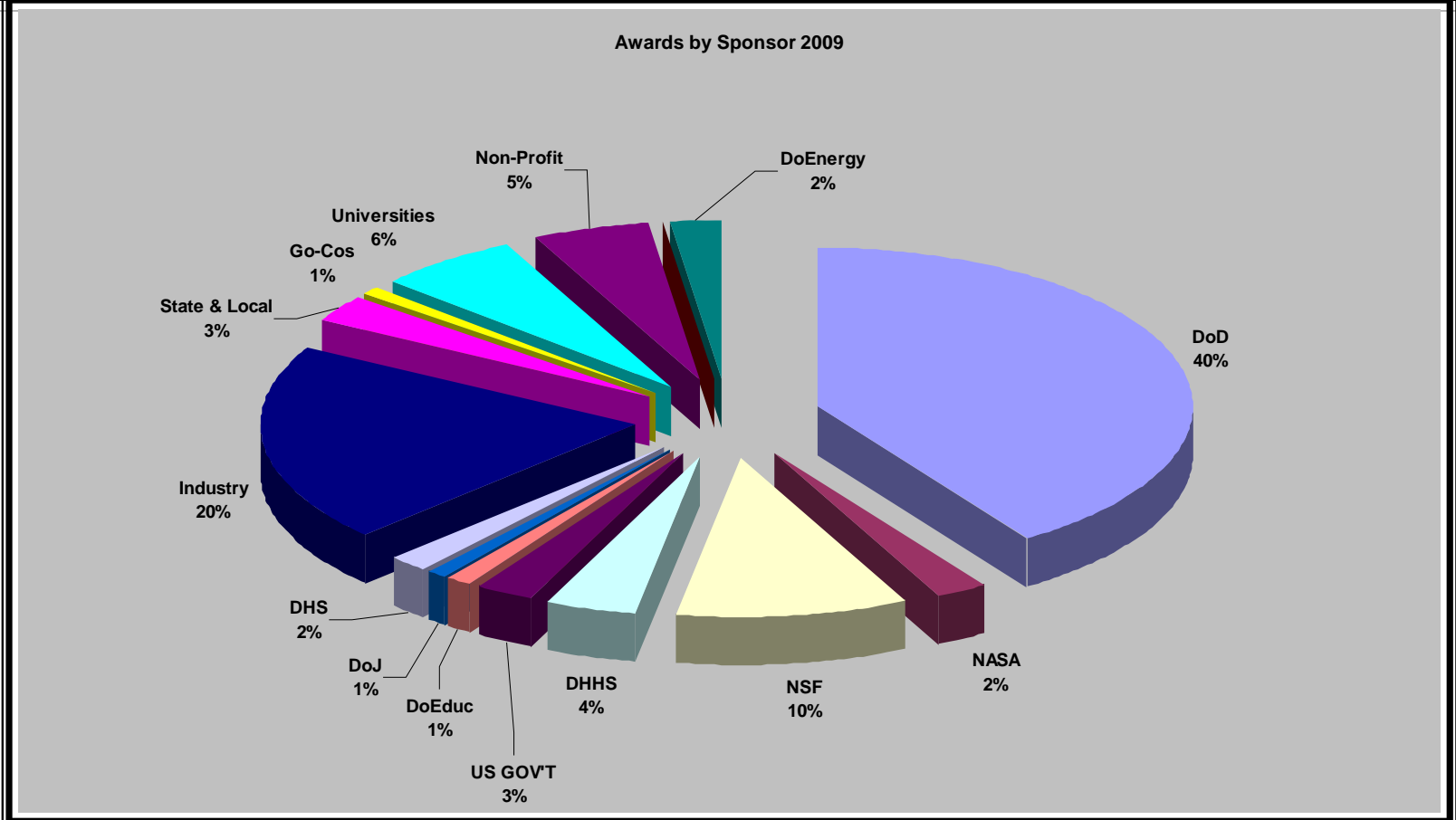


Engineering degrees awarded to women.

U.S. News & World Report

- No. 7 public university in the country
- No. 4 graduate engineering college
- No. 5 undergraduate engineering college
- No. 1 industrial engineering program
- 7 undergraduate engineering programs ranked in the top 5
- 10 graduate engineering programs ranked in the top 10

...and are trying to keep research relevant



Approximately \$100 million in awards from industry (20%)
Office of Technology Licensing receives about 1 disclosure/day

VentureLab and the Enterprise Innovation Institute at GT

- EII: Focus for translating research results into impact in the private sector
 - Technology extension
 - Strategic partnerships: industry and government
 - New companies and licensing (VentureLab)
- Staff has substantial private-sector experience
 - Risk identification and mitigation
 - Venture-backable innovations
- *Goal: Successful startup companies based on Georgia Tech research*

Georgia Research Alliance

- Recruiting Eminent Scholars from all over the world to Georgia
- Investing in university capital equipment
 - Over \$600 million in last 15 years
- Innovation grant program
 - Phase 1: up to \$50K to university R&D
 - Phase 2: up to \$100K to university (must be matched—equity, SBIR, sale of services, etc.)
 - Phase 3: up to \$250K *loan* to company (must be repaid upon success or leaving GA)



GEORGIA RESEARCH ALLIANCE

Georgia Institute
of Technology

GRA Venture Fund

- Approved by Georgia legislature in April '08.
- State invests \$7.5M as anchor to \$30M+ early-stage venture fund.
- State tax credit established as incentive to private (3:1) investors.
- Can invest in equity or debt in VentureLab graduate companies.
 - University intellectual property
 - VentureLab business discipline
- *Target:* \$1M+ per deal.

VentureLab Projects (current)

http://www.gtventurelab.com/tracking.html

Georgia Tech VentureLab

If you ever get lost, click [VentureLab Tracking](#) to return home.

Click the grey **VIEW** button to left of any record to see detailed information on that opportunity.

Sign in **MY QUICKBASE**

Sort by Phase Sort by Dept. Sort by Catalyst

link at <<http://www.gtventurelab.com>>. Check out the [Guide](#) under the "Help"

Choose sort options (Phase, Dept., Catalyst) from the three links above this text box.

Active Opportunities

FULL REPORT | EMAIL | PRINT | OTHER ▾ Results 1 to 63 (out of 63)

VentureLab Phase	Opportunity	Tagline	Deal Type	VL Contact	Faculty	Academic Unit
0-Explore 7 Links						
0-Explore	Attitude Adjustment	Thruster applications to prevent vehicle roll-over	Preliminary	Ben Hill	Panagiotis Tsiotras	Aerospace
0-Explore	Guided Therapeutics	Gold nanoparticles for cancer diagnostics and photo-thermal therapy	Preliminary	Greg Dane	Mostafa El-Sayed	Chemistry
0-Explore	SoftWear Automation	Automation of traditional sewing process	Preliminary	Stephen Fleming	Sundaresan Jayaraman	PTFE
0-Explore	Swarm Intelligence	Honeybee Inspired Resource Allocation Algorithm	Preliminary	Paul Freet	Craig Tovey	ISyE
NEW! 0-Explore	Tepyt Technologies	Advanced Last-Mile Solutions	Preliminary	Paul Freet	Gee-Kung Chang	Electrical/ECE
0-Explore	Nanotailored Carbon Fibers	Enhancing carbon fibers though the use of nanotubes	Venture Fundable	Roberto Casas	Satish Kumar	PTFE
0-Explore	Transmium	Neurotransmitter-based biomaterials for restoration of nerve function	Venture Fundable	Lee Herron	Yadong Wang	Biomed.Eng

GT Website

<http://www.gtventurelab.com>

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GT Website

VentureLab Graduates

asankya

DAMBALLA

GTronix

NUVENTIX

INNOVOLT

JMD

Zend
Technologies

Georgia Institute
of Technology

Suniva

SENTRINSIC

Pramana

Qualtré

Qcept
Technologies

Radatec

eleon

ADAPTIVE
FLIGHT

Oil
Technologies

Virtual AeroSurface
Technologies

InterCAX

Verco
Materials_{LLC}

VQLink

SIMATRA

cardiomems

MedShape
Solutions, Inc.

vivonetics

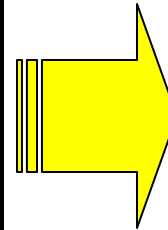
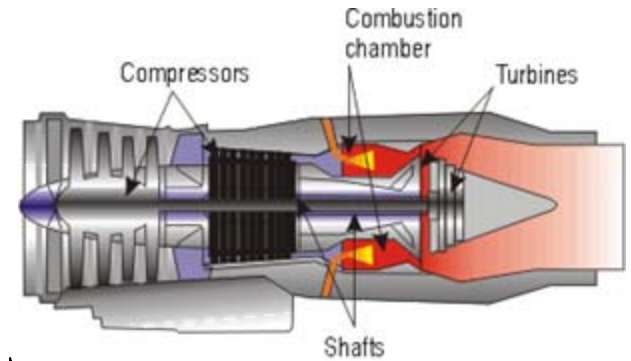
AxoTect™

axion
BioSystems

Stheno

ORTHONICS

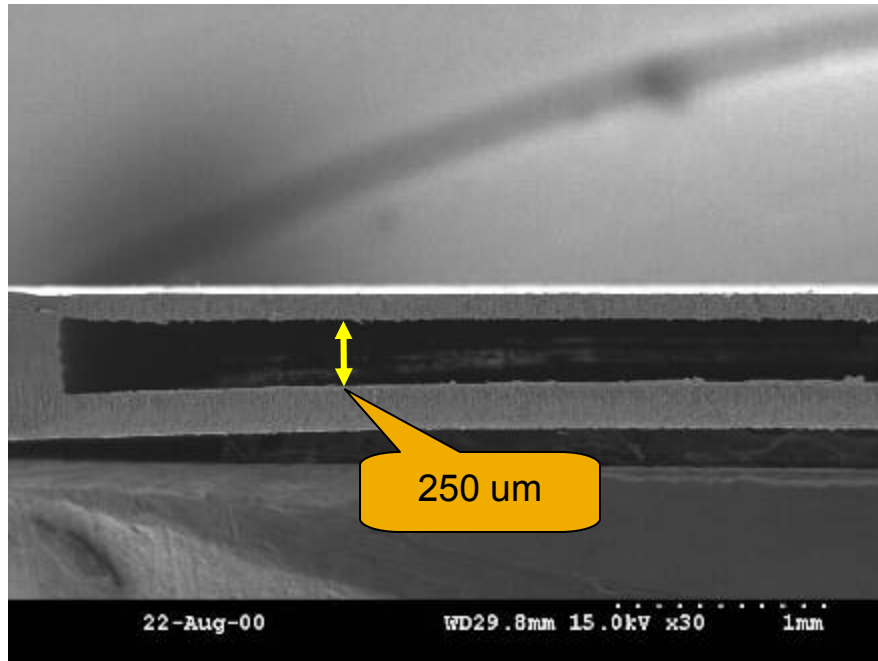
High Temperature Pressure Sensing



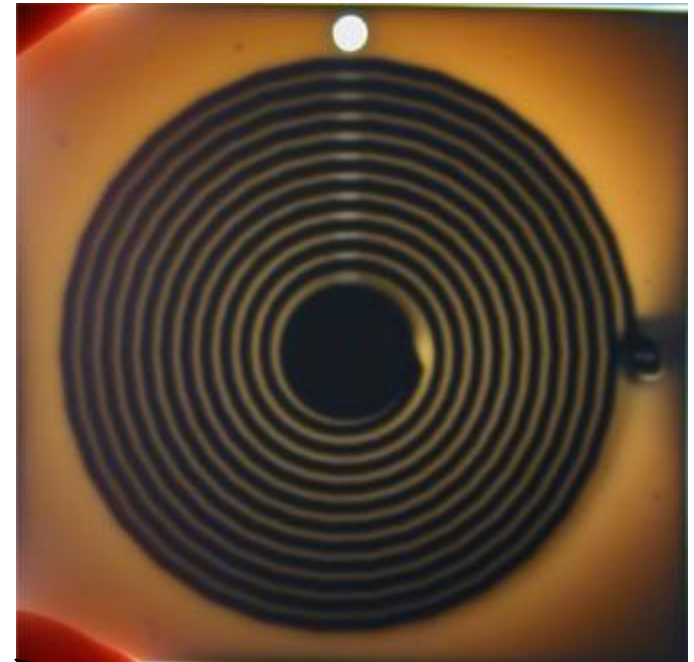
Combustion chambers
in engines

Ceramic Wireless Resonant Sensor

Cavity and diaphragm cross-section




Sensor top view



Note: sensor is backlit to show embedded circuitry

English et al., Proc. MEMS 1999
Fonseca et al., Proc. Transducers 2001

The Road to Commercialization



US00611520A

United States Patent [19] [11] **Patent Number:** **6,111,520**
Allen et al. [45] **Date of Patent:** **Aug. 29, 2000**

[54] **SYSTEM AND METHOD FOR THE WIRELESS SENSING OF PHYSICAL PROPERTIES** 4,764,244 8/1988 Chitty et al. 216/20
 4,991,283 2/1991 Johnson et al. 29/595
 5,260,683 11/1993 Tanaka et al. 340/448
 5,312,674 5/1994 Haertling et al. 428/210
 5,514,337 5/1996 Gieger et al. 429/82,08
 5,514,832 5/1996 Dusablon, Sr. et al. 174/15.1
 5,544,399 8/1996 Bishop et al. 92/25-41
 5,603,340 3/1997 Carr et al. 73/718
 5,731,754 3/1998 Lee, Jr. et al. 340/447

[75] **Inventors:** **Mark G. Allen, Atlanta; Jennifer M. English, Kennesaw, both of Ga.**

[73] **Assignee:** **Georgia Tech Research Corp., Atlanta, Ga.**

[21] **Appl. No.:** **09/054,011** *Primary Examiner*—Benjamin C. Lee
 [22] **Filed:** **Apr. 2, 1998** *Attorney, Agent, or Firm*—Thomas, Kayden, Horstemeyer & Risley, L.L.P.

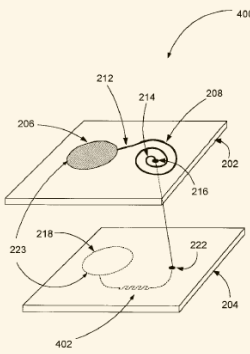
Related U.S. Application Data
 [60] Provisional application No. 60/044,670, Apr. 18, 1997.


[51] **Int. Cl.⁷** **G08B 21/00**
 [52] **U.S. Cl.** **340/870.16, 340/870.17, 340/870.31, 340/447, 340/825.54, 340/442, 340/449, 340/451, 340/584, 340/665, 340/521, 340/531, 374/120, 374/183, 374/184, 422/82.02, 331/66, 324/655**


[58] **Field of Search** 340/825.54, 870.11, 340/870.16, 870.17, 870.28, 447, 870.31, 870.32, 870.37, 870.38, 870.4, 690, 572, 448, 442, 449, 451, 584, 665, 521, 531, 374/120, 154, 163, 183, 184, 422/82.02, 331/66, 141, 724/655

[50] **References Cited**
U.S. PATENT DOCUMENTS
 3,338,100 8/1967 Takami 374/154
 4,127,110 11/1978 Bullani 600/561
 4,237,900 12/1980 Schulman et al. 600/301
 4,494,411 1/1985 Koschke et al. 73/724

19 Claims, 21 Drawing Sheets





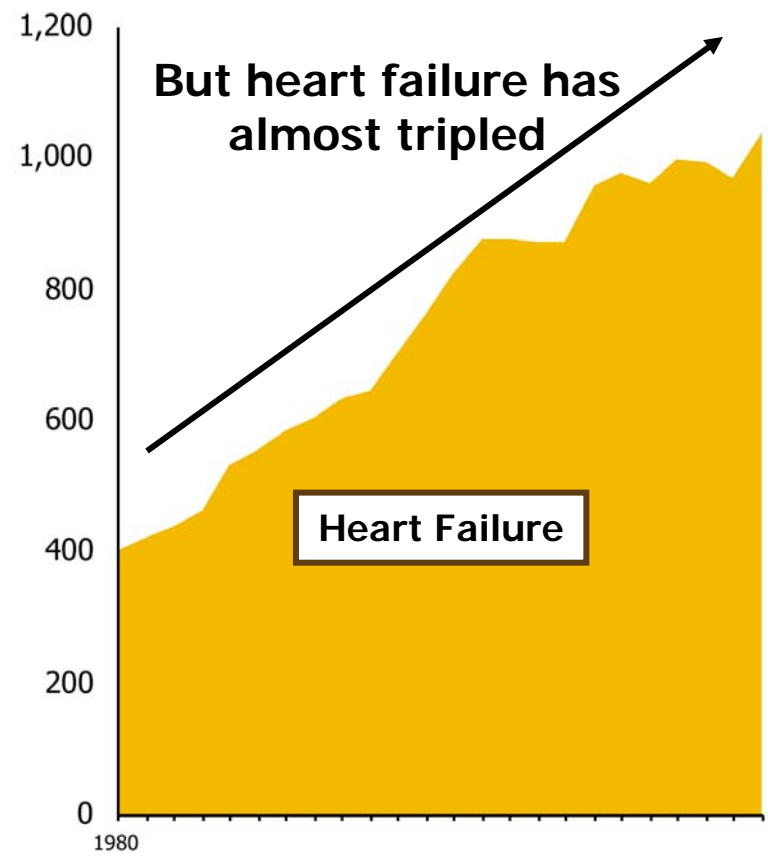
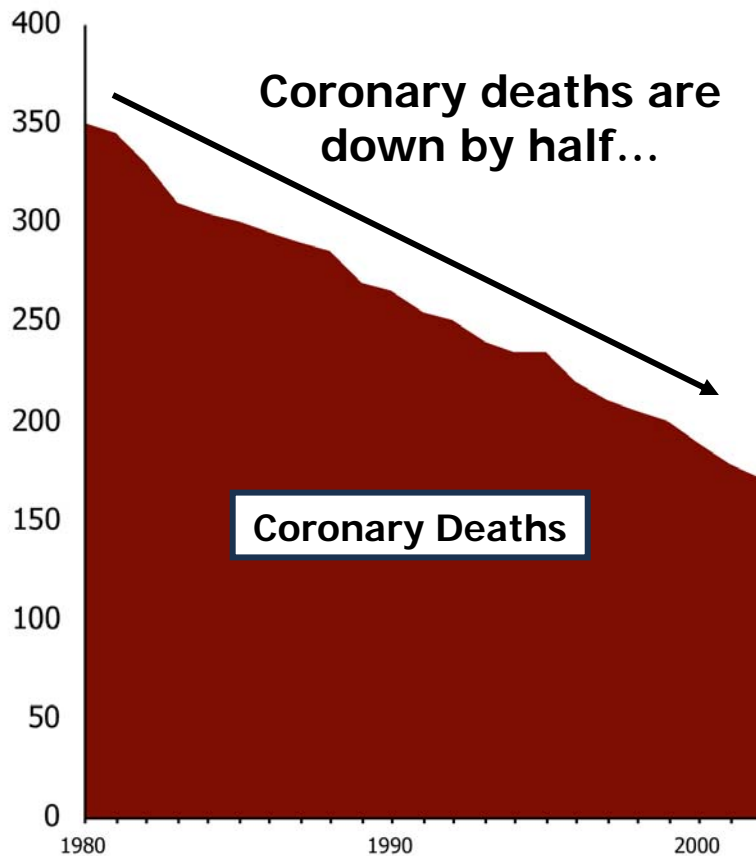
Business Plan Copy Number 1

This document contains confidential and proprietary information
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 430 10th Street, Suite N-005
 Atlanta, GA 30318
 (404)885-9980
 (404) 885-9974 (facsimile)

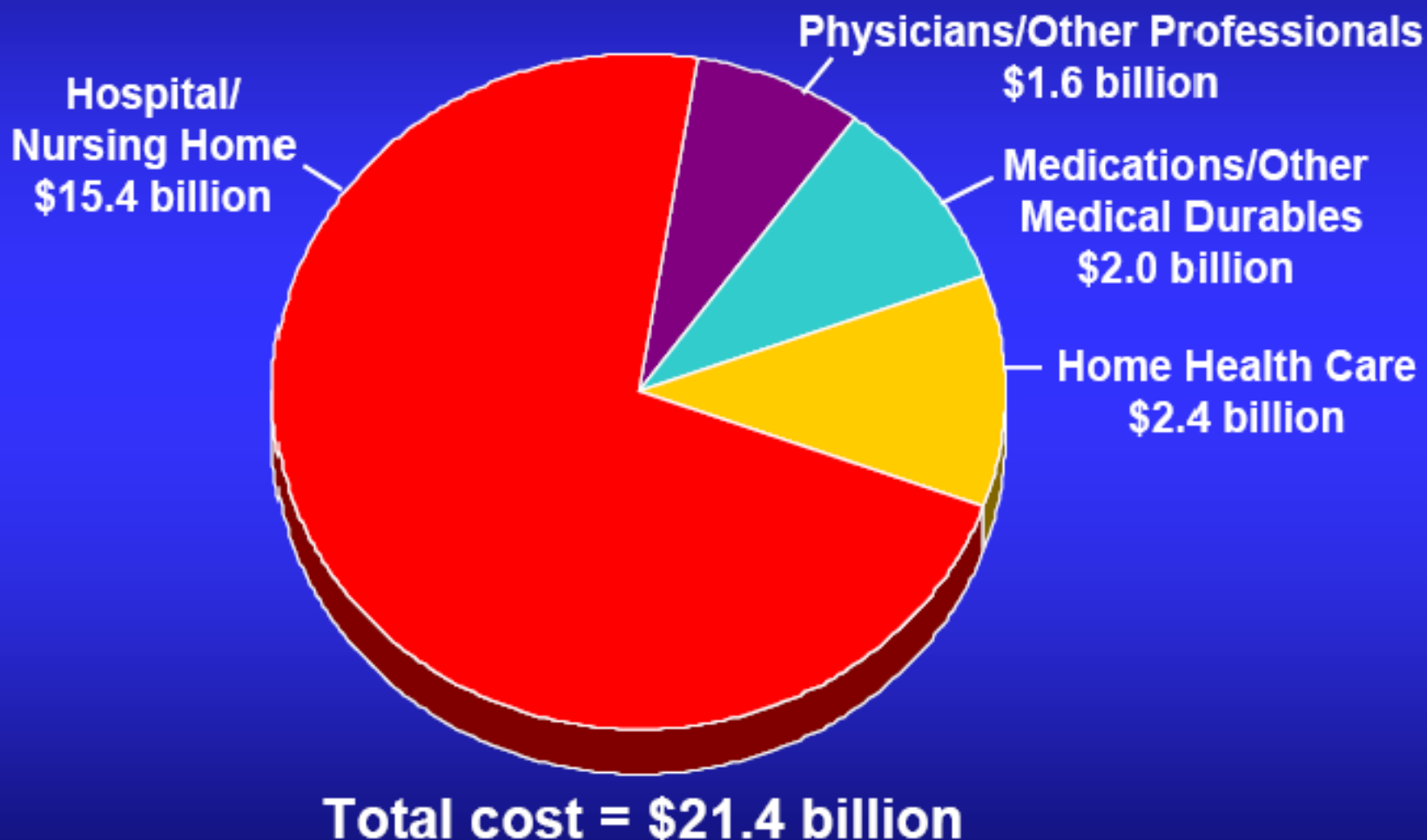
www.cardiomems.com

Heart Failure: It's Now All About Chronic Disease Management...



Source: National Hospital Discharge Survey, CDC/NCHS and NHLBI.

Estimated Total Direct Costs of Heart Failure in the United States



Proactively Managing Cardiovascular Pressure is Critical to Chronic Disease Management

In the same way that...

Blood Glucose

Diabetes



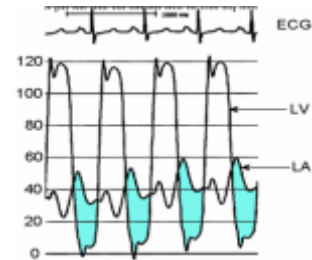
DRIVES



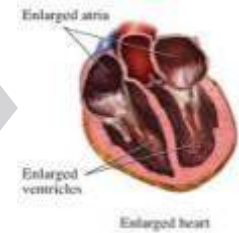
We know that...

Intracardiac Pressure

Heart Failure



DRIVES



HF Management Devices

- Pulmonary Artery Pressures, Waveforms and Cardiac Output (what cardiologists are used to and trained on)
- Simple, Safe and Fast Implant
- Implantable By: General Cardiologist, Interventionalist, or EP
- Does not preclude future therapy
 - Does not use chest / subclavian vein real estate
- Compatible with other devices
 - CRTs, ICDs
- MRI compatible
- Treats only what is needed (leadless, ease of insertion)

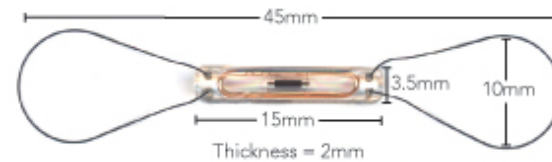
Video...

The CardioMEMS Pressure Measurement System

Catheter-based delivery system



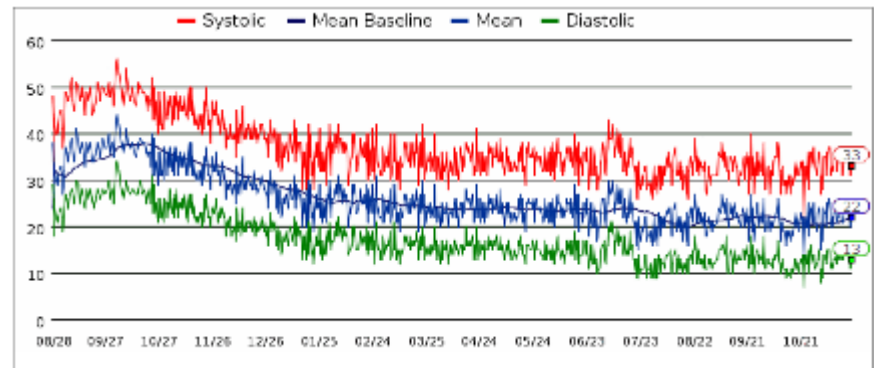
MEMS-based pressure sensor



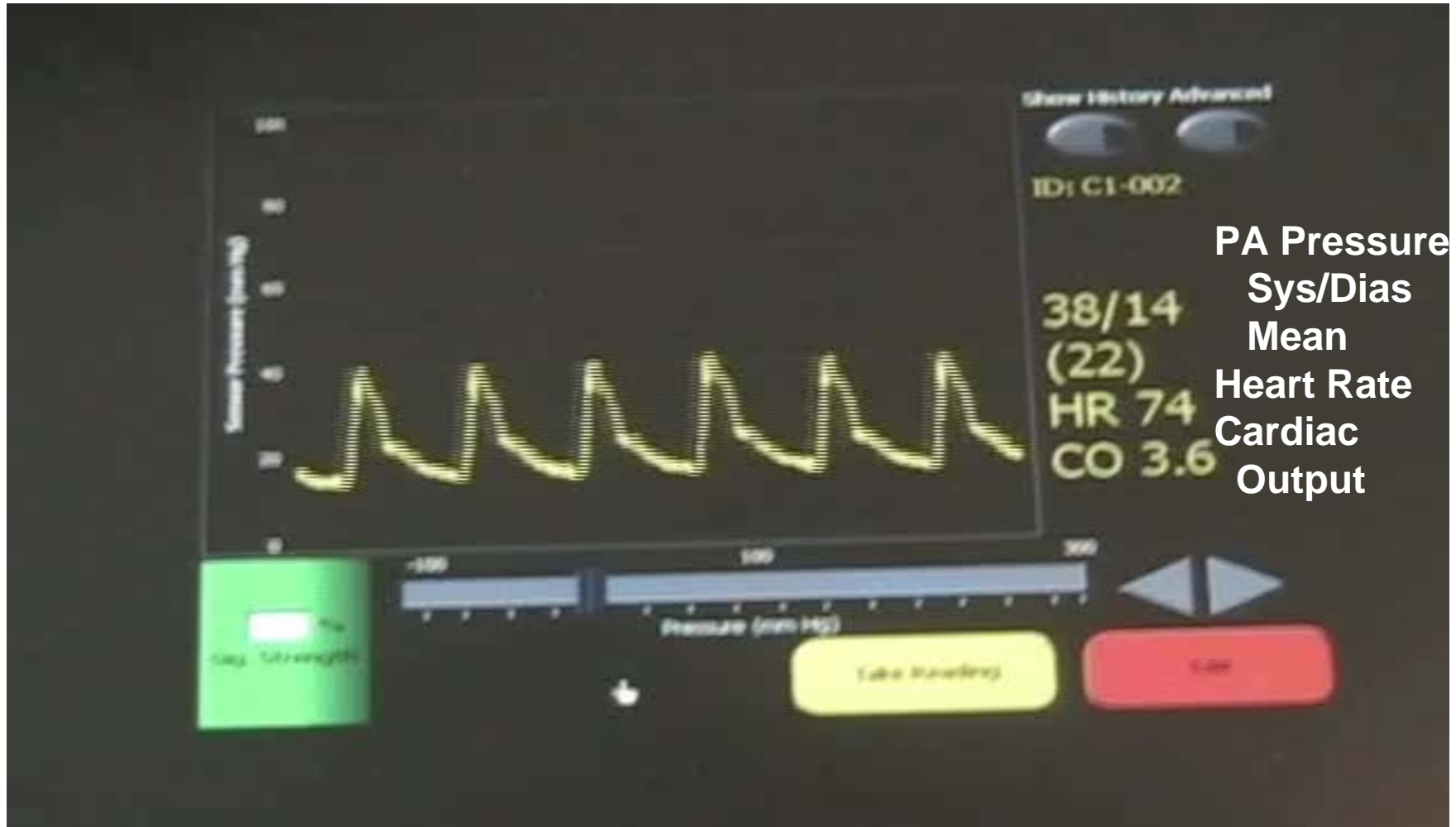
Readout electronics



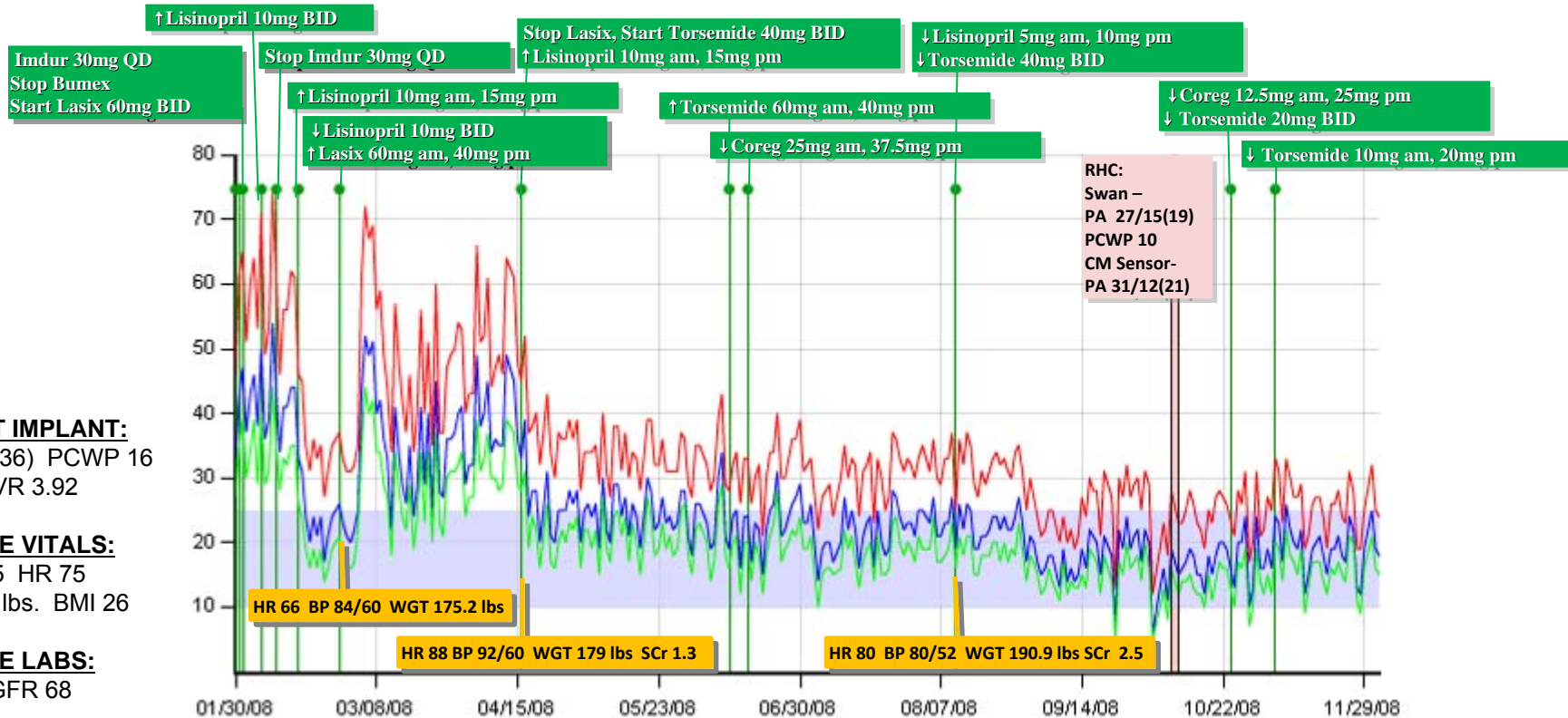
Measurement database



Wireless Measurement of PA Pressure



Ohio State University- Dr. Ayesha Hasan, Case Study Subject 2-005
 Decreased Diuretics once ACE & BB optimized and PA pressures normalized
 52 yo Male
 CM Implant 1/30/08



SWAN AT IMPLANT:
 PA 51/24(36) PCWP 16
 CO 5.1 PVR 3.92

BASELINE VITALS:
 BP 127/75 HR 75
 WGT 176 lbs. BMI 26

BASELINE LABS:
 SCr 1.2 GFR 68

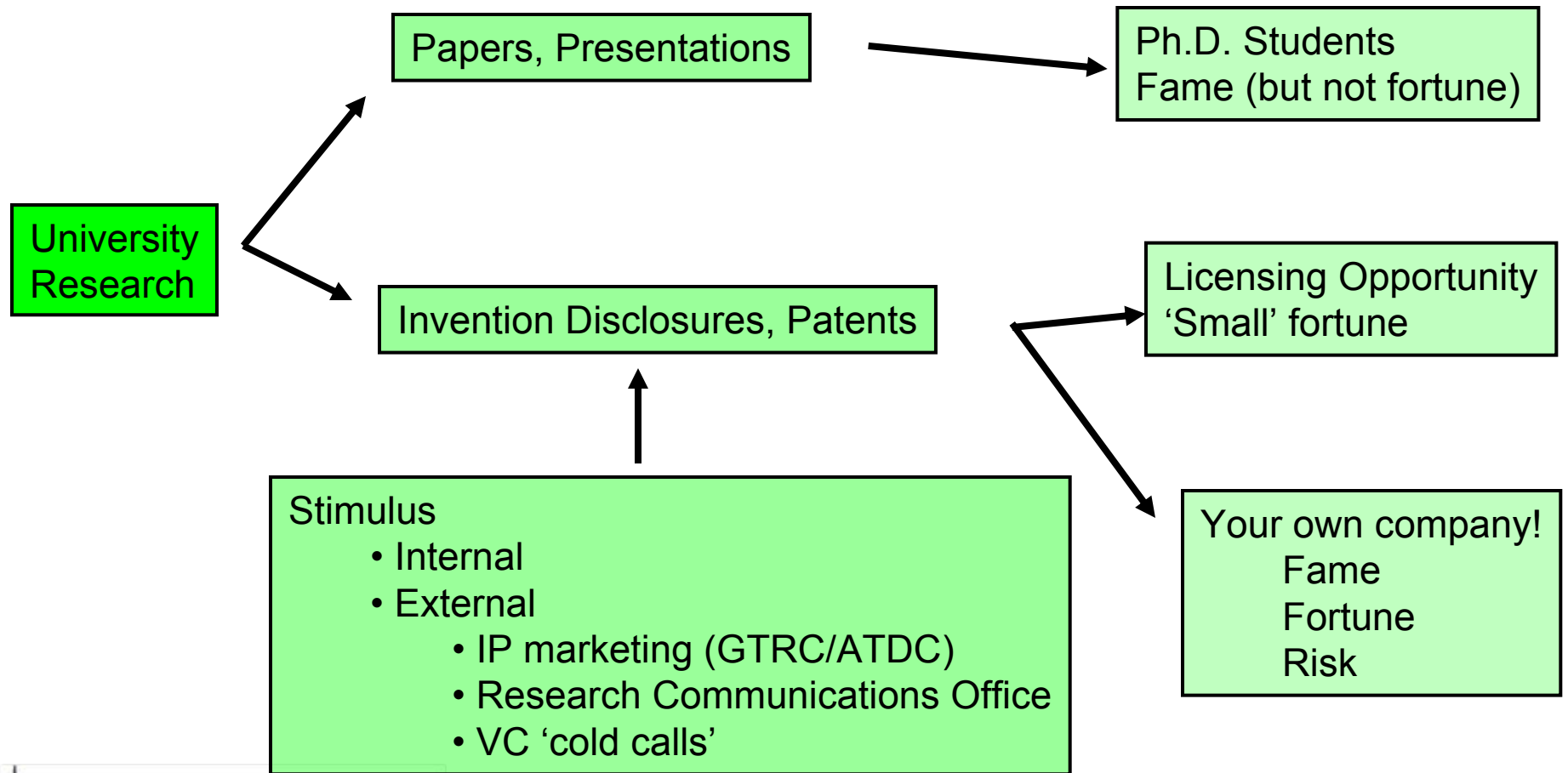
MEDICAL HISTORY

- Familial Dilated Cardiomyopathy
- ICD with CRT
- HTN
- Paroxysmal Atrial Fibrillation
- Hyperlipidemia
- Gout
- Sleep Apnea
- Depression
- Osteoarthritis
- Insomnia

BASELINE MEDICATIONS

- | | | |
|-----------------------|----------------------|----------------------|
| Carvedilol 37.5mg BID | Bumetanide 1mg BID | Coumadin as directed |
| Lisinopril 10mg QD | KCL 10 meq BID | Aspirin 81mg QD |
| Eplerenone 25mg QD | Amiodarone 200mg BID | |
| Digoxin 0.125mg QD | | |

A faculty view of the fame & fortune roadmap



A few points to stimulate discussion...

- From Tesla to Edison...for universities?
- What is the role of government/policy in stimulating innovation and translational research?
 - Funding of basic research activities
 - Sec. Locke and Commerce Initiatives
- How do we continue supporting translational research to drive the engine?
 - G-U-I partnerships
- Good jobs are not a zero-sum game
 - Universities as attractors of overseas entrepreneurial talent
- Outsourcing – OK, but let's be thoughtful...