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## Medical Device Innovation in Massachusetts – M2D2: Massachusetts Medical Device Development Center

Stephen P. McCarthy  
*University of Massachusetts - Lowell*

*Et al.*

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# Medical Device Innovation in Massachusetts

M2D2: Massachusetts Medical Device Development Center

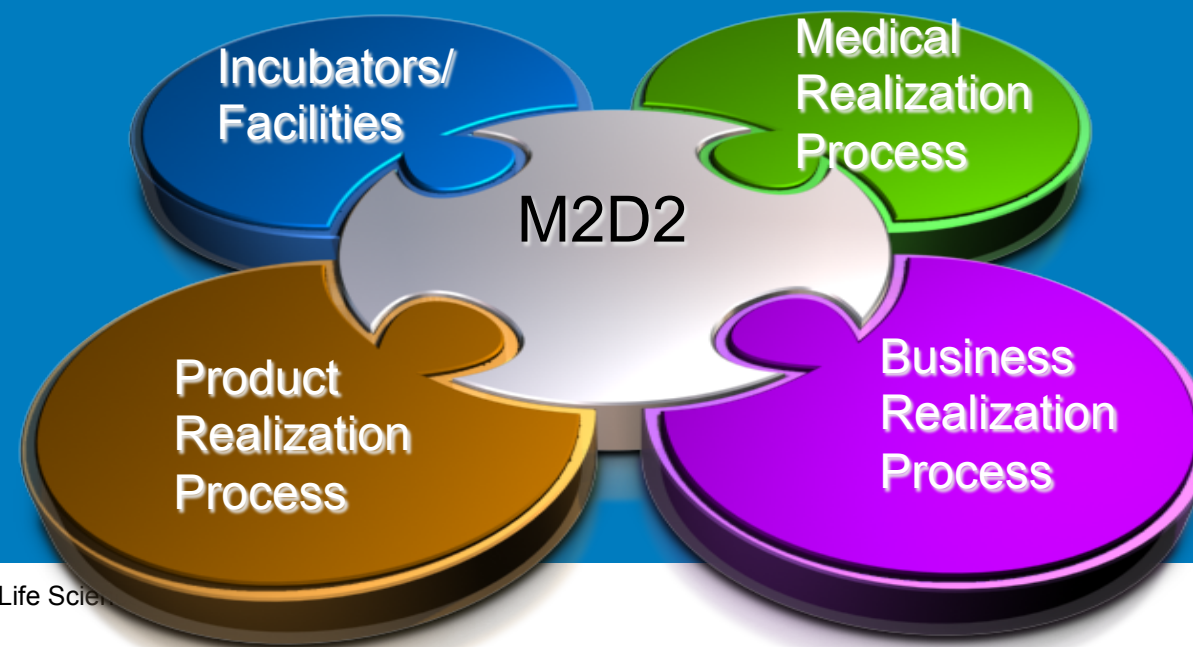
Directors:

Stephen McCarthy

Steven Tello

Nate Hafer

**M2D2**  
**Massachusetts Medical Device Development Center**  
**UMass Lowell & Worcester**  
**Connect the Resources of the**  
**University of Massachusetts**  
**to Medical Device firms within Massachusetts**  
26 UMass Lowell and 18 UMass Worcester Faculty  
Steering Committee – 24 Investment and Industry Leaders



M2D2: Fueling the Life Sciences



# With M2D2 They Reach Across



M2D2: Fueling the Life Sciences Economy

# M2D2: An Economic Engine for the Medical Device Industry

- M2D2 Gets New Medical Device Ideas from Patent to Production
- Partnership with UMass Medical School
- Industry focused, industry engaged
- Statewide Reach
- Model for Regional Innovation Center



# UMass Partnership



## Lowell: Engineering Expertise

- Materials Characterization, Analysis, Selection
- Design and Prototyping
- Testing and Verification

## Lowell: Business Expertise

- Opportunity Assessment, Business Planning
- Market Identification, Analysis
- Integrated into Graduate Courses



## Worcester: Clinical Expertise

- Surgeons with Ideas
- Partnership with Pre-Clinical Investigators
- Large animal testing/clinical trial facilities

# M2D2 Prototyping Capabilities

- 26 UMass Lowell Faculty Spanning 11 Departments
  - Biological Sciences
  - Chemical Engineering
  - Clinical Lab and Nutritional Services
  - Electrical and Computer Engineering
  - Health and Environment
  - Management
  - Mechanical Engineering
  - Physics and Applied Physics
  - Plastics Engineering
  - Radiation
  - Work Environment Health
- UMass Worcester and UMass Memorial Medical Center Physicians and Researchers to provide rapid design feedback
- Network of Private Sector Design, Fabrication and Testing Firms

# M2D2 Business Assessment

- Phase I - Initial Business Assessment Process
  - 3-6 page summary of Business Opportunity
    - 40+ Reviews to Date
  - Integrated into UG/G Coursework
  - Initial Review by Management Team, Prioritize
  - Factor into FastTrack, Inventor-Funding Decs.
- Phase II - Business Plan Consultation
  - Longer term engagement with Inventor-Founder
  - Consult w/Expert Business Faculty & Grads/
  - Assist in Business Plan Development



# M2D2 Clinical Trial Capability



- UMass Worcester and UMass Memorial Medical Center
- Facilitate partnership with clinical investigators
- Provide access to patient population for clinical trials
- Provide regulatory support for FDA submissions
- Medical expertise across broad therapeutic areas:
  - surgery (plastic, wound healing, vascular, urology)
  - medicine (cardiology, digestive diseases, diabetes)
  - radiology (interventional, imaging); pediatrics, geriatrics
  - women' health (urogynecology, endocrinology)
- Dedicated central service for support through life cycle of clinical study (feasibility to close-out)



## National Center for Advancing Translational Sciences

- Highest priority of NIH Director, Dr. Francis Collins
- Focused on advancing the science of translational medicine and enhancing the efficiency of developing novel approaches to prevent or treat diseases
- New Director (Sept, 2012): Christopher P. Austin, M.D.
- Success measured by novel products in clinical use and advances in clinical practice

## M2D2 Economic Development

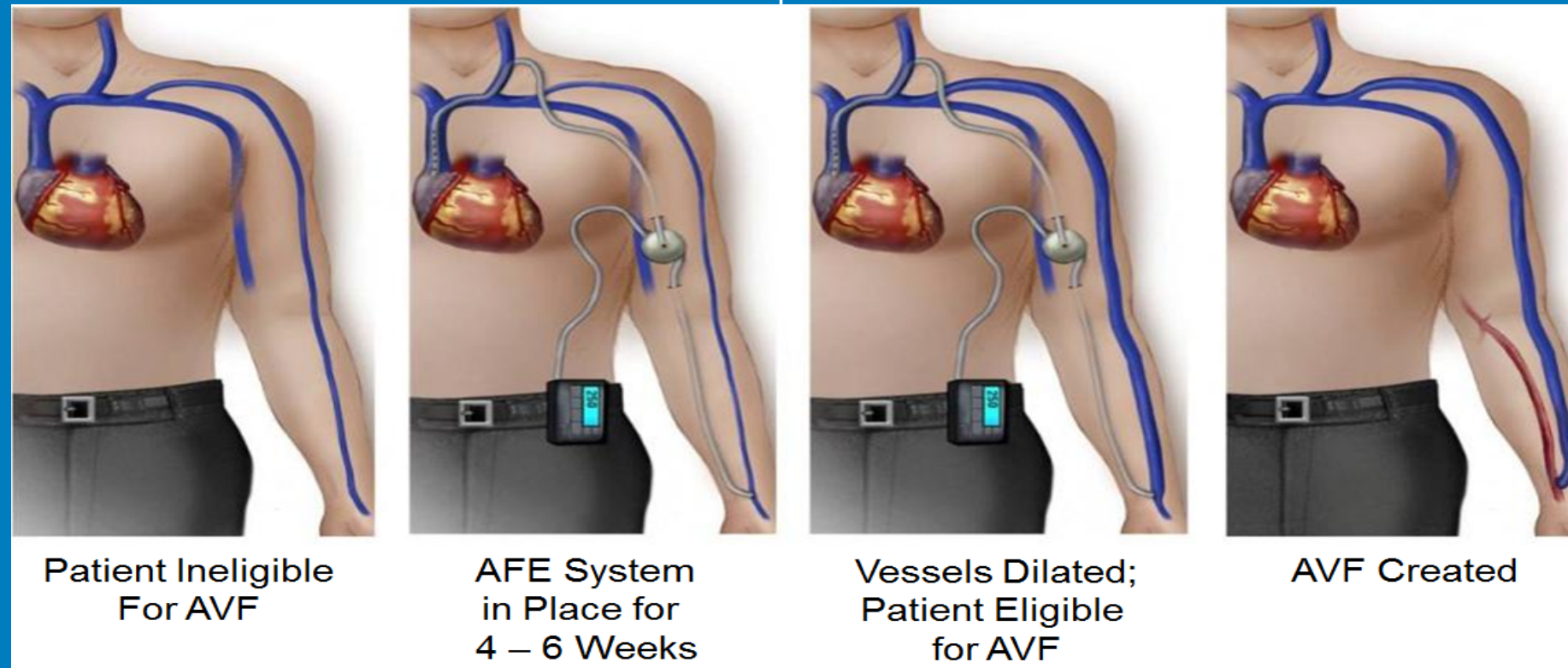
- UMass President (2005) \$135,000
- Mass. Economic Dev. (2007) \$650,000
- Mass. Capital Funds (2007) \$4,000,000

### Direct Funding to Start-Ups

- Federal SBIR/STTR \$4,700,000
- Company Investment \$ 22,000,000
  
- 40 Companies 152 Employees 37 Interns

# Flow Forward Medical

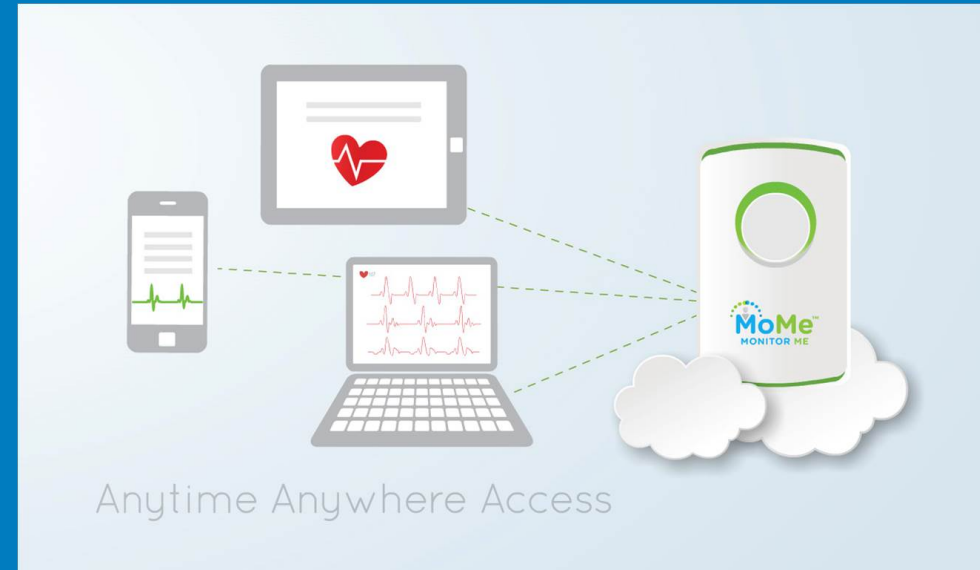
## Wearable Blood Pump System to Enhance Arteriovenous Fistulae Eligibility Raised \$6 million





**Proprietary wireless remote patient monitoring platform for superior heart arrhythmia monitoring and diagnosis**

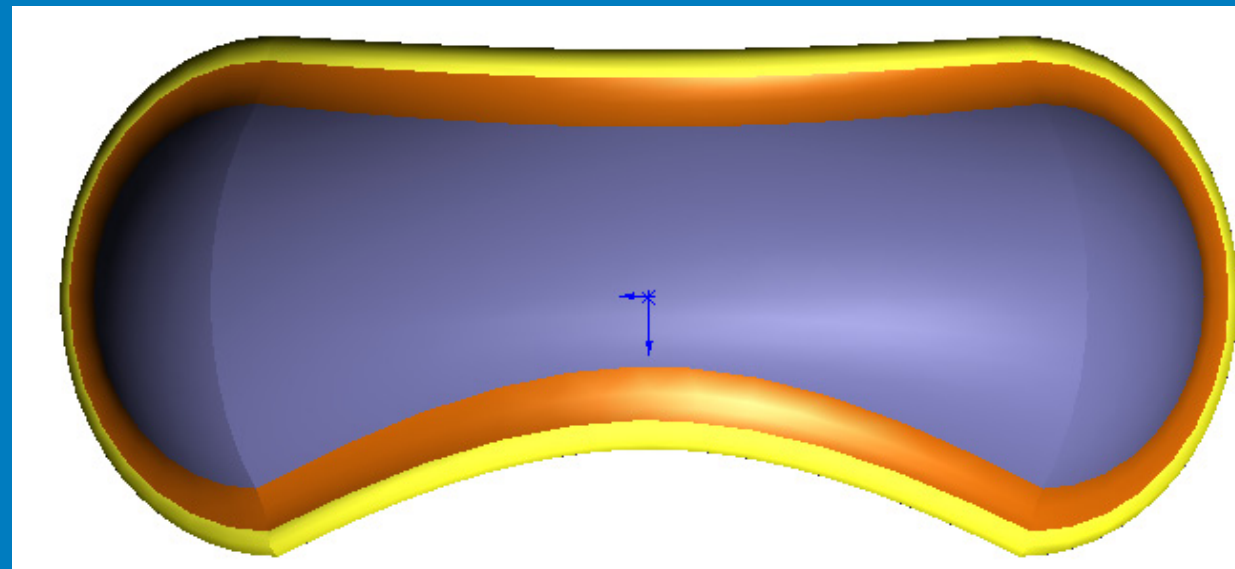
**Raised \$ 3.2 million  
12 Employees**



# Vista

Topical Ophthalmic Drug Delivery Device

\$1.6 million NIH SBIR Grant

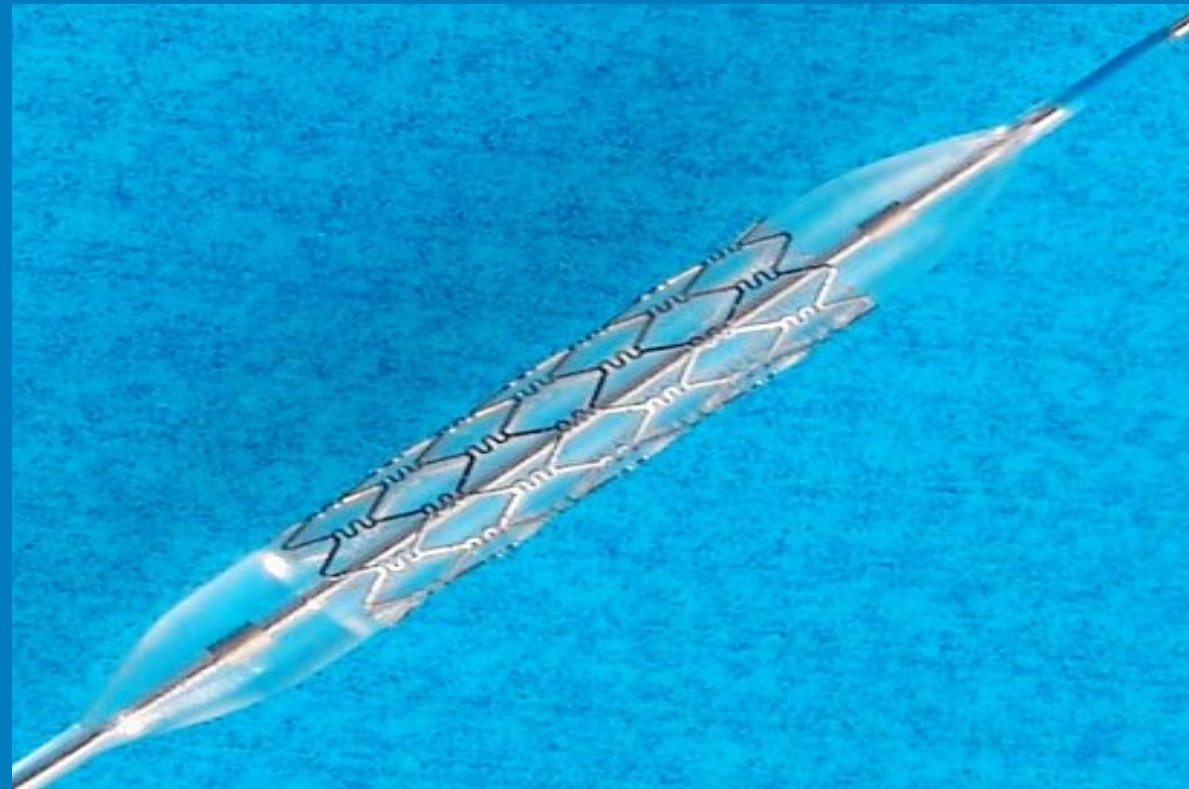




# VasoTech

## Biodegradable Drug Eluting Stent

### \$1.2 million NIH STTR



# Lucifics

## Photodynamic Therapy for Non-melanoma Skin Cancer

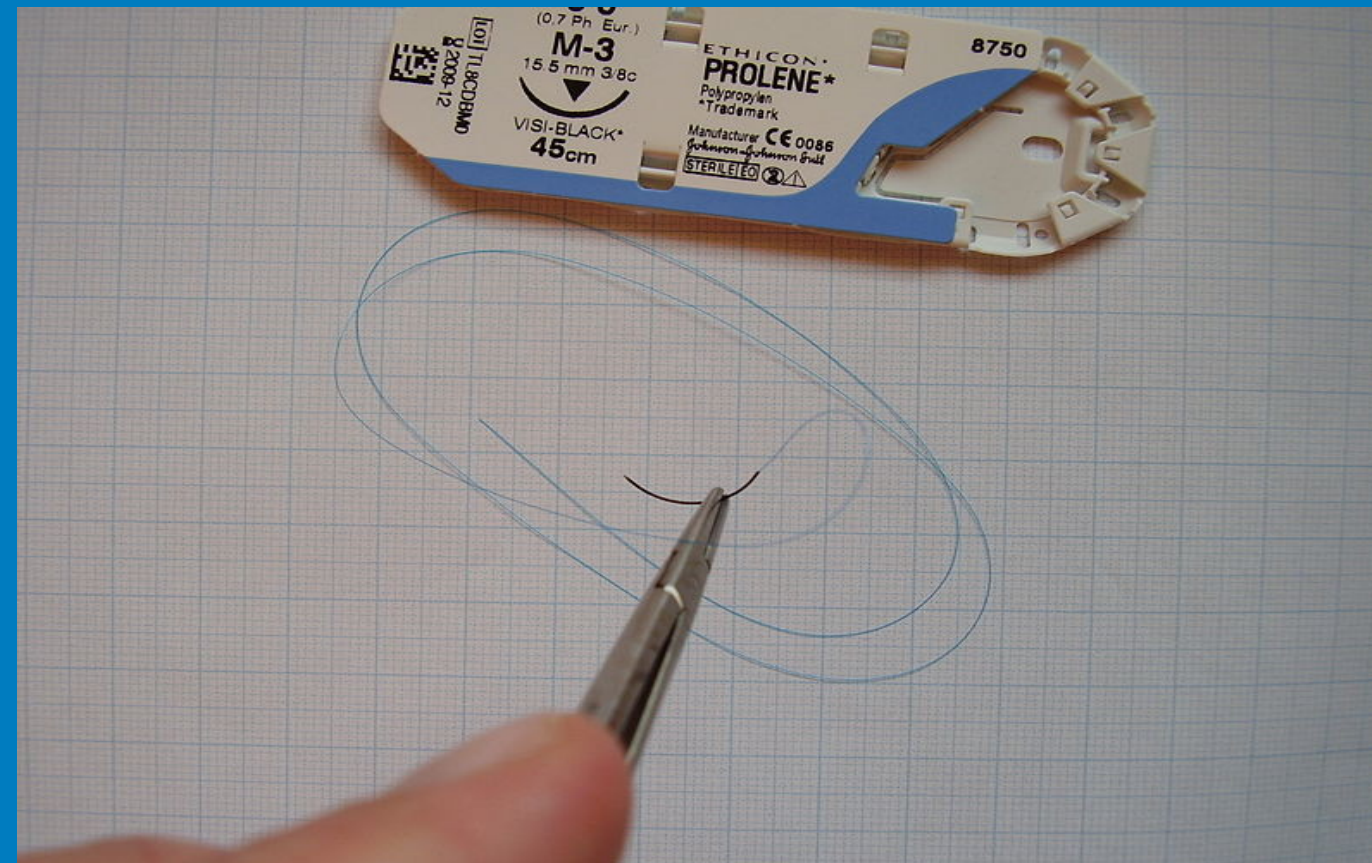




# SafePath

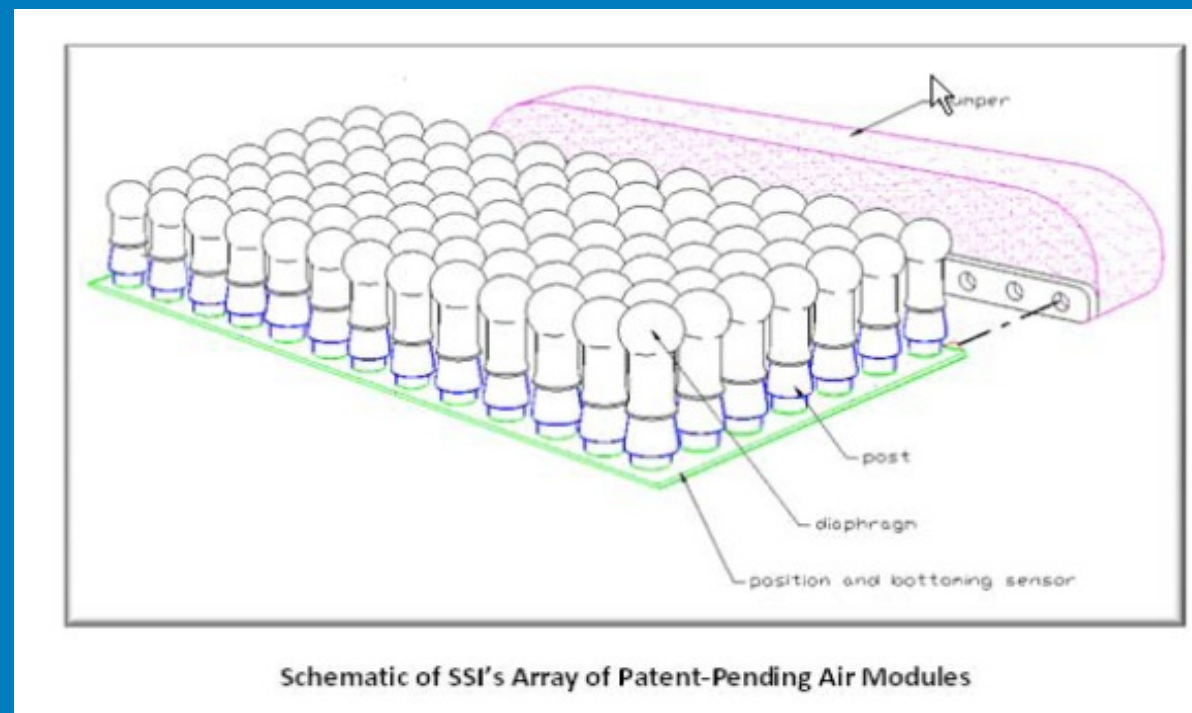
## Safety Suture Needle

Eliminates accidental needle stick injuries in hospitals.



# TheraTorr Medical

Reactive Mattress to Prevent Pressure Ulcers  
M2D2 FastLane Award  
Raised \$1.4 million

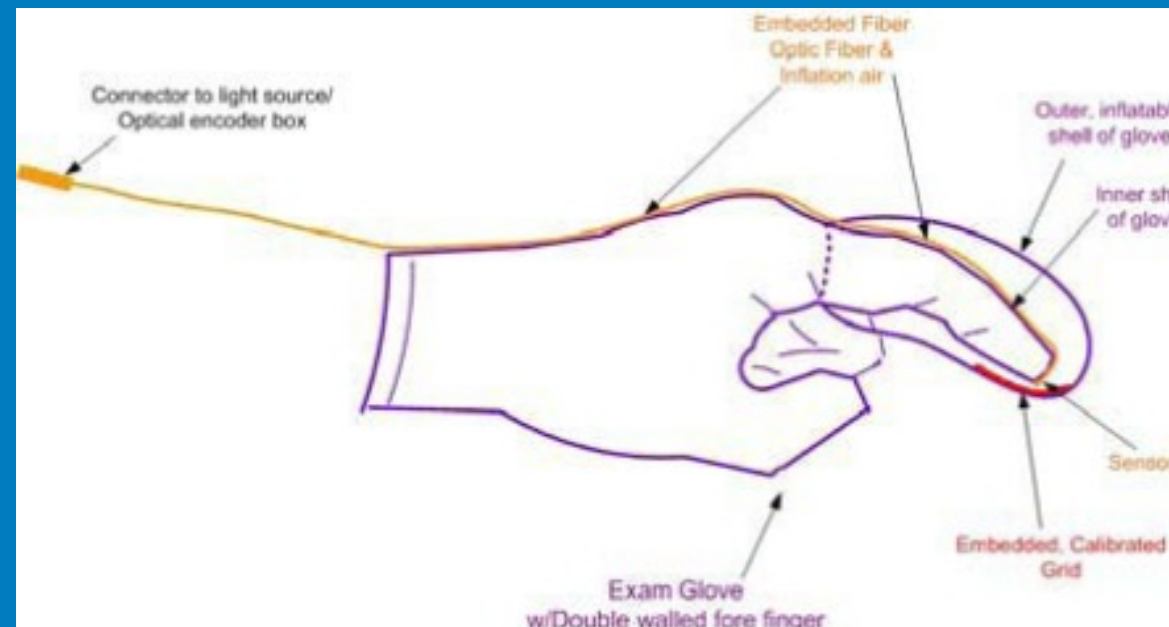


# MedicaMetric

## ProstaGlove – Prostate Measurement

M2D2 FastLane Award

Raised \$3.5 million



# M2D2 Advisory Board Industry Focused & Engaged



# Tsongas visits M2D2

Updated: 07/17/2012 12:32:54 PM EDT

U.S. Rep. Niki Tsongas, left, watches a demonstration from Howard Loree, vice president of Research & Development at Flow Forward, a tenant firm of the Massachusetts Medical Device Development Center in Lowell. Tsongas visited the center Friday to learn about developmental-stage companies. Flow Forward is developing a product that opens veins in such a way as to make them more accessible for medical procedures. COURTESY PHOTO





## M2D2 “liked” by U.S. Senator Elizabeth Warren



M2D2: Fueling th

# Thank You



**Director Stephen P. McCarthy, Ph.D.**  
Engineering, UMass Lowell



**Director Steven Tello, Ed.D.**  
Business, UMass Lowell



**Director Nate Hafer, Ph.D.**  
Medical, UMass Worcester



# Massachusetts Medical Device Ecosystem

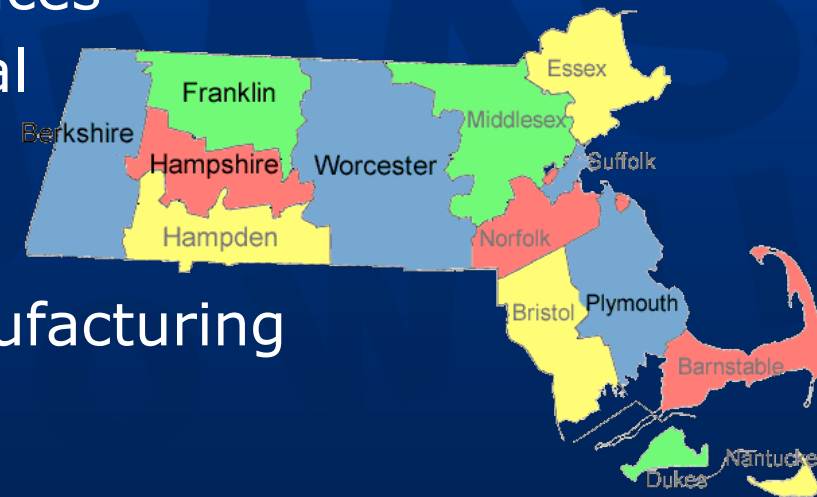
Steven Tello, Ed. D.  
Assoc. Vice Chancellor, UMass Lowell  
Director, M2D2





# Massachusetts

- ▶ 6.65 million residents
- ▶ \$365 B annual economic output (GDP)  
13<sup>th</sup> largest US economy (7.2% unemployment)
- ▶ Key Industry Sectors include:
  - Biopharma & Medical Devices
  - Business, Financial & Legal
  - Computer & Hardware
  - Defense Manufacturing
  - Diversified Industrial Manufacturing
  - Health Care Delivery
  - Post Secondary Education
  - Software & Communications



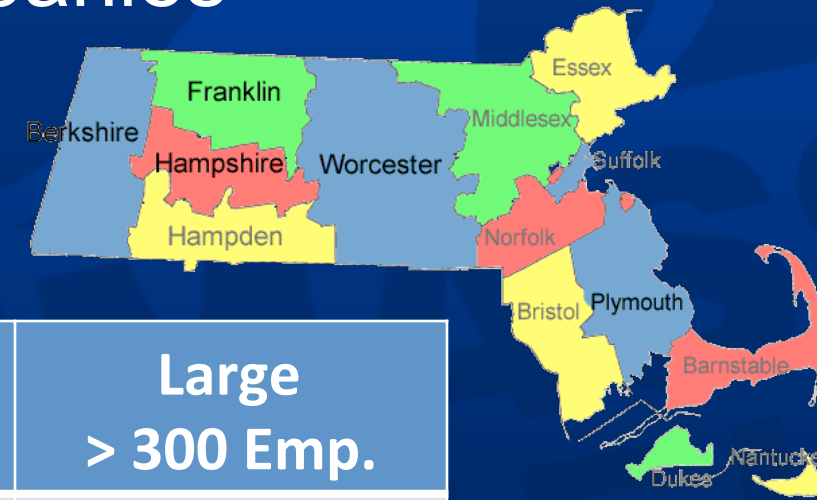
# Mass. Life Science Cluster

- Biotechnology
- Medical Devices
- Pharmaceuticals
- Wholesale Trade
- Medical Testing Laboratories
- Teaching Hospitals
  
- \$1 B State commitment through Mass. Life Science Center



# Impact of Med Device Companies in Mass.

- 400 Med. Device Companies  
24,300 employees
- Mix of companies



Small <30 Emp.	Medium 30-300 Emp.	Large > 300 Emp.
304	86	13

- Eastern/Central Mass. Focus  
41% in Middlesex County

# Impact of Med Device Companies in Mass.

- Broader economic impact
- 3.4 X multiplier in related industries  
82,500 employees
- 13% of Mass. Exported Goods - \$3.4 B  
Fastest growing export category
- Captured 12% of US Med Device venture funding  
\$ 329 M Med Device  
\$1,084 M Biotech Investment

# Range of Good Jobs Created

BASIC  
RESEARCH

SCIENCE

Ph.D Biology,  
Chemistry,

BS, MS  
Research Assts.

Lab  
Technicians

APPLIED  
RESEARCH

SCIENCE &  
ENGINEERING

PhD  
Researchers

MD, Clinical  
Researchers

Research Assts.

Statisticians

Clinical Lab Tech

PROTOTYPE &  
DEVELOPMENT

ENGINEERING,  
REGULATORY &  
BUSINESS

Engineers  
NPD/ Operations  
Finance  
Manufacturing  
Market Analytics  
QA/QC  
Regulatory  
Technicians

COMMERCIALIZATION

BUSINESS  
LAUNCH &  
OPERATIONS

Accounting &  
Finance  
Customer Serv.  
Marketing  
Medical Affairs  
Brand  
Managers  
Manufacturing  
Operations  
Sales &  
Distribution

# Why Massachusetts?



- World-Premiere Medical & Research Institutions
- Highly educated workforce – 50% + college
- Engaged High Ed Community, Angel/VC, Industry/Trade Councils
- Government commitment
- Established and Startup Life Science Companies
- Business Services to support Company Growth
- Willingness to Partner

# Networks in Massachusetts

- M2D2

- Concept to Prototype, Resource Network
- Business, Clinical, Engineering Assistance
- Incubator



- Massachusetts Life Sciences Center

- Research Funding, Accelerator Funding
- Infrastructure Support, Summer Intern Program



- MassMEDIC

- MedTech Ignite  
Mentoring by Experienced Med Tech Execs,  
Education programs





## Other Networks

- **MATCH Team – University of Ulster**



- Explore technical and business development
- Reserch and education partnerships

- **Mass. Technology Transfer Center**

- Platform Presentation
- Entrepreneur/Inventor Training
- Revolving Grants Program



- **Massachusetts Technology Collaborative Innovation Institute**

Innovation activities across industry sectors in Mass.

- IT/Wireless, Life Sciences, Medical Devices





# Closing Thoughts

- Medical Devices are a subset of the larger Life Science Cluster
- Development of this subset has significant multiplier implications
  - Creates range of research, development and employment opportunities
  - Research to Market more quickly than Big Pharma
- You may already have the ecosystem in place

# Resources

- [www.uml.edu/m2d2](http://www.uml.edu/m2d2)
- The Medical Device Industry in Massachusetts – Deloitte & Touche, LLP, MassMEDIC Annual Meeting, May 3, 2011
- Annual Index of the Massachusetts Innovation Economy 2012, Innovation Institute, Mass. Technology Collaborative