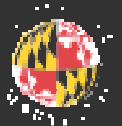


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Technology Transfer: The Maryland Solution

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Professor and Executive
Director**



The Bayh-Dole Act

Historically, government retained title to inventions created under government contracts

In 1980, Bayh-Dole Act gave universities the right to retain title to inventions made under federal funding agreements

- Promote commercialization and use of inventions created under federally supported R&D

Option to Retain Title

Universities have the option to retain title to inventions made under federal funding agreements by doing the following:

- Disclose the invention to the agency
- Make a written election to retain title within two years after disclosure

Government License Rights

If the university retains rights in an invention, the federal agency receives a nonexclusive, paid-up license to practice the invention anywhere in the world

Government may require the university to grant a license to another party where:

- University is not taking steps to achieve practical application of the invention.
- Doing so is necessary to alleviate health or safety needs or to meet requirements for public use

Effect of Bayh-Dole Act on Universities

The Bayh-Dole Act has had a profound effect on research carried out at universities in the U.S.

- ☐ Creation of technology transfer offices at major research universities
- ☐ Universities engage in patenting and licensing of inventions
- ☐ Research collaborations have developed between universities and private industry

University Research and Licensing

In 2007, universities and related entities received \$31.7 billion in research support from the federal government and \$17.1 billion from industry

For fiscal year 2007, universities reported:

- ☐ 17,210 invention disclosures submitted
- ☐ 10,470 patent applications filed
- ☐ 4,316 license agreements executed
- ☐ \$2.08 billion in licensing income
- ☐ LRORI = 4% Mostly from a small number of licenses

University of Maryland Tech Transfer Organizations

- Office of Technology Commercialization (OTC)
 - Handles University of Maryland Intellectual Property
 - Licenses UM IP to Industry
 - Licenses UM IP to MIPS and VentureAccelerator Companies
- Mtech
 - MIPS Program transfers technology by working closely with companies to create new and improved products

Basis for the MIPS Model

- The more the transferor and transferee work together, the higher the probability of successful technology transfer
- Major research universities have unique expertise, facilities and equipment that can be used to help companies create new and improved products



MIPS

Helps Maryland companies develop new and improved products by co-funding projects carried out at the University by faculty and graduate students

MIPS Overview

- MIPS fosters academic-industrial (faculty-company) partnerships for innovation
- Funds from MIPS and Maryland companies go toward UM projects to accelerate research and knowledge into products
- Commercialization is THE key factor

MIPS: A National Model

- MIPS Award from US SBA for “Best Practices in Technology Transfer” (March, 2005)
- Award from SSTI for best practices in Technology Based Economic Development (October, 2007)

Key Points about MIPS

- MIPS proposals are co-authored by UM faculty and company personnel
- MIPS projects are conducted by university faculty in conjunction with company researchers
- Proposals are evaluated on technical merit and economic development potential
- Projects are jointly funded by MIPS and companies
- All funding goes towards university project costs
- MIPS is win-win-win:
 - Companies leverage their R&D funding and gain access to faculty expertise
 - Faculty and students gain funding to engage in commercially relevant research
 - State benefits via accelerated and increased revenue

Disciplines for MIPS Projects

- Engineering
- Computer Sciences
- Life Sciences
- Physical Sciences
- Environmental Sciences

MIPS: A Flexible Program Changes with emerging technologies

- On the rise:
 - Sustainability technologies
 - Energy technologies
 - Homeland security
 - Biotech/life sciences
 - Nanotechnology

MIPS: The Process

How to Apply for MIPS

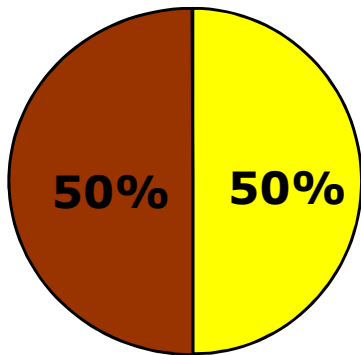
- Company must partner with a faculty researcher
- Company registers at the proposal website
- Company begins proposal (all electronic, no paper) and names faculty P.I.
- Faculty P.I. & company collaborate to complete and route proposal prior to deadline

Proposal Evaluation Process

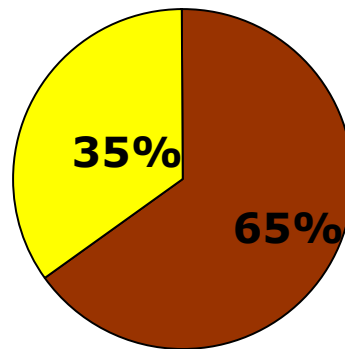
- Scientific/technical evaluation
- **Business/economic review**
- 60 day turnaround from application to award
- 2 funding cycles per year, May and October deadlines

Minimum Company Cash Match

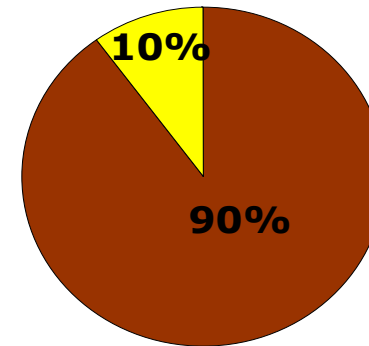
**Large Company
>100**



**Small Company
13 to 100**



**Start-Up Company*
Up to 12**



Company Share



MIPS Share

**** Plus other requirements***

MIPS offers up to \$100K/year in matching funds for projects for up to two years. With minimum company contributions, total project value can be:

\$200K for startups

\$310K for small companies

\$400K for large companies

Start-Up Company Criteria

- 1 to 12 Employees
- Time in business cannot exceed 4 years
- Annual Sales under \$1,000,000
- No Public Offering
- Must submit Business Plan (Executive Summary)
- Must be In Good Standing with State

Benefits to Companies

- Financial support for product R&D
- Leveraging assets/outourcing R&D
- Access to university
 - ❖ faculty & students expertise
 - ❖ facilities
- Companies establish lasting relationships with faculty experts, hire students

Benefits to Faculty

- Financial support for commercially applicable research
- Relevant real world experience for students
 - ❖ Papers published
 - ❖ Thesis work
 - ❖ Job opportunities
- Faculty can establish lasting relationships with technology companies
- Possible future sponsored research

Intellectual Property

- Company has first right to an exclusive license to I.P. created by the university research team during the course of a project
- Terms negotiated with campus after the invention
 - Norms for technology area

Environmental Projects

- Additional funding obtained from EPA via Maryland DNR for projects which can improve the water quality of the Chesapeake Bay
- Can fund about 4 to 5 projects per year

MIPS Results

MIPS Impact Data (1987-2009)

- **Performance of the Top Products MIPS Research Has Contributed to:**

Company	MIPS-Related Product	Revenue /Sales
MedImmune	Synagis	\$7.8 billion
Martek Biosciences	Nutritional oils, primarily DHA, added to infant formula and other foods	\$1.7 billion
Hughes Communications	DIRECWAY, now called HughesNet	\$7.4 billion
Total:		\$16.9 billion

Successful MIPS Products: Made in Maryland

Synagis

MedImmune: Gaithersburg, MD



- **Now the 10th best selling biotech drug in the world (past sales approx \$6.0 B)**
- **Used to prevent respiratory syncytial virus (RSV) disease in infants.**
- **MedImmune's MIPS project "improved [our] knowledge of carbohydrate analysis...and helped in structural testing of Synagis,"**

-John Hope, MedImmune scientist

HughesNet

Hughes Network Systems: Germantown, MD



- **HughesNet is the world's leading broadband by satellite service. Formerly called DirecWay, DirectPC.**
- **More than 600,000 systems ordered or shipped to customers in 85 countries.**
- **System based on design by Dr. John Baras, Professor of Electrical and Computer Engineering at UM College Park.**

Formulaid

Martek: Columbia, MD



- **Patented blending of nutritional oils (docosahexaenoic acid (DHA) and arachidonic acid (ARA), produced from microalgae**
- **Aids in the development of the eyes and central nervous system in newborns.**
- **Company has license agreements with thirteen infant formula manufacturers representing more than two-thirds of the world's wholesale infant formula market.**
- **95% of US kids under 5 have consumed this product**

Bullet Speed Tip Masonry Drill Bit

Black & Decker: Towson, MD



- **Unique drill bit design for masonry work used in the DeWalt line of 29 drill bits**
- **Drills up to two times faster than competitive bits; drills up to six times more holes per battery charge when using a cordless drill**
- **Black & Decker employs 500 people in Maryland and over 25,000 worldwide.**

CryoSpray Ablation™ System

CSA Medical: Baltimore, MD

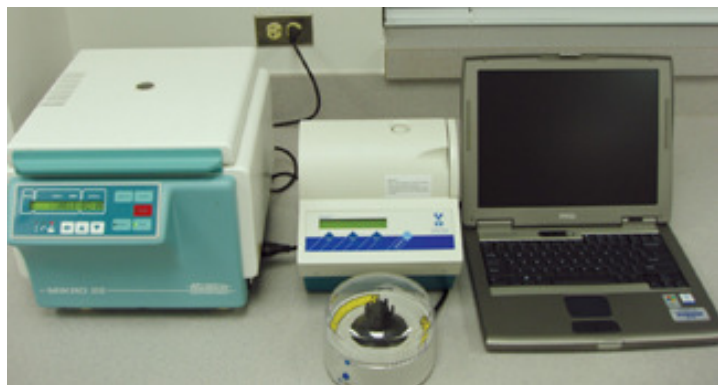


- New device and treatment for Barrett's esophagus (a pre-cancerous condition)
- Original concept from Bethesda Naval Medical Center
- Product launched in May, 2007
- Start-up CSA Medical significant financing
- Grew from 1 employee at start of MIPS project to over 40 now.



E-Coli 0157 Detection Kit

Innovative Biosensors: College Park, MD



- A simple and robust kit to detect *E. coli* O157:H7 contamination in food surfaces in less than 5 minutes.
- Rapid, ultra-sensitive test, easy to use, highly specific detection.
- Product launched January, 2005.

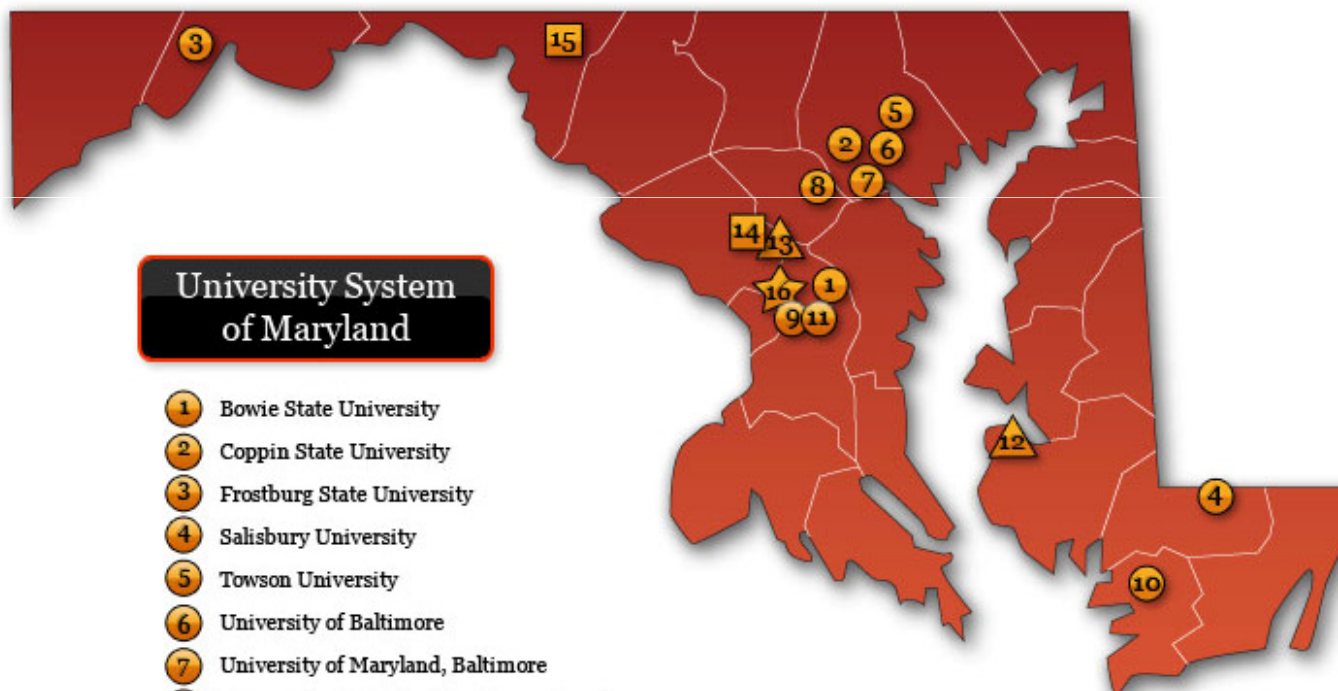
World-class off-wind sails

Quantum Sail Design Group: Annapolis, MD



- Quantum created the first U.S.-based wind tunnel testing facilities with the University of Maryland for downwind sails
- MIPS-developed technology is used in nearly all of Quantum's sail products.
- Quantum is now the No. 2 sail maker in the world, with more than 30 new employees hired
- Sails used in Volvo Round the World Race and America's Cup

University System of Maryland



University System of Maryland

- 1 Bowie State University
- 2 Coppin State University
- 3 Frostburg State University
- 4 Salisbury University
- 5 Towson University
- 6 University of Baltimore
- 7 University of Maryland, Baltimore
- 8 University of Maryland, Baltimore County
- 9 University of Maryland, College Park
- 10 University of Maryland Eastern Shore
- 11 University of Maryland University College
- 12 University of Maryland Center for Environmental Science Headquarters*
- 13 University of Maryland Biotechnology Institute Headquarters**
- 14 Universities at Shady Grove
- 15 University System of Maryland at Hagerstown
- 16 System Office

- Universities
- △ Research Institutions
- Regional Higher Education Centers
- ☆ System Office

*UMCES has laboratories at Horn Point on the Eastern Shore, at Solomons in Southern Maryland, and in Frostburg in Western Maryland.

**UMBI has three centers in Baltimore, a center at Shady Grove in Rockville, and a center in College Park.

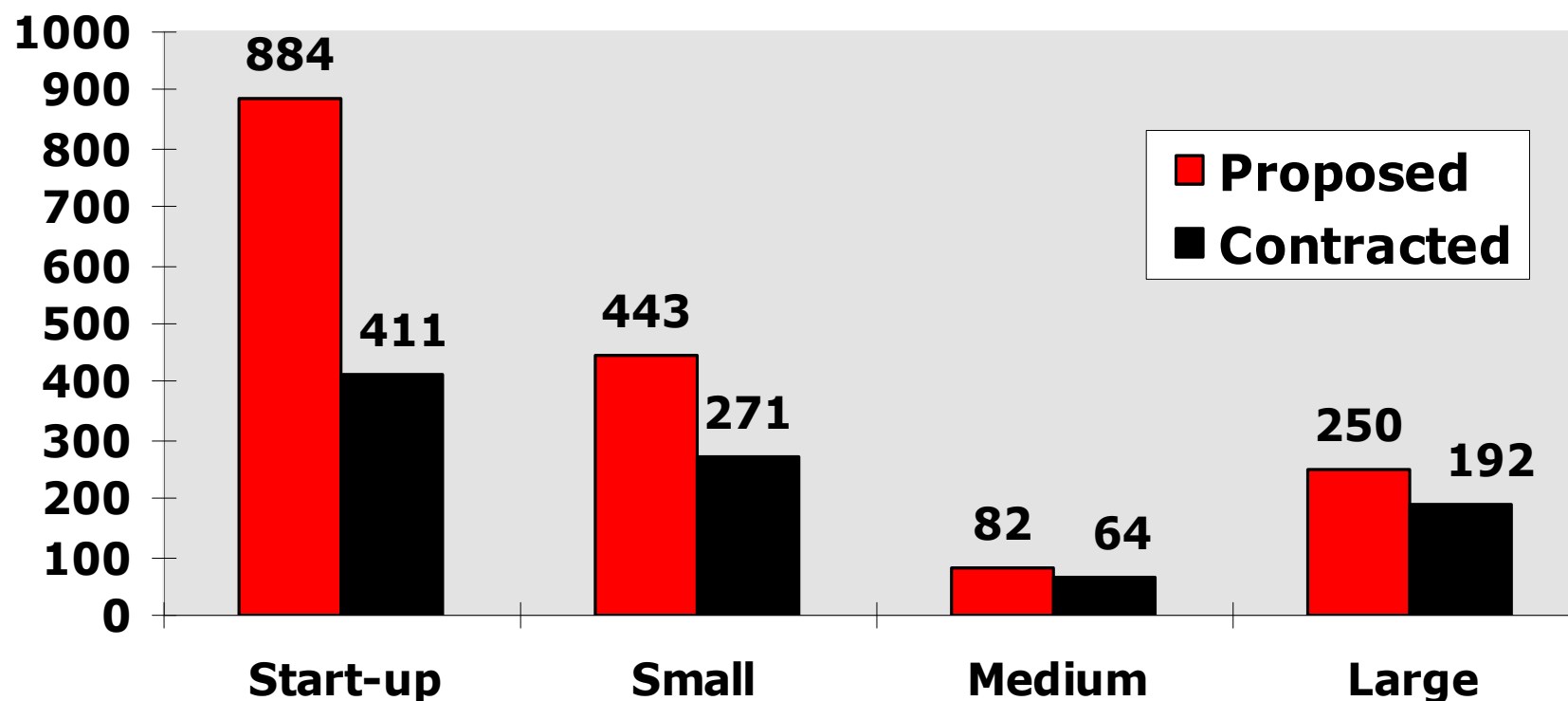
In addition, the University of Maryland, College Park has Technology Extension Service offices, Agricultural Experiment Station sites, Cooperative Extension Service offices, Fire and Rescue Institute facilities, and Maryland Sea Grant sites throughout Maryland. University of Maryland University College has education sites throughout the state.

Program Summary

Forty-four Competitive Rounds

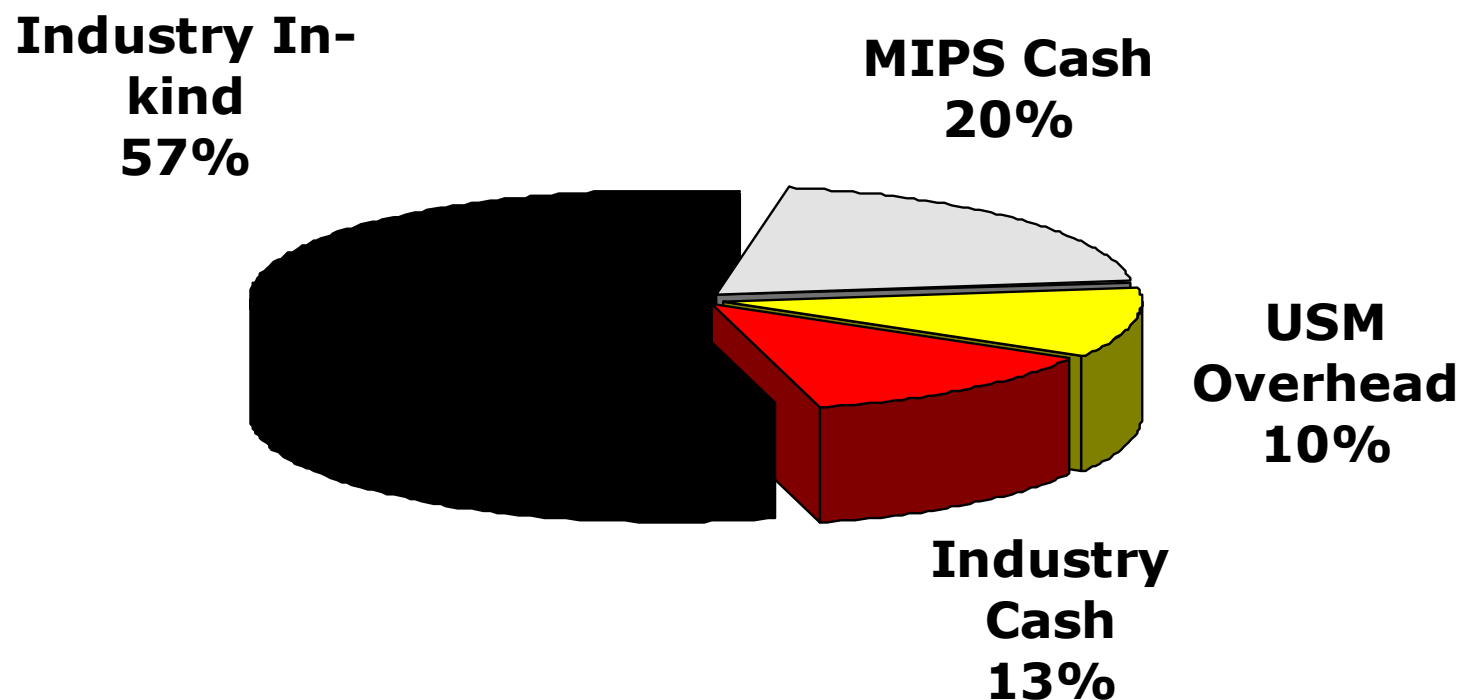
- 1659 Applications Received
- 938 Different Contracts & Amendments
- 644 Individual Projects
- 448 Companies
- 348 Faculty

Program Summary



Applications by Company Size

Program Summary



Project Funding Sources

Round 44 – New MIPS Projects

- Amplimmune
- Community Analytics
- CoolCAD Electronics
- FlexEI
- Fyodor Biotechnologies Inc.
- Integrated BioTherapeutics, Inc.
- Intertwine Health Solutions
- J Green Foods
- PCTEST Engineering Laboratory, Inc.
- SEGMA Technologies, Inc.
- Stancills Inc.
- Sustainable Systems, Inc.
- United Therapeutics

Functional Assay for Cancer Therapeutic AMP-224
Enhanced Opinion Leader Identification
Signals and Sensors for Energy Conservation
Power Distribution Systems for Thin-Film Batteries
Yeast-based Artemisinin (YAT) Production
Feasibility of Toxin Based S. Aureus Vaccine
Development of Customized Cardiology HER
Plant-based Proteins: Next Generation Products
Smart thermal management platform for Li Battery
Kaelo-Automated Corporate Governance Rating System
Low Carbon Footprint Green Roof Planting Media
Aeoloun Harvester ® Wind Turbine Evaluation
Development of a Broad-Spectrum Antiviral Drug

What Does MIPS Contribute to Maryland's Innovation Economy?

- Opens direct company access to faculty experts at all USM institutions.
- Only organized university R&D program in which commercialization is a primary factor for award.
- Real world experience for students
- Demonstrated pay-offs to hundreds of Maryland companies.
- Highly efficient job creation program for economic development

MIPS Return on Investment: a self funded program

- Income Tax Estimates: 2009
 - Projected number of jobs created/yr = 684
 - Average salary = \$75,000/yr
 - State income tax rate = 0.0475
 - Estimated income tax/yr generated:
\$2,436,750 (MIPS is self-funding!)

MIPS Cumulative ROI

- \$16.9 B sales of products whose initial development was supported by MIPS
- \$34 M total state funding for MIPS projects through Round 44
- Total Maryland Tax Revenues:
$$\$16.9 \text{ B} \times 0.05 = \$845 \text{ M}$$
- **MIPS ROI: $\$845 \text{ M} / \$34 \text{ M} = 25 \text{ to } 1$**

Summary

- **Proven best-practice tech transfer model with 22 years of innovation**
- **Deploys funds to the best researchers working on practical problems**
- **Allows new technologies rapid proof-of-concept and prototyping**
- ***MIPS speeds research results to market***

Web Site and Contact

301- 405- 3906

- **Mtech: www.mtech.umd.edu with links to other Mtech programs**



Dziekuje!