



## **Agenda Item 4**

# **Maryland Technology Enterprise Institute (Mtech) – Entrepreneurship Programs and Initiatives**



## BOARD OF REGENTS

### SUMMARY OF ITEM FOR ACTION **INFORMATION** OR DISCUSSION

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**TOPIC:** Maryland Technology Enterprise Institute (Mtech) – Entrepreneurship Programs and Initiatives (information item)

**COMMITTEE:** Economic Development and Technology Commercialization

**DATE OF COMMITTEE MEETING:** November 19, 2015

**SUMMARY:** The Maryland Technology Enterprise Institute (Mtech), an initiative of the Clark School of Engineering at the University of Maryland, provides a range of entrepreneurship programs that create value for the State of Maryland. Through its comprehensive innovation ecosystem, Mtech builds companies, connects existing Maryland-based companies with USM resources, and educates aspiring entrepreneurs. All these activities translate into job creation, tax base expansion, and university revenue.

Mtech's venture programs accommodate 40+ companies at a time through an on-campus incubator (TAP); VentureAccelerator, which helps faculty and students move technologies from bench to market; DC I-Corps, which takes 100+ companies per year through business model and customer discovery processes; Startup Shell, a student-run, on-campus incubator; Technology Ventures Building, a second-stage incubator; and the Maryland International Incubator, which brings in companies from outside the United States to establish operations in Maryland. The TAP incubator also features two prototyping facilities, including the MakerBot Innovation Center. Two billion-dollar companies have emerged from Mtech's venture programs, Martek Biosciences and Digene Corporation, along with industry-leading patents in hybrid car technologies, and several acquisitions for more than \$20 million.

Mtech's Maryland Industrial Partnerships (MIPS) program connects companies with faculty throughout the state's public universities to help bring new technology products to market. Through a cost sharing arrangement that supports participating faculty, more than 500 companies have developed technology-based products through MIPS. The resulting commercial products have generated more than \$30.3 billion in revenue and directly added more than 6,600 jobs to the state's economy. Products aided by MIPS include Martek Biosciences' nutritional oils, Hughes Communications' HughesNet™, MedImmune's Synagis®, Black & Decker's Bullet® Speed Tip Masonry Drill Bit, WellDoc's mobile diabetes management platform, and CSA Medical's diseased-tissue ablation platform.

In addition, Mtech offers up to 30 classes per year and features two living-learning entrepreneurship programs for undergraduates, as well as the region's first Master of

Technology Entrepreneurship degree. Squarespace (500+ employees), Alertus and FiscalNote are among the companies that have emerged from Mtech's education initiatives. The Mtech Coursera MOOC "Developing Innovative Ideas for New Companies" has had over 1 million students since 2013.

**ALTERNATIVE(S):** This item is for information purposes.

**FISCAL IMPACT:** This item is for information purposes.

**CHANCELLOR'S RECOMMENDATION:** This item is for information purposes.

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COMMITTEE RECOMMENDATION:

DATE:

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BOARD ACTION:

DATE:

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SUBMITTED BY: Joseph F. Vivona (301) 445-2783

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# **Committee on Economic Development and Technology Commercialization**

**Maryland Technology Enterprise Institute (Mtech) –  
Entrepreneurship Programs and Initiatives**

**November 19, 2015**

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**PATHS FOR MARYLAND  
ENTREPRENEURS & INNOVATORS**



# **Maryland Technology Enterprise Institute (Mtech)**

**Peter Sandborn  
University of Maryland**



# Mtech Entrepreneurship Ecosystem

*Mtech Programs Span: students, faculty and staff, all Maryland public universities, local non-university community, national university cohorts, international companies*



## Entrepreneurship Education

- Master of Professional Studies in Technology Entrepreneurship
- Coursera: Four-Course Entrepreneurship Specialization (MOOC)
- Minor in Technology Entrepreneurship
- **Hinman CEOs**
- Entrepreneurship and Innovation Program (Honors College)
- Entrepreneurship Courses



## Venture Creation

- **Technology Advancement Program Incubator**
- **Venture Accelerator**
- **Startup Shell**
- **DC I-Corps**
- Entrepreneur Office Hours
- National Capital Consortium for Pediatric Device Innovation
- Rapid Prototyping Lab
- Chesapeake Bay Seed Capital Fund
- Maryland Intellectual Property Legal Resource Center (MIPLRC)



## Company/University Connections

- **Maryland Industrial Partnerships Program (MIPS)**
- Biotechnology Research and Education Program
- **Maryland International Incubator (MI<sup>2</sup>)**
- Technology Ventures Building
- Mtech Baltimore



## Educating Students

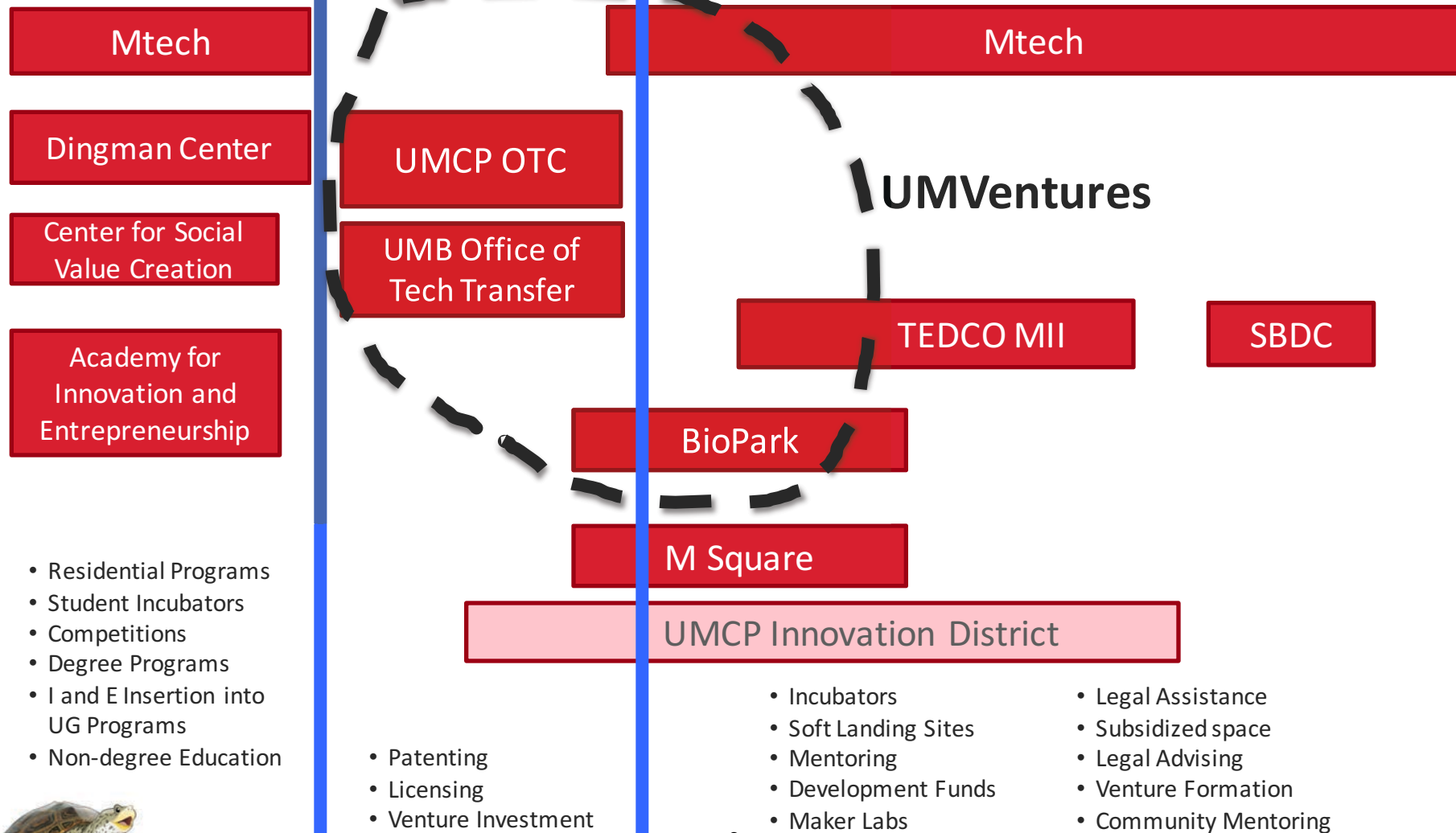
- Successful Students
- Future Donors

## Revenue (to USM)

- Licensing
- Royalties
- Equity

## Economic Value

- Job Creation
- Tax Base Creation
- Return on Investment





# Incubators

- **TAP – First-stage incubator**
  - 24,000 ft<sup>2</sup> of company space
  - 21 current residents (>100 graduates)
  - \$300M VC funding, 2 IPOs over \$1B, 2 acquisitions over \$1B
  - Extensive prototyping labs
- **TVB – Second-stage incubator**
  - 32,000 ft<sup>2</sup> of company space
  - 13 current residents
- **MI<sup>2</sup> – International incubator**
  - 9,200 ft<sup>2</sup> of company space
  - 12 current residents (31 graduates)
- **Startup Shell – Student incubator**
  - 100% student-run incubator and collective
  - >25 student companies

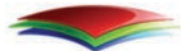




# Technology Advancement Program (TAP) Incubator

*First incubator in Maryland, established 1985 | 100+ graduates*

Current TAP and VA companies:



FLEXEL



Fluency



- Calabash Bioscience
- Hawkeye Medical
- MedSense
- North American Wave Engine Corporation
- Online Fluency
- Prasidiux
- Rakta Therapeutics
- SD NanoSciences



# Technology Advancement Program (TAP) Incubator: Selected Graduates

Two **\$1 billion+** graduates

*Both still employ hundreds in Maryland*



Hybrid vehicle engine technology; **licensed all 23 of its domestic and foreign patents to Toyota** and its breakthrough hybrid vehicle patent (U.S. Patent 5,343, 970) to Ford Motor Company in 2010



Nanocrystal dispersions for optical applications and both LED and OLED lighting; raised **\$26 million in financing**; based in a 13,000 sq. ft. facility in Baltimore



Neural stem cell therapy and pharmaceuticals for the treatment of diseases and conditions of the central nervous system; **\$183 million market cap**; based in Germantown



Mass, precision data conversion company; **acquired by Dolan Media for \$20 million**; still based in College Park



Sold to Hoover's for \$17 million



Sold to Caliper Life sciences for \$30 million



# Venture Accelerator Program

*“High-touch” venture accelerator | Mtech manages start-ups for 6-24 months to develop business plans, raise funding, and hire management.*

## Selected Mtech venture accelerator companies:



Flexel is a battery solutions company that develops a rechargeable, flexible, thin-film battery technology.



Omnispeech LLC is developing speech extraction technology for cellular and similar communications.



Remedium Technologies Inc. develops innovative products to treat severe bleeding injuries.



Resensys develops self-powered, wireless, distributed sensors for monitoring structures such as bridges, buildings, and pipelines.



Traffax develops line of traffic surveillance equipment using Bluetooth technology to provide accurate travel time and origin-destination.



VisiSonics brings 3D sound to gaming, virtual reality, and entertainment platforms. In addition, through its advanced RealSpace™ Audio Panoramic Camera, VisiSonics can capture, measure, analyze and reproduce natural, fully dimensional sound in any environment.

### All VA Companies

- Applied Media Analysis, Inc.\*
- Cyber Security Team\*
- FlexEl\*
- Lurn
- **North American Wave Engine Corporation**
- **OmniSpeech\***
- **Rakta Therapeutics\***
- **React Labs\***
- **Redox Power Systems**
- **Remedium Technologies\***
- Resensys\*
- Traffax\*
- TRX Systems\*
- Video Semantics\*
- VisiSonics Corporation\*
- Zymetis\*

\*company has licensed UMD IP



# Venture Accelerator Program - FLEXEL

*“High-touch” venture accelerator | Mtech manages start-ups for 6-24 months to develop business plans, raise funding, and hire management.*



Electrical Engineering Professors at Maryland:

- Marty Peckerar
- Neil Goldsman

- Thin Film Battery Technology
- Flexible
- RF Rechargeable
- High Energy Density
- Unique Chemistry
- Broad Applications



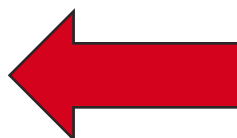
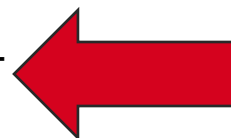
## Mtech Venture Accelerator Program (2009-2010)

- Business Modeling
- Hired Management Team
- Grant and Equity Funding



CEO Hired: Bob Proctor

Resident of  
Mtech TAP  
incubator (2010-  
2015);  
2 MIPS projects  
(2009-2015)



## Today:

- Moved to larger dedicated facility in the University's innovation district (2015)

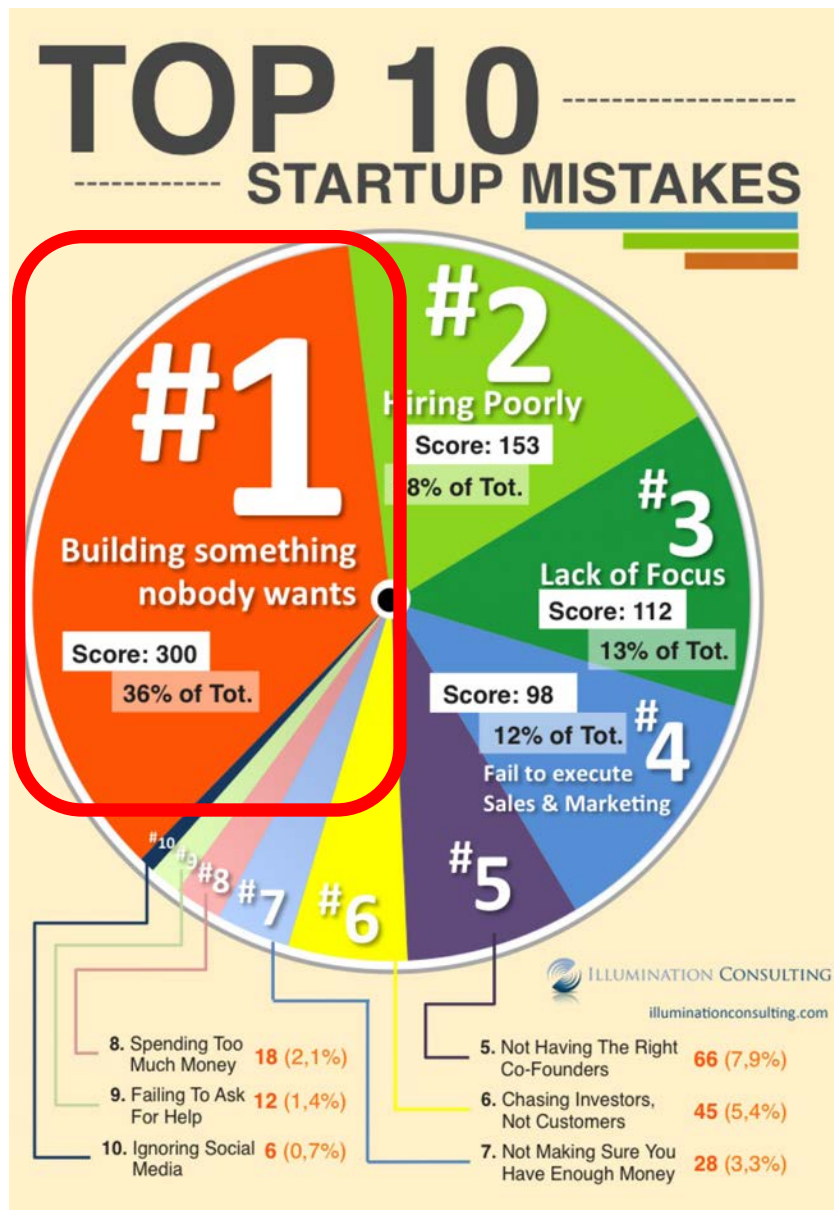




# I-Corps

*UMCP is NSF's Mid-Atlantic Node Lead*

- I-Corps addresses:
  - Who are your real customers?
  - Why will customers buy your products or services?
  - How will you get the product to your customers?
  - How will you make money?
  - How big is the potential market?
  - Who are your competitors?
- 3-person teams: Principal Investigator, Entrepreneurial Lead, and Industry Mentor
- Teams conduct 100+ interviews of customers/stakeholders
- DC I-Corps (UMCP-lead, GWU, VT, JHU):
  - 150+ teams trained in NSF I-Corps programs
  - 200+ teams trained in Regional/University I-Corps programs
  - 400+ teams trained in NSF and NIH SBIR and HHS programs
  - 65 international teams trained (S. Korea, Mexico, Russia)
  - 20+ certified I-Corps instructors (10 national, 10+ regional)



# Maryland International Incubator (MI<sup>2</sup>)

*International incubator, serves as a “soft landing” site for international companies to gain a foothold in the United States/Maryland.*

Signed MOU with the  
Ministry of Science and  
Technology in China

Established in 2009

**Canon**

CANON U.S. LIFE SCIENCES, INC.

*Worked with UMD bioengineering  
faculty on molecular diagnosis for  
human genetic diseases.*

**Glodon**

*\$200 million+ revenue; hired UMD  
graduates and offered grants to civil  
engineering and business faculty*

**FOXCONN®**

*\$100 billion+ revenue; recruited 8 UMD  
faculty members and graduate students  
in computer engineering to work on  
next-generation communication  
technologies*

## Maryland International Incubator Companies:

**Bangladesh**  
Za Za Limited

**Canada**  
Mina Mar Group

**China**  
Ankang Shimao Biotech Company  
Anji Dasol Solar Energy & Technology Co.Ltd.  
[Beijing Golden Island Medical Technology Co., Ltd.](#)  
[Beijing Glodon Company Limited](#)  
Beijing Oiltee Petroleum Technology LLC  
Beijing Rechsand Science and Technology Group  
CellPath China, LLC  
China Zhaoshan Group  
Clear Spring Applied Technologies, LLC  
Dimetek Digital Medical Technologies, Limited  
[Dycent Biotech](#)  
Hangzhou Qingtai Packing And Printing Company  
Nanjing Wanji Technologies  
Ningbo Dafengche Educational Equipment Co. Ltd.  
Origin Company  
Sanhome Group  
Shandong Department of Science and Technology  
Shanghai Fahe International Company  
Shanghai Tongji Biological Product Company  
Shanxi Water Industry Investment Group Co., Ltd.  
[Signalway Antibody Biotech Company](#)  
Sino-American Venture Capital, LLC  
Sunscape (Hong Kong)  
Systek Systems, Inc.  
Totus Lightning Solutions Inc.  
US-China Training Services  
Wuxi TocaTek LLC  
[Zhejiang Wuyuan Company](#)

**Great Britain**  
Community DNS, Ltd.

**India**  
Indus Links

**Israel**  
[Gigaspace](#)

**Italy**  
[Loccioni Group](#)

**Japan**  
Canon Life Sciences

**Kazakhstan**  
JSC National Scientific & Tech Holding Company

**Romania**  
Romanian Group For Investments and Consultancy

**Russia**  
Investment and Venture Fund of the Republic of Tatarstan  
Pulsar Innovation LLC  
Russian University of Nizhni Novgorod  
[U.S.-Russia Innovation Corridor](#)

**South Korea**  
Samin Sciences

**Taiwan**  
[Foxconn](#)



# 2015 Graduates of MI<sup>2</sup>

## Loccioni (Italy)



- In incubator: 10/2012 to 10/2015
- Started with 2 employees (now 9 employees)
- Measurement and Test solutions (medical, automotive, rail, industrial)
- Have sold hardware (Cancer Therapy Compounding Equipment) – UMB hospital, JHU, and others
- Hired 5 student interns (1 permanent hire)



Moved to new offices in  
College Park in October 2015

## Origin Wireless (Taiwan)



- In incubator: 12/2012 to 5/2015
- Started with 1 employee (now 12 employees)
- Video streaming products
- Hired 10+ students (3 permanent hires)



Moved to new offices in  
Greenbelt in May 2015





# Startup Shell

*Student-run co-working space and incubator supporting 50+ student companies*



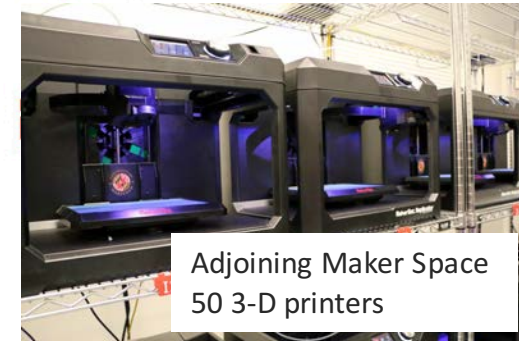
Used in major motion picture



150 colleges and universities in 36 states



Raised \$3M Kickstarter fund in 2014



Adjoining Maker Space  
50 3-D printers



# Maryland Industrial Partnerships (MIPS)

*Funding collaborative R&D projects between Maryland industry and University System of Maryland faculty to accelerate product commercialization*

- Maryland companies submit proposals in collaboration with faculty and staff from Maryland public universities (USM + Morgan State & St. Mary's)
- Proposals are evaluated on technical merit and economic development potential
  - **Primary criterion: Likelihood of long-term job creation in Maryland resulting from the proposed R&D project**
- Projects are jointly funded by MIPS and companies
- All funding goes to university researchers

**6,600**

Direct jobs created through the MIPS program, impacts created 15,000 jobs

**\$30 billion**

Revenue generated from MIPS products

**87%**

Five-year survival rate for startups receiving MIPS funding

**35:1**

ROI on MIPS funding

**\$87 million**

Annual state tax revenue

**\$70 million**

Annual county tax revenue

**63%**

Startups still in business that received MIPS funding since 1987



# Maryland Industrial Partnerships (MIPS)

**\$30.3 billion** of industry-leading products were developed with the help of MIPS funding

## Synagis, by MedImmune (Gaithersburg)

Prevents a serious respiratory disease in infants



**\$13.6 billion**

## Life's DHA, by Martek (Columbia)

Nutritional oils, especially DHA, found in 90% of infant formulas, many other foods



**\$2.9 billion**

## HughesNet, by Hughes Network Systems (Germantown)

World's leading provider of satellite broadband for home and office



**\$13.7 billion**



**Under Armour:**  
running shoes



**WeatherBug:** energy  
management for  
consumers, utilities



**WellDoc:** mobile  
diabetes management  
platform



**CSA Medical:** cryo  
spray for pre- and  
cancer treatment



**Fleetpro:** mass  
maintenance for  
vehicle fleets



**Manta Biofuel:**  
efficient, inexpensive  
crude oil from algae

# Entrepreneurship Education

<i>Middle School</i>	<ul style="list-style-type: none"> <li>• Young Scholars Discovery summer program for 7<sup>th</sup> - 8<sup>th</sup> grade</li> <li>• 1 non-credit course for middle school students</li> </ul>
<i>High School</i>	<ul style="list-style-type: none"> <li>• Young Scholars Program for 9<sup>th</sup> - 12<sup>th</sup> grade</li> </ul>
<i>UM Freshmen &amp; Sophomores</i>	<ul style="list-style-type: none"> <li>• Entrepreneurship &amp; Innovation Living-Learning Program (EIP)</li> <li>• Minor in Technology Entrepreneurship</li> <li>• 9 courses at the 100- and 200-levels</li> </ul>
<i>UM Juniors &amp; Seniors</i>	<ul style="list-style-type: none"> <li>• <b>Hinman CEOs Living-Learning Program</b></li> <li>• Impact Seed Fund</li> <li>• 9 courses at the 400-level</li> <li>• BioE Capstone class connected to UMB</li> </ul>
<i>Graduate Students and Professionals</i>	<ul style="list-style-type: none"> <li>• 4 MOOCs with Coursera in entrepreneurship and innovation</li> <li>• Online Master's of Professional Studies in Technology Entrepreneurship</li> </ul>

- 29 courses with 2,000+ enrollments annually
- MOOCs serving nearly 1 million students since 2013
- New online master's program in technology entrepreneurship





# Hinman CEOs Program

*As the nation's first living-learning entrepreneurship program, Hinman CEOs is a groundbreaking initiative placing entrepreneurial students from all technical and non-technical academic disciplines in a unique community.*

SQUARESPEACE



Founded by Anthony Casalena. Leading web publishing platform created during sophomore year in Hinman CEOs. Raised \$78.5 million in venture capital and employees over 500.

SQUARESPEACE

ZetaBoards

Fruitees  
SQUEEZING IN THE GOOD STUFF

Lurn inc.  
where u come first

daocloud

bevo media  
your internet marketing homepage

dose spot

OPENGov

GoMei

BRAVE UX

darwinapps

INVESTOURS

Social Rise

JAVAZEN  
COFFEE BLEND

CAREERPEER

ALERTUS  
LOCALIZED EMERGENCY NOTIFICATION

Mowing  
& More

ZUSIN



FN FiscalNote

MyFridge  
Rental.com

trium fun

1847  
PHILANTHROPIC

GYM Q

ventureboard

OneReceipt  
keep the purchase, lose the receipt

GRIP BOOST

S

PLANE TICKETS.COM

sparkgift

VentureStorm

FINAL

Zentail Commerce

مونتليك k.



FN FiscalNote

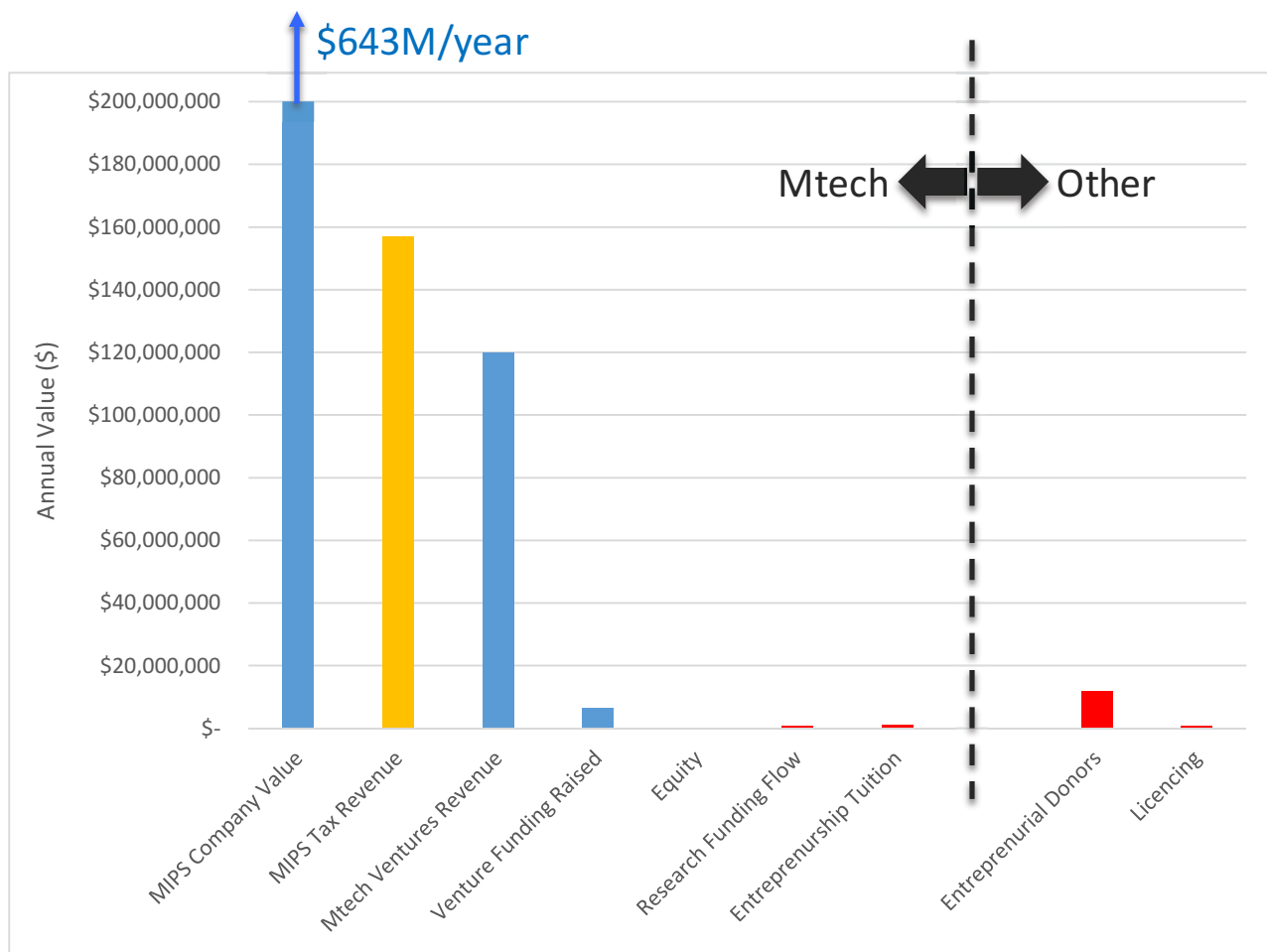
Co-founded by Jonathan Chen. Software analyzes and predicts the outcome of legislation. Raised \$18.3 million and has 35 employees.



ALERTUS  
UNIFIED FACILITY NOTIFICATION

Alertus, co-founded by two alumni, is a leading provider of emergency notification systems.

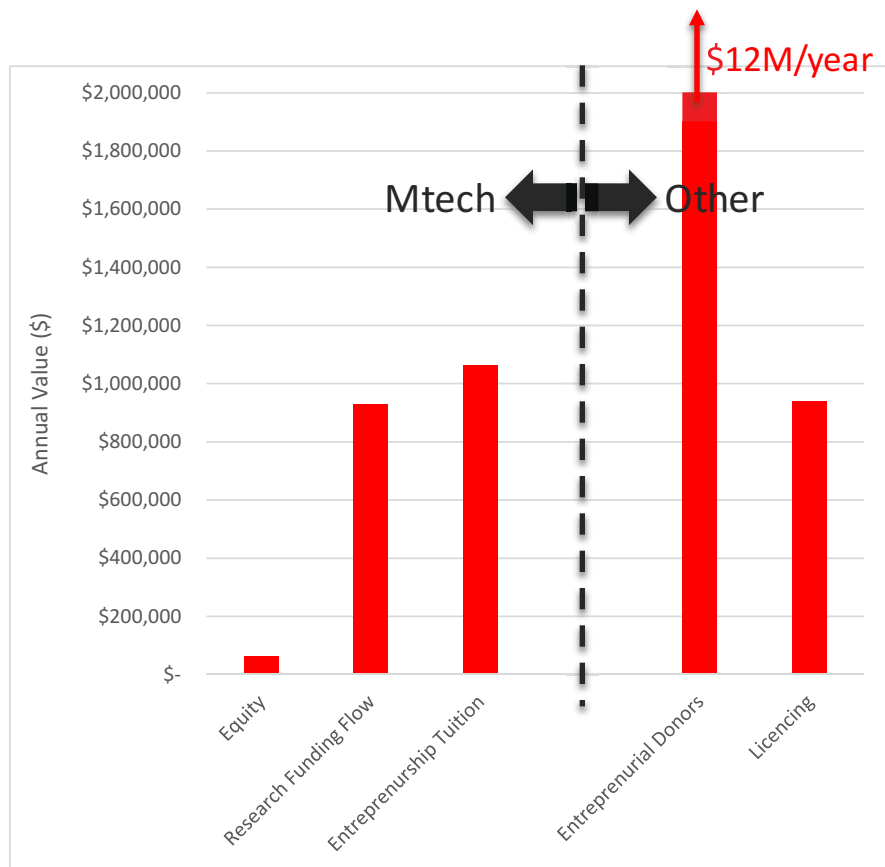
# UMCP Value



- State Revenue
- UMCP Revenue
- Value to Companies



# UMCP Value



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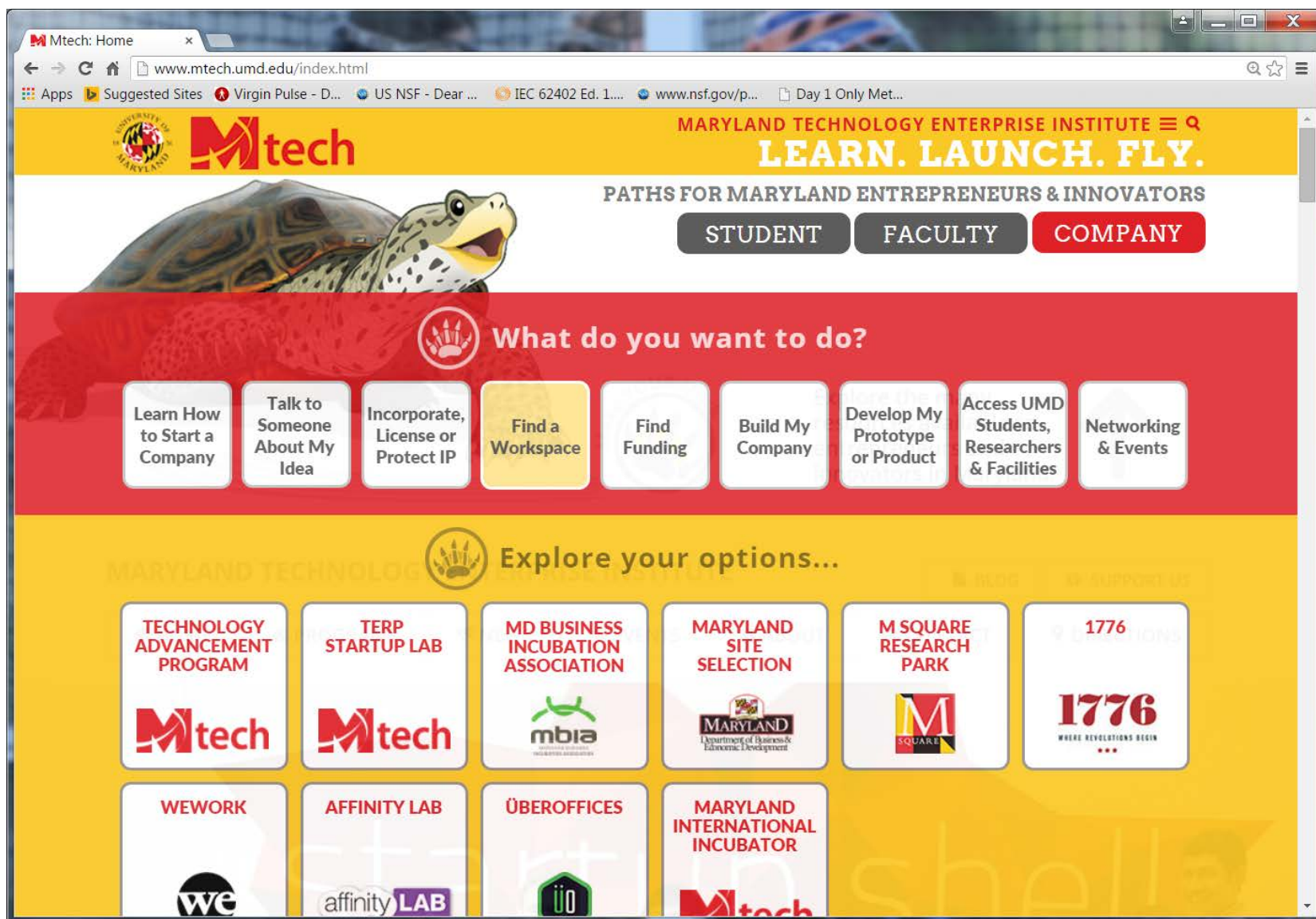
- State Revenue
- UMCP Revenue
- Value to Companies







<http://www.mtech.umd.edu>



The screenshot shows the Mtech website homepage. At the top, there's a navigation bar with the Mtech logo and the text "MARYLAND TECHNOLOGY ENTERPRISE INSTITUTE". Below this, a large banner features a turtle illustration and the text "LEARN. LAUNCH. FLY." and "PATHS FOR MARYLAND ENTREPRENEURS & INNOVATORS". There are three buttons: "STUDENT", "FACULTY", and "COMPANY". Below this is a section titled "What do you want to do?" with a grid of buttons: "Learn How to Start a Company", "Talk to Someone About My Idea", "Incorporate, License or Protect IP", "Find a Workspace", "Find Funding", "Build My Company", "Develop My Prototype or Product", "Access UMD Students, Researchers & Facilities", and "Networking & Events". The next section is "Explore your options..." with a grid of boxes for various programs: "TECHNOLOGY ADVANCEMENT PROGRAM", "TERP STARTUP LAB", "MD BUSINESS INCUBATION ASSOCIATION", "MARYLAND SITE SELECTION", "M SQUARE RESEARCH PARK", "1776", "WEWORK", "AFFINITY LAB", "ÜBEROFFICES", and "MARYLAND INTERNATIONAL INCUBATOR".



# Additional Information Not Presented



# Entrepreneur Office Hours

*Mtech offers free Entrepreneur Office Hours for entrepreneurs in the region on the second and third Tuesday of each month, in College Park and Baltimore, respectively.*



1,000

Entrepreneurs  
served in College  
Park

94

Entrepreneurs served  
in Baltimore since 2014

4

Universities  
represented by  
entrepreneurs served  
in Baltimore since 2014





# Maryland Intellectual Property Legal Resource Center (MIPLRC)



- Free legal services for entrepreneurs and emerging technology companies, including:
  - patent applications
  - prior art searches
  - license agreements
  - non-disclosure agreements
  - company formation, and more
- MIPLRC's offices are located in Mtech's on-campus incubator
- Joint effort with the UMB School of Law, using 3<sup>rd</sup> year law students
- Free and open to the entire university community



# TAP Incubator

*First incubator in Maryland, established 1985 | 21 current companies | 100+ graduates*

- |   |  |  |
|---|--|--|
| 1. AccuStrata                                 | 40. EBTech/HallCloset Comm'l, Inc.               | NASDAQ: CALP in 2005]                  |
| 2. Adheron Corp.                              | 41. EchoDynamics, Inc.                           | 79. OmniSpeech, LLC*                   |
| 3. AIRS, Inc.                                 | 42. Energy Dense Power Systems                   | 80. Oncolmmunin, Inc.                  |
| 4. Alan Penn Associates, Inc.                 | 43. Environmental Comm. Consultant               | 81. Operant Systems                    |
| 5. Animal Genetics Systems, Inc.              | 44. ERS, Inc.                                    | 82. Optical Communications, Corp.      |
| 6. AnthroTronix, Inc.                         | 45. eSatisfy.com, Inc.                           | 83. PAICE Corp.                        |
| 7. Applied Media Analysis*                    | 46. FlexEI LLC*                                  | 84. Particle Technology, Inc.          |
| 8. AscentGene, Inc.                           | 47. Freewing Aircraft Corp.                      | 85. Physical Dynamics, Inc.            |
| 9. Assay Research, Inc.                       | 48. GeoQwest International, Inc.                 | 86. Pixelligent Technologies*          |
| 10. Astrapi Corporation                       | 49. Global Outpost, Inc.                         | 87. Potomac Photonics, Inc.            |
| 11. ATEC, Inc.*                               | 50. Goozex                                       | 88. Powerize.com [acquired by Hoovers] |
| 12. Beacon Corp.                              | 51. EB Tech/HallCloset Communications, Inc.      | 89. Prasiidux                          |
| 13. Behavheuristics, Inc.                     | 52. Health Care Futures, Inc.                    | 90. Prognosis, LLC                     |
| 14. Bioavailability Systems, Inc.             | 53. Homequest Network                            | 91. ProteinOne, Inc.                   |
| 15. Bioelectronics Corp.                      | 54. Horizon Resources, Inc.                      | 92. Redox Power Systems                |
| 16. Bioserve Biotechnologies, Ltd.            | 55. Hydrodyne, Inc.                              | 93. Relativity Sciences                |
| 17. Biospace International Corp.              | 56. ICOW, LLC                                    | 94. Remedium Technologies Inc.*        |
| 18. Bioelectronics Corp.                      | 57. IGI Technologies, Inc.                       | 95. Renova Life Inc.                   |
| 19. BioSurface Engineering Technologies, Inc. | 58. Innovative Biosensors                        | 96. Resensys LLC                       |
| 20. Bypass Systems, Inc.                      | 59. Lean Power, Inc.                             | 97. SD Nanosciences, LLC*              |
| 21. BWI Distributions                         | 60. Lifetime Pharmaceuticals, Inc.               | 98. Security Do                        |
| 22. Bypass Systems, Inc.                      | 61. Litetrends Co., Inc.                         | 99. SiReverse                          |
| 23. Celadon Labs, Inc.                        | 62. Lurn   | 100. SLS Industries Inc.               |
| 24. Chesapeake PERL, Inc.                     | 63. Macronetics                                  | 101. Spessard Manufacturing*           |
| 25. ClaraGen, Inc.                            | 64. Marketplace TV, Inc.                         | 102. StreamCenter                      |
| 26. CoolCAD Electronics, LLC                  | 65. Martek, Corp. [NASDAQ: MATK]                 | 103. Subject 7                         |
| 27. Cordex                                    | 66. Maryland Energy and Sensor Technologies LLC* | 104. TAP Multimedia LLC                |
| 28. Cornell Technical Services                | 67. Med-Q Corporation                            | 105. Telemechanics, Inc.               |
| 29. CosmosID                                  | 68. MedSense*                                    | 106. TeraStore, Inc.                   |
| 30. Custom Command Systems, Inc.              | 69. Medtest Systems, Inc.                        | 107. Thermal Analysis Partners         |
| 31. Customer Insites/e-Satisfy, Inc.          | 70. Micronet Software Corp.                      | 108. Top Orchids, Inc.                 |
| 32. Cutting Edge Technologies, Inc.           | 71. MiMo Cloud, Inc.                             | 109. Trufina                           |
| 33. CytImmune Sci.                            | 72. Molecular Toxicology, Inc.                   | 110. TRX Systems                       |
| 34. Custom Command Systems, Inc.              | 73. myeCab                                       | 111. Vibran Technologies, Inc.         |
| 35. Cytonix Corporation                       | 74. Namian Labs, Inc.                            | 112. VisiSonics Corporation*           |
| 36. DataStream Content Solutions              | 75. Neocera, Inc.                                | 113. Viteq Corp.                       |
| 37. Digene Corp. [NASDAQ: DIGE]               | 76. NetInterests, Inc.                           | 114. Xenotran Corp.                    |
| 38. Dovetail Technologies                     | 77. Neuralstem, Inc.                             | 115. Zone Therapeutics, Inc.           |
| 39. Eastern Analytical, Inc.                  | 78. NovaScreen Bio. Corp. [acquired by Caliper   | 116. Zymetis*                          |

\*company has licensed UMD IP

# Tech Ventures Building

*Second stage incubator space managed by Mtech offering affordable space and proximity to both the University of Maryland and the College Park Metro Station*

## Technology Ventures Building Companies:

- Accustrata
- Applied Media Analysis
- Berberian & Company
- CATT/MD T2 Center (University of Maryland)
- Cluster for Sustainability in the Built Environment-CITY@UMD (University of Maryland)
- CoolCAD Electronics, LLC
- DataStream Content Solutions
- Diagnostic Ansaers\*
- Enterprise Sciences
- Excella
- Imaginex
- ISR Optics Lab (University of Maryland)
- MATOC/CapWIN (University of Maryland)
- Maxion Technologies
- MXF Technologies
- Optimized Thermal Systems
- Optonicus
- Organon Advisors
- SecondWrite\*
- Traffax\*

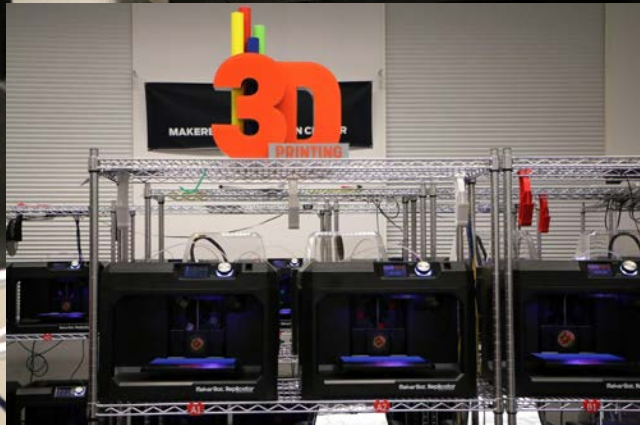
\*company has licensed UMD IP



# Maker Labs



*Prototyping labs supporting first-stage incubator and student start-up incubator*



## MakerBot Innovation Center Resources:

- 33 Replicator 5th Generation Desktop 3-D Printers
- 13 MakerBot Replicator 2X Experimental 3-D Printers
- 2 MakerBot Replicator Z18 Desktop 3-D Printers
- 2 MakerBot Replicator Mini 3-D Printers
- 2 MakerBot Digitizer Desk top 3-D Scanner



**Innovation  
Center**



# Mtech Impact



## Venture Creation

### 50+

Active technology startups at any point in time

### \$1 billion x 2

Two incubator grads, Martek Biosciences and Digene Corporation, sold for > \$1 billion. Each created hundreds of jobs and is still in Maryland

### \$3.6 billion

Total revenue generated, investments, grants and contracts, and acquisitions of Mtech companies

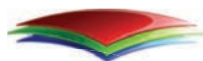
### \$52 million

Investments, contracts, and grants acquired by Mtech Ventures companies since 2008

### 200+

Regional companies completing Mtech's NSF-backed DC I-Corps customer discovery program

Current Mtech Ventures companies you should be aware of:



FLEXEL



**Remedium**  
TECHNOLOGIES

**VisiSonics**  
As Good as Being There!

**OmniSpeech™**  
Speak and be understood™



# Coursera Entrepreneurship Specialization

*The Entrepreneurship Specialization requires that students generate and validate an innovative new venture concept. Courses in innovation and new venture financing set the foundation for building a comprehensive, customer-validated business model. In the capstone project, students create a business plan and investor pitch.*



## Four Courses:

1. Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship
2. Innovation for Entrepreneurs: From Idea to Marketplace
3. New Venture Finance: Startup Funding for Entrepreneurs
4. Entrepreneurship Capstone

**960,000+**  
Students enrolled since 2013



# Mtech I&E Courses

*Mtech offers 20-30 innovation and entrepreneurship courses each semester, with an average of 1,000 enrolls. Fall 2015 courses are listed below.*

- **ENES140:** Discovering New Ventures - Foundations in Entrepreneurship
- **ENES143:** Communication Essentials for Entrepreneurs
- **HEIP143:** Foundations in Entrepreneurship & Innovation
- **HEIP144:** Contemporary Issues in Entrepreneurship & Innovation
- **ENES210:** Entrepreneurial Opportunity Analysis and Decision-Making in 21st Century Technology Ventures
- **HEIP240:** Exploring International Entrepreneurship & Innovation
- **HEIP241:** Social Entrepreneurship Practicum
- **ENES460:** Fundamentals of Technology Start-Up Ventures
- **ENES461:** Advanced Entrepreneurial Opportunity Analysis in Technology Ventures
- **ENES462:** Marketing High-Technology Products & Innovations
- **ENES463:** Strategies for Managing Innovation
- **ENES464:** International Entrepreneurship & Innovation
- **ENES465:** Entrepreneurial Design Thinking
- **ENES466:** Leading and Financing the Technology Venture
- **ENES498:** Special Topics in Entrepreneurship
- **ENES498A:** Special Topics in Entrepreneurship / Introduction to Innovative Thinking
- **ENES498E/CHEM498E:** Special Topics in Entrepreneurship / Entrepreneurship in Chemical and Life Sciences
- **ENES498P:** Special Topics in Entrepreneurship / Corporate Technology Ventures
- **ENES660:** Fundamentals of Technology Startup Ventures
- **ENES662:** Innovative Ideas and Concept Development
- **ENES663:** Strategies for Managing Innovation
- **ENES664:** Business Modeling and Customer Validation
- **ENES665:** Innovative Thinking
- **ENES666:** Creative Design, Prototyping, and Testing
- **ENES667:** Market Development and Commercialization
- **ENES668:** Corporate Technology Entrepreneurship
- **ENES669:** Legal Aspects of Entrepreneurship
- **ENES670:** Financial Management and New Venture Financing

**1,347**

Fall 2015  
undergraduate  
enrollments

**140**

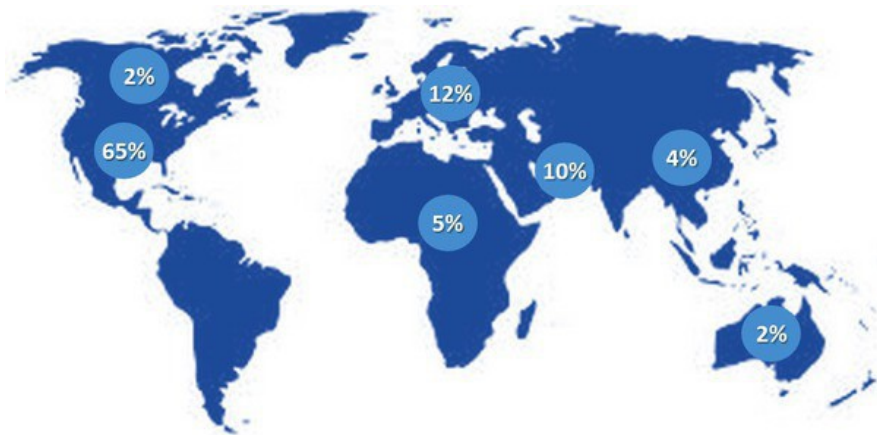
Fall 2015 graduate  
enrollments



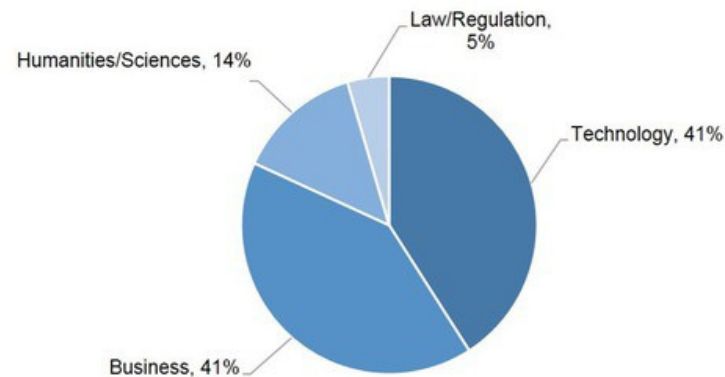
# Master of Professional Studies in Technology Entrepreneurship

*Our most comprehensive entrepreneurship curriculum to date  
100% online. 15 months. \$19,500.*

## Worldwide Enrollment



## Industry and Startup Experience



Average Age: **36** | Advanced Degrees: **43%** | Average Years of Experience: **14**



# Entrepreneurship & Innovation Program (EIP)

*EIP provides Honors College freshmen and sophomores from any major with a living-learning educational experience that helps them develop the entrepreneurial mindset, skills, and principles to create innovative and impactful solutions to challenges in any discipline.*

## Honors College + Mtech (Clark School of Engineering)

**Honors College** Program Launched Fall 2010

Based on **Mtech's Hinman CEOs** living-learning program for juniors and seniors

For **any** entering Honors College student interested in entrepreneurship & innovation

**Diverse Majors:** Engineering (40%), Business (30%), CMNS (15%), BSOS, ARHU, LTSC

For business start-ups and/or **being entrepreneurial & innovative in any organization**

**75-100 students** per cohort

**Develop entrepreneurial spirit, community, cooperation, and ethical, innovative leaders**

**Live:** La Plata Hall residences, offices, classrooms and team spaces

**Learn:** Challenging courses with experiential learning and team projects

**Launch:** Mentoring, workshops, legal services, seed funding, internships, networking

**2014 USASBE Outstanding Specialty Entrepreneurship Education Program**





# Bioengineering Capstone with UMB



## Students Enrolled:

Growing enrollment

2013-4	81
2014-5	91
2015-6	99

## Fearless Ideas Course: AIE

Students learn entrepreneurial aspects of design projects

## Disclosure of Inventions

Average of 5/year

## Project Teams

2013-4	16
2014-5	18
2015-6	20

## UM Ventures Support 2013-5

Support ends Jan 1, 2016



# Mtech Impact

## *Entrepreneurship Education*

**1 million**

Students enrolled in  
Mtech's  
entrepreneurship  
Coursera courses  
since 2013

**FIRST**

Minor and Master's  
degrees in  
technology  
entrepreneurship  
offered in the state

**646**

Students completing Mtech's rigorous  
living-learning entrepreneurship  
programs since 2000

**1,000**

Average enrolls in undergraduate and  
graduate entrepreneurship courses  
EVERY SEMESTER

**20-30**

Entrepreneurship courses offered  
EVERY SEMESTER

Companies from Mtech's entrepreneurship education programs you should be aware of:





# Biotechnology Research and Education Program (BREP)

## Contract Research

- Two core facilities
- Rockville and College Park
- ~5,000 sq. ft. of lab space
- Provides supplemental research to academia, federal labs, and commercial biotech companies
- Since inception (1985), has completed over 850 contract research projects



# Biotechnology Research and Education Program (BREP)

## Workforce Development

- Longest running biomanufacturing training workshop in region
  - 16 years
- Over 500 people trained throughout the world

## Undergraduate Education

- Bioengineering courses, Gemstone, Independent Research Projects
- 100% Undergraduate job placement since 1995
  - 63 Students working in local biotech



# Maryland Industrial Partnerships (MIPS) Program

*MIPS provides matching grants for university-based research projects that help Maryland companies develop technology-based products*

180's LLC  
2020 GeneSystems, Inc.  
21st Century Seafood, Inc.  
3CLogic, Inc.  
A&G Pharmaceutical  
AAI Corporation  
ACAGI, Inc.  
Acceptys, Inc.  
Advanced Acoustic Concepts  
Advanced BioNutrition Corp.  
Advanced Biotechnologies, Inc.  
Advanced Digital Forensic Solutions, Inc.  
Advanced Oxidation Systems, Inc.  
Advanced Thermal and Environmental Concepts, Inc.  
Adventure Sports  
Advertising, Inc.  
AHPharma Energy Systems, Inc.  
AHPharma Food Safety Products, Inc.  
Aid Networks, LLC  
AIRS, Inc.  
Aither Engineering  
Alba Therapeutics Corporation  
Alcoa  
Alertus Technologies, LLC  
Alliant Techsystems  
Allied Metal Finishing  
Allied-Signal  
Altenara Technology  
American Dehydrated Foods, Inc.  
American Dynamics Flight Systems, Inc.  
American Minority Engineering Corp.  
Amplimmune, Inc.  
Animalgesic Laboratories, Inc.  
AnthroTronix, Inc.  
Aparna Biosciences  
APC Biotechnology Services, Inc.  
APEX/ECLIPSE Systems, Inc.  
Applied Data Systems, Inc.  
Applied Research  
Applied Sensor Research & Development Corporation  
AquaMar Industries  
AquaPharm Technologies Corporation  
Arbitron Company  
Archivex, LLC  
AriaVax, Inc.  
Associated Enterprises, Inc.  
AST Services, LLC  
Astrox Corporation  
Atlantic Biomass Conversions, Inc.  
Audiodontics  
Automated Precision, Inc.  
Autonomy Engine LLC

axonX File  
Baltimore Gas & Electric Co.  
Bata Shoe Co., Inc.  
Batching Systems, Inc.  
Bausch & Lomb, Inc.  
Baycraft Fiberglass Engineering, Inc.  
BaySaver (TM), Inc.  
BDS Dental Laboratory  
Beacon Research, Incorporated  
Beaverkill Rod Company  
BehavHeuristics, Inc.  
Berkeley Springs Instruments LLC  
Bethlehem Steel Corporation  
Beyond Meat  
Biketoo  
Bio Optimization Systems  
Bio-Quick Corporation  
BioAssessments, LLC  
Bioclinical Systems, Inc.  
BioFutura, Inc.  
BioMat Sciences  
Biomedical Management Corp  
Biometrics, Inc.  
BioSpace International  
BioSurface Engineering Technologies, Inc.  
Biosys, Inc.  
Biotechnology Transfer, Inc.  
Biotrax, Inc.  
Birich Technologies, LLC  
Black and Decker, Inc.  
Blackrock Algae, LLC  
Blanchard & Company  
BlueInfusion Technologies, Inc.  
BlueWave Semiconductors, Inc.  
BlueWing Environmental Solutions & Technologies, LLC  
Bowles Fluidics Corporation  
Brain Biosciences, Inc.  
Brake Master, Inc.  
Brimrose Corporation of America  
Buford Biomedical, Inc.  
Burns Laboratories, Inc.  
CAB, Inc.  
CADKEY (formerly Cutting Edge Technology)  
CAE Link Corporation  
Calibrant Biosystems  
CAMBREX Bio Science  
Captain's Choice Food Products  
Cardinal Scientific, Inc.  
CARE-2, LLC  
Carleton Technologies, Inc.  
Catalyst Research  
CCC Diagnostics, LLC  
CEL-SCI Corporation  
Celadon Laboratories, Inc.

Celek Pharmaceuticals, LLC  
Cellex, Inc.  
Cellphire, Inc.  
Celsion Corp.  
CEMCOM Corporation  
CEMCOM Research Associates, Inc.  
Centredon Corporation  
Ceramic Composites, Inc.  
Cereplex, Inc.  
Ceron Networks Corporation  
CertusNet Inc  
Chamberlain Contractors, Inc.  
Chesapeake Bay Seafood Industry  
Chesapeake Fields Farmers  
Chesapeake PERL, Inc.  
Chondros, Inc.  
ChromoTrax, Inc.  
CI Technologies (Core-IT), LLC  
Circle C. Oyster Ranchers Association, Inc.  
Civilized Software, Inc.  
Claragen, Inc.  
Clark Construction Company  
Coil, LLC  
Columbia BioSystems, Inc.  
Columbia Imaging, Inc.  
Columbia Technologies, LLC  
Community Analytics  
Compression Telecommunications Corp.  
COMSAT Laboratories  
Constellation Energy Group  
ConverGene  
COOLCAD Electronics LLC  
Corabi International Telemetrics  
Cortex Systems, LLC  
Corridor Pharmaceuticals, Inc.  
Covega, Inc.  
CSA Medical  
CTX Corporation  
Custom Command Systems  
Cyber Technology  
Cylex Inc.  
Cytimmune Sciences, Inc.  
Damlic Corporation  
Data Design Corporation  
Datastream Conversion Services, LLC  
Dawn Crest Farm LLC  
DeJarnette Research Systems, Inc.  
DEKU Enterprises, Inc.  
Delmarva Foundation for Medical Care, Inc.  
Denro, Inc.  
Deus Technologies, Inc.  
Diagnostic SERS Inc  
Differential Dynamics Corporation  
Digena Diagnostics

Digital Technics, LP (formerly Inc.)  
DoCom, LLC  
Dovetail Technologies, Inc.  
Dresser Industries, Inc.  
DYAD Pharmaceutical Corporation  
Dynaflow, Inc.  
E-Doc  
E.G. & G. Pressure Science  
Earth Networks  
Eastern Analytical, Inc.  
ECO Atlantic, Inc.  
EcoEmergence Corporation  
EDVOTEK  
Elliott Machine Corporation  
Emerald Sky Technologies LLC  
Emergent ImmunoSolutions  
EncorePath, Inc.  
Energy Concepts Co., LLC  
Energy Generation Technologies  
EntreMed  
Enviracare Corporation  
Epitaxial Technologies, LLC  
Epoch Engineering, Inc.  
Espro, Inc.  
Essex Corporation  
Excalibur Acquisition Corporation  
Fairchild Controls Corp.  
Feature Flooring Products Inc  
FiberCell Systems, Inc.  
Fiberlight LLC  
Fish Pro Grow LLC  
Fitness Corporation of America  
Five Aces Breeding LLC  
FLAVORX INC  
Fleetro, Inc.  
Fleld  
Flexible Medical Systems, LLC  
Fluid Motion LLC  
Foligo Therapeutics, Inc.  
Food Instrument Corporation  
Foss NIRSystems, Inc.  
Freewing Aerial Robotics Corporation  
Fusion Systems  
Fuzien Technology Institute  
Fyodor Biotechnologies, Inc.  
Gamma Engineering Corporation  
General Electric Information Services  
Genex Corporation  
Genex Technologies, Inc.  
Genovation Cars Inc  
GenVec Inc  
Gerace Combustion Transistor Lic, Inc.  
GIS-USA, Inc.  
Gliuknik Inc.

Global Outpost, Inc.  
Global Resource Recyclers, Inc.  
Global Systems and Technology Corp.  
GlycoPure, Inc.  
Gordon Shellfish  
Gould, Inc.  
Great Game Products  
Green Eyes LLC  
Green's Branch Trout Farm  
GreenSpaces, Inc.  
GreenStone Industries  
GSE Power Systems, Inc.  
Guardian Scientific  
Guilford Pharmaceuticals, Inc.  
Haas Tailoring Company  
Hardlaw Software, Inc.  
HeMemics Biotechnology, Inc.  
High Impact Environmental Inc.  
Hollywood Oyster Company, LLC  
Hooper Island Oyster Aquaculture Company, LLC  
Horizon Resources Corporation  
Hosho-Somerset Corporation  
HT Medical Systems, Inc.  
Hughes Network Systems  
HY-TEK Bio, LLC  
Hyperion Technologies  
Hyrock Aquaculture Farm, Inc.  
IBG, Inc.  
iBiquity Digital Corporation  
IGENE Biotechnology, Inc.  
Imaginil Technology, LLC  
Imperium, Inc.  
In Vitro Technologies, Inc.  
Industrial Quality, Inc.  
Infinite Biomedical Technologies, Inc.

+280 more Maryland  
companies



# Maryland Industrial Partnerships (MIPS)

*Matching grants for collaborative R&D projects between Maryland companies and University System of Maryland faculty to accelerate product commercialization*

**6,600**

Current, direct  
jobs created

**\$30 billion**

Revenue from top MIPS-  
supported products

**\$87 million**

Annual tax revenues to the  
state from MIPS companies

**15,000**

Total jobs  
supported

**500+**

Maryland companies  
have used MIPS to  
develop products through  
700 projects

**\$70 million**

Annual tax revenues to  
counties from MIPS  
companies

**35 to 1**

Return on  
investment, per  
dollar, to the state

**87%**

MIPS-funded startups still  
in business five years later

**63%**

Of ALL MIPS-funded startups  
still in business since 1987



# Mtech Impact

## ⇔ *Company/University Connections*

**6,600**

Direct jobs created  
through the MIPS  
program

**\$31 billion**

Revenue from top  
MIPS-supported  
products

**1,500**

Contract research projects  
conducted for Maryland  
biotechnology companies

**13**

Countries represented  
by companies in the  
Maryland International  
Incubator

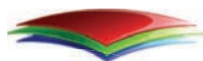
**39**

Companies from other countries  
have established operations in  
the Maryland International  
Incubator since 2006

**500+**

Maryland companies have  
used MIPS to develop  
products through 700 projects

Current Mtech Connect companies you should be aware of:



FLEXEL



**Remedium**  
TECHNOLOGIES

**VisiSonics**  
As Good as Being There!

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