Agenda Item 4

Maryland Technology Enterprise Institute (Mtech) – Entrepreneurship Programs and Initiatives
**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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<th>COMMITTEE RECOMMENDATION:</th>
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SUBMITTED BY: Joseph F. Vivona (301) 445-2783
Committee on Economic Development and Technology Commercialization

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

November 19, 2015
Maryland Technology Enterprise Institute (Mtech)

Peter Sandborn
University of Maryland

November 2015
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 (MI²)
- Technology Ventures Building
- Mtech Baltimore
Incubators

- **TAP – First-stage incubator**
  - 24,000 ft² 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 ft² of company space
  - 13 current residents

- **MI² – International incubator**
  - 9,200 ft² 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:

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

VisiSonics

As Good as Being There!
Technology Advancement Program (TAP) Incubator: Selected Graduates

Two $1 billion+ graduates
Both still employ hundreds in Maryland

**paice**
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

**pixelligent**
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

**neuralstem inc.**
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

**powerize.com**
Sold to Hoover’s for $17 million

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

**novascreen biosciences corporation**
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

Today:
• Moved to larger dedicated facility in the University’s innovation district (2015)

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

CEO Hired: Bob Proctor
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 (MI²)

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

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 Oilite Petroleum Technology LLC
Beijing Rechand 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 Wanjri Technologies
Ningbo Daifenghe 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**
Gigaspaces

**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 MI²

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

<table>
<thead>
<tr>
<th>6,600</th>
<th>$30 billion</th>
<th>87%</th>
<th>35:1</th>
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</thead>
<tbody>
<tr>
<td>Direct jobs created through the MIPS program, impacts created 15,000 jobs</td>
<td>Revenue generated from MIPS products</td>
<td>Five-year survival rate for startups receiving MIPS funding</td>
<td>ROI on MIPS funding</td>
</tr>
<tr>
<td>$87 million</td>
<td>$70 million</td>
<td>63%</td>
<td></td>
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<tr>
<td>Annual state tax revenue</td>
<td>Annual county tax revenue</td>
<td>Startups still in business that received MIPS funding since 1987</td>
<td></td>
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</table>
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

**Life’s DHA, by Martek (Columbia)**
Nutritional oils, especially DHA, found in 90% of infant formulas, many other foods

**HughesNet, by Hughes Network Systems (Germantown)**
World’s leading provider of satellite broadband for home and office

$13.6 billion

$2.9 billion

$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

<table>
<thead>
<tr>
<th>Level</th>
<th>Programs and Courses</th>
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<tbody>
<tr>
<td><strong>Middle School</strong></td>
<td>• Young Scholars Discovery summer program for 7&lt;sup&gt;th&lt;/sup&gt; - 8&lt;sup&gt;th&lt;/sup&gt; grade</td>
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<tr>
<td></td>
<td>• 1 non-credit course for middle school students</td>
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<tr>
<td><strong>High School</strong></td>
<td>• Young Scholars Program for 9&lt;sup&gt;th&lt;/sup&gt; - 12&lt;sup&gt;th&lt;/sup&gt; grade</td>
</tr>
<tr>
<td><strong>UM Freshmen &amp; Sophomores</strong></td>
<td>• Entrepreneurship &amp; Innovation Living-Learning Program (EIP)</td>
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<td></td>
<td>• Minor in Technology Entrepreneurship</td>
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<td></td>
<td>• 9 courses at the 100- and 200-levels</td>
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<tr>
<td><strong>UM Juniors &amp; Seniors</strong></td>
<td>• Hinman CEOs Living-Learning Program</td>
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<tr>
<td></td>
<td>• Impact Seed Fund</td>
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<tr>
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<td>• 9 courses at the 400-level</td>
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<td></td>
<td>• BioE Capstone class connected to UMB</td>
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<tr>
<td><strong>Graduate Students</strong></td>
<td>• 4 MOOCs with Coursera in entrepreneurship and innovation</td>
</tr>
<tr>
<td><strong>and Professionals</strong></td>
<td>• Online Master’s of Professional Studies in Technology Entrepreneurship</td>
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</tbody>
</table>

- 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.

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.

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

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

$643M/year

Annual Value ($)
UMCP Value

Zoomed in from previous slide

- State Revenue
- UMCP Revenue
- Value to Companies

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

**Entrepreneurship Education**

**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

20-30
Entrepreneurship courses offered EVERY SEMESTER

1,000
Average enrolls in undergraduate and graduate entrepreneurship courses 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.

+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**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,600</td>
<td>Direct jobs created through the MIPS program</td>
</tr>
<tr>
<td>$31 billion</td>
<td>Revenue from top MIPS-supported products</td>
</tr>
<tr>
<td>1,500</td>
<td>Contract research projects conducted for Maryland biotechnology companies</td>
</tr>
<tr>
<td>13</td>
<td>Countries represented by companies in the Maryland International Incubator</td>
</tr>
<tr>
<td>39</td>
<td>Companies from other countries have established operations in the Maryland International Incubator since 2006</td>
</tr>
<tr>
<td>500+</td>
<td>Maryland companies have used MIPS to develop products through 700 projects</td>
</tr>
</tbody>
</table>

Current Mtech Connect companies you should be aware of:

- Flexel
- REDOX
- Remedium Technologies
- VisiSonics
- OmniSpeech