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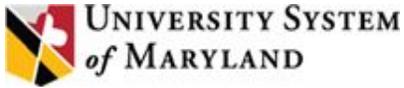
OFFICE OF VICE CHANCELLOR FOR ECONOMIC DEVELOPMENT

Board of Regents
Committee on Economic Development and Technology Commercialization
UMUC – Chesapeake Ballroom, Salon A

October 11, 2018
12:30 -2:00 PM

Public Agenda

- 1) [USM Featured Startup: NextStep Robotics – Brad Hennesie, CEO](#)
- 2) [MD Technical Internship Program — Caroline Baker, UMBC Asst. VP for Careers & Corporate Partnerships and Christine Routzahn, Director, UMBC Career Center](#)
- 3) [USM Economic Development Update — Tom Sadowski, Vice Chancellor](#)
 - a. Momentum Fund
 - b. Excel Maryland
 - c. Workforce Development Initiatives
 - d. USM IP policy update
 - e. Regional Institutional Strategic Enterprise (RISE) Zone
 - f. USM Innovation Metrics/Dashboard Development



BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION
INFORMATION OR DISCUSSION

TOPIC: USM Featured Startup – NextStep Robotics

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Thursday - October 11, 2018

SUMMARY: NextStep CEO Brad Hennesie will present on the company’s new medical device, developed at University of Maryland, Baltimore (UMB) that treats foot drop experienced by recovering stroke victims. The company is a recent recipient of USM Momentum Fund investment.

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

FISCAL IMPACT: There is no fiscal impact

CHANCELLOR’S RECOMMENDATION: n/a

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Tom Sadowski (410) 576-5742





THE PROBLEM

Clinics have no treatment option for foot drop

**5,000,000
stroke
survivors in the
U.S.**

**800,000
strokes in the
U.S. per year**

**30% have
mobility
disability due
to foot drop**

THE SOLUTION



6- weeks of Robotic Assisted Training



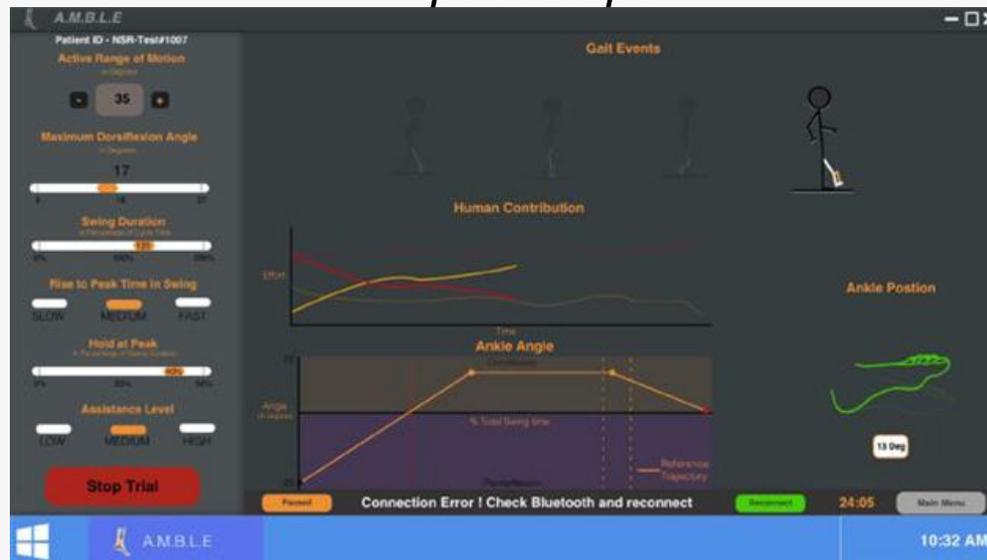
- Customized and Adaptive
- Assist as Needed
- 4 Positive Clinical Trials, 5th Underway



THE SOLUTION

Embed Control System

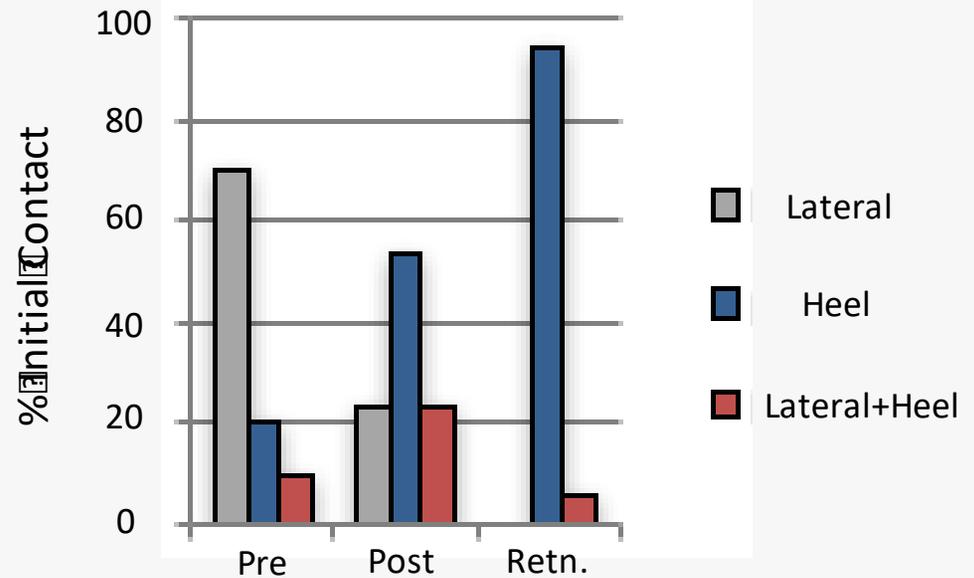
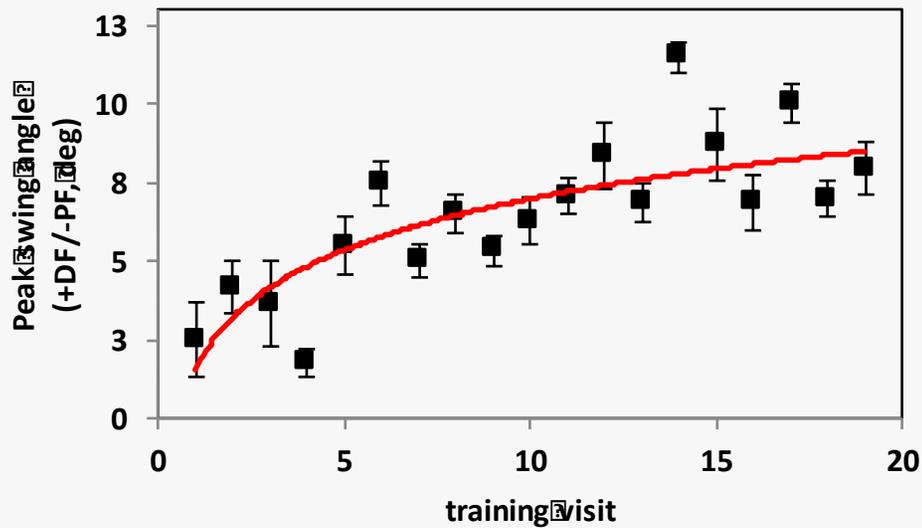
Create real time automatic adjustments based on set number of past steps



- Consulted with 12 therapists on key parameters to adjust in real time
- Created multi faceted adjustment tools that provides cause-and-effect visual



THE SOLUTION



- Continued improvement 6 weeks after training
- Randomized study average 3.5 yrs post stroke
- 85% discarded or downgraded their assistive device



CUSTOMERS

- **Physical Therapy Clinics:**
 - 123,500 in the US
- **Assisted Living Facilities:**
 - 30,000 in the US
- **VA Healthcare System**
 - 1,200 Facilities

No FDA needed
to sell the
device, or for
PT
reimbursement

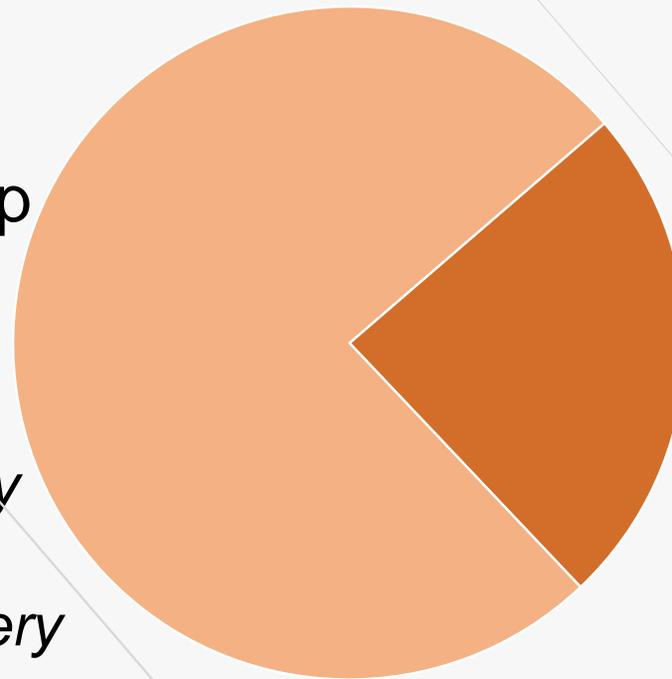
TAM & TARGET STROKE MARKET (US ONLY)



All PT Facilities TAM: \$3.5B

Other Causes of Foot Drop

- *MS*
- *Parkinson's Disease*
- *Diabetic Neuropathy*
- *Spinal Stenosis or Surgery*
- *Cerebral Palsy*
- *Orthopedic Injury or Surgery*
 - *700K Knee replacements/year*
 - *300K Hip replacements/year*



**Stroke Alone:
\$930M**

COMPETITION

Rehabilitation Robotics

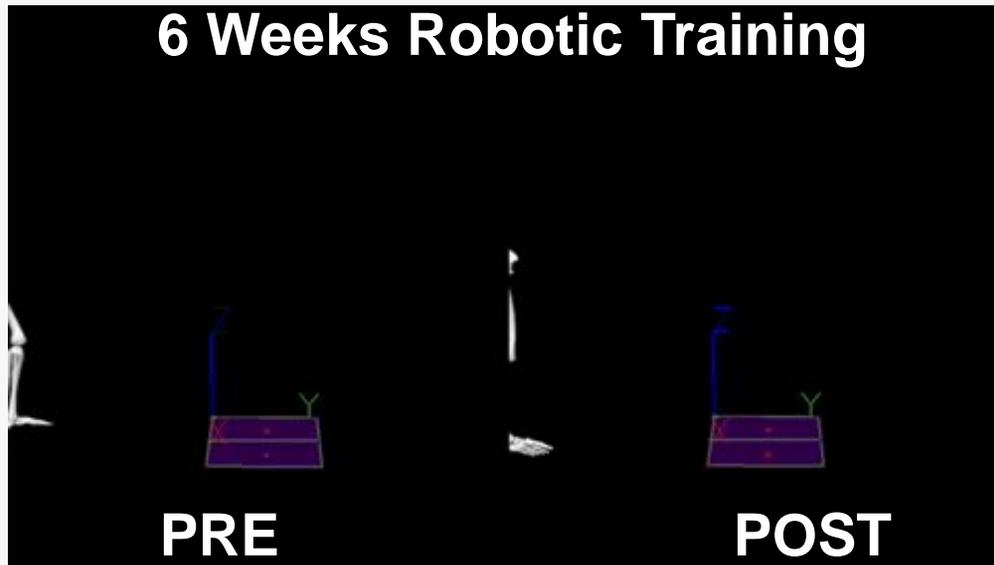
	 -97% since 2014 IPO	 -98% since 2015 IPO	 -87.5% since 2014 IPO	
Adaptive Control System	NO	NO	NO	YES
Business Model	B2C	B2C	B2C	B2B, B-D-B
Clear Reimbursement Path	NO	NO	NO	YES
Clinically Efficacy	NO	NO	NO	YES

COMPETITION

Functional Electronic Stimulation (FES):



6 Weeks Robotic Training



Intellectual Property



- **Adaptive control system**
 - *Patent Issued – April 2018*
- **Portable ankle robot**
 - *PCT Filed – June 2016 (in national phase)*
- **Command-and-control software interface**
 - *US Copyright Issued - Nov. 2013*

THE TEAM



Brad Hennessee
MHA, MBA

Chief Executive Officer



Richard Macko
MD

Chief Scientific Officer



Anindo Roy
PhD

Chief Technology Officer



Larry Forrester
PhD

Resident Scientist



Gil Blankenship
PhD

Partner



Amar Vamsi Krishna, MS
Device Engineer
UMCP 2018

NEW MEMBERS

Ranye Mclendon
Engineering Intern
UMBC Sophomore
nPower Grad.



Suchitra Chanda
MS
Device Engineer
Perdue 2017



Chris Chornay, BS
Device Engineer
UMCP 2018

FUNDING



- **\$1.14M Raised to Date**
 - \$125K Early Co-Founder funding
 - \$265K from Technology Development Corporation
 - \$250K from the Maryland Momentum Fund
 - \$500K Private Convertible Debt
- **\$5.4M in pending non-dilutive submissions**
 - NIH NINDS U44 grant submitted June 2018
- **Maryland Bio-Tech Tax Credit Eligible**
 - Investors can get 50% of investment back from the state of MD.

FINANCIALS



(in \$000's)	2018	2019	2020	2021	2022	2023
Total Revenue	0	1400	8280	19040	42000	60500
Cost of Goods Sold	0	800	4085	8500	17480	23130
<i>Distributor Costs (robot sales only)</i>	0	600	3,000	6,000	12,000	15,000
Gross Profit	0	1,200	7,195	16,540	36,520	52370
Total Operating Expenses	900	3000	4250	7000	8500	12000
EBITDA	900	2400	55	3540	16020	25370
<i>Series A</i>	0	3,500	0	0	0	0
Minimum cash balance	80	2,080	2,025	5,565	21,585	46,955

EBITDA Positive after 3 Years

NEXTSTEPS



- **Looking to raise \$3-5M 2019 Q1**
 - Small FDA clinical trial and team building
- **Finalize commercial design**
- **Strategic partnerships for distribution and sales**
 - Key in the PT space
 - In advanced talks with Innovative Neurotronics/Hanger
- **Develop sales and marketing team**
 - Supplemental to distribution partnership
- **FDA Phase II clinical trial**
 - Q-Sub meeting on 9/10 - predicate device approved

FUTURE DIRECTIONS



Upper Extremity Trainer

- Low entry price point <\$5,000
 - Passive trainer
- Additional upgrade for \$3,000/side
 - Actuated arm with our proprietary control system



NeuroRehab Clinic

- Lack of options for neuro recovery
- Generate revenue immediately
- Showcase for our devices
- Keep it close to UMB to allow access and demos for PT students



THANK YOU

(CONTACT INFO)



Email: Brad.Hennessee@NextStepRobo.com

Web Site: www.NextStepRobo.com

Phone: 443-543-6950

300 W. Pratt St. Suite 200
Baltimore, MD 21201



**Maryland
Development
Center**



Maryland
Momentum
Fund





BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION
INFORMATION OR DISCUSSION

TOPIC: Maryland Technology Internship Program

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Thursday - October 11, 2018

SUMMARY: UMBC's Career Center representatives will present on a new internship program administered by UMBC, which was recently funded by the Governor Hogan Administration. The program was launched in August of 2018 and offers subsidized internships to students from Maryland institutions with Maryland-based companies.

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

FISCAL IMPACT: There is no fiscal impact

CHANCELLOR'S RECOMMENDATION: n/a

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Tom Sadowski (410) 576-5742

MARYLAND TECHNOLOGY INTERNSHIP PROGRAM



University System of Maryland

Board of Regents

Committee on Economic Development &
Technology Commercialization

MTIP Presentation

October 11, 2018



Hello & Introductions



- Caroline Baker
Assistant Vice President for Careers and
Corporate Partnerships
cbaker@umbc.edu



- Christine Routzahn
Director, UMBC Career Center
and Lead for MTIP
routzahn@umbc.edu



- Annie Weinschenk
Assistant Director, MTIP
anniew@umbc.edu



MTIP History

Goal: To help Maryland retain top talent by increasing the number of paid technical internships offered in the state.

- In 2014, HB 1317 – establishing MTIP – was introduced and passed unanimously. No funding was allocated to launch the program.
- In 2018, HB 527 – amending HB 1317 – was introduced and passed unanimously. The Governor’s FY19 budget included \$340,000 to launch the MTIP program.

“MTIP meets both a vital educational and economic need in our state.” – Del. Sandy Rosenberg



MTIP Facts

- Administered by UMBC and open to students/graduates from across the State, MTIP supports technology-based businesses, and state and local agencies.
- Employers may be reimbursed up to 50% of an intern's wages and up to \$3,000 annually per intern.
- \$225,000 is available in FY19 to support eligible internships.
- Half of MTIP's internship funds are reserved for businesses with fewer than 150 employees.



Why Internships?



What Employers Want Most

In your opinion, what talent, knowledge or skills should higher education institutions develop in students to best prepare them for success in the workforce in the coming years?

#1

INTERNSHIPS/ON-THE-JOB EXPERIENCE

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The complex block contains a photograph of a woman and a man in a professional setting, looking at documents on a desk. The woman is pointing at a document while the man writes. To the right of the photo is a dark grey panel with white and green text. The text asks what skills higher education should develop, and the answer is "#1 INTERNSHIPS/ON-THE-JOB EXPERIENCE". At the bottom of the panel, there is a small number "15", a copyright notice for Gallup, and the Gallup logo.



Why Internships?

- Increase Productivity
- Support students
- Develop a strong talent pipeline

*46% = Average national conversion rate from intern to full-time hire
(2018 Internship & Co-op Survey Report, NACE)*

More than half of UMBC graduates reporting full-time employment at graduation accepted positions at organizations where they previously worked or interned.
(2017 UMBC Graduating Student Survey)



MTIP Status Update

(as of October 8th)

- Applications went live on Aug 17, 2018
- 78 applications received
- 73 applications accepted
- 90% approved applications are from businesses with fewer than 150 employees.
- 34 students from 10 MD institutions have been matched with MTIP internships thus far
- 61% of accepted applicants reported that the MTIP funding helped to create a new internship



MTIP Outreach Activity

Presentations

- Maryland Business Incubator Association (MBIA) Meeting
- Towson University Pre-Fair Employer Event
- Economic Impact Committee at UMD College Park
- Maryland Career Consortium Board Meeting

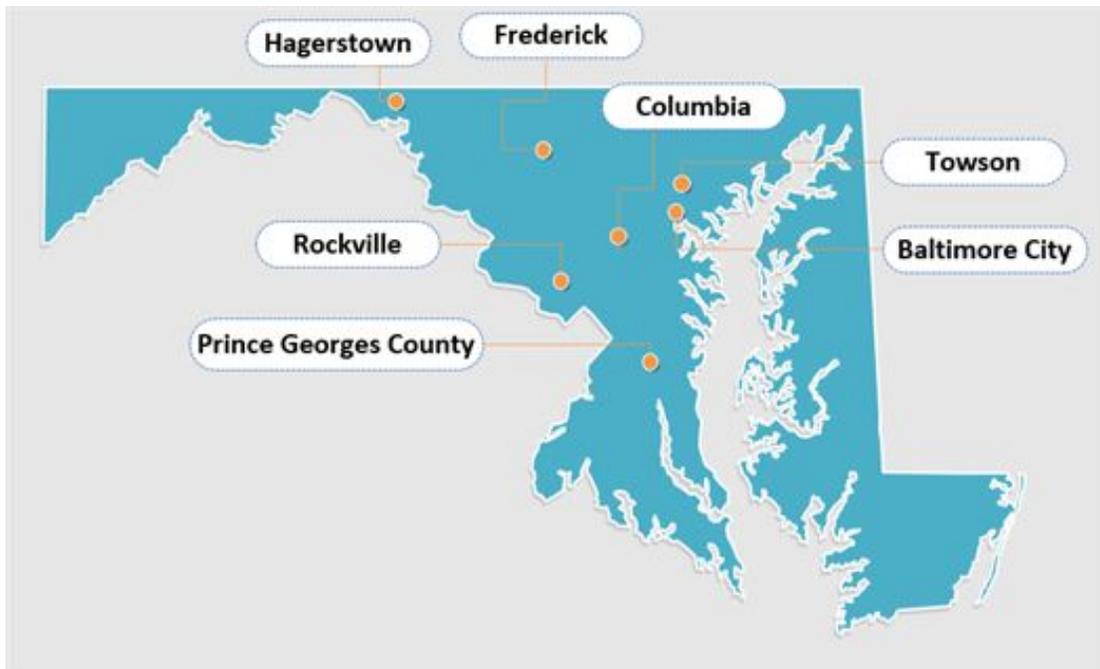
Events

- Biotech Conference
- EdTech
- Moco Tech Symposium
- Cyber Maryland
- Hire Bmore
- T. Rowe Price Innovation Series
- Waterfront Tech Series

Upcoming Events: Allegany College, Hagerstown Community College, etc



Sample of MTIP Employers



mtip.umbc.edu

[Que Technology](#)

[Percival Engineering](#)

[Scientific Systems and Software](#)

[Track Off](#)

[Athena Environmental Sciences](#)

[BaltiVirtual](#)

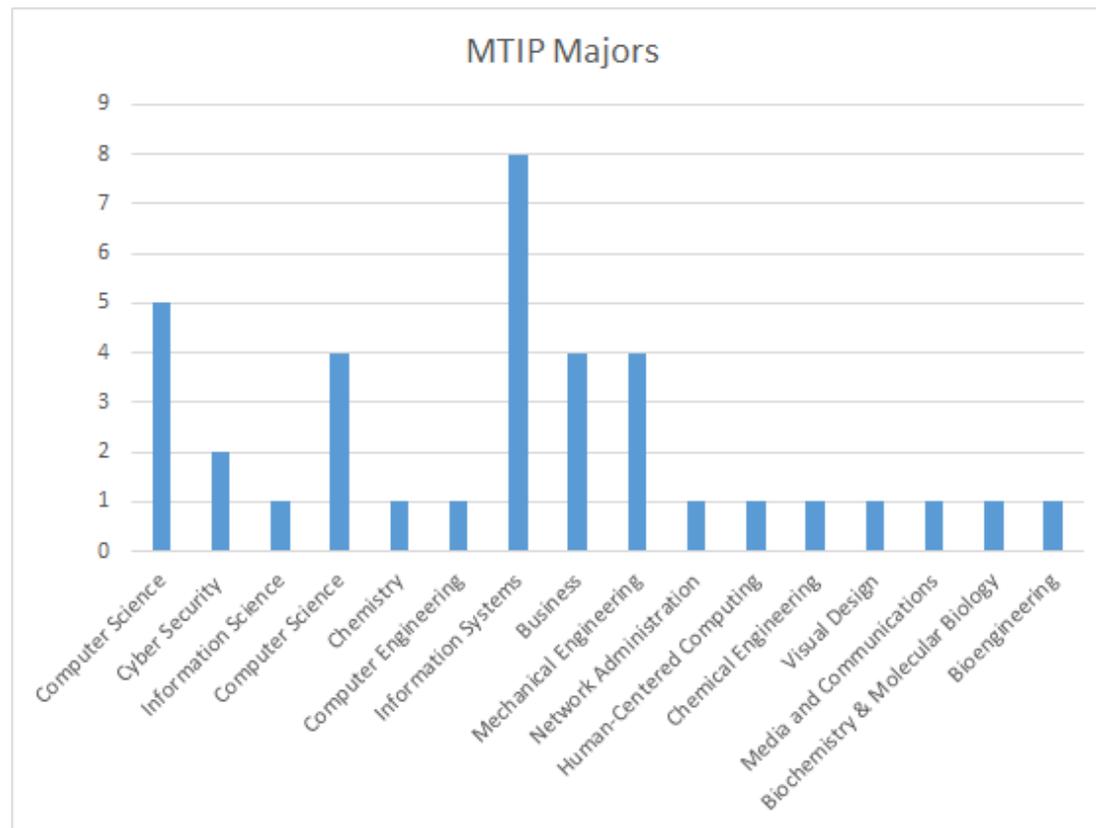
[Vectorworks](#)

[MindGrub](#)

[Min Engineering](#)



Interns' Fields of Study





Guest Student Testimonial



- Michael Gorham, Senior, Mechanical Engineering
- Min Engineering - Engineering Intern
- MTIP Participant



Sample Data Being Tracked

- Demographics of Participating Interns
- Industry & Geographic Representation of Employers
- Conversion of Interns to Full Time Hires

MARYLAND TECHNOLOGY INTERNSHIP PROGRAM



QUESTIONS?

Contact Information

- Annie Weinschenk
- 410-455-8783
- anniew@umbc.edu
- @MDTechInterns



BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION
INFORMATION OR DISCUSSION

TOPIC: USM Office of Economic Development Update

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Thursday - October 11, 2018

SUMMARY: Vice Chancellor Sadowski will provide an update of activities of the Office of Economic Development including the USM Momentum Fund, key workforce development initiatives, partnership activities to include Excel MD and Army Research Lab partnership, placemaking legislation and policy updates designed to fuel greater industry and government collaboration.

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

FISCAL IMPACT: There is no fiscal impact

CHANCELLOR'S RECOMMENDATION: n/a

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Tom Sadowski (410) 576-5742

USM Economic Development

*Briefing for Economic Development & Tech
Commercialization Committee*

October 11, 2018



MomentUM Fund

Activity to Date

11 companies presented to the Advisory Board over the first five quarters, more than **150** companies counseled to date:

- **3** have been invested in by Momentum
- **3** closed rounds without Momentum;
 - 2 were cyber companies with out-of-state VC commitments
- **1** was voted down by the Board
- **4** are pending, seeking co-investment with Momentum Fund staff help

Investments To Date

MF Fire (College Park) *\$192.5K invested, \$1.2M round*
World's most advanced wood burning stove

Next Step Robotics (UMB) *\$250K invested, \$750K round*
Exoskeleton robot to reverse foot drop for stroke victims

NAWEC (College Park) *\$350K invested, \$1.4M round*
Advanced pulse jet engine

Total: *~\$800K invested matched with ~\$2.5M from others*
(3:1 match ratio)

Co-Investors: RW Deutsch Foundation, Bunting Foundation,
Abell Foundation, individual angels, high net worth individuals



Funding Rounds in Process

Veralox (UMB) \$500K out of \$4.5M round
Therapeutics for rare blood disorders

CyberCrucible (UMBC bwtech) \$250K of at least \$1.1M round
Cybersecurity product automating detection/remediation of attacks

Zest Tea (College Park) \$350K out of \$1M round
Series of bagged and ready to drink teas with added caffeine

PaverGuide (College Park) \$250K out of \$650K round
Advanced semipermeable pavement system

Potential and Committed Co-Investors: TEDCO, Chesapeake Bay Seed Fund, Lord Baltimore Fund, Fort Capital, 301 Ventures Harvard Business School Angels, University of Vermont Life Sciences Fund, Baltimore Angels, Element 8 Fund, Brown Advisory, Inova Strategic Investments, T1D Fund, various angels.

Workforce

MD Technology Internship Program

- \$225,000 State funding received
- August 2018 program launch
- >50 applications accepted; 20 Students from 8 MD institutions matched with companies thus far

UMBC Training Centers

- In September UMBC TC was advised they had won two significant contracts with the NSA ... both are 5-year contracts:
 - MINDCRAFT \$4-6 Million per year to train NSA/military personnel worldwide
 - SEIGETOWER \$1 Million per year to deliver software development training for NSA personnel nationally

Partnerships

ARL “Army Artificial Intelligence Institute”

- Planning underway for new hub at Aberdeen Proving Ground (APG) specializing in High performance computing, AI, autonomous Technology, machine learning
- ARL interested in USM as academic partner
- Federal funding for infrastructure and planning being determined

EXCEL Maryland

- Working with Governors Office on legislative approach and initial project funding
- USM working with institutional partners and JHU to develop project proposals for funding consideration
- Industry leadership being marshalled to drive initiative

Place Making

Regional Institution Strategic Enterprise (RISE) Zone

- Working with Dept of Legislative Services on enhancement to RISE Program to offer direct to incentives to desired startups and small business tenants
- Towson University Application pending; Shady Grove and Bowie State projects in planning phase
- \$3 to 5 million State funding sought for initial implementation

Culture

IP Policy Updates

- Working with USM institutions to determine need for changes to USM IP policies or development of institution-specific IP policies (ala. UMCP)
- Reviewing patent trolling protection practices

USM Performance Metrics/Dashboard

- Towson's Regional Economic Studies Institute (RESI) surveying USM institutions and revising how we measure/articulate our venture creation and innovation success
- Using national best practices as model
- Development of initial on-line reporting platform projected year-end 2018, with launch in Spring of 2019