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 Hennessie, 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
TOPIC: USM Featured Startup – NextStep Robotics

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Thursday - October 11, 2018

SUMMARY: NextStep CEO Brad Hennessie 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

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
• 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
<table>
<thead>
<tr>
<th>Adaptive Control System</th>
<th>-97% since 2014 IPO</th>
<th>-98% since 2015 IPO</th>
<th>-87.5% since 2014 IPO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Reimbursement Path</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Clinically Efficacy</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>
COMPETITION

Functional Electronic Stimulation (FES):

6 Weeks Robotic Training

PRE POST
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 Hennessie
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

Suchitra Chanda
MS
Device Engineer
Perdue 2017

Ranye Mclendon
Engineering Intern
UMBC Sophomore
nPower Grad.

Chris Chornay, BS
Device Engineer
UMCP 2018

NEW MEMBERS
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

<table>
<thead>
<tr>
<th>(in $000's)</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Revenue</strong></td>
<td>0</td>
<td>1400</td>
<td>8280</td>
<td>19040</td>
<td>42000</td>
<td>60500</td>
</tr>
<tr>
<td><strong>Cost of Goods Sold</strong></td>
<td>0</td>
<td>800</td>
<td>4085</td>
<td>8500</td>
<td>17480</td>
<td>23130</td>
</tr>
<tr>
<td><strong>Distributor Costs (robot sales only)</strong></td>
<td>0</td>
<td>600</td>
<td>3,000</td>
<td>6,000</td>
<td>12,000</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Gross Profit</strong></td>
<td>0</td>
<td>1,200</td>
<td>7,195</td>
<td>16,540</td>
<td>36,520</td>
<td>52,370</td>
</tr>
<tr>
<td><strong>Total Operating Expenses</strong></td>
<td>900</td>
<td>3000</td>
<td>4250</td>
<td>7000</td>
<td>8500</td>
<td>12,000</td>
</tr>
<tr>
<td><strong>EBITDA</strong></td>
<td>900</td>
<td>2400</td>
<td>55</td>
<td>3540</td>
<td>16020</td>
<td>25,370</td>
</tr>
<tr>
<td><strong>Series A</strong></td>
<td>0</td>
<td>3,500</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Minimum cash balance</strong></td>
<td>80</td>
<td>2,080</td>
<td>2,025</td>
<td>5,565</td>
<td>21,585</td>
<td>46,955</td>
</tr>
</tbody>
</table>

**EBITDA Positive after 3 Years**
NEXT STEPS

- 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.Hennessie@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
Fort Capital
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
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
GALLUP
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

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
QUESTIONS?

Contact Information

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