Board of Regents
Committee on Economic Development and Technology Commercialization

December 2, 2020
Virtual (public listen only access at 443-353-0686, Conference ID: 265 085 306)
Committee Members will be sent Zoom information

Public Session Agenda

(1) Featured Start-Up: Aeon Technologies – Kimberly Brown, CEO (Information Item)

(2) Global Pandemic Prevention and Biodefense Center & BioHealth Capital Region Update and COVID Response – Rich Bendis, President & CEO of BioHealth Innovation, Inc. (Information Item)

(3) USM Office of Economic Development Update – Tom Sadowski, Vice Chancellor for Economic Development (Information Item)
   a. USM BioHealth Perspective
   b. COVID-19 Task Force Activity
   c. Good News: Recent Rankings
TOPIC: Featured Startup: Aeon Technologies

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Wednesday, December 2 2020

SUMMARY: Mr. Al Delia, vice president for Regional Development and Engagement at Frostburg State University will introduce Dr. Kimberly Brown, CEO of Aeon Technologies and Amethyst Technologies. Mr. Delia has facilitate engagement between Frostburg State University and Dr. Brown and Aeon Technologies. Dr. Brown will share information about both firms, which are connected to USM. Dr. Brown, who received her PhD from UMBC, founded Amethyst Technologies in 2006. As a graduate of bwtech@UMBC, the company has experienced great growth. It provides global health services and has worked for federal and private clients. In March of 2020, Dr. Brown and partners formed Aeon Technologies in Frostburg, Maryland. Dr. Brown is appointed as Adjunct Professor in Frostburg State University’s Department of Chemistry to provide laboratory training for students, establish research programs, and global health collaborations with universities in Africa. Before COVID-19, the plan was to expansion analytical testing for commercial, food/beverage, pharmaceutical, and environmental sectors with pilot scale GMP pharmaceutical manufacturing and research. Aeon pivoted to respond to COVID-19 and opened a clinical lab in April of 2020 to provide testing and is innovating to provide other solutions to the pandemic for skilled nursing facilities. Future plans include partnering with Frostburg State University to establish an analytical laboratory and pilot scale pharmaceutical manufacturing facility in the first quarter of 2021.

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
Leveraging Global Health Expertise and University of Maryland Linkages to Expand During the COVID-19 Pandemic

Kimberly Brown PhD

December 2020
Amethyst Corporate Profile- UMBC Incubator Graduate Company Founded 2006

Kimberly Brown, Ph.D., CEO and Founder

UMCP Graduate PhD Chemical Engineering 2005

- Intern for Small Business at Walter Reed Army Institute of Research; Purchased Rights to Government Contract from Employer after 9 years

- Incubator Company at UMBC Bwtech 2007

- 2007: one employee and one client

- 2020: 50+ Prime Government Contracts including USAID, US Army, Department of State, NIH, FDA, CDC in the US, Tanzania, Kenya, Ghana, Senegal, Iraq and numerous commercial clients

*Located in Baltimore County, MD - Woman, Minority Owned Business - SBA 8(a) graduate*
Integrating Innovation and FDA Compliance to Solve Problems and Improve Processes

- Clinical Trials
- Emerging Infectious Disease Research (BSL-3 and BSL-4 containment labs)
- Drug Development
- Global Health Systems Strengthening
- Quality Centric Data and Analytics
Turn–Key Quality Resources for Personnel

*FDA, WHO, ISO, EU, USDA, USP, and Corporate Standards*

Training Programs
(Competence, Retention, Understanding)

- Documentation
- Material Management
- Medical Diagnostics
- Waste Management
- Quality Control
Turn–Key Quality Resources for Development

- Lab strengthening programs for Correct, Consistent, and Compliant healthcare in Africa
- Quality program development
- Quality system auditing / gap analysis USDA, GCLP, GMP, GCP, GLP, WHO, DOD, ISO
- Vaccine production capacity building
- Records management/ archiving for laboratories
- ICT and eHealth Systems
- Contact Tracing and Index Testing
Turn–Key Quality Services

- Validation for Processes, Equipment, and Software
- NIST–traceable Equipment Calibration
- Environmental monitoring and Building Automation system management, calibration, and validation
- Commissioning and Qualification for Clean Rooms, HVAC systems, High Purity Utilities
- Development of Sterilization Assurance Programs
Vaccine Manufacturing – managed process, assay, equipment, and software validation program for sterile vaccine production to FDA standards

Biodefense – implemented initial QA program, developed the laboratory records archive program, qualified storage programs for select agents, implemented training, developed laboratory transition program

US Army Medical Research Institute of Infectious Diseases – quality assurance services to support FDA compliant clinical studies for Ebola and other infectious diseases
Problem: US Army had a failed clinical trial due to inaccurate malaria diagnostics

Managed Malaria Program (2008–2016)
- Improved the quality of diagnostics at 21 hospitals and healthcare facilities
- Trained 1000 technicians
- Created Centers of Excellence Laboratories for HIV diagnostics and malaria diagnostics
Our Work in Tanzania Supporting USAID PEPFAR HIV Program (2016-2020)

- Performed 2,000 Quality Assurance Assessments for PEPFAR funded HIV programs to include hospitals, laboratories, community programs
- Provided evaluation and guidance on opportunities for improvement of HIV services using 30 + indicators for patient treatment, diagnostics, counseling and testing, medication management, community engagement, workload, training, etc.
- Quality Improvement to increase uptake and adherence to quality diagnostics, improve adherence and retention with focus on pediatrics and adolescents, and enhance viral load data for decision making.
Our Work in Kenya Supporting Cancer Diagnostics and Research

- Consultant to Kenyan government to develop a comprehensive cancer center to US standards
- Established consortium of US companies and organizations
- Led the pre-design activities for the cancer center
- Supported an esophageal cancer study with Johns Hopkins
Our Work in Liberia Supporting Ebola

Amethyst volunteered and provided training to health care workers at JFK Hospital and laboratory technicians at National Public Health Reference Laboratory for Ebola outbreak response (August 2014)
Our Work in Iraq Supporting The Department of State

- Provided Independent Verification and Validation for Hospital Quality Assurance Initiatives

- Focus on equipment maintenance and safety to US Standards for radiology, blood banking, and general chemistry

- Assessed Five US Hospitals in Iraq for Laboratory and Diagnostic Compliance – 2017
Aeon Technologies at FSU–Small, Minority Owned Lab with Established Community Partners

- Kimberly Brown PhD–70% 14 years as Amethyst Technologies’ CEO with success

- John Balch–15% ownership, Founder and Owner of Pharmacare Network since 1977 with seven pharmacies, a home medical equipment company, institutional pharmacy, and infusion pharmacy (UM School of Pharmacy Graduate)
  
  http://www.pharmacareofcumberland.com/About

- William Freas Jr.–15% ownership, Founder and Owner of CareVentures since 1990 which owns Flagship Rehabilitation Services; Anchor Rehabilitation Services; CrossRoads Physical Therapy, Rehab 1st Physical Therapy & Rehabilitation, Flagship Pain Management & Rehabilitation and Flagship Healthcare
  
  http://www.flagshiprehab.com/index.html
Aeon Corporate Profile- Located at Frostburg State University

- Allegany County Government Provided Initial Loan in March 2020 to Create 10 Technical Jobs in two years
- Brown appointed as Adjunct Professor in Frostburg State University’s Department of Chemistry to provide laboratory training for students, establish research programs, and Global Health Collaborations with Universities in Africa
- Pre COVID Business Plan: Expansion of UMBC Analytical testing for commercial, food/beverage, pharmaceutical, and environmental sectors with pilot scale GMP pharmaceutical manufacturing and research; Creation of Laboratory Center of Excellence
Aeon Pivoted to Respond to COVID-19
Opened a Clinical Laboratory in April 2020

- Aeon Technologies, LLC provides RT PCR COVID-19 testing that focuses on providing accurate results within 4–24 hours with our team of 8 using Thermo Fisher Quant 6 and Quant 12 Flex platforms with a King Fisher for automated extraction.

- Aeon’s current clients include Frostburg State University, Allegany County Government, numerous nursing homes in Western Maryland, Private Schools in Washington DC, and the Private Sector in Cumberland.

*CLIA and Maryland Department of Health Accredited for High Complexity Testing in Three Months*
Providing Solutions to Skilled Nursing Facilities

- Weekly diagnostic services for both staff and residents. With the ability to process private pay, Medicare, Medicaid, and uninsured payments, and utilizing an online portal for ease of ordering and reporting with 24 hours turnaround.

- Aeon partnered with our existing pharmacy partner, Pharmacare Network, to collect samples and distribute supplies up to twice per day through leveraging existing pharmacy distribution logistics. This incorporation of test collection into existing business processes saved time for nursing homes and reduced costs.

"Aeon's professionals are friendly, knowledgeable, and helpful during these difficult times. They offer a personal touch to their services. I would recommend them without hesitation."

-Kim, Director of Nursing
COVID-19 PCR Testing: Supporting FSU

Serving Institutions of Higher Education

- With many institutions of higher learning scrambling to find solutions in order to safely conduct in-person instruction, Frostburg State University turned to Allegany County Government to assist. Aeon Technologies bid and secured a contract to provide 1600 COVID-19 diagnostic tests for students and faculty members in the Fall of 2020.

- Aug 2020: Aeon provides a one-stop testing operation model that includes: project management, administrative support, supplies, Pharmacare nursing staff for specimen collection, Pharmacare courier services, electronic reporting, and a rapid 24 hour turnaround for testing results.
Future Plans for Aeon

- Expanding our current COVID Testing capacity from 1200 to 2400 per day with our newly purchased equipment

- Future testing services include toxicology, pharmacogenomics, urinary tract infections, additional infectious diseases, and respiratory panels beginning in January 2021

- Partnership with Frostburg to establish an analytical laboratory and pilot scale pharmaceutical manufacturing facility, First Quarter 2021
Contact

Kimberly Brown PhD

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kabrown@amethysttech.com
TOPIC: Global Pandemic Prevention and Biodefense Center & BioHealth Capital Region Update and COVID Response

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Wednesday, December 2 2020

SUMMARY: USM is the lead academic partner on the Global Pandemic Prevention and Biodefense Center, initiated by the COVID-19 Strategic Renewal Task Force of Connected DMV. Connected DMV is a charitable 501(c)(3) organization that creates and delivers initiatives together with government, industry, academia, and community interests to the benefit of DMV residents and visitors. Rich Bendis, President & CEO of BioHealth Innovation, Inc., is a member of the Strategic Renewal Task Force and will present information on the Center, in addition to an overview of the BioHealth Capital region and COVID Response.

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
Maryland BioHealth Update
&
Global Pandemic Prevention and Biodefense Center:
An Opportunity to Lead

Presentation to USM Regents Committee on Economic Development & Tech Commercialization
Rich Bendis, President & CEO, BioHealth Innovation
December 2, 2020
Top 10 U.S. Biopharma Clusters

Ranking Based on Five Criteria:

1. NIH Funding
2. Venture Capital Funding
3. Patents
4. Lab Space
5. Jobs

- Maryland ranked #4 in JLL Life Science Cluster Rankings
- Maryland ranked #4 in Milken State Technology & Science Index

- 2020

1. San Francisco Bay Area
2. Boston / Cambridge Mass
3. New York/New Jersey
4. BioHealth Capital Region (Maryland / Virginia / DC)
5. San Diego
6. Los Angeles / Orange County
7. Greater Philadelphia
8. Seattle
9. Chicagoland
10. Raleigh-Durham, NC (inc. Research Triangle Park, NC)
Maryland companies account for four of the top eight recipients of Operation Warp Speed funding

Maryland Companies received $6.28 Billion in Warp Speed Funding

Source: JLL Research
Maryland companies have received billions in spending from BARDA’s COVID-19 Medical Countermeasure Portfolio

**Maryland Funding**

$13.3 Billion

44%

**Non Maryland Funding**

56%

### Vaccine Efforts

**Total Spending:** $11.2 B  
**Maryland Spending:** $5.3 B

- **GlaxoSmithKline**  
  Rockville, Maryland  
  $2.1 Billion

- **AstraZeneca**  
  Gaithersburg, Maryland  
  $1.6 Billion

- **Novavax**  
  Gaithersburg, Maryland  
  $1.6 Billion

### Therapeutics

**Total Spending:** $1.2 B  
**Maryland Spending:** $525 M

- **AstraZeneca**  
  Gaithersburg, Maryland  
  $510 M

- **Emergent Biosolutions**  
  Gaithersburg, Maryland  
  $14.5 M

### Diagnostics

**Total Spending:** $219 M  
**Maryland Spending:** $1.2 M

- **Hememics**  
  Gaithersburg, Maryland  
  $638,000

- **Qiagen**  
  Germantown, Maryland  
  $598,200

Source: BARDA, JLL Research  
**GlaxoSmithKline is codeveloping their vaccine via a partnership with Sanofi Pasteur**
Maryland set a record high for NIH funding in 2019, and has already received $1.3 billion YTD from 2,320 awards.

Maryland NIH Funding ($)
VC and grant funding has grown 6x between 2016-2020, already setting a new record high with 2 months remaining.

**Largest Funding Rounds YTD**

<table>
<thead>
<tr>
<th>Firm</th>
<th>Date</th>
<th>Funding Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novavax Gaithersburg, MD</td>
<td>7/7/2020</td>
<td>$384 Million CEPI Grant in support of their COVID-19 Vaccine Candidate</td>
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<tr>
<td>Siranomics Gaithersburg, MD</td>
<td>10/23/2020</td>
<td>$105 Million Series D Venture Capital Round</td>
</tr>
<tr>
<td>OncoImmune Rockville, MD</td>
<td>9/9/2020</td>
<td>$56 Million Series B Venture Capital Round</td>
</tr>
<tr>
<td>Sensei Biotherapeutics Gaithersburg, MD</td>
<td>10/7/2020</td>
<td>$28.5 Million Series A Venture Capital Round</td>
</tr>
<tr>
<td>B.Well Connected Health Baltimore, MD</td>
<td>3/11/2020</td>
<td>$16 Million Series A Venture Capital Round</td>
</tr>
<tr>
<td>ValenzaBio Bethesda, MD</td>
<td>2/14/2020</td>
<td>$14.5 Million Unlabeled Venture Capital Round</td>
</tr>
</tbody>
</table>

*Excludes funding rounds as a product of Operation Warp Speed*

Source: Crunchbase, JLL Research

**Graph Notes:**
- 2016 = $99.9 M
- 2017 = $176.7 M
- 2018 = $565.7 M
- 2019 = $309 M
- 2020 YTD = $659.4 M

*Excludes funding rounds as a product of Operation Warp Speed*
Leasing Activity & Pricing

1) Rents over the last three years have grown by 30%-50% from the $20-$30 range to $30-$40 range depending on property type.

2) Mid-Atlantic is still inexpensive compared to other markets.

3) The top 3 markets are more than double our rents.

4) 2.8% vacancy among the lab real-estate space continues to drop to historic levels.
WE ARE A 501(c)(3) THAT IS:

- Governed by regional leaders
- Breaking down regional silos
- Delivering initiatives and results
- Preparing for the digital age
- Lifting marginalized communities
- Uniting regional organizations
- Gaining momentum
The Cost of Pandemics

The Human Cost is catastrophic, with far too many lives lost.

>1M Global COVID Deaths

The Economic Cost is exorbitant, unsustainable, and crippling to society.

>$10 Trillion Estimated Global Cost of COVID Pandemic

Pandemics are predictable, and future outbreaks are certain.

8 Pandemics since 1900
Our Need & Opportunity

- Inadequate readiness and response coordination fosters uncertainty, chaos, and division
- Bilateral relationships are insufficient across public, private, academia, and community
- Lack of rapidly deployable solutions delays response to pandemic threats
- Innovation has outpaced societal and policy alignment
- Technology has matured to help us anticipate and quickly respond
- Proactive solutions are attainable to forestall massive loss of life and economic upheaval
- Pandemic and biodefense prevention / preparedness / response requires close coordination
- Cross-sector leadership is required; we will continue to chase pandemics unless robust, targeted action is taken

We can get in front of global outbreaks with an integrated approach.

US leadership is required.
Our Solution

Define and develop a **Global Pandemic Prevention & Biodefense** Center in Greater Washington to:

- Enable integration across gov’t, industry & academia
- Establish rapid threat identification & infrastructure
- Initiate & accelerate emerging platforms/solutions
- Advance global pandemic policies, partnerships & programs
- Design readiness frameworks for all levels of government
- Gather & develop societal & business best practices
- Identify & address implications for underserved communities

**Essential Elements**
- Global Policy & Program Coordination
- Proactive Initiatives Focus
- Integration Across Sectors

**Focused Outcomes**
- Improved Public Health
- Increased Economic Resilience
- Strengthened Community Sustainability

Proprietary and confidential to Connected DMV.
## Integration: A Necessary Priority

Comprehensive preparedness demands a public-private-academia approach

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Public Health Policy</th>
<th>Basic Research &amp; Discovery</th>
<th>Applied Technology &amp; Pre-Clinical Studies</th>
<th>Clinical Trials (Phases 1/2/3)</th>
<th>Manufacturing</th>
<th>Supply Chain &amp; Distribution</th>
<th>Community Preparedness</th>
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</thead>
<tbody>
<tr>
<td>Federal Government</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>State/Local Government</td>
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<td>Academia</td>
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<td>Philanthropy</td>
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<td>Non-Profits</td>
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<td>Investors</td>
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<td>Biotech</td>
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<td>Health Care</td>
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</table>
By advancing focused initiatives through an integrated model, the Center will:

- **Integrate and coordinate** ongoing functions across the pandemic prevention value chain
- **Originate, enable, and facilitate key initiatives** that advance pandemic preparedness; initially launching AHEAD100
- **Collaborate across** Federal, state, and local governments; industry; academia; civil society; and the diplomatic community
- **Constitute a public-private structure** to complement and support the missions of NIH/NIAID, ASPR/BARDA, DARPA, etc.

### Initiatives-Based Model

#### Initiatives

- Antibodies (AHEAD100)
- Vaccines
- Anti-Viral Drugs
- Theranostics
- Rapid Data Assimilation & Diagnostics
- Advanced PPE
- Eliminating Bio Threats
- Minority Community Resilience

#### Supporting Functions

- Policy & Regulatory Coordination / Advancement
- Research Coordination
- Manufacturing
- Supply Chain & Distribution
- Commercialization
- Advanced Technologies (e.g., Bioinformatics, AI, Quantum)
- Public Preparedness, Education & Training
- Partnerships, Funding & Marketing
Initiative Incubation:

A targeted program that seeks to develop best-in-class neutralizing human monoclonal antibody solutions for the top 100 most likely causes of pandemics

**WHY AHEAD100?**

- **Increased Optionality & Reduced Risk**
  Advances a broad portfolio of antibodies for the widest diversity of pathogens possible vs. a big bet on a single pathogen, which may or may not occur.

- **Speed of Response**
  Develops solutions *ahead* of need, giving government and industry a “warm” stockpile system with readiness for last-mile development when outbreaks occur.

- **Innovation Potential**
  Establishes platforms and techniques for ultra-fast development, with great potential for spin-off IP and applications.

**Development Phases**

- Basic Research & Discovery
- Applied Technology & Pre-Clinical Studies
- Phase 1 Trials

**Estimated Costs**

$2B for 100 top pathogens
Greater Washington Assets

The Region:

- Extensive ecosystem of government, industry, academia, and non-profits
- Home to more than 70 federal labs, 800 life sciences companies, the FDA, NIH/NIAID, ASPR/BARDA, DARPA, NIST, and other critical national biodefense assets
- Leading pharma and biotech industry companies and biohealth incubators
- World renowned academia and research institutions (e.g. University System of Maryland, Johns Hopkins, George Mason, George Washington)
- Global center of non-profits and philanthropy
A cohesive set of leaders is committed to delivering an integrated strategy for pandemic prevention.

**Stu Solomon** (Co-Lead)  **Rich Bendis** (Co-Lead)

**Dr. James Crowe** (AHEAD100)  **Dr. Steve Projan** (Initiatives)

**Hon. Andy Weber** (Biodefense)  **Dr. Richard Tubb** (Federal)

**Dr. Andrew Flagel** (Academia)  **Marty Rosendale** (Technology)

**Jim Traficant** (Industry/Community)  **Burrell Kilmer** (Pgm Mgt)

**Sarah Bauder** (Development)
### Strategy Phase

A 6-month planning phase will fully define the Center’s:

- Scope
- Functions
- Operating model
- Structure
- Goals & outcomes
- Strategic location(s)
- Strategic partner(s)
- Preliminary initiative portfolio
- Operational funding needed and funding model

**First commitments confirmed**

<table>
<thead>
<tr>
<th>Mobilize</th>
<th>Conceptual Design</th>
<th>Launch</th>
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</thead>
<tbody>
<tr>
<td>Nov 2020</td>
<td>Dec 2020</td>
<td>Mar 2021 Jun 2021</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secure funding for 6-month effort</th>
<th>Define requirements</th>
<th>Launch Center and begin developing first initiative(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirm Steering Committee</td>
<td>Research and evaluate other industry initiatives</td>
<td>Formalize partnerships</td>
</tr>
<tr>
<td>Identify and confirm Strategy Team</td>
<td>Confirm Center scope and functions</td>
<td>Establish legal entities</td>
</tr>
<tr>
<td>Identify and confirm lead professional services firm</td>
<td>Refine and confirm mission, goals, and value proposition</td>
<td>Secure funding</td>
</tr>
<tr>
<td></td>
<td>Define governance, operating model, structure</td>
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<tr>
<td></td>
<td>Identify strategic location(s)</td>
<td></td>
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<tr>
<td></td>
<td>Identify strategic partner(s)</td>
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<tr>
<td></td>
<td>Develop initiative evaluation framework</td>
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<tr>
<td></td>
<td>Identify preliminary initiative portfolio</td>
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<tr>
<td></td>
<td>Develop funding needs and model</td>
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<tr>
<td></td>
<td>Formalize recommendation and funding prospectus</td>
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</tbody>
</table>
Key Actions for Maryland

• State participation on Steering Committee
• Maryland Universities’ participation and leadership
  A collaboration agreement between Connected DMV & The University System of Maryland has been signed concerning; Cooperation in Advancing a Pandemic Prevention & Biodefense Initiative in Greater Washington
• Encourage industry participation and sponsorship
• Federal awareness and engagement
• Consideration of State funds for Strategy Phase
• LSAB publicly support Maryland’s involvement via Connected DMV
Appendix
<table>
<thead>
<tr>
<th>Maryland Company</th>
<th>City</th>
<th>Type</th>
<th>Funding Total</th>
<th>Funding Agency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leidos Biomedical Research</td>
<td>Frederick</td>
<td>Contract</td>
<td>$822 Million</td>
<td>HHS</td>
<td>COVID-19 Research at the National Cancer Institute in Frederick. Multiple task orders.</td>
</tr>
<tr>
<td>AstraZeneca</td>
<td>Gaithersburg</td>
<td>Contract</td>
<td>$287 Million</td>
<td>United States Army</td>
<td>200 Million doses of AstraZeneca’s vaccine candidate will be produced at their facilities in Ohio and New Mexico.</td>
</tr>
<tr>
<td>Longhorn Vaccines</td>
<td>Bethesda</td>
<td>Contract</td>
<td>$225 Million</td>
<td>Dept Homeland Security</td>
<td>The transportation and storage of clinical samples to testing labs.</td>
</tr>
<tr>
<td>Novavax</td>
<td>Gaithersburg</td>
<td>Contract</td>
<td>$60 Million</td>
<td>DOD</td>
<td>Additional $60 million contract from the DOD to expedite the development of their vaccine.</td>
</tr>
<tr>
<td>Emmes</td>
<td>Rockville</td>
<td>Contract</td>
<td>$17.2 Million</td>
<td>NIAID</td>
<td>Aided in the evaluation of Moderna’s COVID-19 clinical trial results.</td>
</tr>
<tr>
<td>Emergent Biosolutions</td>
<td>Gaithersburg</td>
<td>Contract</td>
<td>$14.5 Million</td>
<td>BARDA</td>
<td>BARDA to provide $14.5 million in funding to support development of Emergent’s vaccine candidate.</td>
</tr>
<tr>
<td>Altimune</td>
<td>Gaithersburg</td>
<td>Contract</td>
<td>$4.7 Million</td>
<td>DOD</td>
<td>COVID-19 vaccine development.</td>
</tr>
<tr>
<td>Maxim Biomedical</td>
<td>Rockville</td>
<td>Contract</td>
<td>$2.5 Million</td>
<td>NIH</td>
<td>Support for a new set of COVID-19 testing technologies as part of its Rapid Acceleration of Diagnostics (RADx) initiative.</td>
</tr>
<tr>
<td>Fisher BioServices</td>
<td>Rockville</td>
<td>Contract</td>
<td>$1.5 Million</td>
<td>HHS</td>
<td>COVID-19 clinical research and vaccine development.</td>
</tr>
</tbody>
</table>

Source: JLL Research
There are sixteen Maryland-based companies with pharmaceuticals in phase III clinical trials or higher.

Source: Global Data, JLL Research
Recent Company Fundraising Successes Located in BHCR

MedImmune/AstraZeneca spin-out
$250M Series A : $75M Series B
$157M IPO Oct-2019

Johns Hopkins spin-out
$129M raise Aug-2019

NYU spin-out
$61.3M raise Q1-20

Johns Hopkins spin-out
$110M raise 2019

NYU spin-out
$50M raise Q2-19

Johns Hopkins spin-out
$36M raise 2019

Johns Hopkins spin-out
$110M raise 2019

Johns Hopkins spin-out
$85M as of Q4-19
Series B

Technology from Yale

Technology from Yale
$160M raise 2019
$75M IPO May-2019

Johns Hopkins spin-out
$28.2M as of 2019

NYU spin-out
$99.3M raise 2019

Johns Hopkins spin-out
$237M raise 2019

Johns Hopkins spin-out
$320M raise 2019

Johns Hopkins spin-out
$42.5M raise 2019

Johns Hopkins spin-out
$131M raise 2019

Johns Hopkins spin-out
$28.5M Series A as of 2020

NYU spin-out
$152M as of 2020

Johns Hopkins spin-out
$40M raise 2019

NYU spin-out
$37M raise Q4-19

NYU spin-out
$28.5M as of Q4-19

NYU spin-out
$160M raise 2019

NYU spin-out
$50M raise Q2-19

November 24, 2020 Committee on Economic Development & Technology Commercialization - Public Session

2019 Data gathered from Pitchbook, Crunchbase
BHCR has Many Successful Recent Exits

- **October 2020**: Thrive. Earlier Detection
  - Acquired by Exact Sciences for $2.15 Billion

- **August 2019**: Jazz Pharmaceuticals
  - Acquired Cavion for $312.5 million

- **October 2019**: VielaBio
  - IPO $157 Million

- **May 2019**: NextCure
  - IPO $75 Million

- **April 2019**: Paragon Bioservices
  - Acquired for $1.2 Billion by Janssen

- **May 2018**: BeneVir
  - Acquired for up to $1.04 billion by Smith & Nephew

- **June 2018**: Autolus
  - IPO $150 Million
  - Relocates to Rockville, MD

- **February 2019**: Danaher
  - Acquires the Scansite for $2.14 Billion

- **September 2018**: Supernus Pharmaceuticals
  - Acquired Micromed for $175 million

- **August 2018**: Stryker
  - Acquired KIM for $1.4 billion

- **August 2018**: Regenxbio
  - Raised $202 Million in Secondary Public Offering

- **April 2019**: Osiris
  - Acquired for $660 million by Smith & Nephew

- **November 2018**: United Therapeutics
  - Acquired Arena Pharmaceuticals for $1.2 billion
  - Acquired SteadyMed for up to $216 million

- **Jan 2017**: Alimmune
  - Meager and IPO with PharmAthene

- **Q1 2020**: Smiths Detection
  - Acquired PathSense

- **Dec 2017**: Harpoon Medical
  - Acquired for $100 million by Mallinckrodt

- **Dec 2017**: Sucampo
  - Acquired for $1.2 billion by Mallinckrodt

- **May 2020**: Net Health
  - Acquired Tissue Analytics
The $1.2 Billion in public offering rounds raised year-to-date will operate as a catalyst for future tenant demand

Source: Global Data, JLL Research
Vacancy among the lab product continues to drop to historic levels, while the office market experiences significant occupancy losses.
Tenant Demand

Vacancy among the lab product continues to drop to historic levels, while the office market experiences significant occupancy losses.

Source: JLL Research
TOPIC: USM Office of Economic Development Update

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Wednesday, December 2 2020

SUMMARY: Vice Chancellor Sadowski will provide information on BioHealth from a USM perspective, update the Committee on the COVID-19 Task Force Activity, and share good news about USM’s position in various rankings and other recent economic development-related recognitions.

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 Regents Committee for Economic Development Tech Commercialization

December 2, 2020
USM Economic Development

Agenda

- USM BioHealth Perspective
- COVID-19 Task Force Activity
- Rankings and Recognition
USM BioHealth Assets

*Talent Production and Capital Investment*

- Produces 3,800 health professionals and almost 9,000 bioscience graduates every year, most of whom stay in Maryland to develop drugs, therapies, medicine and health care related devices and products.

- Performs more than $500M in life science and health research annually.

- Invested over $600M in biohealth and STEM-related research and learning facilities over the last several years.

- Licenses over 50 biohealth technologies each year.

- Assists about 50 biohealth spinout ventures annually.
USM COVID Research & Innovation Task Force

**Continuing and Forward Initiatives**

- **Acceleration Program:** November COVID I-Corps cohort complete; conducting follow-up to identify support. In parallel, partnering to provide additional support. Upcoming general I-Corps cohort in January.

- **Bioproduction and Vaccine Development Strategy:** Working with the Governor’s Life Science Advisory Board (LSAB), MD Commerce and MD Tech Council on comprehensive strategy to develop MD’s bio-manufacturing, vaccine development, medical supply chain and related workforce capacity; exploring federal funding and industry partnership opportunities.
USM COVID Research & Innovation Task Force

**Continuing and Forward Initiatives**

- **Public Health Communications Challenge:** Challenge prize competition aimed at encouraging Marylanders experiencing “COVID fatigue” to remain vigilant, maintain sound public health practices and good hygiene, and when available, to get vaccinated!

- **Workshop:** Developing workshop led by USM experts on solutions to current and future pandemic challenges.
  - Pandemic Predicting & Tracking
  - Business & Economics
  - Medicine & Life Sciences
  - Social & Public Health
Rankings and Reports

Milken State Technology & Science Index

#2

RESEARCH AND DEVELOPMENT INPUTS (RDI)

RISK CAPITAL AND ENTREPRENEURIAL INFRASTRUCTURE (RCI)

HUMAN CAPITAL INVESTMENT (HCI)

#1

TECHNOLOGY AND SCIENCE WORKFORCE (TSW)

TECHNOLOGY CONCENTRATION AND DYNAMISM (TCD)

#2

4th overall behind Massachusetts, Colorado, and California

“Much like Massachusetts, Maryland’s high rankings for R&D inputs are also due to the presence of top-tier research universities.”
Rankings and Reports

_Milken State Technology & Science Index_

**Federally-funded R&D Per Capita**

**Industry-funded R&D Per Capita**

*Source: Milken Institute analysis of National Science Foundation data (2020)*
Rankings and Reports

*Princeton Review, Entrepreneur Magazine*

**6th!**

UMD Ranked in Top 10 for Innovation and Entrepreneurship Education for Sixth Straight Year

*Princeton Review, Entrepreneur Magazine Acknowledge University’s Efforts to Include All Students*

By Maryland Today Staff / Nov 17, 2020

More: [https://today.umd.edu/articles/umd-ranked-top-10-innovation-and-entrepreneurship-education-sixth-straight-year-6526cb3d-72e8-421c-a7b5-06a9f1fb4765](https://today.umd.edu/articles/umd-ranked-top-10-innovation-and-entrepreneurship-education-sixth-straight-year-6526cb3d-72e8-421c-a7b5-06a9f1fb4765)
Rankings and Reports

*Maryland Future 20*

Statewide search, administered by the Dept. of Commerce, to identify Maryland’s most innovative start-up companies with the potential to be the state’s next major business success story

- 15 had a touchpoint with USM
- 9 licensed USM intellectual property
- 8 accessed significant capital or in-kind investment via MIPS, MMF or other equity investment
- 13 accessed advising through programs and/or incubators

[https://open.maryland.gov/blog/announcing-maryland-future-20/](https://open.maryland.gov/blog/announcing-maryland-future-20/)
Rankings and Reports

**Maryland Future 20: USM spinouts and/or USM supported**

- **ACTIVEcharge** (Baltimore County) – Provider of blade monitoring hardware and software for wind turbines.
- **Aidar Health** (Baltimore City) – Healthcare technology company focused on personalized medicine that provides a rapid overall health assessment.
- **Airgility** (Prince George's County) – Developer of unmanned aerial systems to help support defense missions, public safety and commercial sectors.
- **HopFlyt Inc.** (Calvert County) – An aerospace company developing an electric Vertical Takeoff & Landing (eVTOL) aircraft.
- **Infercabulary** (Baltimore County) – Education technology start-up that offers a web-based, visual vocabulary and reasoning program.
- **InventWood** (Prince George's County) – Startup developing environmentally-sustainable cellulose products.
- **IonQ** (Prince George's County) – Quantum computing hardware and software company taking ion quantum computing from the lab to the marketplace.
- **Ion Storage Systems** (Prince George's County) – Technology company that creates batteries that are safer and enhance system performance.
- **Medcura** (Prince George's County) – Medical device company developing a wound care platform for surgical, medical, and consumer applications.
- **N5 Sensors, Inc.** (Montgomery County) – Electronics company manufacturing high-performance sensors and detectors.
- **pathOtrak** (Prince George's County) – Biotechnology company that is developing a rapid detection test for foodborne pathogens.
- **Relavo** (Baltimore City) – Medical device company working on a solution for safer, in-home kidney dialysis.
- **Resensys** (Prince George's County) – Technology company with a wireless sensor network to help monitor infrastructure systems.
- **Silfra Biosystems LLC** (Baltimore County) – Start-up that manages fish waste in aquaculture.
- **Sisu Global Health** (Baltimore City) – Medical device company with an innovative blood-filtering product.