



**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



BOARD OF REGENTS

SUMMARY OF ITEM FOR INFORMATION

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 Aoen 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





Amethyst First Client: US Army

- 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



Our Work in Tanzania

Supporting US Army Malaria Program

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





"Rock Solid" Validation

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

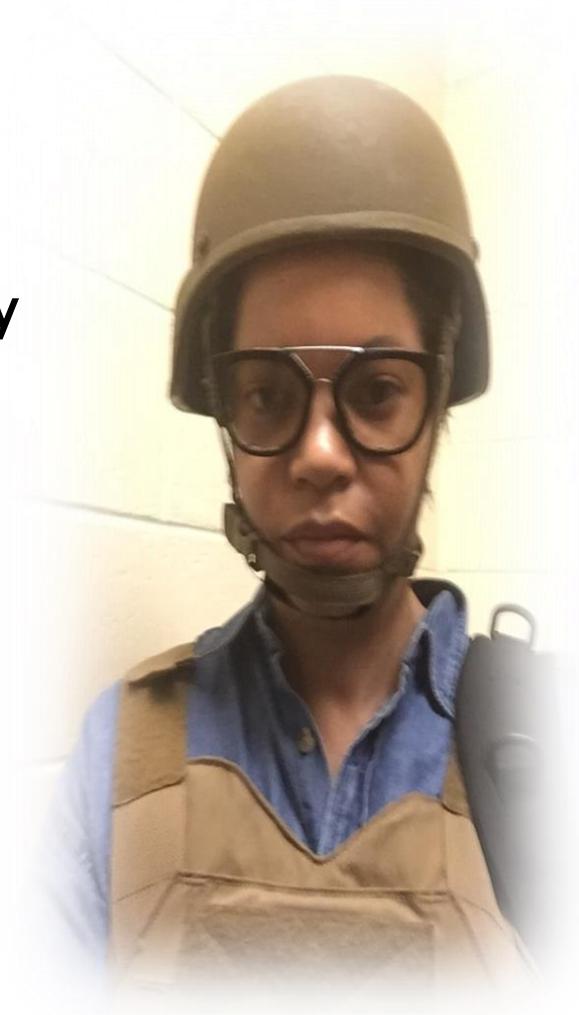
Amethyst volunteered and provided training to health care workers at JFK Hospital and laboratory technicians at National Public Health Reference Laboratory for Ebola outbreak response (August 2014)





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



COVID-19 PCR Testing: Initially Planned for 25 tests per day; Currently performing 600-900 daily tests

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.



Pharmacy Partner





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



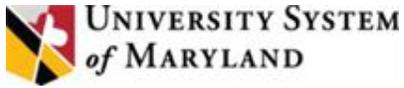
Contact

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**SUMMARY OF ITEM FOR
INFORMATION**

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.

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CHANCELLOR'S RECOMMENDATION: n/a

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CONNECTED  **DMV**

 **BioHealth Innovation**

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

Proprietary and Confidential to Connected DMV.



Top 10 U.S. Biopharma Clusters

Ranking Based on Five Criteria:

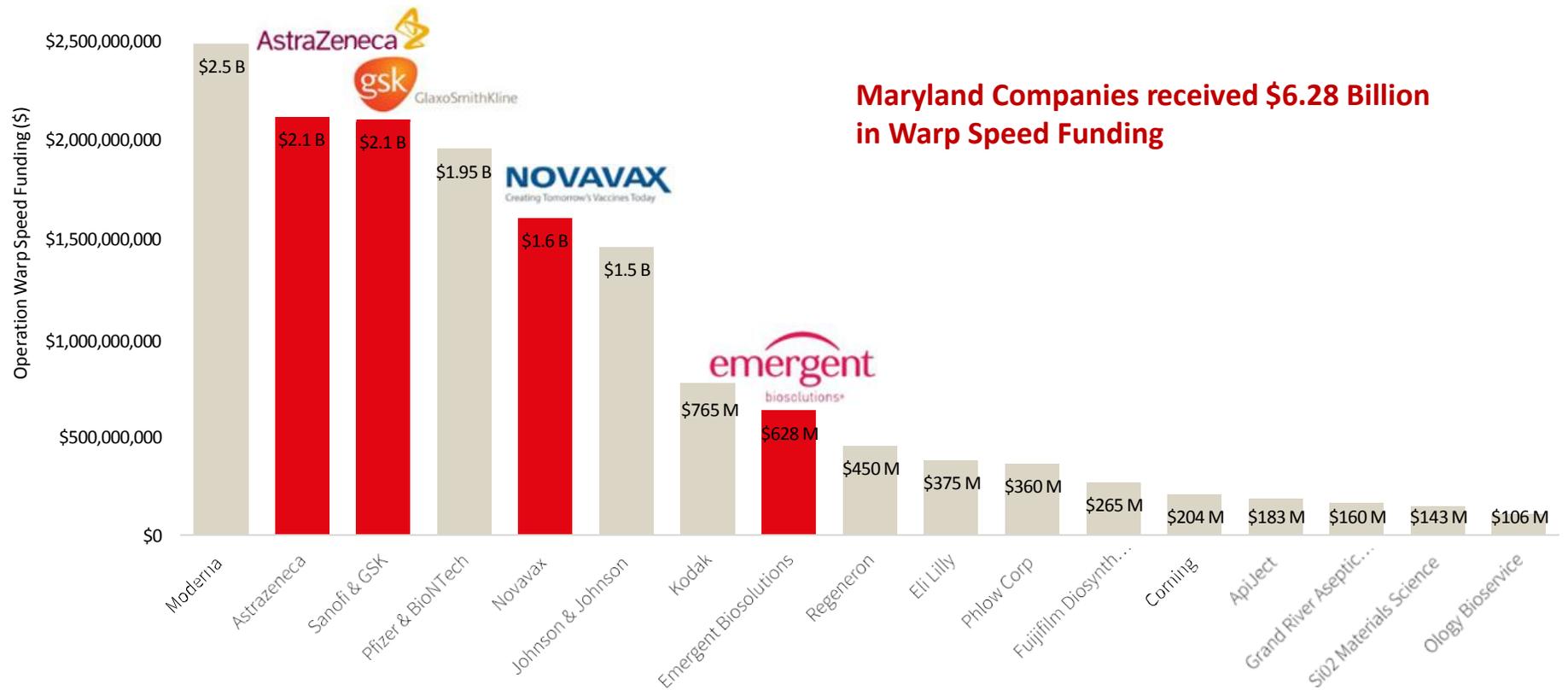
• 2020

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

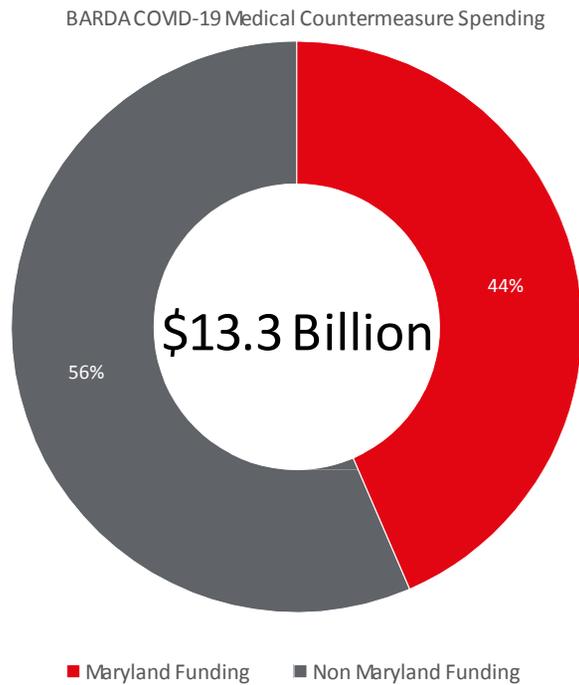
1. San Francisco Bay Area
2. Boston / Cambridge Mass
3. New York/New Jersey
- ↑ 4. **BioHealth Capital Region (Maryland / Virginia / DC)**
5. San Diego
6. Los Angeles / Orange County
7. Greater Philadelphia
8. Seattle
9. Chicagoland
- 10. Raleigh-Durham, NC (inc. Research Triangle Park, NC)

Maryland companies account for four of the top eight recipients of Operation Warp Speed funding



Source: JLL Research

Maryland companies have received billions in spending from BARDA's COVID-19 Medical Countermeasure Portfolio



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
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Therapeutics

Total Spending: \$1.2 B

Maryland Spending: \$525 M

 AstraZeneca Gaithersburg, Maryland \$510 M	 Emergent Biosolutions Gaithersburg, Maryland \$14.5 M
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Diagnostics

Total Spending: \$219 M

Maryland Spending: \$1.2 M

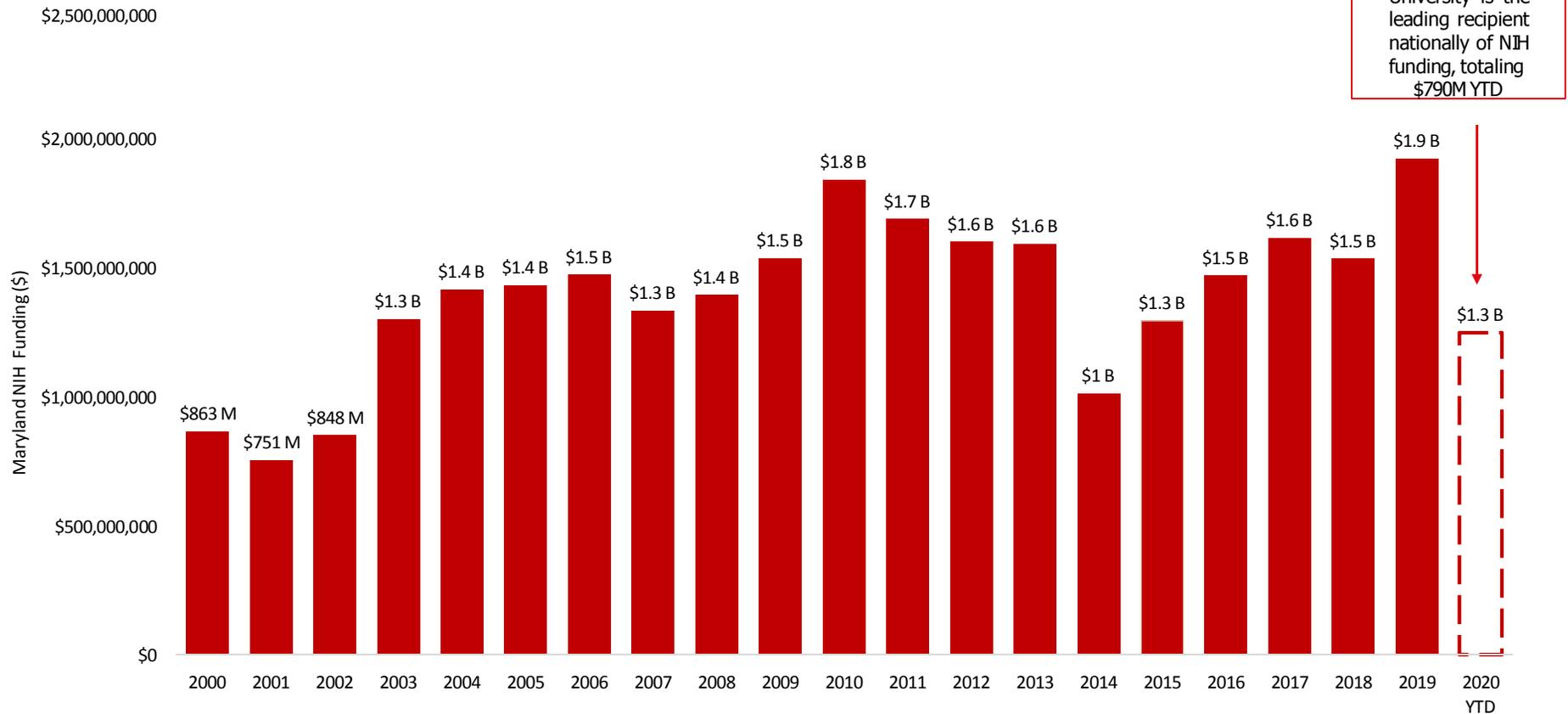
 Hememics Gaithersburg, Maryland \$638,000	 Qiagen Germantown, Maryland \$598,200
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**GlaxoSmithKline is codeveloping their vaccine via a partnership with Sanofi Pasteur

Source: BARDA, JLL Research

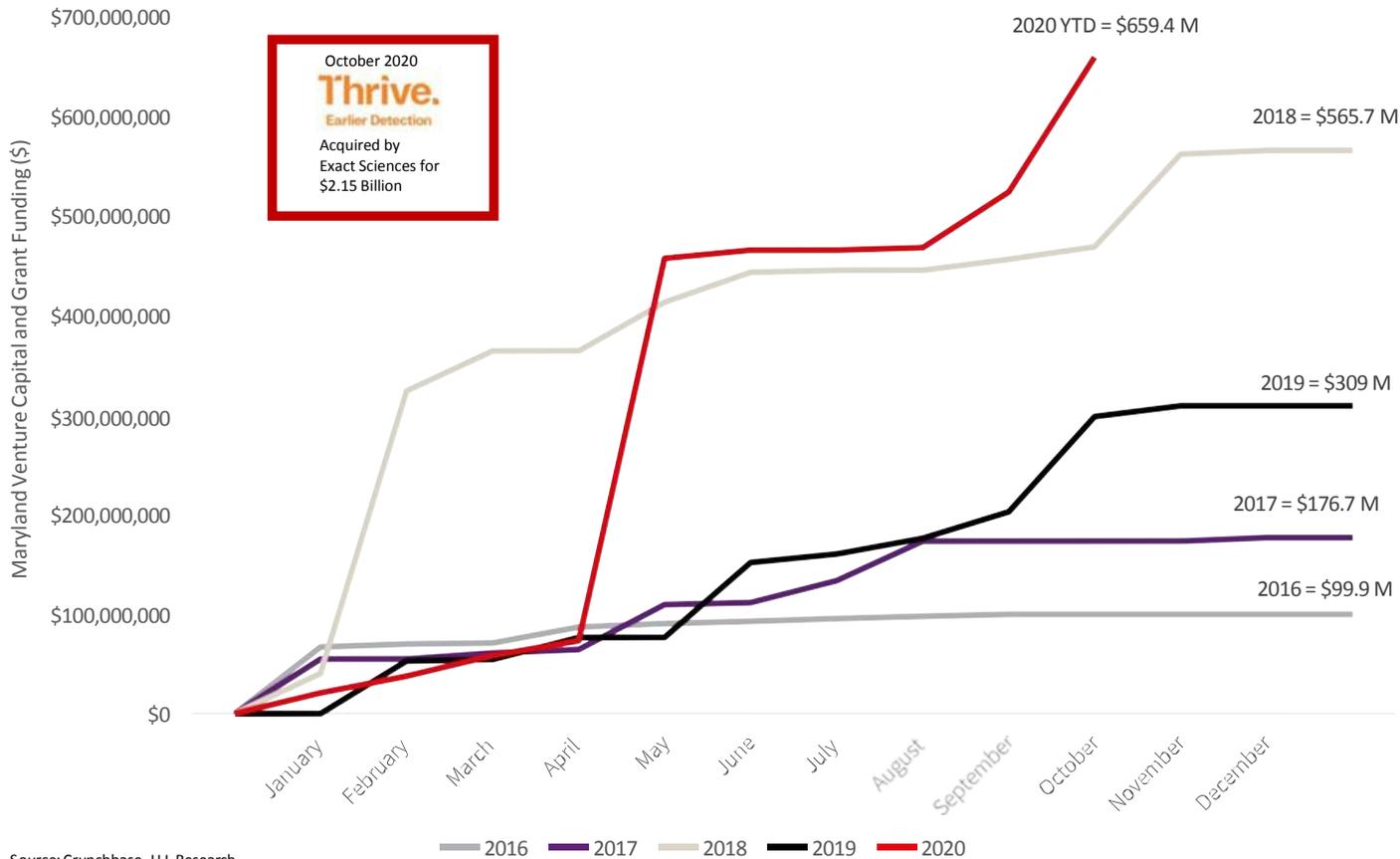


Maryland set a record high for NIH funding in 2019, and has already received \$1.3 billion YTD from 2,320 awards



Source: NIH, JLL Research

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



Source: Crunchbase, JLL Research

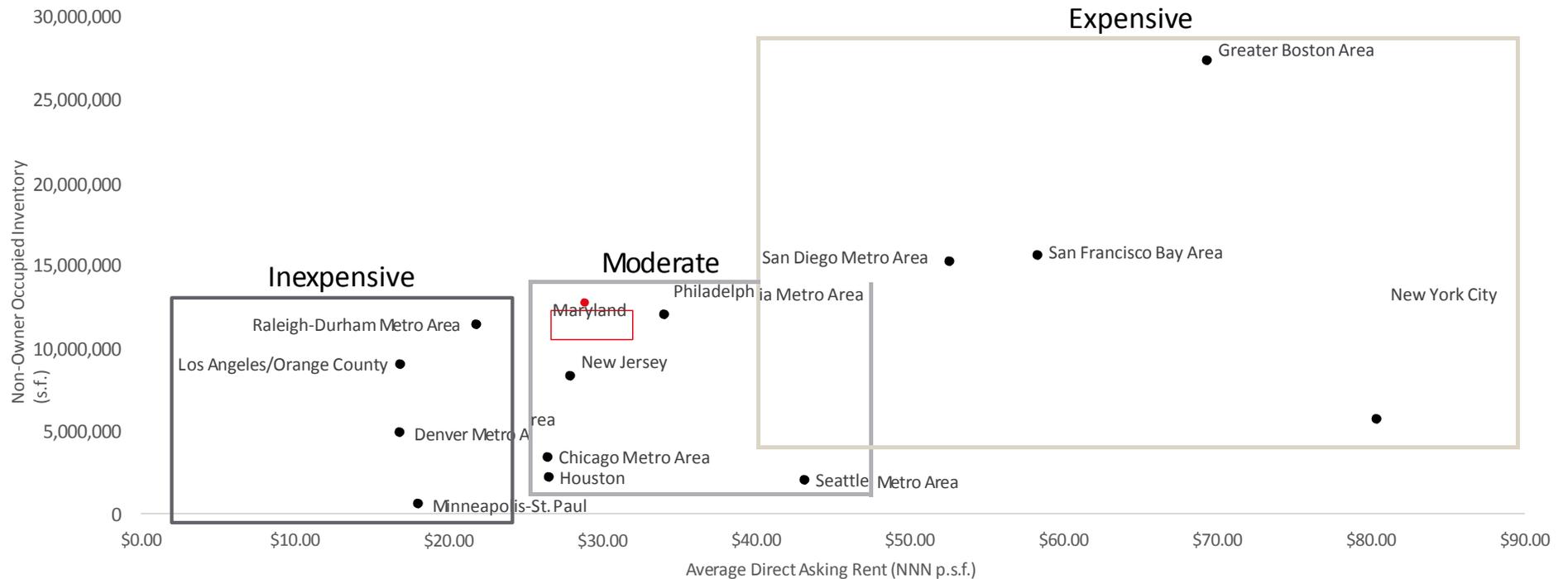
Firm	Date	Funding Type
Novavax Gaithersburg, MD	7/7/2020	\$384 Million CEPI Grant in support of their COVID-19 Vaccine Candidate
Siranomics Gaithersburg, MD	10/23/2020	\$105 Million Series D Venture Capital Round
OncoImmune Rockville, MD	9/9/2020	\$56 Million Series B Venture Capital Round
Sensei Biotherapeutics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

*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



CONNECTED  **DMV**

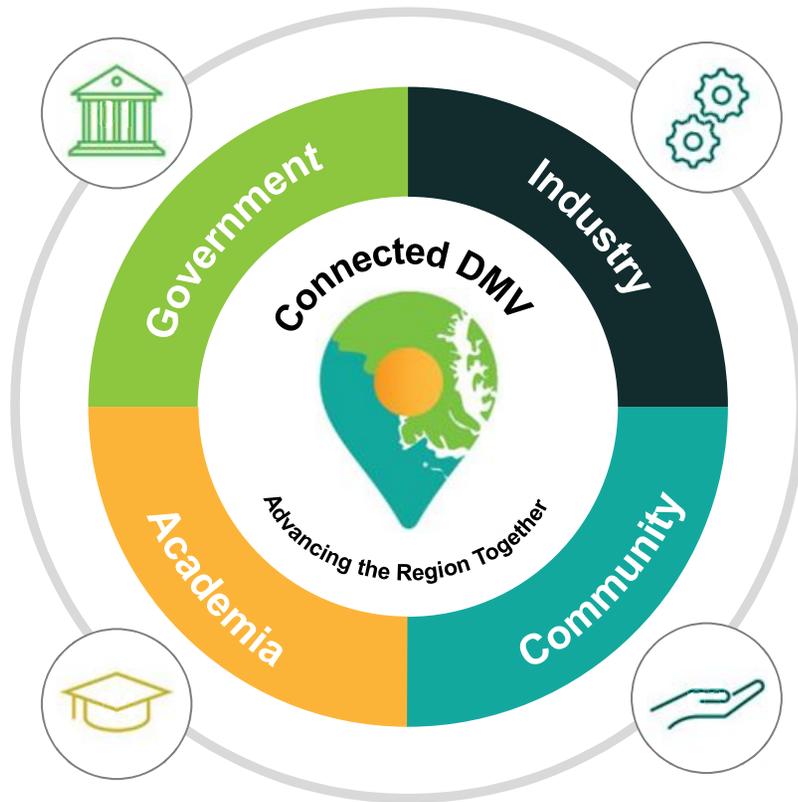
 **BioHealth Innovation**

Global Pandemic Prevention and Biodefense Center

November, 2020

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Connected DMV



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

Strategic Renewal Task Force



- Regional Organizations
- Academia
- Public Sector
- Industry & Community
- Federal Government

Task Force Facilitators
 Jack McDougle
 Hon Anthony Williams

Connected DMV
 Stu Solomon

Council of Governments <i>Chuck Bean</i>	Montgomery County <i>Ben Wu</i>	University <i>Dr. Wayne Frederick, Howard Univ.</i>	Banking <i>Richard Bynum, PNC</i>	Mobility <i>Stephanie Davis, Volkswagen Group</i>
Greater Wash. Board of Trade <i>Jack McDougle</i>	Fairfax Economic Development <i>Victor Hoskins</i>	Community College <i>Dr. Anne M. Kress, NVCC</i>	Communications <i>Tony Lewis, Verizon</i>	Non-Profit Association <i>Scott Frisch, AARP</i>
Consortium of Universities <i>Dr. Andrew Flagel</i>	Prince George's County <i>Hon. Todd Turner</i>	K-12 <i>Katherine Bradley, CityBridge</i>	Community / Civic <i>Radha Muthiah, Cap Area Food Bank</i>	Public Relations <i>Evan Kraus, APCO Worldwide</i>
WMATA <i>Paul Wiedefeld</i>	DC Mayor Rep. <i>Eugene D. Kinlow</i>	Health & Human Services <i>Glenn Blanchette</i>	Community / Civic <i>Denise Rolark Barnes, Was. Informer</i>	Real Estate Dev. & Construction <i>Sameer Bhargava, Clark</i>
Federal City Council <i>Hon. Tony Williams</i>	Public Health Official <i>Dr. Anneta Arno, DC Health</i>	Cyber & Infrs. Security Agency <i>Bill Ryan</i>	Consulting <i>Nora Gardner, McKinsey & Co.</i>	Retail & Supply Chain <i>Brian Kenner, Amazon</i>
Economic Club <i>Mary Brady</i>	Commonwealth of Virginia <i>Cassidy Rasnick</i>	FEMA <i>Kim Kadesch</i>	Cybersecurity <i>Jim Cook, The MITRE Corp.</i>	Small Business <i>Anne Mahlum, Solidcore</i>
2030 Group <i>Bob Buchanan</i>	State of Maryland <i>Kelly M. Schulz</i>	Joint Force Headquarters - NCR <i>Major General Omar Jones</i>	Healthcare <i>Ken Samet, MedStar Health</i>	Technology <i>Samuel Gordy, IBM</i>
Metro. Wash. Airport Authority <i>Jack Potter</i>	Maryland Governor Rep. <i>Allison Mayer</i>	Accounting <i>Tim Gillis, KPMG</i>	Hospitality <i>David Grissen, Marriott</i>	Tourism & Entertainment <i>Elliott Ferguson, Destination DC</i>
DMV Chambers of Commerce <i>David Harrington</i>	Northern VA Technology Council <i>Jennifer Taylor</i>	Advanced Manufacturing <i>Tim O'Brien, Micron</i>	Legal <i>Manny Rouvelas, K&L Gates</i>	Utilities <i>Dave Velazquez, Pepco Holdings</i>
NOVA Chamber of Commerce <i>Julie Coons</i>	Maryland Tech Council <i>Martin Rosendale</i>	Aerospace & Defense <i>Lesley Kalan, Northrop Grumman</i>	Life Sciences <i>Rich Bendis, BioHealth Innovation</i>	Venture Capital / Private Equity <i>Stacey Dion, The Carlyle Group</i>

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GLOBAL PANDEMIC PREVENTION AND BIODEFENSE CENTER



BioHealth Innovation

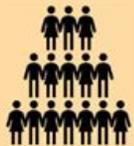
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DMV

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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

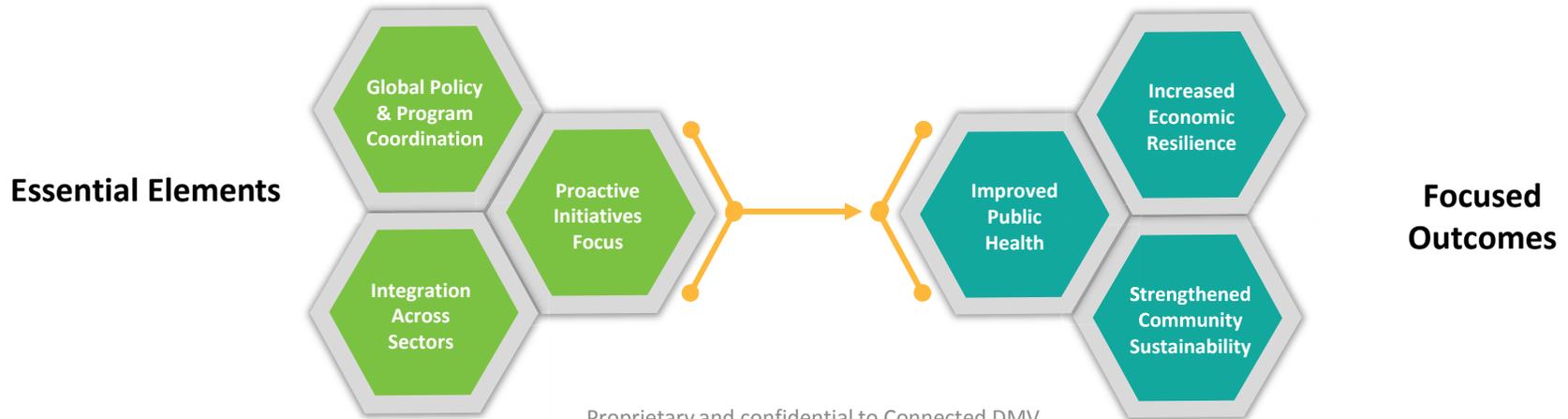
We can get in front of global outbreaks with an integrated approach.

US leadership is required.

Our Solution



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



Integration: A Necessary Priority



Comprehensive preparedness demands a public-private-academia approach

Stage Stakeholder	Public Health Policy	Basic Research & Discovery	Applied Technology & Pre-Clinical Studies	Clinical Trials (Phases 1/2/3)	Manufacturing	Supply Chain & Distribution	Community Preparedness
Federal Government	✓	✓	✓	✓		✓	
State/Local Government						✓	✓
Academia		✓	✓	✓			
Philanthropy		✓					✓
Non-Profits	✓	✓					✓
Investors		✓	✓	✓			
Biotech			✓	✓	✓		
Pharma					✓	✓	
Health Care						✓	✓

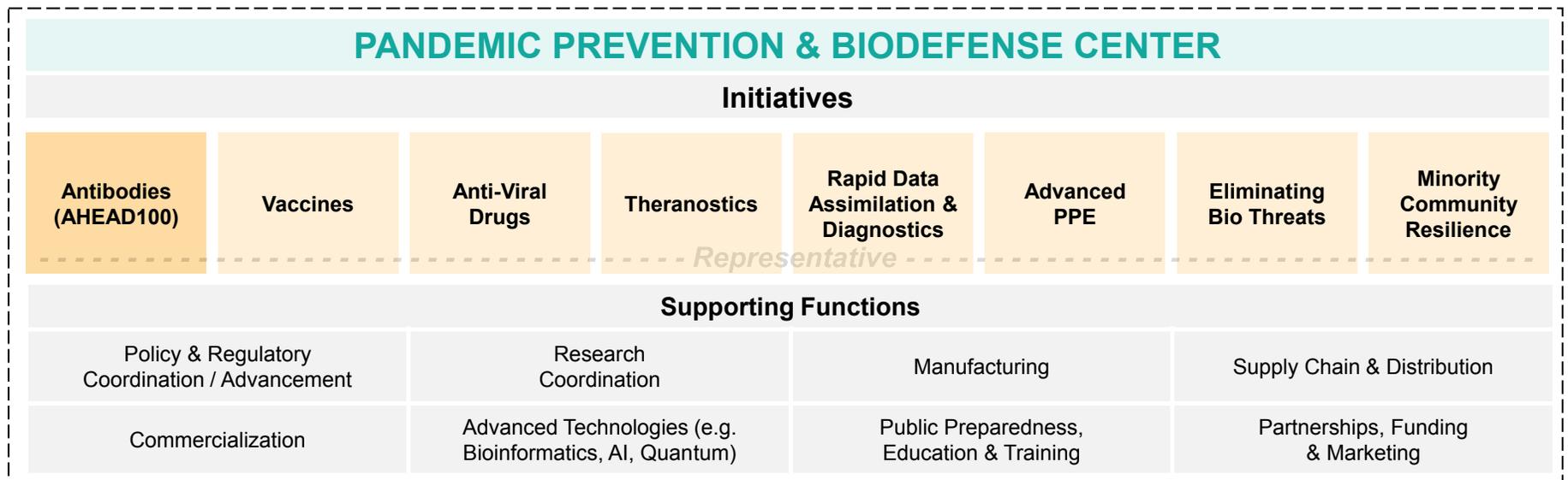
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Initiatives-Based Model



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.

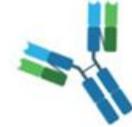


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Initiative Incubation:



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

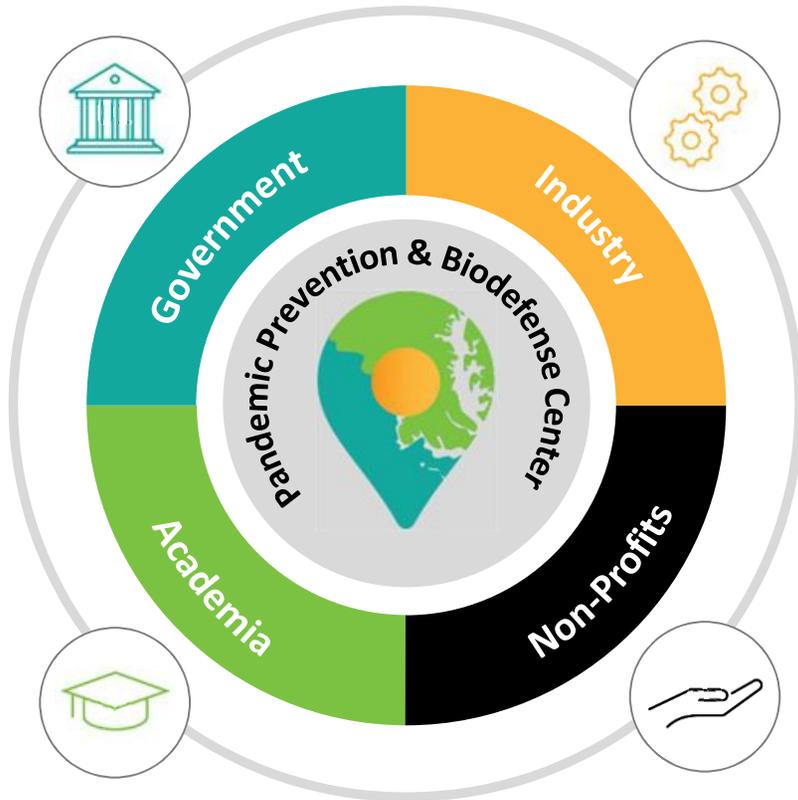
Establishes platforms and techniques for ultra-fast development, with great potential for spin-off IP and applications.



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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

Collaboration & Governance CONNECTED

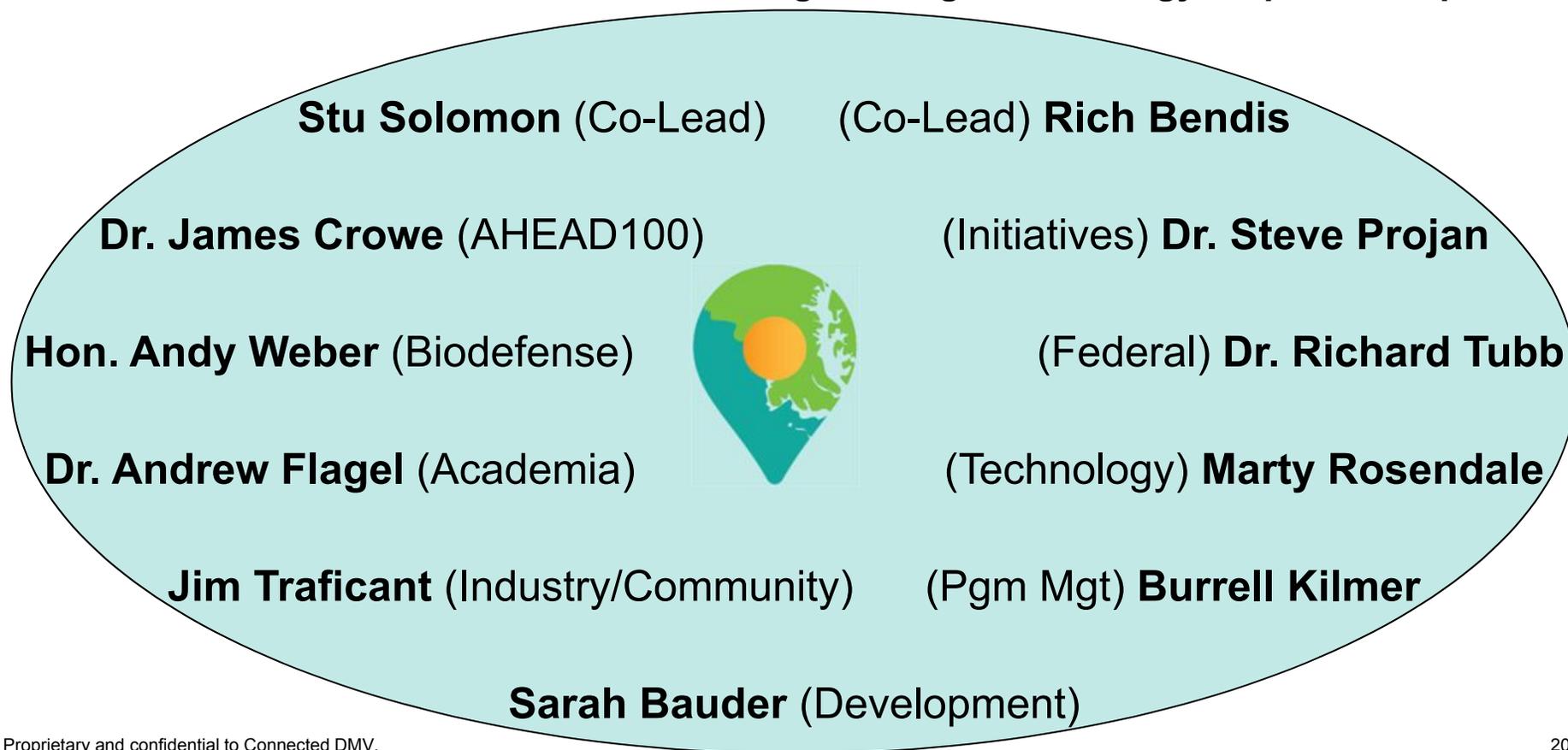


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Strategy Phase Leadership Team



A cohesive set of leaders is committed to delivering an integrated strategy for pandemic prevention





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

<ul style="list-style-type: none"> • Secure funding for 6-month effort • Confirm Steering Committee • Identify and confirm Strategy Team • Identify and confirm lead professional services firm <p>✓ First commitments confirmed</p>	<ul style="list-style-type: none"> • Define requirements • Research and evaluate other industry initiatives • Confirm Center scope and functions • Refine and confirm mission, goals, and value proposition • Define governance, operating model, structure • Identify strategic location(s) • Identify strategic partner(s) • Develop initiative evaluation framework • Identify preliminary initiative portfolio • Develop funding needs and model • Formalize recommendation and funding prospectus 	<ul style="list-style-type: none"> • Launch Center and begin developing first initiative(s) • Formalize partnerships • Establish legal entities • Secure funding
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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

CONNECTED DMV



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Appendix

Proprietary and confidential to Connected DMV.

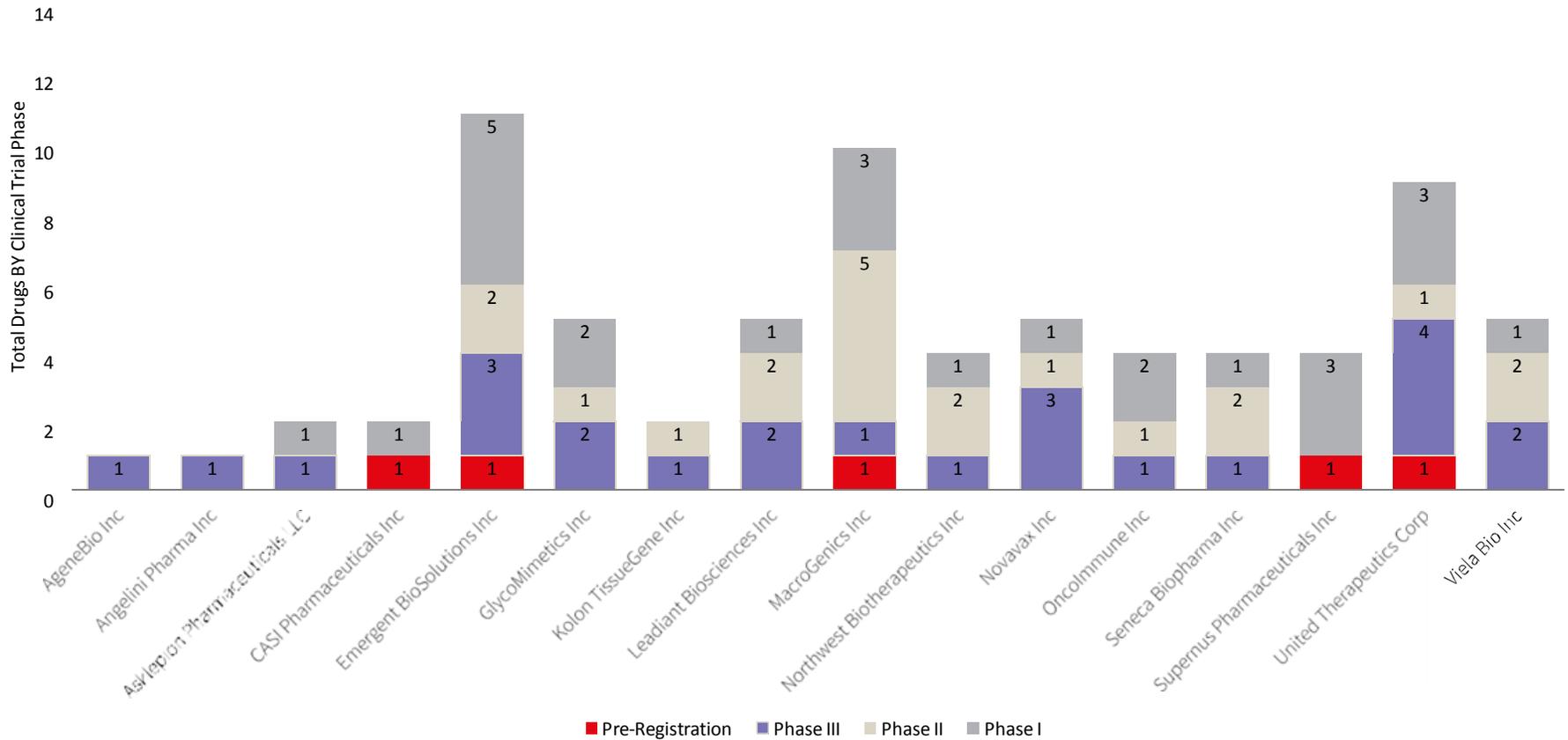
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Maryland Company	City	Type	Funding Total	Funding Agency	Notes
Leidos Biomedical Research	Frederick	Contract	\$822 Million	HHS	COVID-19 Research at the National Cancer Institute in Frederick. Multiple task orders.
AstraZeneca	Gaithersburg	Contract	\$287 Million	United States Army	200 Million doses of AstraZeneca's vaccine candidate will be produced at their facilities in Ohio and New Mexico.
Longhorn Vaccines	Bethesda	Contract	\$225 Million	Dept Homeland Security	The transportation and storage of clinical samples to testing labs.
Novavax	Gaithersburg	Contract	\$60 Million	DOD	Additional \$60 million contract from the DOD to expedite the development of their vaccine.
Qiagen	Germantown	Contract	\$16.5 Million	HHS	Support for COVID-19 related research. Committing equipment and material. Diagnostics focused.
Emmes	Rockville	Contract	\$17.2 Million	NIAID	Aided in the evaluation of Moderna's COVID-19 clinical trial results.
Emergent Biosolutions	Gaithersburg	Contract	\$14.5 Million	BARDA	BARDA to provide \$14.5 million in funding to support development of Emergent's vaccine candidate.
Altimune	Gaithersburg	Contract	\$4.7 Million	DOD	COVID-19 vaccine development.
Maxim Biomedical	Rockville	Contract	\$2.5 Million	NIH	Support for a new set of COVID-19 testing technologies as part of its Rapid Acceleration of Diagnostics (RADx) initiative.
Fisher BioServices	Rockville	Contract	\$1.5 Million	HHS	COVID-19 clinical research and vaccine development.

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



NYU spin-out
Acquired by Janssen (JNJ) for \$1.04B (2018)



Johns Hopkins spin-out
\$36M raise 2019



\$173M raise 2019



\$61.3M raise Q1-20



\$50M raise Q2-19



\$152M as of 2020



\$28.5M Series A as of 2020



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



Johns Hopkins spin-out
\$110M raise 2019



\$85M as of Q4-19
Series B



Johns Hopkins spin-out
\$40M raise 2019



Johns Hopkins spin-out
\$28.2M as of 2019



\$42.5M raise 2019



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



\$237M raise 2019



\$320M raise 2019



Johns Hopkins spin-out
\$99.3M raise 2019



\$131M raise 2019



\$37M raise Q4-19



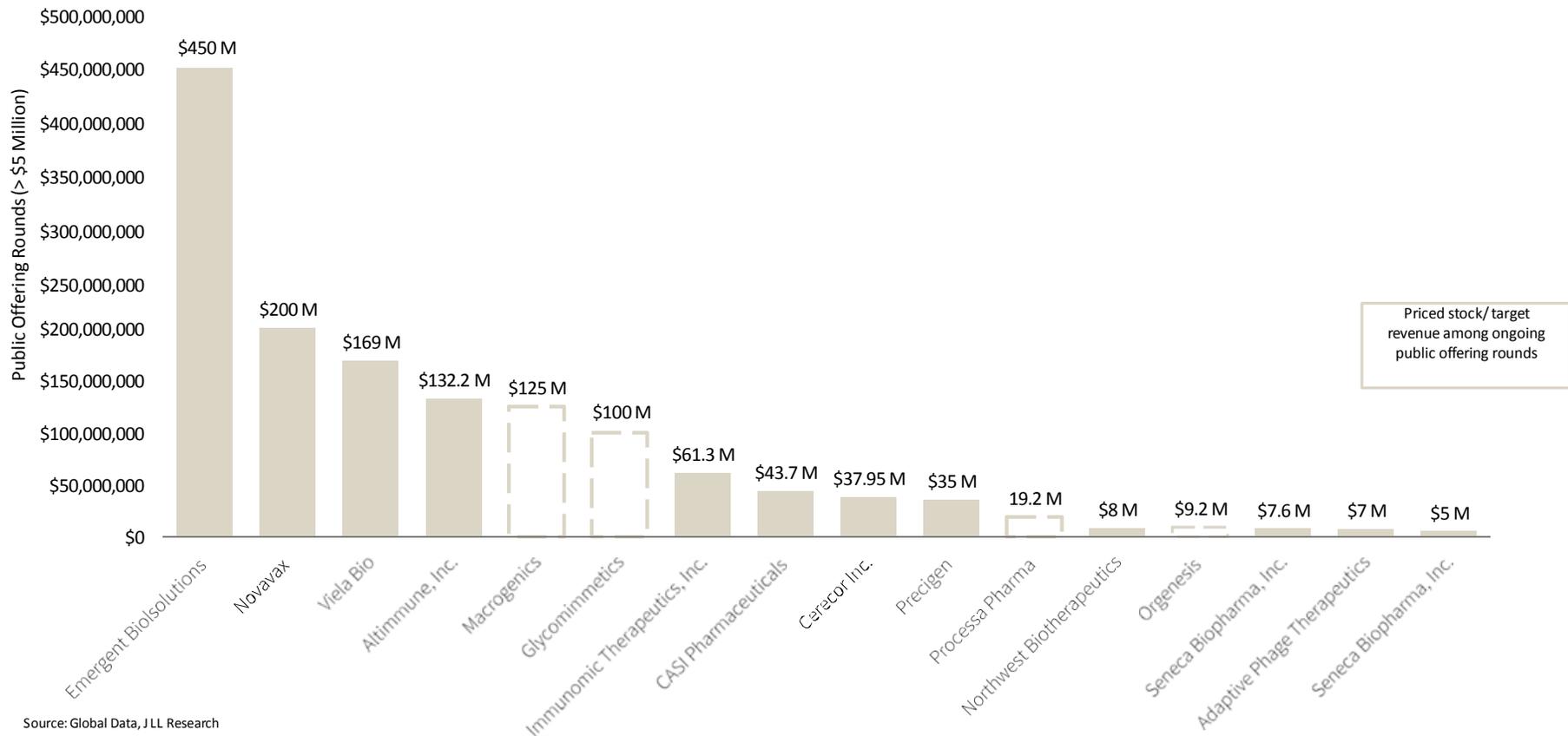
- BHI Companies

2019 Data gathered from Pitchbook, Crunchbase

BHCR has Many Successful Recent Exits



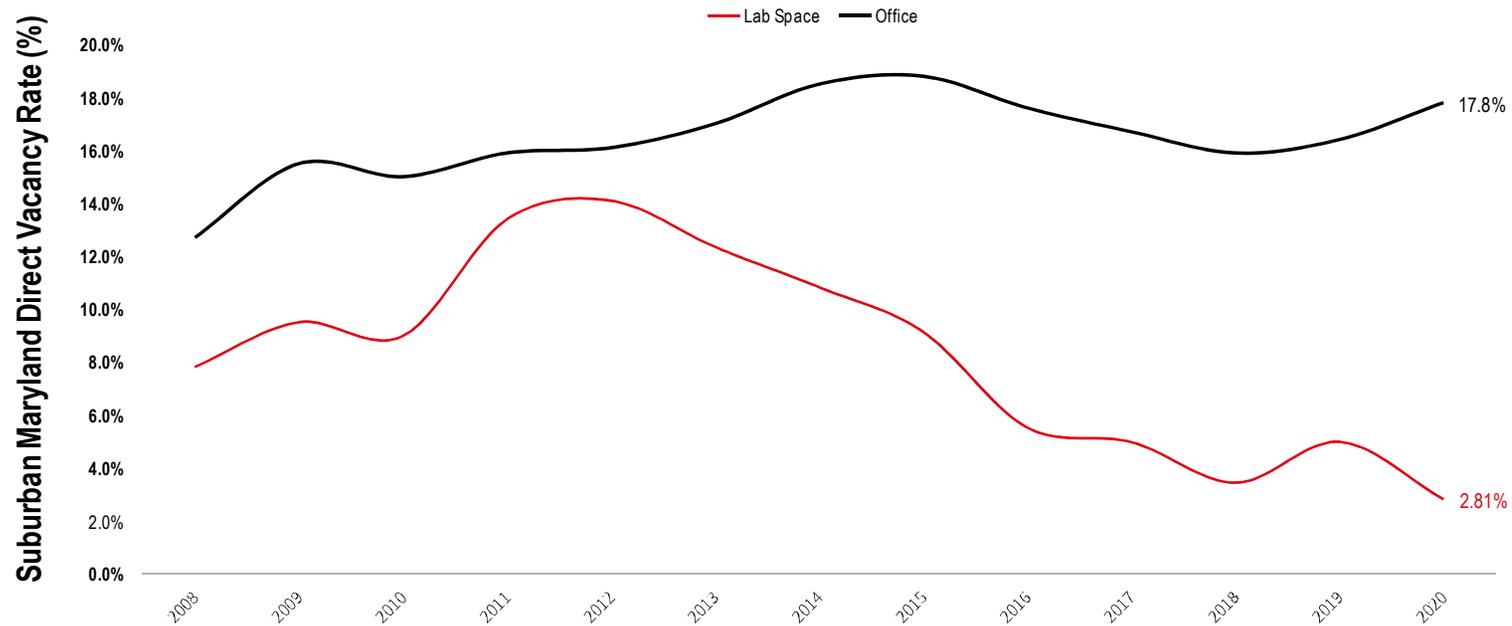
The \$1.2 Billion in public offering rounds raised year-to-date will operate as a catalyst for future tenant demand



Tenant Demand



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



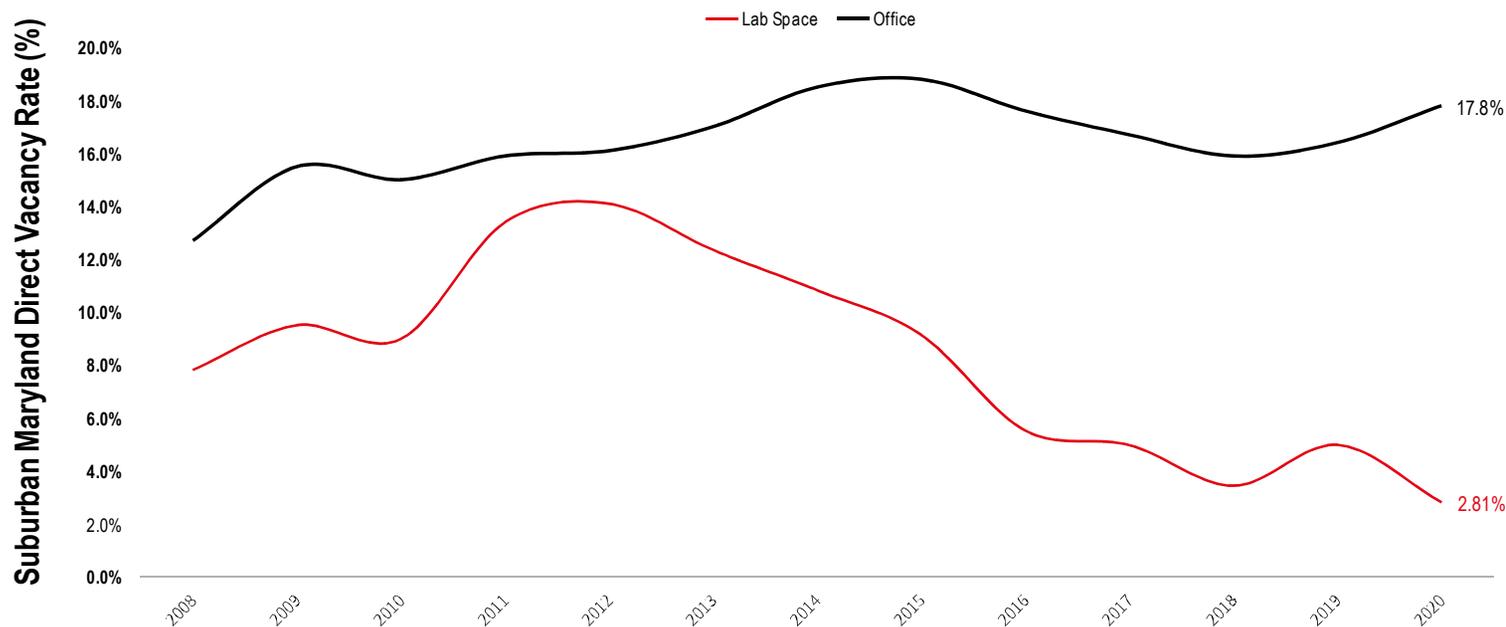
Source: JLL Research

JLL Life Science Practice Group + Boston Properties | Page 30

Tenant Demand

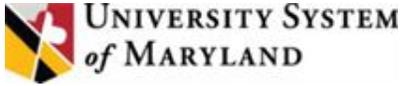


Vacancy among the lab product continues to drop to historic levels, while the office market experiences significant occupancy losses



Source: JLL Research

JLL Life Science Practice Group + Boston Properties | Page 31



BOARD OF REGENTS

**SUMMARY OF ITEM FOR
INFORMATION**

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



Rankings and Reports

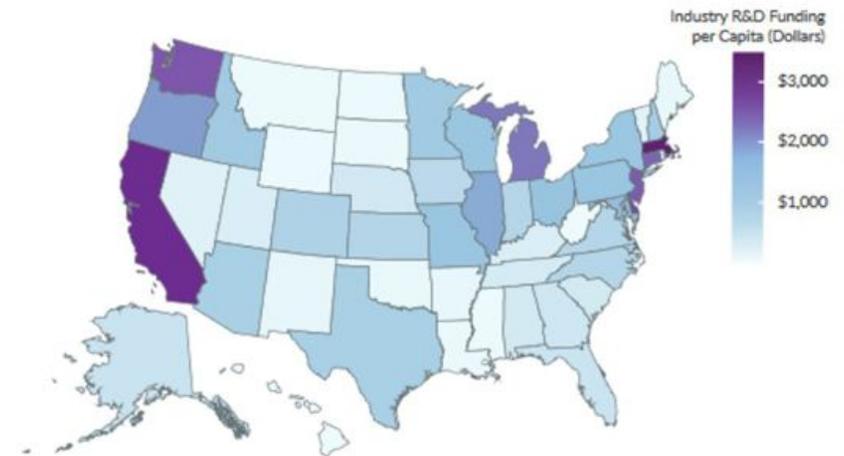
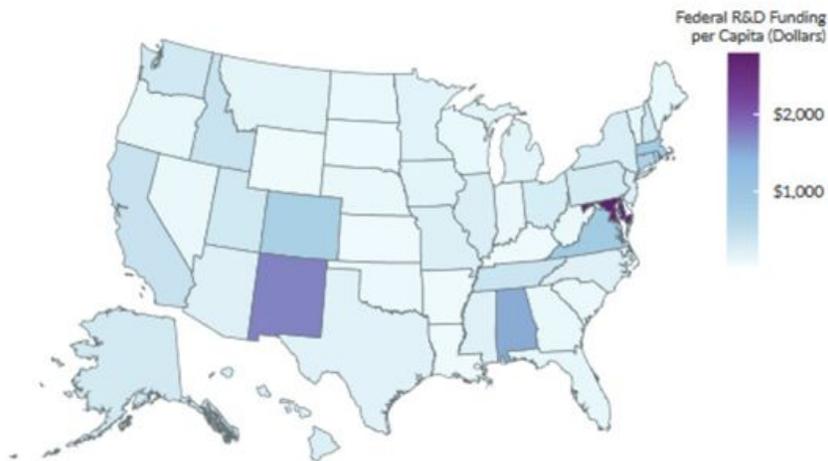
Milken State Technology & Science Index

Federally-Funded R&D Per Capita

Industry-Funded R&D Per Capita

■ FIGURE 3: FEDERAL R&D FUNDING PER CAPITA:
■ THREE-YEAR AVERAGE (2016-2018)

■ FIGURE 4: INDUSTRY R&D FUNDING PER CAPITA:
■ THREE-YEAR AVERAGE (2015-2017)



Source: Milken Institute analysis of National Science Foundation data (2020)

Source: Milken Institute analysis of National Science Foundation data (2020)

Rankings and Reports

Princeton Review, Entrepreneur Magazine

6th!



CAMPUS & COMMUNITY

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>

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/>



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.