

Montgomery County Economic Development Corporation MCEDC Staff Review: Research University Engagement Project



The premise of this MCEDC staff review is to provide specific input as part of the larger question of whether the presence of a research university could increase entrepreneurship, new business formation, and talent in Montgomery County. If the answer is affirmative, what might that presence look like? This report provides analytical models of what a non-Maryland research university engagement could be. This report is designed to be complementary and reviewed in conjunction with both the Bolan Smart & Associates and the Margrave Strategies reports.

Montgomery County has an increasingly complex and evolving biohealth cluster that includes a unique mix of federal labs, a diverse talent pool, emerging and well-established industries, proximity to legislative and regulatory power, and a growing venture capital portfolio. These factors may give a non-Maryland-based research university interest in locating an institute or developing initiatives in Montgomery County.

This section includes a targeted list of possible non-Maryland research universities, both local and national, that could be identified as potential partners with Montgomery County's existing and emerging industries.

MCEDC primarily examined universities with a life sciences focus; however, research in hospitality and IT should also be considered. Additionally, this work did not include non-profit research institutions like the Cleveland Clinic or the Mayo Clinic, which may find reasons to enter the Montgomery County or Greater Washington market.

Research at the intersection of physical and life sciences, life sciences and “big data” and life sciences and health IT could benefit from, and partner with, local Montgomery County biohealth companies and anchor institutions that are blurring the lines between traditional life science verticals.

MCEDC staff has initiated some early-stage preliminary conversations with some of these institutions to evaluate general interest. If deemed a priority, a coordinated outreach strategy may be a next step.

MCEDC has also created a list of landowners and businesses for local, private sector outreach. If needed, MCEDC is willing to work with the County Executive and County Council to participate in structured conversations with these stakeholders.

A successful engagement with academic research institutions would be a long-term project, rooted in mutual interests. There could be multiple university partners leveraging Montgomery County's significant industries and assets to reach their own institutional goals.

University Engagement Criteria

MCEDC developed nine criteria to identify potential non-Maryland research universities to target for outreach. The university matrix can be found below this glossary.

If a matrix block is shaded, that means the corresponding research university met one of these criteria:

1. **Life Sciences PhD's:** This university was listed in JLL's list of "Largest Number of Life Sciences PhD's." Having an outpost in MoCo could be attractive to these universities to be closer to their alumni and employers (create internships/externships/etc).
2. **NIH Funds:** This university was one of the top recipients of NIH funding in 2017 or 2018. Proxy measure for understanding potential for collaboration with our local life sciences sector.
3. **Out of State Investing:** Based on available data in Pitchbook, 30% or more of the companies in which this university made investments are now headquartered in a different state than the university. Serves as a proxy measure for interest in investing outside of home state.
4. **Diverse Industries:** Based on available data in Pitchbook, this university invested in companies across 10 or more industry groups. Serves as a proxy measure for diverse investing interests.
5. **Deals < MoCo:** The combined statistical area of this university had fewer venture capital deals or grants since January 1, 2014 than Montgomery County did. Could be attractive to be close to more companies receiving venture capital.
6. **Cap < MoCo:** The combined statistical area of this university had lower dollar amounts of capital flow via venture and grant investing since January 1, 2014 than Montgomery County did. Could be attractive to be close to more companies receiving more venture capital and grants.
7. **Deals < DMV:** The home state of this university had fewer venture capital deals or grants since January 1, 2014 than the DMV region (DC, Maryland, Virginia) did. Could be attractive to be near more companies receiving venture capital. *Important to note that

if DMV were a state, it would be 4th for deal flow after California, Massachusetts, and New York.

8. **Cap < DMV:** The home state of this university had lower dollar amounts of capital flow via venture and grant investing since January 1, 2014 than the DMV region (DC, Maryland, Virginia) did. Could be attractive to be near more companies receiving more venture capital and grants.
9. **Out-of-State Campuses:** This university advertises having one or more campuses in a different state or country than the main campus. Of these, five universities had campuses in the US but outside of the same state as their main campus: Carnegie Mellon, Cornell, Purdue, UC Davis, and University of Southern California.

University Matrix

University	Life Sci PhDs	NIH Funds	Out of State Investing	Diverse Industries	Deals < MoCo	Cap < MoCo	Deals < DMV	Cap < DMV	Out of state campuses
Cornell									
Ohio State									
Penn State									
Purdue									
Texas A&M									
U Illinois									
U Michigan									
<i>Carnegie Mellon</i>									
<i>Duke</i>									
<i>Georgia Tech</i>									
<i>Northwestern</i>									
<i>UC Davis</i>									
<i>U Florida</i>									
<i>U Pittsburgh</i>									
<i>UPenn</i>									
<i>Case Western</i>									
<i>Drexel</i>									
<i>NC State</i>									
<i>UCLA</i>									
<i>UC San Diego</i>									
<i>U Minnesota-Twin Cities</i>									
<i>U Southern California</i>									
<i>U Texas Austin</i>									
<i>U Wisconsin Madison</i>									
<i>Vanderbilt</i>									
<i>Washington U STL</i>									

This preliminary analysis of universities produced the following seven universities that fulfilled six of the nine criteria:

1. Cornell University
2. Ohio State University
3. Pennsylvania State University
4. Purdue University
5. Texas A&M University
6. University of Illinois Urbana-Champaign
7. University of Michigan

The following eight universities fulfilled five out of the nine criteria:

1. Carnegie Mellon University
2. Duke University
3. Georgia Institute of Technology
4. Northwestern University
5. University of California Davis
6. University of Florida
7. University of Pittsburgh
8. University of Pennsylvania

More details about these universities and their relevant research institutes/centers are described below.

CORNELL UNIVERSITY

Weill Cornell College of Medicine in New York City has a range of research institutes focused on various medical specialties. The Ithaca-based Institute of Biotechnology is an umbrella organization and resource for research efforts across the university.

Institute/Center	Overview
<i>Ansary Stem Cell Institute</i>	Research focused on repairing damaged tissues and organs using regenerated or engineered human stem cells. Recent research includes using blood vessel cells to repair and regrow damaged tissues and organs and understanding blood cells' effect on cancer tumor aggressiveness.
<i>Englander Institute for Precision Medicine</i>	Research and development of innovative precision medicine technologies, including disease targeting initiatives for various types of cancer, organoid development to aid in tumor diagnostics, and computational analysis of genetic information.
<i>Institute for Computational Biomedicine</i>	Research focused on the structure of complex biological systems and bridging the gap between bioinformatics and medical informatics. Recent research has studied real-time HIV dynamics to improve infection prevention, the biomedical effects of space flight on humans, and non-surgical prosthetics for eyesight restoration.
<i>Institute of Biotechnology</i>	Umbrella organization that supports the Biotechnology Resource Center Center for Life Science Enterprises (CAT) and McGovern Family Center for Venture Development in the Life Sciences. CAT provides training and technology testing services in a variety of disciplines: genomics, proteomics, imaging, metabolomics, bioinformatics, and flow cytometry.

OHIO STATE UNIVERSITY

Ohio State's life sciences and biomedical research spans across its colleges. Some centers support research across the university to coordinate partnerships, test and commercialize technology, and secure funding.

Institute/Center	Overview
<i>Bioproducts Innovation Center (OBIC)</i>	Provides consumer education and outreach to expedite the commercialization of bio-based products, as well as advisory services for bioproduct businesses.
<i>Center for Clinical and Translational Science</i>	Provides financial, advisory, and organizational services for team-oriented biomedical research across the university, and opportunities for community members to participate in research studies.
<i>Center for Affordable Nanoengineering of Polymeric Biomedical Devices</i>	Research focused on developing nanomaterial technologies with applications for biosensors, biochips, and drug delivery.
<i>Comprehensive Cancer Center</i>	Transdisciplinary center for cancer research, clinical trials, and care programs. Research areas include genomics, sequencing, and tissue banking, and comprehensive research to accelerate immunotherapy for cancer treatment.
<i>Center for Research and Health Analytics</i>	Provides funding, grant management, and laboratory support for faculty and student R&D within the College of Nursing.

PENN STATE UNIVERSITY

The Huck Institutes of Life Sciences serve as a network, funder, and umbrella organization for the university’s life science research centers and laboratories.

Institute/Center	Overview
<i>Applied Biological and Biosecurity Research Laboratory</i>	Interdisciplinary programming to improve global health and biosecurity with a network of international partners. Mission areas are community engagement for health security, understanding pathogen dynamics to design interventions, fighting antimicrobial resistance, and innovating biomedical engineering for health security.
<i>Center for Computational Biology and Bioinformatics</i>	Connects researchers developing computational and bioinformatic approaches to various areas of biological science.
<i>Center for Medical Genomics</i>	Connects researches across disciplines to advance basic genomic research and translation into new diagnostic, therapeutic, and preventative strategies.
<i>Center of Excellence in Industrial Biotechnology</i>	Research and educational activities focused on pharmaceutical manufacturing, bio-based chemicals and fuels, and food biotechnology. Industry partners include Bristol-Myers Squibb, Pfizer, Lilly and MilliporeSigma.
<i>Center for Statistical Genetics</i>	Interdisciplinary forum for experimental geneticists, statisticians, and software engineers. Recent research highlights include eQTL mapping, family-based genome-wide association survey, and functional mapping of pharmacodynamics.

PURDUE UNIVERSITY

Purdue's life science research aligns with the university's engineering expertise and includes multiple departments, as well as other university resources like Discovery Park.

Institute/Center	Overview
<i>Biotechnology Innovation and Regulatory Science Center</i>	Programming focused on meeting regulatory science needs, including applied R&D support, professional education for sector innovators, and a Global Health Challenge.
<i>Center for Implantable Devices</i>	Research focused on devices designed for medical applications including treatment of epilepsy and glaucoma, cardiology monitoring, and neural interfaces.
<i>International Center for Biometric Research</i>	Provides research and innovation opportunities for students in biometrics and other identity management applications. Facilities include a biometric data collection suite.
<i>Institute for Drug Discovery</i>	Research focused on discovery, synthesis, testing, and clinical translation of new drugs. Disease categories include cancer, neurological disorders and trauma, immunology and infectious diseases, and diabetes.
<i>Regenstrief Center for Healthcare Engineering</i>	Research focused on improving healthcare delivery systems. Strategic areas are health analytics, capacity management, and rural and global health.

TEXAS A&M UNIVERSITY

The Institute of Biosciences and Technology is the home of many of Texas A&M's life science research centers. Other departments with relevant life science research include engineering and veterinary medicine and biological sciences.

Institute/Center	Overview
<i>Center for Bioinformatics and Genomic Systems Engineering</i>	Research focused on systems biology, computational biology, and bioinformatics.
<i>Center for Cell and Organ Biotechnologies</i>	Collaboration with the Texas Heart Institute focused on stem cell research, organ transplantation, and personalized medicine. Technologies under development include bioreactors, stem cell therapies, and drugs for pulmonary hypertension.
<i>Center for Epigenetics and Disease Prevention</i>	Research focused on developing protective agents from natural sources, immunoprevention, and drug repurposing through epigenetic mechanisms. Research is transferred into clinical settings at the nearby Texas Medical Center.
<i>Center for Phage Technology</i>	Research focused on developing "phages," viruses designed for their antibacterial purposes.
<i>Center for Statistical Bioinformatics</i>	Develops and promotes the use of modern statistical methodologies in genomics through a training program and seminar series.
<i>Center for Translational Cancer Research</i>	Promotes translation of discovery in cancer cell biology research.

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

The University of Illinois' life science research is organized across a variety of multidisciplinary centers and initiatives, many of which are focused on multiple applications including health.

Institute/Center	Overview
<i>Woese Institute for Genomic Biology</i>	Research focused on three broad areas: health, technology, and environment. Health research areas include microbiome metabolic engineering, computing genomes for reproductive health and nanotechnology for cancer precision medicine.
<i>CompGen Initiative</i>	Builds connections from university's genomic research to big data and large-scale parallel systems to develop new genomic technologies. Recent research includes the development of an instrument that will allow biologists to create new data-management algorithms, among other applications.
<i>Midwest Cancer Nanotechnology Training Center</i>	Provides training to empower the next generation of leaders to leverage nanotechnology to solve life science problems and vice versa.
<i>NIH Center for Macromolecular Modeling and Bioinformatics</i>	Research and development focused on applying advanced molecular modeling and bioinformatic technologies to address needs of the biomedical research community.

UNIVERSITY OF MICHIGAN

The University of Michigan's life science research centers are largely cross-departmental and focused on accelerating promising work. Some of these centers are housed at the University's Life Sciences Institute, which facilitates programmatic collaboration across disciplines.

Institute/Center	Overview
<i>Center for Computational Medicine and Bioinformatics</i>	Cross-departmental research focused on biomedical informatics ranging from basic to translational. Provides training and funding to researchers across the university.
<i>Center for Drug Discovery</i>	Provides support to researchers to translate work to clinical settings. This includes mentorship, access to funding resources, and events and training.
<i>Center for Structural Biology</i>	Provides laboratory facilities and technical support to structural biology researchers within and outside of the university.

GEORGIA INSTITUTE OF TECHNOLOGY

The Petit Institute for Bioengineering and Bioscience brings together Georgia Tech’s engineering expertise with life sciences researchers and serves as the headquarters for several research centers. Other centers outside of the Petit Institute include collaborations with other local universities.

Institute/Center	Overview
<i>Center for Integrative Genomics</i>	Research focused on genetic analysis of genomes, transcriptomes, proteomes, metabolomes and phenomes. Research areas include molecular evolution, quantitative genomics, and systems biology.
<i>Center for the Study of Systems Biology</i>	Research focused on interactions between complex living systems, with applications for disease diagnostics and treatment.
<i>Center for ImmunoEngineering</i>	Cross-departmental research focused on understanding, predicting, and responding to the human immune system. Research areas include immune-therapeutics, immuno-profiling, and systems immunology.
<i>Center for Regenerative Engineering and Medicine</i>	Collaboration with Emory and the University of Georgia focused on endogenous repair, or how human bodies can regenerate themselves. Research areas include biomaterials to control inflammation, limb repair and regeneration, therapeutic delivery, nerve regeneration, cell therapies, and biomanufacturing.

UNIVERSITY OF PITTSBURGH

University of Pittsburgh's life sciences research is conducted by departments across its engineering, pharmacy, and medical colleges. Some centers are based within departments, while others are cross-departmental.

Institute/Center	Overview
<i>Center for Bioengineering</i>	Research department focused on developing materials, instrumentation, and devices for application in biological sciences and medicine. Work includes collaborations with college of medicine and translational research.
<i>Center for Clinical Pharmaceutical Sciences</i>	Research programs within the School of Pharmacy focused on optimizing drug therapy and developing new therapeutics interventions.
<i>Center for Pathology Informatics</i>	Manages clinical information systems to support academic and hospital research into anatomical, digital, clinical, and molecular pathology.
<i>Clinical and Translational Sciences Institute</i>	Provides support resources for translating university research, including connections with clinical trials, seed funding, and advisory services.
<i>Epidemiology Data Center</i>	Supports research efforts at the intersection of biology and statistics. Services include data management and analytics, project coordination, and technology provision.
<i>McGowan Institute for Regenerative Medicine</i>	Research focused on developing technology to address tissue and organ insufficiency. Research areas include tissue engineering and biomaterials, cellular therapies, medical devices, artificial organs, and clinical translation.

CARNEGIE MELLON UNIVERSITY

Life sciences research at Carnegie Mellon occurs within its biological sciences, computer sciences, and engineering departments, as well as cross-departmental institutes. While Carnegie Mellon does not have a medical school, it jointly sponsors the Pittsburgh NMR Center for Biomedical Research with the University of Pittsburgh.

Institute/Center	Overview
<i>Computational Biology Department</i>	Research focused on developing and using models of biological systems constructed from experimental measurements. Research areas include active learning of cell organization, algorithms for large-scale genomics, and development of machine learning for clinical applications.
<i>Center for the Mechanics and Engineering of Cellular Systems</i>	Research focused on understanding mechanical signals inside living cells for various biomedical applications. Researchers working within the center come from various departments, including engineering, physics, life sciences, and computation.
<i>Disruptive Health Technology Institute</i>	Provides R&D and investment support to accelerate adoption of technology with medical applications. Current projects include applications for blood count testing, reducing side effects of cancer treatments, and treating inflammatory bowel disease.

UNIVERSITY OF FLORIDA

The University of Florida's life sciences research centers span a variety of colleges, including medicine, pharmacy, dentistry, engineering, and arts and sciences. Interdisciplinary institutes also coordinate certain research areas.

Institute/Center	Overview
<i>Center for Natural Products, Drug Discovery, and Development</i>	Provides infrastructure, chemical libraries, and expertise to foster early-state drug discovery. Focus areas include microbial genomics, molecular diversity and screening, molecular pharmacology, structure-based drug design, and synthetic chemistry.
<i>Center for Pharmacometrics and Systems Pharmacology</i>	Provides translational research and training focused on personalized medicine in quantitative clinical pharmacology. Focus areas include modeling and simulation techniques to de-risk clinical trials, development of disease models, improving drug safety, and integrating new technologies into the drug development process.
<i>Center of Excellence for Regenerative Health Biotechnology</i>	Supports commercialization of technologies to treat and cure human diseases. Activities include education, translational research, and pharmaceutical manufacturing.
<i>Interdisciplinary Center for Biotechnology Research</i>	Supports university-wide biotechnology research through seven core service laboratories: Bioinformatics, Cytometry, Electron Microscopy, Gene Expression & Genotyping, Monoclonal Antibody, NextGen DNA Sequencing, and Proteomics & Mass Spectrometry.
<i>Institute for Therapeutic Innovation</i>	Research focused on developing optimized chemotherapy for a variety of infectious disease pathogens. Laboratories include antiviral pharmacodynamics and computational infection biology.

University Presence in the Region

Several non-local universities have a local presence in the Washington, DC region. Some of the listed universities include:

- Cornell University—3 properties in DC
 - 2148 O Street NW (“Cornell in Washington” is lease name)
 - 23,666 square feet, sole tenant
 - Occupied since June 2003
 - 815 Connecticut Ave NW
 - 2,338 square feet
 - Occupied since November 2016
 - 400-444 N Capitol Street NW
 - 2,500 square feet
 - Occupied since October 2017
- Ohio State University Federal Relations—1 property in DC
 - 400-444 N Capitol Street NW
 - 1,600 square feet
 - Occupied since unspecified
- Texas A&M University—1 property in DC
 - 1747 Pennsylvania Ave NW
 - 2,823 square feet
 - Occupied since September 2012
- Carnegie Mellon University—2 properties in DC and 2 in Arlington
 - 100-110 Maryland Ave NE, Washington, DC
 - 2,150 square feet
 - Occupied since April 2018
 - 400-444 N Capitol Street NW, Washington, DC
 - 1,000 square feet
 - Occupied since November 2017
 - 4301 Wilson Blvd, Arlington, VA
 - 24,337 square feet
 - Occupied since September 2016
 - 4401 Wilson Blvd, Arlington, VA (“Carnegie Mellon Software Engineering Institute”)
 - 22,884 square feet
 - Occupied since March 2007
- Duke University—1 property in DC
 - 1201 Pennsylvania Ave NW, Washington, DC
 - 14,400 square feet
 - Occupied since March 2017

- Georgia Tech—1 property in VA and 1 in MD
 - 1700 Moore Street, Arlington, VA
 - 11,026 square feet
 - Occupied since December 1994
 - 46610 Expedition Dr, Lexington Park, MD
 - 5,071 square feet
 - Occupied since November 2014
- University of Pittsburgh—1 property in DC
 - 2025 M Street NW, Washington, DC
 - 1,235 square feet
 - Occupied since August 2008
- Case Western Reserve University—1 property in DC
 - 820 1st Street NE
 - 8,200 square feet
 - Occupied since November 2013
- Drexel University—1 property in DC
 - 801 17th Street NW, Washington, DC
 - 5,058 square feet
 - Occupied since January 2013
- University of Southern California—2 DC properties
 - 701 Pennsylvania Ave NW
 - 5,030 square feet
 - Occupied since unspecified
 - 1901 K Street NW (“USC Dornsife”)
 - 3,529 square feet
 - Occupied since October 2016
- University of Texas System—1 DC property
 - 1750 Pennsylvania Ave NW
 - 8,956 square feet
 - Occupied since May 2013

Initial University Outreach

Based on various research inputs, MCEDC developed a list of universities to target for initial outreach. For each university, we created a profile to identify unique research strengths and assets that could support the evolution of our biohealth industry.

Additionally, we identified key contacts within the university administration, licensing and commercialization offices, interdisciplinary life science research institutes, medical and bioengineering faculty, and tech transfer/industry partnership staff.

We also identified specific researchers with academic or industry experience in Montgomery County who could offer a comparative perspective.

Based on these profiles, we initiated preliminary conversations with specific individuals. The conversations were targeted to allow MCEDC to:

- Evaluate the potential for commercialization in emerging “bio-adjacent” tech verticals
- Understand the needs and requirements of academic researchers
- Assess the desirability of a satellite location in Montgomery County
- Identify how researchers are currently engaged with County assets, as well as opportunities to strengthen such engagements through public investments
- Evaluate the administrative culture around expansion and satellite locations

A Note on COVID-19

This research project was initiated prior to the COVID-19 global pandemic crisis.

COVID-19 has drastically altered the landscape for both public and private research universities. Universities are now unlikely to be in expansion mode; rather, they are scrambling to react to significant disruptions of their academic business model as well as furloughs, drained budgets, and massive enrollment fluxes.

Some analysts predict that we could see the accelerated demise of bricks and mortar universities and the permanent transition to remote learning, which was already on the rise prior to the pandemic. As online education becomes more of a fixture of higher education, there may be unique opportunities for universities to rethink their education models.

Some analysts predict that the pandemic has created a prime opportunity for big tech’s entry into higher education. The post-pandemic future could entail partnerships between the largest tech companies in the world and elite universities which would allow universities to expand their enrollment by offering hybrid online-office degrees, the affordability and value of which could seismically alter the landscape of higher education. There are concerns that these shifts could exclude non-traditional student populations.

Key Findings

Biohealth is an evolving industry that presents unique opportunities for a tech-based approach to local economic growth.

The field of biology is rapidly evolving to incorporate innovative technological advancements in engineering, computer and data science, environmental science, and advanced manufacturing.

Some of the more prolific research fields reflecting the interaction of biology and emerging technology include:

- robotics
- computational biology and bioinformatics
- quantum computing
- artificial intelligence and machine learning
- medical devices and wearables
- cyber security and IoT
- nanobiotechnology
- biomaterials
- biomanufacturing
- artificial organs
- synthetic biology
- sustainable systems
- additive manufacturing
- bioenergy and integrated energy systems
- bioenvironmental engineering
- cellular & medical imaging
- biorenewable systems

Many universities across the country have invested in research institutes and infrastructure to bolster this research. The result is a rapid blurring of lines between traditional life science verticals in ways that can translate innovative market solutions to large, unmet challenges in biology, healthcare, medicine, mobility and the environment.

The Montgomery County biohealth sector is uniquely positioned to capitalize on these research breakthroughs. There could be a role for public support of these technologies and industry-

academic collaboration to better position our biohealth industry to leverage and commercialize these research findings. Our companies could ultimately lead in the development of new medical devices or pioneer novel approaches to personalized healthcare, drug delivery, and manufacturing.

In particular, we received positive feedback about opportunities at the intersection of biotechnology and big data. Our conversations with researchers suggested high industry demand for computational biologists both locally and nationally. The industry need was projected for at least several years, with the possibility of that timeline being extended due to COVID-19. We engaged with one prestigious international university with a particularly strong interest in exploring opportunities in Montgomery County at the intersection of biotechnology and big data.

Through public support of innovative academic-industry partnerships based on these emerging technologies, opportunities may exist for new company formation, talent development, and increased pathways to opportunities for County residents.

Public investment in this space could have benefits that extend far beyond the local biohealth cluster. Computational science experts repeatedly emphasized the power of predictive data analytics to transform any industry looking to analyze large quantities of data across disparate physical and network systems. Intentional public investment in the computational sciences could impact the development and commercialization of other County tech verticals, including defense tech, gaming, IT, international trade, and public health.

Though the prospects for university attraction are slim, the opportunity for consortiums or partnerships merit further exploration.

We found limited instances where universities required a satellite campus to access industry connections.

One exception is when Purdue opened a satellite office in Silicon Valley in 2010 to connect its engineering and tech strengths with Bay Area companies. Similarly, some universities have created outposts in Los Angeles to connect students within the entertainment industry. It is unclear about the current status or success of these initiatives.

Researchers overwhelmingly indicated that they did not need to be located in Montgomery County to enhance their research capabilities. Most researchers indicated that they could readily access federal research dollars without a physical presence in the Washington, DC region. Moreover, they were minimally connected with our federal lab system; only one researcher mentioned a prior partnership with NIST.

We did receive some feedback that Montgomery County could be considered a highly desirable location for researchers outside of the top-ten university rankings. As far as potential models, we received feedback that a consortium model could be appropriate; this would allow several universities to participate with some permanent researchers and some rotating researchers. We

also heard that the Scripps model, including the Jupiter expansion, was an empowering model for researchers.

Across the board, university experts and researchers emphasized the value of industry partnerships. There is a growing consensus that the private sector can further important university goals, including licensing, funding support, and research assistance.

We came across some instances of universities partnering with private industry to advance R&D in bio-adjacent fields; however, it appears that such partnerships are still in early stages.

It could be worthwhile for MCEDC and the County to include outreach to university tech transfer offices and individual researchers to better understand commercialization opportunities that could benefit our local technology companies.

It is worth noting that an expressed interest at the university administrative level to further industry partnerships does not necessarily translate into commercialization success.

In reality, whether researchers can successfully engage the private sector to advance research goals will depend on a variety of factors that are not the scope of this project. The success will depend in part on the individual preferences and interests of the researchers, as well as whether the university has invested into the mechanics of successful partnership – the depth of network, infrastructure and capacity to foster arrangements that empower both university and private partners to achieve goals.

Ultimately, embracing industry partnerships as a pathway to meeting academic and economic development goals is a substantial endeavor that requires consistent efforts and dedicated resources to develop a pipeline of successful partnerships.

Aside from the satellite campus concept, University researchers can serve as a wealth of information for technology-led economic development efforts.

Researchers often possess unique business intelligence because they are engaged at the cutting edge of their field and have network access to top talent. As a result, they can provide valuable market insight to County-led development efforts.

As an example, during conversations with a private East Coast university, we learned that one of Montgomery County's largest hospitality brands has lost its edge in talent recruitment due to competition from other brands perceived to be more appealing to the next-generation workforce. Additionally, we gained insight on how to access the university's network of hospitality tech funders.

In another instance, we engaged a local university-federal lab researcher who facilitated an A.I. licensing deal with a County biohealth enterprise. He emphasized the depth of tech talent in the region that rivals that of Silicon Valley but is unfortunately hidden due to restrictive tech transfer policies. He shared that there is new momentum at the federal and university level, as well as

from top leadership within his organization to effectuate better industry partnerships, and that resistance is mainly limited to middle management.

In another example, a local university approached us to apply for federal CARES Act funding; the partnership would focus on economic growth strategies related to the COVID-19 coronavirus impact in our transit-oriented urban corridors.

These conversations provide rich intel that could guide MCEDC in exploring new avenues to support local business growth, business attraction, and technology commercialization.

A successful engagement with academic research institutions would be a long-term project, rooted in the mutual interests of expert researchers and local industry.

Over time, there could be multiple university partners leveraging Montgomery County's significant industries and assets to reach their own institutional goals.

MCEDC could explore whether there are any small-scale partnerships that could be pursued to leverage and coordinate cooperation between university and federal research expertise. For example, MCEDC recently engaged in a conversation with a local professor about how to support a University of Maryland and FDA consortium for pediatric medical device innovation.

Additionally, there could be opportunities to enhance interdisciplinary biotechnology research with an emphasis on product development, such as the NIH e-C3i Pilot Project. This federally funded program provides medical device innovators with the educational and business framework to translate ideas from lab to market; this concept could be scaled to leverage our high concentration of university and federal lab post-docs as a new source of entrepreneurship and product development expertise.

A long-term effort to release the full potential of our federal and university research partners may require additional forms of support including legislative ones. Regardless of any formal partnership that is advanced, MCEDC and the County should continue to engage with the professors, experts and graduate students who are driving the discovery and innovation that can support desirable economic outcomes in our community.