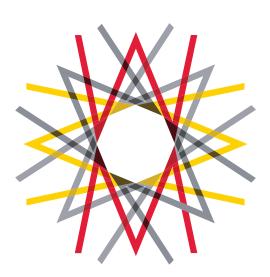
CENTER FOR MARYLAND ADVANCED VENTURES FY 2020 REPORT



CENTER FOR MARYLAND ADVANCED VENTURES OVERVIEW

The University of Maryland Strategic Partnership Act of 2016 created and funded the Center for Maryland Advanced Ventures (CMAV), which launched on July 1, 2017. The legislation provides \$4 million annually to strengthen the commercialization of high-potential, university-based discoveries. Located in Baltimore City on the University of Maryland, Baltimore campus, CMAV is led by Jim Hughes, Director of CMAV and UMB's Senior Vice President and Chief Enterprise and Economic Development



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President and Chief Enterprise and Economic Development James L. Hughes, MBA Officer.

CMAV has implemented a series of strategic and thoughtful initiatives to fulfill its legislative mission of facilitating technology transfer, identifying research projects that can be commercialized, and developing programs to support that commercialization. The initiatives connect to and expand existing UM Ventures programming, enhancing support for the advancement of technology commercialization. Through collaboration with TEDCO and the Maryland Department of Commerce, CMAV is able to leverage existing Maryland programs, ensuring they are fully integrated with and complimentary to CMAV initiatives. CMAV works with these entities to continually augment offerings to address emerging technologies. In FY2020, additional programs were created in response to COVID-19.

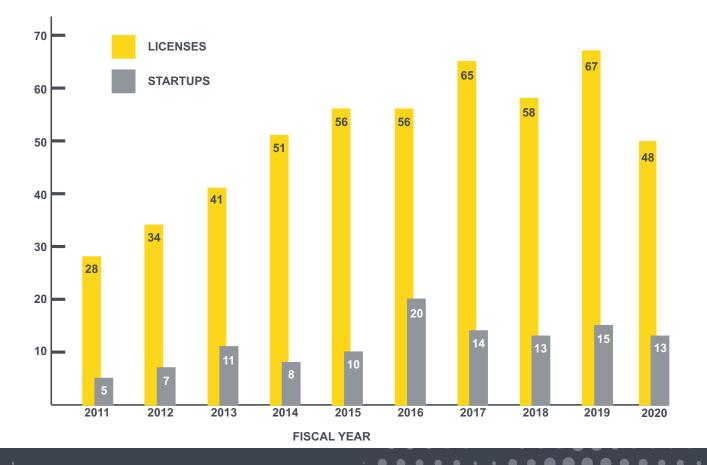
TECHNOLOGY COMMERCIALIZATION



Since UM Ventures was formed in 2012, there has been a dramatic increase in technology transfer activities at both UMB and UMCP. In FY2020, UM Ventures recorded 333 new disclosures, 48 licenses, created 13 new start-ups, and was awarded 17 Maryland Innovation Initiative (MII) grants. Licensing results in FY2020 were depressed due to economic turmoil related to the COVID-19 pandemic, however, start-up creation remained strong and included several enterprises directly related to addressing COVID-19.

Strategic industry partnerships have strengthened and the portfolio of high-profile start-ups has increased. These goals have been achieved through the concerted effort of UM Ventures staff and industry outreach.

In addition, targeted initiatives have been created to support and advance technology transfer and commercialization.

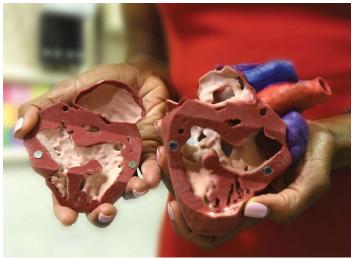


SPECIALIZED FACILITIES

Specialized facilities have been created at UMB to further foster technology commercialization.

- A 650 sq. ft. wet laboratory with molecular and cell biology capabilities and specialized equipment was opened in the UM BioPark in FY2020 and is staffed by UMB's Office of Technology Transfer (OTT).
- After significant work with leading UMB surgeons to expand the development of novel medical devices, a medical device innovation and

rapid prototyping space was created in collaboration with the University of Maryland School of Medicine (UMSOM). Located in the UMSOM and connected to the University of Maryland Medical Center, the space facilitates easy access for surgeons. OTT and the Robert E. Fischell Institute for Biomedical Devices will provide direct support, enabling CAD drawings, 3D printing, rapid



prototyping, and streamlined patent filing, all of which will support the rapid expansion of UMB's medical device portfolio. This effort is financially supported by significant philanthropic contributions to UMSOM.

LIFE SCIENCES IP FUND

21 TECHNOLOGIES

UMB START-UPS FORMED

The Life Sciences IP Fund provides proof-of-concept and external validation funding to accelerate commercialization of technologies at UMB. Since the program's inception in February 2018, **CMAV has assisted 21 early-stage technologies, including 10 device and 11 therapeutic technologies, in moving towards commercialization.** All have received project management support along with funding for technology validation and further development. Three new UMB start-ups, Isoprene Pharmaceuticals, Protaryx, and GEn1E Lifesciences, have been formed as a result of the program. Both Protaryx and GEn1E Lifesciences have successfully completed initial financing rounds, and Isoprene recently executed a sublicense agreement with Hoth Therapeutics.

INSTITUTE FOR CLINICAL & TRANSLATIONAL RESEARCH

17 PROJECTS FUNDED

1 COVID-19 PROJECTS

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UMB's Institute for Clinical & Translational Research (ICTR) is the first Universitywide interdisciplinary hub for clinical translational research and training. CMAV funds supported this unique center which operates as part of a consortium with JHU. **ICTR funded 17 general projects and 10 COVID-19specific projects in FY2020. Of these, it is anticipated that 21 have potential technology transfer value.** UMB's Office of Technology Transfer works closely with UMSOM on this initiative and aa joint program manager facilitates interaction. CMAV also supported patient-oriented research and Phase II clinical trials through ICTR.

ARTIFICIAL INTELLIGENCE & MEDICINE FOR HIGH IMPACT CHALLENGE AWARD

The Artificial Intelligence & Medicine for High Impact Challenge Award (AIM-HI) was launched by UMB and UMCP to support innovation in the fields of artificial intelligence and medicine. Four joint UMB/UMCP research teams were selected for funding.

MEDICAL DEVICE DEVELOPMENT FUND

\$200K AWARDS FUNDING COVID-19 PROJECTS

The Medical Device Development Fund launched in October 2018 with the purpose of contributing to a meaningful milestone that would advance a medical device technology towards commercialization. In FY2020, the Fund focused on proposals that would contribute to the commercialization of evidencebased medical devices related to the COVID-19 pandemic. The technologies utilize UMB and UMCP strengths in medical devices (e.g., Robert E. Fischell Institute) and related innovation (e.g., computer technology) to rapidly contribute to human health and related outcomes with respect to COVID-19 or the causal virus (SARS-CoV-2), including prevention, control, and response efforts. Awards of \$50,00 each were made to four joint UMB/UMCP projects.

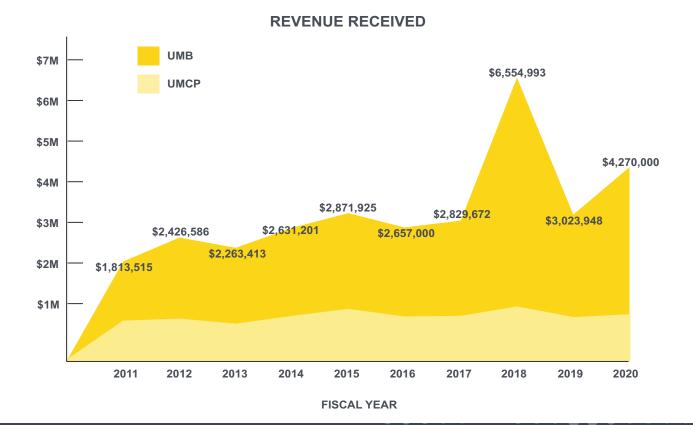
ONEX

OnEx, UM Ventures' online express license store which offers a streamlined licensing experience for select software and materials, processed 39 transactions in FY2020. The store creates an additional access point for industry to peruse technologies that are routine and ready to be commercialized. Plans are underway to streamline the payment system to support an increase in the number of transactions.

VALUE OF LICENSED TECHNOLOGIES

It is difficult and highly speculative to value technologies when they are first licensed, however, the technology transfer revenues to UM Ventures increased in FY2020 to \$4.25 million. UM Ventures has also seen four acquisitions of UMB technologies in three years.

Additionally, equity raised by UM Ventures start-up companies is a good indicator of the value of the technology and the strength of the management team. **Publicly disclosed equity raised by our start-ups exceeded \$12 million in FY2020. Two UMB start-ups, SurgiGyn and Breethe, were sold in FY2020** with undisclosed terms. SurgiGyn also recently announced a Series B investment of \$7 million.



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MARYLAND MOMENTUM FUND

8 INVESTMENTS \$1.8M INVESTED

A collaboration between UM Ventures and the University System of Maryland (USM), the Maryland Momentum Fund (MMF) is a \$10 million early-stage investment fund that invests in Maryland-based, USM-affiliated start-up companies. With input from 28 review panels, the external advisory board reviewed 21 companies for investment in FY2020, approving eight. A total of \$1.8 million was invested by MMF and other USM institutions. To date, MMF has invested a total of \$4.6875 million in 16 companies (including several follow-on rounds), representing eight USM campuses. MMF's investment has been matched by \$21 million from more than 20 co-investors. This 5:1 match of USM dollars far surpasses the original goal of a 2:1 match. Portfolio companies have created 66 new jobs and increased their valuation substantially.

CMAV funds a full-time Director based at UMB, partially funds additional staff based at UMCP, and covers operational expenses for the program. MMF staff work with all 12 USM institutions to solicit applications for funding and provide advice and support to entrepreneurs across USM campuses.

PRESIDENT'S ENTREPRENEURIAL FELLOWSHIP

The President's Entrepreneurial Fellowship program provides UMB and University of Maryland, College Park Robert H. Smith School of Business MBA students the opportunity to learn first-hand the unique challenges of commercializing life science technologies. Mentored by UM Ventures staff, the Fellows work on interdisciplinary teams, commercializing UMB-owned technologies. Seven students from four UMB schools were accepted into the 2019-20 cohort. The Fellows again worked with Isoprene Pharmaceutical, this year focusing on preparing for pre-clinical animal safety studies of toxicity and metabolism and an SBIR submission. Plans were created to move the President's Entrepreneurial Fellows program to an online platform for the 2020-21 cohort.

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GRADUATE RESEARCH INNOVATION DISTRICT

The Graduate Research Innovation District (Grid), created in 2017, fosters student entrepreneurship through a variety of educational opportunities, entrepreneurial resources, and programming. Co-located with startups in the UM BioPark's Lion Brothers Building's innovation space, the Grid gives students a peek into the day-today life of an entrepreneur building their company. The Lion Brothers Building, along with CMAV, provides early-stage



companies with the space and services needed to grow their ventures.

START-UP TENANTS

UM BioPark tenants in the Lion Brothers Building include a number of startup companies, such as b.well and ARMR, the Grid, UMB Graduate School, the Small Business Development Center, and the Carey School of Law IP and Business Law Clinic.

During FY2020, two Lion Brothers start-up companies achieved significant growth. CMAV supported seven additional early-stage companies in making the Lion Brothers Building's innovation space their headquarters.

bwell

b.well, a health IT firm founded in 2015 with five employees, grew to more than 50 employees nationally and graduated from the Lion Brothers space at the end of the fiscal year.

ARMR

ARMR, a medical device company engineering a next-generation tourniquet, tripled their leasing space, expanding into a new suite of offices within the Lion Brothers Building, raised a \$750,000 seed round which included a \$350,000 joint investment from UMB and MMF, established a strategic relationship with the R Adams Cowley Shock Trauma Center, and hired additional employees.

STUDENT PROGRAMS

The Grid's opportunities for student entrepreneurs and innovators expanded with nearly 900 participants in more than 20 programs. Additionally, eight teams participated in the Grid Pitch, an annual showcase where students pitch their innovative business ideas to a panel of experts and investors. Final presentations were held virtually due to COVID-19 restrictions.



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In September 2019, the Grid became home to the UMB Graduate School's MS in Health and Social Innovation. Six students formed the inaugural cohort.

At the end of FY2020, the Grid relocated from the UM BioPark to the main UMB campus. The new location in the Health Sciences and Human Services Library (HS/HSL) provides a more central convening destination for students, faculty, staff, and the community. The innovation space in the UM BioPark's Lion Brothers Building continues to house early-stage companies.

SMALL BUSINESS DEVELOPMENT CENTER

The Small Business Development Center (SBDC), the Federal small business outreach entity, is supported by CMAV with funding and space. With two locations, one on the main UMB campus and one in the UM BioPark's Lion Brothers Building's innovation space, the SBDC is strategically positioned to provide direct assistance to local and University-affiliated entrepreneurs. During FY2020, they served 358 new clients in Baltimore City, resulting in the creation of 108 jobs and 21 new businesses. They also provided over \$18 million in 81 SBA loans and an additional 39 COVID-19 funding actions.

INTELLECTUAL PROPERTY LAW AND ENTREPRENEURSHIP CLINIC

The Intellectual Property Law and Entrepreneurship Clinic (IPEC), supervised by Patricia Campbell, law school professor, and two part-time clinical law instructors, engaged 24 second- and third-year law students (12 each semester). The students gained valuable work experience providing 117 clients with general counselling on basic business law, the protection of trade secrets, and preparing nondisclosure agreements. They also assisted with the formation of four new Maryland limited liability companies and worked with clients to file five copyright registrations, 50 trademark applications, and 19 patent applications. Service was suspended on March 5, 2020 due to COVID-19 restrictions, but will resume once the University returns to standard operations.

GRANT ACTIVITIES

ANCHOR VENTURES

Anchor Ventures harnesses the collective expertise and influence of local universities, key stakeholders, entrepreneurs, and investors to foster the collaboration and education of Baltimore's innovation ecosystem. Led by a cohesive team of entrepreneurial staff from UMB, Johns Hopkins University (JHU), the USM Chancellor's Office, and University of Maryland, Baltimore County (UMBC), Anchor Ventures provided six programmed events during FY2020. When COVID-19 shuttered in-person

events, the Anchor Ventures team transitioned to a

ANCHOR

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virtual series, collaborating with the Chesapeake Digital Health Exchange (CDHx) to provide a four-part digital health series in May 2020. Over the course of the series, there were more than 365 live attendees and thousands of post-event views of the content. Anchor Ventures received a grant from the Maryland Department of Commerce to support programming in FY2021.

MARYLAND DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT SEED GRANT

A SEED Grant from the Maryland Department of Housing and Community Development (DHCD), is supporting UMB's development of additional entrepreneurial infrastructure in West Baltimore. The **\$750,000 grant provides funding to off-set the development of District Hall**, an 11,400 sq. ft. innovaton space in the 4MLK, UM BioPark's planned 330,000 sq. ft. mixed-use building. District Hall will provide places where companies of all sizes, stages, and industries can build their businesses and connect with one another as well as regional anchor institutions. Wexford Science + Technology, the developer of 4MLK, is matching the award. UMB is leveraging its innovation expertise by teaming with DHCD to help revitalize the historic Packing House in Cambridge, Maryland.

BALTIMORE FUND

18 COMPANIES



The Baltimore Fund encourages University-created or -sponsored technology companies to locate and expand in Baltimore City as specified in the legislation. The program is open to all Maryland public higher education institutions and is administered by UMB. Through engagement with Maryland's entrepreneurial ecosystem and its myriad support programs and resources, including TEDCO, Baltimore Development Corporation, and the Maryland Department of Commerce, the Baltimore Fund helps facilitate the growth of companies.

- Since its inception in 2017, UMB has provided conditional grants to 18 companies. To date, these companies have created and/or retained over 400 jobs in Baltimore City.
- Of these grants, 12 emerging companies received lease subsidies to establish operations in Baltimore City, and six grants supported the direct expansion of existing companies.
- The Baltimore Fund collaborates with six Baltimore City locations and USM institutions located in Baltimore to source and house the emerging companies.
- Companies receiving Baltimore Fund conditional grants represent four USM institutions and a wide array of technologies.

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FY2020 METRICS SUMMARY

- 1. Technology transfer transaction efforts at UMB and UMCP have been augmented with CMAV initiatives, resulting in 333 disclosures, 48 licenses ,and 13 new start-up companies in FY2020.
- 2. UM Ventures staff created new programs and services to increase the pipeline of technologies that will likely convert to technology transfer opportunities in future years.
- 3. CMAV initiated extensive outreach to University entrepreneurs and industry partners, and developed multiple strategic initiatives to deliver funding, educational, and programmatic support.
- 4. UM Ventures received revenue in excess of \$4 million in FY2020 from technology transfer activities.
- 5. Publicly disclosed equity raised by UMB start-ups exceeded \$12 million in FY2020; non-disclosed equity was significantly higher.
- 6. Direct support was provided to entities affiliated with UMB, UMCP, UMBC, University of Maryland, Eastern Shore, University of Maryland Global Campus, Towson University, and University of Baltimore in FY2020.
- 7. New programs were created to encourage IP creation and development in response to the COVID-19 pandemic.

RECOMMENDATION FOR FY2021

- Support connections between tech transfer activities and research parks/ incubators.
- Strengthen connections with local angel networks and national venture capital companies.

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- Ensure outreach to and inclusion of underserved populations in activities.
- Create more opportunities to educate interested USM faculty, staff, and students on technology transfer opportunities and entrepreneurial skills.