



University System of Maryland

Economic Development and Technology Commercialization

December 2014

Some Notable Highlights

83% increase in new patents
filed (227 in 2013) compared to 2011

398 disclosures in 2014
compared to 292 in 2013

1.2 billion in total research
spending – USM is ranked **8th** in the US

111 joint research proposals,
nearly three times 2012

249 new companies
facilitated since 2011 against the 2020 strategic plan goal of 325



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Context

Recent years have seen a push to increase the level of technology transfer and entrepreneurship across the USM

- The Board of Regents created a standing Committee on Economic Development and Technology Commercialization

Economic development and innovation is a core goal of the USM 2020 Strategic Plan

- A primary theme is to advance Maryland's competitiveness in the innovation economy. Goals under this theme include:
 - Facilitate the creation of 325 new companies
 - Create a culture of innovation and entrepreneurship throughout the USM

Economic Development is a priority for the State and the legislature passed two key initiatives in 2014

- **The RISE Zones initiative** to spur economic development and create communities of innovation. A significant part of Maryland's economy, nearly 6%, is based on the research and development sector, so the opportunities for commercial development around universities and federal labs are strong.
- **The "E-nnovation" initiative** to create a \$100 million matching fund for recruiting the world's best scholars to Maryland in areas as diverse as cyber security, biotechnology, STEM education, autonomous systems, language science and food safety. The fund will require these scholars to work with other Maryland universities, federal labs or with innovative startup companies, ensuring integration of research into economic development.

Recent Federal Initiatives have created new opportunities for accelerating commercialization and fostering entrepreneurship

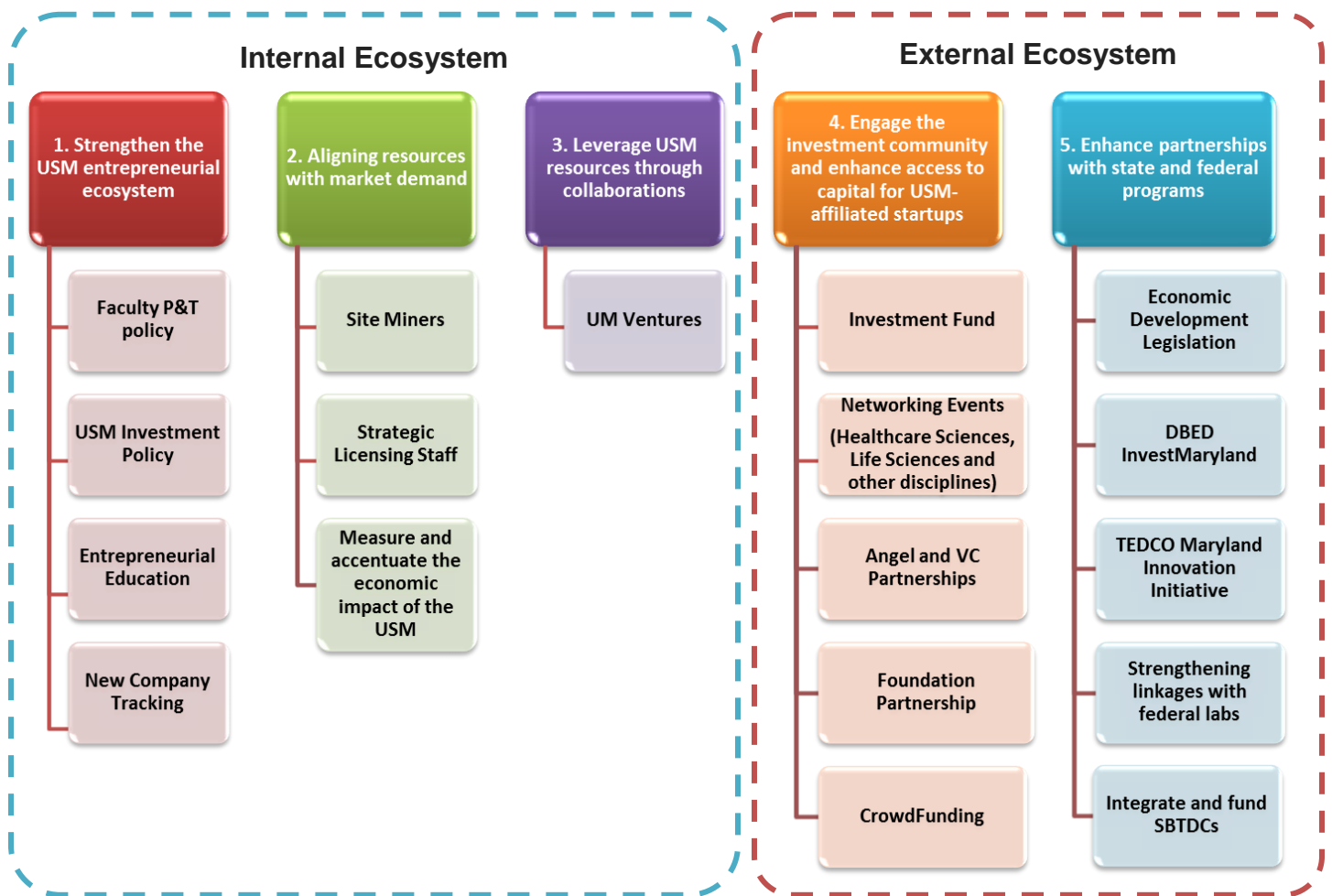
- **JOBS Act** – Crowdfunding allows entrepreneurs to raise investments up to \$1 million per year through approved channels (online financial intermediaries) from both accredited and non-accredited investors. SEC released rules for Crowdfunding on October 23, 2013.
- **I-Corps** is a set of activities and programs that prepare scientists and engineers to extend their focus beyond the laboratory and broadens the impact of select, NSF-funded, basic-research projects.

USM institutions facilitated the creation of 176 companies towards the 2020 Strategic Plan goal of 325 companies in 10 years

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Strategic Focus Areas and Growth

To transform and accelerate technology commercialization and entrepreneurship throughout the USM, the BOR Committee has focused on five strategic areas, as depicted in the chart below:



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The BOR Committee initially focused on the internal entrepreneurial ecosystem, represented by strategic focus areas 1, 2, and 3, and is now shifting attention to the external ecosystem, represented by 4 and 5. Highlights of initiatives related to these strategic focus areas include:

1. **Strengthen the USM entrepreneurial ecosystem**

- a. The USM has put in place Faculty P&T and Sabbatical Leave policies that reward research with potential for commercial development
- b. Tracking USM-affiliated new company formation against the strategic plan goal of 325 companies by 2020

2. **Aligning resources with market demand**

- a. The USM has boosted site miners, entrepreneurs in residence, and licensing staff resources.

3. **Leverage USM resources through collaborations**

- a. UM Ventures, through collaborative leadership between the University of Maryland, Baltimore and College Park, is bringing innovative products to market, expanding collaborations with industry, and creating new jobs in Maryland by integrating the commercialization and entrepreneurial programs of the two powerhouse universities.
- b. Due to new investments in staffing and program funding as well as the coordination of the entrepreneurial offices at UMB and UMCP, UM Ventures has achieved significant growth in invention disclosures, licenses executed, and startup companies in the last two years.

4. **Engage the investment community and enhance access to capital for USM-affiliated startups**

- a. The Board also recently approved a USM Investment Policy that enables USM institutions to invest in startups that license USM intellectual property.
- b. The USM is also promoting networking events in the biomedical sciences and other disciplines

where faculty members and recent startups give presentations on their technologies to an audience of venture capitalists, angel investors and serial entrepreneurs.

5. **Enhance partnerships with state and federal programs**

- a. HB 442 -- Maryland Innovation Initiative (MII) -- MII was created as a partnership between the State of Maryland and five Maryland academic research institutions (Johns Hopkins University, Morgan State University, University of Maryland College Park, University of Maryland Baltimore and University of Maryland Baltimore County) and is designed to promote commercialization of research conducted in the partnership universities and leverage each institution's strengths.



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- b. Invest Maryland Program -- Through a premium insurance tax credit auction sale, the State of Maryland raised \$84 million to invest in early stage technologies in the areas of software, communications, cyber security, and life sciences.
- c. Maryland Cyber Security Investment Incentive Tax Credit -- Effective January 2014, the purpose of this new program is to incentivize and attract cyber security companies to startup in or move to Maryland and provides refundable tax credits for investments from an in-state or out-of-state investor.
- d. Working with NIST and other federal agencies to evaluate ways to accelerate the technology commercialization process

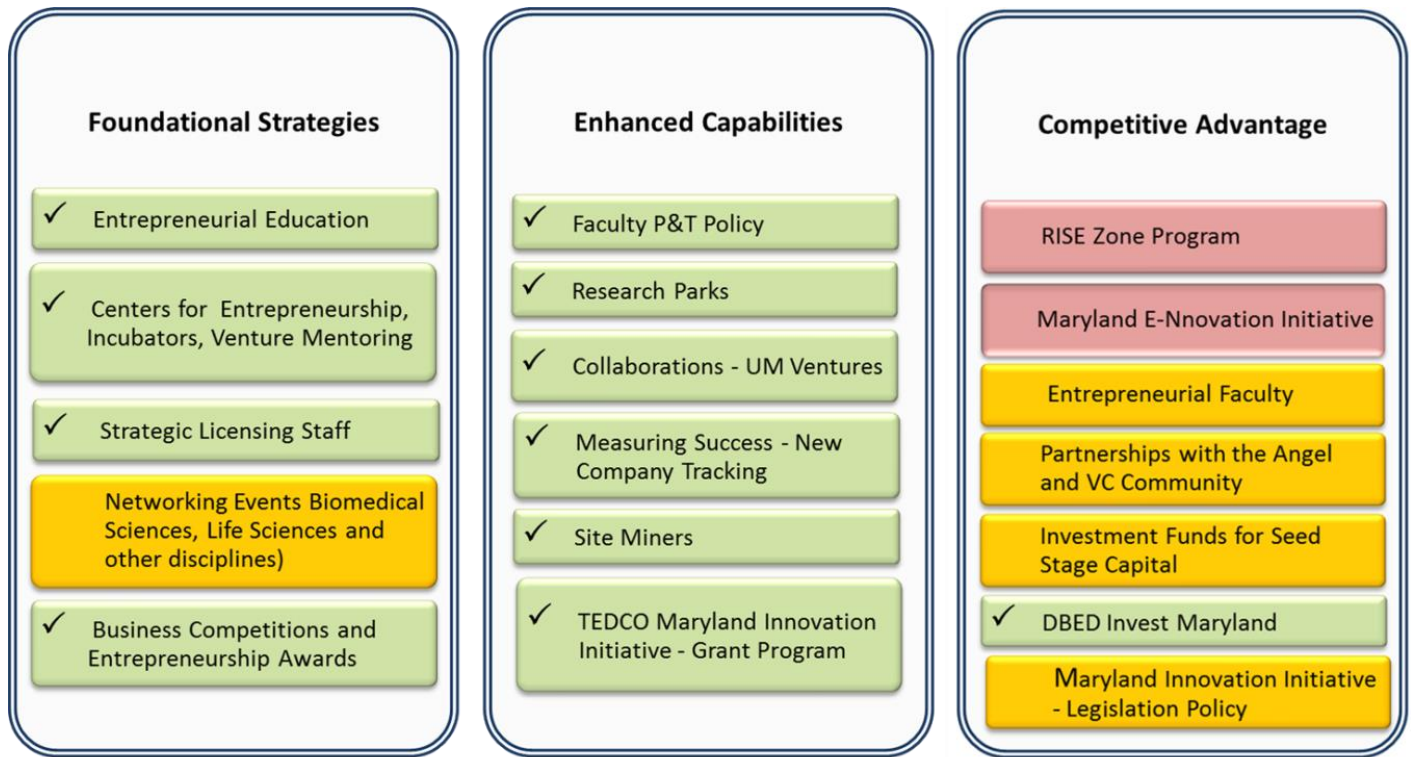
In terms of the external ecosystem:

- UM Ventures has created an Investment Fund to provide early stage capital and is working on a partnership with the USM Foundation as well as developing strategies to enhance engagement with the investment community
- We are also working on strengthening partnerships with various state and federal programs.
 - New leadership package for economic development in 2014, including the Maryland E-nnovation Initiative, RISE Zones, and Cyber Seed Investment Fund
 - E-nnovation Initiative -- The Maryland E-nnovation Initiative will allow for the auctioning of varied credits to the private sector to match higher education funding to attract the best research scholars to USM institutions.
 - RISE Zones -- The Regional Institution Strategic Enterprise (RISE) Zone legislation will utilize enhanced property and income tax credits and accelerated depreciation schedules to spur significant financial investments in designated "RISE Zones".
 - Cyber Seed Investment Fund -- The cyber fund would make investments of up to \$100,000 in seed/early stage cyber security companies that develop products for both government and commercial markets.

UM Ventures, in addition to its efforts on expanding collaborations among USM research institutions, has created an Investment Fund to provide early stage capital

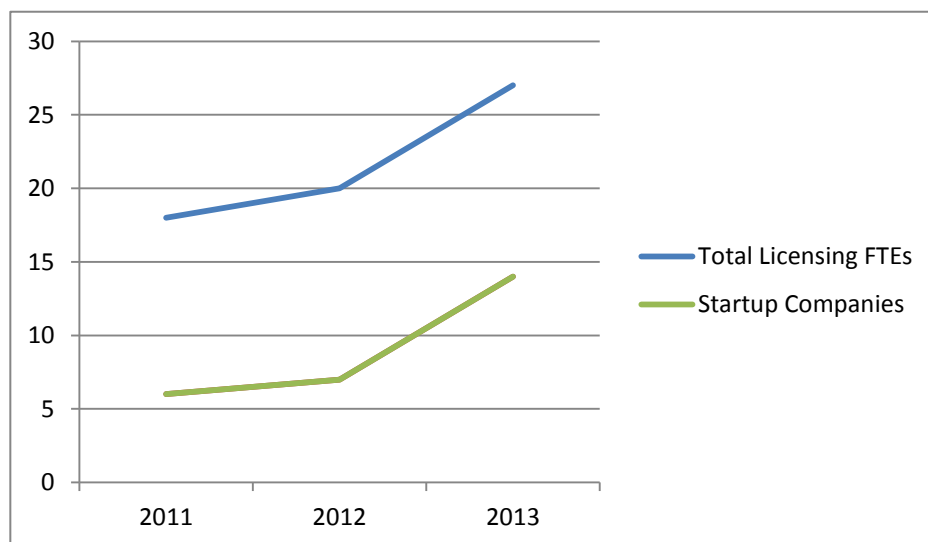
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These initiatives have strengthened the USM's overall entrepreneurial capacity, as summarized in the chart below:



■ Green boxes: programs successfully implemented ■ Yellow boxes: programs in progress ■ Red boxes: recently passed legislation

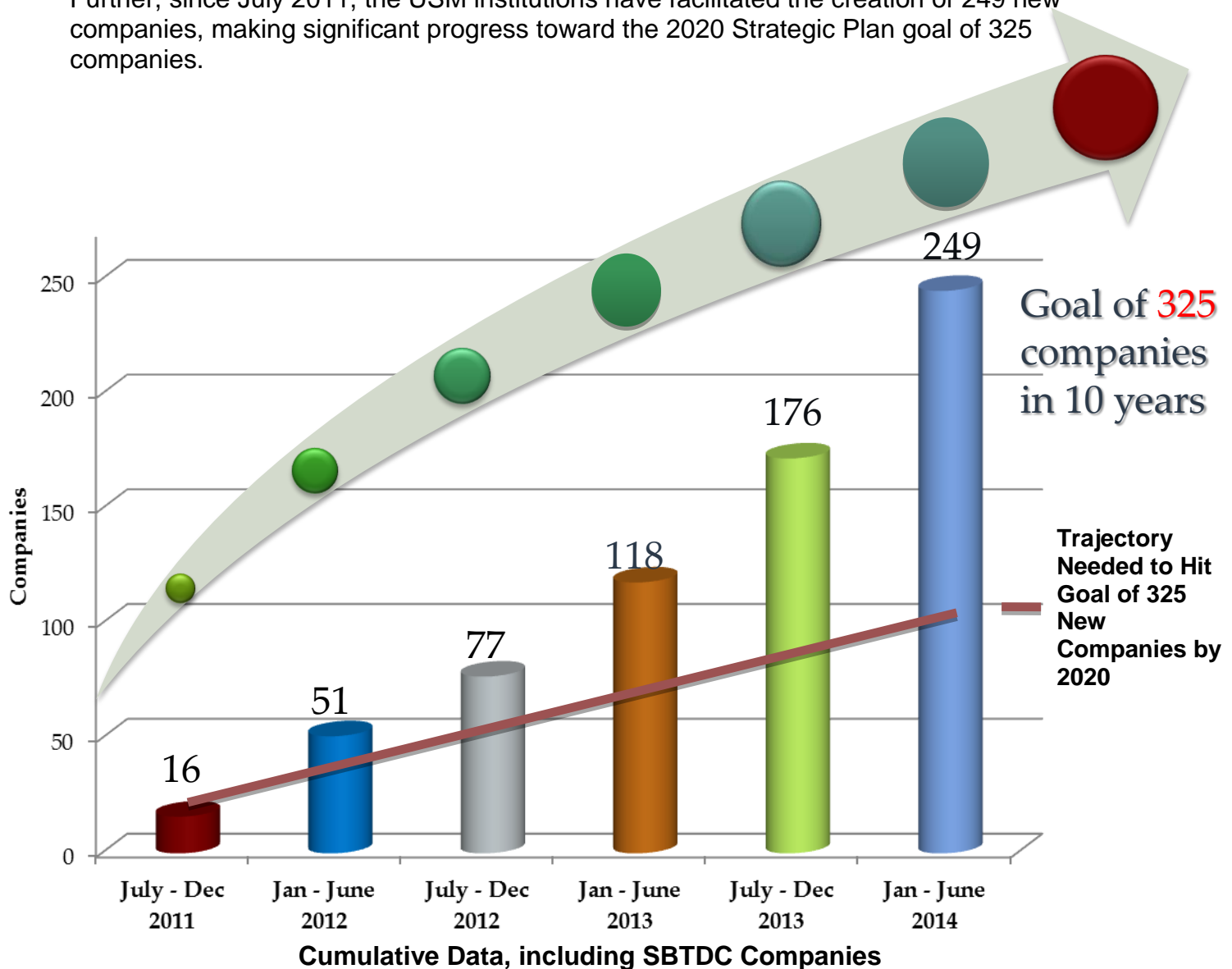
Notably, the boost in technology transfer staff resources has resulted in significant growth in new patents filed and startups created since FY 2011.



Source: AUTM data

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Further, since July 2011, the USM institutions have facilitated the creation of 249 new companies, making significant progress toward the 2020 Strategic Plan goal of 325 companies.



Source: Periodic New Company Formation Reports to the Committee

Economic Impact of the USM

A recent study on the economic impact of the USM, conducted by the Jacobs France Institute, provided ample evidence of the system's significant contribution to the health of the state's economy. For example:

- Economic activity generated by the lifetime incremental earnings of 1996 graduates support jobs earning \$5.9 billion in salaries and wages, resulting in a total of \$1.6 billion in additional state taxes.

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- The overall increase in state income and sales taxes generated by USM graduates employed in Maryland, extrapolated from the analysis of the three graduating classes used in the study, totaled \$1.1 billion annually, an amount that exceeded the state's appropriation to the system.

Also, USM's FY 2014 budget included \$12 million in enhancement funding targeted to increase STEM, cybersecurity, and health-related enrollment. It is estimated that this investment would lead to an additional 1,000 students enrolled in these disciplines by FY 2017, ultimately leading to 700 additional degrees in the areas that will continue to drive the new economy. USM institutions enrolled more than 1,400 additional STEM and health care-related majors in FY 2014 alone and are adding the STEM majors needed to secure Maryland's economic future.

USM graduates employed in Maryland increased state income and sales taxes by an estimated \$1.1 billion annually

USM Research Parks' Impact

UMB, UMBC, and UMCP are each developing research parks that are transforming the economies surrounding their campuses.

With 200 tenants, USM research parks are home to 5,950 jobs and 1.125 billion in capital investments

The research parks are home to:

- 5,950 jobs
- 200 tenants – including start-up and mature technology companies, federal research centers, private research institutes, workforce training and executive education.
- 2.9 million square feet of privately financed research space.
- \$1.125 billion in capital investment, the vast majority of which is from the private sector.

Capitalizing on university research strengths, the research parks are creating thriving technology clusters in Maryland:

- MSquare at UMCP:
 - The largest cluster of language scientists in the world and among the largest clusters of environmental scientists and food scientists in the US.
 - One of the 200 fastest supercomputers in the world and one of the fastest computer networks in the US.
 - Since 2003, new construction at MSquare has



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- accounted for 26% of all new construction in Prince George's County.
- UMCP is also home to the Technology Advancement Program (TAP) incubator for start-up companies and Maryland International Incubator for US branches of international companies.
- bwtech@UMBC:
 - Home to the largest concentration of start-up companies (60) in Maryland.
 - With 50 cybersecurity companies, bwtech has the largest cybersecurity cluster in any university-affiliated research park in the In the US.
 - In the first six months of calendar year 2014, bwtech companies hired 105 UMBC students, employed 90 UMBC alums, and contributed \$4 million in taxes to the Baltimore County region annually.
- UM BioPark:
 - UMB has the largest concentration of biotech companies in Baltimore City.
 - UMB start-up companies located in the BioPark have attracted over \$100 million in funding from venture capital firms and pharmaceutical companies.
 - UMB faculty and BioPark companies have collaborated to win over \$60 million in federal research funding.
 - In 2015, UMB physicians will begin treating cancer patients at the Maryland Proton Treatment Center, a \$250 million privately financed facility that will be 12th in the US and first in the region.

With assistance from the State, these three university research parks have the capacity to add at least another 3.6 million square feet and 7,500 high quality jobs.

Some Recent Successes

- Seven site miners have been critical in assisting UMB, UMBC, and UMCP faculty and startups to win 56 Maryland Innovation Initiative awards, totaling more than \$5.5 million. In FY14, USM institutions received 34 MII awards totaling over \$4 million.
 - Five projects involved collaborations between faculties at multiple institutions.
- Joint research proposals have more than doubled to 72
 - Researchers from the Center for Health-related Informatics and Bioimaging at the UM School of Medicine have submitted more than \$70 million in joint research proposals and secured multi-million dollar federal contracts.
- Late last year, MedImmune, the global biologics research and development arm of AstraZeneca, announced a 5-year \$6+ million strategic collaboration that includes UMB, UMCP, and UMBC



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- MedImmune has announced that they have identified the first five Joint bioscience-related research projects.
- Gliknik, a startup co-founded by a UMB faculty member, announced a world-wide licensing agreement with Pfizer with an upfront payment to Gliknik of \$25 million.
- bwtech@UMBC Cyber Incubator was a finalist for the International Incubator of the Year (National Business Incubator Association).
- Four bwtech companies are finalists for ICOY (Maryland Incubator Company of the Year) awards.
- Three startup companies leveraging technologies and know-how created at the University of Maryland, Baltimore have recently entered the commercial phase of business
 - Advance Management Services was founded in January 2013 and achieved its first commercial sale during the second quarter of 2013. The company licensed software-based clinical outcomes management system for the healthcare industry from the University of Maryland, Baltimore.
 - Analytical Informatics (AI), founded in August 2011, offers a suite of quality improvement tools created by leading universities and innovative startup companies. These innovative tools have been proven to provide health care organizations with improved quality, efficiency and better workflows. In the last quarter, AI has added three new customers.
 - SilcsBio, LLC, founded in April of 2012 and located within the University of Maryland BioPark, provides software and services for drug discovery. SilcsBio has recently achieved initial revenue from drug discovery services from a company in Pennsylvania.
- Advanced Metrics, a UMB Health IT startup, moved quickly into commercialization since establishment only a year ago and moved from offices on the university's campus to the BioPark.
 - OmniSpeech, a UMCP startup that develops solutions to separate the speech signal from background noise for telecommunications applications, received \$2.8 million of funding.
 - Potomac Photonics, a digital manufacturing company specializing in micro technology for the biotech and medical device industries, has leased 8,000 SF of labs and offices at bwtech South. The CEO is a UMBC graduate; the company already is collaborating with UMBC and held a summit on 3D printing in May 2014.
- UMBC's business incubator, bwtech@UMBC, and Northrop Grumman recently announced KoolSpan as its latest graduating cyber start-up from the Cync Program.



Cync is a unique global partnership between Northrop Grumman and the Cyber Incubator at bwtech@UMBC that nurtures cyber start-ups to commercialize next-generation technologies. Since being accepted into Cync, KoolSpan, a

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developer of a suite of patented, hardware-based mobile security encryption solutions, has grown from 8 to 40 employees, bolstered its intellectual property portfolio to more than 20 patents, and expanded into more than 55 countries.

Highlights of Grant Awards

- UMCP's Earth System Science Interdisciplinary Center was awarded \$36 million by NASA for collaboration with the National Weather and Climate Prediction Center.
- UMB received a \$4.9 million grant from NIH for artificial lung research.
- With \$3.75 million in funding from the National Science Foundation, UMCP is teaming up with George Washington University and Virginia Tech to launch a regional Innovation Corps (I-Corps) node with one sweeping goal: find the best entrepreneurial student and faculty researchers and help them bring their discoveries to market.
- The BioMaryland Center, awarded \$1.5 million to eight companies, including Harpoon Medical Inc. and Otomagnetics, startups from UMB and UMCP.

*UMB received a
\$4.9 million grant
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Other Developments

- While the University of Maryland, *MPowering the State*, the structured collaboration between UMCP and UMB, is still in its early stages, it has already had a profound impact on technology transfer and commercialization efforts at the two institutions.
- Towson is expanding its entrepreneurial efforts as well, selecting Frank Bonsal III as TU's first director of entrepreneurship, marking the advent of a larger and more integrated approach to entrepreneurship at the university.



*Bowie's College
of Business is
launching a new
Student Business
Incubator*

- At Salisbury, the Baltimore-based Ratcliffe Foundation has committed to as much as \$1 million to the Franklin P. Perdue School of Business over the next five years to support student entrepreneurs who are looking to create startups.
- Bowie's College of Business is launching a new Student Business Incubator to encourage entrepreneurship and nurture student startup ventures.
- UMB's Office of Technology Transfer announced the addition of an Entrepreneur-in-Residence (EIR), a pathologist/immunologist with experience in biosimilars, biomarkets, manufacturing, repurposed compounds, and startup formation.
- UMCP is now integrating the Lean LaunchPad into standard innovation and entrepreneurship courses across all 12 colleges within the University.