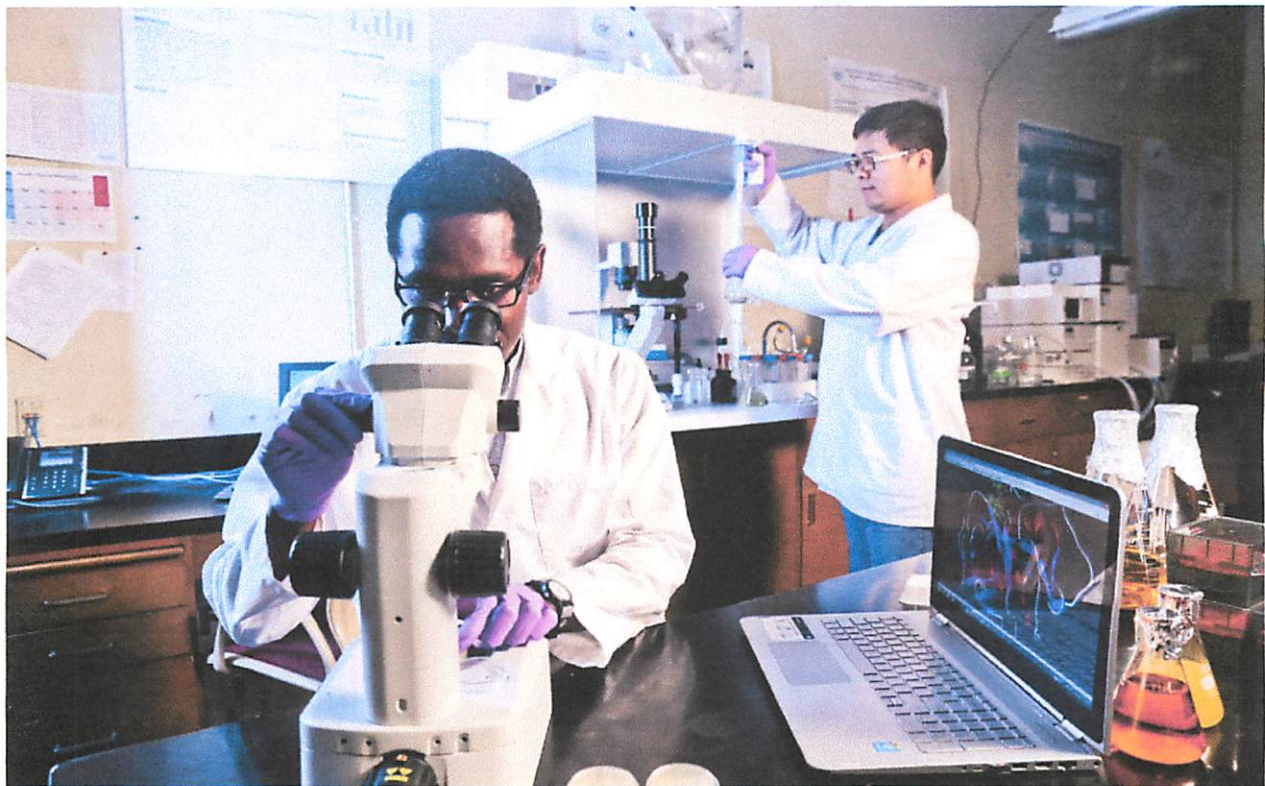


TECHNOLOGY COMMERCIALIZATION AT HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCUs)

****A SNAPSHOT ON THE CURRENT
STATE OF THE PRACTICE ****



The National Academies of Science, Engineering, and Medicine (NASEM)

*Victor McCrary*¹

December 2021

¹ Dr. Chad Womack, member of the NASEM Committee on Defense Research at HBCUs and Other Minority Institutions provided unpaid expertise and relevant resources to support Dr. McCrary's commissioned work.

TECHNOLOGY COMMERCIALIZATION AT HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCUs)

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I. Introduction

Technology commercialization is one of the key indicators of research productivity for institutions of higher education (IHEs, i.e., universities and colleges) and the impacts that such activity contributes to America's technology and economic landscape. Since the passage of the Patent and Trademark Law Amendment Act, commonly known as the Bayh-Dole Act of 1980, universities have been incentivized to take the results of their federally funded research to pursue patents on their intellectual property. In addition, universities are encouraged to take their intellectual property to market – a process called technology commercialization.¹ Many of the nation's research universities have successfully incorporated technology commercialization as part of their research ecosystems. Historic examples include: i) the University of Wisconsin for the blood thinner coumadin; ii) the University of Florida's royalty shares for their development of Gatorade, and iii) the start-up of Google at Stanford. In 2005, Stanford netted \$336 million on Google stock it held as part of the deal between the two entities for internet search technology patents held by Stanford.² For our nation's Historically Black Colleges and Universities (HBCUs), the history of patents and technology commercialization has been more complex, and *far less lucrative*. While the first HBCU in the United States was founded in 1837 (the African Institute; now Cheyney University of Pennsylvania), the first HBCU patent was not until 1978.³ ⁴ Perhaps one of the most well-known examples of HBCU innovation is the historic groundbreaking research of George Washington Carver at Tuskegee Institute (now Tuskegee University) on peanuts and peanut extracts. Unfortunately, Dr. Carver only had three patents and none of them assigned to Tuskegee. The dearth of patents and technology commercialization footprints can be attributed to the historical underfunding of HBCUs and their research ecosystems. In addition, most HBCUs concentrated on a mission of 'teaching and educational research' for their students to gain employment and give back to their communities. Finally, due to historic systemic racism, most HBCU entrepreneurs were not included in the nation's patent/technology commercialization ecosystem and afforded the same access as their IHE white counterparts. Most Predominately White Institutions (PWIs) had missions to reproduce a merchant class with the objective of the accumulation of wealth. After World War II, the investment into basic research by the federal government was concentrated on a select number of elite PWIs, as emphasized by Vannevar Bush, who was head of the Office of Science, Research and Development. HBCUs were not included in that initial conversation, even though the scientific research at places like Tuskegee Institute and Howard University were well known in scientific circles at that time.⁵

¹ Bayh-Dole Act, www.govinfo.gov

² "Stanford Reaps Windfall from Google Stock Sale", Los Angeles Times, December 2, 2005

³ Cheyney State University of Pennsylvania, www.cheyney.edu

⁴ *Repositioning HBCUs for the Future: Access, Success, Research & Innovation*, J.M. Lee, S. Keys, Association of Public & Land Grant Universities, 2013

⁵ When the National Science Board, the governing body over the National Science Foundation, was formed in 1950, Robert Percy Barnes, an African American chemist and chair of the Department of Chemistry at Howard University, was appointed by President Harry Truman to the initial National Science Board; *Bulletin for the History of Chemistry*, v40-1, 2015

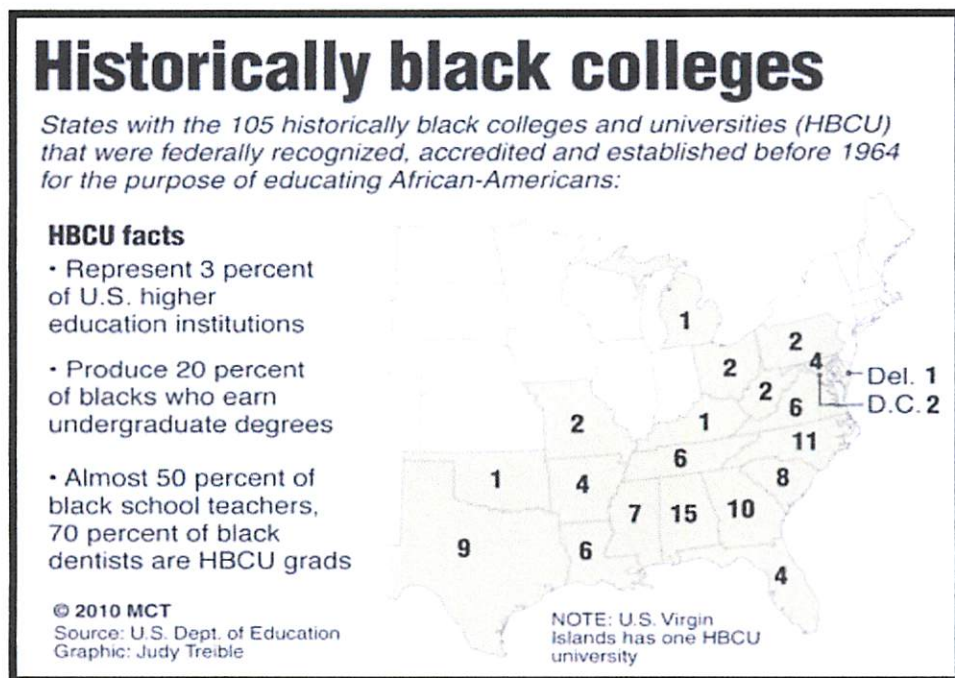
This white paper is a snapshot of the current state-of-the-practice for HBCUs in terms of technology commercialization and proposed perspective actions to increase the capacity for research translation at these institutions. We will restrict our overview to the following three groups of HBCUs:

i) HBCUs with designated Carnegie Classification of R2: High Research Activity (11).

ii) HBCUs designated under the Second Morrill Act: The 1890 Land-Grant HBCUs (16), and the two (2) institutions designated as 1862 Land-Grant HBCUs.

iii) HBCUs with ABET-accredited undergraduate engineering programs (15).⁶

We believe an overview of the current state-of-the-practice for technology commercialization efforts at these *'research intensive/emerging research'* HBCUs will inform policy makers, both public and private, on investments which would lead to a higher probability of outcomes for technology commercialization of sponsored research at HBCUs.⁷



In 2010 there were 105 HBCUs recognized then by the US Department of Education (see above map). Currently there are 101 HBCUs according to the US Department of Education’s National Center for Education Statistics (NCES).⁸

⁶ Second Morrill Act. BlackPast.org; <https://www.blackpast.org/african-amaerican-history/second-morrill-act-1890/>

⁷ The University of the District of Columbia (UDC) & University of the Virgin Islands are designated as 1862 Land-Grant HBCUs

⁸ National Center for Educational Statistics, US Department of Education; [Fast Facts: Historically Black Colleges and Universities \(667\) \(ed.gov\)](#)

II. HBCU Technology Commercialization Landscape

This select set of ‘research intensive/emerging research’ HBCUs comprises a list of twenty-five (25) institutions (21 public HBCUs and 4 private HBCUs). This set represents 25% of the nation’s HBCUs, including the District of Columbia and the US Virgin Islands, as referenced previously by the National Center for Education Statistics. This starting set of HBCUs was selected because as previously mentioned, the 1862/1890 HBCUs, the Carnegie Classified ‘R2’ HBCUs, and the HBCUs with ABET-accredited undergraduate engineering programs all have a strong legacy of research and innovation. The rationale for selecting and surveying these institutions is based on i) Carnegie research designation; ii) 1862/1890 HBCUs were designated historically to conduct research (mainly agricultural studies) and transfer their knowledge to their surrounding communities for their benefit; iii) the fifteen HBCUs that have ABET-accredited undergraduate engineering programs are required for student outcomes “an ability to design and conduct experiments, as well as to analyze and interpret data to design” and as part of their accreditation criteria; and iv) these institutions have a “respectful amount” of research expenditures given the challenges they face. The below table of HBCU research expenditures is based on the amount of total research and development expenditures for 2019 as captured by the National Science Foundation’s (NSF) annual Higher Education Research & Development (HERD) Survey.⁹

INSTITUTION NAME	Public or Private?	R2	1890	1862	ABET ENGINEERING	TOTAL R&D EXPENDITURES 2019
Lincoln -Jefferson City	public		X			\$4.6M
Texas Southern	public	X				\$4.9M
University of DC	public			X	X	\$4.8M
SC State	public		X			\$3.6M
WV State	public		X			\$5.8M
U. of Arkansas Pine Bluff	public		X			\$9.0M
Ft. Valley State	public		X			\$4.5M
Kentucky State	public		X			\$8.4M
Clark- Atlanta	private	X				\$9.0M
Langston	public		X			\$10.7M
Virginia State	public		X		X	\$11.4M
UMES	public	X	X		X	\$7.1M
Alcorn State	public		X			\$14.4M
Norfolk State	public				X	\$8.0M
Alabama A&M	public		X		X	\$12.8M
Tennessee State	public	X	X		X	\$15.2M
U. Virgin Islands	public			X		\$12.2M
Morgan State	public	X			X	\$13.2M
Delaware State	public	X	X			\$23M
Hampton University	private	X			X	\$13.6M
Tuskegee	private		X		X	\$20.5M
Jackson State	public	X			X	\$18.1M
North Carolina A&T	public	X	X		X	\$37.3M
Howard	private	X			X	\$44.1M
Florida A&M	public	X	X		X	\$42.5M

Table 1: The Twenty-five (25) Research Intensive/Emerging Research HBCUs
(N.B. There is overlap between two to three categories of the four categories for 15/25 HBCUs)

⁹ ABET is the nonprofit, non-governmental organization that accredits college and university programs in applied and natural science, computing, engineering, and engineering technology; [Criteria for Accrediting Engineering Programs, 2016 – 2017 | ABET](#)

Survey of Research Intensive/Emerging Research Institutions

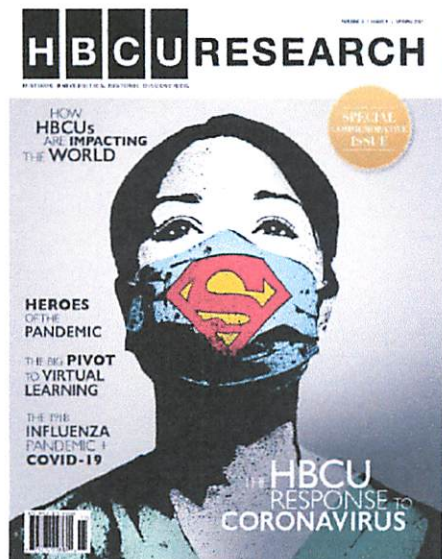
The following survey was sent to all the twenty-five (25) institutions listed above to assess their current state of readiness for technology commercialization. For a portion of the institutions listed, the survey was followed up with a telephone discussion with the institutional contact. The survey questions are as follows:

1. Does your institution have an Intellectual/Patent Policy?
2. How old is the policy?
3. How would you rate the current Intellectual/Patent Policy in terms on technology commercialization?
1= Inadequate, 2 = OK, 3 = Exemplary
4. How many patents (provisional and permanent) have your institution obtained from 2016 – present?
5. How many people do you have dedicated to technology commercialization as part of your office of sponsored programs/research?
6. How would you rate your institution’s ability to commercialize technology resulting from faculty research?
1 = Inadequate, 2 = OK, 3 = Exemplary
7. How would you rate your institution’s commitment to technology commercialization? 1 = Low,
2 = OK, 3 = Fully Committed
8. How many STTRs/SBIRs has your institution undertaken in the past five years?
9. How many licenses for technology has your institution undertaken in the past five years?
10. What suggestions would you make to increase the technology commercialization capabilities at your institution?

Survey Responses

On behalf of the Dotted Zebra, LLC consulting firm, surveys were sent to the twenty-five HBCUs listed in Table 1, and we received fourteen (14) responses (highlighted in Table 1). We agreed with the HBCU institutional contacts that their survey responses would be reported without institutional attribution for this report. This is completely understandable and valid because for the small set of HBCUs, we do not intend the purpose this report to highlight any one institution's deficiencies. In Section III, we will highlight examples of good practices undertaken by specific institutions, and for the reader keep in mind that the mentioning of these institutions does not imply that other HBCUs are not taking positive steps towards increasing their technology commercialization capabilities. Based on the surveys received, the following **observations** on the state of technology commercialization capabilities at these fourteen HBCUs are noted as follows:

- 1) **All** responding institutions have some form of intellectual/patent policies, but many of the policies are more than five (5) years old and have not been reviewed and updated in the current environment which places an expectation of technology commercialization at the nation's universities who receive federal funding for research activities. This includes policies that incentivize technology commercialization by university students, faculty, and staff.
- 2) **All** responding institutions have an inadequate number of (in many cases zero) of staff members who are focused solely on intellectual property capture and technology commercialization. This situation is commonplace among HBCUs, where this activity would normally reside under the Vice President for Research (if that position exists), who mainly has oversight over sponsored programs. For many HBCUs this research administration function is also understaffed.



- 3) **Many** of the responding institutions conveyed their leadership's desire to have a robust technology commercialization capability; however, the ability to implement technology commercialization is dependent upon the interdependence of other divisions at the institution (e.g., human resources, finance, legal) and acceptance of research/technology commercialization as a full and equal partner in the overall mission and vision of the university.

4) **Very little staff expertise** to encourage faculty participation in STTRs/SBIRs at the universities. This observation ties to Observation #2 above where there are few industry-experienced personnel available in the offices of research (sponsored programs) to inform and train faculty on STTRs/SBIRs, and in parallel build relationships with the business community.

5) **All** responding institutions would welcome capacity building grants in the form of a) personnel costs – funding additional personnel (technology commercialization/patent expertise) to the HBCUs sponsored program/university research offices, and b) non-personnel costs to retain intellectual property law firms for patents.

6) **All** responding institutions would welcome a third party briefing to their respective senior leadership and their governing boards on the changing nature of IHEs, and the competitive environment for HBCUs in terms of technology commercialization and sponsored research. Such a briefing could also be a workshop/forum that would include members of HBCU senior leadership, i.e., the presidents/chancellors of these select HBCUs and board members.

7) **All** responding institutions have or are in the process of seeking patents, and the number of patents for each portfolio's institution varies from zero to upwards of over 70 patents. This correlates with institutions which are originally designated as 1890 Land-Grant HBCUs and/or Carnegie designated R2 HBCUs who have a history tied to both agricultural and medical research.

8) **All** responding institutions would welcome a partnership with a PWI research institution to guide and mentor them in the technology commercialization process. This partnership would include assisting in the development of intellectual property policies, and exchanges between PWI research administrators and HBCU research administrators on best practices. For a robust partnership, the emphasis on the relationship should be on equal treatment, fair outcomes, and the opportunity for both institutions to extend and advance their professional and cultural networks.

III. Prospective Actions to Increase Capacity for Commercialization at HBCUs

Capacity Building Grants for HBCU Sponsored Program Offices

There is value in establishing a federally funded program to award grants that increase technology commercialization activities for research intensive/emerging research HBCUs. This program could fund 1-2 staff members to become part of their sponsored program offices, to focus on technology commercialization. Such a funded program would be akin to the SPAD (Sponsored Programs Administration Development) Program by the National Institutes of Health (NIH), which funded HBCU/MSI sponsored program offices with a dedicated person to focus solely on increasing faculty proposals in the biomedical research areas resulting in an increase of the number of proposals to NIH from these underrepresented institutions.



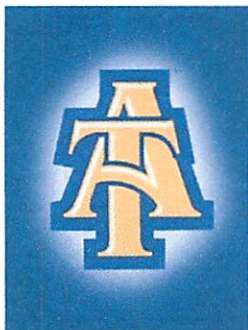
For example, in 2020 the University of the Virgin Islands was a recipient of a NIH (National Institute of General Medical Sciences-NIGMS) Diversity Program Consortium SPAD award of \$200,000.¹⁰ According to the NIH-NIGMS website, 'Applicant institutions were limited to domestic associate's degree-granting and baccalaureate degree-granting colleges/universities that receive an average NIH research project grant funding of less than \$7.5 million total costs per year over the last three fiscal years and have at least 25% of undergraduate students supported by Pell grants.'

Convene Workshops on for Institutional Strategies to Increase Technology Commercialization

A forum for the exchange of best practices and experiences is the best way to include HBCUs in their efforts to increase technology commercialization (see Observation #8 under Survey Responses in Section III). The focus of these forums/workshops would be on: i) raising awareness of the importance of technology commercialization (as part of a writ large research strategy) starting at the particular HBCU's board of trustees and senior leadership levels, ii) raising the importance of the value proposition of technology commercialization at HBCUs to the external community, i.e. community residents, small businesses, state and local government, and iii) the importance of investments by both internal and external stake holders into technology commercialization. It is noted here that these investments in time and money must be taken in the context of 'patient capital', i.e., the payoffs will be long term; HBCUs and their stakeholders should not expect short term monetary gains. Activities would include the development of robust intellectual property policies and procedures (or updating existing ones), outreach to research faculty for intellectual property capture and pursuit of patent protection, and licensing and commercialization. Such forums/workshops could be convened concurrently by the National Academies (NASEM), the Association of Public and Land Grant Universities (APLU), and the National Sponsored Programs Administrators Alliance of HBCUs

¹⁰ Diversity Program Consortium Sponsored Programs Administration Development (SPAD) Program (UC2), National Institute of General Medical Sciences, National Institutes of Health; nigms.nih.gov

(NSPAA). For example, the topic of creating 'HBCU Innovation Ecosystems' and technology commercialization was a seminar topic at the 2019 Black Engineer of the Year (BEYA) STEM Conference.



More importantly, the advocacy for federally funded research which leads to outputs for potential technology commercialization must be part of 'an HBCU's DNA'. This requires a cultural shift for many HBCUs, as research and the potential gains from technology commercialization cannot be viewed as *just* another revenue stream for the university, but part of the overall strategy to achieve the HBCU's unique mission and vision. Ultimately the board of trustees/regents must embrace the research (and subsequently technology commercialization) mission/vision of the institution to the same degree as they embrace the institution's academic mission as part of its legacy, and it must be reinforced and communicated in all public venues, including the university's strategic plan. This implies, that HBCU Boards are 'fully on-board' and committed to research and technology commercialization activities by the university, and the board composition must reflect this commitment. For example, North Carolina A&T State University (NCA&T) recently published its strategic plan entitled, 'A&T Preeminence: Taking the Momentum to 2023' (see Appendix; Section IV). NCA&T is the nation's largest HBCU and had the third largest total R&D expenditures among HBCUs according to the 2019 NSF HERD Survey. Among their key metrics for 2023 cited in their strategic plan is to achieve twenty (20) new patents and licenses. NCA&T in 2019-2020 had over **fifty (50) patents, twenty-six (26) patents pending, sixteen (16) patents licensed for commercial activity, and seven (7) start-up companies.**

Organize and Launch Agency Workshops on STTR/SBIRs at HBCUs

There is potential for federal agencies in establishing workshops to meet with HBCU faculty and students to discuss/establish their STTR/SBIR programs. This effort could provide two opportunities: i) expose faculty and students to opportunities offered by these programs, as well as a chance to build industry/small business partnerships, and ii) begin to create a culture of entrepreneurship and innovation at these institutions. Recently in 2021, the NASA Minority University Research and Education Project (MUREP) program has met with HBCU faculty members and administrators to apply for short-term (4 month) STTR/SBIR grants to acquaint them with the process and the development of relationships with local small businesses.



Clark Atlanta University (CAU) is an example of success with SBIRs/STTRs, a major step for an HBCU towards technology commercialization as summarized below for their efforts in 2021:

- **STTR Award**- One NIH Phase I project for cancer research and therapeutic development, \$2 M for the new small business, plus a \$600,000 sub-award for the University.
- **SBIR Awards** - Two Phase I private partnerships: \$1.1 M with a technology development sub-award to CAU.
- **Venture Development Awards** - Two privately funded venture development awards for cancer research and cybersecurity.
- **Patents** - 2 new patents were awarded this year: one for materials science (lithium battery compounds) and the other for prostate cancer research.
- **License Agreements** – In 2020, CAU licensed 1 new cell line and have 6 more license pending.
- **STTR/Venture Development Applications** – For 2021, CAU has 3 STTR or venture development STTR applications pending.

Federal Agency On-Site Participation & Visibility at HBCUs

There is potential for federal agencies to convey their interest in the importance of technology commercialization, by directly visiting HBCUs to obtain a first-hand overview of their research ecosystem and technology commercialization activities and aspirations. It cannot be emphasized the importance of on-site visits by federal sponsors and their participation in university research/technology commercialization events. In addition, if federal agencies choose to sustain a presence at an HBCU, they might consider offering six to twelve months details of their federal employees to the sponsored program office at these HBCUs. Particularly, employees familiar with grant/contract administration, technology commercialization, intellectual property administration and research policy development would greatly aid in ramping up these types of activities, at no-cost to the HBCUs. Transfer of valuable experience to university staff would be invaluable and would help HBCU sponsor program staff to expand their professional networks.



For example, the University of the District of Columbia (UDC) is an emerging research institution which aspires to obtain Carnegie R2 designation by 2024 – *to become the twelfth R2 HBCU*. It is the only public HBCU, public institution of higher education in the Nation's Capital, and the only urban land-grant institution in the country. UDC has hosted several senior federal funding agency officials to showcase its research ecosystem, including Dr. Sethuraman Panchanathan, Director of the National Science Foundation in April 2021, Mr. Torrey Johnson, Director of the NASA MUREP program in April 2021, and the Dr. Stefanie Tompkins, Director of the

Defense Advanced Research Project Agency (DARPA) in September 2021. In addition, UDC established in 2019 its External Research Advisory Panel, which consists of former and current federal employees from the Air Force Office of Scientific Research (AFOSR), Office of Naval Research (ONR), Department of Treasury, Department of the Interior, National Institutes of Standards and Technology (NIST), and the US Patent & Trademark Office (USPTO). **In 2021, UDC established a technology commercialization activity within its Office of Research, and filed its very first provisional patent application, and had a total of six (6) provisional patents filed in 2021.**

State & Local Agencies Sponsor Technology Commercialization Administrative Grants for Memberships and Patent Processing

There is potential for federal agencies and state/local government agencies to provide/appropriate funding to establish technology commercialization activities at the nation's HBCUs. This funding could be used for costs incurred to process patents, hire technology commercialization staff, technology assessment consultants, and outside intellectual property counsel. In addition, these investments can encourage HBCU sponsored programs staff to become members of organizations like the Federal Demonstration Partnership (FDP) or the Association of University Technology Managers (AUTM).



An example of an HBCU which followed a successful strategy for investment in technology commercialization was Morgan State University. In 2012, Morgan had **zero patents** and no technology commercialization efforts underway. However, in accordance with The State of Maryland Senate Bill 1158 (SB 1158), enacted on May 28, 2016, Morgan State University (MSU), began implementation of a three-phase technology commercialization plan for a total appropriated cost of approximately \$3M from Maryland State appropriations to establish an office of technology transfer in their Division of Research and Economic Development (D-RED). This funding allowed for consistent staffing and the development of a robust intellectual property policy which incentivizes technology commercialization and was approved by their Board of Regents in 2019 (see Appendix; Section IV).¹¹ Unlike older patent policies of many HBCUs whose scope is limited to the process of patenting and ownerships, Morgan's intellectual policy is much broader, flexible, and industry friendly. By 2018, Morgan State University recorded its first technology transfer agreement, **thirty-nine (39) invention disclosures, six (6) utility patents filed, nineteen (19) provisional patents filed, one issued US patent, and one start-up company formed.** These outputs demonstrate the value of the investment initially by the State of Maryland for HBCU technology commercialization.

¹¹ *Morgan Research: Five Years of Achievement (2013-2017)*, Division of Research & Economic Development, Morgan State University 2018

Expand the NSF I-Corps Program for HBCUs and facilitate targeted HBCUs to become a member of one of the current NSF I-Corps Nodes.

Since the inception of the NSF I-Corps Program in 2011, it has engaged numerous university faculty members from across the nation to understand how their research efforts can be aligned to market needs. The emphasis is placed on ‘customer discovery’ and faculty and students participate in a program to learn this aspect and apply it by interviewing the potential customers for their research innovations. This is a key step in the process of technology commercialization and developing a culture of entrepreneurship for a university research ecosystem. It is of the opinion that more HBCUs need to be included in the NSF I-Corp program. For larger agencies like the Department of Defense, there is potential in partnering with the National Science Foundation (NSF) to target and tailor this program for HBCU/MSI faculty and students. This opportunity would be timely, since in FY 2022, NSF will have established a new directorate devoted to translation, innovation, and partnerships (‘the new TIP Directorate’), where NSF’s current I-Corps and STTR/SBIR programs will be moved. The TIP Directorate’s mission is to take a portion of the basic and applied research funded by the Foundation to the next step being technology commercialization (‘translation’) with industry. This new ‘bench to benefits’ mentality fits the missions of many HBCUs which is to be hubs of education, workforce development and research to serve their communities.



For example, Howard University is an active member of the NSF I-Corps Mid-Atlantic Regional Hub which was recently funded for **five years for total amount of funding at \$15 million**. This effort is part of an overall \$ 75 million dollar effort by the National Science Foundation’s (NSF) to create and fund ‘University Innovation Hubs’ to both expand the geography of innovation and to tap the innovative talent in our nation’s Minority Serving Institutions (MSIs). Howard University is one of two HBCUs (the other is Delaware State University) who are members of this NSF I-Corps University Innovation Hub.

Leverage and Re-imagine EPSCoR to Stimulate Technology Commercialization at the Nation’s HBCUs

In 1979, the National Science Foundation created the EPSCoR (Establishing Program to Stimulate Competitive Research) for those states that receive lesser amounts of federal research dollars than other states (currently < 0.75%). EPSCoR awards have been transformative to those states who are committed to develop their research ecosystems and to foster STEM-based research at their universities. Currently, the National Science Board and the National Science Foundation are engaged in a conversation on how to utilize and ‘re-imagine’ EPSCoR to include more minority serving institutions, including HBCUs. The following states where there are HBCUs are currently eligible for EPSCoR funding: Alabama, Arkansas, Delaware, Kentucky, Louisiana,

Mississippi, and West Virginia.



For example, Tuskegee University is a member (along with two other HBCUs, Alabama A&M University and Alabama State University) in ALEPSCoR which is Alabama's EPSCoR activity. Their role in this initiative is to achieve the overall vision of enabling an internationally competitive research initiative in nanotechnology and biotechnology which will foster economic development and attract more local students into the STEM disciplines for a sustainable STEM-based workforce for the region.

IV. Appendix

Strategic Plan Example: A&T Preeminence: Taking The Momentum to 2023, North Carolina Agricultural & Technical State University

Intellectual Property Policy Example: Morgan State University Intellectual Property Policy, approved 2019, Morgan State University

About the Author: Victor R. McCrary, Jr.



Victor R. McCrary is the Vice President for Research at the University of the District of Columbia, where his team leads the growth, development, direction, and oversight of the University's research enterprise. He has held similar research leadership positions at the Johns Hopkins University Applied Physics Laboratory, Morgan State University, and the University of Tennessee. He is a change agent and serial innovator, responsible for developing comprehensive, sustainable research strategies, fostering trans-disciplinary research and technology commercialization, and expanding research programs via engagement with federal and state agencies and private entities. His accomplishments include his contributions to Morgan State University as its first vice president for research and his team's efforts that led to its elevation to R2 high research status in the Carnegie Classification of Institutions of Higher Education and serving two terms as the national president of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE). He is a Fellow of the American Chemical Society. Dr. McCrary received his doctoral degree in chemistry from Howard University, a master's degree in engineering from the University of Pennsylvania, and a bachelor's degree in chemistry from The Catholic University of America.

Dr. McCrary was born and raised in the District of Columbia, growing up in the Lamond-Riggs section of DC. He attended DC public schools from K-5 and graduated from DeMatha Catholic High School. He has authored and co-authored more than 60 technical papers and co-edited two books during his career at AT&T Bell Laboratories and the National Institute of Standards and Technology (NIST). He has received numerous honors and awards including co-recipient of the U.S. Department of Commerce's *Gold Medal in 2000* for the development of the first global electronic book industry standards, and the *2002 Percy Julian Award* by the National Organization of Black Chemists and Chemical Engineers. In 2011, he was honored as *Scientist of the Year* by the Annual Black Engineer of the Year Award (BEYA) STEM Conference.

In October 2016, President Barack Obama appointed Dr. McCrary to serve on the National Science Board which oversees the National Science Foundation and advises Congress and the Executive Branch. He chaired a task force which recently produced the report, "*The Skilled Technical Workforce: Crafting America's Science and Engineering Enterprise*". In May 2020, was elected as the Vice Chair of the National Science Board.



A&T Preeminence:

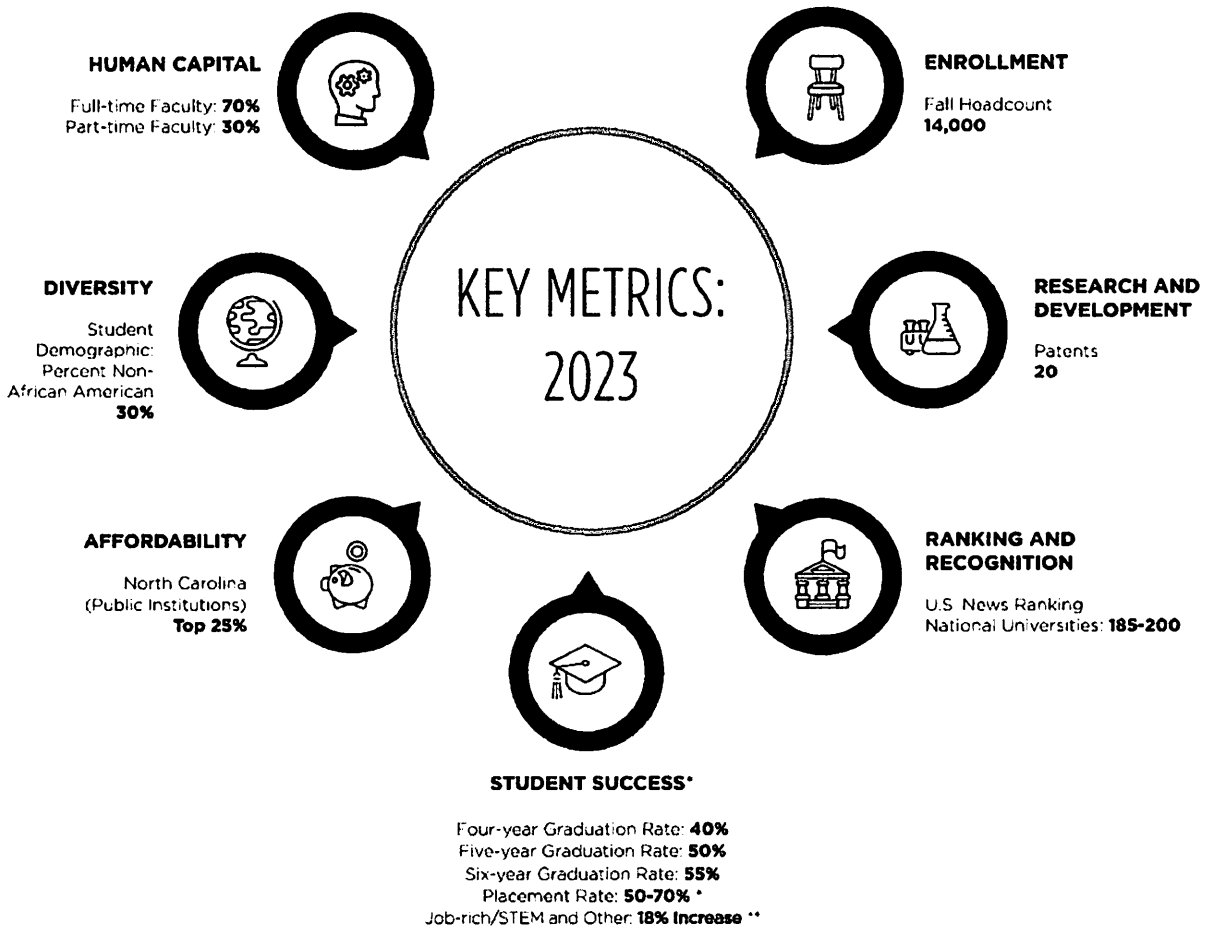
TAKING THE MOMENTUM TO 2023

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY STRATEGIC PLAN



Key Performance **INDICATORS**

An important part of the strategic plan involves the development of key indicators and metrics to monitor progress toward preeminence. Opportunities to refine these key indicators will be given to the academic and administrative units during the course of planning and implementation. To enhance ownership at all levels of the institution, the academic deans and division vice chancellors will be accountable for the development of plans that link to the goals of the university. Progress updates to the Board of Trustees, university community and other key stakeholders will occur at least annually.



* Placement rate is defined as employment, graduate school or military: 50% placement 30 days after commencement; 60% placement 60 days after commencement; 70% placement 90 days after commencement

** Other - Teacher education and health professions



**NORTH CAROLINA
AGRICULTURAL AND TECHNICAL
STATE UNIVERSITY**

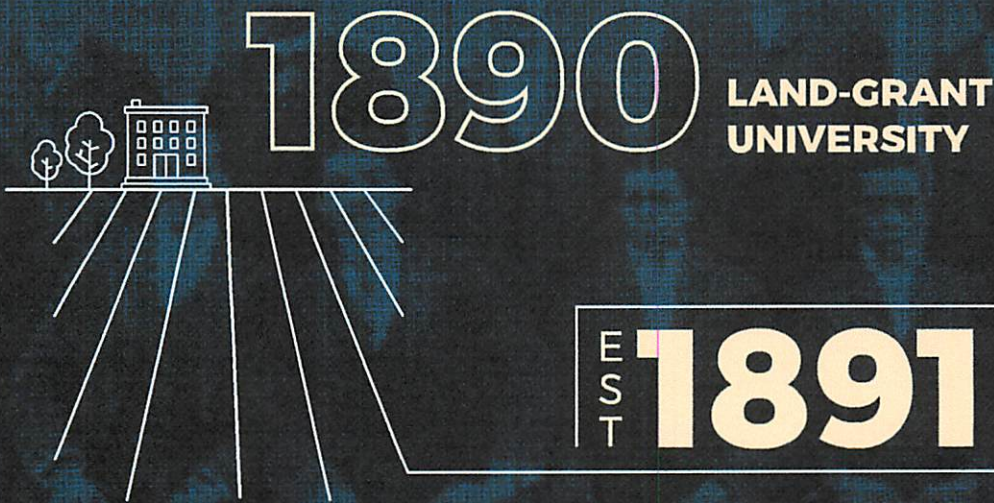
2020

EXECUTIVE SUMMARY

A&T PREEMINENCE:
TAKING THE MOMENTUM TO 2023

	GOAL 2023	2017- 2018	2018- 2019	2019- 2020
ENROLLMENT				
TOTAL	14,000	11,877	12,142	12,566
UNDERGRADUATE				
Online	500	368	409	405
New transfers	1,500	822	817	795
Rural (in-state)	2,700	2,356	2,514	2,626
Pell (in-state)	5,600	5,162	4,683	4,975
GRADUATE				
Online	500	167	194	224
Master's	2,112	1,070	1,059	1,027
Doctoral	1,024	409	401	437
STUDENT SUCCESS				
UNDERGRADUATE				
First-year retention	85%	78.6%	77.0%	79.4%
General education course completions	90%	77.6%	79.6%	79.9%
Graduation and placement				
4-year graduation	40%	25.4%	27.5%	33.9%
5-year graduation	50%	44.8%	45.0%	47.7%
6-year graduation	55%	53.0%	51.0%	52%
Degrees awarded	2,100	1,669	1,689	1,959
STEM degrees awarded	450	471	512	579
Degree efficiency	19	18.4	18.0	*
Gender diff degree efficiency (male graduates)	1.0	17.2	17.2	*
Rural (in-state)	600	464	441	456
Pell (in-state)	1,250	1,013	919	1,131
Online degrees awarded	118	71	108	113
GRADUATE				
Degrees awarded	750	480	468	453
Master's degrees awarded	675	423	409	387
Doctoral degrees awarded	75	57	59	66
STEM degrees awarded	250	232	208	200
Online degrees awarded	147	59	72	62
FACULTY				
Faculty-student	1:19	1:8	1:18	1:17
Full-time faculty	70%	69%	57.6%	55%
RESEARCH AND INNOVATION				
Contracts and grants award dollars (millions)	\$75	\$64.26	\$64.4	\$60.85
Approved patents and licenses	20	6	4	6
FINANCIAL RESOURCES				
Endowment market value (millions)	\$75	\$60	\$68.4	\$73.8
Alumni participation rate	10%	8%	9.2%	10.9%
Endowment per student ratio	\$7,500	\$5,183	\$5,452	\$5,878
REPUTATION AND RANKINGS				
U.S. News Best National Universities ranking	185-200	231-300	231-301	281
U.S. News Best Undergraduate Business Programs ranking	Top 300	381-494	350	331
U.S. News Best Undergraduate Engineering Programs ranking	Top 100	137	146	134
Affordability in N.C. public institutions	Top 25%	Top 25%	Top 25%	Top 25%
Diversity (% non-African American)	30%	22.1%	22.1%	21.5%
ATHLETIC SUCCESS				
Departmental APR (annual)	985	987	981	*
Fundraising (millions)	\$1.20	<\$1	\$1.02	<\$1

NORTH CAROLINA A&T 2019-2020



DOCTORAL UNIVERSITY: HIGH RESEARCH ACTIVITY

(The Carnegie Classification of Institutions of Higher Education)



RESEARCH DOCTORAL: STEM-DOMINANT

(The Carnegie Classification of Institutions of Higher Education)



CARNEGIE CLASSIFICATION FOR COMMUNITY ENGAGEMENT

NO.

1

MOST AFFORDABLE IN NORTH CAROLINA

(Money Magazine)



NO.

1

AMONG PUBLIC HBCUs

(U.S. News & World Report, 2020 Best Colleges)



NO.

66

TOP PERFORMERS ON SOCIAL MOBILITY (TIE)

(U.S. News & World Report, 2020 Best Colleges)



NO.

140

TOP PUBLIC SCHOOLS (TIE)

(U.S. News & World Report, 2020 Best Colleges)



50

PATENTS



26

PATENTS PENDING



16

PATENTS LICENSED FOR COMMERCIAL ACTIVITY



7

START-UP COMPANIES



\$60.85M

CONTRACTS AND GRANTS EARNED BY FACULTY RESEARCHERS

MORGAN STATE UNIVERSITY

INTELLECTUAL PROPERTY POLICY

Approved by the Board of Regents on November 5, 2019

MORGAN STATE UNIVERSITY INTELLECTUAL PROPERTY POLICY

I. Introduction

The primary mission of universities is to advance, preserve, and disseminate knowledge. Morgan State University (“Morgan” or “University”) has established this policy on intellectual property to: (1) assure that the benefits of University research and scholarship, which include intellectual property, are fairly and fully disseminated to benefit the public, (2) create an environment that encourages and recognizes the creative efforts of faculty, students and personnel, and (3) generate resources to support the University’s primary mission.

Morgan is the State of Maryland’s Preeminent Public Urban Research University, known for its excellence in teaching, intensive research, effective public service and community engagement. Morgan prepares diverse and competitive graduates for success in a global, interdependent society.

Morgan’s mission is to serve the community, region, state, nation, and world as an intellectual and creative resource by supporting, empowering and preparing high quality, diverse graduates to lead the world. The University offers innovative, inclusive, and distinctive educational experiences to a broad cross section of the population in a comprehensive range of disciplines at the baccalaureate, master’s, doctoral, and professional degree levels. Through collaborative pursuits, scholarly research, creative endeavors, and dedicated public service, the University gives significant priority to addressing societal problems, particularly those prevalent in urban communities.

The following institutional core values guide the promotion of student learning and success, faculty scholarship and research, and community engagement at Morgan: excellence, integrity, respect, diversity, innovation, and leadership. Morgan encourages and supports its faculty, staff, and students in all forms of scholarship including the discovery and application of knowledge in teaching and learning and in developing innovative products and processes. This includes the transfer of knowledge and technological advancement in the form of intellectual property so it inures to the benefit of society.

When knowledge takes the form of Intellectual Property, a university must establish a clear and explicit policy that will protect the interests of both its Creators and the University while ensuring that society benefits from the fair and full dissemination of that knowledge.

II. Scope

This policy governs the ownership and protection of Intellectual Property created by Personnel, Students and others at the University. The policy applies to all University units, Personnel and Students as well as non-University visitors who make use of University facilities and resources. This policy is considered a part of the conditions of employment for all employees and a part of the conditions of enrollment and attendance for all Students.

Applicable laws and regulations will take precedence over any conflicting language in this policy. The terms of authorized University contracts with third parties may take precedence, when applicable, over any conflicting language in the policy subject to compliance with Article IV.

III. Definitions

The terms defined in this Article are given the following special meanings in this policy.

A. Administrative Works: All copyrighted works other than Traditional Scholarly Works that are created by Personnel in the performance of an administrative duty to the University or as a work for hire as defined under U.S. Copyright Law.

B. Author: Someone who contributes original expression to a copyrighted work as determined under U.S. copyright law.

C. Copyrighted Work: An original work of authorship fixed in any tangible medium of expression.

D. Creator: Anyone subject to this policy who is either (1) an Author or (2) an Inventor.

E. Gross Revenue: Consideration paid in cash or equity by a third party in exchange for specific rights in specific University-owned Intellectual Property. Gross Revenue does not include financial or in-kind support for research (e.g., sponsored research agreements, restricted or unrestricted grants and gifts), tuition income or reimbursement for patent costs of University-owned and University-licensed intellectual property.

F. Intellectual Property: Traditional Scholarly Works, Administrative Works, Inventions (whether or not patentable), Software, Research Data, Tangible Research Materials, Trademarks and Service Marks, and associated legal rights to the same.

G. Invention: Any potentially patentable new and useful process, machine, manufacture or composition of matter or any new and useful improvement to the same.

H. Inventor: Someone who makes an inventive contribution to the conception of ideas claimed in a potentially patentable Invention as determined under U.S. patent law.

I. Net Revenue: Gross Revenue in the form of cash, including liquidation of equity, received by the University from the commercialization of University-owned Intellectual Property less unreimbursed expenses incurred in the protection of such Intellectual Property.

J. Personnel: Someone who receives a salary or other consideration from the University for performance of services on a part-time or full time basis. University employees with an appointment of less than a full year (e.g., 9-month) shall be considered Personnel for actions undertaken during their period of appointment. Students who receive wages for working on a University-administered scope of work or project are Personnel when acting within the scope of that employment. Personnel also include University consultants, visitors and others using University resources.

K. Research Data: Recorded information, regardless of the form or medium of recordation, in the nature of (1) form, fit, or function of data; data relating to items, components, or processes that are sufficient to enable physical and functional interchangeability; data identifying source, size, configuration, mating, and attachment characteristics, functional characteristics, and performance requirements, data files, statistical data; (2) computer software data that identifies source, functional characteristics or performance requirements and (3) technical data of a scientific or technical nature that are commonly accepted in the relevant scientific community to validate research findings. Research Data do not include computer software source code, algorithms, processes, formulae, flow charts or financial, administrative costs or pricing, or management information related to contract or project management.

L. Scope of Employment. All activities, related to the field or discipline of the faculty member's appointment, including the general obligation of a faculty member to teach, to do creative work, and to conduct research, or related to the employment responsibilities of non-faculty employees and for which employees receive compensation from the University, where compensation is any consideration, monetary or otherwise.

M. Significant University Resources: Gifts received by the University or an affiliated foundation or corporation, funds received by the University or an affiliated foundation or corporation under a contract or grant, direct or indirect support from other funds administered by the University or an affiliated foundation or corporation, assistance of Personnel or Students from outside one's home department or unit; assistance of Personnel or Students in one's home department or unit or specialists (e.g., graphic designers, instructional designers, multimedia and other specialists) beyond the level of support that is generally provided to Personnel in one's home department or unit. In general, salary, office space, use of University libraries, personal computers and facsimile machines that are customarily provided campus wide or are typically made available to all Personnel in one's home department will not qualify as Significant University Resources.

N. Software: A computer program, including, without limitation, microcode, subroutines, and operating systems, source code, algorithms, processes, formulae, or flow charts, regardless of the form of expression or object in which it is embodied, together with users' manuals and other accompanying explanatory materials.

O. Sponsored Research Agreements: Grants, contracts, cooperative agreements and other agreements under which research and development activities are carried out and that are executed and/or administered by the University or an affiliated University foundation or corporation.

P. Student: Someone enrolled in the University and fulfilling his or her academic and research requirements and responsibilities including, but not limited to, undergraduate, graduate, professional, non-degree, not-for-credit and visiting students.

Q. Tangible Research Materials: Models, machines, devices, designs, cell lines, cultures, solid tissue, apparatus, instrumentation, circuits, antibodies, recombinant materials, laboratory animals, chemical compounds, compositions, formulations, and plant varieties.

R. Traditional Scholarly Works: Original copyrighted works authored by Personnel in connection with their teaching, research, and professional activities or scholarship or by Students

in the performance of their academic requirements and activities, including course work, dissertations, and theses. Traditional Scholarly Works include but are not limited to courses, course syllabi, course materials, whether delivered on-line or in a traditional face-to-face setting, lecture notes, literary works, non-fiction books, textbooks, professional articles and presentations, musical scores and librettos, dramatic and choreographic works; photographic, graphic, sculptural and architectural works; films, other audiovisual works, sound recordings, models, and designs.

S. University: Morgan State University.

IV. Policy Administration

A. Authority. The President shall have the authority and responsibility for implementation and coordination of this Policy. The President may delegate authority to the Vice President for Research and Economic Development to administer the provisions of the policy.

B. Waivers. Subject to any legal or contractual limitations and only after any potential conflicts of interest have been properly managed, the President or his/her designee may waive any requirements of this policy, subject to approval of the Board of Regents, when he /she determines that doing so would be in the best interest of the University. Waivers may be considered on a case-by-case basis upon the written request and approval of the principal investigator, all persons expected to participate in the underlying project, the department chair or unit head and the Dean of the School or College. All waiver requests must be submitted to the Vice President for Research and Economic Development for consideration. Persons who join a project after a waiver has been granted must be advised of the waiver and agree to it as a condition of joining the project.

C. Retained Rights. Any transaction granting rights in University-owned Intellectual Property shall (1) retain for the University, at a minimum, a royalty-free, irrevocable right to use, practice, and reproduce the Intellectual Property in support of University research and educational purposes; (2) be consistent with applicable private use restrictions, including bond covenants; (3) be subject to the right of the United States government to use Intellectual Property created with Government funds; and may (4) reserve other rights, including the right of the University to authorize other not-for-profit educational and research entities to use University Intellectual Property in support of their own non-commercial research and educational activities.

D. Amendments. This policy may be amended from time-to-time as appropriate or as required to comply with changes in applicable laws and regulations in accordance with University policy and practices and subject to prior approval by the Board of Regents.

E. Intellectual Property Committee. The Vice President for Research & Economic Development shall, in consultation with the University Council, appoint a University Intellectual Property Committee. The Committee shall be an advisory committee constituted with nine voting members. The committee shall include a majority of faculty members, a minimum of two Students, and representatives from non-academic University departments that are involved in Intellectual Property issues. A representative from the Office of General Counsel and a representative from the Office of Internal Audits shall serve as *ex-officio* members of the Committee. The President, Vice President for Research & Economic Development and/or

Provost and Senior Vice President for Academic Affairs (“Provost”) may consult the Committee on Intellectual Property matters, ask it to review and recommend revisions to this policy, and request its advice on the resolution of disputes arising under or regarding matters not addressed by this policy. Recommendations by the Committee for revisions to this policy shall be submitted to the President. When the Committee considers this policy’s application in order to provide advice about specific Intellectual Property, the Creator(s) of the Intellectual Property may make a written and/or oral presentation to the Committee.

F. Reporting. The Vice President for Research and Economic Development shall report annually to the President and Provost on Intellectual Property activities at the University. The report shall include, but not be limited to, data for the preceding year on disclosures, any waivers issued, any releases of Intellectual Property to the public domain, patent applications, patent awards, licenses, and start-up companies distinguishing, when appropriate, between Maryland-based companies and those outside the State, as well as revenue and expenditures associated with the University’s technology transfer program, and suggested changes to the policy. In turn, the President shall report annually to the Board of Regents.

V. Ownership of Intellectual Property

A. Traditional Scholarly Works

1. Personnel. Personnel who author Traditional Scholarly Works shall hold copyright in those Copyrighted Works subject to the following conditions and exceptions:

- a) **Reservation of Rights.** The University reserves the right at all times to exercise copyright in Traditional Scholarly Works as authorized under United States Copyright Law.
- b) **Exceptions.** The University holds copyright in Traditional Scholarly Works created by Personnel when:
 - i. the Works are required as deliverables under or created in the performance of any contract to which the University is a party; or
 - ii. not holding copyright would result in a breach by the University of a contractual obligation to a third party or would be contrary to law, regulation or University policy; or
 - iii. the Works are commissioned by the University or created in connection with a duty specifically assigned by the University to the Creator; or
 - iv. the Works are created for University purposes with the support of Significant University Resources; or
 - v. Personnel create the Works for personal purposes using Significant University Resources without prior written approval by the Vice President of the Creator’s department or unit.

2. Students. Students shall hold copyright in Traditional Scholarly Works they author in connection with their University academic and research activities subject to the following conditions and exceptions:

- a) **Reservation of Rights.** The University reserves the right at all times to exercise copyright in Traditional Scholarly Works created by Students as authorized under United States Copyright Law.

b) **Exceptions.** The University holds copyright in Traditional Scholarly Works created by Students when:

- i. the Works are created by Students in their capacity as Personnel; or
- ii. the Works are required as deliverables under or created in the performance of any contract to which the University is a party; or
- iii. not holding copyright would result in a breach of a University contractual obligation to a third party or would be contrary to law, regulation, or any University policy; or
- iv. the Works are created outside the scope of their academic and research activities using Significant University Resources without the prior written approval of the department or unit that controls the resources.

B. Collaborative and Joint Works. When people collaborate to author a Copyrighted Work, it often results in a “joint work” in which the Creators jointly hold nonexclusive rights to use the Work. Personnel and Students who collaborate with each other or with non-University third-parties (e.g., volunteers, visitors) to create Copyrighted Works are encouraged to agree, in writing, on the disposition and ownership of copyright in the Works prior to commencing their collaboration.

C. Administrative Works

1. The University holds copyright in Administrative Works.
2. The University may allow Personnel and Students access to and use of Administrative Works under appropriate terms.

D. Inventions, Software, Research Data and Tangible Research Materials

1. **University.** The University owns all rights, title and interests, including Intellectual Property rights, in Inventions, Software, Research Data and Tangible Research Materials that are created, conceived or reduced to practice by Personnel or Students:
 - a) when not owning title and rights in the Inventions, Software, Research Data or Tangible Research Materials would result in a breach of a University contract with a third party or would be contrary to law, regulation or University policy; or
 - b) in the performance of Sponsored Research activities and other research or creative activities administered by the University, supported by funds controlled or administered by the University or an affiliated foundation or corporation of the University or under a contract requiring University ownership; or
 - c) for personal purposes using Significant University Resources without prior written approval by the Vice President of the department or unit that controls those Resources; or
 - d) as provided under their Scope of Employment.
2. **Personnel.** Personnel shall own all rights, title and interests, including Intellectual Property rights, in Inventions, Software, Research Data and Tangible Research Materials they create, conceive or reduce to practice that are not owned by the University under Section V.D.1.

3. Students. Students shall own all rights, title and interests, including Intellectual Property rights, in Inventions, Software, Research Data and Tangible Research Materials they create, conceive or reduce to practice in the performance of their academic activities whether or not they use Significant University Resources provided they are not owned by the University under Section V.D.1.

E. Course Research Projects

1. Under certain limited circumstances, Students may be asked as a condition of participating in a course research project to assign or license their rights in Intellectual Property they create in performing the project that they would otherwise own under this policy to the University or a third party that sponsors the course research project. In such circumstances, course instructors must give Students who object to making such an assignment or granting such a license the option to participate in an alternative project, without penalty, that does not require the assignment or licensing of their Intellectual Property rights.

2. When Students are granted access to proprietary data or information of a third party in connection with academic course work, the use and protection of such proprietary information shall be governed by an agreement entered into by and between the third party and the University and not the third party and Students.

F. Trademarks and Service Marks. All trademark and service mark matters are governed by the University's Policy for the Control and Protection of the Various Trademarks, Designs, Colors and Symbols of Morgan State University approved by the Board of Regents.

G. Acquisition of Intellectual Property. The University may acquire title to or rights in Intellectual Property by assignment, license, gift, bequest, and any other legal means. The appropriate administrative offices, often reflecting the purpose of the acquisition, must be consulted and applicable processes must be followed prior to any such acquisition.

VI. Responsibilities

A. Protection of University Interests. Personnel and Students agree to assign and do hereby irrevocably assign to the University all rights, title and interests, including Intellectual Property rights, in Intellectual Property that the University owns under this policy. Personnel engaged in consulting and other activities with third parties must ensure their activities and agreements with such third parties regarding the use of University-owned Intellectual Property do not conflict with this policy or other University commitments and do not undermine or compete with the University's rights in University-owned Intellectual Property.

B. Duty to Disclose and Cooperate. Personnel, Students and other persons who create Intellectual Property that the University owns under this policy have an obligation to complete and submit to the Office of Technology Transfer (OTT) an Intellectual Property disclosure of such Intellectual Property and to cooperate with the OTT's Intellectual Property management efforts.

C. OTT Responsibilities. The OTT has day-to-day responsibility, on behalf of the University, to make determinations of ownership of Intellectual Property and to manage, protect and commercialize University-owned Intellectual Property and/or otherwise make it available for the benefit of the public. The OTT works in consultation with Creators, reports to the Vice President for Research and Economic Development, and is supported by the Office of General Counsel.

D. Retention and Use of Research Data and Tangible Research Materials. The University must maintain possession of all Research Data, Tangible Research Materials and related information the University owns under this policy in order to meet its legal and contractual obligations.

1. The director of the lab or unit or the principal investigator of the project through which such Data and Materials originate will serve as custodian of those Data and Materials on behalf of the University and shall be responsible for complying with all University policies and terms in Sponsored Research Agreements regarding the management and public release of Data and Materials to the relevant scientific community or the public.

2. Students have a right to publish in their dissertations or theses University-owned Research Data and information about University-owned Research Data and Tangible Research Materials that they create or collect individually or jointly with others. The custodian of University-owned Research Data and Tangible Research Materials may, at the request of Students who participate in the creation or collection of University-owned Research Data and Materials, allow them to publish the Data and information about the Data and Materials outside of their dissertations or theses and/or to receive a copy of such University-owned Research Data and Tangible Research Materials under appropriate terms set forth in a written agreement.

VII. Revenue

A. Distribution of Net Revenue. The University will distribute Net Revenue as follows:

1. Fifty percent (50%) to the Creators; and
2. Twenty-five percent (25%) to the Creators' department or unit; and
3. Twenty-five percent (25%) to the OTT or as otherwise designated by the Vice President for Research.

B. Distribution to Multiple Creators. In the case of multiple Creators and/or multiple departments, Net Revenue will be divided and distributed between or among them to reflect their relative intellectual contributions to the creation of the Intellectual Property, as specified in the written Intellectual Property Disclosure submitted to the OTT. When the Intellectual Property Disclosure does not differentiate the level of contribution made by Creators, Net Revenue will be distributed equally between or among Creators and departments.

C. Review. The revenue distribution provisions shall be reviewed at least every five years and may be modified in accordance with this policy.

D. Equity. Consideration for a license may include equity in a business. If equity is liquidated, the proceeds shall be treated and distributed as Net Revenue under Article VII. Equity will be held, liquidated, or directly distributed to Creators (to the extent permitted by law) at the discretion of the University. Neither the OTT nor Creators will control the timing or terms of the liquidation of such equity received by the University. The Office of the Vice President for the Division of Finance and Management, in consultation with the Office of the Vice President for the Division of Research and Economic Development, will hold and manage the disposal of equity held by the University. Equity holding and trading is subject to applicable laws and policies, including those that regulate securities, ethics, and conflicts of interests.

E. Revenue Received from Commercialization of Administrative Works. In those rare circumstances when Administrative Works have commercial potential, the department or unit where the Administrative Works originated will submit an Intellectual Property disclosure to the OTT. The OTT shall determine whether or not to commercialize the Works and how resulting revenue, if any, shall be distributed in consultation with the Vice President of the department or unit.

F. Alternative Distribution. Requests to distribute revenue other than as set forth in this Article VI will be processed as waiver requests under Section IV.B.

VIII. Granting Rights to Creators

A. Assignment

1. The OTT may assign the University's rights in specific University-owned Intellectual Property to all the Creators of that Intellectual Property when the OTT determines, in its sole discretion, assignment is in the best interest of the University, subject to compliance with applicable laws and federal regulations and University policies.

2. Any assignment to Creators of University-owned Intellectual Property shall be conditioned on their reimbursement to the University of all out-of-pocket expenses incurred by the University prior to the date of the assignment and payment of a royalty or other consideration.

B. Licensing University-Owned Intellectual Property to Personnel Start-ups

1. The OTT may with the approval of the Vice President of Research & Economic Development, and at the request of one or more Creators of University-owned Intellectual Property, license that University-owned Intellectual Property to a business entity in which one or more Creators has an ownership or other financial interest. In making a decision, the OTT and the Vice President of Research and Development shall take into account the entity's technical and business acumen to commercialize the Intellectual Property and the demonstrated compliance of Creators with University conflict of interest and facility use policies and State Ethics laws.

2. The OTT will attempt to consult with all Creators before executing any license under this Section, but need not obtain their approval. All Creators, regardless of whether they have an ownership/financial interest in the company, will share in any revenue received by the University in accordance with Article VI. Creators with an ownership or financial interest in

the company shall recuse themselves from directly negotiating the terms of the company's license with the OTT in the light of the conflict of interest that would create.

IX. Effective Date

This policy will be effective upon the approval of the Board of Regents on November 5, 2019 ("Effective Date") and will apply to all Intellectual Property disclosed to the University on or after the Effective Date, unless otherwise agreed in writing by the University and all Creators of the Intellectual Property (or the heir or assignee of any Creator's share of Revenue).