

Morgan State University

Principal Investigator Handbook

Part 4: Research Facilities & Resources

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OFFICE OF RESEARCH ADMINISTRATION | morgan.edu/ora
DIVISION OF RESEARCH AND ECONOMIC DEVELOPMENT | MORGAN STATE UNIVERSITY

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CHAPTER 1: OVERVIEW OF MAJOR RESEARCH ASSETS

Morgan State University (MSU) is a Historically Black College or University (HBCU) located in Baltimore, Maryland. While there are over 100 HBCUs nationwide, MSU is currently one of only 10 HBCUs that have a Carnegie Classification® of R2 (Doctoral Research University – High Research Activity). MSU President David Wilson and the University faculty have made achieving R1 research status (Doctoral Research University – Very High Research Activity) one of the primary goals of the [new MSU 10-year Strategic Plan](#).

MSU has a vast research portfolio in a wide range of fields, including science, engineering, mathematics, public health, psychology, social work, and other fields, and has received major grants, cooperative agreements, and contracts from various funding agencies. While MSU investigators conduct research on a wide variety of topics, a central theme in MSU's research activities is reducing societal disparities and addressing urban life issues. In 2017, MSU was designated by statute as "Maryland's Preeminent Public Urban Research University." MSU's sponsored research also includes major grants and cooperative agreements focused on training the next generation as a more diverse workforce.

Major Research Assets

MSU has:

- Eleven (11) schools, with a wide range of academic programs and faculty expertise, and over 8500 students;
- Research administration support within the Division of Research and Economic Development (D-RED) and the Division of Finance and Administration (DFM);
- A history of receiving major grants, cooperative agreements, and contracts from federal, state, and other sources;
- Several state-funded major research centers;
- The Earl S. Richardson Library;
- Well-equipped core laboratories;
- The Office of Technology Transfer;
- A strong cadre of faculty members;
- A highly-renowned and diverse board of advisors;
- Proximity and history of significant collaborations with many top research institutions, such as Johns Hopkins University and the University of Maryland; and
- Proximity to federal agencies and a history of collaborations with government research labs.

A short description is provided in this Chapter. Further details are provided in the [next chapters](#).

Schools and Academic Programs

MSU has over 8500 students and offers 60 bachelor's, 35 master's, and 23 doctoral degrees across 11 schools/colleges, as of 2022. The schools and colleges include:

- School of Computer, Mathematical, and Natural Sciences;
- School of Engineering;
- School of Community Health and Policy;
- School of Business and Management;
- School of Social Work;
- School of Architecture and Planning;
- School of Global Journalism and Communications;
- College of Liberal Arts;
- School of Education and Urban Studies;
- College of Interdisciplinary and Continuing Studies; and
- School of Graduate Studies.

For a detailed list of programs, please see [this link](#).

Research Administration Support and Recent Statistics

The Office of Research Administration (ORA) within the Division of Research and Economic Development (D-RED) offers comprehensive pre-award and post-award services, from grant preparation to grant close-out. Some of the core services include:

- Assist faculty members with budget preparation;
- Review, process, and submit proposals to sponsors;
- Receive and review awards;
- Provide grant-management training for the principal investigators and supporting staff;
- Oversee research compliance and regulatory matters, including the protection of human subjects, research integrity, and export control;
- Assist with preparing, issuing, and monitoring subaward agreements;
- Serve as a liaison with sponsors for non-fiscal award management matters;
- Prepare data related to proposal submissions, grant and contract funding, and research output;
- Assist with programmatic close-out of awards.

Leading D-RED is Vice President Willie May, Ph.D., formerly the U.S. Undersecretary for Commerce for Standards and Technology and [Director of the National Institute for Standards and Technology \(NIST\)](#). D-RED works closely with the Office of the Provost and the Division of Finance to pave the way for MSU's ascendancy to Carnegie Classification® R1 status. An Office of Restricted Funds Accounting (RFA) operates under the aegis of the Division of Finance and Management (DFM).

In Academic Years 2021 and 2022, the ORA staff reviewed and submitted 475 grants and contract proposals with a total requested amount of approximately \$310 million. During this same period, MSU received 234 new funding obligations worth \$106 million.

History of Major Grants, Cooperative Agreements, and Contracts

MSU has received major grants, cooperative agreements, and contracts from the National Institutes of Health (NIH), National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), Department of Defense (DoD), Department of Transportation (DoT), and many other research organizations.

MSU has a history of receiving major grants, cooperative agreements, and contracts. Some current salient examples of large grants or cooperative agreements are:

- [ASCEND](#) (**A Student-Centered Entrepreneurship Development Training Model to Increase Diversity in the Biomedical Research Workforce**); **\$40 million**; funded by the NIH; 2014 to 2024; Prime.
- [RCMI](#) (**Research Centers at Minority Institutions**); **\$15 million**; funded by the NIH; 2018 to 2023; Prime.
- [GESTAR I and GESTAR II](#) (**Goddard Earth Sciences Technology and Research Cooperative Agreement**); **\$58 million**; funded by NASA; 2011 to 2024; Subrecipient.
- [Center for Advanced Electro-Photonics with 2D Materials](#); **\$7.5 million**; funded by the DoD; 2021 to 2026; Prime.

Major Grant-Funded and State-Funded Research Centers

MSU has several grant- and state-funded research centers. ASCEND, RCMI, and GESTAR, referred to earlier, are examples of research centers funded by federal grants. The [National Transportation Center](#), which has been in operation for over 20 years, is another major research center that has used federal grant funds as well as funds provided by the State of Maryland.

Morgan currently has several other major research centers and Institutes. The establishment of these centers serves to help MSU be a major resource to the City of Baltimore, State of Maryland, the nation, and the international community. Some of these centers include:

- [Center for Cybersecurity Assurance and Policy \(CAP\)](#). Established in 2018, CAP receives \$2 million base funding from the State of Maryland. The major purpose of this center is to conduct research and provide training on cybersecurity.
- [Patuxent Environmental & Aquatic Research Laboratory \(PEARL\)](#). Acquired by MSU in 2004, PEARL provides society with the knowledge to solve its environmental challenges through research, education, and economic development.
- [Center for Urban Health Equity \(CUHE\)](#). Established in 2021, CUHE receives \$3 million annually from the State of Maryland. The main goal of this center is to positively impact the root causes of urban health disparities through asset-based community driven research and practice.
- [Center for Equitable Artificial Intelligence \(AI\) & Machine Learning \(CEAMLS\)](#). Established in 2022, CEAMLS receives \$3.1 million annually. The main goal of this center is to better understand and address the challenges introduced by algorithmic bias in machine learning and artificial intelligence (AI) by engaging in research and development of new tools and techniques for detection of such bias and reducing the disparate impact caused.
- [Center for Data Analytics and Sports Gaming Research \(DA SGR\)](#). Established in 2021, DA SGR has thus far received \$1.5 million from the State of Maryland. The main goal of this center is to conduct rigorous and impactful research that guides state stakeholders in the development of

comprehensive policy and programs in sports gaming and eSports that improve the lives of individuals and underserved communities.

- [Institute for Urban Research \(IUR\)](#). Established in 1978, IUR is tasked with identifying and researching urban issues and, when relevant, sharing such information with policy makers. Working closely with elected officials and other policy makers in locating information that gives elected officials a comprehensive understanding of proposed policy and its potential impact on a community, IUR aids in allowing for policy makers to make informed decisions and understand how those decisions may impact neighborhoods and regions.

Several of these centers were established based on recommendations received by a [Blue-Ribbon Panel](#) on STEM Research Advancement, see below under Board of Advisors for further information on the Blue-Ribbon Panel. The assembly of which comprised a Nobel Laureate and former National Medal of Science Winner, several National Academy Members, and other renowned scientists, as well as high-ranking administrators in academia and the federal government. The Panel identified key areas where with significant investments, MSU could establish nationally-recognized “peaks of excellence”, including:

- Equitable AI and Machine Learning;
- Climate Science – with a focus in Coastal Science and Policy;
- Cybersecurity for IoT Devices;
- Brain Science;
- Predictive Analytics; and
- STEM Education.

Core Laboratories

MSU has a major core laboratory in the Dixon Research Building. On October 17, 2003, Morgan State University formally opened the Richard N. Dixon Science Research Center, named for former state treasurer, the Honorable Richard N. Dixon. This \$23.3 million, three-story (48,500 gross square feet) scientific research building includes 26 research laboratories, state-of-the-art teaching/research greenhouse and a 100-seat Travelers Auditorium. The concrete and glass structure is joined by an overhead bridge to the Science Complex, which is used for classrooms, research, and teaching laboratories. The funds for this laboratory were primarily provided by NIH grants (ASCEND and RCMI).

Details of the Core Lab are described in [Chapter 2](#) of this handbook.

The Office of Technology Transfer

Established in 2017 as a unit of the Division of Research and Economic Development (D-RED), [the Office of Technology Transfer \(OTT\)](#) translates the results of the research laboratory into social and economic benefit with the aim of upholding Morgan’s public service mission as a research institution. With an eye toward benefiting society, the OTT assists university community members in transferring innovative research into products and services for business and industry. In addition, the OTT manages all of Morgan’s intellectual property and can help faculty with patent applications, software, copyrights, and other forms of intellectual property.

Faculty Members and Publications

MSU has a distinguished cadre of faculty researchers. These include Elected Fellows of academic societies, such as:

- Dr. Gaston N'Guerekata: Distinguished Professor of Mathematics, Fellow of the American Mathematical Society (AMS), The World Academy of Sciences (TWAS), African Academy of Sciences (AAS), and Pan African Scientific Research Council (PASRC)
- Dr. Ramesh Budhani: Professor of Mathematics, Fellow of the American Physical Society (APS), Indian Academy of Sciences, National Academy of Sciences India (NASI), and the Indian National Science Academy (INSA)
- Dr. Willie May, Professor of Chemistry and Vice- President of D-RED, Fellow of the American Association for the Advancement of Science (AAAS) and the American Chemical Society (ACS)
- Dr. Christine Hohmann, Professor of Biology, Fellow of the International Behavioral Neuroscience Society (IBNS) and the American Association for the Advancement of Science (AAAS)
- Dr. Anthony Saka, a professor and chair of the Department of Transportation and Urban Infrastructure Studies in the Clarence M. Mitchell, Jr. School of Engineering, Fellow of the American Society of Civil Engineers (ASCE) and the Institute of Transportation Engineers (ITE)
- Dr. Jiang Li, Professor of Civil Engineering, Fellow of the American Society of Civil Engineers (ASCE) and the Environmental and Water Resource Institute (F. EWRI)
- Dr. Oscar Barton, Jr., PE, Professor and Dean of the Clarence M. Mitchell, Jr. School of Engineering, Fellow of the American Society of Mechanical Engineers (ASME)
- Dr. David Wilson, President of MSU, an elected member of the American Academy of Arts & Sciences (AAA&S)

There are many other distinguished faculty members at MSU, some of whom are well known in their field of research and have been cited tens of thousands of times. For example, Dr. Michael Spencer, Professor of Electrical and Computer Engineering, has a distinguished career as a researcher, previously serving as the Assistant Dean for Research at Cornell. Dr. Spencer has authored more than 2,350 publications and been cited over 14,000 times in the area of compound semiconductor research, and has over 20 U.S. patents, many in the area of betavoltaics.

Board of Advisors

The [Blue-Ribbon Panel](#) of STEM Research Expansion that suggested the Five "Peaks of Excellence" are:

- Carol Espy-Wilson, Ph.D., professor in the Electrical and Computer Engineering Department and the Institute for Systems Research at the University of Maryland, College Park
- Craig N. McLean, acting chief scientist for science and technology priorities and assistant administrator for Oceanic and Atmospheric Research at the National Oceanic and Atmospheric Administration (NOAA)
- Claudia Rankins, Ph.D., an immediate past program officer in the Directorate for Education and Human Resources at the National Science Foundation (NSF), managing the HBCU undergraduate program and the Centers for Research Excellence in Science and Technology

- Eugene M. DeLoatch, Ph.D., dean emeritus and founding dean for Morgan's Clarence M. Mitchell, Jr. School of Engineering, and past president and Fellow for the American Society of Engineering Education (ASEE)
- Hratch Semerjian, Ph.D., chief scientist emeritus for the National Institute of Standards and Technology (NIST), and a member of the National Academy of Engineering (NAE)
- Isiah M. Warner, Ph.D., an analytical/materials chemist with focal research in fluorescence spectroscopy, organized media and ionic liquid chemistry, who currently serves as vice president for Strategic Initiatives, and is a Boyd Professor and Phillip W. West Professor of analytical and environmental chemistry at Louisiana State University
- Juan E. Gilbert, Ph.D., the Andrew Banks Family preeminence endowed professor and department chair for Computer and Information Science and Engineering at the University of Florida
- Landon Taylor, founder and chairman of Base 11, a nonprofit 501(c)3 STEM workforce and entrepreneur accelerator
- Mahlet N. Mesfin, Ph.D., senior advisor for policy planning to the Secretary of State for the U.S. Department of State and a former visiting scholar at the Penn Biden Center for Diplomacy and Global Engagement
- Rhonda R. Franklin, Ph.D., professor of electrical and computer engineering at the University of Minnesota, with a research focus on microelectronic mechanical structures in radio and microwave applications
- Sylvester James Gates, Jr., Ph.D., a National Medal of Science-winning theoretical physicist, the Ford Foundation professor of physics and director of the Brown Theoretical Physics Center at Brown University, and an affiliate professor of mathematics and a faculty Fellow at Brown's Watson Institute for International Studies and Public Affairs
- William D. Phillips, Ph.D., a Nobel Prize-winning scientist and Fellow at NIST, and a distinguished professor of physics within the Joint Quantum Institute at the University of Maryland, College Park

[History of Collaborations with Major Research Universities](#)

MSU has had research collaborations with many other universities across the United States and internationally. Some examples include Johns Hopkins University (JHU); Brown University; University of Maryland, College Park; University of Maryland, Baltimore; University of Maryland, Baltimore County; University of Southern California; Texas A & M; Purdue University; University of Illinois; University of North Texas, Health Science Center; Virginia Tech; Penn State; and Columbia University. Over the past two years, MSU has received over 50 subawards and has issued over 20 subawards to other institutions.

[History of Collaborations with the Federal Government](#)

MSU is in close proximity to many federal institutions and has had collaborations with the National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), Department of Defense (DOD), and National Institutes of Standards and Technology (NIST) in the form of cooperative agreements or using other mechanisms.

CHAPTER 2: RESEARCH CAPABILITIES

As a part of Morgan’s endeavor to establish itself as a highly respected, R1 Carnegie classified® research institution, the University has been building up new centers of research excellence. Using funds made available through Maryland’s HBCU coalition case settlement, these centers will be supported by an ongoing increase in the University’s annual operating budget, representing a substantial investment of the State in the expansion of Morgan’s research capacity. A selection of Morgan’s established and up-and-coming research centers is presented here.

History of Major Grants, Cooperative Agreements, and Contracts

ASCEND

Program Manager: Diane Hughes diane.hughees@morgan.edu

Principal Investigators: Payam Sheikhattari, MD payam.sheikhattari@morgan.edu

Christine Hohmann, PhD christine.hohmann@morgan.edu

URL: <https://www.morgan.edu/ascend>

“**A Student-Centered Entrepreneurship Development Training Model to Increase Diversity in the Biomedical Research Workforce**” (ASCEND) is a cooperative agreement funded by the National Institutes of Health (NIH) through the Building Infrastructure Leading to Diversity (BUILD) Initiative. Started in 2014 with a five-year \$23.3M grant – the largest such grant that MSU had by then received from the NIH – ASCEND has been granted more than \$16.7M more and extended five more years for a total of over \$40M and ten years (2014 – 2024).

The mission of ASCEND is to increase diversity in the biomedical workforce, specifically by developing new systems to engage underrepresented undergraduate students from minority backgrounds in research and research development to become future biomedical leaders and researchers with a focus in health disparities and outcomes for underrepresented communities. ASCEND aims to increase MSU’s research capacity and intervene in faculty and institutional development with such offerings as pilot research grants, community-based participatory research (CBPR) mini-grants, course redesign grants, etc.

In seeking to revolutionize biomedical training, ASCEND does not utilize traditional apprenticeship models of learning. Instead, ASCEND has embraced a new and more creative direction that has proven successful in international models of training: ASCEND allows students to take ownership of their own training by proposing and selecting their own topic of research, developing the research methods to be used, writing small grants, and being responsible for the research project from initiation to completion. To this end, the biomedical sciences are defined to include all health-related research fields, including public health, biology, psychology, sociology, social work, nutrition, physics, chemistry, mathematics, and more.

The funding for ASCEND has allowed for the building of a rich infrastructure of biomedical training and learning at Morgan State University. There has been the creation of the Student Research Center (SRC) – a thriving center on campus run by and for student researchers – as well as the Summer Research Institute, providing further research and training opportunities. The creation of the Office of Undergraduate Research (OUR) ensures institutionalized research program components remain strong.

Students are also able to compete for mini-grants and being named an ASCEND Scholar, which provides scholarships and research support. Faculty support also exists with an eye towards developing new or improved interdisciplinary science classes with research foci that explore the disparities in health and health outcomes for underserved communities. There is a successful semester-long grant writing workshop, as well as faculty development and travel awards, and funding for sabbaticals. ASCEND has allowed for the procurement of state-of-the-art technologies and updated resources for the library, including research databases.

MSU is the prime grantee of ASCEND in partnership with Johns Hopkins University, University of Maryland, the Intramural Program of NIH, Lehigh University, and Northeastern University, among others.

RCMI & the Center for Urban Health Disparities Research and Innovation

Program Manager: Diane Hughes diane.hughes@morgan.edu

Executive Director/PI: Valerie Odero-Marah, PhD valerie.odero-marah@morgan.edu

Co-Principal Investigator: Hongtao Yu, PhD hongtao.yu@morgan.edu

URL: <https://www.morgan.edu/rcmi>

The Research Centers at Minority Institutions (RCMI) at Morgan State University is the Center for Urban Health Disparities Research and Innovation. RCMI is funded through a five-year \$14.2M cooperative agreement with the National Institutes of Health's (NIH's) National Institute on Minority Health and Health Disparities (NIMHD). RCMI's mission is to engage and train a diverse community of researchers in the exploration of health disparities devastating minority communities in urban areas, such as Baltimore City. Utilizing a transdisciplinary approach, RCMI brings together biomedical, public health, and behavioral scientists to conduct research, while training future researchers from these underrepresented, urban communities.

Aiming to facilitate collaborations between basic biomedical and social/behavioral faculty researchers, RCMI also seeks to create a collaborative and supportive environment for faculty career development, especially for new and early career faculty. To this end, RCMI intends to build sustainable partnerships with two local research-intensive institutions, Johns Hopkins University and University of Maryland, Baltimore, as well as local government. In addition to RCMI's mission to enhance Morgan's infrastructure and capacity for biomedical and behavioral/public health research with increased external funding, publications, and scientific services to the community, RCMI aims to enhance community translation of any such research and its values. Through community engagement and community-based participatory research (CBPR) RCMI proposes to become a research hub on urban health disparities and an integral part of the City of Baltimore.

Internally, RCMI is organized around core groups: the Research Infrastructure Core, the Investigator Development Core, the Community Engagement Core, and the Administrative Core. The Research Infrastructure Core provides new technologies and instrumentation needed for successful research faculty, and within itself established three core facilities: Animal Research Core (ARC), Biostatistics and Bioinformatics Support Unit (BBSU), and Molecular and Cell Biology Core (MCB). With innovative collaborative workshops and scientific writing accountability groups, the Investigator Development Core manages a Pilot Program and works with Johns Hopkins University and the University of Maryland, Baltimore to train early career faculty for state-of-the-art research in health disparities and urban health. The Community Engagement Core collaborates with community groups and governments to facilitate CBPR. An example of their work is the assessment of the effectiveness of virtual versus in-person motivation for smoking cessation among youths and adults; two additional projects are: the relationship between socioeconomic status and poverty and mRNA expression in immune cells; and HIV/HCV-related health disparities in Baltimore – from community to lab bench. And finally, the Administrative Core handles all budgeting and reporting, and is the home for RCMI's internal evaluation and liaison with the RCMI Translational Research Network's Data Coordinating Center (RTRN DCC) external evaluation.

Establishment of the RCMI allows for the study of major threats to people's health in Baltimore and offers solutions to enhance health for all citizens and eliminate health disparities. Further, RCMI

collaborates with researchers from other Research Centers at Minority Institutions throughout the United States via the RCMI Translational Research Network's Coordinating Center (RTRN CC), allowing for enhanced mentorship of junior faculty members at MSU and developing them as independent researchers.

Goddard Earth Sciences Technology and Research (GESTAR)

Director: Dan Laughlin, PhD daniel.laughlin@morgan.edu

URL: <https://www.morgan.edu/gestar>

Goddard Earth Sciences Technology and Research (GESTAR) II is a NASA cooperative agreement providing \$27.9M to Morgan State University over three years to advance NASA's Earth Science Division within the Science Mission Directorate by providing a competitive environment to recruit, hire, and retain a diverse workforce of high-quality scientists and students who are on track to be leaders in NASA, academia, and industry. Part of a larger \$72M cooperative agreement, MSU administers GESTAR II as part of a consortium with the University of Maryland, Baltimore County, Colorado State University, Arizona State University, Pennsylvania State University, Northrop Grumman Corporation, Earth Resources Technology, Inc., and the nonprofit Southeastern Universities Research Association. Currently, Morgan's GESTAR II program is comprised of 41 Goddard Space Flight Center (GSFC)-based scientists and a three-person program office staff. Morgan provides the consortium's senior associate director, chief scientist, and the recruiting lead.

GESTAR II exemplifies the power of mentorship, embracing a career development strategy that only a university research center can provide. In GESTAR II, early-career researchers and students can build outstanding resumes, launching them to become the Earth science leaders of tomorrow. The GESTAR II Consortium supports over 120 researchers who work to create extensive opportunities for breakthroughs in earth and atmospheric science research, carrying out observational, experimental, and theoretical research in support of NASA strategic Earth Science mission objectives.

In 2011, GESTAR began as a five-year, \$95.8M cooperative agreement from NASA GSFC to Morgan State University and partners Universities Space Research Association (USRA), I.M. Systems Group (IMSG), Johns Hopkins University (JHU), Ball Aerospace & Technologies, and The Institute for Global Environmental Strategies (IGES) with an intended goal of increasing the involvement of underrepresented groups in earth science research. MSU's \$28.5M share of the GESTAR cooperative agreement was then the largest such grant in Morgan's history.

Led by USRA, GESTAR conducted research collaboratively, providing MSU professors and students the opportunity to tackle some of the most important and high-profile challenges in science today, including in the fields of atmospheric chemistry, oceanography, polar climate changes, and carbon cycle effects on ecosystems.

The Center for Advanced Electro-Photonics with 2D Materials

Director: Ramesh Budhani, PhD ramesh.budhani@morgan.edu

URL: <https://www.morgan.edu/physics/dodcenter>

Established in 2021, the Center of Excellence for Advanced Electro-Photonics with 2D Materials is funded by a \$7.5M grant from the US Department of Defense (DoD). Designed to explore the technological efficacy and use of emergent two-dimensional (2D) materials, the new Center will be run jointly by Morgan and Johns Hopkins University (JHU) in partnership with the JHU Applied Physics Laboratory (APL), with additional contributions from scientists at the Adelphi Laboratory Center (ALC) and Aberdeen Proving Ground (APG) research centers of the U.S. Army.

The DoD funding will provide vital resources in the realm of scientific research rooted in thin films and nanostructures of refractory metal dichalcogenides and layered materials of a semiconductor and thermoelectric material called bismuth telluride, which is often used as a topological insulator. These layered materials will be synthesized at Morgan. Subsequent highly critical stability calculations and growth kinetics modeling of the 2D materials, along with experimental device development, will be performed by JHU and APL researchers.

The joint research effort will target three specific areas of 2D material technology: wearable photovoltaics (PV) and thermally managed photosensors augmented by plasmonic nanostructures; hybrid PV—thermoelectric technologies for the use of individual warfighters; and interrogation of quantum defects with light and quantized photogalvanic effects. These three research facets will be pursued in close coordination with Army scientists at APL-ALC and APL-APG. Beyond their defense sector applications, the 2D (layered) materials have universal functionality that can be used in many products and technologies in today's marketplace, including high-efficiency solar cells, photon sensors, detectors of other electromagnetic fields and thermoelectric devices for waste-heat harvesting and refrigeration. In addition, the Center's research is expected to provide clean energy solutions to protect the environment, sensors and detectors of defense forces, and other modern technologies.

In addition, the Center is committed to the promotion of STEM education and mentoring of STEM students for advanced scientific research on novel materials. Fundamental to the Center's research operations will be its mission to train underrepresented diverse students, expanding talent pipelines within the technology workforce and defense sector. The cornerstone of the applied experience made available through the Center's research will be summer internships for both Morgan and JHU students, co-advising of PhD dissertations, and joint annual workshops. Additional funding from the grant will underwrite internships for 10 to 15 undergraduate students and five students from area high schools and community colleges.

Ramesh C. Budhani, Ph.D., professor of Physics at Morgan, will serve as the principal investigator and director of the Center for Advanced Electro-Photonics.

Major Grant-Funded and State-Funded Research Centers

The National Transportation Center (NTC)

Director: Mansoureh Jeihani, PhD mansoureh.jeihani@morgan.edu

URL: <https://www.morgan.edu/soe/ntc>

General Description:

The National Transportation Center (NTC) was established by Congress under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. For the past 30 plus years, the NTC has been engaged in innovative interdisciplinary research, technology transfer, education, and workforce development. Under the Fixing America's Surface Transportation (FAST) Act of 2016, NTC received a \$9M, six-year United States Department of Transportation (USDOT) grant to develop the Urban Mobility & Equity Center (UMEC), a three-university consortium led by Morgan State University. UMEC is one of 20 Tier-1 University Transportation Centers (UTCs) nationwide, and Morgan is one of only two HBCUs to lead a UTC.

In recognition of the tremendous work done at the NTC, the center received two 2020 Council of University Transportation Centers (CUTC) awards, one each for leadership in workforce development and technology transfer. To date, the work at NTC has culminated in 117 research projects; two utility and five provisional patent filings; one book, several book chapters, and hundreds of peer-reviewed journal articles and conference papers; numerous webinars, conferences, and presentations; over 650 college interns – an internship opportunity that was featured in TRB publication NCHRP Report 710; and 600 plus high-school and middle-school students at the National Summer Transportation Institute.

Capabilities

The [Safety and Behavioral Analysis \(SABA\) lab](#): The SABA Lab is an academic applied research lab that supports global, national, state, and local efforts to solve traffic safety and mobility problems by studying drivers' behavior with state-of-the-art technology and software. It includes two full-size driving simulators and a bicycle that can be connected so that researchers can study reactions among drivers and cyclists. This technology allows researchers to conduct studies that would be difficult and dangerous to do in real life. It also possesses an eye-tracking system that indicates where a driver is looking and for how long, which allows researchers to study distracted driving and track drivers' attention to road objects and warning signs.

Capabilities include:

- two full-size driving simulators, one with a motion platform
- a portable driving simulator
- a bicycle simulator
- an eye tracking system
- connected and automated vehicles testbed
- VR-Design Studio, developed by FORUM8 Co.
- Software:
 - UCWInRoad: driving simulator software
 - Tobii Analyzer: Eye tracking software

- Aimsun: Traffic simulation software
- TransCAD: Transportation modeling software

Mixed Traffic CAV Advanced Mobility Test Environment: As part of the smart campus initiative, MSU/NTC established the Testbed, a living laboratory that provides an environment for testing CAV applications in the real world. The lab is designed to serve as a source of high-resolution traffic operations data for the City of Baltimore, improve the safety of vulnerable road users/pedestrians, and establish a foundation for transportation innovation and research. An eye-tracking system indicates where a driver is looking and for how long, allowing researchers to study all types of distractions and attention to signs and warning messages. Different levels of autonomous driving and connected infrastructure can also be simulated.

The [Urban Mobility & Equity Center \(UMEC\)](#): UMEC conducts research to improve urban mobility of people and goods in an environmentally sustainable and equitable manner. UMEC seeks to bolster the scientific foundation and discern equity implications for policies that focus on urban mobility. By researching transit/paratransit and freight planning and operations; buyers' acceptance, affordability and government promotion of connected and automated vehicles; and the distribution of transportation costs and benefits, including user fees and taxes, UMEC will contribute to the body of knowledge on which planning and policies are based. Research focus areas include increasing access to opportunities, smart cities, novel modes of transport, systems integration, analytical tools to optimize movement, and regional planning. UMEC's research will be widely available. Through educational programs and community outreach, UMEC also will provide technical assistance to communities and nurture the next generation of transportation professionals.

Cybersecurity Assurance and Policy (CAP) Center

Director: Kevin Kornegay, Ph.D., kevin.kornegay@morgan.edu

Associate Director: Ketchiozo Wandji, Ph.D., ketchiozo.wandji@morgan.edu

URL: <https://www.morgan.edu/cap>

General Description

The Cybersecurity Assurance and Policy (CAP) Center's mission is to provide the electronics industry and intelligence community with the knowledge, methodology, solutions, and skilled cybersecurity engineers to help prevent penetration and manipulation of our nation's cyber-physical infrastructures while establishing MSU as a major contributor in the cybersecurity research community. CAP Center applies invasive and noninvasive hardware and software reverse engineering techniques to assess physical layer cybersecurity vulnerabilities in embedded systems, specifically "Internet of Things" (IoT) devices, while developing countermeasures to secure them against sensitive data extraction, disruption, diversion, and obfuscation. CAP Center's director, Kevin T. Kornegay, Ph.D., is the Eugene Deloatch Endowed Chair in IoT of Morgan's Electrical and Computer Engineering Department.

In recent years, there has been an explosion in the proliferation of consumer and industrial IoT devices, including security cameras, baby monitors, smart locks, smart speakers and assistants, smart sensors and controllers in agricultural devices, internet-connected televisions, and even Wi-Fi-connected microwaves and toasters. Such devices present a unique set of security challenges given the variety of hardware and software platforms and capabilities, power sources and requirements, physical and remote accessibility, and embedded state within the environment.

Recently, CAP Center was awarded a \$3.2M National Science Foundation (NSF) grant to implement that agency's novel CyberCorps® Scholarship for Service (SFS) program providing 24 graduate and undergraduate cybersecurity scholarships to Morgan.

Capabilities

- Hardware Security
- Side Channel Analysis (SCA)
 - Simple Power Analysis (SPA)
 - Differential Power Analysis (DPA)
 - Correlation Power Analysis (CPA)
 - Differential Electromagnetic Analysis (DEMA)
- Fault Injection (FI)
 - Power and Clock Glitching
- Software Reverse Engineering
- Hardware Reverse Engineering
- Countermeasure Assessment and Development
- Wireless Interface/Protocol Hacking
- Trusted Platform Module Security Applications & Design
- Semiconductor Supply Chain Security
- Trustworthy AI

The Patuxent Environmental & Aquatic Research Laboratory (PEARL)

Director: Scott Knoche, PhD scott.knoche@morgan.edu

URL: <https://www.morgan.edu/pearl>

General Description

The Patuxent Environmental & Aquatic Research Laboratory (PEARL) is located near the Patuxent River (part of the Chesapeake Bay watershed) in Saint Leonard, Calvert County, Maryland, 80 miles south of Baltimore City. PEARL is an environmental research laboratory dedicated to solving complex environmental problems and generates scientific knowledge through innovative, interdisciplinary environmental research. PEARL embraces the public university's role in translating this knowledge to stakeholders for the benefit of the public and inspires the next generation of scientists and environmentally aware citizens through experiential learning opportunities, mentored research experiences, and environmental education.

PEARL's mission is to provide society with the knowledge to solve its environmental challenges through research, education, and economic development. In addition, it has the immediate goal of maintaining an active research program in environmental economics, working with state and federal agencies and funding agencies to better understand how environmental protection and restoration confers economic benefits to user groups and economic impacts to regional economies.

Much of the research conducted at the 22,000 square-foot, state-of-the art facility is designed to increase the understanding of coastal ecosystems, such as the Chesapeake Bay and its tributaries, of which the Patuxent River is one, such that they may be properly managed and protected. Providing essential data and innovative techniques for assessing the health of the Chesapeake Bay spanning four specific areas: aquaculture, coastal resilience, natural resource economics and environmental education. PEARL maintains Class 100 and Class 1000 clean rooms, a fleet of vessels, indoor and outdoor flow-through ambient water facilities, oyster hatchery, a large-scale algae production center and teaching

Funded by the Maryland State Legislature, PEARL has received many grants including 2019's nearly \$500,000 in research grants awarded by the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration (NOAA), National Sea Grant, and the Maryland Department of Natural Resources (DNR), among others.

Founded in 1967 by The Academy of Natural Sciences in Benedict, MD, PEARL moved to its current facility in 1994, becoming part of Morgan State University in September 2004.

The Center for Urban Health Equity (CUHE)

Director: Kim Sydnor, PhD kim.sydnor@morgan.edu

Established in 2021, [the Center for Urban Health Equity \(CUHE\)](#) is made possible by a \$3 million annual investment from the State of Maryland and an allocation of \$500,000 in startup funding from the \$40 million gift made by author and philanthropist MacKenzie Scott to Morgan State University. CUHE's mission is to positively impact the root causes of urban health disparities through asset-based community driven research and practice.

Based in the School of Community Health and Policy, spearheaded by Baltimore-native Dean Kim Sydnor, PhD, CUHE will conduct research on the social determinants of health and the sources of minority health disparities and develop practical solutions to mitigate these disparities in urban communities nationwide, but most of all, in the City of Baltimore. It is an unfortunate and unjust reality that minority communities, and particularly black communities, across the United States suffer worse health outcomes than majority white communities. These disparities can be observed in nearly every health metric available, including higher rates of: infant mortality and low birth weights, asthma, traumatic childhood experiences, drug and alcohol abuse, diabetes, cardiovascular disease, stroke, obesity, kidney disease, HIV, COVID-19, and many more. These disparities are especially pronounced in the City of Baltimore, where minority residents suffer some of the worst health outcomes in the country.

As a long-standing HBCU, Morgan State University has a unique history, perspective, knowledge, and approach to research and practice that the new CUHE will utilize as the basis for addressing health inequity. To do so CUHE will rely on an interdisciplinary model, bringing together students, staff, and faculty from disparate schools/colleges across Morgan to work closely with local communities and community leaders. The foundation of CUHE is the belief that transformation of systems is necessary; action is required; and leadership is called for. CUHE aims to center Morgan State University as a leading voice of health inequity data, research, and solutions, working toward the vision of thriving health communities for all.

CUHE has set for itself five goals to accomplish its mission. First, CUHE aims to enhance the capability of communities to address urban health disparities and increase health equity through supported community-based scholarship. Secondly, CUHE seeks to identify strengths and illuminate structural inequities to inform decision-making through data driven approaches. Third, CUHE intends to build knowledge and skills regarding health equity within the University and beyond. Fourth, CUHE aims to educate and disseminate new knowledge from urban health equity research. Lastly, CUHE proposes to foster and facilitate coordination and collaboration of health equity efforts across the state. The priority areas are the socioeconomic well-being for individuals and communities (education and economics); cultural policies and practices of health care systems and services; neighborhood social conditions; and lastly, neighborhood environmental conditions.

Utilizing an umbrella structure for its organization, CUHE will be run by a Center Leadership Core, made up of the Center's Director, currently Dr. Sydnor, and a Co-Director, the School of Community and Health's Associate Dean. There will be four Core groups under the Center Leadership Core. Made up of Equity Scholars and Community Leaders will be three of the four Core groups: Applied Community Research Core, Health Equity Training Core, and Equity Data Analytics Core. The fourth Core group, MD HBCU Health Equity Collaborative, will be comprised of Maryland HBCU Deans.

The Center for Equitable AI and Machine Learning (CEAMLS)

Director: Kofi Nyarko, PhD kofi.nyarko@morgan.edu

Technical Director: Paul Wang, PhD shuangbao.wang@morgan.edu

URL: www.morgan.edu/ceamls

General Description

Established in July 2022 and led by Director Kofi Nyarko, PhD, associate professor of Electrical and Computer Engineering, Morgan State University's Center for Equitable AI and Machine Learning (CEAMLS) aims to better understand and address the challenges introduced by algorithmic bias in machine learning and artificial intelligence (AI) by engaging in research and development of new tools and techniques for detection of such bias and reducing the disparate impact caused. In addition, the Center works to formalize best practices and standards, while engaging in educational outreach to the public, industry, and government about the potential bias and disparate impact of AI systems and best practices for mitigating bias and developing equitable algorithms. To this end, CEAMLS has recently won a \$9M grant from the Office of Naval Research (ONR). CEAMLS will soon include a cutting-edge computer lab with high-performance workstations, each capable of delivering the equivalent of hundreds of traditional servers.

In recent years, the world has seen an explosion in the quantity of digital data available and the computational capacity of systems to process that data. These resources have fueled the exponential growth of machine learning approaches to AI. Machine learning algorithms allow computer scientists and programmers to train models to emulate human-like discernment and decision making. These algorithms are increasingly becoming integral parts of our lives in programs that perform a wide range of functions, including recognizing faces, animals, and other objects in photos and videos, converting speech to text, finding the fastest or most fuel-efficient route to the grocery store, and in making predictions about the weather, consumer behavior, or the stock market. While these algorithms can make our lives easier and more efficient, our pervasive reliance on them also has the potential to do extensive and serious harm. For example, because machine learning algorithms are trained on the basis of human choices, they also tend to reproduce human biases. We have already seen real-world examples of such algorithmic bias in job applicant screening programs that are less likely to recommend candidates with black-sounding names, sentencing algorithms that tend to recommend longer prison sentences for black defendants, and medical diagnosis algorithms that are less likely to catch skin cancer and other conditions in black skin. As one computer scientist has put it, machine learning algorithms enable us to make bad decisions far more quickly, efficiently, and with far greater impact than we have in the past.

The Center for Equitable AI and Machine Learning has a \$3M state-legislated yearly budget. In addition, the Maryland State House of Representatives will soon see legislation requesting an additional \$2M be allocated to CEAMLS; supported by Rep. Dutch Ruppersberger (D-MD), the Commerce, Justice and Science and Related Agencies (CJS) Appropriations bill for fiscal year 2023 passed a House Appropriations subcommittee and will soon advance to the full committee for consideration.

Center for Data Analytics and Sports Gaming Research (DA SGR)

Director: Ali Emdad, PhD ali.emdad@morgan.edu

URL: <https://www.morgan.edu/data-analytics-and-sports-gaming>

General Description

In 2021 the State of Maryland offered Morgan State University \$1.5 M in annual funding to establish the impartial Center for Data Analytics and Sports Gaming Research (DA SGR). The funding of which allows for collaboration and participation of faculty, staff, and students from several schools and units at Morgan and external researchers and stakeholders in data analytics, eSports, leading-edge technologies, including NFTs (blockchain-based Non-Fungible Tokens), entrepreneurship, investment, and social work.

The Center will leverage the on-campus expertise at other Morgan centers, initiatives, departments, as well as its staff to function as a resource to minority entrepreneurs, eSports game developers, software developers, tournament management companies, professional players, gaming executives, venture capital firms, regulatory agencies, the legislature, and the general public.

The vision of DA SGR is to be a leading Center for scholarly inquiry on the dimensions and impacts of gaming and eSports; to engage in innovative education, and cutting-edge insights into policy and regulation; to be a recognized Center for learning opportunities in data analytics for students to ensure a diversified and skilled workforce; and to be a recognized support Center for the underserved communities affected by problem gambling. The mission of the Center is to conduct rigorous and impactful research that guides state stakeholders in the development of comprehensive policy and programs in sports gaming and eSports that improve the lives of individuals and the underserved communities. Through collaborative pursuits and innovative educational programs, the Center addresses societal problems, specifically in marginalized communities. The Center offers learning opportunities to Maryland HBCU students to improve skills and knowledge in data analytics.

The Center will be operated by a Director, a Data Analyst, and a Project Coordinator. Three of the Center's affiliate research faculty will be in the Information Science and Systems Department's Data Analytics and Visualization program, and two will be in the Psychology Department's Predictive Analytics program. All five faculty will have joint appointments between the Center and their respective departments.

Among programs and events that the Center will offer are workshops, webinars, conferences, mini-grants for research and special projects, community outreach, entrepreneurial training, eSports programs, hackathons, and case competitions. The Center will conduct annual impact analyses and reports.

The Center will establish a lab with 30 high-end workstations and a large interactive display for data analytics visualization.

As of August 26, 2022, the University has not identified a location for the Center, including offices for its faculty researchers, staff, lab, and student space.

An advisory board that currently has seven members with expertise in data science and analytics, gaming, eSports, and the entertainment industry has been created to help DA SGR develop into a dynamic resource and training ground. The advisory board includes:

- Charles Hurley - Legal Counsel for FanDuel, the leader in sportsbook, fantasy, racing, casino space
- Dylan Small - Universal Furniture Professor; Professor of Statistics and Data Science; Department Chair; Wharton School, University of Pennsylvania
- Eric T. Bradlow - K.P. Chao Professor, Professor of Marketing, Statistics, Education and Economics, Chairperson Wharton Marketing Department, and Vice-Dean of Analytics at the Wharton School of the University of Pennsylvania
- Jeremy Babb - MSU Alum/Director of Technology & Educational Programming
- Kevin Liles – Co-founder of 300 Entertainment record label
- Malcolm Coley - Chief Technology Officer & Founder for Futures First Gaming
- Ryan Johnson - CEO & Founder of non-profit organization, HYPERLINK
"https://urldefense.proofpoint.com/v2/

Institute for Urban Research (IUR)

Director: Raymond Winbush, PhD raymond.winbush@morgan.edu

URL: <https://www.morgan.edu/iur>

General Description

Morgan State University has a long history of direct involvement in helping to solve the complex problems in the urban ecosystem. In 1978 with a mandate from the State of Maryland, the Institute for Urban Research (IUR) was established. Currently within the Division of Research and Economic Development (D-RED), IUR is tasked with identifying and researching urban issues and, when relevant, sharing such information with policy makers. IUR works closely with elected officials and other policy makers in locating information that gives elected officials a comprehensive understanding of proposed policy and its potential impact on a community, allowing for policy makers to then make informed decisions and understand how those decisions may impact neighborhoods and regions.

IUR focuses on survey research of populations that are traditionally overlooked, underserved, and rarely asked questions often reserved for majority populations. During its 40-plus-year history, IUR has conducted countless surveys on community attitudes toward state and private institutions, and has engaged in many research, training, and community service activities - internationally, nationally, and locally. Through workshops held at both Morgan State University and inside community organizations, IUR offers technical assistance to Community Based Organizations (CBOs) that seek aide with writing grants, researching their own histories, and devising strategies for dealing with public policies that directly affect them. At the request of CBOs, IUR helps in providing data, consultants, and technical support, helping CBOs to gain a better understanding of their own strengths and weaknesses. IUR has built a Community Development Research Center and a Survey Research Center within itself to aide in its mission.

Interdisciplinary cooperation is a key strategy for IUR. IUR's eight-member staff reflects a diversity of disciplines so that robust snapshots of the studied communities and institutions are produced, with the aim of maintaining integrity and avoiding biased stereotypes. IUR staff is comprised of sociologists, psychologists, historians, transportation engineers, anthropologists, public health, and communications scholars. Another critical component of IUR research is to provide research support to Morgan faculty and staff. Connecting within the University with similar staff helps in bringing a comprehensive view of urban challenges and increases faculty and staff collegiality in solving problems.

As urban education has increasingly come to mean educating Black and Brown students who often experience "educational abuse" during their matriculation, IUR staff consults widely with educational institutions on subjects such as school discipline, parental involvement, corporal punishment, effective strategies for educating African American boys, and attendance. IUR is one of only two such institutes housed at an HBCU and is sought after by schools and universities for its expertise in understanding students and educators of color.

In addition, IUR plays an essential role in growing research talent by employing and training undergraduate and graduate students from a wide variety of disciplines, such as architecture, demography, city and regional planning, education, history, law, public administration, social work, sociology, and transportation studies.

Facilities, Equipment, and Other Resources

The Earl S. Richardson Library

Director: Richard Bradberry, PhD richard.bradberry@morgan.edu

URL: <http://www.morgan.edu/library>

The mission of the Earl S. Richardson Library is to support the academic programs of Morgan State University. The Library provides resources and services to sustain learning, teaching, research, service, cultural and extra-curricular enrichment. Major functions that the Library performs include, but are by no means restricted to: evaluating, selecting, and acquiring resources for the Library's various collections; processing, providing, and preserving resources for access by library users; providing reference, informational, and technological services; and fostering intellectual curiosity, research and information literacy skills for life-long learning. Utilizing carefully husbanded human and monetary resources, the Library intends to contribute to the transformation of the University for the better.

The Earl S. Richardson Library is the main academic information resource center on the campus. The building covers approximately 222,517 square feet and opened in 2008. The state-of-the-art building is equipped with state-of-the-art technology, enhanced instruction and research rooms. The Earl S. Richardson Library has several notable features:

- Multimedia and audiovisual capabilities in meeting and study rooms
- The Beulah M. Davis Special Collection Department for African-American books, manuscripts, artifacts and Morganiana
- The Benjamin A. Quarles Room for seminars and meetings
- The Boardroom and terrace located on the fourth floor
- The Parren J. Mitchell Room/Study Lounge (vending machines, computers, etc.)
- The Clarence W. Blount Room for seminars and meetings
- Study space for visiting and emeriti faculty
- General use computer lab accommodating sixty (60) users

The Library houses over 500,000 volumes, and offers access to over 160,000 e-books and 5,000 periodical titles. The Library subscribes to 167 online databases. Reading and study spaces provide wired and wireless access to databases for research.

The Interlibrary Loan Services ILLiad, RapidILL and the University System of Maryland and Affiliate Institutions ([USMAI](#)) programs offered by the library enable patrons to connect, obtain and share needed resources from other institutions easily and effectively. USMAI is a statewide library consortium focused on resource sharing and professional capacity development and includes seventeen (17) member libraries of universities and colleges in the State of Maryland with historical roots in the state's university system; the consortium includes libraries of both public and private institutions. It provides unified, cost effective and creative approaches to acquiring, managing, and sharing information and knowledge resources.

The Library has acquired new technologies to boost library services, and most of its services have been migrated to an online environment. The Library's electronic resources include access to full-text articles, abstracts, e-journals, and e-books. Other electronic resources include a collection from OCLC net library, EBSCOHost subject specific e-books, Springer e-book collections, Ebrary, Sage Reference Collection, CREDO Reference, Mc-Graw Hill AccessScience, etc.

Currently, Earl S. Richardson Library management is exploring the ramifications of Open Educational Resources (OER) and its impact on college students' success in a way that minimizes cost. The Library is keen on adopting Open Educational Resources to benefit the community of researchers and the students it serves.

The Library provides information literacy workshops which help students to develop library research skills and the ability to use information competently. Information literacy sessions are provided by the Library to create awareness, and educate library patrons on available resources in the library and instruct them on how to access them. Additionally, the Library has an online chat platform ([Ask the Librarian](#), powered by Mosio) used to provide real-time answers to patrons attempting to access library resources from remote locations.

The Earl S. Richardson Library aims to become the 126th member of the Association of Research Libraries (ARL), thereby becoming the second Historically Black Colleges and Universities (HBCU) library to attain this status. In realizing this vision, the MSU Library will become one of the premier libraries of higher education in the state of Maryland, the nation, and the world through achieving excellence in teaching, staff development, services provided, and in the provision of necessary resources—print and electronic—to the Morgan State University community.

Dixon Research Building

Building Description

The Dixon Research Building houses most of the equipment and space for cell, molecular, and tissue research. Total assignable laboratory and office space is 12,085 square feet. In addition, a 2600 sq. ft green house is attached to the building as is a 100-seat auditorium used for teaching, meetings, and presentations. Faculty in Physics, Chemistry, and Biology are assigned laboratory and office space in Dixon. The office suite and conference room of the Dean of the School of Computer Science, Mathematics and Natural Sciences is located on the upper level of Dixon. Faculty offices are located adjacent to research laboratories.

Reverse osmosis deionized water is available in all laboratories. Two autoclaves are located on the second floor for use by all faculty and students. Wet and dry ice are readily available. Chemical fume hoods, eyewash stations and safety showers are present throughout the building.

Morgan State University's Molecular and Cellular Biology Core (MCB)

Director:	James Wachira, PhD	james.wachira@morgan.edu
Manager:	Elizabeth Rodriguez, PhD	elizabeth.rodriguez@morgan.edu
Technicians:	Jacob Curtis, MSE	jacob.curtis@morgan.edu
	Nikki Handy, MS	nikki.handy@morgan.edu
URL:	https://www.morgan.edu/rcmi/research-infrastructure-core/mcb	

General Description:

The NIGMS/BUILD Initiative and NMHD/RCMI supported Core Laboratory houses three microscopy and imaging rooms, a molecular biology instrumentation lab, mass spectrometry lab, an electron microscopy lab, a cold room, a dark room, and a common user cell culture lab. Access to the facility is open to all MSU investigators and their collaborators.

Square Footage: 1,464

Facility Location: Dixon Upper Level, rooms 204, 207, 215, 217, 218A/D/E, 223, 226
Dixon Basement Level, room 018

Spencer 206, Spencer G11A

URL: MCB Core Laboratory, <https://www.morgan.edu/rcmi/research-infrastructure-core/mcb>.

Major Equipment

Molecular biology

1. MiSeq® integrated DNA and RNA sequencing system
2. ProteinSimple WES System. A fully automated quantitative micro-western blot system using ultra-fast, capillary electrophoresis to run 25 samples per 3 h run.
3. Luminex MagPix System. A multiplexing unit with magnetic bead technology runs 50 different tests in single reaction volume and reads 96-well-plate in 60 minutes.
4. Bio-Rad NGC Quest 10 System. An FPLC (fast protein liquid chromatography) system for protein purification to homogeneity.

5. GE Amersham 680R gel imaging system for DNA and protein gels capable of chemiluminescence and fluorescence in Western blots.
6. GE Healthcare Life Sciences Nanovue Plus spectrophotometer. Available for the measurement of nucleic acid and protein samples.
7. PCR and Thermocyclers: Bio-Rad CFX96 Touch Real-Time PCR Detection System. ThermoFisher QuantStudio Pro real-time PCR system.
8. Bio-Tek Synergy H1MF is a hybrid multimode microplate reader with top and bottom fluorescence intensity, UV-visible absorbance, luminescence, fluorescence polarization, TRF & TR-FRET detection.
9. Centrifugation: Beckman-Coulter Avanti J25I high speed centrifuge (max. 25000xg), Optima L-100XP ultracentrifuge (max. 802,400xg), and Optima MAX-TL tabletop ultracentrifuge (max. 657,000xg).

Tissue Preparation/Histology

1. PELCO Pella BioWavePro Microwave System: rapid processing of thin tissue sections for histological analysis
2. PELCO SteadyTemp™ Pro Solid-State Chiller with Digital Control- offers the unique ability to provide continuous temperature control from 4°C to 80°C
3. Leica CM1860 cryostat- immunohistochemistry and histology applications
4. Leica paraffin embedding station
5. Leica rotary microtome for paraffin embedded tissues.

Cell Culture

1. Dixon Room 218D is equipped with a Class II/Type B2 laminar flow hood that is suitable for microbiological studies involving BSL-2 agents.
2. A multi-user cell culture facility (Room 207) is equipped with CO2 incubators a Zeiss Axiovert 200 inverted microscope, a centrifuge, and a TC-20 automated cell counter.

Flow Cytometry

1. SONY SH800 cell sorter has the capacity to sort different cell sizes using microfluidics sorting chips. The sorter is equipped with 488nm/638nm/408nm lasers.
2. SONY SA3800 Spectral analyzer is equipped with 488nm, 405nm and 638nm lasers. The spectral unmixing technology allows for the efficient separation of spectra from different fluorochromes. As set up, 10 color phenotyping can be accomplished from a single experiment.

Biomedical Imaging

1. Two Nikon Eclipse TE2000-E inverted microscopes. One is equipped with motorized focus and nosepiece, BF, FL, Phase Contrast and Differential Interference Contrast (DIC) optics, Nikon 100W FL power supply and Nikon DXM 1200 Digital Camera. The second TE2000-E is equipped with BF, FL, Phase Contrast and DIC optics and a Photometrics CoolSnap ES digital camera.
2. Arcturus Inverted Microscope and Pixel IIe Laser capture system.
3. Nikon Eclipse 90i upright microscope equipped with BF, FL and DIC optics, motorized focus and Nikon 100W mercury power supply, a Lumenera 3 digital camera, Image Pro Plus image analysis software and Dell Optiplex 5040 workstation.

4. JEOL JEM-1400 transmission electron microscope with 120 kV accelerating voltage; electron gun assembly with Cool Beam Illumination System - LaB6 filament standard with a comprehensive Energy Dispersive X-ray Microanalysis system, including all the tools required to perform qualitative and quantitative analysis, image capture, image centric analysis and X-ray spectral analysis. Accessories include a NanoSprint43L-Mark II AMT 43-megapixel bottom-mount camera, double-tilt beryllium specimen holder, high-tilt specimen retainer, hard x-ray aperture for HR PP, Aztec Energy standard EDS, and Xplore Detector standard microanalysis system with Xplore Large Area Analytical Drift Detector.
5. Leica STELLARIS 5 Confocal Microscope with integrated White Light Laser, Acousto-Optical Beam Splitter, Power HyD S detectors, and ImageCompass smart user interface; capable of multicolor FL, DIC, 3D, and stage-top incubation for live cell imaging at 10x, 20x, and 63x (oil) objectives.
6. Leica SP5 Confocal Microscope with DM5000B frame

Molecular Separations and Identification

1. NGC Quest 10 Chromatography System has automated 10 ml/min pumps that provide accurate gradients for high-resolution separation of proteins and biomolecules and supports automated sample injection using fixed or dynamic loops.
2. Agilent 6546 Q-TOF LC/MS System with Agilent Jet Stream source, oil foreline pump, bundled PC, monitor, MassHunter software suite- at the low and high concentrations with simultaneous delivery of five orders of in-spectrum dynamic range and mass resolution over 60k (for high masses) and over 30k (for low masses)
3. Agilent 7800 ICP-MS enables analysis of major and trace analytes in a single run – The wide dynamic range orthogonal detector system (ODS) enables direct analysis of major elements (100s or 1000s of ppm) and trace level analytes (single or sub-ppt) in a single run.

Data Analysis

1. Dell Precision 7920 Towers, Intel Xeon Silver 4214 2.2GHz, 3.2GHz Turbo, 12C, 9.6GT/s 2UPI,16.5MB Cache, HT (85W) DDR4-2400 1st, NVIDIA Quadro P5000, 16GB, 4 DP, DL-DVI-D (7X20T), 256GB 4x64GB DDR4 2666MHz LRDIMM ECC Memory, 2.5" 1TB SATA Class 20 Solid State Drive.
2. Data analysis Software packages:
 - a. Graphpad Prism
 - b. Stata statistical software for data science
3. FLOWJO flow cytometry software.
4. DNASTAR Lasergene software for genomics and molecular biology.
5. Spartan computational chemistry software.

Services

1. Initial consultation and training on all laboratory instruments.
2. Assistance with experimental design.
3. Assistance with data analysis.
4. Assays will be performed upon request

Other Multi-User Equipment in or near the Dixon Research Building

1. Real Time PCR: MX3000P Real-Time PCR System. Multiplexing capabilities of 4 dyes in using a photomultiplier tube (PMT) detector. Dynamic range of 7 orders of magnitude. Excitation range of 350nm – 750nm and emission range: 350nm –700nm.
2. Eppendorf Thermal Cycler: Accepts multiple 0.2ml and 0.5ml tubes and it can perform gradient amplifications. It is ideal for routine PCR and cloning experiments.
3. Allegra X-22R Centrifuge: Cooled bench-top centrifuge with rotors for microcentrifuge tubes, 15ml and 50ml tubes.
4. Electrophoresis: Various gel electrophoresis apparatus for nucleic acids and proteins including Ettan IPGphor II IEF System. A fully programmable integrated isoelectric focusing equipment capable of running up to 12 IPG strips (7, 11, 13, 18, or 24 cm) simultaneously. The system is cooled by a peltier platform and has an integral 8000V power supply.
5. Shaking Incubators (DI109 and DI207): Ideal for cell culture studies, cell aeration, bacterial aeration and metabolism studies. Accommodates multiple volumes of culture flasks and includes a static shelf for culture plates.
6. Sample concentrator (DI207): Vacufuge Concentrator for concentrating DNA/RNA, nucleotides, proteins and other samples in 96 x 1.5-2.0ml sample format. Automatic vacuum release prevents sample loss due to bumping and foaming.
7. Nuclear Magnetic Resonance Spectrophotometer (NMR) (DI108): 400 MHz Ultrashield NMR BRUKER Bio Spin.
8. Gas Chromatogram-Mass Spectrophotometers (GCMS) (Spencer Hall (SP) RMs 206 and 313 and DI113): HP 6890 GCMS system, which includes: HP 6890 series GC system, HP 5973 Mass Selective Detector (MSD), and Agilent 7683 Series injector. Agilent 6890N network GCMS system, which includes: Agilent 6890N Network GC system, Agilent 5973 inert Mass Selective Detector (MSD), Agilent G188 Network Head Space Sampler, Agilent 7683 Series Auto sampler, and Agilent 7683B Series injector. Saturn 2200 GCMS system from Agilent Technologies (Varian) GCMS Qp50/50A system Shimadzu Scientific.
9. Liquid Chromatogram-Mass Spectrophotometer (LCMS) (SP206): Agilent 1100 LC /MSD System, which includes: Agilent 1100 LC /MSD, G1322A Online Vacuum Degasser, G1311A Quaternary Pump G1313A, Automatic Liquid Sampler G1316A Column Compartment, and G1315B Diode Array Detector

Animal Research Facility (ARF)

Director: Ingrid Tulloch, PhD Ingrid.Tulloch@morgan.edu

Manager: Rysheem McGirt rysheem.mcgart@morgan.edu

URL: <https://www.morgan.edu/rcmi/research-infrastructure-core/animal-facility>

General Description

The Animal Research Facility (ARF) was built in 2017 and includes a state-of-the-art vivarium and research facility. This research facility was built, staffed, and equipped according to the standards of the American Association for Accreditation of Laboratory Animal Care (AAALAC). Faculty and students can perform laboratory animal studies in an innovative, ethical, and humane manner. Housing is available for rats and mice, and aquarium space for crayfish is included.

Square Footage: 2,725

Facility Location: The Martin D. Jenkins Building

The Facility Manager, Caretaker and Veterinarian are American Association for Laboratory Animal Science (AALAS) certified. All work performed in the facility is approved by the Morgan State University [Institutional Animal Care and Use Committee](#) and adheres to occupational [Health and Safety](#) guidelines. Any interested investigator is encouraged to access policies and procedures at <https://www.morgan.edu/office-of-research-administration/research-compliance/animal-research/training-and-consultation>.

The ARF maintains compliance at all times with federal Animal Welfare Act requirements for laboratory animal care and use.

Animal Housing Capacity

Species	Animals Per Cage	Cages per Rack	# of Racks	# Animals
Rat individual ventilated housing in 2 rooms	2	30	12	720
Mouse individual ventilated housing in 2 rooms	4	80	3	960
Mouse individual biometric housing with 24-hour activity monitoring in 1 room	1	60	1	60
Aquaria for housing fish in one room	4	12	2	96
	Total capacity			1836

Equipment and Apparatus

1. State-of-the-art surgery room with two surgery tables (one backdraft and one downdraft), digitized stereotaxic instruments, gas and chemical anesthesia system, animal physiological monitoring (Kent Scientific) and autoclave system for surgical sterilization.

2. Histology laboratory with biosafety level II cabinet, chemical fume hood for perfusions, HistoCore Arcadia tissue processing and embedding apparatus and a Leica RM2255 fully automated rotary microtome.
3. Molecular laboratory with a Hacker Bright cryostat, a Keyence BZ-XB fluorescence microscope with live cell imaging and automated cell counting capabilities, refrigerated centrifuge, digital temperature shaking incubator, Wes™ Simple western blot protein analysis apparatus, a microplate reader and various small laboratory equipment items.
4. Three behavior testing rooms with various automated testing equipment that includes: Automated operant conditioning chambers for fear conditioning and drug self-administration, Light-dark boxes, and modular mazes, a Rotarod for mice and rats with video recording capabilities. manual open-field, Elevated Plus and a T-Maze for mice and rats, and T-maze for small aquatic species.
5. Automated bedding dispenser and water filling station.
6. Cabinet cage washer with separate clean and dirty sides.
7. Reverse osmosis purification water system.
8. Dry ice maker.
9. Automated environmental monitoring system with 24-hour monitoring for rodent circadian rhythm studies, with environmental temperature and humidity controls.
10. Three freezers (including and ultra-low temperature freezer) and 2 refrigerators for sample storage.

Training and Consultation Services

The Facility Director, Manager or Veterinarian have over fifteen years of combined experience working with laboratory animal in research, teaching, and facility operations. The Veterinarian, Facility Manager and Animal Caretaker are all AALAS certified in various animal care and use operations. Training or consultations provided are as follows:

- Health and safety training scheduled 4 times annually.
- Basic rodent handling, animal care and health monitoring training scheduled 4 times annually but also by individual training appointments as needed.
- Consultations for laboratory animal research design and IACUC protocol writing by appointment.
- Individualized training for specialized surgical and behavioral techniques or other technical procedures are appointment.

Morgan State University's Biostatistics and Bioinformatics Support Unit (BBSU)

Co-Leaders: Mian B. Hossain, PhD Mian.Hossain@morgan.edu

Roshan Paudel, PhD roshan.paudel@morgan.edu

URL: <https://www.morgan.edu/rcmi/research-infrastructure-core/bbsu>

General Description

Located in the Portage Building on Cold Spring Lane, the Morgan State University's Biostatistics and Bioinformatics Support Unit (BBSU) provides space, software, computers, and research statistical analysis services to Morgan students and faculty.

Computational Resources

1. Dell Precision 7920 Towers, Intel Xeon Silver 4214 2.2GHz, 3.2GHz Turbo, 12C, 9.6GT/s 2UPI, 16.5MB Cache, HT (85W) DDR4-2400 1st, NVIDIA Quadro P5000, 16GB, 4 DP, DL-DVI-D (7X20T), 256GB 4x64GB DDR4 2666MHz LRDIMM ECC Memory, 2.5" 1TB SATA Class 20 Solid State Drive.
2. STATA statistical software for data science
3. Portage building has a computer lab with 22 Dell desktop computers. The installed statistical packages include:
 - a. SAS 9.4
 - b. STATA 14.2
 - c. SPSS 24.0
 - d. ATLAS.ti 8.0. (Qualitative data analysis software)

Services

- Provide assistance in designing the analytical portion of studies.
- Provide assistance with data analysis.
- Provide assistance with sample size determination of studies.
- Conduct Summer Institute on biostatistical methods, data analyses, and bioinformatics.
- Conduct Training on R statistical software.
- Conduct Training on STATA statistical software.

The Center for Reverse Engineering and Assured Microelectronics' (CREAM) Lab

Director: Kevin Kornegay, Ph.D. kevin.kornegay@morgan.edu

URL: <https://www.iotcream.com/facilities/>

The Center for Reverse Engineering and Assured Microelectronics (CREAM) Lab provides the electronics industry and intelligence community with knowledge, methodology, solutions, and skilled cybersecurity engineers to help prevent penetration and manipulation of our nation's cyber physical infrastructures. They apply invasive and noninvasive hardware and software reverse engineering techniques to assess physical layer cybersecurity threats in embedded systems, specifically IoT devices. At CREAM they develop countermeasures and trusted platform module design methodology to secure them against sensitive data extraction, disruption, diversion, and obfuscation.

Hardware resources (CREAM):

- Tektronix DPO-7104C Digital Phosphor Oscilloscope for signal analysis
- Agilent N9030 PXA Signal Analyzer for real-time spectrum measurements and countermeasure analysis
- Embedded system platforms include a variety of Xilinx Zynq based system-on-chip application boards: pico-Zed, Zedboard, ZC702, ZC706, and software-defined radio (SDR)
- Smart Home IoT Testbed includes IRIS home automation system and devices: hub, smart lighting, sensors, smart garage door opener, smart door locks, etc.
- Smart Grid IoT Testbed is an advanced metering infrastructure (AMI) device that includes: a smart meter, gatekeeper (collector), and AMI access point to communicate with the monitoring station
- Linksys WiFi router
- 6 Dell computers with dual monitors
- Side Channel Analysis and Differential Fault Analysis System
- Diode Laser Station

Software resources (CREAM LAB):

- Xilinx Vivado and SDK tools
- Metercat smart meter programming tool
- Inspector side-channel analysis software tool
- Tektronix TekVisa and SignalRF signal measurement and analysis tools
- Operating system platforms include MS Windows, XP, Ubuntu, and Kali Linux with associated hacking tools such as aircrack-ng, airplay-ng, airmon-ng, Wireshark, etc.
- Sierraware TEE ARM Trustzone development tool
- Cadence

The Data Engineering and Predictive Analytics (DEPA) Research Lab

Director: Kofi Nyarko, PhD kofi.nyarko@morgan.edu

DEPA develops tools, technology and techniques that provide insight into complex data and concepts by performing research in machine learning (ML), computer vision (CV), computational engineering, modeling, simulation, and visualization. Specific capabilities include: developing ML/CV based engineering solutions, algorithm/software development and deployment, data analytics/visualization, and autonomous systems development.

Hardware resources (DEPA LAB):

- Embedded sensors & systems laboratory (sensor development)
- 40 TB Network Attached Storage server (custom database implementations)
- 8 High Performance workstations with 27" monitors
- Visualization theater with 12 x 4 ft. Christie Mirage S+14K 16,000 lumen, stereoscopic projectors
- 60" Digital white board
- Intersense Inertia Motion Tracking System.
- Full 9 speaker Mayer Surround Sound System
- 30 Seat theater
- Haptic devices (force feedback research)
- 2 Additive manufacturing printers

The Office of Technology Transfer (OTT)

Director: Wayne Swann

URL: <https://www.morgan.edu/technologytransfer>

Established in 2017 as a unit of the Division of Research and Economic Development (D-RED), the Office of Technology Transfer (OTT) supports the University's public service mission as a research institution to translate the results of the research laboratory into social and economic benefit. OTT assists faculty, staff, and students in transferring innovations to business and industry to develop products and services that benefit society. The OTT team manages the University's intellectual property and assists Morgan faculty on issues such as patent applications, software, copyrights, and other forms of intellectual property.

OTT's Strategic Plan includes three phases: Startup, Growth, and Maturity. Once the office was fully funded through Maryland legislation in FY2018, Phase I was implemented with respectable momentum and produced several record setting successes. Throughout the university, a number of innovations were identified, and multiple patent applications were filed, representative of a diverse range of schools, colleges, and departments throughout Morgan. It was also the start of a noteworthy streak for OTT, receiving a new intellectual property disclosure every 15 days or less and filing more than one new U.S. patent application per month. In its first five years, OTT has received IP disclosures from 27 departments and units across the University.

As a caveat to highlighting and encouraging innovation throughout Morgan, the Office of Technology Transfer developed their signature initiative, Innovations Works (I-Works), to translate innovation into local economic development opportunities and jobs. The I-Works initiative consists of four development programs: The Innovation Grant Assistance Program (I-GAP), I-Works ISO, I Works Community, and I-Start. Since its inception, OTT has awarded over 100 awards, with over 90 I-GAP awards for innovation development throughout the campus, representing over 20 departments/units within eight academic schools/colleges and other major administrative divisions.

The Office of Technology Transfer hosts the Innovation of the Year Awards, an annual celebration that recognizes and rewards innovative contributions of faculty, students, and staff at Morgan. Award categories include Intellectual Property Innovation Awards in the areas of Life Science, Physical Science, and Information Science, in addition to Community Innovator Awards in the categories of Staff Innovator of the Year, Instructional Innovator of the Year, and Student Innovator of the Year. The Innovation of the Year awards also recognize inventors that were issued U.S. Patents from the U.S. Patent and Trademark Office. To date, OTT has conferred over 40 Innovation awards to innovators representative of schools/colleges and administrative units throughout Morgan.

To ensure that the Morgan community is aware of the innovation taking place on campus, OTT publishes a newsletter, *Innovations*. The newsletter, released on a bi-yearly basis, features Morgan innovators and highlights their innovative works and projects, often funded through grants provided by OTT. In addition to the feature stories, innovators with technical and social science related projects are included to denote their ongoing work. The newsletter also lists the active intellectual property disclosures submitted to the office, issued U.S. patents, and innovation related activities taking place on campus.

On behalf of the Department of Research and Economic Development, the OTT team spearheaded the new University Conflict of Interest and Intellectual Property Policies, both of which were approved by the University Board of Regents. In addition, OTT authored and implemented Morgan's Procedures for Patents and Technology Transfer, while establishing the Office as a "one stop shop" for Morgan intellectual property, tech transfer, and start-up companies. OTT also leads the Morgan Innovation Day event, on behalf of the division and The Office of the President. This annual event takes place in Annapolis, MD and serves as a showcase of Morgan Research and Innovation for legislators and political leaders.

The OTT Team continues to make strides towards implementing Phase II of its Strategic Plan to maintain the high level of Innovation Outputs: IP Disclosures and new U.S. Patent Applications. The Office projects Innovation Outcomes: Tech Transfer Agreements, Issued U.S. Patents, and Start-up Companies will rise as the increasing number of Morgan innovations mature, and move through the tech transfer pipeline. In addition, OTT has been actively engaged in Morgan's Strategic Goal to achieve Carnegie Doctoral Research University R1 Classification by FY 2030.

CHAPTER 3: A BRIEF HISTORY OF SPONSORED PROGRAMS AT MSU

While academic research has been conducted at MSU for many decades, sponsored research administration was first formalized with the establishment of the MSU Office of Sponsored Programs and Research (OSPR) in 1988, with the appointment of Dr. Edet Isuk as the Founding Director and a staff member serving as the Secretarial Assistant. Prior to that, no single office was charged with reviewing, approving, and submitting research proposals for extramural funding. Organizationally, the Director reported to the Dean of Graduate Studies. Total extramural funding at the time averaged around \$7M annually.

OSPR was tasked to assist PIs with concept development, identification of potential appropriate extramural funding mechanisms, proposal and budget preparation, and submission of competitive proposals. Additionally, following an award, OSPR was (and is) involved in some aspects of financial management of the award, including submission of the technical reports and close-out reports.

In 1997, Dr. Henry Williams was hired as the new Assistant Vice President for Sponsored Program, elevating the status of OSPR, and reporting directly to the Vice President for Academic Affairs. Dr. Williams served in this position for five years, until 2002. His tenure marked an interval of considerable growth. The staff grew to 11, including the Title III Program staff. Similarly, the OSPR administrative functions expanded to encompass not only pre- and post-award administration, which includes proposal submission, budget review and oversight, but also research compliance, time and effort reporting, processing contracts and subcontracts, compiling grant and contract metrics and business development. Total extramural funding increased to \$24M.

Following Dr. Williams' departure in 2002, Dr. Mildred Ofosu joined MSU, serving as the Assistant Vice President for Research, a position that she held until 2020. Title III Program and staff were reassigned from OSPR to Academic Affairs shortly after Dr. Ofosu's arrival. However, the OSPR maintained consistent growth in its extramural funding portfolio, as well as in the quality of its services to PIs/PDs. Total annual extramural funding grew to around \$30M over that period.

In 2012, President Wilson decided to further enhance research and other sponsored programs by creating the Division of Research and Economic Development (D-RED) and hiring a Vice President to lead the newly established Division. Dr. Victor McCrary was appointed the inaugural Vice President, who led the Division from 2012 to 2018. During his tenure, there was an increased emphasis on:

- Acquiring multi-year funding for major transdisciplinary projects such as ASCEND (A Student-Centered Entrepreneurship Development Model to Enhance the Diversity of Biomedical Research Workforce);
- Establishing and equipping research centers, such as the PEARL (Patuxent Environmental and Aquatic Research Laboratory); and
- Establishing an Office of Technology Transfer.

In 2018, Dr. Willie May, the former Director of the National Institute of Standards and Technology (NIST) and the former Under Secretary of Commerce accepted to serve as the new Vice President for Research. In 2020, following the retirement of Dr. Mildred Ofosu, Dr. May selected Dr. Farin Kamangar to serve as the Assistant Vice President for Research, and the OSPR became the Office of Research Administration (ORA).

Under Dr. May's leadership, there were major advancements in total funding, some of which include:

- Renewal and substantial expansion of GESTAR (GESTAR II), a cooperative agreement receiving \$28 million from NASA;
- Renewal of ASCEND, a cooperative agreement receiving an additional \$17 million from the NIH;
- Receiving funding to establish RCMI at Morgan, a cooperative agreement receiving \$15 million to establish research centers at MSU to establish health disparities;
- Center for Advanced Electro-Photonics and 2D Materials, a cooperative agreement funded by the Department of Defense for \$7.5 million;
- A program to conduct research and education in equitable artificial intelligence (AI) and machine learning (ML), a grant funded by the Office of Naval Research (ONR) for \$9 million

As a result of these developments, in 2022, the new funding commitments that MSU received reached \$72 million.

Furthermore, under Dr. May's leadership, MSU has:

- Established multiple research centers, with over \$15 million of recurring funds from the State of Maryland;
- Enhanced its technology transfer program to be among the top 10 universities nationwide, when adjusted for research expenditures;
- Substantially enhanced its research portfolio, encompassing both STEM and non-STEM research that address health disparities.

The timeline below shows MSU's ascending path over its history. MSU's strategic goals to further enhance its research program to become a Carnegie-classified® R1 (Doctoral University – Very High Research Activity) by 2030.

- 2018: R2 Designation
- 2017: Named State of Maryland's Preeminent Public Urban Research University
- 2016: Office of Technology Transfer is established
- 2012: Division of Research & Economic Development is established.
- 2006: R3 Designation
- 1998: School of Computer, Mathematical, and Natural Sciences is founded
- 1988: Office of Sponsored Programs and Research is established
- 1984: School of Engineering is founded
- 1983: First doctoral student graduates
- 1975: Morgan State University
- 1939: Morgan State College
- 1890: Morgan College
- 1867: Centenary Biblical Institute

For a more detailed history of MSU, please visit [this link](#).