Morgan State University
External Research Advisory Panel

Report No. 4
April 2016

Submitted to:
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Compiled by:
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Edited by:
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Morgan State University
External Research Advisory Panel

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Restricted Funds Accounting
Morgan State University External Research & Advisory Panel (ERAP)
Roles and Responsibilities

General Statement

The principal objective of the External Research & Advisory Panel (ERAP) is to advise Morgan State University (MSU) on how to achieve its vision as it relates towards being a premier, research, urban institution that conducts high quality, forward-looking, innovative research activities across its various schools and colleges. In addition, the ERAP is expected to offer advice on areas supportive and aligned to Morgan’s research enterprise including technology transfer, and economic development activities. The External Research & Advisory Panel will meet twice a year, and provide a written summary report of its observations and recommendations to the MSU Vice-President of Research & Economic Development. The VP of Research & Economic Development will share this report with the Morgan State University President, President’s Cabinet, and the Morgan State University Internal Research Council.

Specific Roles and Responsibilities

1. Assess Morgan’s Research Activities based on:
   a. Domain expertise and experience in specific research areas
   b. Current research trends and prior work
   c. Current funding levels and trends
   d. Domestic and foreign technology advances
   e. Balance of STEM & non-STEM research across the University

2. Assess Morgan’s Research Administration by:
   a. Evaluating the overall University Research Strategy led by the VP for Research & Economic Development
   b. Evaluating the University environment for its support of faculty research
   c. Evaluating the adequacy of metrics to assess reporting of sponsored programs
   d. Sharing of best-practices for oversight of sponsored programs
   e. Sharing of best practices for technology transfer
   f. Sharing of best practices for the University as a catalyst for economic development

3. Benchmark Morgan’s Research Capabilities:
   a. Relative to alternative providers (e.g. other universities, National laboratories) and potential partners, based on quality, reputation and cost
   b. Based on potential for technology transfer and potential work for industry (where appropriate)
   c. Based on the adequacy of faculty to meet anticipated challenges
   d. Based on the adequacy of technical facilities to meet anticipated challenges
   e. Based on the University’s reputation to attract both grants & contract and research faculty

4. Advocacy of Morgan’s Research Enterprise by:
   a. Identification of potential partners and resources for Morgan State University
   b. Identifying opportunities for faculty and staff members to increase participation on external boards, and working groups to increase their exposure to the greater research community
MORGAN STATE UNIVERSITY

Vision Statement
Morgan State University is the premier public urban research university in Maryland, 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.

Mission Statement
Morgan State University serves 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.

Core Values
The following institutional core values guide the promotion of student learning and success, faculty scholarship and research, and community engagement at Morgan:

Excellence. Excellence in teaching, research, scholarship, creative endeavors, student services, and in all aspects of the University’s operations is continuously pursued at Morgan to ensure institutional effectiveness and efficiency.

Integrity. At Morgan, honest communications, ethical behavior, and accountability for words and deeds are expected from all members of the University community.

Respect. Each person at Morgan is to be treated with respect and dignity and is to be treated equitably in all situations.

Diversity. A broad diversity of people and ideas are welcomed and supported at Morgan as essential to quality education in a global interdependent society. Students will have reasonable and affordable access to a comprehensive range of high quality educational programs and services.

Innovation. 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.

Leadership. Morgan seeks to provide rigorous academic curricula and challenging co-curricular opportunities to promote the development of leadership qualities in students and to facilitate leadership development among faculty, staff, and students.

1Growing the Future, Leading the World: The Strategic Plan for Morgan State University, 2011-2021
2Ibi
The Vice President for Research and Economic Development, Dr. Victory McCrary, began the fourth meeting of the External Research Advisory Panel (ERAP) with a summary of research policies, statistics and programs at Morgan State University (MSU). The goals of student success, excellence in research, improved infrastructure, amplified resources and community service are familiar to the members of ERAP and retain their complete support. MSU, like most public institutions of higher learning, performs a variety of vital functions for society that must be sustained in a changing economic and administrative environment. Dr. McCrary continued to emphasize the importance of building entrepreneurial awareness among students and faculty, a theme that he has introduced in previous meetings. Like many universities, MSU has had to operate with decreasing funds and to do more with less. Yet, while federal funding is going down, corporate opportunities are increasing, and MSU is slowly changing its culture as it learns to embrace these opportunities.

Since this ERAP meeting, news of the designation by the National Security Agency and the Department of Homeland Security of MSU as a Center of Academic Excellence in Cyber Defense Education arrived. All members of the ERAP congratulate MSU on this achievement.

The need for a strategic focus in the fulfillment of MSU’s goals is apparent to the members of ERAP. This concentration of attention leads naturally to a set of execution priorities whose realization can propel MSU to higher levels of distinction and achievement. The ERAP panel recommends that among these priorities should be a research and technology transfer organization with several functions. This organization should develop best practices, perform gap analysis and develop a strategic roadmap that has the endorsement of the MSU President and other high-ranking academic leaders. It should meet with key stakeholders to secure their support for the roadmap. This organization should improve communication within MSU, especially when interdisciplinary opportunities arise. It should design financial, marketing and research models that provide guidance to research administrators. There also is a need for producing a shared resource model that bridges departments. A focused research advisory team could move from project to project to facilitate, monitor and manage progress.

Certain reforms and additional resources will be needed. Public universities often have an organizational structure that limits the mobility of resources to vertical transfers achieved in separate administrative silos. Limited physical resources and budgets constitute another challenge. The commitment of leadership or staff to research conducted in graduate programs may be incomplete. Areas of excellence at MSU are not connected to each other and their potential benefits to MSU departments and collaborators may not be fully realized.
Identifying key stakeholders within MSU is therefore an important component of a strategy for the future. Partnerships with accomplished professionals (e.g. Prof. Kornegay) and promising junior investigators (e.g. Prof. Head) in the faculty should be developed. Such individuals may become facilitators of positive change. The Are-You-SMART-Enough communication platform is a useful branding tool. Close relationships with NAVSEA/USNRC will continue to be beneficial. Close communication that avoids hierarchical impediments can improve the use of internal and external resources in an interdisciplinary manner.

MSU has succeeded in establishing itself in several areas of sponsored research. Climate modeling, internet security, pyrotechnic engineering, environmental training, the PEARL hatchery, biomedical education initiatives, and the GESTAR Earth Sciences subcontract are examples of activities where MSU’s faculty and staff are involved in externally supported work that involves government organizations such as NASA, NSWC, NRC and NIH. Efforts to stimulate proposals to DoD are well poised to build on this success.

There is a need to reform administrative practices in support of research. In many cases, altered practices can facilitate the submission of competitive proposals.

- The concept of a flattened organization, one where hierarchical impediments are avoided, is a useful guide.
- The acquisition of certificates that correspond to competency in handling specialized requirements and correspondence with funding agencies should be encouraged. Dr. Odia can arrange to have some of his colleagues with experience in proposal writing and review, travel policy and federal acquisition regulations provide training and presentations at no cost to MSU. Participants who gain such competency contribute to MSU’s capacity for performing sponsored research.
- Updated accounting software and administrative procedures that resemble those of universities with ample research programs are indicated.
- Policies on conflicts of interest that reflect the actual arrangements that typify current interactions between funding agencies and universities are needed.
- Similar updates on travel should be enacted.
- The distribution of indirect costs can be an important factor in improving the research performance of a university.

All of these measures characterize an organization that is undergoing a fundamental change in its missions. In the state of Maryland, the competitive environment for state universities is changing, especially with the closer integration of missions performed by the University of Maryland’s College Park and Baltimore County campuses. There is a need to elevate research activities and economic stimuli provided by MSU in public awareness.

Alliances with Johns Hopkins University (JHU) are in MSU’s interests. JHU should be engaged for its guidance and experience in research and technology in an urban context.
MSU should consider establishing commercialization as one of its measures for promotion and tenure. There are some bright students at MSU whose promising research is worth serious consideration for future partnerships. The university should consider collaborating with these students and their professors in commercializing and or patenting their results. Such collaborations might support MSU’s ability to stimulate technology and business startups in the very near future. Given that much of MSU’s history is bound up in academic excellence, some effort in entrepreneurship should be dedicated to the pursuit of academic endeavors such as teaching methodologies that could ultimately be commercialized and that would involve experienced faculty.

MSU has partnered with the Maryland Innovation Initiative (MII), a division of Technology Development Corporation (TEDCO). TEDCO is a public corporation run with state funding, but with autonomy in how it operates, providing technology development programs such as MII. The MII describes itself as “designed to foster the transition of promising technologies with significant commercial potential from five Maryland academic research institutions …” including MSU. Qualifying universities are encouraged to apply for funding for start-ups to work on licensing technologies in order to promote commercialization of research in that institution’s strong areas. MII is accountable to the Maryland House and Senate, who want to know “how many start-ups have you funded.” MII is well supported in its mission, which is reflected in its capacity to fund start-ups six times a year, unlike other similar organizations which only fund once or twice a year.

In addition to funding, MII and TEDCO offers several kinds of assistance including: 1) an awards manager who meets with submitters throughout the process to prevent miscommunication about deadlines and submittal expectations, 2) access to a network of CEOs who are interested in future technology opportunities, and 3) entrepreneurship mentoring program. MII also works with university site miners who scout existing and upcoming opportunities that would be appropriate for this program.

MSU’s participation in MII has provided a much needed wake-up call. MSU has participated in the program from the start and has submitted 28 applications. However, only three of these submissions have received funding. The statistical tracking of MSU involvement in the MII entrepreneurship program has prompted MSU to question itself on its commitment to promoting a more entrepreneurial culture. Although MSU has two site miners supported by MII, MSU can augment the technology transfer program by taking the following actions:

1. Develop a fully functioning technology transfer office that has the support of faculty, staff, the Board of Regents, and external entities.
2. Support more entrepreneurs-in-residence (EIR) to mentor promising students and staff.
3. Provide a dedicated manager who tracks opportunities, analyzes which grants to pursue, provides grant writing support, and reports on results.
4. Facilitate MSU application processes through use of standardized procedures, templates, and answers to frequently asked questions.
5. Offer administrative support for site miners.
6. Offer administrative support to “rising stars,” staff that have been making significant progress in innovative fields who could benefit from such assistance.
7. Involve business students in the business side of technology transfer in two ways:
   a. Create a business case for how stronger participation in MII can help MSU on many levels, including drawing different departments into collaborative projects and improving the culture of entrepreneurship.
b. Create a marketing plan for the overall tech transfer program, as well as for individual start-ups.

8. Propose to MII that MSU act as an incubator for developing a culture of technology entrepreneurship. This partnership would provide benefits to both entities as MII learns about how best to grow a university that isn’t strong on technology transfer, and MSU continues to improve its skills in entrepreneurship.

The discussion of on-line education by a student who had acquired extensive credentials by such means provided deeper understanding of how MSU can extend its influence to wider community of learners. Accommodating students’ economic and family commitments leads MSU to important educational opportunities.

A presentation on Bio-ethics provided an example of unusual educational and professional opportunities that partnerships with JHU may enable.

An undergraduate poster symposium displayed the vigor and variety of student engagement in research at MSU.

A presentation on structural engineering revealed an area of vitality and potential promise for MSU. Dr. Head is a rising star at the university. She collaborates with other institutions of higher learning as well as private sector organizations in the area. While collaboration is a good thing and should be encouraged, it does entail some risk. Others will quickly recognize Dr. Head’s enthusiasm, knowledge, talent and before long, she may start receiving more attractive offers of employment. To retain her services and to remove distractions to her professional growth, MSU should prepare counter-offers to her with improved accommodations. ERAP strongly recommends to the university that it provide administrative and clerical support to Dr. Head, her department and others in similar situations. Questions to Dr. Head on neighboring fields of engineering that are germane to her research revealed an opportunity for MSU to hire faculty with complementary interests who will build on her initiatives, increase MSU’s competitiveness for interdisciplinary projects and potentially bind a generation of young, productive scientists to MSU and each other for an extended period of time.

A research proposal by an energetic, enterprising undergraduate exemplified the interdisciplinary, entrepreneurial attitude that MSU seeks to inculcate. Thomas Clifford’s presentation provided an example of the benefits of interdisciplinary education to an enterprising individual.

Clearly MSU is going through a cultural change. Institutional change is seldom easy and usually requires some dramatic moves. Even though all the comparative data that Dr. McCrary and TEDCO presented were pretty clear, their clear implications may not be immediately accepted. Part of this reluctance is due to the maturation of MSU into a more independent institution. Another source of reluctance is failure to recognize that public education is no longer supported by the taxpayers as an entitlement system. Each institution is required to establish financial independence in order to exist and thrive. While many private institutions have operated under this system for most of their existence, public institutions have had to learn these skills and make organizational changes that enable them to establish a new way of operating. Although MSU appears to be slow to react, the new President and his
administrative team are attempting to make up ground quickly. This new leadership must paint a clear, highly visible picture for the future. As in most organizations, change will likely come from the top and the bottom (students and young professors such as Thomas Clifford and Monique Head.) Successes must be celebrated and rewarded. Some who will form the "picture of the future" will also come from mentors and role models (e.g. General Ward). Some will come from other schools, both as new faculty and as case studies for what is possible. These examples must be sought out and brought in to promote a sense of pride, competitiveness and opportunity. Interdisciplinary opportunities that cross the traditional boundaries of study and research and that help MSU to be known for innovation should be seized.
Appendix

1. Meeting Agenda

2. Meeting Presentations
   a. Maryland Innovation Initiative Program
      John Wasilisin, President/Chief Operating Officer Maryland Technology
      Development Corporation- TEDCO,
      Jennifer Hammaker, Director, Maryland Innovation Initiative, TEDCO
   b. Latest Trends in Structural Engineering
      Dr. Monique Head, Associate Professor
      Morgan State University
Appendix 1: Meeting Agenda
ITINERARY & LOGISTICS

THE MORGAN STATE UNIVERSITY EXTERNAL RESEARCH ADVISORY PANEL

THURSDAY, APRIL 14, 2016

Thursday, April 14, 2016

8:00 am – 8:45 am  Arrive for Continental Breakfast - rm. 412 Boardroom, Earl G. Graves of School of Business, Morgan State University

- Panel members are to park their cars in the lot adjacent to the School of Business

8:45 am  Welcome to Morgan State University (MSU)!

- Division of Research & Economic Development – Overview of 2015
  Victor McCrary, VP for Research & Economic Development

9:45 am  Break

10:00 am – 12:00 pm Morgan ‘Partner’ Presentations

- Maryland Innovation Initiative Program – John Wasilisin, President/Chief Operating Officer
  Maryland Technology Development Corporation- TEDCO, Jennifer Hammaker, Director,
  Maryland Innovation Initiative, TEDCO

- Travis N. Rieder, PhD  Assistant Director of Education Initiatives & Research Scholar
  Berman Institute of Bioethics, The Johns Hopkins University

12:00 pm Lunch

Student Poster Presentations

23RD ANNUAL UNDERGRADUATE & GRADUATE SCIENCE RESEARCH SYMPOSIUM
MORGAN STATE UNIVERSITY STUDENT CENTER BALLROOM

2:30 pm  Heather Gonzalez-Yager, School of Engineering

3:00 pm  Break

3:15 pm  Latest Trends in Structural Engineering – Dr. Monique Head, Associate Professor

3:45 pm  Business Pitch, Student in the School of Engineering – Thomas Clifford
4:15 pm  MSU Research Strategy – Victor McCrary

5:00 pm  Questions & Answers

5:30 pm  Adjourn

7:00 pm  Dinner (Optional) Sheraton Hotel - Towson

V. McCrary’s cell # 301-580-1941
Appendix 2: Meeting Presentations
Bioethics and the Berman Institute’s MBE Degree Program
Travis N. Rieder, PhD
Assistant Director for Education Initiatives & Research Scholar

WHAT IS BIOETHICS?
Radically Interdisciplinary Field
Individual morality, policy, regulation broadly related to biology and health

SOME BIOETHICAL ISSUES TODAY

Topic Areas in Bioethics

The MBE
THE BERMAN INSTITUTE’S MASTER IN BIOETHICS DEGREE
Who are we?

- **Who?**
  - Our Vision is to achieve more ethical practices and policies relevant to human health.
  - Our Mission is to identify and address key ethical issues in science, clinical care, and public health, locally and globally.

- **Where?**

- **More Information?**
  www.bioethicsinstitute.org

- **Questions?**
  Email: trieder@jhu.edu or elicegb@jhu.edu

MBE Degree

**What is involved?**

- Interdisciplinary study
- 64 Credit Program
  - 26 = required coursework
  - 38 = elective coursework
- Graduate in 18 months (12-24 average)
- Smaller Class Sizes

Curriculum
- Foundational Courses
- Practicum
- Thesis
- Optional Concentration

Meet our Students

Farnoosh Faezi-Marian
- Interested in privacy and big data
- Focusing on Precision Medicine Initiative

Cameron Okike
- Interested in social justice, inequality, and reparations
- Focusing on the role of adaptive preferences in inequality

Diana Mendoza-Cervantes
- Interested in epistemic injustice
- Focusing on harm done when physicians don’t believe patients

Questions?
Latest Trends in Structural Engineering

Monique Head, PhD, Associate Professor
Email: monique.head@morgan.edu
Website: http://www.moniquehead.com
April 24, 2016
MSU External Research Advisory Panel

PRESENTATION OVERVIEW

- Background and Research Interests
- Latest Trends in Structural Engineering
  - Grand Challenge
  - Concept of AFRP “Rocking” Bridge Column
  - LEED for Bridges
- Student Involvement and Training
- Resources and Facilities
- Broader Impact and Future Direction

Background and Research Interests – Structural engineering

- BSCE '00 & MSCE '02 – Univ. of Delaware
- PhD '07 – Georgia Tech
- Aug '07 – Mar '11: Asst. Prof., Texas A&M Univ.
- June '14 – present: Assoc. Prof., Morgan State Univ.

Grand Challenge – how can we design more sustainable bridges?

Our Solution – design/engineer bridge components with corrosion-resistant (made from composites) rebar that replaces steel!

Fiber Reinforced Polymer (FRP) Bars

ADVANTAGES
- High strength to self weight ratio (10-15 times steel)
- Corrosion-resistant, non-magnetic, non-conducting
- Excellent fatigue characteristics (AFRP and CFRP)

SHORTCOMINGS
- Brittle behavior
- Low elastic modulus

Is this really a drawback?

Performance-Based Design of Concrete Slabs and Beams Prestressed with Aramid Fiber Reinforced Polymer (AFRP) Tendons

- TAMU PI: M. Head (2009-12)
- National Science Foundation (NSF) BRIDGE Award: $175,000
- Goal: To prove that nonmetallic concrete structures that are prestressed with aramid fiber reinforced polymers have adequate load-deformation capacity to replace conventional steel in concrete bridge structures.

Concept of AFRP Bridge Deck System

Bridge Decks
Bridge Girders
Bridge Piers
Previous experimental tests were successfully conducted to evaluate the performance of AFRP bars prestressed within a concrete bridge deck.

**Concept of AFRP “Rocking” Bridge Column**

![Concept of AFRP “Rocking” Bridge Column](image)

**High-Performance Green Bridges**

**Objective:** To evaluate AFRP bars as internal reinforcement in bridge columns to resist seismic loads (NSF HBCU-UP #1238808)

- Very few experimental investigations have been conducted for bridges columns with FRP bars (limited experimental data)
- Design of a “green” bridge takes into account 5 areas:
  1. Sustainability (ex. surrounding green space)
  2. Materials (ex. use of CRR or FRP bars)
  3. Water Use and Quality (ex. stormwater runoff)
  4. Energy Efficiency (ex. rocking, energy dissipaters, etc.)
  5. Construction Methods (ex. PBES)

**Student Involvement and Research Training**

- NSF HBCU-UP: High-Performance Green Bridges, $240K
  - Develop LEED criteria for bridges
  - Test concrete columns with AFRP bars to allow for column rocking
  - Four (4) undergraduate researchers involved since Fall 2012

- MD SHA: Stainless Steel Prestressing Strands and Bars for Use in Prestressed Concrete Girders and Slabs, $80K
  - Synthesize current state of the practice for stainless steel usage in concrete girders and slabs
  - One (1) graduate student and two (2) undergraduate students involved

- MD SHA: Durability Assessment of Prefabricated Bridge Elements and Systems (PBES), $120K
  - Develop quality assurance/quality control specifications for precast plant personnel to complete on site
  - Three (3) graduate students and one (1) undergraduate student involved
What research is underway in Dr. Head’s Research Group?

Student Involvement and Research Training

**NSF NEESoft: Seismic Risk Reduction of Soft-Story Woodframe Buildings, $560K (collaboration with Colorado State University)**
- Develop analytical models of woodframe shear walls within buildings
- One (1) graduate and two (2) undergraduate students involved

**MAUTec: Structural Health Monitoring to Determine Long-term Behavior of FRP Bars in Prestressed Concrete Panels, $120K (collaboration with University of Virginia)**
- Evaluate the long-term effects of beams with FRP bars and determine the durability of these materials
- Two (2) graduate students and one (1) undergraduate involved

**Foundation Anchorages Using Composite Materials for Offshore Wind Turbines (MHEC and MEA)**
- Evaluate existing design and foundation anchorages using composite materials
- One (1) postdoctoral research associate and one (1) doctoral student
- Two (2) undergraduates involved
- Collaborating with colleagues from South Dakota State University

126,000 GSF shared facility for academic engineering and design programs

CBEIS – Center for the Built Environment and Infrastructure Studies

CBEIS houses research and instructional programs for the School of Architecture and Planning and the School of Engineering’s Civil Engineering, Transportation Studies, and the National Transportation Center

USGBC LEED Gold certification

New Large-Scale Structural Testing Facilities at Morgan State University

- L-shaped Strong Wall - Strong Floor
  - CBEIS 121
- 6DOF Seismic Simulator
  - CBEIS 121

New Large-Scale Testing Facilities at Morgan State University

Broader Impact and Future Direction

**STUDENTS**
- More than 30 undergraduate students that have been a part of my lab, integrated projects for SENIOR PROJECTS and Green Transportation Infrastructure Center (GTIC)
- Will graduate my first Morgan doctoral student this May – Dr. Steve Efe (defended on March 15, 2016), 3/6 (total that I’ve advised)
- More than 20% of my undergraduate researchers are going or have enrolled in graduate school

**RESEARCH**
- Generating more seismic experimental research (NSF NHERI)
- Continuing work with FRP bars and bridge SYSTEMS
- Continuing design and analysis with offshore wind turbines and foundation anchorages using composite materials
- Participating in national call for University Transportation Centers (Federal); partnering proposals with West Virginia University, Missouri S&T, University of Kentucky and Morgan State University

Questions?

Thank you!

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