

Morgan State University

External Research Advisory Panel

Report No. 4

April 2016



Submitted to:

Dr. Victor R. McCrary, Vice President, Research & Economic Development

Compiled by:

Dr. Edet E. Isuk, Director, Research Compliance

Edited by:

Dr. J.V. Ortiz, Panel Chair

Morgan State University
External Research Advisory Panel

PANEL MEMBERS

Dr. J. V. Ortiz, Panel Chair

Ruth W. Molette Professor and Chairman
Department of Chemistry and Biochemistry
Auburn University

Ms. Camylle C. Coley

Senior Consultant to the Director
DoD Office of Small Business Programs
Workforce Development & STEM Entrepreneurship

Dr. Dianne L. Poster

Special Assistant to the Principal Deputy
Director's Office
National Institute of Standards and Technology

Ms. Betsy Proch

IT Security Analyst
US Department of Homeland Security

Ms. Kelley L. Dempsey

Senior Information Security Specialist
National Institute of Standards and Technology
Information Technology Laboratory/Computer Security
Division

Mr. Vincent B. Knox

Senior Associate General Counsel
Johns Hopkins University Applied Physics Laboratory

Ms. Magdalena Navarro

Physical Scientist/Senior International Program Manager
National Institute of Standards and Technology
International and Academic Affairs/ Office of the Director

Ms. Joanne C. Murphy

Chief Architect, CISSP
Signature Client Group
AT&T Operations, Inc.

Dr. Anthony Dent

Adjunct Professor
Cheyney University

Ms. Tanaga Boozer

Program Advisor
Office of Education and Outreach
United States Patent and Trademark Office

Mr. J. Walter Faulconer

Executive Vice President
American Astronautical Society
Strategic Space Solutions, LLC

Dr. Godwin Odia

Captain, Commissioned Corps
U.S. Public Health Services
Centers for Medicare and Medicaid Services

Dr. Filomena Califano

Associate Professor of Chemistry and Physics
St. Francis College, NY

General William (Kip) Ward

President and COO
SENTEL Corporation

Mr. John Schuster

John Hopkins University
Applied Physics Laboratory

Dr. Lisandra Geray-Vega

Project Manager
Office of Highway Safety, NTSB

Dr. Joycelynn Nelson

Vice Chairman
Central State Hospital Local
Redevelopment Auxiliary Board

Dr. Thomas M. Gallas, CPA, LEED AP

BD+C Chief Executive Officer
Commissioner
National Capital Planning Commission

Dr. Ambrose R. Philips III.

Vice President & Treasurer
Vencore Inc.

Submitted to:

*Dr. Victor R. McCrary, Vice President, Research & Economic
Development*

Compiled by:

Dr. Edet E. Isuk, Director, Research Compliance

Edited by:

Dr. J.V. Ortiz, Panel Chair

MSU Division of Research & Economic Development (D-RED) Senior Staff



Dr. David Wilson
President
Morgan State University



Dr. Victor McCrary
Vice President
Division of Research & Economic Development



Dr. Mildred H. Ofosu
Assistant Vice President
Research Administration



Dr. Tim Akers
Assistant Vice President
Research Innovation & Advocacy



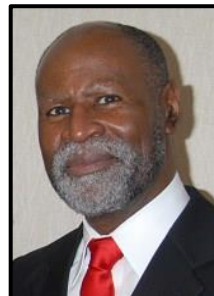
Dr. Edet Isuk
Director
Research
Compliance



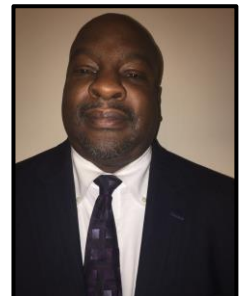
Gerald Whitaker
Director
Base Realignment/
DoD Liaison



Dr. Kelton Clark
Director
Morgan P.E.A.R.L.



Ellis Brown
Acting Director
Morgan Community
Mile



Jeffrey Copeland
Director
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 Statementⁱ

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 Statementⁱⁱ

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.

ⁱ *Growing the Future, Leading the World:* The Strategic Plan for Morgan State University, 2011-2021

ⁱⁱ Ibi

Morgan State University

External Research Advisory Panel

14 April 2016 Meeting

J. V. Ortiz

Department of Chemistry and Biochemistry, Auburn University, Auburn AL 36849-5312

13 June 2016

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



Radically Interdisciplinary Field
 Individual morality, policy, regulation broadly related to
 biology and health



Topic Areas in Bioethics



Question:

WHAT IS BIOETHICS?

Questions

SOME BIOETHICAL ISSUES TODAY

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 Okeke

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



Diana Mendoza-Cervantes

- Interested 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>

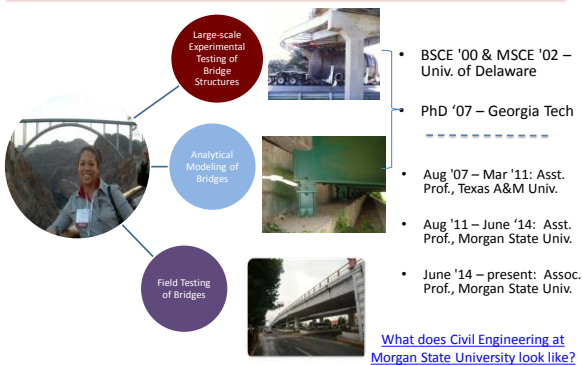
April 14, 2016
 MSU External Research Advisory Panel

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



[What does Civil Engineering at Morgan State University look like?](#)

Latest Trends in Structural Engineering

- **Grand Challenge** – how can we design more sustainable bridges?



Bridge Decks

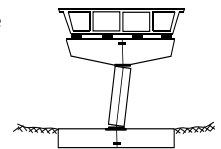


Bridge Girders



Bridge Piers

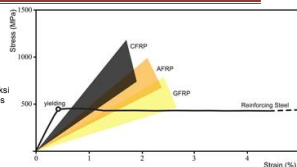
- **Our Solution** – design/engineer bridge components with corrosion-resistant (made from composites) rebar that replaces steel!



Fiber Reinforced Polymer (FRP) Bars



Quick Facts:
 •Max. tensile stress – 220 ksi
 •Max. long. force – 24 kips
 •E – 10,200 ksi
 •Strain ϵ – 2.1 to 2.3%



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?**

Concept of AFRP Bridge Deck System

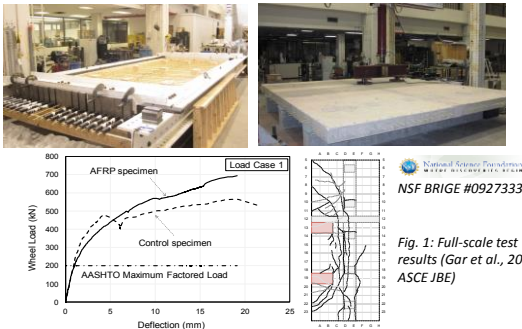


Performance-Based Design of Concrete Slabs and Beams Prestressed with Aramid Fiber Reinforced Polymer (AFRP) Tendons

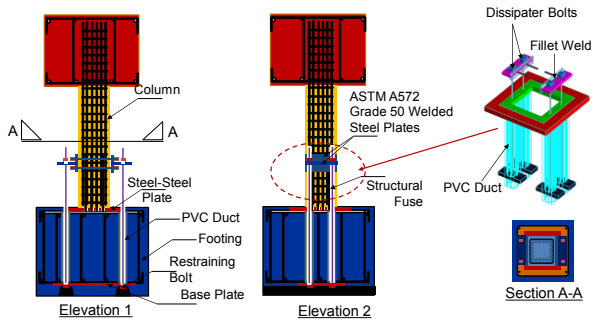
- TAMU PI: M. Head (2009-12)
- National Science Foundation (NSF) BRIGE Award: \$175,000
- **Goal:** To prove that nonmetallic concrete structures that are prestressed with aramid fiber reinforced polymers have adequate load-deformation capacity to replace conventional steel in concrete bridge structures.

Experimental Testing of AFRP Bridge Deck

• 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



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)

High-Performance Green Bridges

NSF HBCU-UP #1238808
Project PI: Monique Head, PhD

- Project Goals**
- 1) Develop a rating system similar to LEED criteria for buildings,
 - 2) Design seismic-resistant bridge columns that are reinforced with composite materials (AFRP bars) and energy devices to enhance sustainability, and
 - 3) Train next generation of earthquake engineers who are focused on structural sustainability

Programmatic Thrusts

- Seismic-Resistant Design of FRP Bridge Columns**
 - Seismic design
 - Construction of FRP bridge column prototype
- Educational Training**
 - Brown bag seminar on seismic design, bridge engineering and experimental methods
 - Hands-on laboratory demonstrations
- Quarter-scale Experimental Testing**
 - Development of test plan and ground motions
 - Evaluation of a FRP bridge column

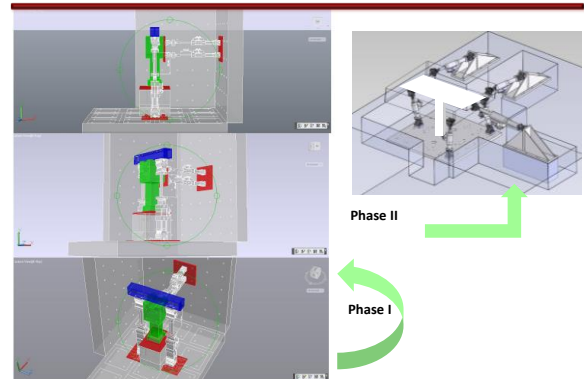
Programmatic Framework

Sponsor: National Science Foundation (NSF) HBCU-UP
Amount: \$240,000 over 2 years
Period of Performance: 8/12- 5/14
Supports: 1 graduate student, 5 undergraduate students and formation of the *Green Transportation Infrastructure Center* at Morgan State University (MSU)

Accomplishments & Next Steps

- Awarded 3rd place poster presentation at the 2013 Earth Day Competition at MSU
- Abstract accepted for presentation at the 2013 Emerging Researchers National Conference in STEM, Wash., DC
- Research will be showcased at the 2014 Innovation Day
- Preparing column specimens for testing!!

AFRP Reinforced Column Testing at Morgan



What research is underway in Dr. Head's Research Group?

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, \$60K (collaboration with Colorado State University)

- Develop analytical models of woodframe shear walls within buildings
- One (1) graduate and two (2) undergraduate students involved



MAUTC: Structural Health Monitoring to Determine Long-term Behavior of FRP Bars in Prestressed Concrete Panels, \$200K (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) post-doctoral research associate and One (1) doctoral student
- Two (2) undergraduates involved
- Collaborating with colleagues from South Dakota State University

CBEIS – Center for the Built Environment and Infrastructure Studies

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

- Involved >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!

Monique Head, PhD

monique.head@morgan.edu

Website: <http://moniquehead.com>

Associate Professor, Structural Engineering
Department of Civil Engineering
Morgan State University
Baltimore, MD 21251-0001
USA