

Report of the External Research Advisory Panel

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1. 2018 ERAP Focus

At its first meeting with the newly appointed Vice President for the Division of Research and Economic Development (DRED), Dr. Willie E. May, the External Research Advisory Panel (ERAP) focused on evaluating:

- 1) MSU's current research trends and prior work, and
- 2) MSU's expertise and experience in specific areas of research and education.

ERAP's goal in performing these assessments is to enable MSU research to fulfill institutional missions, especially those that affect urban populations in general. (See DRED's "Five Years of Achievement 2013-2017" report¹.) This work is especially urgent, given the high probability of changes in Federal and State programmatic and budgetary priorities.

ERAP discussed several topics and issues, including

1. improving stakeholder engagement,
2. technology transfer, especially in applied student and faculty research,
3. stimulating innovation,
4. enriching educational experiences for students and faculty, and
5. increasing student retention, graduation, and graduate-school admissions.

With a view to item 2 above, ERAP was briefed on: entrepreneurial research training activities, educational programs of distinction in fine arts, humanities, social and behavioral science, service opportunities in cybersecurity engineering and policy, and the Innovation Works Initiative for transforming innovation into local economic development opportunities and jobs. Balanced support of innovation and public service is the aim of these activities, which benefit MSU's students, faculty and community.

¹ "Five Years of Achievement 2013-2017", Division of Research & Economic Development, Morgan State University, 2017. Available at <https://www.morgan.edu/dred> (accessed November 20, 2018).

ERAP also monitors MSU's research capabilities and infrastructure, the quality of its programs, its reputation in sponsoring agencies and its engagement with stakeholders. This report summarizes the ERAP's observations and recommendations related to these topics.

2. Current Research Trends and Prior Work

A common thread of the ERAP's discussion of MSU's current research trends and prior work was the need for MSU to be able to effectively improve the lives of MSU students, faculty, and community, while simultaneously broadening the horizons of science. Research is an important tool that can address emerging needs of local, regional and national communities. Considering the restricted budget environment throughout all sectors of society, i.e., public and private, ERAP agreed on the importance of continued discussions of MSU's research and the need to identify and develop approaches to meet the priority research needs of its stakeholders. Continued efforts to examine and align MSU's research portfolio with its stakeholders' needs will be necessary for MSU to effectively establish, maintain, and grow effective partnerships and to recruit faculty and students who will achieve full resource optimization and success.

Dr. May presented his vision and goals for DRED. Achieving an R2² research university status within the next three to five years is a near-term goal, with targets of achieving \$50M in sponsored projects, greater faculty involvement, and increased technology transfer. Through the end of fiscal year 2018, MSU was awarded a total of \$34M from external sponsors through grants, contracts and cooperative agreements. At ERAP's inception in January 2014, the total was \$28.4 M for FY2013. An impressive 20% increase has been realized in five years.

Two externally funded programs provide opportunities for research and professional development experiences to MSU students and faculty. First, the Goddard Earth Science Technology and Research (GESTAR) Program currently supports 21 MSU researchers to work at NASA in Greenbelt, Maryland, about 40 miles away from the MSU main campus. It was not clear how researchers stay engaged with MSU once they begin their tenure in the program. **Lack of local transportation is a major impediment and must be redressed by**

² An R2 (research 2) university has a very high level of research. It is the second designation category of three which describe doctorate-granting institutions based on a measure of research activity. The designation is the result of an analysis of the following correlates of research activity: research & development (R&D) expenditures in science and engineering (S&E); R&D expenditures in non-S&E fields; S&E research staff (postdoctoral appointees and other non-faculty research staff with doctorates); doctoral conferrals in humanities fields, in social science fields, in STEM (science, technology, engineering, and mathematics) fields, and in other fields (e.g., business, education, public policy, social work). An R1 university has the highest level of research activity, and an R3 university has a moderate level of research activity. Source: Carnegie Classification of Institutions of Higher Education, Definitions, Basic Classification Description (2017)

http://carnegieclassifications.iu.edu/classification_descriptions/basic.php (accessed November 20, 2018).

MSU. Service to students requires fulfillment of this urgent, local need. MSU also should enhance opportunities for interaction with NASA by enabling better communication between participants and its main campus through a seminar series. Transportation and webcasting should be provided when seminars occur at NASA. Indirect costs from this program can be used to enhance this connection.

The second, newly established Professional Research Experience Program (PREP) involves NIST and offers opportunities for MSU researchers at all stages of their careers. **This program should be advertised broadly and repeatedly to MSU faculty, staff, and students.** Teams from MSU and NIST should plan one-day visits to learn more about PREP and each institution's research and personnel. PREP could help to achieve critical mass at the MSU's Patuxent Environmental & Aquatic Research Laboratory (PEARL) in Saint Leonard, Maryland via internships and faculty appointments that support NIST's environmental research programs in Gaithersburg or at the Hollings Marine Laboratory in Charleston, South Carolina. Food safety, including seafood, may also be a topic of mutual interest.

Research on hemp offers opportunities to MSU faculty and staff for engagement with the agriculture, construction, building, engineering, and data industries. Characterization of materials being an integral component of this field, PREP provides opportunities to leverage faculty and staff appointments between MSU and NIST in the areas of seed characterization and genetics, soil and environmental measurements, microscopy, and building-materials characterization. Codes and standards may also be a component of this new trend. Therefore, collaborations with NIST on its buildings and construction programs, through PREP, should be considered. An MSU proposal to NIST for supporting a workshop should be considered.

The Cyber Warriors program to engage unemployed or unskilled workers should be advertised to the best extent possible. MSU's achievements in this kind of engagement and collaboration in cybersecurity indicates increased investments to serve not only the workforce needs of industry in the U.S., but also to support job creation in the local community. A one-year program in coding and related job placement could augment the effects of this initiative.

The new public lecture series on hot topics also should be thoroughly advertised. MSU's success in conveying science and technology messages on current issues, especially those that immediately affect the MSU community, can be amplified by recording, archiving, broadcasting and social networking (e.g. Facebook). An open page for comments and questions should be provided as well, along with a space for comments for new topics. To best serve the entire MSU community, daytime and evening presentations are needed.

3. Expertise and Experience

3.a. Academic Affairs Office

3.a.1. Faculty workloads. Establishment of a taskforce to examine workloads and release time for MSU faculty is long overdue. Policies that date from 1984 require updating and standardization across the MSU organization. **Realistic expectations that enable faculty research and contribute to realizing the goal of R2 status must be established.**

3.a.2. Enhancing student success. Establishment of one-year master's professional degrees and advanced certificates in medical science and transportation is a positive development. Engagement with industry partners should aim at student placement in jobs or internships. Faculty should be supported to attend professional association meetings and learn about employment opportunities for students. The example of the Morgan Community Mile's placement of over 60 students in internships at Google, Facebook, Intel and other companies is worthy of generalization.

3.a.3. Increasing graduation rate beyond 40%. Whereas the retention rate of freshman returning to MSU for the second year is 70%, the graduate rate after six years is only 40%. The Academic Affairs Office is rightly embarking on a campaign to increase this to 50% by 2025. A focus group that considers the sources of the retention gap should be constituted. It was not clear why transfer students into MSU who graduate are not counted in the graduation rate. Statistics should take account of social and economic factors that affect MSU's rates. A proposal to the Department of Education could help to sustain the accumulation of such data. Developing other metrics of success, such as starting a business, should be considered.

3.b. Entrepreneurial Research Training – the ASCEND Model and Beyond

ERAP applauds MSU's new Student-Centered Entrepreneurship Development (ASCEND) Research Training Model to enhance the diversity of the biomedical research workforce. Innovation, ownership, leadership, and strong peer and near-peer interactions are all fundamental and essential skills for entrepreneurs. **ERAP recommends adding MSU technology-transfer-staff expertise on intellectual property to this program.**

ASCEND participants should be informed that many professional organizations, such as the American Chemical Society, publish materials to guide new investigators in preparing and publishing scientific papers.

Participants in MSU's one-year master's professional degree and advanced certificate programs should be involved in ASCEND and learn the skills that it offers to help them be successful.

Additional one-year programs should be considered in skill development areas that are in demand to support today's workforce. For example, a one-year certificate in metrology

training in weights, measures, measurement science, or microscopy would be of use in developing skilled manufacturing workers. **ERAP supports Dr. May's interest in working with the Maryland Governor's Manufacturing Advisory Board to develop such curricular options, which create opportunities for students seeking alternative educational and career options.**

ASCEND should aim to be as inclusive as possible for those who have time or financial constraints, a substantial subset of MSU students. ASCEND students should be encouraged to pursue terminal degrees at MSU.

3.c. College of Liberal Arts Programs

The College of Liberal Arts engages every student at MSU and provides an expansive set of opportunities, including graduate programs that involve research off campus and studies that amplify global competency and engender compassionate citizenship. These programs should be publicized in the state of Maryland; Dr. May's contacts also could prove useful. The breadth of these programs is a supporting criterion for higher R status. Liberal arts programs on weekends and evenings are a foundation of educational advancement for students with busy work schedules. Recent academic investments and funding from foundations are very encouraging. **Whereas seven of the 11 languages offered by the College fulfill critical needs, ERAP recommends it engage with the Department of State, Department of Defense, and the United Nations to increase awareness of MSU's language programs.**

3.d. School of Engineering and Cyber

The program and goals of the Cybersecurity Assurance and Policy Center (CAPC) are very promising. **To prepare for the stated goal of hiring five assistant professors, a set of performance criteria in service, research, and teaching should be clearly established in consultation with faculty, chairmen and deans who will be involved in promotion and tenure decisions.** These criteria should be based on CAPC's goals for collective success in addition to the usual measures of individual achievement. All contributing faculty should remain engaged and not be isolated when Center funding is distributed. Dr. Kornegay and DRED should work closely and cooperatively toward the realization of mutual goals.

3.e. Innovation and Technology Transfer

Raising MSU's sponsorship level to \$50M requires examining all possible streams of income. MSU's capabilities in providing services on task order contracts should be considered as an additional source of revenue.

Since its inception two years ago, the Office of Technology Transfer (OTT) has vigorously facilitated the transfer of university technology and innovation to business and industry, fostered local economic development and provided benefits to the public. Its campus

innovation programs are particularly noteworthy, especially the Innovation Works Initiative, which has led to numerous awards and an innovation every 15 days. The recent Economic Impact Report³ has confirmed OTT's accomplishments and shows why MSU outperforms state and national averages for research universities in key innovation and technology-transfer metrics.

The breadth of OTT's activities under the leadership of MSU's Assistant Vice President for Research Innovation and Advocacy contributes to the diversification of research that is necessary for R2 status. The Director of OTT presented very encouraging data on the return on investment for MSU and its competitiveness with respect to state and national averages. The energy and the acumen of DRED's staff are a continuing asset to MSU's institutional aspirations.

The development of quantitative targets for measuring technology transfer, such as number or value of transfers per annum, would help to focus planning and discussion.

4. General Recommendations

DRED's five-year achievement report substantiates MSU's engagement in the frontiers of research and its ability to respond to market forces and technological changes. To track progress toward Dr. May's stated goals (\$50M in sponsored research, increased faculty research, increased technology transfer), it would be useful to see, in addition to the latest, encouraging figure of \$34M, a decomposition of the latter figure into subcategories. This information would aid in understanding how close MSU is to its targets, in identifying processes that will enable achievement of R2 status and in generating a roadmap for the realization of its goals. It also could establish a baseline for assessment and management of risk, an essential step in expanding MSU's ability to compete for larger government funding, some of which must be set aside for minority-serving institutions. Estimating costs and benefits are an essential element of risk analysis. Progress toward the R2 goal should be quantified and thereby clarified with a view toward identifying and redressing deficiencies. Because the number and the type of doctoral degrees are criteria for R classification, an identification of necessary costs and changes that involve DRED and academic units should be made. The highest levels of MSU management must be involved in harmonizing DRED's goals with those of all academic units.

ERAP has previously recommended promoting faculty research by reducing teaching and service duties in order to enable proposal submission. These reductions will be of little long

³ "Excellence in Education, Research, and Public Service: The Economic & Social Impact of Morgan State University", Final Report, May 4, 2018. Available at <https://www.morgan.edu/economicimpact> (accessed November 20, 2018).

term benefit unless they are extended to enabling fulfillment of funded research projects. Without continued reductions in teaching duties, funds will not be expended optimally, student researchers will not be properly developed and faculty will be subjected to excessive, discouraging demands on their time. It is not realistic to expect faculty research productivity comparable to that of R2 institutions when teaching and service duties are significantly greater than those required by such competitors. The reputation of MSU could suffer as a result of unrealistic expectations of faculty productivity when proposed work is performed incompletely or deficiently. Those who will the ends must will the means.