RESEARCH WORKING GROUP
EXECUTIVE SUMMARY AND REPORT

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by the Research Working Group for the President's Vision Effort

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I. EXECUTIVE SUMMARY
Research Task Force
January 30, 2013

KEY INSIGHTS

1. **The active creation and development of knowledge through research and scholarship distinguishes universities from other educational venues. If Mason aspires to national and international recognition as a university that has a positive economic impact on Northern Virginia, then establishing and maintaining a robust research culture must be the highest priority.** Research should be defined as a core function of the university, reflected in its mission and vision statement, strategic plan, infrastructure, operations and budget. This includes developing a culture and environment where the production of basic knowledge is prioritized and supported. This also includes supporting and encouraging the transformation of that knowledge into useful forms, such as effective interventions, jobs, companies, and social improvements, as well as into opportunities for teaching, learning and mentoring. An assessment of documents and interviews/focus groups indicate that **Mason does not presently identify research as a top or primary goal.** Absent a comprehensive reorganization of the university around research, the aspirations of Mason are likely to be thwarted and its overall educational impact limited.

2. **The research generated by Mason needs to be innovative, consequential and have a meaningful impact on our community and society as a whole.** Mason must evolve into an integrated, interdisciplinary research and education system that focuses on idea generation, problem identification and solutions for highly important and innovative areas of research. Mason's research is distinguished by an interest in and commitment to translating and applying research to pressing problems and meeting the high demand for relevant research in our surrounding local, state, regional, federal and international communities.

3. **George Mason is a diverse and creative institution with regard to research and scholarship.** Given the unpredictability of research areas that will emerge as significant in the future, diversity, collaboration and complexity in Mason's research activities, perspectives, and methods can allow us to adapt and compete in a rapidly changing world. This will make Mason attractive to a wide range of audiences both on and off-campus.

COMPETITIVE ADVANTAGE

Interviews with regional, national and international leaders (private and non-profit sectors, government and community), insights from various communities within Mason, and national analysis of research universities indicate that Mason has not yet taken full advantage of a wide range of available research opportunities. Given our location, we can strengthen research partnerships with business, government, and non-profit organizations, which in turn could facilitate the transfer of knowledge, ideas, and technology to society, accelerating diffusion of Mason's innovations. Although almost all major market areas in the U.S. have at least one top-tier research university (top 25 ranked), no such university in the Washington Metropolitan

Region exists. The presence of such universities is highly correlated with the amount of new knowledge that is produced in a region and also with the frequency by which that knowledge is translated into economically and socially useful information (products and services; improvement in quality of life, jobs, income and wealth).

Mason's competitive advantage in this area lies in the strength of its faculty, researchers, and students, who already have shown a commitment to research that can be applied to important and pressing problems at the local, national, international levels. Mason distinguishes itself through its practical research and translational focus, with clusters of faculty who are directly involved in activities that produce tangible outputs. Mason also has a number of nationally and internationally recognized research centers and receives support from diverse funding sources, positioning the University to explore an even broader funding base by expanding non-profit, government, corporate and international partnerships.

COMMITMENT

To make consequential, meaningful, and sustainable research a top priority at George Mason University and to better align the supply of research with local, national, and international demands, Mason must make the following commitments:

- Mason must commit to making research central to its mission and vision.

- Mason must commit to recruit and retain faculty and students who will advance our mission to become a top-tier research university.

- Mason must commit to acknowledging the value of the diverse types of research and scholarly activities across different disciplines that generate useful knowledge for the betterment of a wide range of societal needs (including economic needs).

- Mason must commit to research on issues that have consistently been identified as key problems of the future. These include problems related to the environment, emerging technologies, aging, health and healthcare delivery, biomedical sciences, data analytics, public safety and national security, STEM, communication and connectivity, novel methodologies and applications for big data problems.

- Mason must commit to the dissemination, publication, and translation of research into practical knowledge. This includes educating students so they are better able to critically assess and identify problems and solve them through systematic and scientific approaches.

- Mason must commit to promote and reward entrepreneurship in its research efforts. For example, Mason could create a new “one-stop” ability to provide business development support enabling transformation of discoveries into new commercial entities.

- Mason must commit to being creative and systemic in solving problems through a culture of research that encourages collaboration, innovation and interdisciplinary entrepreneurship.

- Mason must commit resources to developing relationships and partnerships with industry, foundations, government, private donors, and other universities to advance research.

II. MAIN REPORT

A. CHARGE OF THE RESEARCH WORKING GROUP

The Research Working Group was charged by the President to analyze George Mason University's research strengths, opportunities, and best practices. The group was chaired by Vikas Chandhoke, Dean of the College of Science, and was comprised of fourteen members[1] who met regularly with each other, in subcommittees, and with individuals and groups from both inside and outside of George Mason University.

The Research Working Group was charged to consider the following questions (and others as the group saw fit).

1. What are our current strengths in research? What areas can we build on where we already have critical mass?
2. What societal challenges and areas of research focus will be most important in our national and global future?
3. What is the short-term and long-term outlook for research funds from federal sources, state and local government, business and foundations? What can we do to attract these funds?
4. What are the best practices in translational research, commercialization and incubation?
5. How can we partner better with businesses, not-for-profits, and government to build our research capacities?
6. How do we compare with support provided for PhD students and leading research faculty at peer and other Virginia research institutions?
7. Given our educational mission, what models and domains of research will be most relevant and impactful for our institution? How can we best integrate research into our undergraduate and graduate mission?
8. What are our current infrastructure strengths and what infrastructure will need to be in place to meet our needs and goals in the future?

The Research Working Group was asked to gather input from a variety of internal and external sources. These included summarizing, reading, and applying reports, documents and data examining both Mason and other research university trends. The group also conducted numerous interviews, focus groups, and discussions with various groups from within the university community and the community at large. The goal of both of these efforts was to

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identify key insights that emerged, determine Mason's competitive advantage, and suggest possible commitments for the purpose of strategic planning.

To carry out this charge the working group divided into **four sub-groups: Internal Data, Internal Community, External Data, and External Community.** Each group, as relevant, reviewed internal and external data and reports, conducted focus groups, interviews and town hall meetings with faculty, staff, students, and key individuals inside and outside of the university, and engaged in a variety of discussions with each other to come to consensus about the data collected. More specifically, these sub-groups did the following:

- Conducted and collated themes from two town hall meetings with approximately 35 individuals present;

- Conducted and collated themes from focus groups of graduate students, tenured and non-tenured faculty, the graduate council and the research council totaling approximately 40 individuals, as well as received focus group information from Alumni and QEP personnel;

- Conducted and collated themes from personal interviews with 6 college deans and other research leaders on campus;

- Conducted and collated themes from personal interviews with 18 leaders from outside of the university;

- Collected existing internal reports that speak to the issues raised in this report, as well as external studies and reports that were relevant to this document; and

- Met with each other and the working group at large in various meetings and exchanges to come to a consensus about the information collected.

The subcommittees carried out this data collection between November 27, 2012 and January 7, 2013, and combined its findings into this executive summary and report. The appendices contain relevant reports and data. The individual notes from the focus groups and interviews were combined to form the discussion below, although these data are available from the Research Working Group in original form if needed.

B. BACKGROUND

This is not the first instance that Mason has considered issues surrounding the research vision for the University, and some themes that emerged in this investigation have emerged before. In 2007, the Research Council wrote a "Report of the Research Funding Planning Committee" (Appendix A), focused primarily on increasing research funding at Mason. The report presented eight principles and corresponding strategies, which included improvements in infrastructure and support for research, addressing Mason's research culture and engaging the external community. The report also cited competitive advantages of Mason, including faculty accomplishments, strong centers of excellence, and past investments. It also cited challenges, including recruiting

and retaining top faculty and graduate students, engaging in open and consistent dialogue and strategic planning, and the need to be competitive with other universities in the area.

Mason is not alone in thinking about improving its research stature and activities. The National Academy of Sciences Committee on Research Universities; Board on Higher Education and Workforce; Policy and Global Affairs; National Research Council, put forth a report in 2012 entitled *"Research Universities and the Future of America: Ten Breakthrough Actions Vital to Our Nation's Prosperity and Security,"* making ten recommendations concerning the challenges facing U.S. research universities:

1. Within the broader framework of United States innovation and research and development (R&D) strategies, the federal government should adopt stable and effective policies, practices, and funding for university-performed R&D and graduate education.
2. The states should strive to restore appropriations for higher education to levels that allow public research universities to operate at world-class levels while providing them with greater autonomy to enable them to compete strategically and respond with agility to new opportunities.
3. The role of business in the research partnership should be strengthened, facilitating the transfer of knowledge, ideas, and technology to society and accelerating "time to innovation" in order to achieve our national goals.
4. Universities must increase cost-effectiveness and productivity in order to provide a greater return on investment for taxpayers, philanthropists, corporations, foundations, and other research sponsors.
5. Create a strategic investment program that funds initiatives at research universities that are vital to advancing education and research in areas of key national priority.
6. Strive to cover, in a consistent and transparent manner, the full costs of research projects and other activities procured from research universities.
7. Reduce or eliminate regulations that increase administrative costs, impede research productivity, and deflect creative energy without substantially improving the research environment.
8. Improve the capacity of graduate programs to attract talented students by addressing issues such as attrition rates, time to degree, funding, and alignment with both student career opportunities and national interests.
9. Secure for the United States the full benefits of education for all Americans, including women and underrepresented minorities, in science, mathematics, engineering, and technology.
10. Ensure that the United States will continue to benefit strongly from the participation of international students and scholars in our research enterprise.

In another 2012 report, "The Current Health and Future Well-being of the American Research University," the Research Universities Futures Consortium made six key findings that address critical success factors for research universities:

1. Scarcity of resources (relative to the demand for them) has engendered a hypercompetitive "winner take all" environment and increased the difficulty of managing academic research activities. Growing regulatory requirements have increased the

challenge. To enable impact-oriented research that addresses significant social challenges, universities and research sponsors must work together in providing flexible and adaptive strategies, tactics, and operational structures.

2. The gradual, ever-increasing growth of government regulation and reporting requirements have exacerbated institutional financial stress and diverted faculty time from research. At the same time, the cost of doing research is not fully recoverable from sponsors.
3. Innovation requires diversity of high quality research and development of standardized performance metrics that reliably reflect the complexity and societal expectations of today's research. This should be initiated by the academic research community, in partnership with key stakeholders.
4. Enabling the highest impact research requires current and predictive data to assess programs and evaluate key opportunities in a resource-constrained environment. Strategic decision-making at local, state, and national levels requires data that reflects a local, national and international scope.
5. Translating the value of the research university in serving society, contributing to local and regional economies as well as promoting national innovation and security, needs to be a story well told. University faculty, students, staff, and administrators as well as external supporters need to provide clear, consistent, and focused messages to local and national opinion leaders and decision makers. Highly credible accountability and performance-based data from neutral sources need to drive the conversations.
6. The fragility of research administration and leadership is not fully understood nor appreciated within the university community or by sponsors and stakeholders. The staffing requirements, competencies, and professionalization of research administrative and program support staff to reliably enable the efficient and effective conduct of research needs to be understood.

These reports, while national in scope, mirror many of the research concerns and aspirations that the research working group found in its data collection, and previous endeavors to think about the research vision.

C. KEY INSIGHTS

Insight/Issue #1:

The active creation and development of knowledge through research and scholarship distinguishes universities from other educational venues. If Mason aspires to national and international recognition as a university that has a positive economic impact on Northern Virginia, then establishing and maintaining a robust research culture must be the highest priority. Research should be defined as a core function of the university, reflected in its mission and vision statement, strategic plan, infrastructure, operations and budget. This includes developing a culture and environment where the production of basic knowledge is prioritized and supported. This also includes supporting and encouraging the transformation of that knowledge into useful forms, such as effective interventions, jobs, companies, and social improvements, as well as into opportunities for teaching, learning and mentoring. An assessment of documents and interviews/focus groups indicate that **Mason**

does not presently identify research as a top or primary goal. Absent a comprehensive reorganization of the university around research, the aspirations of Mason are likely to be thwarted and its overall educational impact limited.

Mason's competitive advantage for Insight/Issue #1:

Interviews with regional, national and international leaders (private and non-profit sectors, government and community), insights from various communities within Mason, and national analysis of research universities indicate that Mason has not yet taken full advantage of a wide range of available research opportunities. Given our location, we can strengthen research partnerships with business, government, and non-profit organizations, which in turn could facilitate the transfer of knowledge, ideas, and technology to society, accelerating diffusion of Mason's innovations. Although almost all major market areas in the U.S. have at least one top-tier research university (top 25 ranked), no such university in the Washington Metropolitan Region exists. The presence of such universities is highly correlated with the amount of new knowledge that is produced in a region and also with the frequency by which that knowledge is translated into economically and socially useful information (products and services; improvement in quality of life, jobs, income and wealth).

Innovations by research universities in knowledge production and use can also have an impact on social and economic advancements and growth, as emphasized by Atkinson and Stewart (2011). They argue that universities connected to government and the business community and that are major entities in the Washington D.C. metropolitan area, can have significant effects on things like job growth and innovation development. They also cite Mansfield (1998), who hypothesizes that the social rate of return from investment in academic research will be at least 40 percent, as well as a report by the Science Coalition (2010), which found that 'companies spun out of research universities have a far greater success rate than other companies.' Mason's competitive advantage lies in its existing and strong connection with government, the business community, and the public. Mason faculty and researchers also have high motivation to diffuse innovation rapidly and with public consequence.

Commitments for Insight/Issue #1

- Mason must commit to making research central to its mission and vision. We must commit to declare publically, and in appropriate forums, the intent to become a top-tier research university.

- All Mason faculty, staff and leaders must commit to making the community, industry and government aware of our research strengths and outputs.

- All Mason faculty, staff and leaders must commit to a culture shift within the university to place research as a top priority.

- Mason must commit to restructuring the university infrastructure and its budget model to support these endeavors.

Trade-Offs and/or Critical Success Factors for Insight/Issue #1

- Mason should not be everything to everyone. We need to be strategic in defining our priorities and focus and be prepared to exercise leadership in making difficult decisions.

- The University should invest in innovative infrastructure to achieve making research our top priority. There should be an adequate level of administrative support and coordination of resources among department, college and central offices to avoid duplication of effort.

- The University's academic and administrative leadership should support a culture of collaboration and cooperation across units. This can be achieved by increasing transparency and breaking down barriers and silos to ensure greater research productivity and efficiency. An innovative way to address this would be to create "fusion centers" (cross unit centers or institutes) that bring appropriate expertise to address a problem from different disciplines.

- There should be clear communication of the importance of research and scholarship across all units and levels of the institution. Reward structures and incentives should be developed to drive research excellence.

- The University must commit to fund high quality full-time GRAs and Post Doctoral Fellows at competitive levels. Our reliance primarily on grant funding to support GRAs is an unstable model that leaves us unable to compete to retain the best students *and* faculty. The consequences that arise from losing these strong contributors reverberate throughout other areas of concern.

- A tangible connection should be maintained between research and teaching as we move to make research our top priority. This includes continuing to integrate research into undergraduate and graduate education, which will in turn strengthen the overall research culture of the university.

Insight/Issue #2:

The research generated by Mason needs to be innovative, consequential and have a meaningful impact on our community and society as a whole. Mason must evolve into an integrated, interdisciplinary research and education system that focuses on idea generation, problem identification and solutions for highly important and innovative areas of research. Mason's research is distinguished by an interest in and commitment to translating and applying research to pressing problems and meeting the high demand for relevant research in our surrounding local, state, regional, federal and international communities.

Mason's competitive advantage for Insight/Issue #2:

Mason's competitive advantage in this area lies in the strength of its faculty, researchers, and students, who already have shown a commitment to research that can be applied to important and pressing problems at the local, national, international levels (Appendix B & C). Mason distinguishes itself through its practical research and translational focus, with clusters of faculty

who are directly involved in activities that produce tangible outputs. Mason also has a number of nationally and internationally recognized research centers and receives support from diverse funding sources, positioning the University to explore an even broader funding base by expanding non-profit, government, corporate and international partnerships (Appendix D - I).

Commitments for Insight/Issue #2

- Mason must commit to research on issues that have consistently been identified as key problems of the future. These include problems related to the environment, emerging technologies, aging, health and healthcare delivery, biomedical sciences, data analytics, public safety and national security, STEM, communication and connectivity, novel methodologies and applications for big data problems (Appendix J).

- Mason must commit to the dissemination, publication, and translation of research into practical knowledge. This includes educating students so they are better able to critically assess and identify problems and solve them through systematic and scientific approaches.

- Mason must commit resources to developing relationships and partnerships with industry, foundations, government, private donors, and other universities to advance research. This can include, for example, creating a research foundation within the university.

- Mason must commit to recruit and retain faculty and students who will advance our mission to become a top-tier research university.

- Mason must commit to promote and reward entrepreneurship in its research efforts. For example, Mason should create a new "one-stop" ability to provide business development support enabling transformation of discoveries into new commercial entities. For the social and economic sciences, Mason should encourage faculty to pursue both primary research as well as activities which seek to incorporate research into policy and practice.

Trade-Offs and/or Critical Success Factors for Insight/Issue #2

- As competition for federal research funding increases, initiatives for enhancing collaborations with industry, government and public services, and foreign partners should be encouraged and supported. Hiring program and project development staff who bring extensive networks with Mason's primary funding agencies including international partners should continue to occur.

- The university will need to support both activities serving to convert research into practice as well as translational research itself. The University will create university-wide institutional and physical infrastructure, including laboratories, equipment and administrative support to facilitate further development of research and activities that facilitates translating scholarship into practical uses that can make an impact to society. For example, Mason could form a university-wide facility supporting entrepreneurship and company formation and growth, and applied research including a prototype laboratory. The university could also support centers and activities focused on research dissemination and translation and use by governments and

communities that help to increase research use in arenas of public health, the environment, and public safety.

- Mason is building on basic research as it moves toward placing stronger emphasis on translational research.

- There may be existing and special opportunities of which Mason can take. One example might be building an international research program at Mason's new Songdo Campus in Korea.

Insight/Issue #3:

George Mason is a diverse and creative institution with regard to research and scholarship. Given the unpredictability of research areas that will emerge as significant in the future, diversity, collaboration and complexity in Mason's research activities, perspectives, and methods can allow us to adapt to and compete in a rapidly changing world. This will make Mason attractive to a wide range of audiences both on and off-campus. (Appendix C, D, & E)

Mason's competitive advantage for Insight/Issue #3:

- Although almost all major market areas in the U.S. have at least one top-tier research university (top 25 ranked), no such university in the Washington Metropolitan Region exists. The presence of such universities is highly correlated with the amount of new knowledge that is produced in a region and also with the frequency by which that knowledge is translated into economically and socially useful information (products and services; improvement in quality of life, jobs, income and wealth).

- Mason is well poised to transform itself into a major research university. Over the past 10 years, a number of nationally-recognized research clusters at Mason have been developed and staffed with expert faculty. These clusters are ready for expansion, enabling the addition of additional high quality faculty, post docs and graduate students.

- Mason's proximity to diverse funding agencies and industry provides a competitive advantage to effectively address fluctuations in fiscal/budgetary environments and to better understand and therefore more tightly focus proposal in areas these offices are likely to fund.

- Given the strengths that have been developed for managing and growing funded research as described above, Mason has an opportunity to become a top-tier research university over the next couple of decades.

Commitments for Insight/Issue #3

- Mason must commit to acknowledging the value of the diverse types of research and scholarly activities across different disciplines that generate useful knowledge for the betterment of a wide range of societal needs (including economic needs).

- Mason will continue to strengthen its core areas of research while exploring and expanding into emerging areas.

Trade-Offs and/or Critical Success Factors for Insight/Issue #3

- Mason will need to invest in a wide spectrum or fusion of fields to maintain its interdisciplinary competitive advantage. This will require a new commitment to resource management at multiple levels.

- Supporting a diverse research agenda would require Mason to continually evaluate and upgrade its priorities for its research agenda and its infrastructure needs.

- To maximize output from diverse research enterprise will require special and nonconventional administrative structures.

III. REFERENCES

[1] "The Current Health and Future Well-being of the American Research University", report by the Research Universities Futures Consortium (June, 2012), http://www.researchuniversitiesfutures.org/RIM_Report_Research%20Future%27s%20Consortium%20.pdf

[2] "Research Universities and the Future of America: Ten Breakthrough Actions Vital to Our Nation's Prosperity and Security", National Academy of Sciences (2012).

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[5] Edwin Mansfield, "Academic Research and Industrial Innovation: An Update of Empirical Findings," *Research Policy* 26, no. 7 (1998): 773-776.

[6] Science Coalition, *Sparking Economic Growth: How Federally Funded University Research Creates Innovation, New Companies and Jobs* (Washington, DC: Science Coalition, 2010), 7, http://www.pagegangster.com/p/VlM3O/.

[7] "Science and Engineering Indicators Digest", National Science Board (2012), http://www.nsf.gov/statistics/digest12/nsb1202.pdf

[8] "Research & Development, Innovation, and the Science and Engineering Workforce", National Science Board (2012), http://www.nsf.gov/nsb/publications/2012/nsb1203.pdf

IV. APPENDICES

A. 2007 Report of the Research Funding Planning Committee
B. Faculty in the Press Calendar Year 2012
C. Mason Research 2012
D. Sponsored Programs Expenditure, Award, Proposal Activity: FY10 – FY12
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F. Top Funded Departments and Centers FY12
G. Top Funded Departments and Centers FY11
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