Research Ecosystem at GW:
Phase 2 Initial Review and Evaluation

GW

February 7, 2020

Findings from the Phase II Research Ecosystem Review at GW
Final Report

February 7, 2020

Submitted to: President Thomas J. LeBlanc

Acknowledgements

This final report is the product of a highly collaborative and integrative process that included multiple stakeholders. We would like to thank our faculty, staff, and administrative partners for their continued support and dedication. We are indebted to the four Phase II working groups including the four tireless leaders (Frank Baginski, Matt Kay, Tarek El-Ghazawi and Keith Crandall), the 32 faculty group members, over 20 staff and administrators, the GW faculty who provided valuable insight, and the Faculty Senate Research Committee, who have been with us from the very beginning and walked with us every step of the way. Many thanks to Leslie Roe and Don Reagan for providing support through the planning and implementation of this process. Lastly, we are indebted to the GW community for recognizing the vital role research and scholarship have in furthering the university mission to be a preeminent global research university.

Executive Summary

The purpose of this project is to perform a comprehensive investigation of The George Washington University (GW) Research Ecosystem, its current state and a detailed proposal for the path forward with a goal to establish a world-class research infrastructure commensurate with GW's academic mission.

Background

After the successful completion of Phase I of the Research Ecosystem Review earlier this year, the Faculty Senate Research Committee has started Phase II of the review. As in Phase I, the objective is an examination of the Research Ecosystem, both its present form and the potential for development to support the University in its quest to be a global preeminent research institution. For this phase, the committee focused on four areas:

1) Shared Facilities
2) Big Data and High-Performance Computing Infrastructure
3) Workforce Development, and
4) Resource Allocation.

In each of these four areas, a working group was formed that consisted of faculty members representing the colleges as well as staff members from the Office of the Vice President for Research and the Office of the Provost, the latter helping the faculty with the process of inquiry.

Research Questions

As part of the Research Ecosystem Phase II Review, the working groups undertook a review of the processes in each of the focus areas to recognize what is going well and to determine the critical questions/pain points/issues that need to be addressed to further improve the respective processes. In addition, each of the groups created a report identifying proposed solutions and operational metrics for evaluating success of the respective action-oriented recommendation.

Each working group was tasked with providing information on the following areas:

- What is working well at each school?
- Critical questions/pain points/issues and proposed solutions.
- Identification of existing best practices or plans for growth.
- Metrics for evaluation of progress.
- Other important information.

Each group was led by a senior GW faculty member and coordinator, and each group was given liberty to decide their methodology of investigation.

Key Findings and Highlights

Each of the four working groups developed specific themes and recommendations listed below. Specific details and action points for a particular focus area can be found in the section containing its individual report. Here we list the key highlights:

Shared Facilities:
The Shared Facilities working group inventoried service centers and recharge centers. In compliance with federal requirements for charging federally-funded research projects, high performance computing resources are available to researchers across the university with a set fee structure. Staff are available to manage and support the use of computing resources, as well as training and assistance with data management. Support for statistical analysis and programming is available through Libraries and Academic Innovation (LAI) at no charge through consultations, workshops and software development assistance. High functioning regional cores are supported off regional research efforts, such as DCCFAR and CTSI, Biostatistics and Epidemiology Consulting Service Core, Animal Facilities, Nanofabrication, and Genomics Core.

Recommendations to improve Shared Facilities include:

1. Provide a central inventory or 'clearinghouse' maintained by a central division such as OVPR for all shared facilities that is user-friendly and accessible to researchers, staff, and students.
2. Define and adopt a common nomenclature around 'shared facilities,' 'core facilities,' and 'service centers' to articulate differences amongst such facilities.
3. Develop clear, strategic business models for such facilities, including funding and shared governance structures.
4. Ensure administrative needs are met through adequate staffing, equipment maintenance, review processes/user feedback, and pay structures.
5. Operationalize proactive efforts to identify and evaluate future facility needs.
6. Expand training and educational opportunities to further promote student, staff, and faculty access.

Big Data High-Performance Computing Infrastructure:
The Big Data and High-Performance Computing (HPC) Infrastructure working group reviewed the entire HPC and Big Data ecosystem to consider not only the hardware and software infrastructure but also all other components that can energize and support our research in Big Data and HPC, including personnel and targeted seed funds. This working group sought input from GW research stakeholders who are leaders in this domain (specially from CCAS, SEAS, SMHS), both from within the working group and outside of the group using an extensive class-evaluation-styled questionnaire targeted to faculty/researchers across the university, and another questionnaire targeted to IT professionals at the university level and within the schools. The working group also took into account emerging common understandings and opinions of other experts in the field and a cursory look at industry standards at other universities.

Recommendations to improve High-Performance Computing and Big Data (BD) Service Centers include:
1. Create better federated coordination and structure, *in the* **short term**, among all entities and initiatives in BD and HPC to provide improved coherence and division of responsibilities.
2. Create a clear plan for growth in facilities and personnel in the short term.
3. Create a partnership and a cost-efficient negotiated bulk services agreement with a cloud service provider known to provide HPC and BD services reliably.
4. Create a fair model of accounting that supports both cloud and GW-specific resources.
5. Examine how cloud services can be leveraged in addressing when and what types of workloads are to be considered subject to PI-specific needs. Validate the scope of need for supporting current and emerging regulated and restricted workloads and data.
6. Provide support for HPC/BD consultants.

7. Through the suggested federation, leverage the capabilities and resources of the IMPACT Initiative, GW libraries, GWIT, and school-based IT operations to establish a coordinated training program that scales from basic computer skills and access to the use of advanced computing including optimizations.
8. With a similar coordinated effort, scale up our outreach and visibility as an institution in HPC/BD through research exhibits in key venues and including supercomputing.
9. Provide support for seeding postdocs and research efforts that target interdisciplinary research in HPC/BD.
10. Establish a long-term vision and provide a platform and mechanisms to engage industry and government, particularly local ones. Perhaps a closer examination to the IDEAS institute at Georgia Tech and similar efforts nationwide should be considered in the light of GWU's unique expertise of our faculty and unique geographical location. The co-directors (academic and administrative) may help harmonize activities across the organization. Leveraging some of the prior related initiatives in HPC and BD would be useful.

Workforce Development:

The Workforce Development working group examined the research pipeline at GW including undergraduates, Masters and PhD students, postdoctorates, and research associates. In-person interviews as well as questionnaire responses were used to learn about "what works" and "pain points" for individuals and programs along the training and research education continuum.

Recommendations to improve Workforce Development include:

1. Enhance undergraduate research opportunities.
2. Improve financial support (especially for graduate students).
3. Streamline GW research infrastructure and communication.
4. Disseminate to faculty information about hiring practices and categories.
5. Capitalize on the benefits of GW location in DC.
6. Make provisions addressing DC cost of living for grad students & postdocs.
7. Recognize that graduate student researchers and postdocs are trainees.
8. Support the development of a Postdoctoral Office.

Resource Allocation:

The Resource Allocation Working Group solicited faculty perspectives, synthesized data, and worked to provide recommendations regarding aspects of resource allocation as they relate to the GW research enterprise. Aspects included 6 primary areas of resource allocation: 1) research space and how it is allocated; 2) faculty time for research as related to teaching release and course buyouts; 3) availability and levels of fellowship support for students; 4) institutional support for grant and/or fellowship preparation; 5) institutionally funded research opportunities and how they are awarded; and 6) the GW Institutional Review Board (IRB) for human subjects research. Committee members represented the best insights from each of their schools and advocated for recommendations that would enhance the ability of faculty across the University to conduct highly competitive scholarly and research activities consistent with GW's aspiration to be a comprehensive global research university.

High priority recommendations for improvement in Resource Allocation are related to the following:

1. Another research facility similar to the Science and Engineering Hall is desperately needed.

2. There is no clear consensus and guidance regarding allocation or usage of research space across campus.
3. Develop a long-term strategic view to assess and develop quality multi-purpose research space.
4. Dedicated space for human subject research is needed.
5. Develop a database of research topics and activities across the university, and the locations involved, for facilitating collaboration and enabling cross-disciplinary opportunities.
6. There is a critical unmet need for more dedicated and uninterrupted research time for faculty scholars and PIs.
7. Teaching load is not linked to research activities and research active faculty members many times do not have the option to dedicate less effort to teaching activities.
8. Faculty PIs need more support from their departmental administrators and staff to help run their research operations.
9. There is great need for more fellowships to support PhD students.

Common Themes and Areas for Investment

There are common themes among the four working groups around streamlined processes, standard terms of use, and robust support enhancements. These common themes are not mutually exclusive and investments in one area will provide opportunity for improvement in others.

Limitations

The research ecosystem review is an ongoing process in a cycle of investigation, problem identification, solution implementation, monitoring, evaluation, and adjustment. Therefore, the effort undertaken thus far is only a beginning of an extensive and continuous process. The report is based on the effort undertaken in the period from September 2019 till January 2020. In the interest of time, it focused on four areas, which were identified during the Phase I review process. The next steps will need to include implementation of the recommendations, monitoring of the process, evaluation of the outcomes, and possible adjustment.

Recommendations and Next Steps

Actionable items have been identified in all four areas. However, there is a need for GW to be more effective and to learn from the effort and practices of peer and aspirational institutions. The GW administration can use the information from this report to determine the strategic planning and investments that can be made to maximize the research and scholarship efforts of the university.