WASHINGTON UNIVERSITY MCKELVEY SCHOOL OF ENGINEERING
STRATEGIC PLAN TO ACHIEVE LEADERSHIP THROUGH EXCELLENCE

EDUCATION

Effective & Efficient Master’s Programs
Effective & Efficient Master’s Programs

Executive Summary

SEAS has experienced dramatic growth (162%) in its Master’s program enrollments since Fall 2008 to an all-time high of 834 students in Fall 2016. Applications to the Master’s programs increased 567% to a record of more than 2,000 applications for that same time period. Full-time status students went from 13% of the population to 58%, and international students now make up 45% of the students. Master’s programs provide an important unrestricted funding source for the school to use to achieve its strategic goals. SEAS finds itself at a critical juncture to evaluate the role and direction Master’s programs should play and an opportunity to improve how they operate. Four key themes emerged from the strategic planning process. (1) The need for student support and services throughout the lifecycle of the graduate student. (2) Differentiation of thesis-based and non-thesis based Master’s students. (3) Streamlining of program offerings and curriculum. (4) Incorporation of digital delivery.

Recommendations to address these four areas are as follows:

- Based on a National Association of Graduate Admissions Professions (NAGAP) study of the roles of graduate enrollment management offices, it is recommended that we adopt a Graduate Enrollment Management model. This involves the integration and interdependence of the five aspects of the graduate student lifecycle — marketing & recruitment, admissions operations, financial support, student support & services, advising & retention, and graduation & alumni relations. This one-stop shop for graduate students would provide enhanced services and allow for future growth with cross-disciplinary training and knowledge within the structure.

- Identifying graduate students interested in thesis-based Master’s programs, early on in the admission process or term of study can provide an opportunity for research support to faculty/departments with a shortage of quality PhD candidates and/or provide a recruiting source for departments looking to retain Master’s students to continue on to a PhD. Accomplishing these goals would require additional tuition funding from the Dean and stipend support from grants extended to Master’s students. Implementing research/PhD informational seminars for upper-level underclassmen or thesis-based Master’s students and providing funding for travel to national conferences would encourage student interest.

- SEAS departments should undergo a thorough review of their Master’s programs and determine criteria to be used for evaluating a successful program and the appropriate allocation of resources. Implementation of soft skills should be considered in Master’s curriculum, either by allowing courses from Sever or creating additional seminars. Departments should encourage and look to incorporate second Master’s degrees from across SEAS in consideration of the 15-credit rule in place.

- SEAS should develop a plan to incorporate digital learning from the best pedagogical practice into graduate programs. This should incorporate the input from all departments and focus on the first-steps of implementation as well as the appropriate target market.
Current Assessment:

The Master’s programs in the School of Engineering & Applied Science (SEAS) have changed dramatically over the last nine years (see Attachment A), both in size and student demographics. In fall 2008, SEAS had 318 Master’s students: 43 (13%) were classified as full-time, and 275 (86%) were classified as part-time. Of all the Master’s students, 49% were registered in a program within one of the five academic departments, and the remainder were in the Sever Institute (Professional Education). For fall 2016, there were 834 Master’s students: 484 (58%) classified as full-time, and 350 (42%) classified as part-time. The five academic departments now make up 75% of the Master’s student population. The boom in full-time students began in fall 2012 when the full-time student population doubled from 64 to 132. This led to the demographics of the student population changing from 13% international in fall 2008 to 45% in fall 2016.

The importance of the role of Master’s programs to SEAS is twofold. The tuition revenue from the master’s students provides SEAS with an unrestricted funding source that can be used to achieve the school’s overall strategic goals. In addition, Master’s programs can be used as a step to recruiting quality PhD candidates. Some students do not want to commit to a PhD program initially, and a strong, high-quality pool of thesis-based Master’s students could provide more depth for PhD recruitment.

All of this growth and change in the Master’s programs has come with very little strategic planning and direction. The process from admissions to graduation has been in silos, depending almost entirely on the resources within the academic department. Outside of adding a few non-tenure-track faculty positions to handle teaching loads, few other resources have been secured during this period of time. From this standpoint, SEAS finds itself at a critical juncture to evaluate the role and direction of the Master’s programs should play and an opportunity to improve how they operate.

Four key themes emerged from the strategic planning process: (1) The need for an increase in student support and services. Respondents said that student support and services for all graduate students (Master’s and PhD) was lacking or at best ad hoc in comparison to undergraduate students; (2) A need for differentiation of students pursuing thesis versus non-thesis tracks to increase student quality and provide a mechanism for Master’s students to be involved in research; (3) Streamline Master’s programs and offerings to allow for easier and more efficient interdisciplinary study; (4) Incorporate the most effective use of digital delivery of courses to engage additional students and alumni.

Services for the Lifecycle of the student:

The call for support ranged from funding resources for items such as paid tutors/mentoring and career guidance to centralized admission/recruitment support and alumni data management.

In general, Master’s students only have departmental resources and funding available to them. Departments use their own resources to perform recruitment, provide all advising and counseling, including academic, career, and non-academic advising. Non-academic advising includes health and wellness, Visa questions, and resolving other issues. Departments also are the main source of any post-graduate follow up.
The National Association of Graduate Admission Professionals (NAGAP) published a study on Integrated Interdependence: The Emergence of Graduate Enrollment Management (GEM) in Spring 2015. This study focused on the differences of undergraduate enrollment management offices versus graduate enrollment offices, and the emerging changes taking place in GEM. The structure of GEM tends to be more decentralized with appreciably lower staffing levels resulting in an evolution of roles outside of primary responsibilities. “A statement was made that undergraduate is more focused on the student experience with extensive student services; while at the graduate level, the tradition has been to focus on the academic program.”¹

The outcome of this study, was the development of the definition of a GEM model (see attachment B) that supports and centralizes the approach to the lifecycle of a graduate student. The model shows the integration and interdependence of the five aspects of the student lifecycle, broken down as recruitment & marketing, admissions operations, financial aid/grants/scholarships, student support & services, advising & retention, graduation & alumni relations. “In this model, the one-stop shop is then amplified by the way in which responsibilities are assigned and the operations of the office are implemented. Staff members are cross-trained on the traditional interdependent functions of GEM. There are primary areas in which a person would be rooted, however each person would be able to support students from before they apply until after they graduate.”²

SEAS has never had a centralized effort for graduate student services. The lifecycle of the SEAS graduate student has been served in a decentralized effort with a combination of a centralized admissions operations staff, decentralized department faculty advisors, and decentralized departmental graduate coordinators. Each of these groups has a little different way of handling roles and responsibilities.

Adoption of a GEM model for SEAS could provide enhanced services to graduate students, as well as allow for future growth, with cross-training and knowledge within the structure. The structure would include the following centralized areas of responsibility:

- **Recruitment & Marketing:** The lifecycle of the graduate student begins with marketing and recruitment. Currently, there is no centralized effort for recruitment. Departments do not have the resources or time to attend potential recruitment opportunities. Recruitment of graduate students (PhD and Master’s), was an item that was addressed by at least two subcommittee’s — Graduate Education and Diversity & Inclusion. For Master’s students, inclusion of some kind of fellowship/scholarship incentive is deemed imperative to recruiting high-quality and diversified students.

- **Admissions Operations:** Admissions operations is the only area that has developed during this changing environment. In June 2014, additional support for admissions operations was added, one centralized and one within an individual department. In January 2016, a fully centralized admissions operations unit was created, serving the student from inquiry to acceptance and through Visa processing for international students. This was needed as not only had enrollments for Master’s programs more than doubled since fall 2008, applications have increased nearly six times (See Attachment A), from about 300 applications to more than 2,000 applications for fall 2016 admissions. With efficiencies and process improvements, we can establish reports to provide the Dean’s office and departments more in-depth information on our students and our competitors. We can analyze data on the differences, similarities, and quality of who accepted our offers, and who did not. What schools did they choose? What were the qualifying factors? With more data, we can refine our enrollment strategies to obtain and maintain consistent enrollment levels that fit within our school resources (teaching, support, and classroom).

¹ Integrated Interdependence: The Emergence of Graduate Enrollment Management (GEM), Connor, LaFave and Balayan, Spring 2015.
² Integrated Interdependence: The Emergence of Graduate Enrollment Management (GEM), Connor, LaFave and Balayan, Spring 2015
• **Financial Aid/Grants/Scholarships:** Currently there is one person housed in the Dean’s department responsible for financial aid for all graduate students. This position is also responsible for manual application of tuition-related costs and scholarships to the student’s accounts, as well as student loan counseling and administration. Continued coordination of this already centralized unit with a GEM-model department would be required or enhanced. Master’s programs do not currently offer any scholarship/fellowship support (see page 4). If there were a program implemented that resulted in an increase in scholarships and fellowships for Master’s students, given the manual nature of current systems, additional support for this position may need to be considered.

• **Student Support & Services:** This is the area found most to be lacking for all SEAS graduate students. Support & services encompasses a broad definition. Resources include mentoring/tutoring (funded through a centralized effort), career and internship counseling, writing help specific to graduate students, English language help for international students, and use of health and wellness offerings to resolve student issues. Some of these resources exist at a university level, but department personnel are not familiar with them, or are not always comfortable with being the “front-line” person. Some of these resources are not available or are inadequate at a centralized university level for specific Engineering needs.

• **Advising & Retention:** This aspect fits hand in hand with student support & services. Faculty advisors provide a key role in the needed academic advising of the graduate students, and this service should be retained, but advising can encompass much more than the academic course selections to meet the degree requirements and interests of the students. Different departments have handled the growth of the enrollments as it relates to the advising role in different ways (See Exhibit 3). Sole advising responsibilities can be burdensome to faculty who have other responsibilities in curriculum, research, and teaching. Having a centralized place that provides a resource for graduate students regarding university and School policies gives the students consistent answers and direction. A centralized advising function could handle questions regarding transfer credit, registration questions, dual-degree unit requirements, Visa issues, and university resources such as WUPD, parking, library, and Blackboard. Knowledge of university resources with which the office personnel have a direct relationship enhances the students experience ensuring students feel a sense of community and could increase retention and/or student satisfaction.

• **Graduation & Alumni Relations:** Maintaining an alumni database has multiple positive benefits. The database aids in determining the success of the program; Did the student achieve their intended outcome? (see page 5). A database provides pertinent data required at the PhD level for some training and research grants. The database also provides industry contacts to provide career and internship connections for students. According to faculty, some departments within the university have full-time staff dedicated to maintaining this information about alumni. Providing and securing this data within SEAS, working to enhance alumni relations data would help SEAS provide better support and resources to current students and graduates.

NAGAP had four case studies it viewed regarding the set up and implementation of GEM models: McDaniel College, University at Buffalo, State University of New York Postdam, and University of Kentucky. Some schools developed this model at the university level and some at a smaller unit level. Overall findings determined that primary benefits ensured there was not a duplication of efforts and services, but the development of a network of
colleagues across the student services area, so you are not sending the student to an office but to specific people and improved decision making with a focus on the overall strategic plan, rather the focus of any one department. Having an integrated model allowed a differentiating service and experience to the students. One university created a GEM council in addition to incorporating administration and faculty working together in open and transparent ways. Such a council could work much like the “Graduate Group” we have recently established, which has been seen a positive from the participants for the sharing of information and creating new ideas.

**Thesis vs Non-Thesis Differentiation:**

Identifying students interested in a thesis-based Master’s program early in the admission or term of study can provide two primary benefits, provide an opportunity for research support for faculty/departments with a shortage of quality PhD candidates, and provide a recruiting source for departments looking to retain Master’s students to continue on to a PhD.

- Departments identified as having difficulty encouraging or finding quality students who are interested in the long-term commitment of a PhD program would like to use a process where current undergraduate or Master’s students could be encouraged with funding and support to stay or continue on for a Master’s degree. These students would already have a relationship and be identified with a faculty advisor. The student would receive a stipend paid for by the PI’s grant, and tuition would be funded through the Dean.

- Departments looking for more high-quality PhD candidates can identify Master’s students interested in thesis-based Master’s programs, and encourage them to stay for a PhD. Providing seminars to thesis-based master students that introduce the students to what it means to be a PhD student and the opportunities it generates could be used to convert students. Dr. Zhu said that in her experience at UConn using seminars for Master’s students in a thesis-based program over time converted approximately 20% of thesis-based Master’s students to PhD candidates. An additional idea is to provide competitive travel grants that Master’s or undergraduate upperclassmen can compete for to attend national conferences in their discipline. This would expose them to the research and happenings in their field and enhance interest in pursuing a PhD program. (This idea has been submitted for blue print)

**Streamline Master’s Programs/Interdisciplinary Study:**

Over the last 10 years, SEAS has granted degrees from 16 additional programs, and has had 17 programs cease granting degrees. Over 20-years, there were 30 additional degrees granted and 37 degrees ceased. Of the “new” programs, average enrollments are 22 students compared with average enrollments of 74 in the longer-term existing programs. It was recommended that SEAS take an inventory of the Master’s programs and determine the best way to define successful programs that warrant the use of the scarce resources.

During discussions with the faculty responsible for Master’s programs, the clear criteria noted for determining the success of a program was achieving the students’ intended outcome. By that notion, we can only determine a successful program with knowledge of the student’s disposition after graduation. Earlier, we noted that tracking of alumni data was a key component to a GEM service model. This would be another situation in which that service would provide key data. The faculty felt confident in the current process of creating and approving new programs, and they were unanimous in that the determination whether to continue a program lies within the department and the department’s decision of its best use of resource allocation. SEAS departments should review their Master’s programs, determine the set of criteria for evaluation, and proceed with appropriate changes.
Current SEAS policy allows for a master’s student to obtain a second master’s degree with a minimum of an additional 15 units. This benefit seems most widely used between the CSE and ESE degrees. It was determined that this policy needed to be more widely acknowledged among department advisors and within student resources, with a possibility of creating a few combination options that would be of interest to current and potential students as recruiting tools.

Also noted during the information-gathering phase was the need for improved soft skills for all graduate students. This could enhance the programs, especially for students wishing to enter the workforce upon completion of the Master’s programs. It was suggested that courses from Sever management degrees be allowed to serve as potential electives in the degree programs. Due to the variation of student’s objectives, it seems best to not require these courses, but accommodate when able. Another option for students to obtain these professional development skills and not interrupt the course of study is to provide the information in seminar formats and require attendance.

**Incorporate Digital Delivery:**

The need for some innovative digital delivery of graduate content was noted on several fronts. SEAS has a large base of part-time students — 350 in fall 2016. Of those 350, nearly 200 are from Boeing. These students often need to interrupt their graduate studies due to required work projects and/or travel. Digital delivery would also increase the reach of SEAS programs, expand our recognition, and allow us continued interaction with alumni who wish to continue their studies with WashU, but are no longer locally located.

SEAS should make a concerted plan, with the representation from all departments, how, from a pedagogical perspective, to best incorporate digital learning into the graduate degree programs. Potential starting phases of implementation could include an entire existing degree program, specific courses that fit well within this dynamic, programs specifically designed in consultation with industry partners geared to recruit their top employees, or non-credit seminar/workshops used to engage existing alumni or future students. (See Operations white paper for discussion on proposal for digital learning capabilities).

**Future State:**

The five-year outlook for SEAS Master’s Programs includes engaged and positive interaction with graduate alumni who achieved their goals while studying at SEAS as a result of the relevance and rigor of their program, the excellent service they received during their time of study, and options they were afforded to be able to continue their studies uninterrupted. The faculty and staff with graduate student responsibilities working collaboratively to share and implement innovative ideas to achieve strategic enrollment goals for all graduate programs and satisfaction of the students.