George Mason University

ANALYSIS OF SPACE NEEDS
for the
COLLEGE OF SCIENCE
Biomedical Education Program

October 2009

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1.0 EXECUTIVE SUMMARY

Paulien & Associates, Inc., of Denver, Colorado, was contracted to provide George Mason University with a Space Needs Analysis to study the space requirements for the College of Science's planned Biomedical Education Program to be located on the Prince William Campus. The Biomedical Education Program will be a joint effort between George Mason University's College of Science and the Georgetown University School of Medicine.

Paulien & Associates' task for this study was to document the Biomedical Education Program's future space needs, designating space requirements in assignable square footage and categorizing them by program and by major space groupings: classrooms, teaching laboratories; open laboratories; research laboratories; offices; and other academic department space (study space and shared spaces). The study analyzed space requirements for the Post-Baccalaureate Advanced Biomedical Sciences Certificate and the Special Master's Programs and for the two-year Medical School Program.

1.1 INTRODUCTION

As the College of Science looks to its future growth, it sees the opportunities for growth in research tied to biological and life sciences and medicine. As a result of the teaching and research opportunities in the biomedical sciences, the business plan for the College of Science includes a Biomedical Education Program.

The College of Science at George Mason University entered into discussions with Georgetown University School of Medicine. These discussions led to the creation of a joint venture to have the College of Science at George Mason University offer an Advanced Biomedical Sciences Certificate Program and a Special Master's Program at the Prince William Campus. Once these programs are established, the College of Science and Georgetown University School of Medicine plan to offer a joint program at the Prince William Campus that includes the first two years of the medical school program.

As George Mason University plans for the College of Science on the Prince William Campus, the existing facilities are expected to serve the initial stages of the biomedical programs. Future facilities and additions to existing facilities will be planned to accommodate growth in academic programs and in enrollment. There is also a need for

housing to serve the development of the Biomedical Education Programs that has been identified, but has not been quantified as part of this analysis.

Of the facilities required by the College of Science for the biomedical programs, one of the most important that will need to be built is a cadaver laboratory. This laboratory will provide facilities for dissection and study of anatomy. In the future, the College of Science will need dedicated classroom space and office space. To increase its research growth opportunities, the College plans to provide research facilities that will attract medical students and research faculty. Consequently, space for laboratories for research efforts will need to be constructed.

With these new opportunities in mind, the College of Science wants to understand the amount of space it will need to for the Biomedical Education Program in the future.

1.2 PLANNING PROCESS AND ASSUMPTIONS

An identification of space needs was made for the College of Science Biomedical Education Program. The consultant began the space programming process in late March 2009. An on-site meeting was held with project leaders and the Dean and the Director of Facilities Planning for the College of Science in March 2009. Following that meeting, the consultant and the George Mason University project leaders toured the School of Medicine facilities at Georgetown University and met with Georgetown University's Associate Dean, Assistant Dean, and Vice President of Planning in June 2009. In August 2009, the consultant, project leaders, and Dean of the College of Science held a teleconference to discuss the enrollment projections, curriculum, and start dates for the program. In addition, the consultant toured the University of Colorado Denver Anschutz Medical Campus facilities and contacted the Associate Dean for Facilities Planning at the University of Arizona's College of Medicine Phoenix Campus and the Associate Provost for Academic Planning at Virginia Tech to gather information on new medical school facilities. A final teleconference was held in September 2009 to review the draft report.

The information gathered and work sessions with College of Science and project leaders provided opportunity for discussion of projected student enrollment as well as programs, services, and activities that will require space, initially in Bull Run Hall and in future facilties. Using information gathered, the consultant applied space standards to establish guideline space needs. The results of this analysis are described in the body of this report along with an explanation of the space guidelines applied.

The purpose of this study was to accomplish the following:

- Identify and define space needs for the College of Science Biomedical Education Programs – space for the Certificate and Special Master's Programs and space for the Medical School (MD/PhD) Program.
- Provide data for the University to plan for the addition to Bull Run Hall.

Because the Biomedical Education Program is a new program for the College of Science there is no existing facilities inventory or course file to use in the analysis. The consultant contacted Georgetown University to ask for a copy of the curriculum for the

Advanced Biomedical Sciences Certificate and Special Master's Programs. The consultant met with the Dean, Director of Medical Research Development, and the Director of Facilities Planning and Special Projects for the College of Science to gather information about the Biomedical Education Program and to understand the unique spaces that will be needed. Projections of anticipated enrollment, faculty, and staff were shared with the consultant. The projections were used in the calculation of space needs.

All space in this analysis is projected in assignable square footage which is defined as the usable space contained within classrooms, laboratories, offices, etc. It does not include circulation and building service space, nor does it include the thickness of walls.

The Advanced Biomedical Sciences Certificate Program is anticipated to start in the Fall of 2010 with 15 to 20 students and grow to 50 students in five years. The Post-Baccalaureate Certificate in Advanced Biomedical Sciences is a 21 credit program with no wet laboratory component.

The Special Master's Program is anticipated to start in 2011 and initially serve 25 students, reaching a level of 100 students in the future. The Special Master's Program is a 32 credit, two semester program that requires a gross anatomy laboratory.

The two-year Medical School Program is expected to begin in 2012 and initially serve around 30 to 40 students, growing to 50 students per year for a total of 100 students. The two-year Medical School Program is a four semester program. Total enrollment in the three programs is anticipated to be around 250 students.

George Mason University
College of Science Biomedical Education Program
Enrollment Projections

	2010	2011	2012	Planning Target
Advanced Biomedial Sciences Certificate	15 to 20			50
Special Master's Program		25		100
MD/PhD			30 to 40	100
TOTAL ENROLLMENT				250

The faculty that will teach and conduct research at Prince William will be joint faculty between Georgetown University School of Medicine and George Mason University. It is expected that a total of 20 faculty will teach in the Advanced Biomedical Sciences Certificate Program and the Special Master's Program. Some of the faculty will be part time. In addition, these programs will need a Director, a Coordinator, Laboratory Technicians, Postdocs, and support staff. When the two-year Medical School Program starts, it will require a Dean or Associate Dean, additional faculty, and two or three other administrative staff people.

1.3 KEY FINDINGS

The Analysis of Space Needs for the College of Science's planned Biomedical Education Program identified space needed to support the new programs. Space requirements include classrooms, teaching laboratories, open laboratories, research laboratories, as well as offices and office service spaces.

Calculations using projections for enrollment, faculty, research levels, and programs for the College of Science Biomedical Education Program show a need for 20,297 ASF of space for the Certificate and Special Master's Programs and an additional 96,748 ASF for the Medical School Program for a total of 117,045 ASF.

The results of the space needs analysis for the Biomedical Education Program are shown in the table below.

George Mason University

Prince William Campus

College of Science

Biomedical Education Program

SPACE CATEGORY	Proposed ASF Allocation
Certificate and Special Master's	
Classroom & Service	0
Teaching Laboratories & Service	5,018
Open Laboratories & Service	1,040
Research Laboratories & Service	1,750
Academic Offices & Service	2,764
Other Academic Department Space	9,725
Certificate and Special Master's Subtotal	**20,297**
MD/PhD	
Classroom & Service	3,750
Teaching Laboratories & Service	968
Open Laboratories & Service	0
Research Laboratories & Service	90,000
Academic Offices & Service	2,030
Other Academic Department Space	0
MD/PhD Subtotal	**96,748**
TOTAL	**117,045**

ASF = Assignable Square Feet

2.0 COLLEGE OF SCIENCE BIOMEDICAL EDUCATION PROGRAM

The College of Science's joint program with Georgetown University's School of Medicine Biomedical Education Program is expected to be located in additions to existing buildings and planned future facilities on the Prince William Campus. The Biomedical Education Program activities will require classroom, laboratory, and office space. In particular, the Biomedical Education Program will need a cadaver laboratory and access to basic science laboratories. Space needs requirements have been calculated for each of these space categories.

2.1 CLASSROOM AND SERVICE SPACE

When meeting with the representatives of the Georgetown University School of Medicine, the consultant was told the classroom pool that exists on the Prince William Campus is very nice and would meet the needs of the Certificate and Master's Programs. When meeting with the representatives of the College of Science, the consultant was told that it will be ideal to have priority scheduled classrooms when the two-year Medical School Program is operational. For this reason, classroom space has been included here for the Medical School Program.

It should be noted that it is assumed one or more of the classrooms will need to have video capabilities so that courses can be received in Prince William that are being transmitted from Georgetown University School of Medicine.

Analyzing classroom needs at medical schools is very difficult, as each of the courses may have lecture, discussion, and laboratory components that vary from week to week. For this analysis, the consultant used data from previous studies conducted that benchmarked classroom space for medical schools and found a range for campuses benchmarked to be between eight and 30 ASF per FTE student. The range of the averages from the benchmarking studies was from 12 to 18 ASF per FTE student. All of the Biomedical Education Programs, the Advanced Biomedical Sciences Certificate Program, the Special Master's Program, and the two-year Medical School Program anticipate a total enrollment of around 250 students. To calculate the overall need for classroom space the consultant used 15 ASF per student, resulting in 3,750 ASF of classroom space. Classroom spaces that the Biomedical Education Programs will have priority in the scheduling include a seminar room and two classrooms, one classroom that seats 50 students and one that seats 100 students.

George Mason University
College of Science Biomedical Education Program
Classroom Space Needs

Department	Number of Rooms	ASF per Station	Number of Student Stations	ASF
MD/PhD				
Seminar Room	1	25	30	750
Classrooms	1	20	50	1,000
Classrooms	1	20	100	2,000
				3,750
Classroom & Service Total				3,750

2.2 TEACHING LABORATORIES AND SERVICE SPACE

Laboratory space will be required for the Biomedical Education Programs. There is a need for basic science laboratories and for a cadaver laboratory. There is a need for simulation laboratories which are visualization rooms and exam rooms, set up to talk to standardized patients and record and evaluate student interaction with these patients.

The Biomedical Education Programs can share some of the basic science laboratories that currently exist on the Prince William Campus. The initial plans are to renovate one of the existing laboratories and build one new basic science laboratory. One new basic science laboratory has been included in the space calculations here.

Initially one cadaver lab is needed. When the Medical School Program begins a second cadaver lab will be needed. The consultant contacted representatives at newly built medical school campuses and found that teaching laboratories using cadavers range from 118 ASF to 128 ASF per cadaver. When each cadaver is shared by four medical students, this translates to 30 ASF to 32 ASF per student station. The larger number, 32 ASF per student station has been used here. The consultant was told that 24 students per laboratory is optimal.

George Mason University
College of Science Biomedical Education Program
Teaching Laboratory Space Needs

Department	Number of Rooms	ASF per Station	Number of Student Stations	ASF
Certificate and Special Master's				
Basic Science				
Teaching Laboratory	1	65	24	1,560
Support/Lab Prep				390
Basic Science Subtotal				1,950
Simulation Laboratories				
Exam Rooms	4		150	600
Simulation/Visualization Room	1			800
Simulation Monitoring	1			200
Simulation Observation/Conference Room	1			300
Simulation Subtotal				1,900
Cadaver Laboratory				
Cadaver Laboratory	1	32	24	768
Support/Lab Prep				400
Cadaver Lab Subtotal				1,168
Certificate and Special Master's Subtotal				5,018
MD/PhD				
Cadaver Laboratory				
Cadaver Laboratory	1	32	24	768
Support/Lab Prep				200
Cadaver Lab Subtotal				968
MD/PhD Subtotal				968
Teaching Laboratory & Service Total				5,986

2.3 OPEN LABORATORIES AND SERVICE SPACE

Open laboratories are defined as laboratories that are used primarily for individual or group instruction or study that are informally scheduled, unscheduled, or open. The space classified as open laboratories includes laboratories that are not used on a regularly scheduled basis. Types of rooms included in this category can include computer laboratories, language laboratories, skills laboratories, music practice rooms, art studios, and tutoring and testing facilities.

The laboratory space needed for the Biomedical Education Program has been included in the teaching laboratory category. The open laboratory need is for a collaborative laboratory where students can study and perform research using biomedical information systems and databases. Space for the collaborative laboratory has been included in the space needs calculations.

George Mason University
College of Science Biomedical Education Program
Open Laboratory Space Needs

Department	Number of Rooms	ASF per Station	Number of Student Stations	ASF
Certificate and Special Master's				
Collaboration Laboratory	1	35	24	840
Support/Lab Prep	1			200
				1,040
Open Laboratory & Service Total				1,040

2.4 RESEARCH LABORATORIES AND SERVICE SPACE

One of the needs identified by the College of Science for the Biomedical Education Program is for laboratories to support research. These would not be teaching laboratories, nonetheless, these laboratories could be used by students to provide unique learning opportunities.

The College of Science administration anticipates that in five to six years the College research effort could be a $100,000,000 to $150,000,000 enterprise for biomedical research. Much of the research will be housed in the laboratories that are in the Biomedical Research Laboratory Building being constructed at Prince William. For the Certificate and Special Master's Programs it is anticipated that research will start with a center. The research expenditures attributed to the new Medical School Program are estimated to be $20,000,000. The research in Biomedical Education Programs will take many forms and change over time. Laboratories will need to be flexible to accommodate change.

The consultant has applied a guideline equal to the amount of space needed for a center to support initial research for the Certificate and Special Master's Programs. For the center, office space was allocated for a 200 ASF office for a director, 160 ASF each for offices for six faculty members, 120 ASF for a support staff member office, a

350 ASF conference room, and 120 ASF of office service space for a total of 1,750 ASF for the center.

The SCHEV Guidelines for research space are 800 ASF per $100,000 of annual research expenditures for disciplines including engineering, computer science, biological sciences, fine and applied arts, psychology, and health professions plus 450 ASF per $100,000 for education, business, foreign languages, mathematics, law, and social sciences. Application of the SCHEV Guideline of 800 ASF per $100,000 to the anticipated $20,000,000 in research expenditures would result in a need for 160,000 ASF of research space for the Medical School Program.

It should be noted that the SCHEV Guidelines are based on the entire research function and include offices as well as laboratory space in the 800 ASF per $100,000. The consultant has noted previously that the SCHEV Guidelines for research space are generous.

Because the research space overall for George Mason University is 320 ASF per $100,000 now, and will be approximately 375 ASF per $100,000 in the ten year projection, and because, in other studies of research universities, the space for health sciences research is often between 300 and 400 ASF per $100,000, the consultant has applied the lower SCHEV Guideline of 450 ASF per $100,000 here. This is a very broad brush projection. When George Mason University is ready to fund research space for these programs, there will undoubtedly be much more definitive information available concerning the laboratories needed and the number of employees. This macro level analysis is not a substitute for such detailed planning at a future time.

George Mason University
College of Science Biomedical Education Program
Research Space Needs

Department	Research Expenditures (in 100,000s)	Guideline ASF per $100,000	ASF
Certificate and Special Master's			
Research Center			1,750
			1,750
MD/PhD			
Research Laboratories and Offices	200	450	90,000
			90,000
Research Laboratory & Service Total			91,750

2.5 ACADEMIC OFFICES AND SERVICE SPACE

The space calculations for office space needs are based on space amounts for offices, office service, and conference space needs. The College of Science provided projections of faculty for the Biomedical Education Programs. The projections for faculty were used in the calculation of office space needs.

The consultant was told that a total of 20 faculty will teach in the Advanced Biomedical Sciences Certificate Program and the Special Master's Program. The 20 faculty will be around six full-time equivalent (FTE) faculty. In addition, these programs will need a Director, a Coordinator, Laboratory Technicians, Postdocs, and support staff. When the two-year Medical School Program starts, it will require a Dean or Associate Dean, additional faculty, and two or three other administrative staff people.

Findings show the Biomedical Education Program needs 2,764 ASF of office space for the Certificate and Special Master's Programs and an additional 2,030 ASF for the Medical School Program for a total of 4,794 ASF.

George Mason University
College of Science Biomedical Education Program
Office Space Needs

Department	Number of Offices	ASF per Station	ASF
Certificate and Special Master's			
Director Office	1	180	180
Coordinator Office	1	120	120
Faculty Office	6	140	840
Staff Office	1	100	100
Lab Technician Office	2	100	200
Postdoc Office (2 per office)	1	140	140
Adjunct Workstations	6	64	384
Interview Rooms	2	100	200
Conference Room			400
Office Support Space			200
Certificate and Special Master's Subtotal			2,764
MD/PhD			
Dean Office	2	285	570
Faculty Office	4	140	560
Staff Office	3	100	300
Conference Room			400
Office Support Space			200
MD/PhD Subtotal			2,030
Office & Service Total			4,794

2.6 SHARED COLLEGE SPACES/OTHER ACADEMIC DEPARTMENT SPACE

The Biomedical Education Program will need facilities for students and faculty that would provide spaces for a student commons, student study, food service, and lockers. Calculations for those shared spaces have been included in this space analysis. For the Biomedical Education Program students the consultant recommends that sufficient study space be provided for cohorts, study groups, and individuals to study. In the detailed programming of the space the open study area or library could include study carrels as well as spaces large enough for a cohort to meet. The library space is expected to be part of the planned library expansion in Bull Run Hall.

George Mason University

College of Science Biomedical Education Program

Shared College Spaces

Space type	Number of Rooms	ASF per Station	Number of Stations	ASF
Student Commons				
Open Study Area	1			600
Changing Rooms	2	250		500
Lockers	1	2	300	600
				1,700
Library				
Collections	1			1,500
Journals	1			1,500
Computer Access to On-line References	1	35	10	350
Study Spaces	1	25	75	1,875
				5,225
Study Spaces				
Group Study Rooms	12	25	6	1,800
				1,800
Coffee Shop				
Dining/servery	1			1,000
				1,000
Shared College Spaces Total				9,725

3.0 SUMMARY OF SPACE NEEDS

The calculation of space needed by the Biomedical Education Program indicates there is a need for 20,297 ASF of space for the Certificate and Special Master's Programs and an additional 96,748 ASF for the Medical School Program for a total of 117,045 ASF. The space requirements have been calculated in assignable square feet and categorized by major space groupings: classrooms, teaching laboratories; open laboratories; research laboratories; offices; and other academic department space (study space and shared spaces).

George Mason University

Prince William Campus

College of Science

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ASF = Assignable Square Feet