ED Committee #2
November 23, 2015

MEMORANDUM

November 19, 2015

TO: Education Committee

FROM: Jacob Sesker, Senior Legislative Analyst

SUBJECT: Universities at Shady Grove Expansion – Biomedical Sciences and Engineering Education Building

The following individuals are expected for this briefing:

- Dr. Stewart Edelstein, Associate Vice Chancellor, University System of Maryland and Executive Director of The Universities at Shady Grove (USG); and
- Mary Lang, Chief Strategy Officer, USG

The Universities at Shady Grove (USG) will expand with a new Biomedical Sciences and Engineering Education Building. The programmed 220,000 square foot facility will accommodate new science, technology, engineering, and mathematics (STEM) degree programs and increase capacity of USG to meet the demand for STEM education in Central Maryland. This presentation will address capital and operational aspects of the expansion and will include a short video presentation.

Attachments:

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The UNIVERSITIES at Shady Grove

Bowie Salisbury Towson ub UMBC Eastern Shore University of Maryland University College

Biomedical Sciences and Engineering Education Facility

This 220,000 GSF/135,414 NASF state-of-the-art Montgomery County facility is programmed to meet the needs of the region's projected workforce, especially in science, technology, engineering, mathematics and medical sciences (STEMM). More specifically, the Universities at Shady Grove (USG) and its University System of Maryland (USM) partner institutions will expand degree opportunities in healthcare and biosciences, engineering, and STEMM education. With the addition of the BSE, USG will be able to provide state-of-the-art laboratories, active learning classrooms, clinical training facilities, academic offices, and an expanded level of student services necessary to support program and enrollment growth in these fields.

The BSE includes facilities that are not currently found on the USG campus to meet the STEMM program needs for teaching laboratories and specialized and general purpose classrooms, individual and group study areas, student support service areas and faculty offices. Classrooms range in size from 30-160 seats and in design from traditional to interactive styles. Several of the partner institution programs co-designed laboratory space, storage areas, and equipment that would be shared and serve the needs of multiple programs. Innovation and product design labs were designed to provide flexible spaces for inter-disciplinary student generated projects.

The USG Biomedical Sciences and Engineering Education Facility (BSE), coupled with the resources available at the co-located USM Institute for Biosciences and Biotechnology Research (IBBR)[1], will provide USM with an educational and research complex that is unique in its ability to nurture, support, and exploit the research and commercial opportunities and workforce needs of the region and continue to position Maryland as a competitive leader in the knowledge-based industry and innovation economy.

The BSE, as designed, is a specialized STEMM instructional facility that includes space for services to support USG's growth. The BSE facility is unique in that it:

[1]The IBBR is a research center jointly operated by University of Maryland, College Park, the University of Maryland, Baltimore and the National Institute for Standards and Technology. The IBBR is located on the USG campus and supports research & development, education & training and commercialization programs in the biosciences.

Builds on USG's primary mission as a regional higher education center focused on expanding access to affordable higher education that is cost efficiently delivered and attentive to regional workforce needs.

- Supports three USM research universities that have collaborated to bring to the region advanced degree education in high technology and medical science fields. The BSE supports UMCP and UMB, through the MPower initiative, to advance a vision for realizing unique instructional and research collaborations. It also expands the UMBC presence at USG and enables UMBC's faculty and degree programs to collaborate with its sister USM institutions. By doing so, it builds on UMBC's recognized national reputation for educating minorities in the sciences (a population of students in the majority at USG).

- Enables instructional facilities to be shared across disciplines and degree programs, increasing efficiencies and opportunities for curricular innovations.

- Adds degree programs that are supported by a robust array of corporate partners in the region including engineering companies, health and bioscience companies, and federal research laboratories and institutions. All of these organizations are committed to providing internships, education partnerships and jobs that will advance the regional and state economy now and far into the future. These partnerships, which include USG's already strong relationships with the K-12 and regional community colleges, will produce STEMM graduates through the most cost effective delivery of higher education in the State.

Proposed BSE STEM Programming[1]
Status Report
August 2015

Institution	Proposed BSE STEMM Programming
UMCP	Information Science[2] Mixed Signal & Embedded Systems Design[2] Mechatronics[2] Agriculture Science and Technology STEM Education for Teachers Bioengineering Biological Sciences Expansion
UMBC	Mechanical Engineering Software Engineering[2/3] Cyber Security[2/3] Translational Life Science Technologies[2] (Applied Biochemistry) [2/3]
UMB	Medicine[4] Dentistry Medical & Research Technology[4] Physical Therapy[4]
MPOWER	Public Health (MPH)[2]: joint program between UMB & UMCP

[1] All institutions require additional operational funding to bring these programs to USG.
[2] New degrees.
[3] New degrees. SE and CS in discussions with UMBC
[4] Still in discussions with UMB. Also in discussions with other USM institutions on additional allied health programs, such as Physician Assistant, Occupational Therapy and Speech & Hearing Sciences

STEM Programs for the BSE Building at Universities at Shady Grove
September 2015

UMCP Information Science (new degree)
The BS in Information Science is a STEM degree designed to serve students with an interest in technical, information-rich fields and a desire to apply their skills to meet the information needs of people in across all sectors of the economy and society. This degree will help students obtain jobs in user-facing roles in the information economy, including health informatics and data analytics. This program will be of interest to community college and other transfer students with backgrounds in General Studies, Computer Science, Information Systems and similar fields. It will also create pathways for students with non-STEM backgrounds to develop their ability to work with technology and information to create systems that meet individual needs. Graduates will be employable in a variety of information science positions in non-profit, for-profit, government, and entrepreneurial settings and will be well prepared to undertake advanced graduate studies in their field of choice. As digital data generation and storage have undergone exponential growth, there is a pressing need for individuals able to leverage big data to create new opportunities by increasing organizational transparency, instrumenting controlled digital experiments, tailoring offerings to population segments, supporting human decision-making, and encouraging innovation. The Bureau of Labor Statistics recognizes big data as a major growth area and reports that data management and analytics work is happening in several of its current occupational and Industry classes.

UMCP Engineering – Mixed Signals and Embedded Systems (new degree)
Modern electronic devices use a combination of analog and digital electronics, so called mixed signals, to operate. The complex data acquisition and signal processing functions within the device are performed by integrated circuits and microcontrollers that are incorporated within the device, which are referred to as embedded systems. With the fast-paced development of new products and applications, there is a pressing need in the industry and government for engineers with special skills in hardware and software design and who are also well versed with both analog and digital electronics. A BS in Mixed-Signals and Embedded Systems is designed to meet this mix of skills, and is ideally suited for the Montgomery County and the industries throughout the I-270 Technology corridor. It is estimated that 9200 jobs in the private sector and 49,000 federal agency jobs are located along the I-270 corridor. The curriculum is designed to train future engineers who are cognizant of the latest trends in technology and capable of immediate contribution to the companies.

UMCP Engineering – Mechatronics (new degree)
The BS in Mechatronics, to be delivered through a collaboration amongst the departments of Aerospace, Mechanical, and Electrical Engineering, will train students in a design process that integrates aerospace, mechanical, and electrical engineering to develop systems that can operate, perhaps autonomously, in the physical world. In this discipline, the aim would be to synergistically apply the topics of aerodynamics, mechanics, electronics, control systems, and manufacturing to improve and optimize the functionality of a given product or system. Examples include robotic systems, flight systems including unmanned aircraft systems, and biomedical devices. The curriculum would be strongly supported by various existing centers and laboratories in the Clark School of Engineering including Space Systems Laboratory (ENAE), Smart Structures Laboratory (ENAE), the Maryland Robotics Center (ENGR) and the UMD Unmanned Air Systems (UAS) Test Site.

UMCP Sustainable Agriculture: (Agricultural Science and Technology)
Agriculture Science and Technology (AGST) is an interdisciplinary major in the College of Agriculture and Natural Resources focused on sustainable production of food, feed and fiber for the global population. Students within AGST can concentrate on Agronomy or Environmental Horticulture. A program at Shady Grove will provide access for underserved urban and rural populations in Central Maryland. Students will learn the basics of economically viable, environmentally friendly precision agricultural production practices. In addition to classroom time, students will use laboratory facilities to carry out projects that will focus on development of

proper laboratory techniques. Students will also have contact time with greenhouse and field grown plants as a part of their training. Graduates will be employed in agricultural management, government regulatory agencies, agricultural education, cooperative extension, agribusiness tech support, agricultural marketing, or agricultural research in academic or commercial environments.

UMBC Translational Life Science Technology (new degree)
The Translational Life Science Technology (TLST) Program at UMBC with a concentration in Applied Biotechnology responds to the dual needs of improving human health and promoting economic development by preparing students for roles in translational science with career applications in the biomedical and behavioral disciplines. The goal of UMBC's TLST Program is to establish a Montgomery County-based innovative and practical course of study at USG that will educate individuals to be well versed in the foundational concepts of translational science and to be professionally trained in translational research methods. The TLST Program is designed as a collaborative, 2 + 2 initiative for community colleges in the Montgomery County and Washington, D. C. area, specifically Montgomery College students seeking either Associate Degrees in Life Science or Applied Associate Degrees in Biotechnology.

The Bachelor of Science degree in TLST allows UMBC to educate and train students with an optimal balance of "know what" and "know how". Salient features of the TLST Program curriculum are:

- A total of 98 credit hours of instruction in biology, chemistry and biochemistry, biochemical engineering, math and physics courses with segments of the three courses in biochemistry, bioprocessing, and bio-manufacturing incorporating instruction applied at the bench.

- A total of 7 credit hours of computer instruction in software applications and bioinformatics with an additional three-weeks of computer-based bioengineering instruction.

- A total of 15 credit hours of pure laboratory course instruction, including a two-semester (6 credit hours) internship or research project based course.

These amounts of laboratory and computer instruction triple the amount in a standard BS in biology, and surpass most BS degrees in biochemistry, biotechnology, or biochemical engineering currently offered in the State of Maryland. UMBC's TLST Program will provide extensive on-site applied, upper-level laboratory and computer-based instruction in addition to its required internships or project-based coursework. Students with the TLST Program degree will have skills and education comparable to and combining the skills of medical/clinical laboratory technologists and biological technicians who hold four-year degrees.

UMBC Mechanical Engineering
Mechanical Engineering is one of the oldest and broadest engineering disciplines. Traditionally, a Mechanical Engineer would be the expert in the production and usage of heat and mechanical power which are critical in the design, production and operation of machinery. Today, Mechanical Engineers have taken on an expansive and critical role across all fields —from automobiles to energy to medical devices — and in the advancement of new technologies, such nano-technologies and MEMS (MicroElectroMechanicalSystems). As undergraduates, students have the option to explore career opportunities before graduation through internships and coops. Mechanical engineering students begin their studies by acquiring a solid foundation in mathematics, physics and design. Higher-level courses cover the fundamental principles in the areas of solid mechanics, thermo fluids and design and manufacturing systems. Laboratory and elective courses give students the opportunity to test these principles and apply them individually and as teams in projects that involve design challenges from the material processing, energy conversion and aerospace industries, among others.

University System of Maryland

Powerful Partnerships

The Universities at Shady Grove

University of Maryland, Baltimore County

B.A. History
B.A. Political Science
B.A. Psychology
B.A. Social Work
M.P.S Biotechnology
M.P.S Cybersecurity
M.P.S Geographic Information Systems (GIS)
M.P.S Industrial-Organizational Psychology
Graduate Certificates in Professional Studies available in: Biotechnology Management, Biochemical Regulatory Engineering, GIS and Cybersecurity Strategy & Policy

Towson University

B.S. Early Childhood Education
B.S. Elementary Education/Special Education (dual certification)
M.A.T. Special Education
M.Ed. Early Childhood Education
M.Ed. Special Education

University of Baltimore

B.S. Health Systems Management
B.S. Simulation & Digital Entertainment
M.A. Publications Design
M.P.A. Public Administration
M.S. Health Systems Management
M.P.S. Justice Leadership & Management
M.S. Forensic Science-High Technology Crime
D.P.A. Doctor of Public Administration

University of Maryland, Baltimore

B.S. Nursing (Basic Option)
B.S. Nursing (RN-BSN Option)
M.S.W. Social Work
Doctor of Pharmacy (PharmD)

University of Maryland, College Park

B.S. Accounting
B.S. Biological Sciences
B.A. Communication
B.A. Criminal Justice and Criminology
B.S. Management with Specialization in Entrepreneurship
B.S. International Business
B.S. Marketing
B.S. Public Health Science
M.B.A. Business Administration
M.Ed. Creative Initiatives in Teacher Education (CITE)
M.Ed. Human Development
M.Ed. Math Education: Middle School Math
M.Ed. Special Education/Severe Disabilities
M.Ed. Teacher Leadership: STEM Education
Master of Public Health in Public Health Practice & Policy
Master of Information Management
M.L.S. Library Science
Master in Engineering
MCERT in Elementary, Secondary & PK-12 Education Subjects
Post-Baccalaureate Certificates in Global Health & Principles of Public Health
Post-Baccalaureate Certificates in TESOL & World Language Education
Graduate Certificates in AMASSP & ACDMR
Graduate Certificate in Engineering

Institute for Bioscience and Biotechnology Research – Shady Grove

UMCP, UMB, NIST

Center for Health & Homeland Security

UMB School of Law

Regional Community Colleges (e.g., Montgomery, Frederick, Prince Georges, Howard)

University of Maryland University College

B.S. Accounting
B.S. Business Administration
B.A. Communications Studies
B.S. Digital Media & Web Technology
B.S. Computer Networks & Cybersecurity
*B.S. Human Resource Management
B.S. Cybersecurity Management & Policy
B.S. Investigative Forensics
B.S. Public Safety Administrative
B.S. Software Development & Security
B.S. Information Systems Management
*B.T.P.S. Biotechnology
B.T.P.S. Laboratory Management
M.S. Biotechnology
*M.S. Health Care Administration
M.S. Information Technology
M.S. Management

**Certificate Program available*

University of Maryland Eastern Shore

B.S. Construction Mgmt. Technology
B.S. Hospitality & Tourism Management

Salisbury University

B.S. Exercise Science

Bowie State University

M.Ed. Education
Ed.D. Education

(5)

Information about programs and additional offerings for the future, please visit: **www.shadygrove.umd.edu**

Revised September 1, 2015

The UNIVERSITIES at Shady Grove

USG: AT A GLANCE

The Universities at Shady Grove (USG), Maryland's largest regional center, is an innovative partnership of **nine University System of Maryland (USM) universities on one campus** in Montgomery County.

Each of the **partner universities provides its most highly sought academic programs and awards its own degrees.** USG, in turn, provides centralized on-site student, academic and administrative services.

This unique integrated approach allows USG to offer easily accessible pathways to **80 upper-level undergraduate and graduate degree and certificate programs**, creating outstanding career opportunities for students while providing regional employers with a highly educated, skilled workforce.

Successfully Expanding Access to Quality, Public Higher Education

- USG currently serves more than **4,000** students (**2,600+ undergraduate** and **1,400+ graduate**); all undergraduate students are upper-level transfer students
- Degree and certificate **programs available on a full-time, part-time, day, evening and weekend basis**, allowing students the flexibility that comes with being able to live, work, and study close to home
- Since its inception in 2000 **more than 6,300 students have earned undergraduate degrees** from programs offered at USG and 2,500 have earned graduate degrees
- **75%** of undergraduate students at USG **transferred from Montgomery College**
- **Four-year graduation rates** for students that follow the pathway from Montgomery College through USG are **20 percentage points higher** than community college students throughout USM
- USG is a cost effective model for delivering higher education in Maryland – community college to university pathway (2+2) **students save nearly $8,000** in four year tuition and fees versus a four year university pathway, as well as **saving the state nearly $14,000**

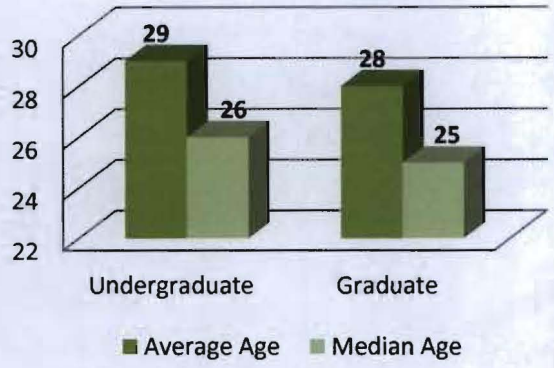
Committed to Student Success

- Small classes, **personalized attention**
- **One-stop-shop of student and academic services**, including financial aid, academic and career counseling, and writing and study skills
- **Partnerships with local employers** provide internships, clinical training, mentoring and career opportunities
- More than **88%** of graduates working in the region and state
- **Vibrant student life** including leadership opportunities, professional groups, volunteer activities and social events
- **State-of-the-art green campus** with "smart" classrooms, computer laboratories, group study areas, university library, café, fitness center and bookstore

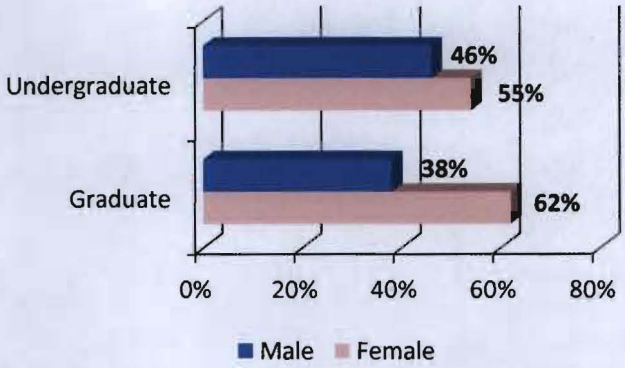
The UNIVERSITIES at Shady Grove

Educating a Diverse Student Body

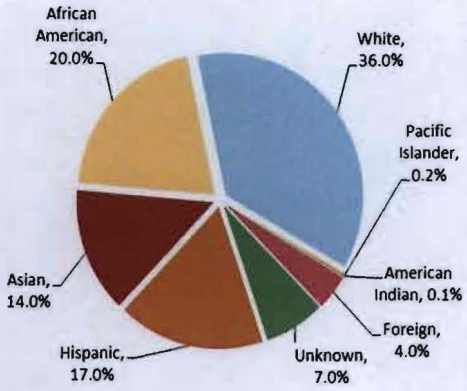
Age Profile of Students at USG



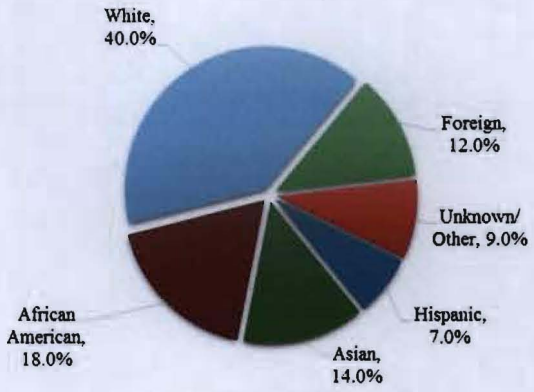
Gender Profile of Students at USG



Ethnic Diversity: Undergraduate Students



Ethnic Diversity: Graduate Students



Bridging a Crucial Gap in Funding for Transfer Students

Lack of financial resources is one of the major challenges that transfer students to four-year institutions experience. Led by the USG Board of Advisors, USG is actively moving to support scholarships and expanded financial assistance to deserving students enrolling from community colleges.

- For Fall 2014-2015 academic year, a total of **543 scholarships were awarded to 494 unique students** (50% of applications received)
- Scholarships were awarded from **44** different scholarship programs, **totaling $1,000,000**
- A **majority** of scholarship recipients were **first generation college students**

Bowie State University 1865 · Salisbury University · Towson University · ub · UMBC · University of Maryland · University of Maryland Eastern Shore · University of Maryland The Founding Campus · University of Maryland University College

11/17/2014