

Letters of Deans in Support of Differential Pricing in Engineering, Business, and Computer Science:

1. Letter of Dean Darryll Pines, A. James Clark School of Engineering, UMCP
2. Letter of Dean Alex Triantis, Robert H. Smith School of Business, UMCP
3. Letter of Dean Jayanth Banavar, College of Computer, Mathematical, and Natural Sciences



A. JAMES CLARK
SCHOOL OF ENGINEERING

OFFICE OF THE DEAN
3110 Jeong H. Kim Engineering Bldg
College Park, Maryland 20742-2831
(301) 405-3868 Fax (301) 314-5908

May 1, 2015

Board of Regents
University System of Maryland
Adelphi, Maryland

Dear Board of Regent Member,

The A. James Clark School of Engineering is one of the largest undergraduate and graduate engineering programs in the nation and represents the Flagship engineering program in D.C., Maryland, and Northern Virginia area. The Clark School now has over 6,000 total students. Of these, more than 4,000 are undergraduates, which represents a **43%** increase from a Fall 2008 enrollment of 2800 students. Annually, the Clark School confers degrees to approximately **1300** BS, MS, MEng, and Ph.D. candidates.

Our undergraduate and graduate students are in very high demand by industry, government, and academia. In fact, a recent poll by the website payscale.com lists that the top 15 jobs for college graduates are all related to **engineering** or **computer science**. Students leaving the Clark School with a Bachelor of Science degree in engineering command an average starting salary of **\$68,000**. As they progress in their careers, these graduates often reach the highest level of corporate management in many of America's *Fortune 500* firms. These graduates include technical, business, and entrepreneurial leaders who have made significant contributions to the State of Maryland, the nation, and society. They include pioneers such as:

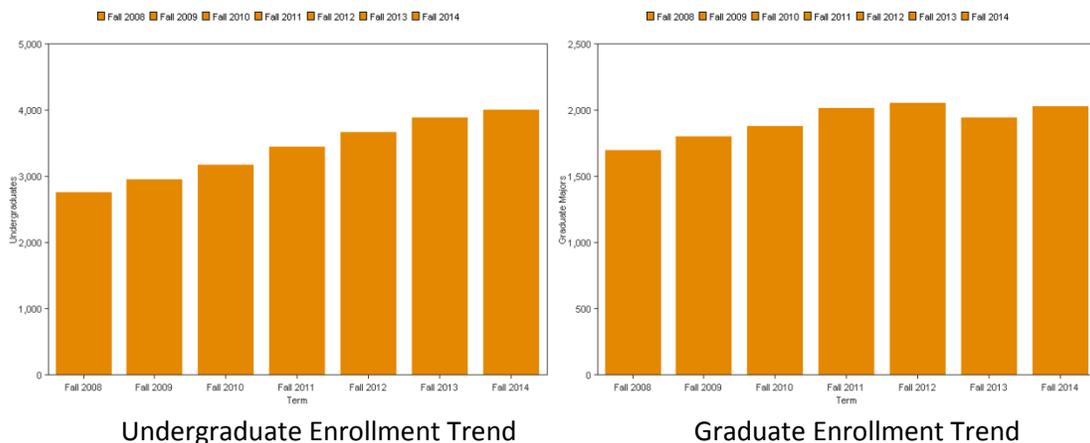
- A. James Clark, '50, CEO/President of Clark Enterprises, 8th largest constr. firm in US
- Jeong H. Kim, '90, former President Alcatel-Lucent, inventor of switch relay for telecom
- Tim Regan, '77, CEO/President of Whiting Turner, 11th largest constr. firm in US
- Edward St. John, '61, CEO/President of St. John Properties
- George Laurer, '51, former IBM employee, Inventor of the University Product Code
- Rob Briskman, '61, founder of Sirius Satellite Digital Radio
- Brian Hinman, '85, serial entrepreneur, and inventor, Polycom Teleconference Systems
- Judith Resnik, '77, and Jeanette Epps, '00, NASA Astronauts

Over the past five years, the A. James Clark School of Engineering has enjoyed an unprecedented level of success as a result of support from USM, campus administration, and the hard work of its faculty, staff and students. Their tireless commitment to academic excellence in undergraduate, graduate, research and entrepreneurial programs has moved the school in a positive direction. This unwavering commitment has placed the college among the *top 15 public engineering schools* in the nation at both the undergraduate (*11th*) and graduate (*11th*) level when ranked against its peer institutions by *US News and World Report-2015*. In addition, a recent *2015 US News Best Online Graduate Program* poll ranks the Clark School *8th* among *public institutions* and *13th overall* against all public and private institutions. However, these

significant gains are in jeopardy if the college is not allowed to develop a *new financial model* to keep pace with peer public institutions including *BigTen* Schools such as the University of Illinois-Urbana, University of Michigan, University of Wisconsin, Purdue University, Pennsylvania State Univ., and other publics such as University of Texas-Austin, Texas A&M University, Virginia Tech, UCLA, UC Santa Barbara, and UC San Diego.

Challenges:

Since 2008, the A. James Clark School of Engineering has added a net of only **10** full-time equivalent new tenure/tenure track faculty positions and has experienced rapid growth (See insert figures below) in student undergraduate and graduate enrollment (>1500 total above 2008 baseline numbers). This growth combined with a lack of sufficient faculty/staff resources poses a serious risk to our ability to provide a high-quality engineering education and keep pace with our peers. The College must have sufficient resources to provide adequate laboratory facilities, support student experiential projects and competitions, upgrade instrumentation and software tools, achieve a reasonable student to faculty ratio, and retain the best of our faculty and staff.



Some of the specific challenges include:

- Class Size:** The number of students enrolling in our key freshmen classes including ENES100 and ENES 102 has been steadily increasing. Data from our signature *Keystone* program suggests that student success and retention is based on reasonable class sizes, mentoring, tutoring, and high quality instruction. The number of students in each section needs to be reduced to provide a more meaningful introductory engineering design experience.
- Facilities:** To provide a relevant engineering education and prepare students for entry into the workforce, it is imperative that our equipment and laboratories keep pace with advancing technologies. Thus, *A. James Clark Hall* must be fully funded from FY16 to FY18 to ensure adequate space to address growing research and enrollment needs.
- Faculty/Staff Hiring:** The hiring of new faculty and staff to keep pace with the growth in student enrollment, and research competitiveness requires new resources.
- Financial Aid and Diversity:** The recruitment of underrepresented minority and female students is a challenge. In the past 5 years, the Clark School has made significant strides in recruiting, retaining, and graduating both minority students and female students, however, there is still much to be done that require our utmost attention. While the Clark School numbers are above the national averages in recruitment, retention and graduation of underrepresented students, the level of competition for these students from our peer

institutions is fierce. In order to attract the best from the state of Maryland, we must be able to compete with other schools with regard to financial aid packages. New financial resources derived from differential pricing will make this possible.

Rationale for Differential Pricing:

We owe it to our undergraduate and graduate students to deliver them a *first-class high value* engineering education. We believe that implementing differential pricing will ensure that adequate resources are available to offer quality instructional and research programs in the Clark School and keep the very best students in the State of Maryland. Below are some of the considerations when developing a budget to fund our undergraduate and graduate programs:

- Driven by competition with other universities and the private sector, engineering faculty and staff salaries must be competitive to continue to attract the best talent;
- The scope of engineering is expanding to include non-traditional areas such as nanotechnology (Nano-FabLab), biomedical engineering and health sciences, virtual reality and augmented reality, quantum optics, communication, engineering and computing, and cybersecurity, which require increasingly sophisticated facilities which are expensive to install and maintain (e.g., nano-bio initiative). This is why it is important to ensure that *A. James Clark Hall* which will house state of the art space for all of engineering stays on schedule for construction and completion by Summer of 2017;
- Rapid advances in technology and the move towards blended learning require frequent upgrades to teaching laboratory equipment; and a technologically sophisticated engineering staff to manage and maintain these systems;
- Students are increasingly engaged in rewarding but expensive extracurricular activities, for which they expect the university to provide financial support (e.g., X-Prize Projects such as Gamera-Human Powered Helicopter, Engineers Without Borders-EWB, SAE Car Competitions, Robotics@ Maryland Club, Solar Decathlon, and other National and International student design competition teams).

Recognizing these expenses, many of our peer institutions have adopted differential pricing/fees for business and engineering majors, typically in the range from **\$1-5k** per year range (see table 1 below).

Table 1. Average fee or pricing differential per academic year for full-time undergraduate engineering and business majors at Big Ten public institutions, AY13-14.

Institution	Engineering	Business
Indiana University	N/A	\$1,200
Michigan State University*	\$567	\$200
Ohio State University	\$915	\$1,572
Penn State University*	\$1,169	\$1,169
Purdue University	\$1,800	\$1,436
Rutgers	\$1,520	\$450
University of Illinois	\$4,920	\$4,920
University of Iowa*	\$1,544	\$1,807
University of Michigan*	\$2,137	\$1,434
University of Minnesota	\$600	\$2,160
University of Nebraska	\$1,560	\$2,805
University of Wisconsin	\$1,400	\$1,000
Median	\$1,520	\$1,435

*Fee/differential varies by class standing; average rate over 4 years given.

What are the benefits to students and what do they think?

In addition to a top quality faculty and staff, which currently exists in the Clark School, students must have high quality services, adequate facilities, a competitive diverse peer group, a good learning environment, and state of the art equipment in order to obtain a quality technical education. With differential pricing, we will be able, hire more instructors, teaching assistants, and technicians to improve the learning environment. This will enable us to decrease class sizes, upgrade our laboratory facilities, and recruit a highly competitive diverse peer group of students. Our classrooms and teaching labs will be modernized and provide our students with the environment and tools they need to succeed in their education and future careers.

We have surveyed our student leaders in every discipline within engineering and many agree that the proposed differential pricing will allow the Clark School to provide opportunities to add value to their educational programs and experiences. They believe it will improve the level of learning both inside and outside of the classroom environment with emphasis on more hands-on learning projects, and foster more opportunities to work in teams. Many of our students believe that the enrichment programs described above will add substantial value to our student experience, allowing them to be more marketable and competitive as well as help to put them on a fast track to leadership positions in industry and government.

In order to maintain and improve our quality, and remain competitive, it is critical that we obtain resource parity with our peers. We strongly hope that you will support President Loh's proposal for Differential Pricing, so that we may continue to graduate students who will impact our state, nation and world in a positive way.

Sincerely,



Darryll J. Pines
Farvardin Professor and Dean
Clark School of Engineering
University of Maryland



Alexander J. Triantis
Dean

Office of the Board of Regents
University System of Maryland

May 1, 2015

Dear Regents:

The world's best business schools, including the Robert H. Smith School of Business, compete aggressively for top students, faculty, and corporate recruiters. This competition has advanced these schools significantly by driving innovation in curriculum, pedagogy, and student services. For example, the Smith School continues to refine its undergraduate curriculum to put greater emphasis on experiential learning opportunities, critical thinking skills, and developing both a global and entrepreneurial mindset. Additionally, the Smith School has invested millions of dollars to upgrade the services provided by our Office of Career Services to better prepare our students for their careers, and to connect our students to the most desirable employers. We also continue to find new ways to provide our students with a more personal learning experience where they are highly engaged with faculty, coaches, alumni and other mentors in individual or small group settings.

The improvements in teaching and services at top business schools, coupled with the competition for the best faculty and students, have not surprisingly increased operating costs significantly over recent years. While business schools generate revenue from other sources to support this higher cost of undergraduate education, inevitably some of the higher cost must be borne by students in the form of tuition increases, including differential pricing. However, students and their families continue to choose to invest in a top tier business education given the tremendous value they see from such an education. The evidence supporting this value proposition is not only found in the unprecedented high demand to enroll in top business programs, but also the increasingly higher salaries being offered to graduates of these programs.

The Smith School of Business is in a very precarious position at this point in time. Over the years, the School has managed to attract some of the most highly respected faculty in the world. The Smith School is frequently ranked as a top 10 business school in terms of its research productivity and reputation. This reputation spills over into our #21 ranking by *US News and World Report* for our undergraduate program, a ranking that is based solely on surveys of

business school deans and senior faculty, and thus heavily influenced by their knowledge of our research reputation. However, our ranking by *Bloomberg Business Week*, which is based on student and recruiter surveys, starting salary of our graduates, and measures of educational quality such as faculty/student ratio and average class sizes, is #39 (and #16 among public schools).

This gap between the two rankings reflects that we have not been able to keep up with our peer institutions in terms of the quality of instruction and services we are providing. Our class sizes are too large, we rely on too many lecturers and adjunct faculty, and despite our investment in co-curricular opportunities and career services, we lag behind peer schools. I continue to be frustrated by the inability to fund innovative opportunities that we know would enhance the value of the educational experience we could provide. I am also repeatedly discouraged every time I speak to Maryland high school students (or their parents) who choose to enroll at competing public universities such as Michigan, Penn State, Texas, and Virginia. All of these schools have higher in-state tuition *and* differential pricing that enables them to invest more in their students. The fact that Maryland families are willing to pay even higher out-of-state tuition in order to benefit from the quality of education and reputation of these other institutions indicates that they understand the tremendous return on investment from a top business education, and are willing to make the sacrifices required to send their children to a top tier business school.

Differential pricing can go a long way to closing the quality and reputational gap and improving the value of the undergraduate business experience we could offer. The additional funds would allow us to properly invest in high quality faculty instruction, building up our full-time faculty, and stemming the faculty losses recently experienced due to compensation issues. It will also allow us to enhance student services including more personal coaching and advising, expanded career services, improved global study opportunities, more co-curricular events focused on skill development, networking and job placement, and upgraded classroom technology to enable more simulations and other interactive and collaborative experiences.

Maryland students receive a great return on the current low in-state tuition they pay to get a Bachelor's degree from the Smith School. However, most are willing to pay more to graduate from a business school that has a higher ranking and provides a higher probability of securing a top job placement. The Smith School's Dean's Student Advisory Council (DSAC) conducted an informal survey of Smith School undergraduates last year inquiring about their student experience, and found support for a higher tuition assessed on Smith students that would enable us to invest in better instruction and services. These students have seen the value of experiential and co-curricular activities, including orientation, career coaching, global and entrepreneurial experiences, student engagement activities, and stronger corporate connectivity inside and outside of the classroom. They understand that these types of experiences are not available to all students at the University, and appreciate the value of preserving and enhancing these opportunities. Casual conversations with parents also indicate an understanding for the value proposition offered by an outstanding business school education, and the justification for higher tuition to support such an education.

Business schools that have instituted differential pricing have not found a negative effect on enrollment and student satisfaction, based on my conversations with their deans. In fact, the ability to fund strong student experiences inside and outside of the classroom appear to have strengthened their rankings, and the desirability of enrolling in these business schools. I am confident that we will witness the same reaction here at Maryland. We will be able to strengthen our programs to better compete with our peers, and we will be able to attract the strongest students from Maryland high schools to the Smith School instead of losing them to peer schools. The funds set aside for financial support will ensure that those who may struggle with the higher cost of a business education will receive the necessary assistance. Not only will the Smith School and the University of Maryland benefit from an enhanced reputation, but the increased investment in business education will ensure that the best talent in Maryland will receive the highest quality education and will in turn create and enhance business opportunities in Maryland to ensure the state's long-term economic competitiveness.

I very much hope that the Board will support this important opportunity for the Smith School and the University of Maryland to be able to compete on a level-playing field with our peer schools and ensure that we can achieve our high aspirations of being truly one of the best public universities in this country.

Sincerely,

A handwritten signature in black ink that reads "A.J. Triantis". The signature is written in a cursive, flowing style.

Alexander J. Triantis
Dean



UNIVERSITY OF MARYLAND

COLLEGE OF COMPUTER, MATHEMATICAL, AND NATURAL SCIENCES

Office of the Dean

2300 Symons Hall
College Park, Maryland 20742
P: 301.405.4906 | F: 301.314.9949
www.cmns.umd.edu

May 1, 2015

Office of the Board of Regents
University System of Maryland

Dear Regents:

An understanding of computer science is becoming increasingly essential in today's hyper-connected, technology-driven world. Computer science touches every field and drives advancements in health care, aerospace, financial services, national defense, personal security, retail and many other industries. The competitiveness of the state of Maryland depends on our ability to provide an outstanding and forward-thinking education in this critical field to our students and prepare them to be leaders and innovators in the work force.

The wonderful news is that our state boasts a top-ranked computer science department at its flagship institution. The Department of Computer Science at the University of Maryland ranks No. 17 in the world according to the prestigious Academic Ranking of World Universities. The department ranks No. 15 in U.S. News & World Report's 2015 Best Graduate Schools rankings, with three computer science specialties also ranking in the top 20.

The department has provided a world of opportunities for its graduates. Alumni have become professors at top-ranked universities and researchers at well-known industrial labs. They are also entrepreneurs who found successful companies, including Michael Antonov (Scaleform/Oculus VR), David Baggett (Inky), Sergey Brin (Google), Paul Capriolo (Now or Never/Social Growth Technologies), Gary Flake (Clipboard), Brendan Iribe (Scaleform/Oculus VR), Sujal Patel (Isilon Systems), Pooja Sankar (Piazza), Shayan Zadeh (Zoosk/Gear Zero) and more.

Students who are preparing for college and careers are responding to the opportunities presented by the information age and the knowledge economy. UMD's Department of Computer Science has seen a rapid, substantial increase in majors. Enrollment grew from 880 undergraduates in spring 2011 to 1,900 today—a five-year increase of 116%! We have already admitted 200 more freshmen for fall 2015 than were admitted in fall 2014. Computer science is now the highest enrollment major at UMD, comprising nearly 6% of total UMD undergraduate enrollment.

The quality of training that the department is able to provide is severely threatened because it now lacks the faculty, instructors and advisors to adequately serve these students. The department has only eight instructors to teach many of the introductory courses and only three undergraduate academic advisors for 1,900 students. There has been no net increase in the number of tenure-track faculty members in the last four years. Faculty hiring has been offset by retirements, departures and unsuccessful searches in which we lost top candidates to other universities. We have directed additional soft funds to hire lecturers and teaching assistants. However, budget constraints have affected our ability to make major investments. As the student demands increase, we are losing ground in the stature of the research, teaching and service missions of this thriving department.

These shortcomings have resulted in large class sizes (upper-level classes have increased from 35 to 60 students and introductory courses have grown to 140 students), reducing the advising, mentoring, career services and support provided to students. Instructional quality is decreasing because we can't provide critical thinking and active learning opportunities with these large class sizes. In addition, students find it harder to get to know faculty and obtain meaningful reference letters with large class sizes, and harder to hear each other and actively participate in large discussion sessions. The undergraduate demand for courses also limits course offerings for graduate students and limits new course offerings in cutting-edge topics because faculty must teach required undergraduate courses multiple times due to demand. Classrooms also fill up, sometimes causing students to get shut out of classes; if not addressed, this will increase time to degree completion.

Most computer science departments across the country are dealing with similar increases in enrollments, but many are providing funding and resources to improve the quality of computer science education they're delivering to their students. Our highly ranked peers compete with us for students and faculty members and are investing in facilities and faculty. As others boldly move forward, the quality of our programs will suffer if we do not move forward too—the best and brightest students will leave the state of Maryland to attend college, and we will be at an increasing disadvantage to hire the best faculty members.

We recently received \$35 million in gifts to create a new home for computer science—and raise its stature as a global leader in virtual reality, robotics, computer vision and immersive science. We also received \$3 million for two endowed professorships in computer science. This is a game-changing boost for us. However, to capitalize on this, we are in dire need of resources to preserve and enhance our educational programs. Increased investment in our programs will add value to our students' degrees and, in turn, to the economy of the state and nation.

With the additional funding from differential pricing, our Department of Computer Science will become world-class by recruiting and retaining top tenure-track faculty members who will train and inspire the next generation of computer scientists. We will hire tenure-track faculty who can provide innovative advanced courses and state-of-the-art research opportunities to our students—expertise lecturers cannot provide. The additional resources will also allow us to create new labs and hacker/maker spaces for students, fund advisors who can help students develop innovative and entrepreneurial ideas, and offer more courses to meet the growing demand.

We believe that our alumni community and students will weigh the importance of the quality, reputation and return on investment of their degree, and will support this proposal.

Thank you for considering the differential pricing proposal.

Sincerely,



Jayanth Banavar
Dean
College of Computer, Mathematical, and Natural Sciences