



November 1, 2017

Dr. James D. Fielder, Jr.
Secretary
Maryland Higher Education Commission
6 N. Liberty Street, 10th Floor
Baltimore, MD 21201

Dear Dr. Fielder:

On behalf of Provost Sunil Kumar, Dean T.E. Schlesinger, and our Whiting School of Engineering, I write to request your review and endorsement of the enclosed proposal for a new **Doctor of Engineering (D.Eng.)**.

The proposed program would be delivered either face-to-face or, more often, nonresidentially, and builds upon the School of Engineering's profound research strength and its long history of educating doctoral students for the Ph.D. degree. The Doctor of Engineering degree is a high-level, terminal degree in engineering particularly suited for candidates already in the workforce who are seeking to advance their careers. We will be enrolling candidates with master's-level education, strong work experience, and proven technical ability and creativity.

The proposed program is consistent with the mission of the university and with the State of Maryland's goals for postsecondary education. The proposal is fully endorsed by Johns Hopkins University.

A business check for review of this proposal is being sent to the Commission under separate cover. If you have any questions or need further information, please do not hesitate to contact me at (410) 516-2855 or alo@jhu.edu. Thank you for your continuing support of Johns Hopkins.

Sincerely,

Janet Simon Schreck, PhD
Assistant Vice Provost for Education

cc: Dr. Sunil Kumar

Dr. T.E. Schlesinger
Dr. Ratna Sarkar
Mr. James Brailer

Mr. Hans Cooper
Ms. Natalie Lopez
Mr. Tom McDermott
Ms. Jennifer Martin

Enclosures

MARYLAND HIGHER EDUCATION COMMISSION

ACADEMIC PROGRAM PROPOSAL

PROPOSAL FOR:

- NEW INSTRUCTIONAL PROGRAM
- SUBSTANTIAL EXPANSION/MAJOR MODIFICATION
- COOPERATIVE DEGREE PROGRAM

- WITHIN EXISTING RESOURCES or REQUIRING NEW RESOURCES

(For each proposed program, attach a separate cover page. For example, two cover pages would accompany a proposal for a degree program and a certificate program.)

The Johns Hopkins University

Institution Submitting Proposal

Fall, 2018

Projected Implementation Date

Doctor of Engineering

Award to be Offered

Doctor of Engineering

Title of Proposed Program

14.0101

Suggested HEGIS Code

Suggested CIP Code

Whiting School of Engineering

Department of Proposed Program

T.E. Schlesinger, Dean

Name of Department Head

Natalie Lopez

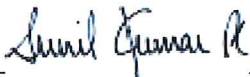
Contact Name

nlopez13@jhu.edu

Contact E-mail Address

410-516-6430

Contact Phone Number



Signature and Date

11/1/2017

President/Chief Executive Approval

n/a

Date

Date Endorsed/Approved by Governing Board

**The Johns Hopkins University
Whiting School of Engineering
Proposal for a Renewed Academic Program
Doctor of Engineering**

A. Centrality to institutional mission statement and planning priorities

1. Program description and alignment with mission

The Johns Hopkins University Whiting School of Engineering is pleased to submit a proposal to reestablish its Doctor of Engineering program.

The proposed program would be delivered either face-to-face or, more often, non-residentially, and builds upon the School of Engineering's profound research strength and its long history of educating doctoral students for the Ph.D. degree.

The Doctor of Engineering degree is a high-level, terminal degree in engineering particularly suited for candidates already in the workforce who are seeking to advance their careers. We will be enrolling candidates with master's-level education, strong work experience, and proven technical ability and creativity.

Doctor of Engineering students will be guided by a Whiting School professor serving as their primary advisor. Typical D.Eng. students will be working in a technical career and will also have a co-advisor (vetted by Whiting School Faculty) at their place of employment. They will draw on the vast course offerings of our Engineering for Professionals programs to provide background knowledge they need to pursue a creative, advanced research project whose scope is comparable to Ph.D. research. Various milestones (diagnostic interview, preliminary examination, research proposal and examination, and research project defense) coupled with semiannual, on-campus conferences will ensure that students stay on track for their degree and produce high quality results.

The focus of a Ph.D. education is ideal preparation for an academic career. While many Ph.D. students nonetheless choose non-academic careers, the new D.Eng. program will be especially attractive for students working toward industrial or public sector advancement.

The mission of The Johns Hopkins University is to educate its students and cultivate their capacity for life-long learning, to foster independent and original research, and to bring the benefits of discovery to the world. In addition, the mission of the Whiting School is closely aligned, as we seek to advance in three areas: Research, Education, and Translation. The proposed degree program dovetails perfectly with both of these. We are

educating students to perform advanced research with the aim of translating that research into tangible outcomes in industry.

2. Alignment with institutional strategic goals

The JHU mission stresses (1) life-long learning, (2) original research, and (3) bringing the benefits of discovery to the world. In close alignment to these, the WSE strategic plan emphasizes (1) education, (2) research, and (3) translation.

The Doctor of Engineering program is constructed to advance the skills and knowledge and early/mid-career engineers [goal (1)], to do original research [goal (2)], and advance their careers as engineers [goal (3)].

Hence, this proposed degree program aligns perfectly both the University and the School missions.

B. Adequacy of curriculum design and delivery to related learning outcomes

1. Program outline and requirements

Doctor of Engineering students will be supervised by a three-person *Supervisory Committee* consisting of a Whiting School professor who serves as *advisor*, a *co-advisor* who typically is a leading engineer/scientist at the candidate's place of employment, and a *third committee member* who is a Hopkins faculty member. The non-Hopkins co-advisor is proposed by the candidate and vetted by the Doctor of Engineering Program Committee, whose members are Whiting School of Engineering faculty.

- Doctor of Engineering students begin their program with a *Diagnostic Interview* prior to formal matriculation. The purpose of the interview is to assess the candidate's current state of knowledge in order to develop a plan comprising what the student needs to learn (through courses and/or directed self-study). In addition, the interview will allow advisors to prepare a syllabus for the Preliminary Examination (described next).
- *Preliminary Examination*. The exam will typically take place one-half year (usually in January) into the D.Eng. program. In their diagnostic interview, the student and advisor will collaboratively develop a corpus of advanced material that the student will master through a combination of course work (likely via the WSE's Engineering for Professionals offerings) and directed readings. The breadth and depth of the material should be feasible for a student to acquire in a semester. The examination is conducted by the student's committee in a manner they choose (such as oral, written, or a combination).
- *Research Proposal and Examination*. This exam is typically taken after two semesters in the D.Eng. program. Under the guidance of the committee, the candidate develops a robust, written research proposal. This proposal will be defended in a public oral presentation coupled with a private oral examination conducted by the supervisory committee plus two additional JHU professors for a total of five examiners. The groundwork to develop the research proposal may include taking courses (typically

through online EP courses), and advisor-guided independent study. This groundwork is roughly equivalent to two to four Ph.D.-level courses. This rigorous exam will probe the student's depth of knowledge relevant to the proposed research.

- *Research Project and Defense.* Students will conduct original research (under the guidance of the advisor and co-advisor) leading to high quality results at a depth and scope comparable to a Ph.D. dissertation. The documentation of this research will include a written summary document, but may also comprise a broader portfolio of artifacts such as prototypes, videos, documentation/user manuals, computer code, design diagrams, invention disclosures, and so forth which, taken as a whole, demonstrate the innovation and impact of the student's work. The results of the research will be presented in a public defense in the same manner as a Ph.D. thesis defense.

In addition, students will come to the Homewood campus twice each year for a Doctor of Engineering Candidates' Conference. The conference will feature ample networking opportunities for the students (to build a community), meetings with supervisory committees, and colloquia and seminars (for both technical advancement and professional development and for oral examinations, as described above).

D.Eng. students will enroll in relevant courses as suits the needs of their program, including the required courses EN.500.791 Doctor of Engineering Fundamentals, EN.500.792 Doctor of Engineering Research Proposal, and EN.500.891 Doctor of Engineering Research for a total of at least 60 credits. See Appendix A.

2. Educational objectives and student learning outcomes

The central learning objective for the Doctor of Engineering program is creative, innovative research. The ability to do such meaningful research and the attainment of this goal is to be assessed through the (1) preliminary examination, (2) creation of a research proposal, (3) successfully defending the research proposal, (4) the portfolio created by the candidate documenting their work, and (5) the oral defense of the research.

Primary responsibility for this will rest with the candidate's supervisory committee, as well as on overall oversight by the Doctor of Engineering Program Committee.

Ph.D. programs are periodically reviewed by the Academic Council at the time when the department hosting that program is reviewed. Because the Doctor of Engineering program does not reside in a department (but operates at the School level under the supervision of the Doctor of Engineering Program Committee), the Academic Council will conduct a separate review of the D.Eng. program periodically (typically, every five years).

3. General education requirements

Not applicable.

4. Specialized accreditation/certification requirements

Not applicable.

5. Contract with another institution or non-collegiate organization

Not applicable.

C. Critical and compelling regional or statewide need as identified in the State Plan

1. Demand and need for program

We have discussed our plans for a Doctor of Engineering program with potential corporate (Northrop-Grumman and Lockheed-Martin), government (the U.S. Army Research Laboratory in Aberdeen), and academic (Johns Hopkins University Applied Physics Laboratory) partners. The potential availability of such a doctoral-level program, focused on advancing employees' depth of knowledge and research ability, was met with unbridled enthusiasm. There is tremendous interest in a path to doctoral-level education for early and mid-career professionals for whom the residential, academic focus of a Ph.D. is not attractive or even feasible. See Appendix E.

2. Alignment with the 2013–2017 Maryland State Plan for Postsecondary Education

The proposed program is well aligned with *Maryland Ready*, the 2013–2017 Maryland State Plan for Postsecondary Education. The Doctor of Engineering degree program will meet the State's goals and address the national need to bolster the technology sector with the most highly qualified workers possible.

This is consistent with the Goal 1 of the State Plan, "Quality and Effectiveness," which asserts that Maryland will enhance its array of postsecondary education programs to more effectively fulfill the evolving educational needs of its students, the state, and the nation.

Similarly, the proposed program is consistent with Goal 4, "Innovation," which articulates Maryland's aspiration to be "a national leader in the exploration, development, and implementation of creative and diverse education and training opportunities that will align with state goals, increase student engagement, and improve learning outcomes..." There are very few Doctor of Engineering programs nationally, and the structure we have proposed is unique.

Goal 5, "Economic Growth and Vitality," is centered on supporting a knowledge-based economy through increased education and training; this, too, is aligned with the goals of the proposed program.

D. Quantifiable and reliable evidence and documentation of market supply and demand in the region and State

1. Market demand

The Maryland's Department of Labor, Licensing, and Regulation (DLLR) projects growth in various engineering positions between 2014 and 2024. Market demand for

specific employment areas that would align with graduates from the proposed program are outlined in Table 1. Each of the employment sectors was noted by DLLR as having a significant amount of growth between the 2014 and 2024. The need for doctorate-level graduates is expected to grow exponentially as these employment areas continue to expand.

Occ Code	Occupational Title	Employment			Change	
		2014	2024	Change	Replacement	Total
17-0000	Architecture and Engineering Occupations	57,319	65,236	7,917	13,264	21,186
17-3000	Drafters, Engineering Technicians, and Mapping Technicians	12,351	13,423	1,072	2,323	3,400
25-1032	Engineering Teachers, Postsecondary	1,706	2,209	503	256	759

Table 1: Projected employment growth (from the Maryland Department of Labor, Licensing, and Regulation)

Please also see Appendix E—Supporting Documents—for additional evidence of market demand.

2. Educational and training needs in the region

From the Johns Hopkins University Applied Physics Laboratory to major Maryland-based corporations (such as Northrop-Grumman) to government based research agencies (such as the National Security Agency, the National Institutes of Health, and the U.S. Census Bureau) one finds a rich cadre of engineers with bachelor's and master's level educations. The ability of these workers to solve society's thorniest problems requires workers with the boundless creativity necessary to conduct advanced research and devise innovative solutions. By advancing the brightest of these engineers to the doctoral level, we will be advancing the missions of these disparate employers.

3. Prospective graduates

In Maryland, four institutions offer doctoral degrees in engineering. Three of these (UMBC, UMCP, and JHU) award the Ph.D. degree and one (Morgan State) offers the D.Eng. degree.

The following chart lists the number of doctorates awarded by Maryland universities in engineering (with CIP codes of the form 14xxxx). Our source is MHEC's Trend Data and Program Inventory data available here: http://data.mhec.state.md.us/mac_Trend.asp

Institution	2009	2010	2011	2012	2013	2014
University of MD, Baltimore	19	14	15	11	16	19

County						
University of MD, College Park	116	105	126	122	130	147
Morgan State University	8	4	5	8	4	11
Johns Hopkins University	55	43	62	80	86	81

E. Reasonableness of program duplication

1. Similar programs

In Maryland, Johns Hopkins University, the University of Maryland College Park, and the University of Maryland Baltimore County (with CIP codes of the form 14xxxx) award Ph.D. degrees. These Ph.D. programs are intensely focused on preparing students for careers in academia and research. In addition, the Ph.D. degrees awarded by these institutions are tied to specific engineering disciplines, such as mechanical engineering. (See the chart in §D.3 above)

Morgan State offers D.Eng. via three engineering departments: civil, electrical & computer engineering, and industrial & systems engineering. (In fact, the D.Eng. is the only doctoral degree offered in those three departments.) Morgan's program is geared primarily toward full- or part-time residential students who partner with industry only through special arrangements. Johns Hopkins' newly reimagined and reinvigorated Doctor of Engineering program is designed specifically to enable engineers already immersed in successful careers to pursue their doctorates without being in residence on campus. In addition, our program encourages and is intended to support strong industrial partnerships and enables students to seamlessly cross traditional disciplinary boundaries to pursue innovative and creative solutions to difficult and complex technical problems.

2. Program justification

Doctor of Philosophy programs are well suited to prospective academics who have recently graduated from college and are able to spend (approximately) five years in residence working on their degrees. While many engineering Ph.D. students ultimately find careers in private industry or in government, the focus of the degree is on advancing scholarship. A typical engineering Ph.D. student is financially supported with a modest stipend derived from a grant to their university.

By contrast, our Doctor of Engineering program is well suited for early- to mid-career professionals seeking a professional degree that will enable them to advance their technical and creative abilities to the highest level. These students are likely already established in their careers, and extracting themselves from the workforce for five or more years is not feasible. They are not seeking to be scholars, but rather to become advanced engineers and entrepreneurs. Thanks to the partnerships we will form with their employers, D.Eng. students will be able to maintain their employment while pursuing their advanced degrees.

In this way, we are advancing the engineering profession overall as well as training students who can apply their knowledge to solve the thorny technical problems that they, their employers, and even society, face.

F. Relevance to Historically Black Institutions (HBIs)

1. Potential impact on implementation or maintenance of high-demand programs at HBIs

As described in Section E.1, although there are similarities between our renewed D.Eng. program and the D.Eng. program at Morgan State University, the programs are different in both aim and scope, and in terms of the students that they serve. As a result, Johns Hopkins' program will not have an impact on Morgan State's program. In addition, it is worth noting that Morgan State's program grants fewer than a dozen Doctor of Engineering degrees per year, and thus, does not qualify as a "high-demand" program. (By contrast, Morgan State graduates roughly 100 students with bachelor's degrees in an engineering discipline annually.)

2. Potential impact on the uniqueness and institutional identities and missions of HBIs

An appropriate student for the Doctor of Engineering program would apply after attending and completing a master's degree at any university or college, including any of Maryland's Historically Black Institutions. The proposed program would not directly affect the implementation, maintenance, uniqueness, identity, or mission of these institutions.

G. Evidence of the [Principles of Good Practice](#)

Not applicable. This is not an online program; rather it is one that can be completely in a non-residential way. Online courses may be used to help student acquire background knowledge.

H. Adequacy of faculty resources

See Appendix C for a list of faculty who will teach in the proposed program.

Primary responsibility for educating Doctor of Engineering students rests with their advisors, who will work with them to chart a research program and a course of study to fill in the technical knowledge necessary to complete that study. All tenure-track and research-track faculty with appointments in the Whiting School of Engineering may serve as primary advisors for D.Eng. students. A list of such faculty can be found online at engineering.jhu.edu/faculty.

I. Adequacy of library resources

Students will have full access to the Homewood campus' Milton S. Eisenhower Library, which is ranked as one of the nation's foremost facilities for research and scholarship. Its collection of more than 3 million bound volumes, several million microfilms, and more

than 13,000 journal subscriptions has been assembled to support the academic efforts of the University. The interlibrary loan department makes the nation's vast research collection available to faculty and students. The library also provides easy access to a wide selection of electronic information resources, including the library's online catalog, and numerous electronic abstracting and indexing tools. Many of the databases are accessible remotely. Librarians help students, and the library maintains an extensive website to allow visitors to view its services and materials. To this are added more than 10,000 audiovisual titles available for on-site consultation.

J. Adequacy of physical facilities, infrastructure and instructional equipment

The program will have full access to existing facilities and equipment already in place for doctoral programs in the Whiting School of Engineering, and there is no discernable impact on the use of these resources.

K. Adequacy of financial resources with documentation

See Appendix D for detailed financial information.

L. Adequacy of provisions for evaluation of program

There are two overlapping mechanisms for ensuring student learning in the Doctor of Engineering program: the supervisory committee (consisting of the advisor, co-advisor, and third committee member who oversee the students' progress, conduct the required examinations, and attest to the worthiness of the research project) and the Doctor of Engineering Program Committee (which oversees admissions, changes to the degree program, evaluations of students, approves co-advisors and committee members, and certifies that degree requirements are met).

M. Consistency with the State's minority student achievement goals

Any student meeting the admissions requirements can apply to the Doctor of Engineering program. The program is designed to help all accepted students improve their workplace competitiveness and reach their professional goals—an aim consistent with the State's minority student achievement goals.

N. Relationship to low productivity programs identified by the Commission:

Not applicable.

Appendix A

Course Descriptions

Progress through the Doctor of Engineering program is tied to enrollment in the following courses. D.Eng. candidates are required to be enrolled in one of the courses listed below during every semester of their programs. The instructor of record for these courses will be the candidate's Hopkins-based primary advisor.

In addition to these courses, students may enroll in any course offered by the Whiting School of Engineering, including courses offered online. However, enrollment in online courses is optional, and their purpose is to help students fill in background necessary for their research.

EN.500.791 Doctor of Engineering Fundamentals, 10 credits

This is an intense, professor-guided, individualized course for D.Eng. students preparing for their Preliminary Examinations. The course instructor is the student's primary advisor and sets the requirements. Successful students pass their Preliminary Examinations upon completing this course. Students may enroll in this course for multiple semesters if necessary.

EN.500.792 Doctor of Engineering Research Proposal, 10 credits

The purpose of this course is to synthesize a coherent research proposal for the Doctor of Engineering major project. The course instructor is the student's primary advisor, working with the student to create the research proposal to be defended in a public presentation and private examination. Students may enroll in this course for multiple semesters if necessary.

EN.500.891 Doctor of Engineering Research, 10-20 credits

Students enroll in this course upon completion of their Research Proposal Examinations while they are conducting advanced engineering research under the supervision of their advisors. The number of credits awarded will vary based on the amount of time students devote to their research; this is exactly analogous to how we assign credit hours for dissertation research for Ph.D. students.

Appendix B [For distance education programs only]

Evidence of Compliance with the Principles of Good Practice
(as outlined in COMAR 13B02.03.22C)

Not applicable: This is not an online program.

Appendix C

Faculty

All full-time tenure-track and research-track faculty with primary or joint appointments in the Whiting School of Engineering may serve as primary advisor to Doctor of Engineering students. A list can be found online at engineering.jhu.edu/faculty .

The following are representative examples of faculty who may supervise Doctor of Engineering students; they served on the committee that developed the academic requirements for the newly invigorated D.Eng. degree.

- Professor Amy Foster, Electrical and Computer Engineering
- Professor Howard Katz, Materials Science and Engineering
- Professor Sridevi Sarma, Biomedical Engineering
- Professor Benjamin Schafer, Civil Engineering
- Professor Russell Taylor, Computer Science
- Professor Marsha Wills-Karp, Environmental Health and Engineering

Appendix D

Finance Information

TABLE 1: RESOURCES:					
Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Reallocated Funds	0	0	0	0	0
2. Tuition/Fee Revenue (c + g below)	\$268,000	\$550,350	\$855,000	\$1,174,000	\$1,511,250
a. Number of F/T Students	5	10	15	20	25
b. Annual Tuition/Fee Rate	\$53,600	\$55,350	\$57,000	\$58,700	\$60,450
c. Total F/T Revenue (a x b)	\$268,000	\$550,350	\$855,000	\$1,174,000	\$1,511,250
d. Number of P/T Students	0	0	0	0	0
e. Credit Hour Rate	\$1787	\$1845	\$1900	\$1957	\$2015
f. Annual Credit Hour Rate	0	0	0	0	0
g. Total P/T Revenue (d x e x f)	0	0	0	0	0
3. Grants, Contracts & Other External Sources	0	0	0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 – 4)	\$268,000	\$550,350	\$855,000	\$1,174,000	\$1,511,250

Resources narrative:

1. Reallocated Funds: The proposed program will be funded by tuition and will not make use of reallocated funds.
2. Tuition and Fee Revenue: Tuition will support all program activities.
3. Grants and Contracts: We are open to support from grants and contracts, but are not relying on such support.
4. Other Sources: No other sources of funding are expected.

TABLE 2: EXPENDITURES:					
Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b + c below)	0	0	0	0	0
a. # Sections offered	n/a	n/a	n/a	n/a	n/a
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
2. Admin. Staff (b + c below)	40,000	41,333	42,666	44,000	45,333
a. # FTE	0.5	1.0	1.0	1.0	1.0
b. Total Salary	30,000	31,000	32,000	33,000	34,000
c. Total Benefits	10,000	10,333	10,666	11,000	11,333
3. Support Staff (b + c below)	0	0	0	0	0
a. # FTE					
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
4. Equipment	0	0	0	0	0
5. Library	0	0	0	0	0
6. New or Renovated Space	0	0	0	0	0
7. Other Expenses	25,000	50,000	75,000	100,000	125,000
TOTAL (Add 1 – 7)	65,000	91,333	117,666	144,000	170,333

Expenditures narrative:

1. Faculty: No additional salary to be paid to faculty.
2. Administrative: One academic program coordinator will manage the program's administrative needs.
3. Support Staff: None.
4. Equipment: None.
5. Library: Existing library facilities are sufficient.
6. New or Renovated Space: No space requirements.
7. Other Expenses: Support for students to attend the semiannual, on-campus, Doctor of Engineering conference.

APPENDIX E
Supporting Documents

We consulted with local employers of engineers to gauge interest in our Doctor of Engineering program. Please find attached letters from the following:

- Patrick Antkowiak, Chief Technology Officer, Northrop Grumman
- Brad Forch, Army Senior Research Scientist, U.S. Army Research Laboratory
- Charles Johnson-Bey, Director of Engineering & Technology, Cyber Solutions, Lockheed Martin
- Jerry Krill, Chief Technology Office, Johns Hopkins University Applied Physics Laboratory

In addition, we include pages from the Johns Hopkins *University Circular*, and from a JHU commencement program relevant to the Doctor of Engineering program from the 1960s.

31 August, 2017

Dr. Ed Scheinerman
Vice Dean for Graduate Education / Professor of Applied Mathematics & Statistics
The Johns Hopkins University
Whiting School of Engineering

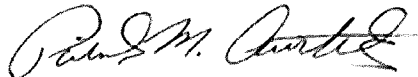
Dr. Scheinerman,

I wanted to provide some points of view from industry in support of the current discussions regarding the re-establishment of a Doctor of Engineering program at the Johns Hopkins Whiting School of Engineering. Northrop Grumman has a long partnership with the Whiting School in the continuing education needs of our engineering workforce. We have a highly skilled technical workforce nearby in Baltimore that needs to be at the forefront of science and technology. A significant portion of this technical workforce goes on to attain advanced engineering degrees while working full time. While this typically culminates in a Master of Science in Engineering (or Computer Science) degree, we strongly desire our workforce to continue their educational pursuits in our mission to meet the defense and security needs of our nation.

Although we have had some success in our employees obtaining a PhD in engineering, it is normally a difficult task due to the nature of research and residency issues – and definitely is a limiting factor in the capacity of employees that we can support through this path. On the other hand, the flexibility of professional engineering doctorate program is very compelling. It meets several of our needs simultaneously: 1) it continues to position our workforce at the forefront of engineering technology; 2) it allows our employees the flexibility to pursue doctorate-level degrees while working; 3) there is no residency requirement so it meets the needs of a larger number of our workforce; 4) the co-advising team potential combining a JHU professor and a Northrop Grumman subject matter expert provides uniquely valuable insights; and 5) it provides an enduring and collaborative tie between JHU and Northrop Grumman since the advanced research projects are of high joint interest.

The characteristics of a professional engineering doctorate program are highly matched to the needs of our workforce strategy and defense and security mission. I enthusiastically support the Whiting School of Engineering as it develops the framework to re-establish the Doctorate of Engineering program.

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick M. Antkowiak". The signature is fluid and cursive, with a prominent initial "P" and "M".

Patrick M. Antkowiak
Corporate Vice President and
Chief Technology Officer
Northrop Grumman Corporation



DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
ARMY RESEARCH LABORATORY
ABERDEEN PROVING GROUND MD 21005-5066

REPLY TO
ATTENTION OF RDRL-WM

2 September 2017

SUBJECT: Doctor of Engineering Degree at The Johns Hopkins University

TO: Professor Edward R. Scheinerman
Vice Dean for Graduate Education
Whiting School of Engineering
Johns Hopkins University Baltimore, MD 21218

Dear Dr. Scheinerman,

I am writing to express my enthusiasm and highest level of support for your plan to offer a Doctor of Engineering degree at The Johns Hopkins University. A program such as the one you are proposing will be an effective way to provide top-tier education to our professional engineers that will enable them to work on more complex projects requiring the research and innovation skills that will be honed under the supervision of your faculty.

It is in ARL's interest to provide doctoral-level education for select members of our workforce but residency requirements of a PhD program make this untenable. The design of your D.Eng. Degree—with no residency required—makes this ideal for us.

We look forward to sending you candidates for this degree with the expectation that they will significantly expand their technical competence and gain far reaching insight into broader impacts of engineering research on realistic problems.

Please do not hesitate to contact me if I can be of any assistance.

Sincerely yours,

A handwritten signature in blue ink that reads "Brad E. Forch".

Dr. Brad E. Forch
ST, Army Senior Research Scientist
U.S. Army Research Laboratory Fellow
U.S. ARL, RDRL-WM
Aberdeen Proving Ground, MD 21005-5066
brad.e.forch.civ@mail.mil
410-306-0929



September 7, 2017

Edward Scheinerman, Vice Dean for Graduate Education
Whiting School of Engineering
Johns Hopkins University
Baltimore, MD 21218

Dear Ed:

I would like to convey our wholehearted support for the Doctor of Engineering Degree program proposed by the JHU Whiting School of Engineering. The program contains key features that are vitally important to APL and, taken together, unique in Maryland, based on our experiences with the engineering programs in the state.

First, with the accelerating pace of technology, it is increasingly valuable for practicing engineers to have access to a non-residential doctoral program to update and enhance their technical skills while remaining employed full-time. The proposed program will allow a staff member to pursue his or her degree at the APL campus on a project of mutual interest to the staff member, APL, and the WSE faculty advisor. Second, the degree is conferred at the engineering school level, versus an individual engineering department, to reflect the increasing need for a broad, multidisciplinary systems engineering approach that is not addressed in conventional engineering doctoral programs. Complex systems challenges to national security, space exploration, and healthcare are the primary focus of APL. Third, engineering investigations leading to new technologies or system capabilities are emphasized. Therefore, a major portion of APL's internal and direct funding is potentially applicable to dissertation work for the proposed program. Finally, we envision that the technical focus of the program will significantly increase the generation of intellectual property, contributing to Maryland's innovation ecosystem.

We anticipate that the program will be in great demand by APL staff members. Presently, of our more than 6,000 staff members we have several dozen pursuing doctorates at any time, with fewer than 10 graduating each year. Because the multi-disciplinary engineering nature of the new doctoral program would align well with our funded projects, we anticipate, eventually, 25 or more doctoral students graduating per year, nearly tripling our present rate. We expect an increased demand at the master's level as well because a Master's Degree in Engineering is a prerequisite for admission to the Doctor of Engineering program. This program would also be a particularly important recruiting tool for attracting nationwide talent to APL and to Maryland.

Thank you for my opportunity to express our support for this ground-breaking degree program.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jerry A. Krill', is written over a white background.

Dr. Jerry A. Krill
Assistant Director, Science and Technology
Chief Technology Officer
Johns Hopkins University Applied Physics Laboratory

LOCKHEED MARTIN



31 August 2017

Professor Edward Scheinerman, Vice Dean for Graduate Education
The Whiting School of Engineering
Johns Hopkins University
Baltimore, Maryland 21218
Re: **Doctor of Engineering Program**

Dear Dean Scheinerman:

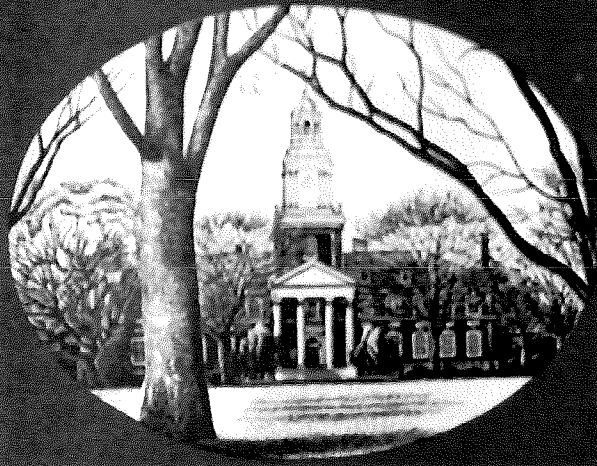
I am writing to you in support of your plan to reestablish the Doctor of Engineering degree at Johns Hopkins University. The opportunity for Lockheed Martin engineers to obtain doctoral-level study via this nonresidential program is especially appealing to us. It would be of great value to us to be able to enroll our employees in your program and to work on advanced engineering projects of importance to Lockheed Martin. This is a win-win for us: Our employees attain advanced, research-based skills and we can forge links with your faculty thereby tapping in to their expertise leading to additional collaborations in the future. The flexibility of a nonresidential doctoral program is key as we, and our employees that are seeking an engineering doctorate, would find a residential PhD program incompatible with the work and life obligations we face.

We hope you get this program in operation soon and look forward to sending you our bright, talented engineers seeking to advance their skills to the highest level.

Sincerely,

A handwritten signature in blue ink that reads "Charles Johnson-Bey". The signature is fluid and cursive.

Charles Johnson-Bey, Ph.D.
Director, Engineering & Technology, Cyber Solutions
Lockheed Martin Corporation
Office: 410-379-5844 Cell: 410-487-2476
charles.johnson-bey@lmco.com



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1966-1967

DEGREE REQUIREMENTS

Departmental requirements appear under the appropriate headings. Requirements which must be met by all candidates are:

FOR THE DOCTOR OF PHILOSOPHY DEGREE

- a) A dissertation worthy of publication. Publication prior to award of the degree is not required. See below.
- b) Two foreign languages as a rule. (See departmental announcements for specific information and exceptions.)
- c) Graduate Board oral examination which, depending on the department, may be either preliminary or final in character.
- d) Departmental oral or written examinations. (See departmental requirements.)
- e) A year of full time residence as a minimum.

FOR THE MASTER OF ARTS DEGREE

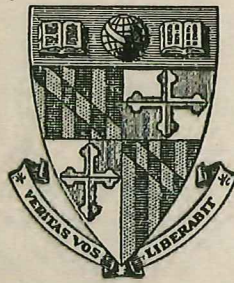
- a) One foreign language.
- b) An essay or comprehensive examination if required by the department.
- c) A year of full time residence as a minimum.

FOR THE DOCTOR OF ENGINEERING DEGREE

- a) An acceptable dissertation. See below.
- b) A reading knowledge of two foreign languages designated by the department.
- c) Fulfillment of the requirements of a department with the approval of the Advisory Board.
- d) A preliminary oral examination a year before the degree is awarded, on the student's first and second subordinate subjects.
- e) A final oral examination on the principal subject, after the dissertation has been submitted.

FOR THE MASTER OF SCIENCE IN ENGINEERING DEGREE

- a) The fulfillment of the requirements of a department with the approval of



THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND

Conferring of Degrees
at the close of the ninety-second academic year

✱

JUNE 11, 1968
Keyser Quadrangle
Homewood

ORDER OF EVENTS

CONFERRING OF DEGREES ON CANDIDATES

Continued

*Presented by Richard A. Mumma,
Dean, Evening College*

BACHELORS OF SCIENCE • BACHELORS OF SCIENCE IN NURSING
BACHELORS OF SCIENCE IN ENGINEERING
MASTERS OF SCIENCE IN ENGINEERING
MASTERS OF SCIENCE • MASTERS OF EDUCATION
MASTERS OF LIBERAL ARTS
CERTIFICATES OF ADVANCED STUDY IN EDUCATION
* * *

*Presented by John C. Hume
Dean, School of Hygiene and Public Health*

MASTERS OF SCIENCE • DOCTORS OF SCIENCE
MASTERS OF PUBLIC HEALTH • DOCTORS OF PUBLIC HEALTH
DOCTORS OF PHILOSOPHY
* * *

*Presented by Francis O. Wilcox,
Dean, School of Advanced International Studies*

MASTERS OF ARTS
DOCTORS OF PHILOSOPHY
* * *

*Presented by Thomas B. Turner,
Dean, School of Medicine*

DOCTORS OF MEDICINE
MASTERS OF ARTS • DOCTORS OF PHILOSOPHY
* * *

*Presented by Allyn W. Kimball,
Dean, Faculty of Arts and Sciences*

MASTERS OF SCIENCE IN ENGINEERING • DOCTOR OF ENGINEERING
MASTERS OF ARTS IN TEACHING • MASTERS OF ARTS
DOCTORS OF PHILOSOPHY
* * *

CONCLUDING REMARKS

*Lincoln Gordon
President of the University*

*

BENEDICTION

*

RECESSIONAL

THE CORONATION MARCH G. MEYERBEER

*The audience is requested to remain standing after the Benediction until
the members of the faculties and the graduates have left the area.*

The Alumni Association of The Johns Hopkins University invites all graduates, their relatives and friends, and the members of the faculties to attend a reception on Keyser Quadrangle immediately following the recessional. In case of rain, the reception will be held in Levering Hall.

CRAIG COLIN SINGER, of Baltimore, Md., B. E. S. The Johns Hopkins University, 1965. Operations Research and Industrial Engineering.

HARCHARAN SINGH, of Calcutta, India, B.Sc. Rangoon Institute of Technology, 1964. Environmental Engineering Science.

A Study of Water Rates with Special Reference to Calcutta Corporation.

HARRY FERNANDO DELARA SMITH, JR., of Oceanside, N. Y., B. C. E. University of Florida, 1962. Environmental Engineering Science.

Public Water Supply Development in Developing Countries.

ROBERT TIMOTHY STONE, of Washington, D. C., B. S. Boston College, 1966. Operations Research and Industrial Engineering.

RAFAEL SUAREZ-MORALES, of Caracas, Venezuela, Civil Engineer Andres Bello Catholic University, 1964. Environmental Engineering Science.

Algae in Water Supplies.

NARINDA KAUR SAHOTA THIND, of Baltimore, Md., B. S. E. Panjab University, 1964; M. Sc., 1966. Electrical Engineering.

GANAFATHY VASUDEVAN, of Madras, India, B. S. in Technology, University of Madras, 1965. Chemical Engineering.

Performance of a Polymerization Reactor in Periodic Operation.

ELBERT EARL WHITLACH, JR., of Wampum, Pa., B. S. Geneva College, 1965; B. S. in C. E. Carnegie Institute of Technology, 1965. Environmental Engineering Science.

Nitrogen and Phosphorus Removal from Domestic Sewage.

(27)

DOCTOR OF ENGINEERING

with title of dissertation

VICTOR EVERETT SCOTTRON, of Storrs, Conn., B. S. Webb Institute of Naval Architecture, 1936; M. S. M. E. Columbia University, 1946. Environmental Engineering Science.

Turbulent Boundary Layer Characteristics over a Rough Surface in an Adverse Pressure Gradient.

(1)

MASTERS OF ARTS IN TEACHING

LANI LEE ALLEMAN, of Santa Ana, Calif., A. B. Stanford University, 1967.

PETER SHAW ASHLEY, of Arlington, Va., A. B. Yale University, 1967.

PETER LEE ATHERTON, of Louisville, Ky., A. B. Georgetown University, 1966.

KATHARINE CAPERTON BARNHARDT, of Virginia Beach, Va., A. B. Sweet Briar College, 1967.

SHARON LEILIA BEDFORD, of Detroit, Mich., A. B. The University of Michigan, 1966.

CHERYL DARIA BELSKY, of Fresh Meadows, N. Y., A. B. Barnard College, 1967.

GEORGE EDWARD BERGEY, of Columbia, Pa., B. S. Pennsylvania State University, 1961.

LAURENCE ERWIN BLOCH, of Annapolis, Md., A. B. Princeton University, 1965.

BARBARA MARIE BOURGEOIS, of Baltimore, Md., B. A. University of Maryland, 1967.

SUSAN BREWSTER COCKER, of Clifton, N. J., A. B. Wilson College, 1967.

MARION VIRGINIA CRIST, of Troy, Ohio, B. S. Wittenberg University, 1967.

JEANETTE SMITH CURETON, of Bordentown, N. J., B. A. Bates College, 1967.

TODD MAURICE DALEY, of Staten Island, N. Y., B. S. The City College of New York, 1966.

SUSAN HUNTINGTON WALLER DALSEMER, of Baltimore, Md., A. B. Mount Holyoke College, 1966.

ELIZABETH GRAY DAVIES, of Alma, Mich., A. B. The University of Michigan, 1967.

SUSAN ELAINE DERR, of Cedar Rapids, Iowa, B. A. Cornell College, Iowa, 1966.

PAULA KAREN FINE, of Montreal, Que., Canada, B. A. McGill University, 1966.

KENNETH LEE GREIF, of Baltimore, Md., B. A. Brown University, 1957; L. L. B. University of Virginia, 1961.