

**WORCESTER POLYTECHNIC INSTITUTE**  
**May 2, 2019**

**To:** The WPI Faculty

**From:** Tanja Dominko  
Secretary of the Faculty

The seventh Faculty meeting of the 2018-2019 academic year will be held on **Thursday, May 2nd, 2019 at 11:00 am in Olin Hall 107.**

1. Call to Order T. Dominko
  - Approval of the Agenda
  - Approval of the Consent Agenda and the Minutes from 4-11-2019
  
2. Announcements T. Dominko
  
3. Committee Business
  - Committee on Academic Operations
    - Motion to approve the May 2019 undergraduate student graduation list A. Mattson
    - Motion to approve the May 2019 graduate student graduation list R. Rao
  
  - Bylaws and Governance Working Group
    - Motion to endorse Recommendations of Bylaws and Governance Working Group M. Richman
  
  - Committee on Governance
    - Motion to endorse Global School Proposal K. Boudreau
  
  - Committee on Academic Policy and Undergraduate Outcomes Assessment Committee
    - Motion to change Undergraduate Learning Outcome #8 D. Olinger/J. deWinter
  
4. New Business
  
5. Adjournment

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# WORCESTER POLYTECHNIC INSTITUTE

## Faculty Meeting Minutes

April 11, 2019

### Summary:

1. Call to Order
2. Announcements
3. Recommendations of Bylaws and Governance Working Group
4. Committee business
5. New Business
6. Adjournment

### Detail:

#### 1. Call to Order

The eight Faculty meeting of the 2018-2019 academic year was called to order in Olin Hall 107 by **Prof. Dominko (BBT)**. She reminded everyone that the meeting is being recorded for the purpose of accuracy in taking minutes. The modified agenda and consent agenda (including the minutes from the March 14, 2019 Faculty meeting) were approved.

#### 2. Announcements

Prof. Dominko announced that Gompei's Goat Cheese company, WPI's student-run business representatives will be joining the faculty gathering at the Quorum after the meeting. They will be introducing their products and answering questions about the company and their products.

#### 3. Recommendations of Bylaws and Governance Working Group

**Prof. Richman (ME)** presented the report of the Group that were developed during the past several months. He reported that the Group developed consensus recommendations by listening to one another, compromising when necessary and by insisting on their respective positions when necessary. He reviewed the membership of the Group and the timeline of events that led to its formation. He reminded everyone that the recommendations are being presented for discussion and will be offered for faculty endorsement at the May faculty meeting upon further faculty input. Prof. Richman reviewed the main faculty concerns that were specifically articulated within the motions approved at the Special Faculty meeting on November 15, 2019. Additional concerns that were identified by the Board of Trustees were also addressed, such as timeliness of decisions, inclusion and collaboration among different constituencies.

Summary of the recommendations for the Bylaws:

- Authority Article and language - removed
- Academic Freedom – removed
- Board's interpretation controls ambiguities in the Bylaws – removed
- President and Provost are *ex-officio* members of all faculty committees – removed
- Provost creates policy – removed
- Establishment of Global School without faculty endorsement – modified to reflect that the Global School will be added to academic structure after endorsement by the Faculty and approval by the Board
- Description of the Faculty – modified to defer faculty definitions to the Faculty Constitution

- Description of Provost and Deans' roles and responsibilities – modified to reflect collaborative and consultative processes; some descriptions that were inconsistent with the Faculty handbook have been addressed (role of Deans in tenure and promotion)
- President “Sets institutional policy” – modified to “Oversees institutional policy making”
- Description of the President’s authority was extended by adding specific language recommended by the AAUP
- Effective collaboration language – modified

Additional recommendations of the Group concerned topics that were impeding collaborative processes:

- The need for improved communication – Joint Coordinating Council (JCC) will be formed and will include the President, Provost, Chair COG, Secretary of the Faculty, an NTT faculty member, and a Trustee. We will continue using existing mechanism that encourages attendance of the President and Provost at meetings of faculty governance.
- Process for future updates to the bylaws
- Encourage addition of two Trustees with deep academic experience to the Board
- Re-examine the process by which faculty are appointed to the Board in time for next year’s appointments
- Faculty Task force to continue developing recommendations for long term commitment of WPI to NTT faculty and for inclusion of NTT colleagues in faculty governance
- Define the role of Deans in appointment and evaluation of Department Heads
- Approval of Faculty constitution and university wide policies that appear in the Faculty Handbook by the Board
- Revisit the approach to faculty review of administrators
- Professional development and compensation of faculty leaders
- Self-reflection and evaluation of performance of each constituency
- Periodic Assessment of the state of shared governance by the President

The Board will discuss these recommendations on April 12. We will collect the input, prepare final recommendations by April 25, and present final recommendations for a faculty vote on May 2<sup>nd</sup>.

**Prof. El-Korchi** (CEE) asked about assurances that the next administration will not repeat the mistakes of the past. Prof. Richman stated that the Board is committed to honoring their commitments, but that the question remains where the recommendation document will reside. It is important that these recommendation be available and accessible. President Leshin gave an assurance that these documents are important and should be guiding collaborative and consultative behaviors. It may be that the recommendations become a guiding document of the JCC.

**Prof. Gericke** (CBC) suggested that “creative works or artistic activity” be added to the description of faculty activities in the bylaws to more fully reflect all that faculty do.

**Prof. Capogna** (MA) raised the question about definitions of faculty. Prof. Richman explained that definitions of faculty reside in the Faculty handbook. Any changes approved by the faculty will be included as the taskforce completes its work, as necessary.

**Prof. Humi** (MA) suggested that guidelines be developed for faculty evaluations, another effort that could be undertaken by the JCC. Important to develop. Prof. Richman acknowledged the importance of the issue that will need to be addressed in the future but for is for now not a component of Group's recommendations.

**Prof. Apelian** asked about efforts to update faculty handbook and evaluate faculty governance structure to improve effectiveness and efficiency.

**Prof. Roberts** inquired about the NTT membership on JCC and was assured that NTT representation will be included on JCC.

Summarizing the positive outcome that was achieved by collaboration between representatives of trustees, administration and faculty the **Prof. Boudreau** (HUA) suggested that the consensus recommendations serves as a good example of shared governance.

#### 4. Committee Business

##### COG

**Prof. Spanagel** (Chair, COG) presented a Motion to endorse the Proposal for Global School (Addendum 2). Prof. Spanagel focused his part of the presentation on concerns that were raised by the COG last September and how these concerns have been addressed in the current proposal. He asked that faculty identify any additional concerns and make recommendations that should be considered to improve the proposal before it is presented to faculty for a vote in May.

**Provost Soboyejo** focused his presentation on the opportunities and on how to we best leverage our expertise to have an impact as a global polytechnic. He reflected on gradual broadening of WPI's impact from local, regional, to national and global over time. The vision for the school will be to connect, coordinate and consolidate the complexity of our global efforts and develop future strategies. Global school can be the heart of the global polytechnic by focusing the resources and amplifying the global impact. The effort needs to be driven from the constituencies with interest and expertise in educational and scholarship efforts relating to global engagement. He encouraged everyone to contribute their thoughts to improve the proposal. **Prof. Spanagel** than reviewed progress on responses to COG concerns, namely the organizational structure; proposed faculty structure and membership; budget; and where will the needed resources come from.

**Prof. Weekes** (MA) asked about the demand for undergrad and grad programs. Provost Soboyejo highlighted initial focus on policy, development, development engineering. Will we develop new bachelor's degree program? Are undergraduates interested, what is comparable demand at other institutions?

**Prof. Burnham** (PH) inquired about any backup plan if we misestimate the projected interest in MS program. Provost Soboyejo. Middle East and China are interested to provide student cohorts through collaborations that will bring students to MS leadership program at WPI. Initial efforts will have to rely on undergraduate increasing

**Prof. Cowlagi** (ME) asked about estimation of the number of students that will major in undergraduate program and are these estimates proportional with allocation of TAs and faculty.

The school will educate majors only but provide competent faculty in global subjects

**Prof. Douglas** (SSPS) stated that many proposed things are ongoing already by faculty in SSPS. She felt that the proposal may dismantle her department and hoped that that was not the intent. Provost Soboyejo assured her that this was not the intent.

**Prof. Samson** (HUA) inquired about the proposal to include faculty with global expertise in global school vs. their traditional departmental affiliation.

**Prof. Gaudette** (BME) was very concerned that another school will create another silo. He referred to the gradual growth of Data Science programs over the years driven by a grass roots efforts. The global effort should be developed step-by-step over time to be successful and more substantial structure should build on the incremental progress.

**Prof. El-Korchi** (CEE) indicated that asking for faculty support for establishment of the School is asking for a leap of faith. We should be sure that the risk of failure is low.

**Prof. Loiacono** (BUS) thought that the vision may be best implemented by establishing an Institute vs. a School. With pool of resources being strained, the approach of a gradual interdisciplinary growth may be more appropriate.

**Prof. Claypool** (CS) was also concerned about isolating global efforts into a School and alienating undergraduate students from participating in courses that will be confined to distinct school.

**Prof. Apelian** (ME) stated that the vision for the School was compelling. However, if the proposed structure doesn't work, an "exit" strategy should be developed to alleviate concerns about an investment.

**Prof. Hansen** (HUA) sees opportunities for investment into undergraduate programming, there is a potential for increased number of majors in listed current programs. He believes that the school may actually increase interdisciplinarity.

**Prof. Elmes** (BUS) highlighted the quality and success of IGSD programs that were developed largely by NTT faculty. But we need to grow TTT faculty.

**Prof. Fehribach** (MA) is missing a reflection on the possibility that if we don't do this well it may have long-term detrimental consequences.

**Dean Taylor** (BUS) stated that the proposal engages in "strategizing" which is important, and fully expects that the actual outcomes will be vastly different 5 years from now – and likely not anything that we anticipated at the inception of the School.

**Prof. Billiar** (BME) stated that the proposal needs to be clear that it is not a zero-sum game. Resources are limited and our other programs may not be able to meet their growing needs. The

needs for TAs, faculty, marketing, advancement are real needs for all programs and all our successful programs should be strongly supported.

**Prof. Rolle** (BME) was proud of our initiative that allows all our students to participate in a global project experience. And any new proposal should benefit all our students as well.

**Prof. Cowlagi** (ME) inquired about how the existence of the School will improve delivery of global MQP projects.

**Prof. Krueger** (SSPS) supports the proposal. The proposal will allow faculty to be involved through self-determined (over 40 faculty) regardless of the discipline. This way the silos that already exist at WPI today could be bridged.

**Prof. Medich** (PH) concerned with the budget that identifies operational loss over the next 5 years.

5. New business - none

6. Adjournment

Meeting was adjourned at 5:00 pm by **Prof. Dominko**.

Respectfully submitted,

Tanja Dominko  
Secretary of the Faculty

**Addenda on file with these minutes:**

**Addendum 1. Presentation of the BGWG recommendations**

**Addendum 2. Presentation of the Global School proposal**



## **CONSENT AGENDA MOTIONS**

**CAO** Add BME 3610

**CAO** Add HUA 1500

**CAO** Add BME 361X

**CAO** Add AR 2115

**CAO** Drop EN 3224

**CAO** Add EN 3226

**CAO** Change and cross-list PY 2716 as PY/RE 2716

**CAO** Add CHE 3722

**CAO** Revise CS degree requirements

**CAO** Add IMGD 4403

**CGSR** Add CS 4000-level Courses to BS/MS List

**CGSR** Adjust CS PhD Coursework and Research Requirements

**CGSR** Adjust CS PhD credits for Combined MS/PhD Students

**CGSR** Cross-list ECE 673 as CS 673 and include it in Cybersecurity bin

**CGSR** Approve ID MS in NSE

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (prof. Mattson, Chair)  
**Re:** Motion to add Transport Analysis in Bioengineering (BME 3610)

**Motion:** The Department of Biomedical Engineering requests the approval of the following course (BME 3610 Transport Analysis in Bioengineering) in Academic Year 2019-20. This motion was approved by the BME department at the April 10, 2019 department faculty meeting.

**Course/Catalog Description:** BME 3610, Transport Analysis in Bioengineering (Cat.I) This course provides an overview of the modeling and analysis of fluid and mass transport processes related to the field of Biomedical Engineering and Bioprocess Engineering. Fundamentals and applications of hydrostatics, conservation of mass and momentum in modeling and analysis of biological fluid transport processes in the human body and bioprocess equipment are presented and discussed. It includes modeling and analysis of blood and biological fluid flow through blood vessels, capillary beds and bioprocess equipment. Modeling and analysis of diffusive and convective mass transport in biological conduits and membranes, selective permeability and nutrient/waste exchange in parenchymal tissues with transport barriers unique to biological systems such as intact and fenestrated endothelium. Basic concepts of pharmacokinetics such as plasma clearance, volume of distribution of drugs and other biological solutes in body tissues are also covered. Surface adsorption and membrane permeability concepts are covered in the context of biological soluted exchange in capillaries and bioprocess operations. Students may not receive credit for both BME 3610 and BME 361X.

Recommended background: Basic knowledge of differential and integral calculus (e.g., MA 2051 or equivalent), fundamental knowledge of biological system function or cell function (e.g., BB 1035 or BB 2550 or equivalent), fundamentals of data analysis and process modeling such as some of the topics covered in BME 2211 or BME 2610 or ChE 2011, or equivalent.

**Anticipated Instructor:** Prof. Raymond Page  
**Alternative instructor:** Prof. Jeannine Coburn

**Anticipated enrollment** – 40 students.

**Rationale:** The purposes of this course is to provide Biomedical Engineering students and those in other majors interested in bioprocess analysis with an essential understanding of mathematical modeling tools used in the field related to understanding the effects of fluid flow on biological tissue development and homeostasis and mass transfer principles applied to biological systems and bioprocess operations. In addition, currently most biomedical engineering students do not obtain any in-depth exposure to the principles of mass transfer and pharmacokinetics which are important in analysis and design of therapeutic product delivery techniques and product separation processes used in the bioprocessing industry. Developing an understanding of the analysis of transport related to physiological process

and design of therapeutic delivery strategies are essential skills in the practice of Biomedical Engineering and Bioprocess Engineering.

**Learning Outcomes:** To develop an understanding of the fundamental concepts of momentum and mass transport, membrane partitioning / transport and pharmacokinetics. An ability to use these principles to quantitatively analyze processes encountered in the field of Biomedical Engineering and Bioprocess Engineering. By the end of the course the student should be able to:

- Identify and characterize transport processes in physiological and biological process systems.
- Set up and solve problems using the principles of transport analysis of fluids and mass in composite systems.

**ABET outcomes include:**

- Criterion 1: An ability to identify, formulate, and solve complex engineering problems at the interface of engineering and biology by applying principles of engineering, science, and mathematics.
- Criterion 7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

This course will not be cross listed.

This course was offered as an experimental course in C18 and C19 and a summary of student and instructor feedback follows.

1. Student feedback.

Verbal feedback from students at the end of the course was generally positive. Aspects they enjoyed were the specific applications to physiological and biotechnological systems and the pace and flow of topics. Aspects they did not like as much were the lack of a study guide for quizzes to help focus on exactly what material to study.

2. Feedback from course evaluations taken directly from the on-line forms.

***What did you particularly like about the course?***

- I like the layout of the course. I thought it was logical and a good place. Also Arth was the best!
- I found the subject material to be very useful and interesting.
- I like how this class was exactly what I expected it to be; fluid dynamics but relevant to the life sciences.
- I liked that everything was related to something I was interested in. Arth was amazing and super helpful.

- I liked the various biomedical applications that could be used in transport analysis. The TA was willing to meet to help me outside of office hours on topics that were difficult. Teacher communicated with the students on interests for the class and reviewed materials on exams and class topics that were difficult.
- I think the concept of the course is great. Transport and fluid and mass transfer but related to biological systems rather than dams and pipes.
- Prof Page clearly cares a lot about having students learn and understand material instead of simply getting through a set amount of material and giving a set number of assignments. When students struggled with material, Prof. Page made sure to go over it again instead of moving on in the course.
- Prof. Page made it very clear verbally and in his teaching style that his goal was not to give us a grade for the course but to help us tackle difficult topics in transport with a focus in the BME field. He paced his lectures on the learning speed of his class and not the syllabus and would constantly update the syllabus to better fit our learning and understanding of material presented
- The subject matter from this course was very interesting and the professor always wanted the students to ask questions during lecture.

***What did you particularly dislike about the course?***

- I think having a class capture may be useful because I found that a lot of times I would miss things said in lecture that weren't written on the notes online and then it would show up on the exam.
- I think study guides for the quizzes would have been helpful.
- Nothing except I wish Professor Page could teach all my classes :)
- Sometimes the professor's exams did not align with what us students thought would be on the exam. But, the professor was very fair when grading and took our feedback into account.
- Tests asked very broad questions and were not clear. Did not know what to study because no direction was provided. Sometimes it was unclear as to why we were being taught certain things because the end point was not explained clearly.
- The homework was computational and sometimes very wordy. Communication between the TA and teacher seems to be lacking when it came to review sessions and homework assignments. It was a guess for both the TA and the students on what will be on the exams and the expected answers on the homework. Review guides for the homework will be beneficial. Homeworks were also not posted systematically and were at random. Class notes posted on the same day class took place would be nice.
- The homework was sometimes lengthy and more intensive than what we may have done in class.

- The lectures were a bit of everything and varied widely. Some lectures were just deriving equations, which we were barely tested on or asked to understand. Some lectures were just tons of slides. Some lectures were in class problems. The quizzes were not very related to the material covered in lectures, but the curve on each was so high that getting a good grade in this class shouldn't be too stressful. I just would prefer more applicable quizzes.
- The quizzes often were difficult and hard to study for. Prof. Page did do a good job of compensating for this though.
- The schedule for the course jumped around a lot and we were not able to cover all the material that was originally planned for.

***Suggestions to improve the quality of teaching:***

- Finding a clearer way to communicate how quizzes will be laid out and making sure the homework lines up with the lectures and quizzes would be helpful.
- Give specific topics to study for tests. Outline objectives at beginning of class.
- N/A.
- NA
- No I think Prof Page is very experienced with teaching and making an effective course to help students learn rather than memorize and strive for a higher grade.
- Nope!
- One thing that would definitely make the course more interesting would be the use of demonstrations during lecture.
- Try to structure classes better. Some lecture and some practice problems every time. Think more about what the material needs to cover, and what can be done in 7 weeks rather than trying to cover a bit of everything. As a senior, I've taken the more in depth version of each of the courses like fluids that this course is supposed to replace one day. More thought and work needs to go into making sure this course makes better sense and is at a more consistent level of depth. Don't waste time on equations if there isn't time to do that and do better practice problems. Most people just copy it down and don't understand it anyway.

3. Outcomes from questions 1, 2, 9 (now 7), and 26 (now 19) of course evaluations.

In general, the students' feedback on the course were positive with the following ratings on selected survey questions:

Q1: 4.1  
 Q2: 4.2  
 Q7: 3.5  
 Q8: 3.9

Eleven of 13 students enrolled responded to the on-line course survey. The reports on the hours spent outside of class were low compared to expectation for a 1/3 unit course as well as what was communicated to me orally following HW assignments and quizzes. The distribution was:

0 hr/wk	0
1-5 hr/wk	1
6-10 hr/wk	6
11-15 hr/wk	3
16-20 hr/wk	1
21+ hr/wk	0

4. Instructor feedback and reflections (e.g., did the course meet the learning objectives or outcomes) from experimental offerings if applicable.

During the second time this course was offered in C19, a few changes were made to the material covered and the method of assessment. First, more class time was devoted to review of exams and assignments in class after their completion to reinforce understanding of topics covered based on student performance. Second, some additional class time was devoted to students working in class to solve example problems prior to the solution being given. This gave them an opportunity to work together with the instructor to help clarify the problem, understand the appropriate underlying assumptions and apply them to a particular problem. Third, the quizzes conducted in class were more geared toward short answers to questions related to topics covered, instead of quantitative problem solving as was done in the first offering in C18. This seemed to work out OK but it led to some confusion as to what kind of material to study, especially on the first quiz which yielded scores lower than expected for student performance. Rather than move on to the next topic right away, I felt it was more important to cover some of that material again. The downside of this is that some of the material related to pharmacokinetics that was originally planned was not covered.

Some of the material covered in the first week of this class is material that is covered in BME 2610, which many of these students did not take prior to this course, so it had to be covered here as a foundation for later material. Going forward, this should not be an issue, since most students taking this course will likely have taken BME 2610. In addition, I will provide a handout that reviews the basic concepts needed at the beginning of the course to enable students familiarize themselves with having to take class time. This will allow coverage of the material originally planned, in particular, pharmacokinetics.

### **Instructor's Suggestions for Future Improvements:**

- Do more rigorous examples of problems associated with each topic in class.
  - Provide a review document at the beginning of the term covering process flow variables, types of processes, process modeling strategy and general mass conservation principles, rather than covering this in the first week of class. These topics are extensively covered in BME 2610, which going forward, most students will have taken prior to taking this course.
  - Have a schedule of topics to be covered worked out such that the schedule can be followed more closely.
  - Spend more time in class reviewing and reinforcing key concepts to be assessed on the in-class quizzes.
  - Add more depth to the quantitative homework assignments such that the students perform more work outside of class learning the course material.
5. Population numbers:
- a. C18 – 6 students
  - b. C19 – 13 students

**Implementation Date:** Implementation date for this action is the 2019-2020 Academic year.

### **Resource Needs:**

Please summarize basic resources needed to deliver this course, including the following:

- Instructor: Part of the regular teaching load for Prof. Page
- Classroom: Standard classroom with whiteboard and/or computer/video projection equipment to accommodate up to 40 students.
- Laboratory: none required
- Library resources: no staff required, occasional electronic journal articles
- Information Technology : no special support
- Other: PLA or TA (depending on enrollment) support for grading and student consultation

### **Impact on Distribution Requirements and Other Courses:**

This course has been reviewed by both the ME and ChE departments and it was agreed that it would represent a good addition to the engineering electives available to students in their major. Particularly for those interested in the bioengineering sub-disciplines in this field as well for students seeking double majors and minors. This course will add to the list of courses that students in the BME department can choose from to fulfill their current requirement for 3000-level engineering courses. The ChE department will add this course to the list of elective engineering courses that students can choose from for their Biology concentration. The ME department will add this course to their list of courses that

students can choose from as part of their 4/3 units competency requirement. This course will not add to the distribution requirements for any department.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Academic Operations (Prof. Mattson, Chair)

**Re:** Motion to add HU 1500 Introduction to Gender, Sexuality & Women's Studies

**Motion:** The Committee on Academic Operation recommends and I move, that HU 1500 Introduction to Gender, Sexuality & Women's Studies, as described below, be added.

**Contact:** Lindsay Davis

**Course/Catalog Description:**

HU 1500. Introduction to Gender, Sexuality & Women's Studies. Cat. II

This foundational course offers an introduction to the interdisciplinary field of gender, sexuality and women's studies. The course fosters critical examination of gender, sexuality and women and asks how the interlocking systems of oppression, including colonialism, racism, sexism, homophobia, transphobia, and ethnocentrism, shape people's lives, and how individuals and groups have worked to resist these oppressions. Potential course topics include histories of gender activism, gender, sexuality and their relationships to the law, religion, reproduction, education, technology, and mental health, globalization and transnational experiences, and the role of popular culture. No prior background is required.

**Anticipated Instructors:** Lindsay Davis, Rebecca Moody, Kristin Boudreau

**Rationale:**

WPI currently offers very few classes that address the questions, topics, and scholarship specifically devoted to the study of gender, sexuality, and women and the ways in which those categories intersect. Students have repeatedly asked—in class, in meetings, and on course ratings—if an introductory course of this nature exists. Similar schools such as MIT, RPI, Northeastern, BU, etc., have offered such a course (as well as broader programs) on gender, sexuality, and women's studies for many years. This course will meet a significant need in the WPI curriculum.

“Introduction to Gender, Sexuality & Women's Studies” will function as a general overview of key scholarship and debates in the field. Existing courses on gender, sexuality, and women's studies are specific to their field of inquiry. This course will serve as a more comprehensive preparation for subsequent gender-related courses.

The intended audience for this course includes:

- Students with an interest in gender, sexuality, and women's studies
- Students completing the HUA Requirement
- Students interested in an Individually Designed Minor in gender, sexuality, and women's studies
- Students departing for or returning from HUA or IQP global project experiences



In addition, this course is an important step toward providing an academic space for WPI's growing population of female, non-binary, and minority students as well as broadening the educational offerings for other students.

Finally, this course supports WPI's commitment in its Strategic Plan to develop a "strong, inclusive community" and cultivates classroom experiences that practice and prioritize a "diversity of thought, culture, and perspective."

**Implementation Date:** Academic year 2020-21.

**Resource Needs:** No new resources are required. The department already has several full-time faculty with teaching and research interests appropriate for this course. Classroom needs are typical for HUA courses. No special information technology is required. Library resources are adequate to offer this introductory course. The expected enrollment is 25-50, and the course type is Lecture/Discussion.

**Impact on Distribution Requirements and Other Courses:** No impact on existing distribution requirements.

**The experimental course proposal is given below for reference.**

**To:** Germano Iannacchione, Chair, Committee on Academic Operations  
**From:** George Pins, Associate Head; Kris Billiar, Head; Dept. of BME  
**Re:** Motion to add BME 361X Transport Analysis in Bioengineering approved by the BME Department faculty on 2/24/2107.  
**Date:** 03/25/2017

The Department of Biomedical Engineering requests the approval of the following experimental course (*BME 361X, Transport Analysis in Bioengineering*) in Academic Years 2018 and 2019 during C term.

**Contact:** Prof. Raymond Page

**Preferred term:** C

**Expected enrollment:** 40

**Course type:** Cat I

**Intended audience:** If the course becomes permanent: potentially all Biomedical Engineering students interested in Biomaterials and Tissue Engineering or Biomechanics as well as some Chemical Engineering students interested in Bioengineering.

**Anticipated Instructor:** Prof. Page

**Course/Catalog Description:** BME 361X, Transport Analysis in Bioengineering (Cat. I). This course provides an overview of the modeling and analysis of fluid and mass transport processes related to the field of Biomedical Engineering. Fundamentals and applications of hydrostatics, conservation of mass and momentum in modeling and analysis of biological fluid transport processes in the human body are discussed. It includes modeling and analysis of blood and biological fluid flow through blood vessels, capillary beds and bioprocess equipment. Modeling and analysis of diffusive and convective mass transport in biological conduits and membranes, selective permeability and nutrient/waste exchange in parenchymal tissues with transport barriers unique to biological systems such as intact and fenestrated endothelium. Basic concepts of pharmacokinetics such as plasma clearance, volume of distribution of drugs and other biological solutes in body tissues are also covered. Surface adsorption and membrane permeability concepts are covered in the context of ligand-receptor interaction kinetics and passive and active transport, respectively.

Recommended background: Basic knowledge of differential and integral calculus (e.g., MA 2051 or equivalent), fundamental knowledge of biological system function or cell function (e.g., BB 1035 or BB 2550 or equivalent), fundamentals of data analysis and programming (e.g., BME 2211) and fundamentals of mathematical modeling techniques applied to biological systems (e.g., BME 2511 or BME 2811, or equivalent).

**Rationale:** The purposes of this course is to provide Biomedical Engineering students with an essential understanding of mathematical modeling tools used in the field related to understanding the effects of fluid flow on biological tissue development and homeostasis. In addition, there are no other courses at WPI that incorporate the concepts of pharmacokinetics important in analysis and design of therapeutic product delivery of

techniques and strategies. Developing an understanding of the analysis of transport related to physiological process and design of therapeutic delivery strategies are essential skills in the practice of Biomedical Engineering.

**Learning Outcomes:** To develop an understanding of the fundamental concepts of momentum and mass transport, membrane partitioning / transport and pharmacokinetics. An ability to use these principles to quantitatively analyze processes encountered in the field of Biomedical Engineering. By the end of the course the student should be able to:

- Identify and characterize transport processes in physiological and biological systems.
- Set-up and solve problems using the principles of transport analysis of fluids and mass in composite systems.

ABET outcomes include:

- An ability to apply knowledge of advanced mathematics (including differential equations and statistics), science, and engineering to solve the problems at the interface of engineering and biology (ABET criterion 3a).
- An ability to identify, formulate, and solve engineering problems (ABET criterion 3e).

**Resource Needs:**

Please summarize basic resources needed to deliver this course, including the following:

- Instructor: Part of the regular teaching load for Prof. Page
- Classroom: Standard classroom with whiteboard and/or computer/video projection equipment to accommodate up to 40 students.
- Laboratory: none required
- Library resources: no staff required, occasional electronic journal articles
- Information Technology : no special support
- Other: TA support for grading and student consultation

**Assessment:** Assessments include Student Feedback (course evaluations) and Instructor feedback and reflections as to whether the learning objectives and outcomes were met through student performance on homework assignments and quizzes. The results of student course evaluations will be considered with special emphasis on responses to questions 1, 2, 9, and 26.

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mattson, Chair)  
**Re:** Motion to add course AR 2115, *Topics in Architecture since 1960*, approved by HuA on April 12, 2019

**Motion:** The Committee on Academic Operations recommends and I move that the course AR2115, *Topics in Architecture since 1960*, be approved.

**Contact:** Prof. M. David Samson, HuA

**Preferred term:** D21

**Expected enrollment:** 50

**Course type:** Lecture; Category 1

**Intended audience:** Students from all majors, toward fulfillment of the Humanities and Arts Requirement with coursework in Studio Art, Digital Art, or Art History; AREN majors; or HUA majors or minors

**Anticipated Instructor:** Prof. Samson.

**Course/Catalog Description:** ~~HU~~ AR 2115, *Topics in Architecture since 1960*. This course offers a detailed overview of the history of architecture between the consolidation of modern architecture in standard architectural practice and the present period of pluralism. Topics covered will include: modernism and its critique in the developing world; Louis I. Kahn's and Robert Venturi's critiques of modernist architecture culture; the High-Tech movement; utopian alternatives to the modernist city; the return of pre-modern urbanism; Critical Regionalism; the rise of Postmodernism 1970-80; the developer-led architectural boom of the 1980s; "Deconstructivism" and critical dissolution of rationalist form; the introduction of CAD in architectural design and its impact on the "blob architecture" of Frank Gehry and others; the development of global models of architectural practice; sustainable architecture and urbanism; global developments in other, related design fields and their consumer culture.

**Recommended background:** AR 2114.

**Rationale:** WPI has not seen significant additions to the art history curriculum in many years. This course will expand its offerings into coverage of the contemporary period. It will also be of value to majors in Architectural Engineering (AREN), as it will study forms and issues that AREN graduates are likely to encounter in their professional practice.

**Resources Needed:**

The creation of this course is in tandem with HUA use of adjunct faculty to teach AR 2111, *Modern Art*, freeing Prof. Samson from that obligation so that he may teach AR 2115, which is more directly related to his scholarly expertise.

**Outcomes :**

After completing this course, students will be able to:

- Identify, analyze and evaluate architectural forms and theories important to the design profession, and create scholarly studies of them in Inquiry Seminars.
- Experiment with the relation of technological advancements and environmentally sustainable practices to architectural form, in preparation for graduate study in architecture and architectural engineering

**Evaluation:**

Course success will be evident in student enrollment, quality of projects completed, the numbers of students completing their HUA requirement with a focus on architectural history, and numbers of students developing AREN minors. Evaluation will also consider student course evaluations.

**Implementation:** Academic Year 2020-2021

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mattson, Chair)  
**Re:** Proposal to Drop Course EN 3224: PICTURING SHAKESPEARE (Cat. II)

**Motion:** The Committee on Academic Operation recommends, and I move, that EN3224, described below, be dropped. This request was approved by the Humanities and Arts Department on October 5<sup>th</sup>, 2018.

### **EN 3224. PICTURING SHAKESPEARE**

Cat. II

This course will focus on one Shakespearean tragedy as well as modern versions of this play. “Picturing” Shakespeare refers to our special emphasis on visual adaptations. Students will examine the selected play in the context of films, graphic novels, comic books, and other provocative artistic forms. Through written work and oral presentations, course participants will engage creatively with a fundamental question: How do these radical re-workings of Shakespeare enrich our understanding of his original stories?

#### **Explanation of Motion:**

I intend to replace EN 3224 with EN 3226: Strange and Strangers, which will focus on racial, religious, and national identity in literature and cultural texts across different time periods. EN 3226 is addressed in a separate proposal.

#### **Rationale:**

The rationale is two-fold. EN 3224 did not draw adequate interest from students the first time it was offered (academic year 2017-8). More significantly, EN 3226 seeks to enrich the HUA course offerings with its focus on race, religion, identity, and nationhood. These are areas of interest to our increasingly diverse student body; the course themes are also relevant to my own research, thus providing an opportunity for dynamic intersections of pedagogy and scholarship.

**Impacts on students:** None, in terms of their ability to fulfill HUA course requirements. It will be a positive impact with regards to students work on breadth and depth.

#### **Implementation Date:**

This course should be removed, beginning with the 2020-2021 academic year. At this time, it will be replaced with EN 3226: Strange and Strangers, which should be listed in next year’s undergraduate course catalog.

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mattson, Chair)  
**Re:** Proposal to Add Course EN 3226: STRANGE AND STRANGERS (Cat. II)

**Motion:** The Committee on Academic Operation recommends, and I move, that EN3224, described below, be added. This request was approved by the Humanities and Arts Department on October 5<sup>th</sup>, 2018.

**Course/Catalog Description:**

**EN 3226: STRANGE AND STRANGERS**  
Cat. II

Instructor: Michelle Ephraim

This course examines the concept of “strange” and the figure of the “stranger” in a wide range of written and visual texts, from Shakespeare to Albert Camus to the 2017 horror/comedy film *Get Out*. We will focus on depictions of religious, racial, gendered, and other forms of alienation and otherness, from both an insider’s and outsider’s perspective.

This course will be offered for the first time during C Term of the 2019-20 academic year, and in the same term for alternate years thereafter (C Term, academic year 2021-2022, etc.).

**Explanation of Motion:**

This course will be offered in place of EN 3224: Picturing Shakespeare, which is addressed in a separate proposal.

**Rationale:**

The rationale is two-fold. The current 3224 course did not attract sufficient student interest when it was first offered during the 2017-8 academic year. More significantly, EN 3226 seeks to enrich the HUA course offerings with its focus on race, religion, identity, and nationhood. These topics are of great interest to our increasingly diverse student body; the course themes are also relevant to my own research, thus providing an opportunity for dynamic intersections of pedagogy and scholarship. The proposed course allows for students to continue the thematic orientation of my Introduction to Literature course, which I taught for the first time in D term 2018 with great success (based on enrollment and student evaluations). The proposed course has the potential to attract students from my Introduction to Literature course as well as other students who are interested in the racial, religious, nationalistic, and sexual aspects of identity.

**Impacts on students:**

None, in terms of their ability to fulfill HUA course requirements. It will be a positive impact with regards to students work on breadth and depth.

**Resource Requirements:**

- a) What currently available resources will be needed - Instructor and classroom for 20 students.
- b) What new resources will be needed - None

**Implementation Date:**

This new course description will take effect for the 2019-2020 academic year and should be listed in next year's undergraduate course catalog.



**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mattson, Chair)  
**Re:** Motion to change the title and description of PY 2716 “Philosophies of Difference”  
Cat. II, and to cross-list the course as PY/RE

**Motion:** The Committee on Academic Operation recommends and I move that the change of the title and description of PY 2716 “Philosophies of Difference” and cross-listing of the course as PY/RE 2716 be approved.

**Existing title, description and course offering schedule:**

**PY 2716. PHILOSOPHIES OF DIFFERENCE**

Cat. II (currently offered in 2019-2020, 2021-2022, etc.)

This course examines difference as a concept and as phenomenon that emerges in everyday experience, especially in regard to identity categories like gender, race, class, sexuality, ability, and species. Students will consider the ontological categories of same and different, normal and abnormal, and self and other as they apply to psychological processes of identify formation and social processes of inclusion and exclusion. We will also explore how our conceptions of difference are influenced by and influence (for example) religion, science, politics, work, and art. Most importantly, we will inquire into the foundations of the categorizations of beings and things that are operative in our contemporary cultures and subject them to intellectual scrutiny. Course readings span a range of philosophical traditions including Continental philosophy, analytic philosophy, Latina/o philosophy, feminist philosophy, queer theory, critical race theory, disability theory, and environmental philosophy.

**Proposed title, description, and course offering:**

**PY/RE 2716. GENDER, RACE, AND CLASS**

Cat. II (currently offered in 2019-2020, 2021-2022, etc.)

This course examines the meanings of social categories such as gender, race, class, sexuality, ability, nationality, and species. What are the philosophical and religious foundations of the categorizations of beings operative in our contemporary cultures? How do attributions of same and different, normal and abnormal, rational and irrational, human and nonhuman shape social and political processes of inclusion and exclusion? Are social categories real, constructed, or both? This course focuses primarily on intersectional approaches to oppression and identity that see social categories such as gender, race, and class as mutually constitutive rather than separable. Course readings span a range of philosophical and religious traditions including Continental philosophy, analytic philosophy, Latina/o studies, feminist theory, queer theory, critical race theory, disability

studies, and environmental studies. Students may not earn credit for both PY 2716 and RE 2716.

**Explanation of Motion:**

We are changing the description for three primary reasons. First, the previous title “Philosophies of Difference” was opaque to students (as they reported in the class) and did not give students or transcript readers a strong sense of what the course is about, namely identity categories like gender, race, and class. The new title is more direct in naming the course subject matter. Second, in light of a retirement in the philosophy and religion group and the subsequent hire of two faculty members and curriculum adjustment, several different faculty members could potentially teach this course. We want the description to be broad enough to encompass each professor’s incarnation of the subject, including incarnations that are primarily based in philosophical considerations and those based in religious ones. Three, the landscape of feminist theory, which is one of the subjects of this course, has also changed rapidly to broaden its notions of difference from male/female differences to include those of race, sexuality, class, disability, and others. We therefore want our description to reflect current advances in the field.

**Rationale:**

We are not changing the frequency with which this course is taught or the class size and therefore we anticipate no change to distribution requirements in the Humanities & Arts department, class sizes, or other student impacts.

**Impacts on students:**

There will be no change to the frequency with which this course is offered.

**Resource Requirements:**

- a) Instructor and classroom for 50 students.
- b) No new resources needed.

**Implementation Date:**

This new course description will take effect for the 2019-2020 academic year and should be listed in next year’s undergraduate course catalog.

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (prof. Mattson, Chair)  
**Re:** Motion to add CHE 3722 Bioenergy approved by the Chemical Engineering Department on March 18, 2019.

**Motion:** The Committee on Academic Operation recommends and I move, that CHE 3722. Bioenergy as described below, be added.

**Course/Catalog Description:** CHE 3722. BIOENERGY.

(Cat. II).

The primary goal of this course is to provide students the necessary understanding and tools to evaluate biochemical and thermochemical biofuel production technologies. The secondary goals include developing understanding of 1) fuel properties, 2) biomass resources, 3) basic enzyme kinetics, 4) biochemical reactor design, 5) the corn ethanol process, 6) challenges to cellulosic ethanol, 7) biomass gasification reactions and thermochemistry, 8) gasification reactor design, and 9) techno economic concepts of biofuel processes.

Recommended background: Knowledge of chemistry (CH 1010, 1020, and 1030 or equivalent), differential and integral calculus and differential equations (MA 1021-1024 and 2051 or equivalent), and chemical processing (CHE 2011 or equivalent).

Students may not receive credit for both CHE 372X and CHE 3722.

**Anticipated Instructor:** Prof. Michael Timko

**Rationale:** The Chemical Engineering Department intends to offer at least one foundation course for each of our four concentrations every year. This course will serve, in alternating years with CHE 3702. Energy Challenges in the 21<sup>st</sup> Century, as a foundation course for our Energy Concentration. It will also be counted towards our Biological and Environmental Concentrations.

Continuing to meet growing energy demands will be one of the key technical challenges of the 21<sup>st</sup> century. Identifying alternatives to petroleum fuels will be an important component of the energy challenge due to the reliance of the internal combustion engine on hydrocarbon fuels, potential environmental and climate threats associated with CO<sub>2</sub> emissions, and dwindling reserves of low-cost petroleum. Biomass is the world's largest source of renewable carbon and a wide range of technologies have been proposed to convert this resource to fuels. A new generation of chemical engineers – fluent in both biochemical and thermochemical biofuel technologies – is needed to develop these technologies into economical and environmentally responsible commercial processes. This course aims to help produce these engineers.

This course was offered as an experimental course, CHE 372X, with the same title in 2016-17 and 2018-19. Table 1 shows the enrollment numbers and outcomes from questions 1, 2, and 9 for those offerings. Table 2 shows the response for question 19 (formerly 26b) for the two experimental offerings

Table 1. Enrollment and assessment results for CHE 372X.

Year	Enrollment	Responses	Q1	Q2	Q7 (formerly 9)
2016-17	32	27	4.44	4.70	4.08
2018-19	34	16	3.4	3.6	4.1

Table 2. Responses to question 19 (formerly 26b), hours/week spent outside of class on CHE 372X.

Year	0	1-5	6-10	11-15	16-20	>=21
2016-17	1	22	4	0	0	0
2018-19	0	6	7	2	1	0

Overall, student feedback was positive, especially in the 2016/2017 offering. Many students cited the course as one of their favorites at WPI and that it inspired them to learn more about alternative energy. The 2018/2019 reviews remained solid, but were not as uniformly positive as the in the 2016/2017 version, due to a combination of low response (16/34) and simultaneous addition of too many experimental elements. By judicious sampling from the two previous versions, future instructors will be able to implement innovative teaching elements in a controlled fashion – and without development of new methods preparation of which might otherwise detract from the core learning objectives. Likewise, the instructor was satisfied with learning outcomes, especially on the use of the course to teach humanitarian, design, and economic material that is either at the periphery of the standard chemical engineering curriculum or highly back-loaded.

**Implementation Date:** Implementation date for this action is the 2020-2021 Academic year.

**Resource Needs:** This course will be taught by a Chemical Engineering Department faculty member as part of his normal teaching load. No new or specialized resources are required.

**Impact on Distribution Requirements and Other Courses:** This course will count as an Engineering Science and Design elective course for CHE majors. It will also be included in the lists of courses that count towards Energy and Environmental Concentrations for Chemical Engineering Majors. There are no known or anticipated impacts on other department's requirements.

### Original Experimental Course Proposal

**To:** Chair, Committee on Academic Operations

**From:** Susan C. Roberts, Head, Chemical Engineering Department

**Re:** Motion to add CHE 372X. Bioenergy approved by the Chemical Engineering Department on November 20, 2015

**Date:** \_11 / 23 / 15\_

The Chemical Engineering Department requests the approval of the following experimental course CHE 372X. Bioenergy in Academic Years 2016/17 and 2018/19 during B term.

**Contact:** Prof. W. M. Clark

**Preferred term:** B

**Expected enrollment:** 30

**Course type:** Cat. II

**Intended audience:** If the course becomes permanent: Chemical Engineering students, especially those with an Energy Concentration, Environmental Concentration, or Biological Concentration and some Chemistry, Mechanical Engineering, and Environmental Engineering students.

**Anticipated Instructor:** Prof. Michael Timko

**Course/Catalog Description:** CHE 372X. BIOENERGY.

Cat.II The primary goal of this course is to provide students the necessary understanding and tools to evaluate biochemical and thermochemical biofuel production technologies. The secondary goals include developing understanding of 1) fuel properties, 2) biomass resources, 3) basic enzyme kinetics, 4) biochemical reactor design, 5) the corn ethanol process, 6) challenges to cellulosic ethanol, 7) biomass gasification reactions and thermochemistry, 8) gasification reactor design, and 9) techno economic concepts of biofuel processes.

Recommended background: Knowledge of chemistry (CH 1010, 1020, and 1030 or equivalent), differential and integral calculus and differential equations (MA 1021-1024 and 2051 or equivalent), and chemical processing (CHE 2011 or equivalent).

**Rationale:** The Chemical Engineering Department intends to offer at least one foundation course for each of our four concentrations every year. This course will serve, in alternating years with CHE 3702. Energy Challenges in the 21<sup>st</sup> Century, as a foundation course for our Energy Concentration. It will also be counted towards our Biological and Environmental Concentrations.

Continuing to meet growing energy demands will be one of the key technical challenges of the 21<sup>st</sup> century. Identifying alternatives to petroleum fuels will be an important component of the energy challenge due to the reliance of the internal combustion engine on hydrocarbon fuels, potential environmental and climate threats associated with CO<sub>2</sub> emissions, and dwindling reserves of low-cost petroleum. Biomass is the world's largest source of renewable carbon and a wide range of technologies have been proposed to convert this resource to fuels. A new generation of chemical engineers – fluent in both biochemical and thermochemical biofuel technologies – is needed to develop these technologies into economical and environmentally responsible commercial processes. This course aims to help produce these engineers.

**Resource Needs:**

This course will be taught by a Chemical Engineering Department faculty member as part of his normal teaching load. The Chemical Engineering Department recently dropped 2 cat II courses (3910 and 3920) and added a new Department Head and an NTT Faculty member. These changes provide an opportunity to add this experimental course without additional resources. No new or specialized resources are required.

**Assessment:** Any motion to convert this course to a permanent course will include assessment from student course evaluations from the experimental offerings. At a minimum outcomes of include outcomes of questions 1, 2, 9, and 26 will be presented and discussed along with instructor reflections on the course.

**Impact on Degree Requirements:** This course, and any permanent course that might arise from it, will count as an Engineering Science and Design elective course. It will also be included in the lists of courses that count towards Energy and Environmental Concentrations for Chemical Engineering Majors.

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations (Prof. Mattson, Chair)  
**Re:** Motion to revise degree requirements for Computer Science degree

**Motion:** The Committee on Academic Operation recommends and I move, that the following changes to the distribution requirements be adopted, as voted on by the Computer Science faculty on April 9<sup>th</sup> 2019.

### **Program Distribution Requirements for the Computer Science Major**

This motion updates Note 1 in the undergraduate catalog with **new text underlined and in bold** and ~~removes text with strikethroughs.~~

#### **NOTES:**

1. a. Only CS 1101, CS 1102 and computer science courses at the 2000-level or higher will count towards the computer science requirement. CS 2119 will not count towards the computer science requirement.
- b. Must include at least 1/3 unit from each of the following areas: Systems (CS 3013, CS 4513, CS 4515, CS 4516), Theory and Languages (CS 3133, CS 4120, CS 4123, CS 4533, CS 4536), Design (CS 3041, CS 3431, CS 3733, CS 4233), and Social Implications of Computing (CS3043, STS 2208, GOV/ID 2314, GOV/ID 2315, IMGD 2000, IMGD 2001). (If STS 2208, GOV/ID 2314, GOV/ID 2315, IMGD 2000 or IMGD 2001 is used to satisfy this requirement, it does not count as part of the 6 units of CS.)
- c. At least 5/3 units of the computer science requirement must consist of 4000-level **or graduate CS** courses. ~~These units can also consist of WPI CS graduate courses.,~~ **except for CS 5007 and CS 505.**
- d. Any of the following graduate courses (when used as described in Note 1c) can be used to satisfy the undergraduate Theory and Languages area requirement: CS 5003, CS 5084, CS 503, CS 536, CS 544, or CS 584.**  
**Any of the following graduate courses (when used as stated in Note 1c) can be used to satisfy the undergraduate Systems area requirement: CS 502, CS 533, or CS 535.**  
**Any of the following graduate courses (when used as stated in Note 1c) can be used to satisfy the undergraduate Design area requirement: CS 509, CS 542, CS 546, CS 561, or CS 562.**
- ~~d.~~e. Only one of CS 1101 and CS 1102 may count towards the computer science requirement. Only one of CS 2301 and CS 2303 may count towards the computer science requirement.

#### **Rationale:**

More students are aiming to complete “more in four” and, in particular, take graduate classes to satisfy the joint BS/MS degree. Each undergraduate must demonstrate “breadth” by taking courses from a number of Areas:

- Systems (CS 3013, CS 4513, CS 4515, CS 4516)
- Theory and Language (CS 3133, CS 4120, CS 4123, CS 4533, CS 4536)
- Design (CS 3041, CS 3431, CS 3733, CS 4233)

- Social Implications (CS 3043, GOV/ID 2314, GOV/ID 2315, IMGD 2000, IMGD 2001)

Some students have enrolled in a graduate course for undergraduate credit that provides more advanced content to a corresponding undergraduate course. For example, students enrolled in CS 502 OPERATING SYSTEMS have demonstrated competency in Systems above and beyond what was provided by CS 3013 OPERATING SYSTEMS. However, these students would not have demonstrated they have satisfied the undergraduate Systems Area requirement because CS 502 is not on the list of acceptable classes.

The CS department has a number of graduate bins – similar to undergraduate Areas – that graduate students must complete to demonstrate breadth. Three of these bins have the same name as their undergraduate counterpart and it just makes sense that undergraduate students taking these graduate courses for undergraduate credit would be able to satisfy the corresponding undergraduate area.

It is important to note that an undergraduate student can enroll in a graduate course but choose not to use that course to satisfy any undergraduate degree requirement; in these cases, the graduate course will not satisfy any of the area requirements.

**Impact on Course in CS Curriculum:** Most of our undergraduate students satisfy these four undergraduate area requirements simply by taking the necessary undergraduate courses. If more students take advantage of the clarified policy, there may be a small increase in the undergraduate student population in our graduate courses.

**Implementation Date:** 2019 – 2020 Academic year.

**Resource Needs:** No additional resources.

**Impact on Distribution Requirements:** This motion contains the full changes to Note 1 which describes the list of acceptable courses.



**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Committee on Academic Operations  
**Re:** Motion to add IMGD 4403: Motion Capture Techniques approved by IMGD Steering Committee on April 11, 2019.

**Motion:** The Committee on Academic Operations recommends and I move that the course IMGD 4403: Motion Capture Techniques be approved as a permanent Cat II course beginning in AY 2019-20.

**Contact:** Prof. Jennifer deWinter

**Expected enrollment:** 15

**Intended audience:** IMGD (BA) and IMGD Technology (BS) majors, IMGD minors, and students interested in the capture and interpretation of human motion data.

**Instructor:** Farley Chery and other qualified faculty.

**Course/Catalog Description:**

IMGD 4403. Motion Capture Techniques

*Cat II.*

This course will introduce students to the principles of motion capture as applied to the production of digital games and cinema. Topics will include the study of different forms of mocap technology, the design of efficient animation pipelines, techniques for combining keyed and mocap animation, and real-time capture into game engines. Students will gain experience in directing actors, blending hand-keyed animations, applying the laws of physics to motion data sets, building tools and troubleshooting captured data. Students cannot receive credit for both IMGD 4403 and IMGD 440X.

Recommended background: Students should have knowledge of basic 3D animation principles and software such as is provided by IMGD/AR 2333: 3D Animation I. They should also have knowledge of structural anatomy and kinematics such as is provided by IMGD 2048: Technical Art and Character Rigging.

This course will be offered in 2019-20, and in alternating years thereafter.

**Rationale:**

IMGD has identified technical art (a field which includes motion capture) as a high- priority area of strategic growth and curricular focus. The proliferation of motion capture tools for medical research, robotics and entertainment is steadily increasing as enabling technologies become more affordable.

The purpose of this course is to give students the ability to expressively capture human movement in an efficient production environment. Students will gain experience with a broad range of skills, including:

- Learning to work in passes, hold poses, obtain solid arcs and emphasize contact points.
- Rig for production with enough flexibility to allow different styles of capture.
- Clean and edit captured data to maximize motion quality.
- Serve as a technician and problem-solver for a performance capture shoot.
- Research tools and techniques for pipeline integration.

- Perform a cost-benefit analysis of key frame animation vs mocap when compiling a business strategy.

**Impact on Distribution Requirements:**

IMGD (BA) majors can apply this course towards either their 8/3 IMGD (General) requirement or their 4/3 IMGD Electives requirement. IMGD Technology (BS) majors can apply this course towards their 5/3 IMGD (General) requirement. IMGD minors can apply the course towards their 6/3 IMGD requirement. The course also counts as 2 graduate credits for IMGD MS students. Students who have completed IMGD440X may not receive credit for credit for IMGD4403.

**Resource Needs:**

**Instructor:** The course will be taught by Prof. Farley Chery as part of his normal teaching load. The experimental version of this course (IMGD 440X) was part of Prof. Chery's teaching load for the past two years.

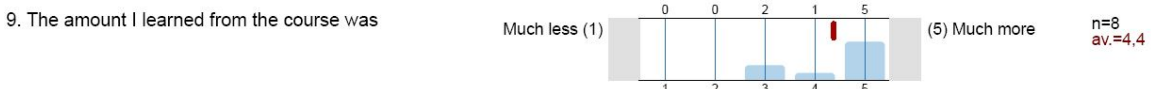
**Classroom:** The class can be taught in either the IMGD Lab (FL 222) or the Zoo Lab (FL A21). Due to the limited availability of motion capture equipment, the class size is limited to 15 students.

**Information Technology:** The course will be taught using existing software that is currently licensed in the IMGD labs and equipment from the collection of the IMGD program.

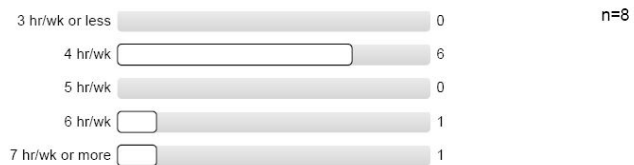
**Library resources:** No new library resources are required.

## Assessment:

The experimental version of this course (IMGD 440X) was assessed by student feedback, particularly the outcomes of questions 1, 2, 9, and 26 of student course evaluations. The questions below are numbered differently, but are the same as in experimental course proposal. Students have been able to manipulate motion capture data to produce cleaner arcs and add extremes for better readability based on the principles of animation. The hand-keyed animation has served as the polishing pass in which animators usually push the models to stylize or create aesthetically pleasing results.



26A. On average, how many hours of the formally scheduled hours for lecture, conference, and labs did you ATTEND each week?



**Course Corrections:**

Students reported spending fewer hours the first offering of the course; adding new topics to the course helped alleviate this issue. New subjects include understanding linear algebra conceptually, creating and understanding the functioning principles of a subspace animation transfer tool, and cloth simulations, animated sculpting topics for integrating artistic assets, pose based deformations and simulation techniques to mimic fat and muscle. The course's second run is currently happening (D-term 2019). Initial discussions and reports indicate that the students find the course rigorous and have increased the time spent on the new material.

## **Original Experimental Course Proposal:**

**To:** Chair, Committee on Academic Operations

**From:** Jennifer deWinter, IMGD

**Re:** Motion to add Motion Capture Techniques (IMGD 440X) approved by IMGD Steering Committee on \_\_\_\_/\_\_\_\_/\_\_\_\_.

**Date:** \_\_\_\_/\_\_\_\_/\_\_\_\_ [Date submitted to CAO]

The IMGD program requests request the approval of the following experimental course (IMGD 440X: Motion Capture Techniques) in Academic Years 2016 and 2017 during D term.

**Contact:** Prof. Jennifer deWinter

**Preferred term:** D17, D18

**Expected enrollment:** 10-12 *can support up to 25*

**Intended audience:** IMGD majors and minors

**Anticipated Instructor:** Farley Chery

### **Course/Catalog Description:**

#### **IMGD 440X. Motion Capture Techniques.**

This course will introduce students to the principles of motion capture as it applies to games, interactive media and cinema. Students will learn how to direct virtual actors, collect motion data using a variety of technologies and apply the laws of physics to datasets. Specific topics may include: Pipeline design, data reuse, efficient data optimization, methods for combining keyed and motion captured animation, and weight checking.

Recommended background: Technical Art and Character Rigging (IMGD 2048), 3D Modeling II (IMGD/AR 3201) and 3D Animation II (IMGD/AR 3333).

NOTE: IMGD/AR 3333 is a new Cat I course currently under proposal for AY2017-18 in a separate motion.

### **Rationale:**

IMGD has identified technical art topics (such as motion capture) as high- priority areas of curricular focus and strategic growth. Inertial mocap systems are becoming more affordable, and will soon be available in consumer-level VR and gaming systems. The use of mocap technology in medical simulation and research, robotics and entertainment is rapidly increasing. These industries are looking for students with demonstrable skills in visual data acquisition and editing. This upper level course will bring together all the skills students have learned to create a solid pipeline for interactive and film animation.

The purpose of this course is to give students the ability to establish efficient pipelines and apply problem solving-techniques that will enable them to work effectively in real-world production environments and schedules.

Specific areas of training will include:

- Production rigging
- Performance capture
- Learning to work in passes
- Strategic cost analysis of different animation strategies (keyframe vs mocap)

#### Resource Needs:

*Instructor:* This course will be taught by Prof. Farley Chery. As a new hire, his teaching schedule is currently under arrangement, and this course will be part of his regular teaching load.

*Classroom:* *Classroom:* This course will primarily be taught in the IMGD Lab (Fuller 222), with some classes held in an open-space setting on an *ad hoc* basis.

*Library:* No additional library resources will be required.

*Information Technology:* The course will be taught using software that is currently licensed and installed in the IMGD labs.

**Assessment:** This experimental course will be assessed based on the aesthetic and technical quality of the student work produced in the course assignments. Student feedback, particularly the outcomes of questions 1, 2, 9, and 26 of student course evaluations, and instructor feedback and reflections will also be taken into account.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. R. Rao, Chair)

**Re:** Motion to Add CS 4000-level Courses to BS/MS List

**Motion:** The Committee on Graduate Studies and Research and the Computer Science Department, I move that the list of CS 4000-level courses that count for BS/MS credit in the Computer Science graduate program be amended as described below.

**Description of changes to the WPI Graduate Catalog:**

On page 79 of the Graduate Catalog, a list of 4000-level courses that may count for B.S./M.S. courses is provided. This motion would alter the list as follows. Additions are indicated in underlined italics (with deleted text indicated by ~~strike throughs~~).

The CS department allows only selected 4000-level undergraduate course credits to count towards the B.S./M.S. The CS 4000-level course credits that may be counted towards both degrees are:

- 4100, 4120, 4123, 4233, 4241, 4341, 4401, 4404, 4432, 4445, 4513, 4515, 4516, 4518, 4533, 4536, 4731, 4732, 4802, 4803
- 4000-level Undergraduate Independent Studies, with permission of instructor and either the Graduate Committee or the Department Chair

On page 80 of the Graduate Catalog, a table of courses is provided in which a student may earn credit for either the undergraduate course or the graduate course, but not both. This motion would add an entry for CS 4802 with CS 582 as shown below. Such an entry already exists for CS 4803 with CS 583, as shown below.

Undergraduate Course	Graduate Course
<u>CS 4802 Biovisualization</u>	<u>CS 582 Biovisualization</u>
CS 4803 Biological and Biomedical Data Mining	CS 583 Biological and Biomedical Data Mining

**Rationale:**

Students have been receiving B.S./M.S. credit for CS 4802 and 4803 through a petition to the CS graduate coordinator and the instructors of these courses. Both 4000-level classes are treated as equivalent to an existing CS graduate class and thus have the appropriate rigor to merit B.S./M.S. credit.

The course descriptions for both CS 582 and CS 583 already indicate that students may not earn credit for their corresponding undergraduate courses, CS 4802 and CS 4803, respectively. The instructors for CS 4802 and CS 4803 support this change.

The historical enrollment for CS 4802 and CS 582 are follows:

Term/Year	CS 4802	BCB 4002	CS 582	BCB 502
Spring/C 2017	14	5	0	0

Spring/C 2018	24	3	1	0
Spring/C 2019	12	3	3	0

The Computer Science Department faculty voted to approve this motion on December 4, 2018.

**Resource Impact:** No additional resources are required.

**Implementation Date:** The proposed implementation date is January 1, 2019.



**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. R. Rao, Chair)

**Re:** Motion to Adjust PhD Coursework and Research Requirements

**Motion:** The Committee on Graduate Studies and Research and the Computer Science Department, I move that the requirements for the Ph.D. degree in Computer Science be adjusted as described below.

### **Description of changes to the WPI Graduate Catalog:**

On page 79 of the Graduate Catalog, the requirements for the Ph.D. are listed. This motion would alter the requirements as follows. Additions are indicated in underlined italics (with deleted text indicated by ~~strike-throughs~~).

~~The coursework component consists of at least 27 graduate credits, including 3 credits of graduate level mathematics. These 27 coursework credits must contain at least 15 graduate credits in computer science.~~ The coursework component must include 1) the completion of the student's Ph.D. Breadth Requirements, 2) 3 credits of graduate-level mathematics, and 3) 15 graduate credits in Computer Science courses, independent studies, or directed research (these 15 credits may include credits earned as part of completing the Ph.D. Breadth Requirements). Coursework credits taken outside eComputer sScience must be approved by the student's advisor.

The student may also enroll for research credits, but is only allowed up to 18 directed research credits prior to the ~~acceptance of the written dissertation proposal by the Dissertation Committee~~ completion of the Ph.D. candidacy requirements. The Ph.D. candidacy requirements are the completion of the Ph.D. Breadth Requirements and the Ph.D. Research Qualifier. With the approval of the Dissertation Committee, the student applies for and takes the Ph.D. comprehensive examination. This examination must be passed prior to the completion of the dissertation defense and is normally taken after some initial dissertation research has been performed. With approval of the Dissertation Committee, the student applies for and takes the dissertation proposal examination, usually within one year of the Ph.D. candidacy.

The Ph.D. research component consists of at least 30 credits (including any research credits earned prior to the acceptance of the dissertation proposal and excluding any research credits applied toward a master's degree) leading to a dissertation and a public defense, which must be approved by the student's Dissertation Committee.

### **Rationale:**

The revisions in paragraphs 1 and 2 remove the 27-credit requirement for the coursework component and changes the cap on directed research credits from applying to the period prior to the PhD proposal to instead apply to the period prior to candidacy, matching the WPI general guidance on page 23 of the graduate catalog. The change also defines PhD candidacy in the catalog rather than being mentioned only in the department's regulations document.

In the past, some students have enrolled in more than 18 directed research credits prior to the proposal. This has required a retroactive reclassification of directed research credits to independent study credits in order for the students to graduate. There is often little practical difference between an independent study and directed research at the graduate level in the department, so the requirement thus introduces complexity without an impact on the student's education. By rewording the 27-credit requirement and changing the range to be up to candidacy instead of the proposal, students are less likely to violate the requirements.

The Computer Science department faculty voted to approve this motion on February 26, 2019.

**Resource Impact:** No additional resources are required.

**Implementation Date:** The proposed implementation is the 2019-2020 academic year.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. R. Rao, Chair)

**Re:** Motion to Adjust PhD credits for Combined MS/PhD Students

**Motion:** On behalf of the Committee on Graduate Studies and Research and the Computer Science Department, I move that the requirements for the Ph.D. degree in Computer Science be adjusted as described below.

### **Description of changes to the WPI Graduate Catalog:**

On page 79 of the Graduate Catalog, the requirements for the Ph.D. are listed. This motion would alter the requirements as follows. Additions are indicated in underlined italics (with deleted text indicated by ~~strike throughs~~).

Students are advised to contact the department for detailed rules, as there are departmental guidelines, in addition to the university's requirements, for the Ph.D. degree.

Upon admission, the student is assigned an academic advisor and together they design a Plan of Study during the first semester of the student's Ph.D. program.

The student must satisfy the Ph.D. Qualifying Requirement, consisting of the Breadth Requirement and the Research Qualifying Requirement. These requirements are described in the Graduate Regulations on the CS department website <https://web.cs.wpi.edu/Intranet/Graduate/guide.html>.

Upon successful completion of the Ph.D. qualifying requirement, the student becomes a computer science Ph.D. candidate. The student's Dissertation Committee must be formed within the first year of candidacy. The student selects a research advisor from within the CS department, and together they select, with the approval of the CS Graduate Committee, three additional members, at least one of whom must be from outside the WPI CS department. The Dissertation Committee will be responsible for supervising the comprehensive examination, and approving the dissertation proposal and final report.

The Ph.D. degree requirements consist of a coursework component and a research component, which together must total at least 60 credit hours beyond the master's degree requirement for PhD students who earned a MS degree in a program other than CS at WPI. The coursework and research component must total at least 57 credit hours for students who earn both a master's degree and Ph.D. degree in CS at WPI.

### **Rationale:**

The first change, in paragraph 3, is to add an "s" to "https." This provides students with additional assurances that they are receiving an authenticated version of the graduate requirements.

The specification of 57 credits for PhD 90 students is required because the WPI CS MS degree requires 33 credits to complete. Requiring “at least 60 credit hours beyond the master’s degree” appears to indicate that PhD 90 students would need to earn 93 credits at WPI. This makes the “PhD 90” label inaccurate and it means a student could not complete the PhD degree in 5 years by simply taking a full-time load, since they would be 3 credits short of the 93 required credits.

This nuance may arise from the WPI CS department requirement of 33 credits for the MS degree compared to WPI’s minimum of 30 credits. In the graduate catalog on page 22, the following text appears:

**General Requirements for the Master of Science and Master of Engineering**

The student must obtain a minimum of 30 credit hours of acceptable course, thesis or project work.

These edits result in the labels “PhD 60” and “PhD 90” actually matching the minimum number of graduate credits required by each variant of the PhD.

The Computer Science department faculty voted to approve this motion on February 26, 2019.

**Resource Impact:** No additional resources are required.

**Implementation Date:** The proposed implementation is the 2019-2020 academic year.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. R. Rao, Chair)

**Re:** Motion to Cross-list ECE 673 as CS 673 and include it in Cybersecurity bin

**Motion:** On behalf of the Committee on Graduate Studies and Research and the Computer Science Department, I move that ECE 673 be cross-listed as CS 673 and counted towards the cybersecurity bin in CS graduate distribution requirements.

**Description of changes to the WPI Graduate Catalog:**

On page 78 of the Graduate Catalog, a list of breadth bins is provided along with courses that belong to each bin. This motion would alter the list as follows. Additions are indicated in *underlined italics* (with deleted text indicated by ~~strike throughs~~).

- **Cybersecurity:** 557, 558, 564, 571, 578, 673

**Rationale:**

The CS department already cross-lists ECE 578 (Cryptography and Data Security) and counts it towards our cybersecurity bin. ECE 673 (Advanced Cryptography) likewise covers material of use to Computer Science graduates studying security and should also satisfy this bin.

The Computer Science Department faculty voted to approve this motion on December 4, 2018.

**Resource Impact:** No additional resources are required.

**Implementation Date:** The proposed implementation date is academic year 2019-2020.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Rao, Chair)

**Re:** Motion to approve Interdisciplinary M.S. in Nuclear Science and Engineering

**Motion:** The Committee on Graduate Studies and Research recommends and I move that the following interdisciplinary M.S. degree in Nuclear Science and Engineering be approved.

**Program goals:** The goal of this proposed program is to obtain a Master's Degree level education in Nuclear Science and Engineering for personal educational growth and future opportunities in the field. By design, it should mirror the coursework and rigor of other, similar programs at other well-known universities offering such a degree program.

**Planned coursework summary:** The following course plan meets the requirements of comparable programs as it covers the concepts (laid out previously) that are common to each program. In addition, the following program of study includes courses that will help prepare the student to most effectively implement nuclear engineering principles in a design project in industry with an understanding of the underlying mathematics, an understanding of adjacent topics in physics, and a background in research.

**NSE 510:** *Introduction to Nuclear Science and Engineering* (3 credits)

**Independent Study:** *Applied Nuclear Physics* (3 credits)

**NSE 530:** *Health Physics* (3 credits)

**NSE 550:** *Reactor Design, Operations & Safety* (3 credits)

**NSE 595:** *Special Topics: Dosimetry and Shielding* (3 credits)

**Independent Study:** *Nuclear Instrumentation* (3 credits)

**PH 597:** *Special Topics: Radiation Biology* (3 credits)

**PH 597:** *Special Topics: Mathematical Methods of Physical Sciences* (2 credits)

**MA 4451:** *Boundary Value Problems* (2 credits)

*Directed Research, Fall 2018 and Spring 2019* (6 credits)

Total: 31 credits

**Capstone Report:** The degree will complete with a Capstone Report in place of a cumulative final exam. The goal of this approximately 15 page report will be to assess the topics covered throughout the 31 credits of coursework and research, and to show how these concepts combine and support each other. The single credit value of the report indicates that it would not be a major work of original research or project work, but instead will be equivalent to a final program exam that serves to demonstrate understanding of all the major concepts needed to earn an MSc degree in Nuclear Science and Engineering.

**M.Sc. in NSE Graduate Committee:**

Dr. Dave Medich, Associate Professor, Department of Physics, Director of the NSE program at WPI (**Advisor**)

Dr. Blake Currier, Assistant Teaching Professor, Department of Physics

Dr. Germano Iannacchione, Professor, Department of Physics

**Proposed WPI program course descriptions:**

- **NSE 510 Introduction to Nuclear Science and Engineering:** This introductory course provides an overview of the field of nuclear science and engineering as it relates to nuclear power and nuclear technologies. Fundamental concepts relevant to nuclear systems are introduced, including radioactivity, radiation interaction phenomena, chain reaction physics, and transport in engineering materials. Nuclear reactor physics and design concepts are introduced with focus on light water fission reactors. A survey of advanced nuclear technologies and applications is provided. Prerequisites: graduate or senior standing or consent of the instructor.
- **NSE 520 Applied Nuclear Physics:** This course introduces engineering and science students to the fundamental topics of nuclear physics for applications, basic properties of the nucleus, nuclear radiations, and radiation interactions with matter. The course is divided into four main sections: (1) introduction to elementary quantum mechanics, (2) nuclear and atomic structure, (3) nuclear decays and radiation, and (4) nuclear matter interactions and nuclear reactions. Prerequisites: Physics of mechanics and electrodynamics (PH1110/11 and PH1120/21) and mathematical techniques up to and including ordinary differential equations (MA2051)
- **NSE 530 Health Physics:** This course builds on fundamental concepts introduced in NSE 510 and applies them to key topics in health physics and radiation protection. Health physics topics include man-made and natural sources of radiation, dose, radiation biology, radiation measurement, and radiation safeguards. Radiation protection concepts are explored as they apply to existing and advanced nuclear power generators, including reactor safety, nuclear waste and byproducts, regulatory constraints, and accident case studies. Prerequisites: graduate standing or consent of the instructor.
- **NSE 540 Nuclear Materials:** This course builds from NSE 510 and explores effects of radiation on materials and the unique nature of nuclear fuels. We will dive into problems such as how long a materials will survive in a nuclear fusion or fission reactor, how electronics degrade in a high radiation environment, and how breeder reactors are designed to produce as much fuel as they consume. Relationships are developed between nuclear effects on crystal structure, microstructure, degraded material performance, and bulk properties of engineering and electronic materials. Nuclear fuels and fuel cycles are introduced.
- **NSE 550 Reactor Design, Operations, and Safety:** This course provides a systems engineering view of commercial nuclear power plant technology. The generation of nuclear fission energy in a generation II reactor core is followed through all of the conversion processes culminating with the delivery of electric power 1 million homes. Power plant components in the various plant designs and their evolutions are studied, ranging from the first commercial reactor designs in the 1950's to the current state of the art, enhanced safety designs of generation III reactors, to advanced design concepts such as small modular reactors. The unique operational, control, and safety characteristics are studied. Safety and protection aspects of reactor design and operation are covered with an eye toward "lessons learned" from the major power plant accidents.
- **NSE 596 Nuclear Instrumentation:** This lab based course will provide students with a fundamental understanding of the principles and applications associated with nuclear radiation detection systems. Students will learn the theory behind many commonly used systems and develop proper measuring techniques when evaluating levels of photons, neutrons and charge particle radiation. Each lab is designed to provide practical experience for a specific type of detection system, including: gas filled detectors (GMs, ionization chambers and gas filled

proportional counters), organic and inorganic scintillators, and a high purity germanium detector. Topics covered in this course will consist of statistical hypothesis testing, detection limits, paralyzable and nonparalyzable deadtime, gamma spectroscopy and neutron activation.

- **PH 597 Radiation Biology:** This course will introduce the student to fundamental concepts in radiation biology. Initially, theories will be developed concerning the effects of radiation exposure on basic biological systems, such as a virus or a cell. These theories will be based on our knowledge of radiation interaction mechanisms at the atomic/molecular level coupled with our knowledge of cell biology. Once developed, these theories will be compared against experimental observations and expanded to include cellular kinetic responses to radiation. Focus will then shift from the simple cell to more complex biological organisms. Ultimately, the student will be expected to appreciate the practical aspects and consequences of human radiation exposure and to properly apply this information in a radiation safety or medical physics environment.

- **PH 597 Mathematical Methods of Physical Sciences:** The course is recommended to both undergraduate and graduate students. To use mathematics effectively in physics, you need not just knowledge, but skills. Skills can be obtained only through practice. This is exactly the purpose of the course. The emphasis will be not on formal proofs of existence, but on solving problems covering techniques needed by physicists for intermediate and advanced study in subjects such as Classical Mechanics, Electrodynamics, Quantum Mechanics and Statistical Mechanics. You may have been exposed to some of the material of the course before. Nevertheless, my experience is that “being exposed” and “knowing how to use” are different things. It is difficult to learn a new mathematical method and simultaneously apply it to an area of physics which is also new to you. The goal of the course is to enable you to concentrate on new physics without being hampered by the lack of basic mathematical techniques.

- **MA 4451 Boundary Value Problems:** Science and engineering majors often encounter partial differential equations in the study of heat flow, vibrations, electric circuits and similar areas. Solution techniques for these types of problems will be emphasized in this course. Topics covered include: derivation of partial differential equations as models of prototype problems in the areas mentioned above, Fourier Series, solution of linear partial differential equations by separation of variables, Fourier integrals and a study of Bessel functions.

**Comparable programs:** Similar programs offered at Texas A&M University, University of Missouri, Pennsylvania State University, and MIT are described in this document, including course requirements and descriptions. Common topics covered in all of these programs are:

- Nuclear physics
- Radiation – sources, interactions with matter/effects on the human body, measurement
- Reactor theory – reactor design, instrumentation, physics, operations, safety
- Engineering mathematics – linear algebra, partial differential equations, Fourier series, Laplace transforms
- Materials – stresses, thermal hydraulics
- Computational modeling and analysis

**Impact on other programs:** none

**Resources required:** none

**Implementation date:** AY 2018-19



**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Academic Operations (Prof. Mattson, Chair)

**Re:** Motion to approve the May 2019 undergraduate student graduation list

**Motion:** The Office of the Registrar reports that the following candidates have either completed all the requirements for the degree designated in the department or program indicated, or are expected to complete their degree requirements before May 11, 2019. They therefore are or will be eligible to receive that degree, and on behalf of the Committee on Academic Operations, I move that – pending final verification by the Registrar that all those on the list have in fact completed their degree requirements - they be approved for May 11, 2019 graduation.

### **Bachelor of Arts**

#### **Environmental and Sustainability**

##### **Studies:**

Michelle Rosa Mestres

*Double Major*

#### **Interactive Media and Game**

##### **Development:**

Leo Ryan Bunyea

Minor: Computer Science

Grant Andrew Frederick

Evan Boyle Frost

Concentration in Design

Kailun Liu

Concentration in Technical Art

Karl J. Rosenfeld

Minor: Computer Science

Laura Elizabeth Sawin

Minor: Computer Science

Minor: Music

Abdah Anabellah St Fleur

#### **International and Global Studies:**

Michelle Rosa Mestres

*Double Major*

### **Bachelor of Science**

#### **Actuarial Mathematics:**

Jonathan Andrew Furey Cohen

Mikala Elizabeth Dunbar

*Double Major*

Jeremy Mathew John

Sze Yui (Seles) Li

Leah Navickis

Minor: Business

Corey Jacob O'Malley

Marshall James Patroliia

Minor: Business

Zhentian Ren

Jacob Benjamin Steinberg

Minor: Data Science

Junhong Zhang

Minor: Business

#### **Aerospace Engineering:**

Alexander R. Alvarez

Quintin Cecil Barker

Theresa E. Bender

Minor: Electrical and Computer  
Engineering

Troy P. Bergeron

Minor: Computer Science

Katherine Elizabeth Burris

Diana Dritan Celaj

Minor: Electrical and Computer  
Engineering

Colin Yuen-Lim Cooper

Robert Crockett

Heather L. Cummings

Nicholas Joseph Cunha

Amanda Charlotte Dings

Minor: Psychology

Peter David Dohn

Minor: Astrophysics

**Aerospace Engineering cont.:**

Jacob H. Fennick  
Minor: Electrical and Computer  
Engineering  
Kyle Francis Foster  
Minor: Electrical and Computer  
Engineering  
Adam J. Frewin  
Minor: Mathematics  
Minor: Philosophy and Religion  
Jean Patrick Furter  
Eve Marie George  
Minor: Spanish  
Grace Helen Gerhardt  
Minor: English  
Jacob Alan Goldsberry  
Steffany Paige Halfrey  
Minor: Materials  
Zachary Charles Hearl  
Minor: Physics  
Spencer Wynn Herrington  
Harrison M. Hertlein  
Minor: History  
Romelle DeVaughn Jack  
Alexander Burgess Kant  
Evan Robert Kelly  
Minor: Physics  
Nicholas Jon DeGrace Lapierre  
Minor: Astrophysics  
Minor: Mechanical Engineering  
Vanessa Ann Legere  
Minor: Physics  
Nicolas Lucena Farias  
Lucas James Mancinelli  
Nicholas J. Manos  
Minor: Business  
Ty F. Moquin  
Connor McMahon Murphy  
John Ryan O'Neill  
Minor: Electrical and Computer  
Engineering  
Michael Allan Oswald  
Benjamin Pasculano  
*Double Major*  
Jackson N. Peters

Nathan Thomas Siegel  
Minor: Computer Science  
Clifford Edward Smith IV  
Nicholas Jordan Songer  
Justin K. Tavares  
*Double Major*  
Bailey Margaret Waterman  
Daniel Chester Weber  
Minor: Robotics Engineering  
Tyler Michael Weiss  
*Double Major*  
Jackson K. Whitehouse  
Rose A. Whittle  
Amelia Blair Wilson  
Minor: Business  
Jacob L. Wilson  
Minor: Business  
Minor: History  
Marysol Zamaniego Cuahonte  
Zachary Julius Zolotarevsky  
Minor: Electrical and Computer  
Engineering

**Architectural Engineering:**

Edward Jack Andrews  
Minor: Environmental and Sustainability  
Studies  
Michael James Brady  
Anqi Cao  
Nicole M. Collucci  
Christine K. Deidrich  
Minor: Psychology  
Antoine Latiye Harris, Jr.  
Julia Marie Karg  
Alyssa Jordyn Konsko  
Congshan Li  
Minor: Mechanical Engineering  
Yasmeen Logan  
Emily L. Mowatt  
Shealyn Marie Musumeci  
Minor: Sustainability Engineering  
Caitlyn M. Peterson  
Nathan A. Rogers  
Christina L. Skavicus  
Lain Edwin Zembek

**Biochemistry:**

Andrew David Brunelle  
Erica Margaret Davis  
Minor: Biology  
Minor: Global Public Health  
Cristina Caseiro DeOliveira  
Minor: Biology  
Stephen James Foley  
*Double Major*  
Olivia Rose Gray  
*Double Major*  
Michelle Courtney Kerns  
Emily Diane Leclerc  
Oscar Lee  
Samantha Kathryn Lindberg  
Minor: Business  
Aylin Lorraine Padir  
Minor: Biology  
Minor: Global Public Health  
Sarah E. Payne  
Kate D. Romero  
Minor: Global Public Health  
Cielo Angelica Sharkus  
Minor: Environmental and Sustainability  
Studies  
Xuejun Wang

**Bioinformatics and Computational****Biology:**

Daniel Mathieu Champlin  
*Double Major*  
Kylie Ann Dickinson  
Jordan Flores Hollands  
Alicia N. Howell-Munson  
Amanda Wylie Moulaison  
Minor: Data Science  
Haylea Tricia Northcott  
*Double Major*  
Eoin James O'Connell  
Jennifer A. Payano  
Akshaye Amish Shah  
*Double Major*

**Biology and Biotechnology:**

Matthew Joseph Araujo  
Locke Ezra-Ros Bonomo

Brianna Rose Burke  
*Double Major*  
Daniel Mathieu Champlin  
*Double Major*  
Brianna Marie Courteau  
Daniel Bernard Crosby  
Minor: Biochemistry  
Alexander B. Czuchra  
Claire Bytheway Dickson-Burke  
*Double Major*  
Andrew S. Ellis  
Joseph R. Evans  
Jacqueline Pilar Garcia  
Sofia Giansiracusa  
Johan Krishna Girgenrath  
Olivia Rose Gray  
*Double Major*  
Renee D. LeClaire  
Jane Axi Lockery  
Madeline Grace Manfra-Levitt  
*Double Major*  
Emily Rose McGlone  
Lindsey Jane Merrill  
Tien Gia Nguyen  
Haylea Tricia Northcott  
*Double Major*  
Allison Paige O'Neill  
Solimar Ramis de Ayreflor Reyes  
Minor: International and Global Studies  
Samantha E. Randall  
Hammad Mohammad Sadiq  
Michael William Savoie  
Minor: Media Arts  
Edith Morgan Sawyer  
Akshaye Amish Shah  
*Double Major*  
Elena Maria Stratis  
Maxwell Conrad Studley  
*Double Major*  
Bailey Ann Sweet  
Minor: Psychology  
James Andrew Velez  
Elizabeth Alexandria Walkes

**Biomedical Engineering:**

Benjamin Stockard Abram

*Double Major*

Benjamin Russell Aldrich

Fatin Mohammed Alkhaleedi

Michael Mark Antonelli

*Double Major*

Michelle Jeanette Bleau

Kelly Lynn Borden

*Double Major*

Minor: Biology

Hannah P. Bornt

Joshua Scott Boynton

Daniela Marie Cerkanowicz

Aatreya Chakravarti

*Double Major*

Franck J. Coly

MacKenzie Ann Conlen

Minor: Spanish

Alicia Brianne Costi

Minor: Mechanical Engineering

Victoria Jean Crowley

*Double Major*

Alexander Michael Cruz

Minor: Biology

Maria Elizabeth Daigle

*Double Major*

Minor: Spanish

Mary Rose Davis

Minor: Mechanical Engineering

Kristen Elizabeth Dettloff

Minor: Biology

Abigail E. Doyle

Minor: Philosophy and Religion

Julia Ann Dunn

Minor: Mechanical Engineering

Zoey Miya Foley

Minor: Biology

Steven Joseph Franca, Jr.

Mateo Franco Frare

Minor: Spanish

Minor: Biology

Sophia Odessa Gervasio

Shahnaz Isabella Ghahremani

Lauren Elin Guertin

Rosanna S. Heidt

*Double Major*

Minor: Chinese Studies

Erin E. Heinle

Megan Ruth Hendrie

Minor: Materials

Sydney Michelle Hurley

*Double Major*

Lyra Huynh

Minor: Mechanical Engineering

Deborah Kalambayi Njilabu

Anastasia Karapanagou

*Double Major*

Minor: Electrical and Computer  
Engineering

Ravneet Kaur

Minor: Global Public Health

Emily A. Kolaya

Justin Eric Korn

Katherine Eleanor Kowalczyk

Alexander Joseph Kuros

Olivia Marie Elaine Leavitt

Minor: Music

Minor: Biology

Seungjoon Lee

*Double Major*

Christine Lujuo

Joshua David Manning

Stephanie Marie Marcucci

Shion Matsumoto

*Double Major*

Catherine Marie Matyas

Madison Denise Michaud

Minor: English

Brian Wilhelm Moore

Jameson Moore

Matthew Charles Moore

Minor: Materials

Samantha Jeanne Moriarty

Emily M. Morra

Minor: Materials

Emily Margaret Mossman

Minor: Biology

Kyle Robert Mudge

*Double Major*

**Biomedical Engineering cont.:**

Caleb Collins Mullen  
*Double Major*  
Teniola Oguntolu  
Alyssa Meghan Paul  
Marissa C. Pereira  
Minor: English  
Rachel Doris Peterson  
*Double Major*  
Jada Ashari Plummer  
Angelica Cornelia Pollard-Knight  
Elizabeth Ann Quevillon  
Alex Steven Rebello  
Minor: Biology  
Kalyn Marie Ricciuti  
John S. Ringuette  
Aaron R. Rosenthal  
Lara Aliasha Schmoyer  
Minor: Biology  
Minor: Chemistry  
John Patrick Schwamb III  
Nicholas W. Seagrave  
Minor: Mechanical Engineering  
Arth Sharma  
Minor: Chemistry  
Sabriya Zaynab Silva  
*Double Major*  
David P. Smieja  
Stephanie Maria Smieszek  
Minor: Psychology  
Daniel Sochacki  
Minor: Biochemistry  
Giselle Chum Sosa  
Minor: Electrical and Computer  
Engineering  
Sarah R. St. Pierre  
Minor: Mathematics  
Victoria T. Velashea  
Jennifer Evelyn Whelehan  
Melissa Ann Wojnowski  
Lucas C. Zuccolo  
*Double Major*

**Business:**

Mikala Elizabeth Dunbar  
*Double Major*  
Concentration in Financial Technology  
Erik D. Fyrer  
Concentration in General Business  
Marc Charles Printz  
Concentration in Innovation for Social  
Change

**Chemical Engineering:**

Dasia Ali Aldarondo  
Minor: Materials  
Farraj Battal F. Alhanabjah Aldossary  
Saeed Oudah Alshahrani  
Khalid Jamail Alsobhi  
Salvador Alvarado-Olivo  
Michael John Ambrose V  
Laura Beth Auerbach  
Minor: Biology  
John Gerald Bauer  
Minor: Chemistry  
Ashley Nicole Blanchard  
Joseph Charles Bosco  
Minor: History  
Josie Ann Bradshaw  
Minor: Chemistry  
Angela Calvi  
Josue Pablo Canales  
Concentration in Environmental  
Katherine Charla  
Ryan Richard Choate  
Ashley Y. Choi  
Joseph Gabriel Crognale  
Minor: Spanish  
Minor: Biology  
Christopher Lee Cyr  
Donald Parry Robert Dione  
Minor: Materials  
Curtis W. Doiron  
Tyler Allan Donovan  
Minor: Materials  
McKenna Dunn  
Caroline Gah-Lok Flynn  
*Double Major*  
Daniela Fraga Alvarez

**Chemical Engineering cont.:**

Lucas Paul Gagne  
Michelle Lynne Gencorelli  
Marco A. Gomez  
Kyle Edward Hanlon  
    Concentration in Energy  
    Minor: Mechanical Engineering  
Keely P. Heyer  
    Minor: Psychology  
Xiaoqiu Hou  
    Concentration in Energy  
Marco Andrew Interlandi  
    *Double Major*  
John Howard Kahler  
Xandria Alexis Korn  
    Minor: Economics  
Maggie Lauren Kuck  
    Minor: English  
    Minor: Materials  
David Lech  
Marissa Anne Leone  
    Minor: Chemistry  
Nikki Therese Loiseau  
Jennifer L. Mague  
Celeste B. Marsan  
    Minor: Bioinformatics and Computational  
    Biology  
    Minor: Biochemistry  
Kelly Lynn Martin  
Sarah Lauren McKeage  
James McRae  
    Minor: Materials  
Matthew Milliken  
Kerry Elisa Muenchow  
    Minor: Materials  
    Minor: Spanish  
Dylan Frank Muise  
Shane Michael O'Dell  
    Minor: Materials  
Dominique T. O'Halloran  
Thang Duc Pham  
    Minor: Chemistry  
Alan T. Phung  
Jacob Patrick Pickett  
    Minor: Drama/Theatre

Deanna Lemay Poirier  
    Minor: Spanish  
Carrie J. Pozaic  
Alexander D. Rockcress  
    Concentration in Environmental  
Carla Isabel Romo  
    *Double Major*  
Matthew J. Scanlon  
Zayla Dean Schaeffer  
Joshua Leo Shukan  
    Minor: German  
Samantha Anne Smith  
Stephanie Anne Sontgerath  
Lauren Marie Souza  
    Minor: Spanish  
Hendrick A. Suwirjo  
Taylor Thompson  
Lawrence Joseph Valeros  
    Minor: Materials  
Mariana I. Velez Llorens  
Olivia Rose Verdone  
    Minor: Spanish  
Kelly A. Vodola  
    Minor: Spanish  
Zachary James Weiland  
Adele Iris Werner  
    Concentration in Materials  
    Minor: Spanish  
Kyle Anthony Werra  
Alexis N. Zoffreo  
    Concentration in Environmental

**Chemistry:**

Casmir D. Kruczynski  
Shaun Patrick McCoy  
Erika Marie-Meadows Stark  
    Minor: Materials  
Emma Isabel Travassos  
    Minor: Environmental and Sustainability  
    Studies  
    Minor: Music  
Caroline Margaret Warchol  
    Minor: Drama/Theatre  
Jared Deven Watson

**Civil Engineering:**

Zachary Ross Abbott  
Peter Nkechukwuyem Chibuzho Aliogo, Jr.  
*Double Major*  
Shannon Stasia Alvarez  
Katherine Mary Baker  
Stephen A. Balcewicz  
Sean Seamus Bingham-Burke  
John W. Bonina  
Minor: Electrical and Computer  
Engineering  
Emily Cafarelli  
Laurence R. Cafaro  
Sara Cardona  
Peter Samuel Carosa  
Minor: Entrepreneurship  
Luca Cerasani  
Colin Thomas Claus  
Megan Ashley Concannon  
Austen Elizabeth Crawford  
James Sean Curtin  
Ermina Damlamayan  
*Double Major*  
Alisa Nicole Da Silva  
Minor: Drama/Theatre  
Nicholas Robert Day  
Minor: Mechanical Engineering  
Marlies Sandra de Jong  
Mark Richard DellaCroce  
Mackenzie James Eberhardt  
Minor: Business  
Austin T. Fabbo  
Dylan Robert Felty  
Francesca B. Ferrero  
Luke Fronhofer  
Constantine John Galanis  
Joseph Daniel Genga  
Concentration in Environmental  
Minor: Environmental and Sustainability  
Studies  
Kimberly Guthrie  
Khant Win Htet  
Kaleigh M. Iler  
Minor: Music

Abigail Myra Ismail  
*Double Major*  
Concentration in Environmental  
Tyler John Kornacki  
Benjamin David Leveillee  
James B. Loring  
Sam Thomas Malafronte  
Thomas Michael McCarthy  
Anis A. Medjahed  
Shea Robert Mooney  
Geoffrey Joel Narlee  
Eduardo Alberto Paoli Lauria, Sr.  
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Minor: Materials  
Ana Fernanda Restrepo Espinosa  
Concentration in Environmental  
James Eli Rios  
Connor James Sakowich  
Sarah N. Sanchez  
Eric V. Schroeder, Jr.  
Mary E. Sheehan  
Kimberly Y. Stanway  
Rachel Elizabeth Stickles  
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Minor: German  
Zebadiah Giovanni Yap-Chung

**Computer Science:**

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Can Alper  
Stephen R. Andrews  
Alexander A. Antaya  
Minor: Robotics Engineering  
Spyridon Antonatos  
Jason L. Ashton  
Quinn S. Averill  
Johnathan Avelino A`Vant  
Minor: Data Science  
Jackson Craig Baker  
Samuel M. Baumgarten  
Adam Benjamin Bettigole  
Meghana Bhatia  
Minor: Interactive Media and Game  
Development  
John B. Bieber  
Minor: Data Science

**Computer Science cont.:**

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Minor: Data Science  
Griffin R. Bishop  
Bradford W. Bonanno  
Fabio A. Borges  
Sean R. Briggs  
*Double Major*  
Jerish Benjamin Brown  
*Double Major*  
Madeline G. Burke  
Minor: Business  
Minor: Data Science  
Adam Orion Camilli  
Minor: Spanish  
Frank R. Campanelli  
Minor: Data Science  
Khuyen Thi Ha Cao  
Minor: Data Science  
Griffin Daniel Cecil  
Daniel Chao  
Jack Luke Charbonneau  
Drew Paul Ciccarelli  
Minor: Bioinformatics and Computational  
Biology  
Minor: Data Science  
Saahil M. Claypool  
Samuel C. Coache  
Minor: Data Science  
Samantha Jo Comeau  
Minor: Electrical and Computer  
Engineering  
James Andrew Corse  
Anh H.P. Dao  
David Deisadze  
*Double Major*  
Nathaniel Steele Dennler  
*Double Major*  
Goutham Om Deva  
Apiwat Ditthapron  
Minor: Data Science  
Nathan Paul Drewniak  
Evan Larcom Duffy  
Minor: Electrical and Computer  
Engineering  
Henry M. Dunphy

John E. Dyer  
Minor: Data Science  
Chaiwat Ekkaewnumchai  
Minor: Electrical and Computer  
Engineering  
Jeffrey Estrada  
Minor: Data Science  
Jacob Thomas Fakult  
Mitchell Thomas Farren  
Maurice Anthony Flannery  
Matthew R. Fortmeyer  
Joshua Andrew D. Galang  
Yufei Gao  
Minor: Data Science  
Tessa C. Garbely  
Luke D. Gardner  
Jesse T. Gaulin  
Minor: Electrical and Computer  
Engineering  
Alazar M. Genene  
David L. Giangrave  
*Double Major*  
Manuel Santana Gonsalves V  
Synella Prima Marie Gonzales  
Anthony Charles Gringeri  
Trang Dieu Ha  
Emily Hao  
Minor: Psychology  
Alexander D. Hard  
Minor: Business  
Robert Alexander Harrison  
Minor: Psychology  
Jacob C. Henry  
*Double Major*  
Juan Luis Herrero Estrada  
*Double Major*  
Quyen Dinh Thuc Hoang  
Jeremy Michael Hoffman  
Nicholas Clark Hollan  
*Double Major*  
Hung Phu Gia Hong  
*Double Major*  
Yifei Jin  
Minor: Data Science  
Ian Johnson  
Minor: Robotics Engineering



**Computer Science cont.:**

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Remy M. Kaldawy  
Concentration in Cyber Security  
Minor: Electrical and Computer Engineering  
Zoraver Singh Kang  
*Double Major*  
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James Harrison Kenney  
Daniel Jaewoo Kim  
*Double Major*  
Taehyun Kim  
Minor: Data Science  
Alec W. Kohlhoff  
*Double Major*  
Jacob Ilias Komissar  
Minor: Mathematics  
Michael J. Krebs  
Austin Bernard LaBastie  
Julian Philippe Lanson  
Concentration in Cyber Security  
Lucas R. Lebrao  
Minor: Interactive Media and Game Development  
Kenneth Levasseur  
Mingquan Liu  
Minor: Robotics Engineering  
Toby J. Macaluso  
*Double Major*  
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Minor: Philosophy and Religion  
Minor: Data Science  
Gavin Keith MacNeal  
*Double Major*  
Benjamin Milton Mattiuzzi  
Minor: Electrical and Computer Engineering  
Steven D. McAteer  
Minor: Data Science  
Matthew J. McDonald  
Minor: Electrical and Computer Engineering  
Minor: Data Science  
Daniel Bowen McKay

Connor William McNamara  
Minor: Electrical and Computer Engineering  
Zhung Keung Moo Feng  
Minor: Data Science  
William Vojtech Mosby  
Krysta Rose Murdy  
*Double Major*  
Minor: Music  
Yosuke Nakamura  
Andrew Edward Nemeth  
Minor: Interactive Media and Game Development  
Liana Nguyen  
Kien V. Nhan  
Benjamin Charles Nickerson  
Minor: Business  
Peter Almeida Nolan  
Minor: Interactive Media and Game Development  
Malika Nurbekova  
Kevin Raymond O'Brien, Jr.  
Minor: Data Science  
Aidan J. O'Keefe  
*Double Major*  
Jack N. Palmstrom  
Amanda Nicole Pennie  
Minor: Data Science  
Eric Hunter Peterson  
Samuel John Pridotkas  
Michael Prindle  
John Elias Pugmire  
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Minor: Physics  
Antony Erdong Qin  
*Double Major*  
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Harsh Rana  
Minor: Data Science  
Tejas Rao  
Minor: Electrical and Computer Engineering  
Redding Simon Galen  
Adonay Zenebe Resom  
Kyle Lipfert Richards  
Minor: Robotics Engineering

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Minor: Data Science  
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Lucas Sacherer  
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Tarek W. Safa  
Kyle Quinn Savell  
Minor: Interactive Media and Game  
Development  
Jake Connor Scheide  
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Ethan Henry Schutzman  
William Redmond Schwartz  
*Double Major*  
Minor: Data Science  
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Minor: Data Science  
Minor: Music  
Paul Clinton Shingleton IV  
Minor: Data Science  
Sola Shaka Shirai  
Minor: Data Science  
Erika S. Snow  
*Double Major*  
Alejandro Soler Gayoso  
*Double Major*  
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Joseph Keenan St. Pierre  
James R. Taylor  
Minor: Psychology  
Michael Teijiro Taylor  
Minor: Data Science  
Kartik Thooppal Vasu  
Chad Jason Underhill  
Minor: Data Science  
Sylvia Mariel van der Weide  
MaryAnn Elizabeth VanValkenburg  
Minor: Mathematics  
Zachary Lewis Vaughan  
Minor: Music  
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Development  
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*Double Major*  
Daniel J. Wensley  
*Double Major*  
Alexandra E. Wheeler  
*Double Major*  
Timothy J. Whitworth  
Thomas Grosvenor Wiles  
Samuel Donald Winter  
*Double Major*  
Ryan William Wittenberg  
Augusto Rolando Wong  
*Double Major*  
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Minor: Interactive Media and Game  
Development  
Minor: Data Science  
Saul Van Hook Woolf  
Minor: Interactive Media and Game  
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Tianyang Yi  
*Double Major*  
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Mario Zyla  
Minor: Data Science  
Brian Matthew Zylich  
Minor: Spanish

**Economic Science:**

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Riley J. Doherty  
*Double Major*  
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*Double Major*  
Minor: System Dynamics

**Electrical and Computer Engineering:**

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*Double Major*  
David James Baker  
Sean Dale Brady  
Matthew David Breidenbach

## Electrical and Computer Engineering

### cont.:

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Abraham Noe Cano Ventura  
Juan Segundo Caraballo, Jr.  
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Aatreya Chakravarti  
*Double Major*  
Robert M. Chase  
Minor: International and Global Studies  
Wei Chen  
Eric Chiem  
*Double Major*  
Keith Patrick Colbert  
Minor: Computer Science  
Aidan Ulysses Cookson  
Minor: Computer Science  
Victoria Jean Crowley  
*Double Major*  
Mitchell R. Curbelo  
*Double Major*  
Ryan E. Darnley  
*Double Major*  
Joshua R. DeNoncour  
Matthew P. DiPlacido  
Brede Emil Doerner  
Christian S. Elzey  
Minor: Computer Science  
Peter T. Emidy  
Gabriel Entov  
*Double Major*  
Nicolas A. Fabbrini  
Alan Ezequiel Fernandez  
Minor: Data Science  
Eliot Moore Fine  
Dominic Paul Fusco  
Minor: Management Information Systems  
Ian Solomon Gelman  
Parker Averil Grant IV  
*Double Major*  
Abdul Hassan

Stephanie C. Huang  
Minor: Psychology  
Aleksander Ibro  
Christopher Neves Jarrett  
Minor: Business  
Yifei Jin  
Michael William Kane  
Minor: Computer Science  
Ryan Zachary Snow Kennedy  
Danielle Jacqueline Kennon  
*Double Major*  
Ryan Scott Kent  
John Terrance Kirwan  
William Michael Kirwan  
Alec W. Kohlhoff  
*Double Major*  
Nicholas John Lanotte  
*Double Major*  
Seungjoon Lee  
*Double Major*  
Yeggi Lee  
Minor: Data Science  
Minor: Business  
Zheng Liang  
John Patrick Loftus  
Theodore B. MacLeod  
Krishna Satyanarayan Madhurkar  
*Double Major*  
Jack Ryan Marabello  
Shannon Kathleen McCormack  
Rebecca Eileen Miles  
*Double Major*  
Michael R. Morisseau  
Minor: History  
Caleb Collins Mullen  
*Double Major*  
Krysta Rose Murdy  
*Double Major*  
Minor: Music  
Syed Ayaz Naeem  
Son Nguyen  
Angelina Nicolella Fernandez  
Nicholas Sylvester Nugent  
John Michael O'Leary  
Hannah P. Olshansky  
*Double Major*

## **Electrical and Computer Engineering**

### **cont.:**

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*Double Major*

Dominic W. Palermo  
Minor: Business

Nicholas Cornell Pandolfi

Michael A. Panicci  
Minor: Economics  
Minor: Data Science

Marmik Y. Patel

Cassandra Marie Pepicelli  
Minor: Business

Nathaniel Peura

Kiriaki Rajotte  
Minor: German

Thomas Vincent Ralph, Jr.  
*Double Major*

Jonathan R. Redus  
Minor: Music  
Minor: Robotics Engineering

William Redmond Schwartz  
*Double Major*  
Minor: Data Science

Holly Elizabeth Shumway  
Minor: Business

Justin Andrew Silkey

Sabriya Zaynab Silva  
*Double Major*

Katherine Marie Smith

Alejandro Soler Gayoso  
*Double Major*

Nicholas Adam Sorensen  
*Double Major*

Michael Tasellari  
Minor: Computer Science

Myo Min Thein  
Minor: Computer Science

Michael S. Truong  
Minor: Data Science

Yil Alberto Verdeja  
*Double Major*  
Minor: Computer Science

Jeffrey Wagner

William A. Wartman

Tyler Michael Weiss  
*Double Major*

Zane Andrew Weissman

Cooper L. Wolanin  
*Double Major*

Yuchang Zhang

Armando Jose Zubillaga  
*Double Major*

## **Environmental Engineering:**

Lucas Alexander Acaba  
Minor: Materials  
Minor: Writing and Rhetoric

Virginia Leigh Adams  
Minor: Sustainability Engineering

Matthew T. Biondi

Katelyn Harding Burke  
Minor: Sustainability Engineering

Morgan Ellen DeAngelis

Carley Dykstra  
Minor: Sustainability Engineering

Remington Paul Gaetjens

Melissa Rose Galgano

Jessica R. Locke  
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Jason Michael Morgan  
*Double Major*

Elisha Suzanne Musgraves

Keeghan Michael O'Leary

Shannon Jeanne Ring  
Minor: Environmental and Sustainability  
Studies

Davianna Marie Vasconcelos  
Minor: Law and Technology

## **Environmental and Sustainability Studies:**

Casey Hunt  
*Double Major*

Jason Michael Morgan  
*Double Major*

**Humanities and Arts:**

Holly Grace Gagnon  
*Double Major*  
Jessica Morgan Greenleaf  
*Double Major*  
Thomas J. Maloney  
*Double Major*  
Morgan Elizabeth Reisinger  
*Double Major*  
Minor: Astrophysics

**Industrial Engineering:**

Omran Mosa Alomran  
Samuel Bryant Michael Bacchiocchi  
Daniela Milagrosa Baez  
Alexandra Caitlyn Barber  
Shreeja Bhattacharjee  
Minor: Computer Science  
Holly N. Cadran  
Won ik Chang  
Yiyi Chen  
Minor: Computer Science  
Benjamin Campbell Diefendorf  
Riley J. Doherty  
*Double Major*  
Roberto Esquivel  
Nicol Fernanda Garcia Andrade  
*Double Major*  
Minor: System Dynamics  
Antonio J. Goncalves  
Veronica Alejandra Hartnett Alvarado  
Toni J. Joy  
Minor: Mathematics  
Danielle Jacqueline Kennon  
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Panuwat Kongpornjaras  
Conrad Teruo Mera  
Minor: Data Science  
Jean Philippe Miralda  
Passavich Nalamlieng  
Hong Chon Ng Fang  
Lillian Hope Olsen  
*Double Major*  
Solomon P. Ortega  
Minor: Physics  
Minor: History

Daly Winters Place  
Minor: Education  
Zachary Trevor Rellstab  
Benjamin Alvrado Seitz, Jr.  
Cassidy Marcelle Sequin  
Minor: Social Entrepreneurship  
Kathleen Marie Sheehy  
Minor: Chemical Engineering  
Trung T. Tran Trong  
*Double Major*  
Jennifer Leigh Vandervort  
Minor: Mathematics  
Miguel Ernesto Vargas  
Minor: Business  
Yaofeng Wang  
*Double Major*  
Kameron Seyed Yagoobi

**Interactive Media and Game  
Development Technology:**  
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Development:**  
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Paige Nicole Cox  
Patrick I. Critz  
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*Double Major*  
Aaron P. Graham  
Hung Phu Gia Hong  
*Double Major*  
Hannah M. Jauris  
Vincent Casto Miller  
Adam Seth Moran  
Aidan J. O'Keefe  
*Double Major*  
Antony Erdong Qin  
*Double Major*  
Bailey Hayward Sostek  
William Suriner  
Samuel Donald Winter  
*Double Major*

**Interdisciplinary:**

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**International and Global Studies:**

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*Double Major*

Sarah Jonell Boecker

*Double Major*

Claire Bytheway Dickson-Burke

*Double Major*

Abigail Myra Ismail

*Double Major*

Robert Alexander Papp

*Double Major*

Thomas Vincent Ralph, Jr.

*Double Major*

Morgan Elizabeth Reisinger

*Double Major*

Minor: Astrophysics

**Management Engineering:**

Nimindu Ambalangodage

Concentration in Electrical and Computer  
Engineering

Michael S. Brooks

Concentration in Mechanical Engineering

David Deisadze

*Double Major*

Chase A. Flibbert

Concentration in Mechanical Engineering

Nicholas Matthew Fontaine

Concentration in Operations Management

Ryan Joseph Herrmann

*Double Major*

Minor: Drama/Theatre

Casey Hunt

*Double Major*

Concentration in Operations Management

Elizabeth Jones

Concentration in Operations Management

Minor: Entrepreneurship

Nathaniel Elliot Lambert

Concentration in Mechanical Engineering

Adam E. Maier

Concentration in Operations Management

Connor Patrick Murphy

Concentration in Operations Management

Matthew J. Nicholson

Concentration in Mechanical Engineering

Jaelyn Ann Panneton

Concentration in Operations Management

Minor: Psychology

Peter Anthony Ross

Concentration in Mechanical Engineering

Jose Ruben Sorto

Concentration in Operations Management

Daniel Paul Sutor

Concentration in Operations Management

Joseph Gustavo-Sepulveda Tomaino

Concentration in Mechanical Engineering

Ryan Michael Tropeano

Concentration in Operations Management

Minor: Economics

Minor: Entrepreneurship

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Concentration in Operations Management

Minor: Social Entrepreneurship

Chang Wu

Concentration in Chemistry

Minor: Psychology

Huaxin Yang

Concentration in Operations Management

**Management Information Systems:**

Pawan M. Dodani

Meghan Shanley Flynn

Tasharah Y. Person

Jerome Peter Agana Santos

Minor: Computer Science

Minor: Data Science

**Management:**

Nicholas Robert Lewis

Minor: Law and Technology

**Mathematical Sciences:**

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Minor: Computer Science

Minor: Physics

Sean William Fraser

Phillip Tomas Heikoop

**Mathematical Sciences cont.:**

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*Double Major*

Juan Luis Herrero Estrada

*Double Major*

Caroline Margaret Johnston

Minor: Computer Science

Minor: Data Science

Daniel Jaewoo Kim

*Double Major*

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*Double Major*

John Elias Pugmire

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Minor: Physics

Robert Marc Rosen II

Minor: Business

Minor: Chinese Studies

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*Double Major*

Jonathan Samuel Venne

Minor: Computer Science

Minor: Data Science

Tianyang Yi

*Double Major*

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Jocelyn N. Abdallah

Benjamin Stockard Abram

*Double Major*

Peter Nkechukwuyem Chibuzho Aliogo, Jr.

*Double Major*

Amanda Marie Alves

Minor: Spanish

Dillon Joseph Arnold

*Double Major*

Kyle Richard Arnold

Concentration in Materials Science and  
Engineering

Chase Michael Arsenault

Alexander John Avakian

Sarah Elizabeth Bachli

Azita Bakhtyari

Olivia Anne Baranowski

*Double Major*

Stephan William Barthold

William Harris Bass

Nicholas E. Batchelder

Laura Ashley Bauer

Christopher Robert Beauregard

Concentration in Mechanical Design

Nolan John Bell

Minor: Sustainability Engineering

Minor: Business

Zachary Thomas Bellion

Geraldine Anne Benn

Minor: History

Nicholas R. Bergstrom

Sarah Jonell Boecker

*Double Major*

Talon Michael Boie

Minor: Spanish

Christopher Chase Bolsinger

Evan R. Bossio

Heather L. Bourassa

Concentration in Biomechanical

David Bovich

Zachary R. Boyer

*Double Major*

Kieran Patrick Bradley

Aidan Brawley

Concentration in Mechanical Design

Maddie Z. Brennan

Concentration in Biomechanical

Emma Waimea Brimdyr

*Double Major*

Elianna C. Buckley

Concentration in Mechanical Design

Minor: Spanish

Stephen Burke

Juliana Cabello

David Andrew Cadilek

Concentration in Mechanical Design

Joseph Vincent Calnan, Jr.

Concentration in Materials Science and  
Engineering

Zachary D. Caplin

Concentration in Mechanical Design

David Cardoza

**Mechanical Engineering cont.:**

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Tristin John Carlton  
Benjamin Patrick Chaffee  
James Chakalos  
Logan Fu Chen  
Li-Yang (Edward) Chiang  
Minor: Mathematics  
Eric Chiem  
*Double Major*  
Thomas Jacob Chiudina  
Minor: Business  
Jillian S. Chu  
Frank Ronald Ciliberto  
Theresa Janene Cloutier  
Sean R. Cody  
Minor: English  
Brandon Cohen  
Concentration in Mechanical Design  
Michael Joseph Cooke  
Concentration in Mechanical Design  
Daniel Scott Corwin  
Tyler Thomas Costello  
Edward Gabriel Bernard Crofts  
Concentration in Mechanical Design  
Mitchell R. Curbelo  
*Double Major*  
Michael Dean Curtis  
Ermina Damlamayan  
*Double Major*  
Francis Mosheh Darmont Araya  
Concentration in Mechanical Design  
Ryan E. Darnley  
*Double Major*  
Kaitlyn Marie DaSilva  
Matthew Paul DeBenedictis  
Julia Mary Decker  
Luis Alexander Delatorre  
Graysen Robert DeLuca  
Matthew D. Dick  
Minor: Industrial Engineering  
Minor: Manufacturing Engineering  
Thomas Peter DiPersio III  
Calvin Downey  
Justin A. Dyer

Jessica Marie Elder  
Minor: Physics  
Libertad Paloma Escobar Carrizales  
Concentration in Mechanical Design  
Daniel J. Farnitano  
Christopher P. Ferreira  
Wesley T. Fischer  
Christine V. Flores  
Ryan Eugene Foley  
Owen Gregory France  
Concentration in Mechanical Design  
Eli Wonnacott Frank  
Concentration in Mechanical Design  
Aidan Troy Freeburg  
Matthew W. Freed  
Minor: Computer Science  
Holly Grace Gagnon  
*Double Major*  
Steven Dean Gallagher  
Alex John Gallant  
Sean Peter Gillis  
Cole Olivia Godzinski  
Concentration in Biomechanical  
Minor: Manufacturing Engineering  
Ariel Goldner  
Concentration in Biomechanical  
Jared Richard Grier  
Minor: Philosophy and Religion  
Jack A. Grubbs  
Concentration in Materials Science and  
Engineering  
Ralph Nicholas Grzybek  
Cesar Guerrero  
John Haddad  
Jessica L. Hanley  
Concentration in Mechanical Design  
Minor: English  
Justin C. Harris  
Kyle James Havey  
Madison Marie Healey  
Rosanna S. Heidt  
*Double Major*  
Minor: Chinese Studies  
Joshua M. Herlands



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*Double Major*

Gabriela P. Hoops

MacKenzie Beaudette Hridel  
Concentration in Mechanical Design

Tess Elian Hudak  
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Concentration in Thermal-Fluid  
Engineering

Muhammad Hussain

Chengyu Jiang  
Concentration in Engineering Mechanics

Olivia Bosselait Jones

Zhidong Ju

Kylie Marie Juarez

Allanah Jane Kalka-Riffel  
Concentration in Mechanical Design

Ava B. Karet  
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Concentration in Thermal-Fluid  
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Concentration in Mechanical Design

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Benedict Zayn Kurtze

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Minor: Materials

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Concentration in Mechanical Design  
Minor: Materials

Sophia Leitzman

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Concentration in Mechanical Design  
Minor: International and Global Studies

Rachel Marie Lia  
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Austin W. Lindner

Riley Lopez

Francis P. Lubega

Andrew George Lucy

Matthew Jacob Lund  
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Concentration in Mechanical Design

Max Cameron Marks

Benjamin G. Mart  
*Double Major*  
Minor: German

Shion Matsumoto  
*Double Major*

Austin Hall McCalmont  
Concentration in Mechanical Design

Erin Ann McCann

Rosie Christine McCarthy  
Minor: Chinese Studies

Glenndon Marcial McCormick  
Concentration in Materials Science and  
Engineering

Ryan Gilbert McLaughlin

Kelly Rose McMahan

Kinsey Lauren McNamara

James Nicholas Meagher  
Concentration in Mechanical Design

Patrick Michael Meehan

Blayne Patrick Merchant

Hannah Lee Modelski  
Concentration in Biomechanical

Emily Paige Molstad  
Concentration in Materials Science and  
Engineering  
Minor: Environmental and Sustainability  
Studies

Gabriela Morales Castillo

**Mechanical Engineering cont.:**

Lauren J.E. Morgan-Evans  
Concentration in Biomechanical  
Kyle Robert Mudge  
*Double Major*  
Michael A. Munroe  
Minor: Physics  
David Christopher Muse  
Minor: Business  
Karen Elizabeth Mushrall  
Ronglin Na  
Minor: Aerospace Engineering  
Miles Anthony Nallen  
*Double Major*  
Peter Timothy Nash  
Minor: Business  
Victoria Ann Nassar  
Minor: Business  
Carly Jane Neeld  
Minor: Sustainability Engineering  
Malachi Michael Nelson  
Matthew Thomas Newell  
Justin Hieu Nguyen  
Concentration in Mechanical Design  
Katherine Jeanne Novak  
Concentration in Mechanical Design  
Edward Louis Noyes  
Kathleen R. Nugent  
James Tonry O'Connor  
Kathryn Marie O'Donnell  
Chisom Jerry Ejikeme Okafor  
Concentration in Mechanical Design  
Lillian Hope Olsen  
*Double Major*  
Kendra Shea O'Malley  
Connor Hayden O'Neill  
Concentration in Materials Science and  
Engineering  
Jillian Elise Onishi  
Kyle J. Opiekun  
Daniel Ottey  
Carlos Jose Pacheco Busquets  
Minor: Materials  
Joseph M. Pagliuca  
Concentration in Mechanical Design  
Minor: Business

Robert Alexander Papp  
*Double Major*  
Mitchell Robert Pastizzo  
Kishan Anant Patel  
Concentration in Manufacturing  
Minor: Business  
Kevin Thomas Pawlak  
Concentration in Mechanical Design  
Gregory M. Pelland  
Concentration in Mechanical Design  
John J. Perkoski  
Concentration in Mechanical Design  
Adam W.W. Peternell  
Minor: Computer Science  
Brooke Katherine Pierce  
Nathan Anthony Pietrowicz  
Concentration in Mechanical Design  
Marcus Anthony Pritchard  
Spencer P. Ralphs  
Kellen Bradley Randall  
Tyler L. Rauch  
Mitch N. Read  
Concentration in Mechanical Design  
Brent Reissman  
Concentration in Acoustics  
David Richardson  
Douglas Rives  
Concentration in Mechanical Design  
Jacquelyn Yvette Roberge  
Amanda Marie Rodriguez  
Nathan L. Rose  
Andrea Eleanor Rota  
Emma Rose Ruano  
Colette Elaine Ruden  
Minor: Spanish  
Paula Sardi  
Collin Richard Saunders  
Brian Thomas Sayers  
Concentration in Mechanical Design  
Minor: Manufacturing Engineering  
Zoe Agronick Schwartz  
Katherine Schweikert  
Minor: Mathematics  
Ethan E. Shipulski  
Ayushka Shrestha  
Minor: Business

**Mechanical Engineering cont.:**

Mingqi Shuai  
*Double Major*  
 Richard C. Smith III  
 Joe Stapleton  
 Charles Carroll Steele III  
 Jeffrey Scott St. Hilaire  
 Minor: Aerospace Engineering  
 Ryan James St. Hilaire  
*Double Major*  
 Baron Russell Strasburger  
 Timothy J. Stump  
 Ian S. Sun  
 Concentration in Mechanical Design  
 Timothy Raymond Tetreault  
 Concentration in Mechanical Design  
 Bryan Robert Therrien  
 Concentration in Mechanical Design  
 Jonathan Thomas Toomey  
 Minor: History  
 Trung T. Tran Trong  
*Double Major*  
 Sean Christian Traynor  
 Carl A. Turnquist  
 Theodore E. Vangos  
 Daniel T. Vankitachalam  
 Anthony D. Vigliotta  
 Benjamin Paul Wagner  
*Double Major*  
 Alexandra Braceros Wallace  
 Jessica Catherine Walsh  
 Concentration in Mechanical Design  
 Martin Augustine Walwik  
 Chenggu Wang  
*Double Major*  
 Thomas Richard Ward  
 Minor: Robotics Engineering  
 Alec S. Wehse  
 Concentration in Mechanical Design  
 Zachary James Whitmore  
 Kyle James Whittaker  
 Shane T. Whittaker  
 Jeremy N. Wiles  
 Concentration in Mechanical Design  
 Katherine Margaret Williamson  
 Concentration in Mechanical Design

Minor: Business  
 Tyler Robert Wilson  
 Caraline Rose Wood  
 Concentration in Biomechanical  
 Luke B. Xu  
 Minor: Business  
 Hannah Yeung  
 Concentration in Biomechanical  
 Minor: Materials  
 Qindong Zhang  
 Minor: Electrical and Computer  
 Engineering  
 Minor: Data Science  
 Armando Jose Zubillaga  
*Double Major*  
 Lucas C. Zuccolo  
*Double Major*

**Physics:**

Jacob Nicholas Bouchard  
 Minor: Mathematics  
 Alexis Taylor Buzzell  
 Benjamin H. Child  
 Darien Gaudet  
 Minor: Mathematics  
 Marco Andrew Interlandi  
*Double Major*  
 Matthew Jacob Lund  
*Double Major*  
 Nicholas Mears  
 Minor: Computer Science  
 Andrew I. Mendizabal  
 Nathaniel Mione  
 Minor: Philosophy and Religion  
 Erin Mae Morissette  
 Minor: Music  
 Paula Sarrion Silvestre  
*Double Major*  
 Mingqi Shuai  
*Double Major*  
 Justin K. Tavares  
*Double Major*  
 Taylor G. Trottier  
 Bryannah Lynn Voydatch  
 Minor: Philosophy and Religion

**Professional Writing:**

Kelly Lynn Borden

*Double Major*

Minor: Biology

Brianna Rose Burke

*Double Major*

Ryan M. Cudemus-Brunoli

*Double Major*

Minor: Materials

Caroline Gah-Lok Flynn

*Double Major*

Stephen James Foley

*Double Major*

Sydney Michelle Hurley

*Double Major*

Madeline Grace Manfra-Levitt

*Double Major*

Miles Anthony Nallen

*Double Major*

Rachel Doris Peterson

*Double Major*

Carla Isabel Romo

*Double Major*

Maxwell Conrad Studley

*Double Major*

**Psychological Science:**

Maria Elizabeth Daigle

*Double Major*

Minor: Spanish

Jessica Morgan Greenleaf

*Double Major*

Anastasia Karapanagou

*Double Major*

Minor: Electrical and Computer  
Engineering

Ethan Thomas Marshall

Jackson Phillip Perry

*Double Major*

Daniel J. Vega

**Robotics Engineering:**

Ioannis Alexiou

*Double Major*

Michael Mark Antonelli

*Double Major*

Dillon Joseph Arnold

*Double Major*

Eva Marie Barinelli

Minor: Electrical and Computer  
Engineering

Nicholas P. Benoit

Jacob L. Berman-Jolton

Keion William Bisland

Josiah Daniel Boucher

Minor: Drama/Theatre

Zachary R. Boyer

*Double Major*

Cory Trent Broliar

Minor: Aerospace Engineering

Jerish Benjamin Brown

*Double Major*

Eric William Carkin

*Double Major*

Nathaniel Steele Dennler

*Double Major*

Peter Fraser McBride Donaldson

Minor: Computer Science

Kaan Emir

Minor: Computer Science

Gabriel Entov

*Double Major*

Albert Jozsef Enyedy

Minor: Computer Science

Nicholas Andres Fajardo

Sydney Alexandra Bernard Fisher

Minor: Computer Science

Nicole Cecilia Franco

Nikolas X. Gamarra

Minor: Computer Science

Minor: Mechanical Engineering

Parker Averil Grant IV

*Double Major*

Laurel Anne Higham

Minor: Electrical and Computer  
Engineering

Noah Adam Hillman

*Double Major*

Nicholas Clark Hollan

*Double Major*

Richard Douglas Hosea

Sean Richard Hunt

**Robotics Engineering cont.:**

Zoraver Singh Kang  
*Double Major*  
Phillip Konyeaso  
James Vahe John Kradjian  
Minor: Computer Science  
Mark Edward Landergan  
Nicholas John Lanotte  
*Double Major*  
Xavier James Little  
Minor: Mechanical Engineering  
Jonathan Esteban Luna  
Max C. Luu  
Toby J. Macaluso  
*Double Major*  
Gavin Keith MacNeal  
*Double Major*  
Krishna Satyanarayan Madhurkar  
*Double Major*  
Thomas J. Maloney  
*Double Major*  
Lanhao Mao  
Minor: Computer Science  
Minor: Business  
Benjamin G. Mart  
*Double Major*  
Minor: German  
Dylan M. McKillip  
Victoria Nicole Mercouris  
Alexander Asinas Michelson  
Minor: Computer Science  
Rebecca Eileen Miles  
*Double Major*  
Andrew Joshua O. Nagal  
Karina Rose Naras  
Hannah P. Olshansky  
*Double Major*  
Sean Thomas O'Neil  
*Double Major*  
Sierra Taylor Palmer  
Minor: Mechanical Engineering  
Benjamin Pasculano  
*Double Major*  
Jacob G. Remz  
Minor: Computer Science  
Minor: Mechanical Engineering

Nathan A. Rosenberg  
Felix A. Sanchez  
Oliver Daniel Sanderson  
Minor: Computer Science  
Matthew Jordan Schueler  
*Double Major*  
Kyle Patrick Seymour  
Minor: Mechanical Engineering  
Benjamin D. Shaffer  
Erika S. Snow  
*Double Major*  
Nicholas Adam Sorensen  
*Double Major*  
Ryan James St. Hilaire  
*Double Major*  
Jonathan LongYing Tai  
Marek Vladimir Travnikar  
Minor: Electrical and Computer  
Engineering  
Yil Alberto Verdeja  
*Double Major*  
Minor: Computer Science  
Steven A. Viola  
*Double Major*  
Benjamin Paul Wagner  
*Double Major*  
Chenggu Wang  
*Double Major*  
Daniel J. Wensley  
*Double Major*  
Alexandra E. Wheeler  
*Double Major*  
Daniel Peter Wivagg  
Cooper L. Wolanin  
*Double Major*  
Augusto Rolando Wong  
*Double Major*  
Zhihao Xie  
Wentao Yuan  
Minor: Computer Science  
Grant Clark Zahorsky

**Society, Technology and Policy:**

Emma Waimea Brimdyr

*Double Major*

Cameron Lyn Cantrell

Minor: Mathematics

Ryan M. Cudemus-Brunoli

*Double Major*

Minor: Materials

Tess Elia Hudak

*Double Major*

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Graduate Studies and Research (Prof. Rao, Chair)

**Re:** Motion to approve the May 2019 graduate student graduation list

**Motion:** The Office of the Registrar reports that the following candidates have either completed all the requirements for the degree designated in the department or program indicated, or are expected to complete their degree requirements before May 9, 2019. They therefore are or will be eligible to receive that degree, and on behalf of the Committee on Graduate Studies and Research, I move that – pending final verification by the Registrar that all those on the list have in fact completed their degree requirements - they be approved for May 9, 2019 graduation.

### **Doctor of Philosophy**

**Aerospace Engineering:**

Benjamin Sherman Cooper

**Bioinformatics and Computational**

**Biology:**

Andi Dhroso

Nathan Tyler Johnson

**Biomedical Engineering:**

Kyra Rand Burnett

Daniel Edward Lawler

**Business Administration:**

Ales Jug

Qingyun Zhu

**Chemical Engineering:**

Tone Pappas D'Amico

Lida Farsi

Alex Roger Maag

**Chemistry:**

John Peter Cvitkovic

Anqi Wang

**Computer Science:**

Ramoza Ahsan

Mi Feng

Xinyue Liu

Xiao Qin

Zhongfang Zhuang

**Data Science:**

Wen Liu

Chong Zhou

**Electrical and Computer Engineering:**

Gizem Selcan Cetin

Wei Dai

Mehmet Sinan Inci

Michael Antoine Moukarzel

Sabah Razavi

Le Wang

**Interdisciplinary:**

Todd Edward Alexander

Christopher Brian Martel

**Learning Sciences and Technologies:**

Anthony Francis Botelho

**Manufacturing Engineering:**

Ryan Moadlo

**Materials Science and Engineering:**

Farzaneh Farhadi

Joel Kenneth Kearns

Xuejian Lyu

Kristin L. Sundberg

Derek George Tsaknopoulos

Kyle Leigh Tsaknopoulos

Haixuan Yu

Lite Zhou

**Mathematical Sciences:**

Brian Gary Kodalen  
Weijie Pang

**Mechanical Engineering:**

Wisawat Keaswejjareansuk  
Seyed Massoud Loeian  
Koohyar Pooladvand  
Michal Talmor

**Physics:**

James Leonard Kingsley

**Robotics Engineering:**

Vincenzo DiLuoffo

**Statistics:**

Yuan Yu

**Master of Business Administration**

Amanda M. Adinolfi  
Jarrett B. Conner  
Kathryn Finigan Cooney  
Jameel Tariq Galloway  
Elda Gautschi  
Neil Anthony Innarelli  
Allison Elizabeth Knouse  
Jonathan Aaron Litwin  
Doreen L. Manning  
Anne McClure  
Meredith Jean Rhein  
Jason Adom Russak  
Michael James Wesaala

**Master of Engineering****Biomedical Engineering:**

Huma Abdul Rauf  
Frank Benesch-Lee  
Jacquelyn Olivia Claveau  
Stephanie Lynn Godding  
Samantha Marie Hires  
Emily Elizabeth Newman

**Electrical and Computer Engineering:**

Yixuan Jiao  
Ruojun Li  
Deepak Yadav  
Jiankun Yin

**Power Systems Engineering:**

Aregehegn D. Abebe  
Raymond K. C. Cheng  
Randall Joseph Ettori  
William Ben Miller  
John Eliot Porter  
Frank Lawrence Walsh IV

**Master of Mathematics for Educators**

Kevin Thomas Donohue  
Stuart Scott Ferguson  
Elle Catherine Fleek  
Andre Machado  
Caitlyn Laura Small

**Master of Science****Aerospace Engineering:**

Troy P. Bergeron  
Nicholas Andrew Bograd  
Theresa Janene Cloutier  
Robert Crockett  
Matthew Escalante Hurtado  
Timothy Liam Jones  
Marios Kontopyrgos  
Binxin Liu  
Colin Robert Maki  
Lucas James Mancinelli  
Finn Eamon O'Brien  
Ricardo Ochoa  
Jackson N. Peters  
Zachary T. Rahilly  
Nabeel Joseph Tokatli  
Pravin Malintha Wedage  
James P. West  
Tristram H. Winship



**Applied Mathematics:**

David Michael Berthiaume  
Jianpeng Cao  
Li Ma  
Eric M. Ostrom

**Applied Statistics:**

Hanqi Cao  
Zhongnan Ji  
Zhengyu Li  
Yang Liu  
Zixiao Liu  
Ruofan Yang

**Bioinformatics and Computational****Biology:**

Anastasia Leshchik  
Ashley Elizabeth Lutz  
Ruosi Zhang

**Biology and Biotechnology:**

Alexander Earl Putnam

**Biomedical Engineering:**

Bryanna Josephina Dellaripa  
Erin Anne Dixon  
Tsolmonbaatar Khurelbaatar  
Kaylee Z. Perron  
Brian James Westgate

**Bioscience Administration:**

Robert M. Femino, Jr.  
Kevin Tse

**Biotechnology:**

Tianyu Yang

**Chemical Engineering:**

Lexi Lee Crowell  
Joseph Albert Daigneault  
Nattikarn Jantakananuruk

**Civil Engineering:**

Joshua Todd Anderson  
Giuseppe Ardito  
Caitlin S. Burner

Cory A. Cormier

Julia Grace Ring

Kaitlin Anna Travers

Edward Alexander Whatley

**Computer Science:**

Unekwujo Esther Agbaji

Yuxiang Bao

Muzammil Bashir

Maoyu Chien

Zorigtbaatar Chuluundorj

Saahil M. Claypool

Joseph Salvatore Crimi

Hongzhu Cui

Jason Dsouza

Frank Egan

Giorgi Gachechiladze

Jesse T. Gaulin

Wen Ge

Sanket R. Gujar

Preeti Ishwar Havannavar

Guohui Huang

Jin Huang

Sayed GousePasha Alvisaheb Inamdar

Thomas Le Baron

Guangda Li

Yuhan Liu

Haoxiang Ma

Guanyi Mou

Justin Alexander Myerson

Holly Alexandra Nguyen

Thananporn Patikorn

Tesia Tomo Shizume

Marie Louise Solman

Kartik Thooppal Vasu

Romuald Valme

Chu Wang

Houjue Wang

Wei Wang

Tian Xie

Dingda Zhou

Cheng Zhu

Brian Matthew Zylich

**Data Science:**

Hiromi Bosman  
Prince Shiva Chaudhary  
Mo Cheng  
Claire E. Danaher  
Russell Davis  
Jiaming Di  
Xiao Du  
Ying Fang  
Dekun Geng  
Manasee R. Godsay  
Yingnan Han  
Yao-Chun Hsieh  
Nathan Chelun Hsu  
Jinal Jayantilal Jain  
Chenjie Jiang  
Mukund Khandelwal  
Janvi Kirti Kumar Kothari  
Mengdi Li  
Weiqing Li  
Zhitao Li  
Chen Liang  
Ran Lin  
Rushikesh Ajay Naidu  
Umesh Unnikrishnan Nair  
Satishraju Rajendran  
Mihir Premsing Sawant  
Yuchen Shen  
Lei Shi  
Mihin S. Sumaria  
Yang Tao  
Krushika Tapedia  
Brandon Tyler Werner  
Guocheng Yao  
Di You  
Jiaxing Zhang  
Xin Zhang  
Xiaoyu Zheng  
Haowen Zhu

**Electrical and Computer Engineering:**

Johnathan W. Adams  
Jordyn Leigh Ansari  
Jiahui Chen  
Anna C. Hernandez  
Andrew Daley McNaught

Leah Morales  
Addison Charles Nute  
Hongyu Pan  
Renuka Rajkumar  
Nick L. Rrapushi  
Jabari Cornell Rutland Stegall  
Haopeng Wang  
Zane Andrew Weissman  
Pinyi Xiao  
Xin Xu  
Bryan Zogg

**Environmental Engineering:**

Jacqueline A. Barr  
Cara Jean Berezna  
Khongorzul Karl Hansen  
April Suzanne Locke  
Mary Elizabeth Prescott  
Hongzhuo Qu  
Sarah Grace Stine  
Renata Vinhas de Oliveira

**Financial Mathematics:**

Andrea Camila Bayas Albuja  
Hanyan Deng  
Jiahao Hou  
Kang Jiang  
Zehui Jiang  
Thomas Archer Leonard  
Yuhan Liu  
Kangjie Mi  
Blanche Sonia Ngo MAHOP  
Kai Sun  
Lianghui Tian  
Fengrui Zhang

**Fire Protection Engineering:**

Danny Kay Cobourne  
Blake Joseph Christian Cornachini  
Glenn A. DeFrees  
John W. DeVine, Jr.  
Adam Walt Dodson  
Vincent Thomas Favale  
Kazi Abdul Hanif  
Kelly Lynn Knopp  
Evan Michael Lacroix

**Fire Protection Engineering cont.:**

Gabrielle M. Lapointe  
Yoon Kyong Lee  
Yu Liu  
Robert Philip McFeaters  
Matthew Nash McMurtrey  
Marcio A. Ferreira Mendes  
Pedro A. Morejon  
Derrick G. Naugler  
Ismael George-Richard Nowick  
Mitchell Robert Pastizzo  
John Peter Ramos  
Sarah Elizabeth Rodino  
Benjamin Laurence Rouleau  
Tara Jean Sharp  
Muhammad Suhail Siddiq  
Cassandra Lynn Tomerlin  
Mercedes L. Walls  
Anthony Richard Wilkens

**Industrial Mathematics:**

Cassidy Rose Litch  
Stephanie A. Martin

**Information Technology:**

Shruti Agrawal  
Kavya Aroor  
Sushmita Bhat  
Yu Cai  
Carlos Alfonso Carle Martinez  
Haoyu Chen  
Lokendra Singh Chouhan  
Manisha Chouhan  
Sha Fang  
Mitali G. Gore  
Dengning He  
Vishakha Subhash Jadhav  
Pushkar Sanjay Kale  
Prateek Kumar Kanoje  
Alekhya Anand Katumalla  
Chunyan Li  
Jinlian Lin  
Rushabh Subhash Lodha  
Sheryar Mazhar  
Vaibhav Mishra  
Anusha V. Patel

Suraj P. Patil  
Nevetha Ramesh  
Sneha Gunwant Shete  
Shivam Singh  
Zirui Song  
Jingwen Sun  
Madhuri Subhash Surve  
Fatima Varzgani  
Manthan Ketan Vikam  
Anuj Vyas  
Nishant Walavalkar  
Kexin Wu  
Zhenyang Yin  
Fuyin Zhang  
Lidan Zhang  
Shimi Zhou  
Ziyu Zhou

**Interactive Media and Game Development:**

Alexander George Holmes  
Matthew S. Pietrucha  
Karen Marie Royer  
Yrenia Yang

**Interdisciplinary:**

Alexander Sutton Hamm  
Malachi Michael Nelson

**Learning Sciences and Technologies:**

Avery Elizabeth Harrison  
Taylyn Renee Hulse  
Sarah Elizabeth Schultz

**Management:**

Brandon Richard Abad  
Craig David Barrett  
Daniel Gregory Bettigole  
Jiaye Cheng  
Bunny A. Cotleur  
Anh H.P. Dao  
Mackenzie James Eberhardt  
Antonio J. Goncalves  
Taylor Cole McNally  
Gina Elizabeth Ryan  
Zening Tao

**Management cont.:**

Qidi Wang  
Min Ying

**Manufacturing Engineering:**

Xujie Dou  
Jason M. Long  
Tianhao Luo  
Hejinyan Qi  
Zongxuan Sha

**Marketing and Innovation:**

Andrew J. Baron  
Jiajing Cao  
Xing Dai  
Xiaoxu Huang  
Zhewen Huang  
Shenghao Liang  
Jinyu Liu  
Yichi Liu  
Zihang Liu  
Yifu Lu  
Xianglin Men  
Yin Shang  
Liyuan Tian  
Jiaxin Wang  
Ying Wang  
Li Wei  
Wei Wei  
Jiaxin Weng  
Yuzhuo Ye  
Kailun Zhang  
Xueying Zhang  
Yichun Zhang  
Minhui Zhong

**Materials Science and Engineering:**

Matthew Paul Catarino  
Yehong Chen  
Qingli Ding  
Richard Theodore Eberheim  
Jeremy Michael Fedors  
Paul Francis Hastings, Jr.  
Aditya Moudgal  
Timothy D. Piette  
Emma Rose Ruano

Corey Linwood Scott  
Evan Reed Stewart  
Cerien Vaidya  
Yanggang Wang  
Yutao Wang  
Weizhao Yang  
Lin Yuan  
Diqing Yue

**Mechanical Engineering:**

Nesa-Maria Ashley Anglin  
Eric John Ardagna  
Laura Ashley Bauer  
Thomas Bell, Jr.  
Nicholas R. Bergstrom  
Samuel C. Bickham  
Matthew Bilodeau  
Manjiri Baburao Borgaokar  
Eric Staples Brundage  
Joseph Vincent Calnan, Jr.  
Adam Marcus Campisi  
Saray Melin Checo  
Andrew Patrick Curran  
Francis Mosheh Darmont Araya  
Matthew Paul DeBenedictis  
Aditya Dholakia  
Andrew Staven DiOrio  
Jacob A. Evans  
Erik S. Faxon  
Karl Peters Fortune  
Emilee Margaret Gancarz  
Yuxin Gao  
Cole Olivia Godzinski  
Allysa Noelle Xyomie Grant  
Carolyn Sawyer Herrick  
Shawn Patrick Karasevicz  
Nicholas Levi Kenyon  
Bela W. Kraut  
Mucheng Li  
Yihe Liu  
Shuosheng Luo  
Michael Ryan Macrae  
Kara Alden Martin  
Michael Joseph McGrath  
Glen James Metcalfe  
Hannah Lee Modelski

**Mechanical Engineering cont.:**

Sean Stegner Murnane  
Karen Elizabeth Mustrall  
Daniel Ottey  
Niel Girish Patel  
Asim I. Rahimatpure  
Philip Francis Murphy Rodino  
Andrew George Rusinko, Jr.  
Emma Kathleen Ryan  
Dharmil Kirtikumar Sanghavi  
Christopher A. Schoorens  
Adam Joseph Scirico  
Zebulon William Shippee  
Nils J. Swenson  
Daniel J. Trainer  
Julia May Veitch  
Ellyn Marjorie Webber  
Tyler D. York  
Saleh Zeidan

**Operations Analytics and Management:**

Zhenge Chen  
Zilun Cheng  
Katharine Darcy Dunphy  
Jie Fu  
Kaiti Huang  
Ruoxi Huang  
Maitrey Madhusudan Jathar  
Jiechao Lei  
Morgan L. Maiola  
Nicholas Martin  
Guanjia Pan  
Ruixu Pan  
Elizabeth Ester Phan  
Thyagarajan Ramachandran  
Saad Bin Rehan  
Lejia Shen  
Akash Sudhakar  
Xikun Sun  
Yan Tan  
Takayoshi Tsutsui  
Huan Wang  
Qiao Wang  
Yuanhao Wu  
Xuejun Yang  
Yiming Zhu

**Physics:**

Elizabeth Carmen Tyree

**Power Systems Management:**

Jenna Michelle Cloutier  
Michael I. Manousakakis  
Safaa Tahoun

**Robotics Engineering:**

Ozan Akyildiz  
Ganesh Prasanna Balakrishnan  
Prakash Baskaran  
Terence Wilbert Carmichael, Jr.  
Nikhil Mario Castelino  
John P. Chiodini  
Alka Choudhary  
Christopher Joseph Dalessio  
Karthick Raja Dhavamani  
Nishant Paresh Doshi  
Kevin G. Ducharme, Jr.  
Shakthi Sharavanan Duraimurugan  
Dharini Kamal Dutia  
Arpit Gupta  
Calvin He  
Aishwary Jagetia  
Shubham Praveen Jain  
Samruddhi Pandurang Kadam  
Rishi Dharmesh Khajuriwala  
Alexander J. Krasa  
Akshay Kumar  
Sihui Li  
Ryan A. Mahoney  
Taylor John Marsh  
Tess Bisbee Meier  
Rebecca Sue Mendivil  
Shannon Marija Moffat  
Shravan Murlidaran  
Aakash Murugan  
Andrew Joshua O. Nagal  
Animesh Nema  
Heramb Nemlekar  
Sanjuksha Sanjay Nirgude  
Bhuvanna Chaitanya Reddy Perugu  
Rianna Cathleen Preston  
Vishnu Radhakrishnan  
Himanshu Raghuvanshi

**Robotics Engineering cont.:**

Arjun Jagdish Ram  
Alberto Ramirez  
Abhilasha Gajarsing Rathod  
Nalin Yatin Raut  
Ashwin Madhav Sahasrabudhe  
Tushar Y. Sawant  
Aniketh Reddy Seelam  
Aayush Sureshkumar Shah  
Daniel B. Sullivan  
Amey Ajay Sutavani  
Abhijeet Mahavir Thakan  
Rajnish Tiwari  
Amit Trivedi  
Alexandra Rose Valiton  
V V S R Datha Deepak Vellampalli  
Gaurav Vikhe  
Ameya Yatindra Wagh  
Erin Morse Wentworth  
Daniel Peter Wivagg

**Systems Engineering:**

David Edward Anthony  
Robert Ben Chim  
Justin Thaddeus Cox  
Christopher John Davis  
Jacob R. Deguire  
Vangjeris Dhroso  
Brian C. Dillon  
Aparna Guruzada Durvasula  
William Andrew Elliott  
Ryan Anthony Faria  
Linda Jean Gunning  
Lynn Bradford Jones  
John David Kochan  
Vinay Lakshminarayan  
Thomas Michael Murphy  
Jennifer Catherine Rekas  
Carl Rosario  
Patrick T. Semeter  
Cameron Michael Shea  
Peter Henry Waszkowski

**Date:** May 2, 2019  
**To:** WPI Faculty  
**From:** Faculty Members of the Bylaws and Governance Working Group (Prof. Mark Richman)  
**Re:** Motion to endorse the Report of the WPI Bylaws and Governance Working Group including recommendations for amending the pending WPI Bylaws of the Corporation

**Motion:** On behalf of the faculty members of the Bylaws and Governance Working Group, I move that the faculty endorse the Report of the WPI Bylaws and Governance Working Group (presented as an attachment to this motion) including recommendations for amending the pending WPI Bylaws of the Corporation (summarized in the attached Report and, for convenience, shown in the attached redlined version of the amended Bylaws).

**Background:**

On November 2, 2018, the WPI Board of Trustees approved a pending set of Bylaws of the Corporation. In response, on November 15, 2018, a faculty meeting was held in executive session to express faculty concerns and to determine an appropriate response. At that meeting, the faculty passed the following two motions:

*Motion #1:* The Secretary of the Faculty, on behalf of the WPI faculty, request the Board of Trustees rescind the new Bylaws (approved by the Board on November 2, 2018) by the close of business on November 27<sup>th</sup>, 2018 and commit to effective collaboration with WPI Faculty Governance Leadership and Administration to negotiate a process to amend the current WPI bylaws by the end of this (2018-2019) academic year to ensure the best possible future for our beloved institution.

*Motion #2:* The WPI faculty request the Board rescind their approval of the following sections of the Corporation Bylaws: Article IV, Section 2.A (*Academic Freedom*); Article IV, Section 1.E (*The Faculty*); and Article XI (*Authority*).

On December 7, 2018, a Task Force of faculty, administration, and trustees completed a final charter that established the Bylaws and Governance Working Group. According to the charter, the Working Group would produce written recommendations to the Board that addressed the following issues: faculty concerns with the pending Bylaws; Board concerns with the current Bylaws and practices limiting inclusion, collaboration, and agility; and a shared desire among faculty, administration, and the Board to create more effective collaborations. The intent was for the Working Group to produce a consensus document that would address these issues and, equally important, would include a set of recommendations for amending the pending Bylaws. On the same day, the Board agreed to delay the implementation of the pending Bylaws until May 15, 2019.

The members of the Working Group were: Laurie Leshin (Pres., Chair); Andy Aberdale (Trustee); Jim Cocola (HUA); Tanja Dominko (SOF, BBT); Marni Hall (Trustee); Steve Kmietek (ChE); Mark Richman (ME); Wole Soboyejo (Provost).

The Working Group met from mid-January 2019 through April 2019 to resolve the issues of concern. Throughout the deliberations, the Working Group worked effectively and successfully to:

- Develop recommendations for amending the pending Bylaws;
- Develop specific recommendations that would form a framework for improved collaboration between faculty, administration, and trustees, and would begin a sustainable effort that would last well beyond May 2019.

**Rationale:**

In the deliberations of the Bylaws and Governance Working Group, all discussions were conducted and all issues were resolved with a clear appreciation of the need for compromise on all sides. This applied both to the recommendations made for amending the Bylaws and to the recommendations made for specific actions that will enhance future collaborations between the faculty, the administration, and the trustees.

Specifically, seven primary faculty concerns with the pending Bylaws identified in the Working Group’s charter were addressed (with recommendations in CAPS, below) as follows:

- Board’s authority to override the Faculty Handbook: REMOVED
- Academic Freedom placed in the Bylaws and within the framework of “society’s norms”: REMOVED
- Board’s interpretation “controls” ambiguities in the Bylaws: REMOVED
- President and Provost written in as ex officio members of all faculty committees: REMOVED
- Provost “creates, reviews, and approves academic policies”: REMOVED
- Global School established without faculty approval: WILL BE ADDED AFTER FACULTY ENDORSEMENT AND BOARD APPROVAL
- Inclusion in the Bylaws of academic matters:
  - Academic Freedom: REMOVED
  - Faculty: MODIFIED\*
  - Provost and Deans: MODIFIED\*\*

\*In the case of the inclusion in the Bylaws of the Faculty, the recommended modifications (in Article V., Section E) include statements that: “The faculty is understood to consist of such persons as shall be designated in the Faculty Constitution and Faculty Bylaws and approved by the Board of Trustees;” and “The roles, responsibilities, and rights of faculty are documents in the WPI Faculty Handbook.”

\*\*In the case of the inclusion in the Bylaws of descriptions of the Provost and the Deans, the recommended modifications (in Article V, Sections C and D) are written to emphasize collaborative and consultation where appropriate, and to be consistent with the Faculty Handbook and with current practice.

Additional faculty concerns with the pending Bylaws raised during the Working Group’s deliberations were addressed with the following recommendations:

- Inserted AAUP language to the description of the President’s overall duty;
- Modified statements that the President “Oversees institutional policy-making,” and “Establishes an administrative structure...”
- Modified language on Effective Collaboration removing language dealing with roles and responsibilities, and pointing out that such collaboration takes place when “...consultation and decision-making processes are well-defined.”

The recommended updates to the pending bylaws address the majority of faculty concerns as expressed in motion #2 above.

Finally, the Working Group recommended the following specific actions that will enhance future collaborations between the faculty, the administration, and the trustees:

- Ongoing improved communication and collaboration through the formation of a Joint Coordinating Council (JCC), better use of existing mechanisms for communications, and additional opportunities for formal and informal interactions;
- Increased consultation with faculty and administration concerning future updates to the Bylaws that have impact on the academic enterprise;
- Addition of more academic expertise to the Board of Trustees;



- Reconsideration of the process for appointing faculty members to Board committees;
- Support for long-term commitments to and greater inclusion of NTT faculty members;
- Process for defining the role of Deans in the appointment and evaluation of department heads;
- Clarification of the mechanism for required Board approval of certain sections of the Faculty Handbook;
- Reexamination of the faculty review of administrators to ensure valuable input;
- Support for time and training of faculty governance leaders;
- Commitments to regularly assess the state of governance at WPI.

These ten recommendations will address a fair combination of current faculty, administration, and trustee concerns. When acted upon, they will require the very collaborations that we wish to achieve and will remove several obstacles that have made such collaborations unduly challenging.

# **Report of the WPI Bylaws & Governance Working Group**

## **Submitted for Endorsement**

### **April 18, 2019**

#### **Introduction**

The WPI Bylaws & Governance Working Group (BGWG) was formally established in December 2018 to provide a mechanism for faculty, administration, and trustees to consult on WPI's pending bylaws (approved by the board on November 2, 2018), and to make recommendations to enable more effective collaboration and increase trust between faculty, administration and trustees in the future.

This report contains the consensus recommendations of the BGWG, reached after significant discussion and deliberation. The intent is for this document, including recommendations for amending the pending bylaws, as well as additional recommendations, to be presented to the faculty for their endorsement ahead of Board action that will take place at the May, 2019 Board meeting, consistent with the agreement documented in the final (12/7/18) [Working Group Charter](#).

The discussions of the BGWG revealed that while occasionally the views of trustees, administrators, and faculty members about what best serves WPI may differ, all approach their work with respect for one another. In addition, while the impact of actions may not always be as anticipated, actions taken emerge from positive intent to make WPI a better University in service to our students and to the communities in which we work.

In order to share our perspectives and understand our differences, we need to increase opportunities for communication between faculty, administration and trustees. Such occasions are critical to building the relationships, trust, and bridges that are essential as we all collectively work to share stewardship of WPI, and to establish a stronger foundation for effective collaboration. All faculty members, administrators, and trustees should embrace these opportunities regardless of whether the interactions are formal or informal, and whether they occur in large or small groups.

When misunderstandings and frustrations have occurred, oftentimes they have been caused by a lack of clarity and agreement on what would constitute appropriate consultation, collaboration, timelines, and decision-making processes on an issue. Working together to provide clear agreements on consultation and collaboration mechanisms for important decisions should take place early, so that progress can be made in the context of mutual understanding of process and within agreed upon timelines. Doing so should allow all constituencies to focus on their core responsibilities on behalf of the institution, and should enable each to contribute their time and expertise most effectively on behalf of WPI.

## **Recommended Updates to the Pending Bylaws**

One of the main activities of the BGWG was to consult with faculty members on matters in the pending WPI bylaws that impact the academic enterprise. Each area of concern was discussed among the BGWG, and consensus recommendations for modifying the bylaws are included below. Proposed changes to the pending bylaws that respond to the BGWG recommendations are provided separately as a redlined document. The BGWG endorses these changes.

Specific faculty concerns raised in the BGWG Charter about the pending bylaws and their disposition are summarized in the table below.

<b>CONCERN RAISED IN BGWG CHARTER</b>	<b>RECOMMENDED ACTION</b>
<i>Authority to override the Faculty Handbook</i>	Remove
<i>Academic freedom placed in the Bylaws and within the framework of "society's norms"</i>	Remove
<i>Board's interpretation "controls" any ambiguities in the Bylaws</i>	Remove
<i>President and Provost written in as ex officio members of all Faculty committees</i>	Remove
<i>Provost "creates, reviews, and approves academic policies."</i>	Remove
<i>Global School established without faculty approval</i>	Global School will be added to the academic structure after faculty endorsement and Board approval.
<i>Inclusion in the bylaws of academic matters:</i> <ul style="list-style-type: none"> <li>• <i>Provost and Deans;</i></li> <li>• <i>Faculty;</i></li> <li>• <i>Academic Freedom</i></li> </ul>	<ul style="list-style-type: none"> <li>• Minor rewrites in sections on Provost and Deans;</li> <li>• Substantially rewrite section on the faculty;</li> <li>• Remove section on academic freedom</li> </ul>

During the BGWG, additional concerns about the bylaws were also discussed. These include language about the role of the President and the principles of effective collaboration. Both of these discussions resulted in additional recommended updates to the pending bylaws.

<b>ADDITIONAL CONCERN RAISED</b>	<b>RECOMMENDED ACTION</b>
<i>The statement in the pending bylaws on Effective Collaboration is unfocused. While the first half of the statement describes the principles, the second half goes beyond and specifies roles and responsibilities of different constituencies.</i>	Remove the language dealing with roles and responsibilities and rewrite slightly
<i>The language in the description of President's roles and responsibilities is unnecessarily specific</i>	Minor rewrite and addition of AAUP language

## **Additional Recommendations for Action**

As a result of the BGWG discussions, additional recommendations for improving the shared stewardship of WPI via collaboration between faculty, administration and trustees have emerged. In some cases, these additional recommendations came directly from a discussion of

the pending bylaws, and in others they address issues of high concern to one or more of the constituent groups that, left unaddressed, stand in the way of effective collaboration. Addressing these issues is considered as important as modifying the pending bylaws. In most cases the BGWG is not suggesting a specific solution to the issue, but rather the mechanism and timeline for a solution to be found after the work of the BGWG has concluded.

#### *Ongoing Improved Communication and Collaboration Mechanisms*

One significant outcome of the BGWG deliberations was in recognizing the need for an ongoing coordination mechanism to build on the foundational work of the BGWG. The resulting increase in communication, collaboration, and coordination between faculty, administration and trustees should enable vital building of trust, provide a forum to raise and address critical issues, and enable agreement on realistic approaches and timetables for action on those issues. Such a mechanism will allow both strategic and operational matters to be considered early and regularly, and will result in deeper understanding of issues from all the perspectives of all constituencies, and better decision-making.

To this end, the BGWG recommends the formation of a Joint Coordinating Council (JCC). The JCC would include the President (Chair), Provost, Secretary of the Faculty, Chair of the Faculty Committee on Governance (COG), and a full-time non-tenure track (NTT) faculty member and one member of the Board of Trustees. The NTT faculty member would be selected by their peers. The Trustee would be appointed by the Board Chair, with the understanding that they would not need to attend every meeting. The JCC would meet at least monthly during the academic year. The JCC would report to the faculty regularly through the Secretary of the Faculty and to the full Board of Trustees at least annually, either at a plenary session, in the Nominating & Governance Committee, or in the Meeting of the Corporation. Operational procedures for the JCC would be established in their early meetings, which would begin in the summer of 2019.

Ultimately, the JCC is intended to assist the President in fulfilling their key role as facilitator of collaboration and communication between the Board, administration, and faculty. This role is well captured in the following section from the American Association of University Professors *Statement on Government of Colleges and Universities*:

*"It is the duty of the president to see to it that the standards and procedures in operational use within the college or university conform to the policy established by the governing board and to the standards of sound academic practice. It is also incumbent on the president to ensure that faculty views, including dissenting views, are presented to the board in those areas and on those issues where responsibilities are shared. Similarly, the faculty should be informed of the views of the board and the administration on like issues."*

In addition to establishing this new formal coordination mechanism, the BGWG recommends that the President take full advantage of existing structures within faculty governance to advance coordination and collaboration between faculty and administration. These include regular attendance at monthly faculty governance Committee Chairs meetings whenever possible to interact and exchange ideas on matters of campus-wide concern, and the codified invitation in

the Faculty Handbook to attend meetings of the Committee on Governance (or any other governance committee) conducting business of relevance to the President's direct interests or concerns.

Finally, the BGWG recommends that the President work to facilitate more numerous opportunities for interaction and increased understanding between faculty, administration, and board members. These could include but are not limited to: plenary sessions at Board of Trustees' meetings, informal small group or one-on-one interactions between faculty and board members on issues of interest, and opportunities to provide insights into the work of the Board of Trustees with the WPI community through more varied and frequent electronic communication.

#### *Process for future updates to bylaws that impact the academic enterprise*

The Board of Trustees realizes that making bylaws changes that could have an impact on the academic enterprise without consultation was a negative shock to the WPI faculty community. The Board does *not* anticipate frequent or significant additional changes in the bylaws that impact the academic enterprise once the version of the bylaws derived from the BGWG recommendations are passed by the Board of Trustees in May, 2019. However, whenever such changes are contemplated, the process by which future updates are made will include consultation with faculty and administration, initiated through the JCC and with enough time to allow considered input to be provided before the changes are finalized. In addition, when possible proposed changes will be posted for at least a four-week comment period ahead of Board ratification of the changes. The Board of Trustees will provide responses to any submitted comments.

#### *Role of Deans in the Appointment/Evaluation of Department Heads*

The Deans and the faculty have important roles to play in such critical academic processes as formulating recommendations for tenure and promotion, and in appointing and evaluating Department Heads. While the role of Deans in the tenure and promotion processes is included in the Faculty Handbook, the appropriate roles for Deans in the appointment and evaluation of Department Heads are not currently well defined. The Provost will bring to the JCC for discussion a proposal for the role of the Deans in this area, and a formal proposal for updating the faculty handbook to reflect this updated role will be brought before the voting faculty through the Committee on Appointments and Promotions and the Committee on Governance. This process will be completed during the 2019-20 academic year.

#### *Long-Term Commitments to and Greater Inclusion of NTT Faculty Members*

The BGWG supports the increased recent focus on the rights of and WPI's commitments to our NTT faculty members, who are essential and highly valued members of the WPI community. Specifically, the BGWG supports the ongoing work of the "NTT Task Force" launched by the Secretary of the Faculty early this academic year. Options for providing NTT faculty members with longer-term commitments from the University, and an examination of the rights and representation of the NTT faculty through faculty governance are both critical subjects that the Task Force is considering. A framework for any recommendations that emerge from the Task

Force work will be shared with the JCC early, so administration, faculty governance, and trustees can work towards alignment on this complex and important topic. This framework should be completed in the coming months, with actionable recommendations, including any updates to administrative processes and changes to the Faculty Handbook, being implemented during the 2019-20 academic year.

#### *Mechanism for Ensuring Required Board Approval of Certain Sections of the Faculty Handbook*

By existing practice, changes to the Faculty Constitution and University-wide policies appearing in the Faculty Handbook require approval by the Board of Trustees. Once approved by the faculty, changes that require Board approval will take effect after they are endorsed by the Board, which would typically occur at its next meeting. The Secretary of the Faculty will coordinate with the Provost and the Secretary of the Corporation to ensure that the needed updates are brought to the Board through the appropriate board committee (normally Nominating & Governance or Academic Planning).

#### *Addition of More Academic Expertise to the Board of Trustees*

The Board of Trustees has a responsibility to bring together the diverse expertise required to oversee the University. Although some academic expertise and experience already exists on the Board, and faculty appointees to board committees provide critical perspectives, the addition of more trustees with deep academic experience would be beneficial. The Board will commit to adding at least two such members over the next two years.

#### *Revisit Approach for Faculty Appointees on Board Committees*

To address the unintended impact of recent changes made by the Board to the process by which faculty members are selected to serve on board committees and to their roles and terms of appointment on those committees, the Board Chair, the President, and the Secretary of the Faculty will work together on modifications to the approach. Updates will be brought before the Trustee's Executive Committee for approval by the beginning of the 2019-20 academic year, in time to select the next set of faculty appointees using the revised approach.

#### *Revisit Approach to Ensure Worthwhile Faculty Review of Administrators*

The JCC will discuss changes to the current approach to faculty review of administrators to ensure that the process of obtaining feedback from faculty members on administrator performance provides valuable, actionable input. The Secretary of the Faculty will develop a proposal to update the process based on the JCC discussions and COG input, and the voting faculty will consider any changes needed to the Faculty Handbook through appropriate motions endorsed by COG by February, 2020.

#### *Support for Time and Training of Faculty Governance Leaders*

Effective governance requires investment in the leaders who take on critical responsibilities in our system of shared governance. The Secretary of the Faculty (with input from faculty members who are or have been active in faculty governance) and the Provost will examine benchmark data from peer institutions and make a recommendation to the President about compensation or other support for key governance leaders, and will create a plan for the professional

development of faculty governance leaders. The President commits to reviewing this plan when it is complete, and to providing a reasonable new investment in support of WPI faculty governance leaders.

#### *Regular Assessment of the State of Governance at WPI*

Regular assessment of the state of governance at WPI is aligned with good practice and contributes to the health of this critical part of our work. Both the Board of Trustees and faculty governance commit to evaluating the health of their governance processes and activities through surveys or other means that assess effectiveness and identify opportunities for improvement. The President, in consultation with the JCC, will investigate methods for regularly assessing the health of shared governance. The President will ensure that such an assessment is performed at least every three years, and that the overall results and any follow-on actions are shared with the entire campus community. The plan for regularly assessing shared governance at WPI will be completed by December, 2019.

#### **Concluding Statement**

The BGWG members are unified in their support for the aspirations of more effective sharing of effort, stewardship, and governance in support of WPI. Significant progress will be made by implementing the recommendations in this report.

WPI has great opportunities ahead. By embracing the potential of more significant collaboration in support of institutional goals, WPI can grow our reach and impact as a distinctive, project-based, STEM university focused on purpose-driven education and research.

*Respectfully submitted by the Bylaws & Governance Working Group, 4/18/19*

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Trustee Andy Aberdale

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Professor Steve Kmiotek

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Professor Jim Cocola

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President Laurie Leshin (Chair, BGWG)

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Professor Tanja Dominko

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Professor Mark Richman

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Trustee Marni Hall

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Provost Winston Soboyejo



**WORCESTER POLYTECHNIC INSTITUTE  
BYLAWS OF THE CORPORATION**  
(Amended ~~November 2, 2018~~ May 15, 2019)

**ARTICLE I - NAME**

The name of the Corporation is Worcester Polytechnic Institute (the “Corporation”). It is intended that the Corporation shall have the status of a corporation which is exempt from federal income taxation under Section 501(a) of the Internal Revenue Code of 1986, as amended, or any corresponding provisions of any future federal tax laws (hereinafter referred to as the “Code”), as an organization described in Section 501(c)(3) of the Code.

**ARTICLE II - OFFICES**

**A. CORPORATE OFFICE**

The initial principal office of the Corporation shall be located at 100 Institute Road, Worcester, Massachusetts 01609. The Corporation may have such other offices, either within or without the Commonwealth of Massachusetts and within or outside the United States, as the Board of Trustees may designate or as the affairs of the Corporation may require from time to time.

**B. REGISTERED OFFICE**

The registered office of the Corporation required to be maintained in the Commonwealth of Massachusetts may, but need not, be identical with the principal office in the Commonwealth of Massachusetts. The address of the registered office may be changed from time to time by the Board of Trustees.

**ARTICLE III - PURPOSE, MISSION AND USE OF FUNDS**

**A. PURPOSE AND MISSION**

The Corporation educates talented students in engineering, science, management, and humanities in preparation for careers of professional practice, civic contribution, and leadership, facilitated by

active lifelong learning. This educational process is true to the founders' directive to create, to discover, and to convey knowledge at the frontiers of academic inquiry for the betterment of society. Knowledge is created and discovered in the scholarly activities of faculty and students ranging across educational methodology, professional practice, and basic research. Knowledge is conveyed through scholarly publication and instruction.

## **B. USE AND ADMINISTRATION OF FUNDS**

In making distributions to effectuate the charitable and educational purposes of the Corporation, as delineated in Section A above, the Board of Trustees shall have the authority to make distributions of both income and principal in such proportions and amounts as the Board of Trustees, in its discretion, determines advisable, provided that all such distributions are consistent with all applicable federal tax laws and regulations, and with Massachusetts law governing acceptance, administration and distribution of charitable funds. The Corporation is not formed for financial or pecuniary gain; and no part of the assets, income, or profits of the Corporation shall be distributable to, or inure to, the benefit of its trustees or officers or any other private person, and except to make payments and distributions in furtherance of the purposes of the Corporation, as set forth in Chapter 214 of the Acts of 1865, as heretofore amended (the "WPI Charter") and Section A above. No substantial part of the activities of the Corporation shall be the carrying on of propaganda, or otherwise attempting to influence legislation; and no part of the activities of the Corporation shall be the participation in, or intervention in (including the publishing or distributing of statements), any political campaign on behalf of or in opposition to any candidate for public office. The Corporation shall not engage in any excess benefit transaction within the meaning of Section 4958 of the Code.

## **C. TERMINATION OF CORPORATION**

The Board of Trustees shall have the authority to authorize a petition for the Corporation's dissolution to be filed in the Massachusetts Supreme Judicial Court, all in accordance with M.G.L. c. 180, Section 11A.

## **ARTICLE IV — MEMBERSHIP OF THE CORPORATION MEMBERSHIP AND ELECTION OF TRUSTEES, TERM OF OFFICE, EMERITI TRUSTEES AND NOMINATIONS**

### **A. MEMBERSHIP AND ELECTION OF TRUSTEES**

The Corporation shall consist of members individually referred to as Trustees and collectively as the Board of Trustees. The number of Trustees shall be at least twelve, and may be as many as shall be elected by the Board of Trustees. Trustees shall be elected by a vote of a majority of the full Board of Trustees at any regular meeting or at any special meeting where a quorum is present, the call for which includes notice of the election.

### **B. TERM OF OFFICE**

The term of office of any Trustee, except that of the President, shall be five years; all terms shall conclude on June 30. Any Trustee may be re-elected for an immediately succeeding term subject to a limit of fifteen (15) consecutive years of service. Any Trustee who shall have attained fifteen (15) years of consecutive service but is in the midst of a term, may complete that term. Any Trustee that is also the Chair, may serve beyond the fifteen (15) consecutive years of service, to the extent necessary to allow such Trustee to serve as Chair for three consecutive one-year terms that can be extended to up to a total of five years. Any Trustee who has served for fifteen (15) consecutive years may be re-elected following a three-year absence from the Board of Trustees. Notwithstanding the foregoing, the Board may, upon recommendation by the Nominations and Governance Committee, waive the limitation on consecutive years of service and the three-year

absence requirement for a Trustee whose continued service is in the best interests of the Corporation to meet a particular need or purpose, provided that not more than one-tenth of the Trustees are serving beyond fifteen consecutive years of service at any time. Any Trustee may be removed from office with or without cause by the Board of Trustees at any regular meeting, or at any special meeting the call for which includes notice thereof, by an affirmative vote of two-thirds all of the Trustees at a meeting where a quorum is present.

### **C. EMERITI TRUSTEES**

Upon recommendation of the Nominations and Governance Committee, Trustees who have served with distinction, ordinarily for two full terms, may be elected by the majority of Trustees as Trustees Emeriti. Terms shall be without limit. Emeritus Trustees may serve as members of Committees and may attend and participate in meetings of the Corporation but they are not members of the Corporation and shall not be entitled to vote or serve as officers or be included when calculating a quorum.

### **D. NOMINATIONS**

The Nominations and Governance Committee shall recommend candidates for election or reelection to the Board of Trustees through procedures adopted by such committee and approved by the Board of Trustees. A slate of candidates, with biographical information for each prospective Trustee candidate, shall be provided to all Trustees in advance of the annual or regular meeting of the Board of Trustees at which an election is scheduled.

## **ARTICLE V – DEFINING THE ROLES AND RESPONSIBILITIES OF THE BOARD OF TRUSTEES, PRESIDENT, PROVOST, ACADEMIC DEANS AND FACULTY**

### **A. THE BOARD OF TRUSTEES**

The Board of Trustees (the “Board”) is the governing board and final institutional authority of Worcester Polytechnic Institute (“WPI” or the “University”). The Board is authorized to carry out all functions permitted by law and these bylaws, including but not limited to:

1. Reviewing and approving the University’s mission, purposes and organizational structure;
2. Appointing the President and setting appropriate terms of employment, including compensation;
3. Supporting the President and assessing the President’s performance;
4. Approving institutional policies and decisions bearing on faculty appointment, promotion, tenure, discipline and dismissal;
5. Reviewing and approving new academic programs and major changes in existing programs, academic organization and structure;
6. Approving all earned and honorary degrees;
7. Approving the University’s annual operating budget, capital budget, tuition and fees;
8. Monitoring the University’s financial condition and establishing policies affecting institutional assets;
9. Authorizing any debt financing and approving the securitization of loans;
10. Authorizing the construction of new buildings, capitalization of deferred maintenance backlogs, and major renovations of existing buildings;
11. Authorizing the purchase, sale and management of land, buildings, or major equipment in excess of \$1.0M;
12. Contributing financially to the University’s fundraising goals and participating actively in strategies to secure sources of support;

13. Approving the terms of employment and compensation of vice presidents and administrative officers who serve at the pleasure of the President;
14. Electing Board members and officers;
15. Reviewing these Bylaws and undertaking or authorizing assessments of the Board's performance.

The Board, while maintaining a general overview of the University, entrusts the operation of the University to the President. The policies established or approved by the Board shall be administered by the President directly, or by delegation to others. In discharge of its responsibilities, the Board may make such formal and informal delegations of functions, responsibilities and authorities as it considers appropriate to the President and, through the President, to administrative officers and members of the Faculty.

## **B. THE PRESIDENT**

The President is the chief executive officer of the University responsible for all of the University's affairs. The President is a Trustee, and a member of the Faculty, ~~and an ex officio member of all committees of the Board and the Faculty (except joint tenure and promotion committees making recommendations to the Provost and the President).~~ It is the duty of the President to see to it that the standards and procedures in operational use within the University conform to the policy established by the the Board and to the standards of sound academic practice. The President has full authority to:

1. Operate the University, including all of its academic, administrative and financial affairs;
2. ~~Set~~ Oversee institutional ~~policy-making~~ies;

3. Consult with the Faculty and other key stakeholders on important institutional matterseoneerns;
4. Maintain and grow the University's resources;
5. Prepare and submit for the Board's approval proposed operating and capital budgets for the ensuing fiscal year;
6. Establish an organizational administrative structure that will best enable the President to discharge the duties of the office effectively;
7. Lead the process of establishing the University's strategic priorities, recognizing that such a process should facilitate a shared effort between the Board, the administration, the Faculty, students and the University community;
8. Appoint vice presidents and other officials to carry out responsibilities for institutional activity.

### C. THE PROVOST

The Provost is the University's chief academic officer after the President and is a member of the Faculty. In consultation with the Deans, Department Heads and members of the Faculty, the ~~The~~ Provost shall take ~~the~~ initiative in proposing plans and actions in academic matters, in reviewing and implementing educational programs and policies, ~~and in meeting and consulting with Academic Deans, Department Heads, and members of the Faculty.~~ The Provost:

1. Is appointed by the Board on nomination by the President;
2. Reports to the President;
3. ~~Is a member of the Faculty and shall be an *ex officio* a member of every Faculty committee and of all committees (except joint tenure and promotion committees~~

~~making recommendations to the Provost) or other bodies concerned with academic policy and appointments;~~

4.3. Appoints, supervises and evaluates the Academic Deans;

~~5. Creates, reviews and approves academic policies;~~

4. Collaborates with the Deans, Department Heads and members of the faculty on academic matters;

5. Develops, recommends and manages the budget of Academic Affairs;

6. Recommends fFaculty candidates for tenure and promotion to the President and the Board of Trustees.

#### **D. THE ACADEMIC DEANS**

Academic Deans are members of the Faculty, reporting to the Provost, charged with responsibility to operate WPI's academic programs. ~~and its four Schools: The School of Arts and Sciences; The School of Engineering; The Foisie School of Business; and The Global School.~~ The Provost may also appoint other academic deans and administrators, including but not limited to deans of Undergraduate Studies and Graduate Studies, and a Vice-Provost for Research. Each School's budget is under the control of the Dean. The Provost may assigns duties and responsibilities to the Academic Deans including responsibility for:

1. ~~Setting~~ Taking initiative in proposing the strategic direction of teaching, scholarship, research, and new programs and initiatives;
2. Collaborating with the other Academic Deans, Department Heads, Program Directors and members of the faculty on academic matters ~~in order~~ to advance institutional goals;
3. Developing and recommending budgets to the Provost for their respective areas of responsibility;



4. Raising the visibility of the activities within their Schools through external engagements, fundraising and other activities;
5. Supporting and providing the Faculty with opportunities for professional advancement;
6. ~~Evaluating Faculty members and making recommendations to~~ Consulting with the Provost regarding recommendations for faculty hiring, tenure and promotion;
7. ~~Appointing,~~ Supervising and evaluating Associate Deans, Department Heads, Program Directors, ~~Faculty (in the case of a School with no Department Heads or Program Directors), or and~~ other direct reports, and making recommendations to the Provost on appointments to these roles;
8. Seeking and obtaining input and advice from Department Heads and Faculty members on important issues affecting their areas of responsibility;
9. Such other duties, responsibilities and authority as may be delegated from time to time by the President and the Provost.

## **E. THE FACULTY**

~~The Faculty consists of the President, the Provost, the Vice Provost for Research, the Academic Deans and all full-time professors of all ranks and titles, including those that are tenured, tenure-track, continuing non-tenure track, teaching professors, research professors, and professors of practice. The faculty is understood to consist of such persons as shall be designated in the Faculty Constitution and Faculty Bylaws and approved by the Board of Trustees. Faculty members report to their respective Department Head and/or Program Director, as applicable. Department Heads and Program Directors report to their respective Academic Dean(s). The WPI Faculty is are~~ primarily responsible for advancing WPI's academic mission through instruction and expanding the boundaries of knowledge through scholarship and research. Faculty members also play critical

service roles within and outside the University. The roles, responsibilities, and rights of faculty are documented in the WPI Faculty Handbook. The Faculty's duties include:

1. Educational, research, scholarly activities and service;
2. Establishing academic standards, curricula, courses of study, and regulations pertaining thereto;
3. Certifying candidates for degrees and recommendation to the Board of Trustees for award of degrees;
4. Defining, subject to the Board's approval, the recognized titles of academic rank, and the criteria of eligibility thereto.

## **F. ACADEMIC STRUCTURE**

The academic structure of WPI shall consist of the following Schools: The School of Arts and Sciences; The School of Engineering; The Robert A. Foisie School of Business[; and The Global School]<sup>1</sup>.

### ~~SECTION 2. ACADEMIC FREEDOM AND EFFECTIVE COLLABORATION~~

~~**ACADEMIC FREEDOM.** It is critically important that WPI Faculty members have freedom in carrying out their academic activities within the framework of WPI's policies and society's laws and norms. Consistent therewith, the University is committed to academic freedom in teaching, in the conduct of research and publication, and in service activities. Faculty members are entitled to freedom in the classroom in discussing their subjects and evaluating their students, but they should be careful not to introduce into their teaching controversial matter which has no relation to their subjects. Faculty members are citizens, members of learned professions, and members of an educational institution. When they speak or write as citizens, they should be free~~

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<sup>1</sup> The Global School will be added to the academic structure after faculty endorsement and Board approval.

~~from institutional censorship or discipline, but their special position in the community imposes special obligations. As persons of learning and as educational officers, they should remember that the public may judge their profession and institution by their utterances. Hence, they should at all times be accurate, should exercise appropriate restraint, should show respect for the opinions of others, and should make every effort to indicate that they are not institutional spokespersons.~~

## **G. EFFECTIVE COLLABORATION**

Navigating the complex and dynamic requirements of sustaining a thriving university requires the focused and collaborative efforts of all members of the WPI community. Effective collaboration must be rooted in principles that reflect mutual respect, trust, integrity, academic freedom, creativity, flexibility, and agility, ~~where~~ Effective collaboration should allow space for change through effective and timely decision-making where roles and responsibilities consultation and decision-making processes are well-defined, ~~where the Board fulfills its fiduciary duty of oversight, where the President effectively executes policies and leads the University's operations, and where the Faculty conducts world-class teaching, research, scholarship, and service within a supportive academic environment. Together, these outcomes create the conditions in which students can learn and grow as citizens and members of the WPI community.~~ The President should periodically evaluate and report to the community on the state of effective collaboration at WPI.

## **ARTICLE VI – OFFICERS**

### **A. OFFICERS**

Upon recommendation by the Nominations and Governance Committee, the Board of Trustees shall elect a Chair, one or more Vice-Chairs, a President, a Treasurer, an Assistant Treasurer, a

Secretary, and an Assistant Secretary of the Corporation. A vacancy in any of said offices may be filled by election at the next meeting of the Corporation.

#### **B. OFFICERS NOT ELECTED FOR SPECIFIC TERMS**

Unless elected for a specific term, the Chair, one or more Vice-Chairs, the President, the Treasurer, the Assistant Treasurer, the Secretary, and the Assistant Secretary shall hold their offices at the pleasure of the Board of Trustees.

#### **C. CHAIR AND VICE-CHAIRS**

The Chair shall be a member of the Corporation, shall preside at all meetings of the Corporation and shall perform the duties usually attached to that office. The Vice-Chairs shall be members of the Corporation and shall perform the duties of the Chair in the event of his or her absence or inability to serve. The Chair and Vice-Chairs shall be elected annually for a maximum of five (5) one-year terms for any individual in either of these positions. The Chair shall be *ex officio* a member of all committees of the Corporation.

#### **D. SECRETARY**

The Board of Trustees shall elect the Secretary from among the full-time employees of the Corporation. The Secretary shall perform the duties customary for the Clerk of any Corporation and shall keep a record of the minutes.

#### **E. TREASURER**

The Board of Trustees shall elect annually at the Annual Meeting of the Corporation the Treasurer from among the full-time employees of the Corporation. The Treasurer shall perform the duties usually attached to that office. The Treasurer may borrow money when authorized to do so by the Corporation and shall give in writing to the Corporation at the October meeting a full account of the financial condition of the Corporation. The Treasurer shall, with the authorization of the

Corporation, have power to buy, sell or transfer from time to time securities and other property in which funds of the Corporation may be invested.

#### **F. ASSISTANT TREASURER AND ASSISTANT SECRETARY**

The Assistant Treasurer and the Assistant Secretary shall be elected annually at the Annual Meeting of the Corporation from among the full-time employees of the Corporation, shall assist the Treasurer and Secretary, respectively, in the discharge of their duties, and shall perform the duties of the Treasurer and the Secretary, respectively, in the event of their absence or inability to serve.

### **ARTICLE VII – COMMITTEES**

#### **A. EXECUTIVE COMMITTEE**

The Board of Trustees annually shall elect an Executive Committee composed of at least seven (7) Trustees, which number shall include the President, the Chair, and the Vice-Chairs. The Chair of the Board of Trustees shall be the Chair of the Executive Committee. The Secretary of the Corporation shall staff the Executive Committee meetings. The Executive Committee shall hold regular meetings at such times and places as its members may from time to time determine, provided that any member who is absent when such determination is made shall be given notice of the determination. Special meetings of the Executive Committee may be held at such time and place as may be designated in a call by the President or the Chair. The President shall prepare an agenda for each meeting of the Executive Committee. A majority of the Executive Committee shall constitute a quorum. The affirmative vote of a majority of all of the members of the Executive Committee shall be required for the Executive Committee to act. The Executive Committee may create other committees, and shall keep records of its proceedings. Each Trustee shall be provided minutes of each meeting of the Executive Committee, with all actions to be reported at the next

meeting of the Corporation. The Executive Committee shall have power during the intervals between the meetings of the Board of Trustees to exercise all powers of the Corporation except as otherwise provided by law or reserved by these Bylaws to the Board of Trustees, and shall have the power to delegate to other committees such of its duties and powers as it may deem desirable. The Executive Committee may not: (a) change the number of the Board of Trustees, remove Trustees from office or fill vacancies on the Board of Trustees; (b) amend the WPI Charter; (c) adopt, amend or repeal Bylaws; or (d) remove officers or fill vacancies in office.

## **B. STANDING COMMITTEES**

The following shall be the standing committees of the Corporation:

### **1. Academic Planning Committee**

The purpose of the Academic Planning Committee is to provide oversight of all matters relating to the undergraduate and graduate educational programs and all research programs. Committee members shall seek the commitment of faculty and administrators in ensuring that academic priorities are unambiguously stated, appropriately funded, and consistent with the overall educational mission of the Corporation.

### **2. Advancement Committee**

The purpose of the Advancement Committee is to assure the Corporation has effective development and alumni relations, and marketing and communications programs in place so as to maximize the philanthropic support for the Corporation and its proper recognition throughout the world.

### **3. Audit and Risk Committee**

The purposes of the Audit & Risk Committee shall be: (A) to provide oversight of the Corporation's financial practices, internal controls, financial management, compliance

with laws and regulations, and its Business Ethics and Conflict of Interest policies; (B) to ensure the integrity of the Corporation's financial statements; (C) to interact directly with and evaluate the performance of the Corporation's independent auditors, including to determine whether to engage or dismiss the independent auditors and to monitor the independent auditors' qualifications and independence; and (D) to promote and oversee development of broad risk management practices.

#### **4. Budget and Finance Committee**

The purpose of the Budget and Finance Committee is to maintain the fiscal stability and long-term economic health of the Corporation. The Committee oversees that financial planning for the Corporation is supportive of and fully integrated with the long-range plans and mission of the Corporation. The Committee provides oversight of fiscal management and guidance to those responsible for the Corporation's day-to-day operations.

#### **5. Leadership Development and Executive Compensation Committee**

The purpose of the Leadership Development and Executive Compensation Committee is to carry out the Board's responsibilities for designing and managing executive compensation. In discharging its duties, the Committee shall effectively and appropriately design and administer reasonable cash and non-cash compensation and benefit packages for the Corporation's key executives and take the steps or actions necessary to establish a presumption of reasonableness, as described in Internal Revenue Code Section 4958, as amended.

#### **6. Investment Committee**

The purpose of the Investment Committee is to maintain the prudent and effective

investment of the endowment and to formulate and oversee the investment policies and management of the endowment and other investable assets of the University. It is responsible for the endowment, planned gift annuities and life income funds, and other investment assets of the institution.

#### **7. Facilities Committee**

The purpose of the Facilities Committee is to broadly oversee the Corporation's physical assets: its land, buildings, equipment, and technology infrastructure. More specifically, to maintain the adequacy and condition of capital assets, to develop and periodically review policies, to advocate for new structures and rehabilitate or remove older structures, and to ascertain that adequate levels of funding exist for plant maintenance and operations, and technology infrastructure.

#### **8. Nominations and Governance Committee**

The purposes of the Nominations and Governance Committee are to attract, nominate, orient, organize, motivate and assess the performance of diverse and highly qualified group of trustees; to recommend to the Board the spring commencement speaker and candidates for honorary degrees and to ensure the continuing ability of the Board to exercise its responsibilities at the highest level of excellence. The Nominations and Governance Committee is committed to building and maintaining diversity among trustees.

#### **9. Student Affairs Committee**

The purpose of the Student Affairs Committee is to provide policy guidance to promote a safe and intellectually stimulating learning environment that encourages academic success, personal development, and student satisfaction.



## **10. Economic Impact Committee**

The purpose of the Economic Impact Committee is to contribute leadership and strategic vision to maximize the use of WPI's knowledge enterprises for driving regional economic development.

Each standing committee shall consist of at least five Trustees, excluding ex officio members. The chair and members of each committee shall be appointed annually by the Chair of the Corporation. Regular rotation of Board members through various committees and regular rotation of committee chairs ensures Board members exposure to the full panoply of areas of the Corporation's operations. Vacancies in any committee shall be filled by the Chair of the Corporation. Each committee shall regularly review its charter and amend when necessary. Amendments shall be reviewed by the Nominations and Governance Committee and approved by the full Board.

### **C. OTHER COMMITTEES**

The Corporation may establish such other committees as it deems appropriate for the transaction of its business.

## **ARTICLE VIII – MEETINGS OF THE BOARD OF TRUSTEES**

### **A. REGULAR MEETINGS**

There shall be at least three regular meetings of the Board of Trustees each year. One of the meetings shall be the Annual Meeting and shall be held between May 1 and June 30. The other two regular meetings shall be held in or about October and February, respectively. All such meetings shall be held on dates approved by the Executive Committee.

### **B. SPECIAL MEETINGS**

Special Meetings of the Board of Trustees may be called at any time by the President, the Chair or any twelve Trustees, to be held at such places and times as stated in the calls to the meetings. No business may be transacted at a special meeting of the Board of Trustees other than that stated in the call to the meeting.

### **C. NOTICES AND MINUTES**

Notice of each meeting of the Board of Trustees shall be sent by the Secretary (or if the Secretary is unable or unwilling, then the Assistant Secretary) to each Trustee at least seven days before the time of the meeting, and the notice of a special meeting shall state the object for which it is called. Trustees shall be provided minutes of each meeting of the Board of Trustees.

### **D. QUORUM**

A majority of all of the Trustees shall constitute a quorum at all meetings of the Board of Trustees.

### **E. ORDER OF BUSINESS**

The President and Chair in coordination shall prepare an agenda for each meeting of the Board of Trustees.

### **F. ACTION AT MEETING**

If a quorum is present when a vote is taken, the affirmative vote of a majority of all Trustees is the act of the Board of Trustees. A Trustee who is present at a meeting of the Board of Trustees or a committee of the Board of Trustees when corporate action is taken is considered to have assented to the action taken unless: (a) he or she objects at the beginning of the meeting, or promptly upon his or her arrival, to holding it or transacting business at the meeting; (b) his or her dissent or abstention from the action taken is entered in the minutes of the meeting; or (c) he or she delivers written notice of his or her dissent or abstention to the presiding officer of the meeting before its

adjournment or to the Corporation immediately after adjournment of the meeting. The right of dissent or abstention is not available to a Trustee who votes in favor of the action taken.

#### **G. CONSENT IN LIEU OF MEETING; TELEPHONE CONFERENCE MEETINGS**

In addition to any other method permitted by law, (1) the Board of Trustees and any committee of the Corporation may take any action by unanimous written consent in lieu of a meeting (including written consent delivered by email transmission or other electronic transmission), and (2) the Board of Trustees and any committee of the Corporation may take any action by means of a meeting conducted using a conference telephone, video conference or similar communications equipment, so long as all Trustees participating may simultaneously hear each other during the meeting.

#### **ARTICLE ~~IXVIII~~ – CONFLICT OF INTEREST**

Each Trustee shall be familiar with and comply with the Corporation’s Conflict of Interest Policy, as it shall be approved and amended by the Board of Trustees from time to time.

#### **ARTICLE ~~IX~~ – MISCELLANEOUS PROVISIONS**

##### **A. POWER TO ACQUIRE, MORTGAGE OR CONVEY REAL ESTATE**

The power of the Corporation to acquire, mortgage or convey real estate shall be exercised by the Board of Trustees or the Executive Committee, provided, however, that the Board of Trustees or the Executive Committee may delegate limited authority to the President, Treasurer and Assistant Treasurers, specifying the extent of the authority so delegated.

##### **B. INDEMNIFICATION**

Each person who at any time has served as a member of the Corporation or of any committee of the Corporation or as an officer of the Corporation or who has served at the request of the Corporation as an officer, individual trustee, director or member of any organization in which the

Corporation has an interest, including any trust or association established in connection with a retirement plan for employees of the Corporation shall, to the extent permitted from time to time by law, be indemnified by it against all expenses actually and necessarily incurred by such individual(s) in connection with the defense of any action, suit, or proceeding to which he or she has been made a party by reason of his or her being or having been in such role, to the extent provided for in the WPI Charter. The Board of Trustees may, in its discretion, authorize from time to time the indemnification of any person not otherwise entitled to indemnification hereunder, who is an employee or other agent of the Corporation or who serves at the request of the Corporation as an employee or other agent of an organization in which the Corporation has an interest, but only to the extent permitted from time to time by law.

#### **ARTICLE XI - FISCAL YEAR**

The fiscal year of the Corporation be and hereby is fixed as the twelve month period ending on the last day of the month of June in each year.

#### **ARTICLE XI—AUTHORITY**

~~Nothing herein shall limit the President's authority to manage the University or to establish policies related thereto, subject to Board approval. In the case of any conflict between these Bylaws and other University policies, manuals or handbooks (e.g. Employee Benefits and Policies Manual; WPI Faculty Handbook) these Bylaws shall prevail. In the event of any ambiguities in these Bylaws, the interpretations of the Board shall be controlling.~~

#### **ARTICLE XII - AMENDMENT**

The Bylaws may be altered or amended at any meeting of the Board of Trustees by an affirmative vote of not less than two-thirds of all of the Trustees at a meeting where a quorum is present. A proposed amendment shall be referred to the Executive Committee for recommendation. The full

text of a proposed amendment shall be sent to the Trustees at least seven days before the date of the meeting at which action thereon is to be taken. If for any reason the Executive Committee fails to report at the next meeting following notice of a proposed amendment, the Board of Trustees may proceed to act thereon without the Committee's report.

Amended and Approved by the Board of Trustees on November 2, 2018, effective November 12, 2018.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Governance (Prof. Spanagel, Chair)

**Re:** Motion to endorse the WPI Administration's Global School proposal

**Motion:**

The Committee on Governance (COG) recommends and I move that the Faculty endorse the WPI Administration's plans to establish a Global School, as generally outlined in the attached "WPI Global School: A Proposal" document.

**Rationale:**

According to the Faculty Handbook "Policy on Initiating and Terminating Departments of Programs" (Part Two Section 2.D), [page 2-23], "*Should the Administration propose creating, merging, realigning, or eliminating an academic program or major academic or research facility, that proposal shall be conveyed to the Committee on Governance,*" COG is supposed to conduct a critical review of said proposal ... [and then] "*frame a recommendation to the Administration, and present it to the Faculty for its approval.*"

The proposal that comes to the Faculty meeting today embodies recent efforts at WPI to engage in shared leadership, meaningful consultation, and critical feedback. Between December 2018 and March 2019, Provost Soboyejo met repeatedly with representatives of the faculty and staff who would be affiliated with the new academic unit. He consulted with other interested members of the campus community, and he continually revised this proposal in respectful appreciation for COG's criteria and iterative suggestions for how to express intentions with greater clarification and transparency.

Throughout this process of gathering input, the Provost has developed and refined his own vision of how a Global School could help WPI to achieve its current strategic planning initiatives. Unlike any Global School documents that existed before November 2018, this proposal also attempts to discuss risks and opportunities with some concrete reference to their anticipated financial consequences. COG insisted upon the provision of information needed to render an informed judgment about whether WPI should establish a Global School, as a prerequisite to the commitment of substantial resources from this point forward to support its implementation. Although it is impossible to predict the details of exactly how the Global School's new programs will roll out, the attached proposal delineates the scope of resource needs just to manage the transition to the proposed new structure, and outlines a plausible scenario for how WPI can hope to mitigate financial stress through an initial five-year period of the Global School's establishment and projected growth.

COG supports this endorsement motion at this time because we recognize the need to develop a more robust institutional framework for WPI's rapidly growing array of global project activities. Intentional expansion of the faculty's research expertise and teaching capacities in relevant fields of integrative and area studies will enhance our ability as an institution to make good on the

strategic plan's promise to offer meaningful global learning experiences to all interested WPI students (both at the undergraduate level and the graduate level).

### **Implementation:**

For this new academic unit to succeed, steps toward its implementation require not only full compliance with all relevant Faculty Handbook policies, but also a redoubled spirit of genuinely shared leadership. The Faculty Handbook delineates how various standing committees must review and approve new courses and new academic or certificate programs, evaluate faculty, appoint faculty members to serve on search committees, appoint faculty members to serve in positions of academic administrative leadership, and so on.

Beyond existing mechanisms of faculty governance support and oversight, the Administration must remain committed to engage in sustained consultation with both TT and NTT faculty and staff constituencies to build out the new Global School. For example, some program development initiatives are likely to require the formation of collaborative, diversely representative Task Forces. Individual communications containing both critical and encouraging feedback will also continue to be highly valuable, and therefore must be invited consistently and warmly welcomed, in order to ensure that future decisions regarding emerging challenges and opportunities (while this ambitious endeavor unfolds) will be made in the most transparent and effective manner practicable.

# WPI GLOBAL SCHOOL

## A Proposal

Wole Soboyejo, Provost





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## Executive Summary

We present a proposal to establish a Global School that will amplify the impact of global research, education and outreach at WPI. Following an overview of the need, the vision and the opportunity, the infrastructure, expertise and resources that are needed for the establishment of the Global School are presented. These include undergraduate and graduate programs, the Grand Challenges Scholars Program, the Global Lab, the Institute of Science and Technology for Development (InSTeD), and the area/core knowledge of WPI's faculty, staff, and students. The Global School will also enable WPI to leverage its backbone of 50+ project centers and global partnerships into a framework for the development of new ideas that will lead integrated efforts by core knowledge experts and students to develop evidence-based solutions to global grand challenge problems. This will be achieved within a Global School that will support diverse communities of collaborators to engage in high impact projects that will lead to the development of resilient and sustainable communities.

# WPI GLOBAL SCHOOL

## 1. INTRODUCTION

### **THE NEED**

The increasing complexity and diversity of global perspectives and the need to address global grand challenges in health, energy and the environment, food, water, and job creation has created a need for a new type of Global School that can prepare “Problem Solvers” and leaders to use Project-Based Approaches to develop socially-conscious evidence-based solutions to local/global problems. Such responsible global leaders must be critical thinkers that possess intercultural competence and sensibility, make informed decisions in the cultural, political and economic contexts, communicate with diverse audiences across cultures and languages and understand religious and ethnic customs that shape the opinions and actions of others from globally diverse backgrounds. They should be adaptive to change and understand their responsibility for resource stewardship, ethical and socially responsible actions, and evidence-based decisions that make the world safer and better for future generations.

### **THE OPPORTUNITY**

WPI has a rich history of innovative undergraduate educational programs in which project-based problem solving is taught using Project-Based Learning. We also have a network of 50+ Project Centers that are used to develop the soft and hard skills of our undergraduates. Hence, there is an opportunity to increase the impact of our undergraduate programs and global network by deepening our scholarship through interdisciplinary research, education and area knowledge, while using our project-based approach to develop evidence-based and socially conscious solutions to Global Grand Challenge Problems.

### **THE VISION**

The Global School will enhance WPI’s impact as a leader in educational and social innovation that addresses global grand challenges. The proposed activities of the Global School will include:

- Integrated undergraduate and graduate programs
- Global partnerships with a focus on problem-solving
- Professional programs that prepare globally-informed/socially conscious leaders
- World class research that uses cross-cutting interdisciplinary approaches and area knowledge to develop socially conscious solutions to local/global problems.

### **INFRASTRUCTURE, EXPERTISE AND OTHER RESOURCES**

WPI’s project-based approach to problem-solving and education has nurtured a community of WPI faculty, researchers, staff and students with a strong interest in solving global grand challenge problems within contexts that are well informed by deep area knowledge and concern for social justice. These include: a community of globally-engaged scholars and teachers in the Interdisciplinary and Global Studies Division (IGSD); faculty involved in the teaching of the Great Problem Seminars; faculty associated with International and Global Studies; and faculty and staff in many departments committed to project-based learning, STEM education, humanitarian engineering, community/global development.

## 2. CURRENT PROGRAMS

### IGSD and Global Projects Program

WPI has committed substantial resources to create our Global Projects Program and to make global projects available to all of our undergraduate students. The global programs have also enabled WPI to hire, mentor, and retain a critical mass of faculty and staff with global expertise in the humanities, arts, social sciences, natural sciences, engineering, and business. Furthermore, through our Global Projects Program, WPI undergraduate students have been able to work on projects that are very meaningful to communities across the world. Such experiences have enabled our

**Figure 1.** WPI Global Project Centers



undergraduate students to develop the soft and hard skills that are needed to solve complex problems across cultural and geographical boundaries. They have also earned WPI the No. 1 ranking (in the US) by the US New and World Report for its study abroad program. Recognizing the importance of global project experience, WPI has recently launched the Global Projects for all initiative in 2017-2018. This initiative provides financial assistance to all undergraduate students, while making inroads into *new* project center locations. We are also piloting and evaluating a comprehensive feedback process while working

with our faculty to define and measure the impacts of WPI's global projects on undergraduate students, faculty, advisors, and the organizations and communities that partner with WPI.

### Great Problems Seminar (GPS)

The Great Problems Seminar is a two-term course that engages first-year WPI students in problem identification within our project-based curriculum at WPI. Established 10 years ago, the course gives students and faculty the opportunity to step outside their disciplines to explore holistic approaches to global problem solving. The course ends with an Annual Roster Day in which students present solutions to some of the world's most critical challenges.

### Grand Challenges Scholars Program (GCSP)

In August of 2017, the National Academy of Engineering (NAE) named WPI as a Grand Challenges Scholars School. WPI's selection was in recognition of our project-based curriculum – the core of the WPI Plan – that enables undergraduate students to engage in real-world problem solving during their four years of study at WPI.

Endorsed by the NAE in 2009, and motivated by NAE's 14 grand challenges for engineering, the GCSP is a global movement that advances a new engineering education paradigm—one that prepares engineers to change the world for the better. The GCSP is a combined curricular, co-curricular, and extracurricular program with five competencies that are designed to prepare students to address the grand challenges facing society in the 21st century. These include: sustainability, health, security, and joy of living. Implemented at more than 50 schools around the world, each institution develops its specific program within the NAE framework.

## Global Lab

The Global Lab has also become a focal point for global research at WPI. The lab fosters connections between global research and project activities by WPI/Visiting faculty. The Global Fellows/Faculty-in-Residence program allows WPI faculty to focus on research or creative projects/programs. The involvement of external visiting fellows also enhances research programs at WPI. The Global Lab also serves as a center for innovative research, documentation and the use of media in the dissemination of WPI's global impact.

## Undergraduate Programs

Our current undergraduate programs in the area of global studies include: an undergraduate major and minor in international and global studies; a program in Economic Sciences, a minor in Society, Technology and Policy, and a minor in Environment and Sustainability. These are all areas in which the Global School will invest significantly to build on the existing programs that have been initiated in the Department of Social Science and Policy Studies (SSPS) and the IGSD. The current undergraduate students will also be able to benefit from BS/MS programs that will be built on the existing course offerings at the undergraduate level.

### **3. PROPOSED ACADEMIC ACTIVITIES**

#### **Education and training**

##### Undergraduate programs

Undergraduate programs that may have involvement with the Global School, such as those identified in the preceding section, will be reviewed to determine their level of engagement with the Global School. A significant effort will be made to invest in these programs along with local Interactive Qualifying Projects (IQPs) and Major Qualifying Projects (MQPs) that are done in collaboration with global partners, companies, governments, non-governmental organizations and development partners. The Global School will weave together courses that include: the Great Problems Seminars in the first year; undergraduate courses in area studies/global studies; global grand challenge programs; and potential new certificate/minor programs in energy, water, food, global health, and STEM education. In each of these areas, project-based approaches will be used to prepare future graduates that are well prepared to solve local/global problems.

##### Graduate programs

The proposed graduate programs will build on our existing undergraduate programs in international and global studies; society, technology and policy; economic sciences, and environment and sustainability. Furthermore, based on faculty interest, additional graduate programs will be developed by faculty task forces in the areas of development/policy, community engagement and social justice. These will be developed by teams of WPI faculty over the next 2-3 years. New demand-driven Masters and PhD programs will also be developed in the areas of technical leadership, and global engineering with different flavors. The latter include: STEM approaches; community engagement, development, policy, sustainability, and design thinking approaches. These will be designed for current WPI undergraduates and graduates, working professionals, WPI alumni, and a diverse national/international group of students that will participate in on-line/on-site programs. The proposed graduate programs will include:

1. BS/MS programs for WPI undergraduates with interests in global studies
2. Masters programs for working professionals

3. Research-based Masters and PhD programs
4. Short courses for working professionals and alumni

Courses and programs in the Department of Global Studies will be developed and taught largely by faculty in Arts & Sciences, Business, Engineering and GPS/IGSD. These courses will be developed in collaboration with global partners and Corporate and Professional Education (CPE) at WPI. This will be done in an effort to make online/on-site versions of the courses available to a global audience. In all cases, a distinctive project-based approach will be used to prepare globally-informed leaders for problem solving.

Finally, in this section it is important to note that the new graduate programs will leverage the expertise of the faculty in the Global School and faculty in Arts and Science, Business, Engineering, and GPS/IGSP. The Global School will therefore, offer additional opportunities for WPI faculty and their global partners to engage in world class projects and research that will elevate the impact of our work on evidence-based policy/development, community engagement/social justice, sustainability and resilience.

### **Institute for Science and Technology for Development (InSTeD)**

Leveraging WPI's long tradition of global engagement and faculty research portfolio, we propose to create an Institute of Science and Technology for Development (InSTeD), as part of the Global School. InSTeD will bring together faculty with expertise in development studies, engineering design, and scientific innovation in the service of historically under-resourced communities. Working in collaboration with academia, local governments, NGOs, and industry, InSTeD plans to engage in research at the nexus of healthcare, water, STEM education, and international development. This program is initially focusing on Ghana and Ecuador and offers a model for additional research collaborations at the frontier of global development and humanitarian challenges.

InSTeD researchers will seek funding to collaborate with various institutional and community partners at home and around the globe. The academic goal of the Institute will be to employ creative design thinking to develop innovative solutions that support a community's needs and aspirations for a better life. The center will, for the first time, bring together an academic program that includes critical development studies, engineering design, and scientific innovation.

In doing so, we will not only fill a gap in the current research/development market, but also will leverage the research to design project experiences for our graduate students. The following needs will be addressed:

- There is a surge in interest in “development engineering” across the US and Western Europe;
- While “development engineering” represents something new, the process for determining need has scarcely changed; development has approached challenges to human well-being as technical issues to be addressed through intervention;
- There is the need to extend existing efforts in the global safety arena from a focus on developed countries to an engagement of developing countries in the Middle East, Africa, Latin America and South America.

### **Area Studies and Grand Challenges**

The global school will integrate our efforts in Area Studies with Grand Challenge Programs that will inform the development of regionally and evidence-based policy. This effort will combine our area of knowledge in China, Latin America and the Caribbean, Africa and the Middle East, Europe and Australasia into hubs that will be integrated with Grand Challenge Projects that extend across multiple countries/regions. The

initial hubs and spokes will be selected from WPI's existing network of 50+ global centers. They will be integrated with WPI's NAE Grand Challenge Program and Global Grand Challenge Programs in water, food, energy and the environment, health and education. In each of these areas WPI faculty, staff and students will engage in research and projects (with our global partners) that will develop high impact scholarship that will form the basis for evidence-based globally-informed policy and problem solving. This effort will be coordinated by Prof. Jennifer Rudolph who will use her area expertise from the China Hub to expand the scope and impact of our Area Studies Programs. She will work closely with the leaders of the NAE Grand Challenges Program (Chrys Demetry and Stephen Kmiotek), the Global Water Reconnaissance Program (Hal Walker), the Energy Group (Mike Timko), the Sustainability Program (Paul Mathisen), INSTED (Rob Krueger) and the Center for Global Public Safety (Jianyu Liang, Milosh Puchovsky and Albert Simeoni).

### **Global Projects and Engagement**

The Global School will expand the scope of our Global Projects to include both undergraduate and graduate students. This will include the support of Global Projects for all undergraduate and graduate students and the harmonization of our global partnership agreements into structured efforts that are well aligned with our global efforts in research, education and outreach. Within this context, the global interests of our faculty, staff and students will be integrated into frameworks that will address important questions that are of local or global interest. The groups will also leverage the resources available within WPI's network of 50+ Global Centers along with collaborators and visiting scholars that will be supported to come to teach and engage in research and projects at WPI. In this way, a significant two-way exchange will be developed between WPI and its global partners. The active exchange will also enrich our academic programs in global studies, while providing globally-informed perspectives to our global education and research in ways that could shape the future development of evidence-based policy and global indices. The potential impact of our global programs could, therefore, be very significant, especially when we enter into an era of WPI global indices for energy and the environment, water, food, safety, environment and STEM education.

### **Challenges**

#### **Internal**

The growth of the Global Project Program has posed multiple challenges:

- The need to increase the number of projects, identify additional sponsors and faculty advisors during a period of growth in undergraduate enrollment
- The need to increase resources for selection and preparation of students, and advising of student teams
- Logistic challenges to ensuring safety and well-being of our students and faculty while at global project centers

Project advising has been a unique opportunity for faculty professional development, and many WPI faculty have become international leaders in the scholarship of project-based learning.

The dominance of the IQP model of global studies as practical problem-solving has limited wider possibilities for envisioning global studies at WPI. Undergraduate opportunities in the humanities and arts, area studies, or in the major field are also available but underdeveloped. The Global School will become a central forum for the wider discussion of what global studies should be at WPI beyond the IQP.

Endorsement of The Department of Global Studies, of all new undergraduate and graduate programs and degrees, associated courses, student learning outcomes, and other academic matters will need to receive endorsement of relevant Faculty Governance Committees and ultimately by the WPI faculty.

### External

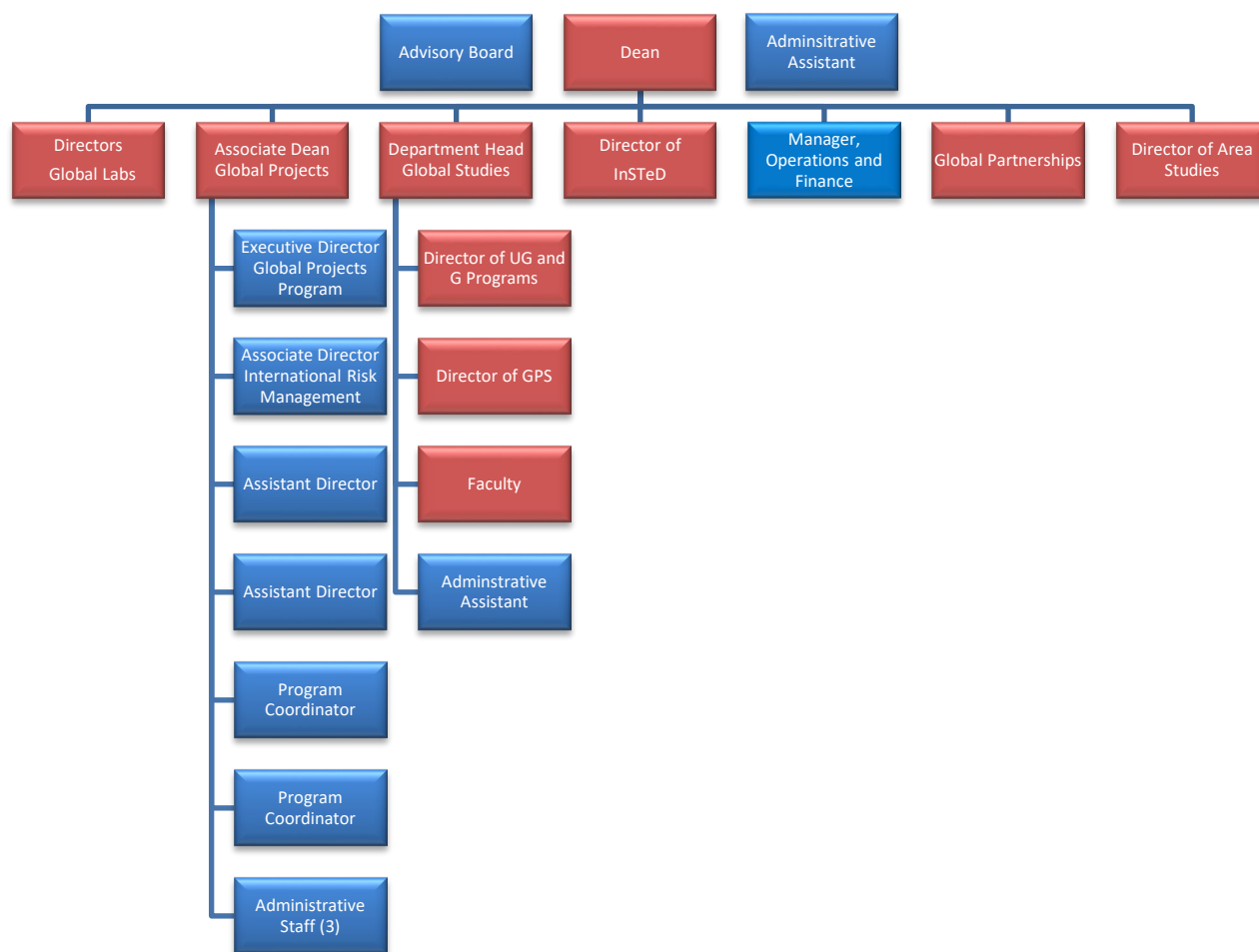
Other universities have tried classical approaches to tackle global challenges in education and research. Many global studies programs are dominated by policy experts without a holistic view of the connections between science, technology, business, arts and humanities. Although the competition in the Global School space includes leading universities, there are several factors that make WPI's approach very compelling. The Global School will create programs that reflect engagement with local and global communities.

While there are programs that integrate engineering and public policy, such as Carnegie Mellon University, University of California at Berkeley, and The Ohio State University, these programs tend to base interventions on narrowly defined economic constraints. Furthermore, policy programs at Harvard and Princeton focus mostly on US perspectives, while the proposed WPI approach will engage global perspectives in the development of local/global solutions.

## **4. ORGANIZATIONAL STRUCTURE OF THE GLOBAL SCHOOL**

The Global School will be managed by a Dean that will coordinate the different components of the school, as shown in **Figure 2**.





**Figure 2.** Organization of Global School (Faculty held positions; Staff held position)

During the early stages of implementation, WPI faculty will be organized into task forces and committees that will help with the establishment of the different components of the Global School. These will include foundational committees that will help with: the establishment of undergraduate and graduate programs; the expansion of the scope of the Global Labs, IGSD and GPS; the implementation of InSTeD, and area studies/grand challenges programs, and the harmonization of Global Partnerships into an integrated platform for engaging in global education, research and outreach.

An implementation committee will also be appointed to work with faculty governance, the WPI administration and staff, and student representatives on the development of policies and procedures that will guide the operation of the Global School.

The Dean of the Global School (see Appendix A) will be selected by a committee that will be appointed following a national/international search that will be conducted with the help of a search firm. The position will be open to an internationally recognized scholar in any area of global studies, and relevant experience in administration and international programs. The Dean will be supported by an Administrative Assistant

that will be recruited through a local search process to support the Global and the Dean. All of the other positions will be filled through local searches at WPI.

## 5. Administration, Operations and Management

Dean of the Global School will be responsible for the coordination and implementation of the vision of the Global School. He or she will be an internationally-recognized scholar with administrative experience. Experience with international projects/policy would also be helpful. The Dean of the Global School will assume responsibility for promoting and enhancing WPI's existing global programming and for developing new initiatives consistent with our vision for the School. We envision a Global School that will dramatically increase WPI's ability to address critical global challenges through knowledge generation, collaborations across the entire campus and the wider academy, and with communities and organizations around the world.

Associate Dean of the Global Projects Program will coordinate the Global Projects Program. This will include coordination of all the local/global centers and the faculty and staff engaged in WPI's Interactive Qualifying Projects (IQPs). The Associate Dean will also coordinate the interactions with sponsors and the formation of new project centers, and the teaching of ID2050, the preparatory course for the off-campus IQP.

Executive Director of the Global Projects Program will oversee the operations of the Global Project Program, including supervision of the GPP staff (assistant directors, program coordinators, and administrative staff), the selection and placement of students in the global programs, and the health and safety of WPI's off-campus programs.

Director of Global School Operations and Finance will oversee the budget and operations of the school, equivalent to similar positions in Arts and Sciences, Business, and Engineering.

Head of the Department will be a tenured professor in the Department of Global Studies. The department will include professors whose primary WPI affiliations are with the Global School.

Director of Undergraduate and Graduate Programs will be responsible for the Great Problems Seminar (GPS) and major and minor programs of the Global School. The Director will also coordinate masters and PhD programs and the professional and graduate certificate/minor programs in the Global School. The Director will coordinate the activities of all faculty members teaching in the graduate programs at the Global School.

Responsibility for the Great Problems Seminars will be overseen by a GPS Program Director, a position that would rotate among faculty affiliated with the program. The GPS Program Director will recruit faculty to teach in the GPS Program, organize course schedules, and coordinate assistance by undergraduates.

Director of the Institute of Science and Technology for Development (InSTeD) will work with faculty and administrators from across WPI to coordinate the research, teaching and outreach of WPI in the areas of Science and Technology for Development. The InSTeD director will bring together collaborators from around the campus. Currently, there are 30 faculty members from 12 Departments from Arts & Sciences, Engineering and Business that have declared interests and three grant proposals are in various stages of development.

Director of Global Partnerships will assist with the development, coordination and implementation of strategic Memoranda of Understanding (MOUs) and strategic alliances between WPI and other universities. These will be implemented by the different units within WPI, in accordance with the strategic vision of WPI, and the terms of the MOUs. By facilitating faculty-led alliances and partnerships, this position will

enable WPI to monitor and develop its global relationships more strategically and systematically. The Director of Global Partnerships will also submit an annual summary of activities and MOUs to the Dean of the Global School and the WPI Provost.

Director of Area Studies The Director of Area Studies will develop and coordinate educational and research programs on particular regions. The China Hub is an example of strategic focus in area studies. Similar hubs will be developed for Latin America and the Caribbean, Africa and the Middle East, Europe and Australasia. In each of these areas, a combination of WPI and Visiting Faculty will be used to develop deep area knowledge that will be integrated into globally-informed approaches to problem-solving.

Directors of the Global Lab provide leadership of programs for students and coordinating global research and the Global Fellows Scholars-in-Residence program. It is anticipated the scope of the activities of the Global Lab will develop ultimately into a framework in which all of WPI’s global projects will be integrated into a “Global Lab”.

**Faculty**

Tenured and Tenure-Track (TTT): There are two current TTT faculty members that will be affiliated with the Department at its launch in the Fall 2019. Searches for two TTT faculty are underway (starting in the Fall 2019) and we propose to hire additional TTT faculty in the next year. This will be followed by our other appointments that will be shared with other schools at WPI. All of the new faculty will also be faculty in the Global School.

Non-Tenure Track (NTT): Eighteen current IGSD and UGS/GPS faculty members will report directly to the Department of Global Studies.

Affiliated faculty: Faculty in any of WPI’s schools (Arts & Sciences, Business and Engineering) and visiting faculty will be engaged as affiliated faculty in the Global School. Such faculty are expected to play a role in the development of the Global School’s interdisciplinary educational, research and outreach programs.

**Advisory Board**

The Global School Dean will be guided by an Advisory Board that will include: notable alumni with relevant high level global experience; representatives from industry, government, development organizations, civil society and academia. The Board will meet twice a year to provide advice on education, research and outreach efforts of the Global School.

**6. TIMELINE**

<b>Timeline</b>	<b>TASK</b>
2018-2019	Development of Vision and Strategy of Global School
2018-2019	Consultations with WPI faculty, staff, and administration
Spring 2019	Consultation with Faculty Governance and endorsement by faculty
Spring 2019	Endorsement by the Board of Trustees
Fall 2019	Advertisement of Dean of Global School Position
Fall 2019	Launch of Global School

Spring 20120	Recruitment of Dean, Faculty, Directors and Administrative Assistants
Spring 2020	Graduate Programs developed and endorsed by faculty
Summer 2020	Initiation of Summer Institutes and Professional Programs by Global School
Fall 2020	Recruitment of Graduate Students
Fall 2021	Initiation of Graduate Programs by Global School

The proposed plan is to obtain support for the Global School from the President, Faculty Governance and the Board of Trustees. This will be followed by the recruitment of a Dean of the Global School through a national search (**Appendix A**). During the recruitment period, Prof. Kent Rissmiller will continue to serve as the Dean of IGSD. Following the appointment of the Dean of the Global School, Prof. Rissmiller will continue as the Associate Dean of Global Projects Program. Anne Ogilvie will remain as the Executive Director of the Global Projects Program, while Prof. Kris Wobbe will serve as the Undergraduate and Graduate Program Director.

Significant efforts will be made to use the administrative positions in the Global School to develop the leadership capabilities of WPI faculty. Hence, with the exception of the recruitment of the Dean of the Global School, all of the other leadership positions in the Global School will be filled initially by WPI faculty, and appointed by the Provost, following an open nomination and interview process.

## 7. BUDGET AND BUDGET JUSTIFICATION

Funding of the Global School will be included in the WPI Operational Budget as part of the Annual Planning and Budgeting Process (APBP). The funding will combine the existing IGSD budget with new requests (**Table 1**). The needs for additional resources are described below.

### Personnel:

1. Dean of Global Studies.
2. Director of Operations and Finance of the Global School.
3. Administrative Assistant to the Dean and to the Director of Operations and Finance.
4. Administrative Assistant to the Department Head.
5. Associate Director for International Risk Management.
6. 6 TTT faculty in the Global School hired over a 5 year period.
  - \*Funding for the Dean’s Office was included in the FY19 budget.
  - \*\*The AY20 budget contains funds for the two tenure-track IGSD faculty which were approved in the APBP process last winter.

While resources for the Dean (since 2018-2019 academic year) and two new TT faculty members (for 2019-2020 academic year) have already been included in WPI operating budget, they do represent new financial commitments to the program of the Global School. Hence, they have been included in the budget as such. One month summer salary (or stipend) is requested for faculty that will hold the following roles:

1. Head of Department of Global Studies
2. Director of Graduate and Undergraduate Programs
3. Director of Global Partnerships
4. Director of the Institute for Science and Technology for Development (InSTeD)
5. Director of Area Studies initiatives

The budget assumes five PLA undergraduate students at 5 hours/week (\$15/hour). Stipends are also requested for 15 affiliated faculty members (\$5,000/faculty).

Other operating costs

Other operating costs include: expenses associated with office supplies, travel, advisory board meetings and workshops; and subcontracts for legal, travel insurance and program evaluation.

**Table 1.** Projected expenditures

Marginal Expenditures		Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative
<b>A. Senior/Key Personnel</b>	<b>Effort in months</b>						
Dean (New)	12.00						
Department Head (Fac)	12.00						
Dir Global Partnership (Fac)	1.00						
Dir Instead (Fac)	1.00						
Director G/UG programs (Fac)	1.00						
Director Area studies (Fac)	1.00						
Director Area studies (Fac)	1.00						
TTT Faculty 1	9.00						
TTT Faculty 2	9.00						
TTT Faculty 3 (.5 GS, .5 Dept)	9.00						
TTT Faculty 4 (.5 GS, .5 Dept)	9.00						
TTT Faculty 5 (.5 GS, .5 Dept)	9.00						
TTT Faculty 6 (.5 GS, .5 Dept)							
<b>Total Senior/Key Personnel</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>B. Other Personnel</b>	<b>Effort in months</b>						
Admin Assist to the Dean (new)	12.00						
Admin Assist to the Department Head (new)	12.00						
Manager of Finance and Operations	12.00						
<b>C. Fringe Benefits (27.2% of faculty/staff salaries)</b>							
<b>Total Personnel</b>		<b>1,168,120</b>	<b>1,268,672</b>	<b>1,374,205</b>	<b>1,484,929</b>	<b>1,601,059</b>	<b>6,896,985</b>
<b>D. Equipment &gt;\$5000 per unit</b>							
Item A.		0	0	0	0	0	0
<b>E. Travel</b>							
Domestic		100,000	100,000	100,000	100,000	100,000	500,000
Foreign		250,000	250,000	250,000	250,000	250,000	1,250,000
<b>Total Travel</b>		<b>350,000</b>	<b>350,000</b>	<b>350,000</b>	<b>350,000</b>	<b>350,000</b>	<b>1,750,000</b>
<b>F. Participant Support Costs (PLEASE CONTACT OSP IF YOU HAVE QUESTIONS REGARDING PARTICIPANT SUPPORT COSTS.)</b>							
Stipends for Affiliated Faculty - 15		75,000	75,000	75,000	75,000	75,000	375,000
<b>Total Participant Support Costs</b>		<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>375,000</b>
<b>G. Other Direct Costs</b>							
1.) Materials and Supplies		20,000	20,000	20,000	20,000	20,000	100,000
2.) Workshops		20,000	20,000	20,000	20,000	20,000	100,000
3.) Advisory Board meetings		10,000	10,000	10,000	10,000	10,000	50,000
4.) Advertising, printing, publications		10,000	10,000	10,000	10,000	10,000	50,000
7.) Subawards (Total) see categories below		30,000	60,000	30,000	60,000	30,000	210,000
		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	
Legal		20,000	20,000	20,000	20,000	20,000	100,000
Travel Insurance		10,000	10,000	10,000	10,000	10,000	50,000
Evaluation			30,000		30,000		60,000
Subaward D		0	0	0	0	0	0
6. Other (Total) see categories below		28,486	58,606	90,434	124,045	159,521	461,092
Tuition Fee for MS(*Use Worksheet Below)		0	0	0	0	0	0
Tuition Fee for PhD(*Use Worksheet Below)		27,234	56,102	86,678	119,037	153,261	442,312
Health Fee (*Use Worksheet Below)		1,252	2,504	3,756	5,008	6,260	18,780
<b>Total Other Direct Costs</b>		<b>118,486</b>	<b>178,606</b>	<b>180,434</b>	<b>244,045</b>	<b>249,521</b>	<b>971,092</b>
<b>Total Direct Costs</b>		<b>1,711,606</b>	<b>1,872,278</b>	<b>1,979,639</b>	<b>2,153,974</b>	<b>2,275,580</b>	<b>9,993,077</b>
Indirect		959,378	1,033,793	1,076,847	1,157,060	1,206,154	5,433,231

## Projected Revenues

### Graduate Tuition

An estimate of tuition revenues generated from new graduate programs is presented in **Table 2**. It assumes that six new Master of Sciences degrees will be gradually introduced over the next five years, each with an initial cohort of 10 students and a steady state of 20 students per degree when the program is fully developed.

**Table 2.** Projected Revenues

REVENUE PROJECTIONS	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative
<b>Program - Graduate</b>						
Masters - Economic Sciences	10	20	20	20	20	
Masters - Society, Technology and Policy	10	20	20	20	20	
Masters - Environment and Sustainability		10	20	20	20	
Masters - Development			10	20	20	
Masters - Global Engineering				10	20	
Masters - Technical Leadership					10	
<b>Total Students</b>	<b>20</b>	<b>50</b>	<b>70</b>	<b>90</b>	<b>110</b>	
<b>Total Credits</b> Certificates; 10 st/year, 12 cr each	<b>120</b>	<b>126</b>	<b>132</b>	<b>139</b>	<b>146</b>	<b>663</b>
<b>Revenues</b>						
Tuition Fee for Masters	544,680	1,402,551	2,022,479	2,678,339	3,371,732	10,019,781
Tuition from credits other Masters	0	0	0	0	0	0
Tuition from Certificates	181,560	187,007	187,007	187,007	187,007	929,587
<b>Total Revenue</b>	<b>726,240</b>	<b>1,589,558</b>	<b>2,209,485</b>	<b>2,865,346</b>	<b>3,558,739</b>	<b>10,949,368</b>

Two certificate programs (Society, Technology and Policy; Environment and Sustainability) have been assumed for budgeting purposes. The model assumes that 5 students would enroll in each certificate program each year. We also anticipate that several distinct Master's programs will be introduced gradually over the next five years. The Master's programs described in **Table 2** reflect current aspirations and potential of our faculty.

New graduate programs will be considered in areas that build on WPI's institutional strengths, demonstrate a strong potential for student enrollment, and bring additional revenue to WPI. The development of additional graduate programs would provide, over time, a stronger financial base for the operation of the Global School.

### Capital Campaign

Furthermore, since fundraising for the Global School will be a part of the new Campaign, the inaugural Dean of the Global School will have the opportunity to work with the President and the Advancement teams to raise funds for the Global School.

### Operating Budget

An incremental increase in funding for the Global School will be sought during the Annual Planning and Budget Process (APBP). The School will request support for faculty, staff and operational expenses in the same manner as all other units on campus.

### Sharing of New Resources

While the details of the resource sharing are yet to be worked out, it is understood that the available resources will be limited to the sum of the additional revenue from new graduate degree programs, teaching activities, and income from government, industry, and development partners.

Funding for participation of available faculty in the teaching and research mission of the Global School will be provided to home departments and the participating faculty. Funding will support individual and team-taught courses, and individual/group research efforts by affiliated and core faculty.

## **8. SUMMARY**

The proposal presents a “game” plan for the establishment of a Global School at WPI. The proposed plan builds on our existing faculty and their interest, and our existing network of global partners. It also increases the impact of our existing undergraduate programs by introducing new demand-driven graduate programs and cross-cutting research/scholarships that will develop deep area knowledge/insights and grand challenge projects. It is anticipated that these will elevate the impact of WPI’s Global Projects. The structure of the Global School is also described along with the approaches that will be used to establish the school. Initial estimates of the marginal costs are then presented along with the projected revenues from the proposed demand-driven programs. The proposed school will train globally-informed leaders, while developing holistic perspectives that can form the basis for evidence-based and socially-informed policy, problem solving, innovation, and entrepreneurship. The potential impact of the Global School could, therefore, be very significant.

## 9. SELECT PUBLICATIONS AND CONFERENCE PRESENTATIONS

### 2020

**Pfeifer, G.** *State, Subject, Global: Globalization, Justice, and State Power* (working book title). Transcript Press (forthcoming 2020), Under contract.

### 2019

**Bulled, N.** Using peer mentors to advance the development of globally engaged students. *Journal of International Education*. (submitted)

**Bulled, N.** Public health's social contract: A continued obstacle in the advancement of effective HIV technologies. *Global Public Health*. (submitted)

**M. Belz.** (2019) Integrating Sustainability and Global Engagement into the Curriculum, *The Interdisciplinary Global Engagement Symposium*, San Jose, Costa Rica (Jan 2019).

**Pfeifer, G.** (2019) "Ethnic Politics and Global Justice" in *The Global Handbook of Ethnicity*. Edited by Steven Ratuva and Joseph Rudolph. London: Palgrave (Forthcoming, 2019).

**Wobbe, K and E. Stoddard** (eds). (2019) *Project-Based Learning in the First-Year: Beyond all Expectations*. Stylus Publishing, Sterling, VA.

### 2018

**Bakermans, M.H., and G. Pfeifer** (2018) A model for translational science in undergraduate courses. *Frontiers in Ecology and the Environment* 16:319-321.

**Foo, Katherine** (2018) Examining the Role of NGOs in Urban Environmental Governance, *Cities* v. 77 (July 2018), 67-72.

**Stoddard, E, and G. Pfeifer** (2018) Working Towards More Equitable Team Dynamics: Mapping Student Assets to Minimize Stereotyping and Task Assignment Bias. *Proceedings from ASEE Conference: 2018 CoNECD - The Collaborative Network for Engineering and Computing Diversity Conference*. Crystal City, VA.

### 2017

**Jiusto, S. and S. McCauley** (2017) Energy and Place-Making in Informal Settlements: A View from Cape Town. In: V. Broto, S. Bouzarovski, and M. Pasqualetti, eds. *Ashgate Research Companion to Energy Geographies*. Chicago. 6<sup>th</sup> edition.

Hager, S., B. Cosentino, M. A. Aguilar, M.L. Anderson, **M.H. Bakermans**, T.J. Boves, et al. (2017). Continent-wide analysis of how urbanization affects bird-window collision mortality in North America. *Biological Conservation* 212: 209-215.

### 2016

Whitney Hazard, Casey Magrath, Tess Nogueira, Anushrot Mohanty, **Nicola Bulled, Robert Hersh**, and Konstantinos Rotsios (2016) Wine Tourism Development in Northern Greece, International Conference. *The Economies of Balkan and Eastern Europe Countries in the changed world*, Split, Croatia. May 6-8, 2016, Springer Edition 2016, Contribution to Economics.

### 2015

Elmes, M., Mendoza-Abarca, K, and **Hersh, R.** (2015) "Food Banking, Ethical Sensemaking, and Social Innovation in an Era of Growing Hunger in the United States, *Journal of Management Inquiry*, 25(2).

### 2013

**Jiusto, S., J. Stephens, and S. McCauley** (2013) Integrating shared action learning into higher education for sustainability. *Journal of Sustainability Education*. Vol. 5.

**McCauley, S.** and J. Murphy (2013) Smart growth and the scalar politics of land management in the greater Boston region, USA. *Environment and Planning A*. 45(12): 2852-2867.

### 2012



**McCauley, S.** and J. Stephens (2012) Green Energy Clusters and Socio-Technical Transitions: Analysis of a Sustainable Energy Cluster for Regional Economic Development in Central Massachusetts, USA. *Sustainability Science*. 7(2)

## 10. APPENDIX A

### SCOPE OF RESPONSIBILITIES OF THE DEAN OF THE GLOBAL SCHOOL

Worcester Polytechnic Institute has embarked on a plan to unify its global educational programing, expand its global partnerships, and elevate its impact to become the premier global polytechnic university. To accomplish this mission, WPI is launching the Global School under new leadership.

The Dean of the Global School will assume responsibility for promoting and enhancing WPI's existing global programing and for developing new initiatives consistent with our vision for the School. We envision a Global School which will dramatically increase WPI's ability to address critical global challenges through knowledge generation and collaborations across the WPI campus, the wider academy, and with communities and organizations around the world.

The first step in achieving this vision is leading the integration of our existing undergraduate and graduate offerings: The first-year Great Problems Seminar, the Global Projects Program, the International and Global Studies major and our area studies minors (esp. China Studies, Latin America Studies, etc.) and Graduate Programs in related areas. We also envision opportunities for development and growth in the undergraduate and graduate curricula in areas such as civic engagement, smart cities and urban policy, sustainability, economic development and public health and social justice. In addition, the WPI Strategic Plan calls for the Global Projects Program to provide off-campus project experiences to all undergraduates, which requires additional growth in the program to keep pace with growth in the student body. In leading this effort, the Dean will work closely with the Associate Dean and the Executive Director of the Global Projects Program to develop project center opportunities and to ensure that policies and practices are in place to safeguard the health and welfare of all program participants. The Dean will also work with Undergraduate Studies to expand offerings in the Great Problem Seminar to make this first-year project experience available to more students.

WPI aspires to provide students with the tools they require to contribute to society as effective global citizens. We envision a Global School that will offer undergraduate and graduate opportunities for global learning and the development of intercultural competencies regardless of the major or program in which they are enrolled. To accomplish this goal, the Dean must collaborate with the Deans of Engineering, the Arts and Sciences, and Business to provide all faculty with opportunities to participate in global education and research. Our vision for the Global School and the University cannot be met without the participation of faculty from disciplines and departments across the University. The Dean must be prepared to work collaboratively with the faculty and staff in the Global School to envision, plan, support and execute new initiatives in education and research at WPI.

The Dean will promote the visibility of the School by guiding the research and teaching mission of the School. To this end, the Dean will participate actively in the hiring of faculty and in their professional development. The Dean will participate in decisions regarding faculty evaluations, tenure and promotion.

With the opening of the Foisie Innovation Studio, WPI has also opened the Global Lab as a center for innovative research, documentation and dissemination of WPI's global impact. The Dean will work with the Lab's director(s) to promote its research and visibility, increase opportunities for faculty and students to work in the Lab, and achieve its full potential as a collaborative hub at the center of our global programs.

The Dean is also expected to take the lead in implementing and developing existing and new global partnerships to support graduate and undergraduate education and research. WPI currently has a significant

network of Global Project Centers, but a comparatively small number of student exchange programs, and several international research collaborations. The Dean will work with the Deans of Engineering, Arts and Sciences and Business to enhance opportunities for faculty exchange and collaborative research with other institutions. The Dean should seek to bring new global resources to campus, whether through international scholars in residence, visiting NGOs, or collaborative programming with our International House.

The Dean of the Global School is expected to recruit members of an advisory board to lend external expertise to the Dean and faculty of the School. The advisory board can assist in refining the School's vision and in making recommendations for growth areas and new initiatives.

Finally, the Dean is expected to work collaboratively with university leadership to support the mission of WPI and advance the strategic goals of the School in tandem with those of the University. The Dean will represent WPI to external audiences including global partners, alumni, donors, peer institutions and professional organizations. The Dean will foster high impact teaching and research, and be an advocate for the faculty to internal and external audiences. The Dean will oversee day-to-day operations of the school, including hiring with respect for WPI's goals of diversity and inclusion, budget planning and supervision, faculty and staff development, and the strategic development of the Global School.

**Date:** May 2, 2019

**To:** WPI Faculty

**From:** Committee on Academic Policy (D. Olinger, Chair)  
Undergraduate Outcomes Assessment Committee (J. DeWinter, Chair)

**Re:** Motion to replace WPI Undergraduate Learning Outcome #8

**Motion:** The Committee on Academic Policy (CAP) and the Undergraduate Outcomes Assessment Committee recommend, and we move, that the current Undergraduate Learning Outcome #8 language be replaced by a learning outcome addressing global and intercultural competency, as described below.

**Details of the motion:**

Currently, WPI has ten undergraduate learning outcomes that were approved by the Faculty in 2004.

Graduates of WPI will:

1. have a base of knowledge in mathematics, science, and humanistic studies.
2. have mastered fundamental concepts and methods in their principal areas of study.
3. understand and employ current technological tools.
4. be effective in oral, written and visual communication.
5. function effectively both individually and on teams.
6. be able to identify, analyze, and solve problems creatively through sustained critical investigation.
7. be able to make connections between disciplines and to integrate information from multiple sources.
8. be aware of how their decisions affect and are affected by other individuals separated by time, space, and culture.
9. be aware of personal, societal, and professional ethical standards.
10. have the skills, diligence, and commitment to excellence needed to engage in lifelong learning.

CAP is proposing to **remove** the current outcome #8:

*Graduates of WPI will be aware of how their decisions affect and are affected by other individuals separated by time, space, and culture.*

That removal will be **replaced** with a new learning outcome specifically addressing global and intercultural competency:

***Graduates of WPI will demonstrate global and intercultural competency by developing the capacity to identify, explain, and critically analyze the forces (such as cultural, historical,***

*political, economic) that shape the self and others as they engage with local and global communities.*

**Rationale:**

The world demands more than knowledge; it requires understanding across boundaries of nation, ethnicity, language, gender, religion, and class. The ability to recognize the meaning of commonalities and differences and then navigate them comes not from a single course or even a set of courses, but rather from a life-long process. The WPI experience can provide the foundation to pursue this continuing exploration.

While the current undergraduate learning outcome #8 addresses competencies in this area that WPI graduates should achieve, it suffers from a lack of clarity and is difficult to assess. The proposed new learning outcome language is the result of extensive work by the Global and Multicultural Competency Taskforce<sup>1</sup>, which was established by the Undergraduate Outcomes Assessment Committee (UOAC) in spring 2017 and submitted a final report to CAP and UOAC in fall 2017. One of the Taskforce’s most significant conclusions was that “...the current learning outcome is not sufficiently specific as to be meaningful; is not aligned with current and best practice; and is not measurable for assessment purposes.”

The Taskforce developed the new learning outcome language after extensive research into both scholarly and institutional definitions of the terms “intercultural competency” and “global competency”, and current learning outcomes at peer institutions that address one or both of these competencies. Global and intercultural competency refers to the skills, knowledge, and dispositions enabling one to engage in open, peaceful, and productive interactions with diverse peoples and ideas on the basis of a shared respect for human dignity.

After much discussion, the Taskforce arrived at the proposed new language, which more accurately describes the skills and competencies that we wish our graduates to have. It is measureable (“will demonstrate...competency”) and provides a mechanism by which competency can be assessed (“...the capacity to identify, explain, and critically analyze...”). The Taskforce recommended that the language of the new learning outcome include both global (referring to challenges that are not bound by geopolitical location but that affect people around the world) and intercultural (dynamics associated with interactions between people of different cultures) competency, because the curriculum at WPI allows multiple pathways to achieve the corresponding learning outcome. For example, participation in the Global Projects Program may be a good mechanism for the achievement of global competence, while other experiences (including coursework) may facilitate the sorts of study and experiences that foster intercultural competency.

**Pathways to achieving the new learning outcome:**

There are a number of mechanisms already in place at WPI whereby students engage in activities that are likely to help them achieve global and intercultural competency. These include, but are not limited to, participation in the Great Problems Seminars; completion of project work at one or more of the many off-campus project centers; and coursework, especially in the Humanities &

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<sup>1</sup> The members of the Taskforce were Michael Brooks ('19), Leslie Dodson, Michael Elmes, Aarti Madan, Anne Ogilvie, Jennifer Rudolph, Aaron Sakulich (Chair), and Seth Tuler.

Arts and Social Science & Policy Studies departments. The Taskforce recommended, and UOAC has discussed, other pathways for students to achieve the learning outcome, but at this time we are not proposing any curricular changes, new activities, or additional requirements for students. Our intent is to gather information on how successful our current requirements and opportunities are in helping students to achieve global and intercultural competency, and to use that information to explore opportunities for improvement as necessary.

**Assessment:**

When the faculty approved the original set of Undergraduate Learning Outcomes in 2004, they also approved an assessment plan. That plan identified data sources and criteria for measuring WPI student achievement of this particular learning outcome. The full assessment plan will be accessible on the Faculty Governance website under the materials for the Undergraduate Outcomes Assessment Committee (UOAC).

The Task Force did not develop an assessment plan and UOAC will take up this next step in its work to revise the assessment plan for all of the learning outcomes.

For the original Outcome #8, the assessment used course completion in Humanities and Arts and the Social Sciences along with selected questions from the National Survey of Student Engagement (NSSE). The plan also asked for regular comparison between the mean response of WPI students (graduating seniors) and graduating seniors from our AITU peer institutions who participated in the NSSE survey on some relevant questions.

As a starting point, UOAC will continue to use the NSSE survey as part of the assessment for student achievement of the new learning outcome. We note that the NSSE Survey has changed significantly since the assessment plan was adopted in 2004 but the survey still includes relevant questions. For example, graduating seniors are asked:

*During the current school year, about how often have you done the following?*

- Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments.

*During the current school year, about how often have you had discussion with people from the following groups?*

- People of a race or ethnicity other than your own.
- People from an economic background other than your own
- People with religious beliefs other than your own
- People with political views other than your own.

*Which of the following have you done or do you plan to do before you graduate?*

- Participate in a study abroad program

The Undergraduate Outcomes Assessment Committee will also consider the following opportunities for assessing achievement of the global and intercultural competency learning outcome:

- Discussing with CAP and the IGSD the possibility of including global and intercultural competency as a learning outcome for the IQP
- Discussing with the Humanities & Arts and Social Science & Policy Studies departments the possibility of assessing global and intercultural competency in appropriate courses and some Inquiry Seminars and Practicums
- Using the AAC&U VALUE rubrics on Intercultural Competence and/or Global Learning to assess artifacts such as course assignments, project reports, and ePortfolios.
- Adding a question related to global and intercultural competency to the Student Report on IQP Learning and Advising, the Advisor Report on IQP Learning, and alumni surveys that address learning outcomes.