### VITAL INSTRUCTIONAL MINIGRANT AWARDS: SUMMER 2017 – 2020

#### VILLANOVA SCHOOL OF BUSINESS

**Mastery of The Case: How to Solve a Business Problem** - Research and write a case (including teaching notes) on the structure-conduct-performance and business problem (VW emissions scandal) in the U.S. auto industry. In an applied economics elective, use it as a model to students on how to analyze a business problem. Pursue publication in a business case journal. As preparation, research cases that build on business/economic principles, and read books/articles on how to write an effective case. Ultimately write additional cases for inclusion in coursework/journal/book.

**2017 - KELLY, Mary, Economics**

#### COLLEGE OF ENGINEERING

**Agile Classrooms with TopHat: Creating Socratic Gradebooks to Tailor Student Learning** - This VITAL minigrant project will address this question by embedding the Socratic method - ask students questions and use their feedback to gauge their understanding - within Top Hat technological platform to create student-driven journeys through different paths of the same learning environment. The result will be a Socratic gradebook that identifies individual learning needs and suggests student-comprehension tailored learning activities.

**2020 - CERECEDA, David, Ph.D., Mechanical Engineering**

**Inclusive Active Learning for Mixed Graduate-Level Engineering Class** - The goal of this minigrant proposal is to help both online and in-class graduate students stay focus during the lecture, enhance the understanding of the key concepts and master problem-solving methodologies, through the implementation of Top Hat, an interactive learning tool. This project pioneers the implementation of Top Hat in a graduate course and will help set a guideline for the implementation of an interactive learning tool in other graduate courses.

**2020 - LI, Bo, Ph.D., Mechanical Engineering**

**Development of a new course CEE 2701 – CE Project Development** - This proposal is on the development of a new course titled CEE 2701 – CE Project Development. It will be replacing the existing course titled CEE 3705 Engineering Economics in a long run. The new course intends to educate the students with process, scheduling, and management of a project along with the important components from Engineering Economics such as economic analysis, decision making process, time value of money, engineering ethics, etc.

**2020 - SHRESTHA, Shweta, Ph.D., Civil and Environmental Engineering**

**Development of a Project-based GIS Course for Civil Engineers** - Geographic information systems (GIS) is a platform for managing, analyzing, and visualizing data associated with developing and managing infrastructure and the environment. The CEE Department is planning a new, project-centric GIS course focused on applications, thus exposing students to a commonly used industry tool while leveraging technology to emphasize connections between civil engineering disciplines. We seek a deeper understanding of teaching computational tools in ways that help students connect the classroom to the real world.

**2020 - WATERS, Kevin, Ph.D., and SMITH, Virginia, Ph.D., Civil and Environmental Engineering**

**Transforming EGR 9200 to Benefit Engineering Ph.D. Students and Faculty** - EGR 9200 Teaching Engineering in Higher Education teaches CoE Ph.D. students engineering pedagogy. The proposed work will restructure the course to increase student engagement and to create a mechanism for CoE faculty to improve their own teaching. This project makes the course more interactive, makes course materials available online, improves the students’ ability to improve their own teaching. These goals are accomplished through flipping the course and developing an assessment hierarchy (self/partner, and class-wide).

**2020 – WEMHOFF, Aaron, Ph.D., Mechanical Engineering**
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<tr>
<th>Project Title</th>
<th>Description</th>
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<tr>
<td>Incorporating Visual Minteq Software in Water and Wastewater Treatment Course</td>
<td>The motivation of this project is to help students tackle overly abstract chemistry concepts in CEE 3321 by integrating hands-on learning tools in the classroom to complement traditional lecture materials. The overall goal is to advance students’ technical excellence, facilitate students’ deep conceptual understanding of the rational basis for the design, interpretation, implementation, and control of physiochemical process for water control, and help students bridge the gap between theory and practice in CEE 3321.</td>
<td>2020</td>
<td>XU, Wenqing, Ph.D., Civil and Environmental Engineering</td>
<td>Civil and Environmental Engineering</td>
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<td>Foundation Design: Increased Problem Solving through Inverting the Classroom</td>
<td>This proposal will apply the inverted classroom approach to many of the topics in CEE 4801 – Foundation Design, a senior technical elective currently offered each fall semester in the Civil and Environmental Engineering department. The inverted classroom will enable more time in class for students to work on real world example problems allowing students to enhance their problem solving and critical thinking.</td>
<td>2019</td>
<td>HUBLER, Jonathan, Ph.D., Civil and Environmental Engineering</td>
<td>Civil and Environmental Engineering</td>
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<td>A Project-Based Learning Approach to Practical Modeling of Dynamic Systems</td>
<td>The modeling and simulation of dynamic systems can be an extremely valuable skillset for engineers. However, students often struggle with developing these skills as they require computational knowledge and often classroom examples are quite different from real-world scenarios. This proposal aims to develop course content to help students build these skills in a project-based learning environment to foster critical thinking and afford students the opportunity to take ownership of how they analyze a system.</td>
<td>2019</td>
<td>KOLLER, Jeffrey, Ph.D., Mechanical Engineering</td>
<td>Mechanical Engineering</td>
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<td>Introducing Engineering Design in Freshman Mechanical Engineering Course with Active and Project-Based Learning</td>
<td>The goal of this project is to enhance the Freshman Mechanical engineering course with active and project-based learning, to better equip students with transferrable technical and soft skills. The course will be transformed to teach and apply Engineering Design, SolidWorks and MATLAB. The activities will be curated to foster creative thinking, problem-solving, collaboration, communication and self-regulated learning skills that are critical for students’ academic success.</td>
<td>2019</td>
<td>SETH, Deeksha, Ph.D., Mechanical Engineering</td>
<td>Mechanical Engineering</td>
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<td>Reinventing Environmental Engineering Labs to Promote Student’s Understanding of Core Course Concepts</td>
<td>This project aims to improve students' understanding in core environmental engineering concepts by reinventing environmental engineering labs in a sophomore course CEE 2311 (Environmental Engineering and Science). In particular, a problem-based learning approach will be used to restructure labs in CEE 2311 to further drive the learning and tighten the lectures with the lab components. The goal is to encourage students to seek to understand, dig deeper into concepts, and therefore achieve long-term recall of knowledge and deep conceptual understanding in Environmental Engineering Courses.</td>
<td>2017</td>
<td>DURAN, Metin, Ph.D., and XU, Wenqing, Ph.D., Civil and Environmental Engineering</td>
<td>Civil and Environmental Engineering</td>
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<td>Enhancing Student’s Practical Experience in the Chemical Process Control Through Inverted Classroom Approach</td>
<td>Mathematical modeling and process control deal with important techniques that can optimize chemical processes with sustained and accident-preventing performance. However, these disciplines are challenging for learning as they are math intensive. A portable control lab will be designed and delivered through an inverted-classroom approach to enhance student’s practical experience such that student’s knowledge gap regarding control real-world application in the current curriculum is filled and our students can competitively handle real control design problems.</td>
<td>2017</td>
<td>HUANG, Zuyi, Chemical Engineering</td>
<td>Chemical Engineering</td>
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<td>Pilot Program Evaluating ePortfolios for Assessment in Civil and Environmental Engineering</td>
<td>ePortfolios allow students to be more directly involved in the assessment process and to reflect on their learning. ePortfolios allow for the collection of a broader range of student work and have the potential to reduce faculty effort. However, there are technical and logistical changes to effectively using ePortfolios. This project proposes to conduct a pilot study to find solutions to these changes and take advantage of the benefits of using ePortfolios for assessment.</td>
<td>2017</td>
<td>MUSSELMAN, Eric, Ph.D., Civil and Environmental Engineering</td>
<td>Civil and Environmental Engineering</td>
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<td>Increasing Social Presence and Student Engagement in Online Cultural Courses</td>
<td>This project seeks to enhance social presence and student engagement in two online cultural courses. This project will introduce interactive discussion tools that will make asynchronous discussions more engaging and motivate students to support one another in an active learning community. I plan to invite guest speakers to my live Zoom sessions and integrate their presentations into the course curriculum so that students establish connections between the course material and local and global communities.</td>
<td>Gonzalez, Jill, Ph.D., Romance Languages and Literatures</td>
<td>2020</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>Inclusive Teaching for Graduate Courses in Philosophy</td>
<td>This proposal seeks to provide the graduate philosophy community with the opportunity to reflect on issues of diversity through a series of three workshops that focus on nurturing inclusive graduate seminars, curating inclusive graduate course material and effective mentoring. Participants will be able to better understand accessibility in graduate education, identify best practices of content selection and delivery method for our discipline and set the common basis for successful mentoring for philosophy graduate students.</td>
<td>Scholz, Sally, Ph.D., and Popa, Delia, Ph.D., Philosophy</td>
<td>2020</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>College Admissions Counseling: A Graduate Online Certificate Program</td>
<td>There is both a significant need and a desire among current and future school counselors for training in college counseling; many secondary school systems are actively seeking counselors with this training or experience. A College Admissions Counseling Certificate Program will: a) enable professional counselors to heighten their competitive professional edge, and b) allow Villanova to establish itself as a leading innovator in this growing field.</td>
<td>Schmidt, Christopher, Ph.D., Philosophy</td>
<td>2019</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>English Department Diversity and Inclusion Pedagogy Workshop</td>
<td>The goal will be to acquire new knowledge about best practices and to equip self-selected faculty with new resources to share with colleagues. In a required follow-up session in Spring 2020, faculty will reconvene to assess how they have implemented ideas from the workshop, and data from the workshop will help to guide future instructional development efforts.</td>
<td>Lutes, Jean, Ph.D., English</td>
<td>2019</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>Teaching for the Intellectual Virtues in Philosophy of Religion</td>
<td>I propose to develop an existing course which prior to this Spring 2019 has not been taught since Fall 2010. In this seminar, I aim to develop materials, activities, assessments, and a classroom environment that encourages intellectually virtuous engagement with religious claims, broadly construed. The primary aim of the present project is to have students learn how to be intellectually virtuous in their inquiry on philosophically difficult and controversial claims.</td>
<td>Napiers, Stephen, Ph.D., Philosophy</td>
<td>2019</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>Engaging Students in the Science of Speech</td>
<td>The project will develop introductory reading materials for the Mendel Science Experience (MSE) course, “The Sounds of Human Language.” This will provide students with background knowledge that will allow them to understand research articles and provide opportunities for in-depth discussion of the material in class. In turn, this will improve student’s learning of the content in the course, helping achieve the goal of the MSE program to provide students with a foundation in basic science.</td>
<td>Toscano, Joseph, Ph.D., Psychological and Brain Sciences</td>
<td>2019</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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<td>Integration of Dispositional Development Framework into the Undergraduate Teacher Education Program</td>
<td>The purpose of this minigrant is to provide funding for the continued development and implementation of an Undergraduate Teacher Education Program (UTEP) Dispositions Framework. The UTEP Framework would serve as a reflective tool that supports the academic, social/emotional, and professional development of students enrolled in UTEP. As a result of their participation, students enrolled in UTEP will hone and demonstrate their reflective skills and gain critical insight into the evaluative process prior to entering the profession.</td>
<td>Bialka, Christa, Ph.D., Education and Counseling</td>
<td>2018</td>
<td>Liberal Arts and Sciences - Liberal Arts</td>
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Bringing the Library into the Classroom: Capitalizing on the Contributions that Research Librarians Play in Assisting Student Research.

Reference librarians are an under-utilized resource for helping students with their research. This project seeks to expand on my past collaboration with librarians by producing three, short instructional videos regarding distinct research tasks and compliment those videos with learning modules. The learning modules will offer students an opportunity to apply the research skills covered in the videos and permit instructors a chance to assess students' competencies. The project aligns with the CLAS' goal to increase self-directed student learning and Falvey's goal to effectively support students' research endeavors.

2018 – KREUZER, Marcus, Ph.D., Political Science

Curriculum Mapping for Programmatic Assessment and ePortfolio Development - This proposal would support the development of a curriculum map for the Graduate Studies in Communication Program. Curriculum mapping is the process of assessing the alignment of student learning objectives with instructional activities in individual courses. I plan to revisit our program-level learning objectives, identify and articulate additional objectives through a grounded, interpretive analysis of course syllabi, and synthesize those objectives to produce an updated list to be shared with our graduate faculty. The proposal will enhance programmatic assessment in the short-term (the comprehensive curriculum map will inform graduate program assessment goals in the coming year and help identify new assessment opportunities) and in the long-term (contributing to the development of ePortfolios for the graduate program). The project will have an indirect impact on student learning through increased faculty awareness of how their individual courses serve the graduate programs as a whole, hopefully creating a more coherent educational experience for our students.

2018 – KSIAZEK, Thomas, Ph.D., Communication

The Child & Child Engagement: Play as Practice - This project will enrich students' learning with creative and innovative pedagogical strategies, such as the bug-in-the-ear technique and creative arts, to teach childhood studies. We employ a playful pedagogy, which requires students to re-conceptualize what counts as learning. This project will accomplish a second goal of creating a multidisciplinary course on childhood studies. This course, along with our conception of creative teaching strategies, fills an identified need at Villanova for courses on children and childhood.

2018 - SKRLAC LO, Rachel, Ph.D. and YEE, Terence, Ph.D., Education and Counseling

Integrating a Flipped Classroom, Simulation Based Teaching Model into an Introductory School Counseling Course

This project aims to move an introductory school counseling course from a traditional teaching model, towards a flipped classroom, simulation-based model. The purpose for this adjustment is to enhance the active learning processes in students and ensure that they are able to apply content knowledge to their counseling practices. In the flipped classroom approach, students will review content material outside of class through computer-based methods and will spend class time simulating & discussing various school counseling scenarios.

2017- HAVLICK, Stacey, Ph.D., Education and Counseling

Integrating Language, Culture and Multiple Literacies in the Intermediate Spanish I and II Curriculum: A Content-Based Approach - This proposal addresses the departmental need to better integrate language learning and cultural content in the intermediate-level Spanish curriculum. Our approach draws upon the practices of content-based instruction, backwards design, and Integrated Performance Assessment to contextualize language learning, foster critical engagement with authentic texts and diversify the assessment tools used to evaluate student learning. The expected outcome is to more closely align course objectives with departmental learning outcomes and national standards for foreign language learning.

2017- PERCOCO, Cristina, Ph.D., and TURPIN, Kristen, PhD., Romance Languages and Literatures
Development of a Chemistry Laboratory Safety Course - Laboratory safety is a fundamental part of the scientific experience. Introducing laboratory safety as a cultural responsibility invokes leadership in students. Safety taught through traditional lectures, case studies, guest speakers, and student innovation creates a unique opportunity for students to understand and appreciate why a culture of safety is an important aspect of their scientific training, giving students the tools they need to be successful in future careers in science, medicine or other professions.

2020 – MINBIOLE, Kevin, Ph.D., and KURCHAN, Eydiejo, Ph.D., - Chemistry

Abnormal Psychology: A Flipped Lecture with Case Study Approach - The aim of this project is to develop a flipped lecture plus case study approach to teaching Abnormal Psychology. A set of instructional videos will be developed for out-of-class viewing. Class time will be devoted to applying video content to first- and third-person case studies. This approach seeks to enhance student learning and engagement, emphasize contextual and socio-cultural issues surrounding mental health, reduce mental health stigma, and promote collaborative, team-based work in the classroom.

2020 – PANTESCO, Elizabeth, Ph.D., - Psychological and Brain Sciences

Statistical Genetics: A Primary Literature Approach - This proposal is for the creation of a new graduate-level course at Villanova University, titled Statistical Genetics. This course will be driven by primary research literature in statistical genetics, in which students will be tasked with the responsibility of leading discussions on journal articles and recreating analyses therein. The goals are to equip students with the tools required to perform modern cutting edge research in statistical genetics, and to increase student interest in research.

2019 - CHI, Peter, Ph.D., Mathematics and Statistics

An Introduction to Linear Algebra through Applications for Science, Technology, Engineering, and Big Data - This new course will explore one of the most widely applicable areas of mathematics: linear algebra and matrix theory. By focusing on modern applications, students in science, technology, engineering, and data science will experience the power of linear algebra as a valuable analytical framework. We will combine lecture, group assignments, and projects. This course represents a new approach to the teaching and learning of linear algebra for my department.

2019 - FEEMAN, Timothy, Ph.D., Mathematics and Statistics

Exploring Student Responsiveness to Pace-Based Learning in Advanced Environmental Science Laboratory Course
The goal of this project is to create a series of place-based learning exercises for a new advanced Environmental Science lab course to be offered in spring 2020, open to upper-level undergraduate and graduate students. Two half-semester long exercises will vary both in the level of student involvement in experimental design and connectivity to community stakeholders. This will mark the first time I have used these exercises to fulfill the laboratory requirements of a course.

2019 - GOLDSMITH, Steven, Ph.D., Geography and the Environment

Object Based Curriculum Laboratory Planning for MSE Polymers - The goal of this project is to commit dedicated time in the laboratory to develop a lab manual and experimental techniques appropriate for non-science major undergraduates to relate to Polymers as a topic relevant to their lives. The desired impact is to ensure that students can clearly see the connection between what they are doing in the laboratory and what they encounter with everyday polymers while becoming connected to the major concepts of Polymer Science.

2019 – GURON, Marta, Ph.D., Chemistry

Linear Algebra Rebooted: A Blended Master’s Level Course - By alternating in-person and online meetings throughout the semester, a blended linear algebra course will be designed to be more accessible to working students. The course will also include a pre-assessment to measure student background knowledge, and early self-paced online modules to refresh and reinforce foundational concepts. An emphasis on proof-writing in a linear algebra context will support students to master skills in logic and proofs.

2019 – HAYMAKER, Kathryn, Ph.D., Mathematics and Statistics
**Teaching Hands-On Cybersecurity Safely and Responsibly** - The goal of this project is to design a set of hands-on labs and assignments to safely teach students the basic techniques used to attack and defend enterprise IT systems. From these exercises, students will learn practical skills in breaking into and repairing IT systems, as well as the ethical impact of breaching systems illegally. These assignments will be used in a flipped-classroom course preparing students for careers in enterprise operations security.

**2018 – CARTER, Henry, Ph.D., Computing Sciences**

**Data Science and Visualization** – I will design a new graduate course on Data Science and Visualization. This course would meet the rapid demand from employers that our graduate students in Applied Statistics have sufficient data processing skills in addition to the strong analytical skills that we currently teach. This course meets specific university goals as well as recently agreed upon departmental priorities and would help position Villanova as a leader in data science education in the Greater Philadelphia area.

**2018 – POSNER, Michael, Ph.D., Mathematics and Statistics**

**A Hybrid Flipped Classroom Model in Introductory Data Mining Course: A Blend of Lecture and Flipped Learning** - Flipped classroom approaches have received increasing attention recently. Despite popular enthusiasm for flipped classrooms, there has been a mixed response and some criticism of this approach on loss of interaction and student motivation. Thus, I propose to employ a hybrid flipped instructional model for an introductory data mining course, a blend of lecture with flipped learning. This hybrid model will promote a learner-centered classroom environment, while preserving the most effective elements of flipped learning format.

**2018 – ZHANG, Yimin, Ph.D., Mathematics and Statistics**

**Data-Driven Learning: A Problem-Based Learning Approach for Discovering Biostatistics** - In the context of a data-based analysis class, students are usually shown formulaic strategies for analyzing and interpreting data. While these strategies are generally well-established and effective in achieving an end analysis goal, students typically only gain a temporary rote knowledge of the analysis process rather than a generalizable conceptual understanding. I propose using a problem-based learning approach based on real-world data problems to motivate and foster student-initiated learning and critical thinking.

**2017 -BERNHARDT, Paul, Ph.D., Mathematics and Statistics**

**Problem-Based Learning in a New Geographies of Environmental Justice Course: Harnessing the Power of Student Curiosity About Real-World EJ Cases** – The goal for this project is to incorporate problem-based learning and computer mapping in a geography course about environmental justice. I will use real-world environmental justice cases to capture student interest and generate inquiries that will provide an entry point to discuss, investigate, and understand fundamental aspects of environmental justice. I will also use mapping exercises to explore in a hands-on way the spatial relationships between environmental harms and/or benefits and different groups in society.

**2017- HENDERSON, Bonnie, Geography and the Environment**

**Reimagining the Chemistry Laboratory Experience of Nursing Students** - This project aims to develop a new, inquiry-based laboratory experience for Nursing majors taking their required chemistry laboratory. Of great importance is the alignment of the laboratory activities with lecture content, allowing for better preparation and safety in the chemistry laboratory. Care will be taken to introduce some discipline-based content allowing relevance to medical applications.

**2017- MINBIOLE, Emily, and KASSEL, Scott, Chemistry**
### COLLEGE OF LIBERAL ARTS AND SCIENCES – SCIENCES cont.

**Singing in the Rain: Development of Field Exercises and Improving Student Engagement for a New Geography Course on Earth’s Weather Systems** - Allowing students to be hands-on and engaged learners greatly enhances student learning and material retention, especially in the science disciplines. To improve upon traditional pedagogies employed to teach atmospheric science, I propose to develop a set of new course exercises and activities that are centered on experiential learning. These course activities are designed to provide each student with an exciting learning experience that will allow them to better understand how weather influences their day-to-day lives.

2017- STRADER, Stephen, Geography and the Environment

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**M. LOUISE FITZPATRICK COLLEGE OF NURSING**

**Assessment of Weight-Related Bias among Undergraduate Nursing Students before and After Curriculum Imbedded Sensitivity Training**

Obesity is one of the leading public health concerns in America today with more than 66% of the US adult population reported as being overweight or obese. Obese individuals are often subject to weight stigma from their health care providers. Therefore, it is essential to enhance current nursing curriculum to educate nursing students on weight stigma and weight sensitivity. This training may heighten awareness and potentially enable students to combat stigma in their future nursing practice.

2017- OLIVER, Tracy, Ph.D., and QI, Bing Bing, Ph.D., Nursing

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**INTERDISCIPLINARY PROJECTS**

**Bridging Nursing and Biology: A Semester-Long, Cross-Course Unfolding Case-Study to Improve Student Engagement** - The goal of this project is to maximize student motivation and engagement with complex course material related to epidemiology, global and public health. Using an unfolding case study design, students will analyze novel data in real time, communicate their findings to other students effectively, make decisions that influence health outcomes, consider the ethical implications of decisions, and gain an understanding of how their work can have widespread public health impact alongside other disciplines.

2019 – BREWER, Christine, MSW, MSN, RN, M. Louise Fitzpatrick College of Nursing and RIVARD, Rebecca, Ph.D., Biology

**Reinventing a Foundational Course: A Communication-in-the Disciplines Approach to Improving Communication Competence Among Mechanical Engineers** - COM1101, required for mechanical engineers, will be redesigned to enhance students' ability to collaborate effectively in teams, and to develop, design, and deliver technical presentations in professional settings. The course will be anchored in contemporary and classical rhetorical principles and follow a Communication-in-the-Disciplines approach, which argues that communication pedagogy must be discipline-specific. We propose to develop instructional materials (including case studies) reflecting authentic engineering communication, and to design new assessment tools (including digital feedback technology).

2018 – BOWEN, Sheryl, Ph.D., Communication and KARLSSON, Jens, Ph.D., Mechanical Engineering

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