**NINETEENTH ANNUAL UNIVERSITY OF PITTSBURGH FIRST-YEAR ENGINEERING CONFERENCE, SATURDAY, APRIL 6, 2019**

**CALL FOR PAPERS**

The annual University of Pittsburgh Swanson School of Engineering First-Year Engineering Conference (FYEC) will be held in Benedum Hall on Saturday, April 6, 2019.

AllSSoE first-year students *must* attend the entire conference on Saturday, April 6.

All first-year SOE students will work on all aspects of the FYEC paper in teams of 3. Each team will write a conference paper and present that paper at the FYEC. All members of each team are expected to contribute seriously, consistently, and equally. **You will be receiving information about your team of 3 later this week**

**The Conference Paper must report on an innovation/technology/product the authors evaluate as being important to engineering and to society**. Through their research and writing, the paper’s authors will provide detailed information about their topic to an audience of

* practicing engineers and other professionals
* engineering, math, science, and liberal arts faculty and professionals
* engineering students from first-year to graduating seniors to advanced graduade students

The paper will describe, explain, exemplify, and evaluate relevant research, developments, designs, technologies, problems, solutions, "real life" applications and impacts

**Conference papers will have significant technical content**. **Authors will undertake and demonstrate best practices in technical writing. FYEC papers will include** clear, extensive, and precise descriptions and explanations of science and technologies applicable to the paper topic. Science and technology do not exist in a vacuum, however. Ongoing communication of the social and professional importance the topic (including the related science and technology) is an essential element of a complete FYEC paper.

**POSSIBLE TOPIC AREAS**

**Note that these suggested topics are general "starting places" for your team's development of a much more specific topic within a general area. A "*topic area*" is not an FYEC paper *topic*--your team will select a topic, including a relevant application, and example *from* a "topic area." Your team will quickly direct research, topic development, and writing towards a specific technology/product, application, and example. Your stated topic/focusing statements will identify an application and an example. For example, if your team is interested in machine-to-machine communication, you would direct your research towards a particular aspect→application→example of M2M communication. Your FYEC paper will then**

* **describe the science/engineering relevant to your selected technology/product**
* **will explain a crucial application of that technology**
* **will describe an example of that application**
* **will analyze/evaluate the significance and impact of that technology/application.**
* Description, explanation, analyses, evaluation of a historical, current, or futuristic **industrial-engineering-related** innovation, process, product, application. Possible **topic areas**: human factors engineering; value engineering; computational methods; reverse engineering; systems simulation; self-optimization; "3D"/additive printing; cyber physical systems; customization within mass production; motion economy; lean; six sigma; machine-to-machine communication; Internet of Things
* Description, explanation analyses, evaluation of a historical, current, or futuristic electrical-engineering-related innovation, product, process, application. Possible topic areas: power engineering; electrochemistry; computational electronics; control

engineering; control systems; renewable energy sources; grid interconnection; smart grids; development/integration of power

grids for particular devices; intelligent systems management; electromagnetism; computerized tomography; magnetic

tomography; microelectronics; instrumentation; sensors; signal processing; GPS; telecommunications

**↓ keep reading**

* Description, explanation, analyses, evaluation of a historical, current, or futuristic **bioengineering-related** innovation, product, process, application. Possible **topic areas**: biosensing; computational biology; synthetic biology; genomics; bioinformatics; bioprocesses; nanofabrication; biocatalysis; bioseparation; biomechanics; biomaterials; biomimetics; biooptics; biomedical therapies; biomedical devices; biomedical pharmaceuticals; nanobiotechnology; bioimaging
* Description, explanation, analyses, evaluation of a historical, current, or futuristic **computer-engineering-related** innovation, product, process, application. Possible **topic areas**: hardware architectures; firmware; mechatronics; robotics; artificial intelligence; natural language processing; inferential modeling; visual sensing; cryptography; intrusion detection/defense; reverse engineering; probabalistic programming; abundant data applications; cryptography; intrusion detection/defense human-computer interface; machine learning; computational biology; computational chemistry; computer security; VLSI architecture/integration; multiplexing; synchronous optical networking; mathematical modeling; socially intelligent software
* Description, explanation, analyses, evaluation of a historical, current, or futuristic **chemical-engineering-related** innovation, product, process, application. Possible **topic areas**: microfluidics; biomass; composites; coatings; ceramics; renewable/alternative fuels; physiochemical processes; agriculture; agrochemicals; industrial chemicals; inks; elastomers; fibers; food processing; pharmaceuticals; explosives; computational chemistry
* Description, explanation, analyses, evaluation of a historical, current, or futuristic **mechanical-engineering-related** innovation, product, process, application. Possible **topic areas**: electrochemistry; instrumentation; mechatronics; computational mechanics; robotics; adaptive control; feedback control; system integration; "3D"/additive printing; thermodynamics; thermomechanics; kinematics; nonlinear dynamics; soft materials; biomimetics; nanostructures; power harvesting; energy/resource conservation; cryogenics; mechanosynthesis; CAD; CAM; solid modeling; nanotechnology; nuclear fusion
* Description, explanation, and analyses of a historical, current, or futuristic **civil-engineering-related** innovation, product, process, application. Possible **topic areas**: bridges; roads; canals; dams; ports; buildings; surveying; hydraulics; hydrology; coastal engineering; hazard mitigation; site safety desalination; water purification; drainage; building materials; tall buildings construction/safety; urban habitats; nanomaterials; waste management; geotechnics; transportation; computational methods/mechanics; intelligent systems; sensors/sensing; infomatics; simulation; environmental protection; building cycle; sustainability metrics

**FROM "CALL FOR PAPERS" TO FYEC ASSIGNMENT 1**

Read, re-read, and continue to refer to Assignment 1 Preliminary Proposal 2019/2194