INDUSTRY, ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

IEMS Program 2020

Please make sure to check-in at the Registration Table in Lobby 3.
Vouchers for the breakfast buffet at Rusty's (Monday & Tuesday, 7:00-10:00A) provided at Registration Table.

Sunday, March 15th			
Time	**Bay Room**	**Island I**	**Island II**
4:00 – 6:00 pm	**Early check-in, Lobby 3**		
Monday, March 16th			
8:30 - 9:45 am	Education and Training (A)	Project Management	Production & Operations Management (A)
10:00 - 11:15 am	Automation, Modeling and Simulation	Business/Data Analytics (A)	Computer Applications (A)
11:30 - 1:00 pm	**Lunch, Palm Room, Keynote Speaker: Dr. Kay Stanney**		
1:15 - 2:30 pm	Marketing	Business/Data Analytics (B)	Quality Planning & Process Improvement (A)
2:45 - 4:15 pm	Supply Chain Mgmt and Logistics	Construction Management	Healthcare Systems
4:30 - 5:45 pm	Education and Training (B)	Leadership and Diversity	Computer Applications (B)
Tuesday, March 17th			
8:30 - 9:45 am	Corporate Governance, Engineers and Price	Management and Organizational Behavior	Quality Planning & Process Improvement (B)
10:00 - 11:15 am	Engineering Innovations (A)	Human Factors and Cognitive Engineering (A)	Production & Operations Management (B)
11:30 - 1:00 pm	**Luncheon, Palm Room**		
1:15 - 2:30 pm	Engineering Innovations (B)	Human Factors and Cognitive Engineering (B)	Additive Manufacturing (A)
2:45 - 4:00 pm	Management of Technology	Business/Data Analytics (C)	Additive Manufacturing (B)

MONDAY 8:30A SESSION:

BAY ROOM: EDUCATION AND TRAINING (A)

SESSION CHAIR: JACOB CRESS, UNIVERSITY OF DAYTON

Incorporating Experiential Learning to Design a Lift Truck in a Systems Engineering Course
Sandy Furterer and Taylor Zehring (Presenting Remotely)
The Management of Systems Engineering course incorporates real-world case studies to enhance learning and help the students model a complex system. The entire class of over 30 students worked on the design of a common lift truck system, focusing on various functional concepts. The case study was a powerful instructional strategy to help the students better apply the tools, and work across teams to ensure connectivity of the interfacing systems.

Industry Capstone Projects as a Vehicle for Faculty Development
Jeff Cunion and George Mollick
This paper examines the impact of mentoring senior industrial capstone projects on introducing project skills for engineering technology faculty. The research uses a qualitative case study approach where faculty are interviewed to determine their existing comfort and skills managing projects. Faculty then provide examples of how working with industry and students have provided them with insights in teaching their classes, including adding lab activities into traditionally lecture problems solving classes.

Analyzing and Integrating Industry Expectations for Professional Communication into Undergraduate Engineering Curricula
Jacob Cress and Patrick Thomas (Presenting Remotely)
Effective communication is critical in the engineering discipline; however, many engineering curriculums lack integration between technical and communication skills. Interviews were completed with several industry partners to identify organizational values for effective professional communication amongst early career engineers. Opportunities to integrate these industry informed communication skills into the engineering curricula at the University of Dayton were evaluated. Several in-progress case studies are presented.

MONDAY 8:30A SESSION (cont.):

ISLAND I: PROJECT MANAGEMENT

SESSION CHAIR: PHILIP APPIAH-KUBI, UNIVERSITY OF DAYTON

Students Perception of the Optimum Number of Project-Based Courses
Philip Appiah-Kubi (Presenting Remotely)
Engineering Technology (ET) programs utilize experiential learning pedagogies (such as project-based learning) in their core curriculums. However, taking several project-based courses in the same semester can be overwhelming for some students. This study reviews ET students' perception of the number of project-based courses they take in a semester.

Enhancing Organizations Output Through Re-engineering of Administrative Processes
Mohammad Kanan
This research implements a descriptive approach in preparing a theoretical framework for reengineering administrative processes. The objective of this work is to identify the administrative processes to be considered and to quantify benefits of applying the re-engineering processes. A field study was performed to determine the feasibility of applying the proposed framework in companies operating in Jeddah, Kingdom of Saudi Arabia.

Agile versus Waterfall: Iterating through an Updated System Development Life Cycle
Gezinus J. Hidding, James McGee, Scott Stribrny and Bob Zimmerman (Presenting Remotely)
A debate is ongoing over Waterfall versus Agile, which can be viewed as iterations through the System Development Life Cycle (Royce, 1970), to which we add an "Architecture" stage. We show that many different iterations, potentially relevant for project managers who contribute to business value, are neither Waterfall nor Agile.

ISLAND II: PRODUCTION AND OPERATIONS MANAGEMENT (A)

SESSION CHAIR: MEHMET YILDIRIM, WICHITA STATE UNIVERSITY

Universidad Autonoma de Santo Domingo Energy Forecast
Felipe Llaugel, Dennis Ridley and Amparo Cespedes
Energy time series data for Universidad Autonoma de Santo Domingo is analyzed and forecast by the moving window spectral method to capture cyclical components and effects. The historical period is 217 months from March 2001 to March 2019. The forecast period is 12 months from April 2019 to March 2020.

Sustainable Energy Aware Scheduling: A Multi-objective Optimization Model to Minimize Total Completion Time, Total Energy Cost and Load Balancing on a Parallel-Machine Non-Preemptive Scheduling
Bayram Yildirim, Saeed Rubaiee, Waqas Saleem and Mehmet Barut (Presenting Remotely)
The purpose of this paper is to study a parallel-machine non-preemptive scheduling problem that minimizes the total completion time, total energy cost and load balancing under time-of-use electricity tariffs and proposed metaheuristics (GRASP and Genetic Algorithm) to solve and generate an approximate optimal Pareto front in a reasonable CPU time.

MONDAY 8:30A SESSION (cont.):

Short-term Demand Growth Estimation in an Electricity Distribution Network
Anyama Tettey, Kim Hensley and Sampson Gholston (Presenting Remotely)
This paper presents the application of the paired t-test statistical analysis tool as an effective and enhanced approach to estimate the load growth for an electricity distribution feeder. The approach blocks the effect of temperature and other seasonal variations for electricity demand and thus reduces the effect of noise.

MONDAY 10:00A SESSION:

BAY ROOM: AUTOMATION, MODELING AND SIMULATION

SESSION CHAIR: ANDRZEJ GAPINSKI, PENN STATE UNIVERSITY, FAYETTE

Comparative Study on the Dimensional Accuracy of Parts Made on a Mini-CNC Lathe and a Conventional Lathe
R. Radharamanan
A low cost Mini-CNC lathe was assembled and tested and compared with a conventional lathe for dimensional accuracy and efficiency. Materials wood, plastic, and wax were used to make small artifacts. Measurements made and analyzed using factorial design experiments indicated that the Mini-CNC lathe was faster with better dimensional accuracy.

Control Systems: A Causality Issue
Andrzej Gapinski
Systems and Control Theory has been very successful in formalizing system description, defining system properties and behavior characteristics for both time-invariant and time-varying cases in recent decades. This characterization of multivariable systems of one independent argument (1-D) cannot be easily nor directly extended to the multidimensional case, due to causality requirements. The article discusses the critical issue of causality in Systems and Control Theory.

Importance of Wireless Electronic Stethoscope System
Rashid K. Aidun
In this paper we will discuss the importance of Wireless Electronic Stethoscope System which store audio recordings on a digital platform, allowing for subsequent evaluation by medical providers or secondary post-processing using analytical software. Also, it opens a new pathway to investigate and find if there are any correlation between heart or respiratory sound signals and diseases not directly related to heart/respiratory system.

Arduino Microcontroller in EET Projects
Andrzej Gapinski
Instructors in courses covering microprocessors often face the task of appropriate hardware platform selection in the context of different operating systems and compatibility issues. The article discusses the author's previous struggles with microprocessor platform selection for EET projects through the years and the solution to this: the Arduino platform.

MONDAY 10:00A SESSION (cont.):

ISLAND I: BUSINESS/DATA ANALYTICS (A)

SESSION CHAIR: JOHN WANG, MONTCLAIR STATE UNIVERSITY

Assessment of Student Interest and Choice in Engineering using Data Visualization
Sampson Gholston, Andrew M. Davis, Michael P.J. Benfield, Matthew W. Turner, Monica L. Dillihunt, Sarah A. Roller and Sandra A. Lampley (Presenting Remotely)
The purpose of this research is to examine students' interest and choice in engineering using data visualization. In this study, we investigate students' survey responses using data visualization techniques to assess students' perceptions of engineering. Our study aims to identify constructs K-12 schools might leverage to increase the engineering pipeline.

Law Enforcement's Usage of Business Intelligence Collaboration
Ellen S. Kramer (Presenting Remotely)
The most significant component for law enforcement agencies in reducing and preventing crime is information. Agencies have harbored the benefits of business intelligence (BI) tools to gather information and combat crime. This paper defines business intelligence, explores best practices in BI application usage, and provides real-world examples of BI in action.

Application of Big Data Copula-Based Clustering for Hedging in Renewable Energy
Khalid Bachkar, Iddrisu Awudu, Mahdi Fathi and William Wilson (Presenting Remotely)
In this paper, we formulate an optimization-hedging model which demonstrates how Operational Research methods and analytics can take advantage of big data sources to inform business decisions in the renewable energy sector. Our results show that adopting the Co-cluster Algorithm gives the ethanol processor an improved risk management strategy.

ISLAND II: COMPUTER APPLICATIONS (A)

SESSION CHAIR: ABDULAZIZ ABDULAZIZ, WICHITA STATE UNIVERSITY

Study of Kinematic and Kinetic Aspects of Mechanisms using Tools of CAD Solid Modelers
Il-Seop Shin, Prathivadi Ravikumar, Blair J. McDonald, Khaled Zbeed, Puneeth N. (Presenting Remotely)
The teaching/learning of mechanisms in mechanical engineering has changed with the advent of CAD tools. The power of this computer application has greatly enhanced the effectiveness of teaching/learning mechanisms and is illustrated through examples on synthesis, kinematics, and kinetics of mechanisms. Certain results are compared with results from alternative approaches.

Progress in Autonomous Drone Prototype Development for Scanning Exterior Damage of Buildings
Byul Hur, Boong Yeol Ryoo, Wei Zhan, Carmelo Bustos, Gabriel Consuelo, Luis Orozco and Ramon Vazquez (Presenting Remotely)
In order to streamline the exterior surface inspection process, a drone with manual and autonomous flight capabilities is being developed by three multidisciplinary faculty members and four undergraduate students at Texas A&M University through a Capstone project. The details of this building analysis drone development process will be presented.

MONDAY 10:00A SESSION (cont.):

A Finite Difference Solution for 1-D Soil Consolidation Using Excel
Blair J. McDonald, Prathivadi Ravikumar, Susan Brooks and Trevor W. McDonald (Presenting Remotely)
Solution of Terzaghi's one dimensional soil consolidation equation is presented using the finite difference method of analysis and Excel. The utility of using a spreadsheet to solve an advanced analytical method of analysis of an engineering problem involving time and space is demonstrated.

MONDAY 1:15P SESSION:

BAY ROOM: **MARKETING**

SESSION CHAIR: **SCOTT SWAIN, CLEMSON UNIVERSITY**

Cognitive Load: Opportunities and Challenges with Augmented Reality
B. Andrew Cudmore and Christian Sonnenberg (Presenting Remotely)
Augmented Reality (AR) provides users a transformative experience across different disciplines. This user interface overlays virtual information on to real world display. While the applications for AR have been addressed extensively, little research has been done on the cognitive workload and human-computer interaction limitations of this technology.

Measuring the Perceived Intensity of Rivalries
Scott D. Swain, Oswald Harris King, Ally Ault, Lucas Ball, Jack Enright, Aleksandra K. Shtompil, Andrew Mohr and Daniel Lentz (Presenting Remotely)
Individuals and groups often compete for the same valued resources. In some cases, these parties come to view one another as rivals, thereby heightening the psychological stakes of competition. To support growing scholarly interest in the topic, we introduce a new approach for measuring the perceived intensity of rivalries.

Fake Online Reviews and its Broad Effects on the Economical and Quality Systems: A Literature Review
Ahmed Abdelaziz (Presenting Remotely)
Online consumer reviews have become one of the primary factors of influence in buying decisions. The fake reviews phenomena are becoming a major challenge for marketplaces, consumers and businesses alike. This literature review seeks to provide a comprehensive research on the causes and effects of fake reviews, the various algorithm and methodology for detection and the effects it has on the free economical system, consumer confidence and other areas like quality improvements incentives.

The Truth about Plastic: Influencing Consumers Perceptions through a Collectivist Perspective
B. Andrew Cudmore (Presenting Remotely)
Plastic is a major contributor to pollution in our environment. This paper explores ways to motivate consumers to encourage the limitation of plastic usage in products and packaging. Research indicates that consumer self-confidence and self-efficacy may be moderators of knowledge that influence a more collectivist versus individualistic perspective.

MONDAY 1:15P SESSION (cont.):

ISLAND I: BUSINESS/DATA ANALYTICS (B)

SESSION CHAIR: JOHN WANG, MONTCLAIR STATE UNIVERSITY

Statistical Models for Analyzing Mortality Rates due to Drug Overdoses and Motor Vehicle Accidents
R. Radharamanan, Richard Gordon, Megan McDowell and Thuydan Ngo
Statistical methods were used to analyze the mortality rates due to drug overdoses, motor vehicle accidents, and overall death rates. The results indicated that the Lognormal distribution is the best fit for drug overdoses and overall death rates, and the Weibull distribution is the best fit for motor vehicle accidents.

A Probabilistic Dynamic Programing Model for Determining Optimum Salt Inventories
John Wang, Steve Bin Zhou and Zhi Pei (Presenting Remotely)
We determine the optimal inventory of rock salt that Essex County should carry on a weekly basis during the winter months. The occurrence and size of snowfall, and therefore, the level of demand for salt, are uncertain for each week. Dynamic programming with a backward recursion is utilized to determine weekly optimal costs/inventory level.

Statistical Models for Forecasting Stock Prices
R. Radharamanan, Kaine Granger and Andrew Hudson
Statistical methods were used to forecast stocks prices of Apple, Berkshire Hathaway, Johnson and Johnson, Microsoft, and Amazon. As the data were predicted farther from the last known data point, the accuracy decreased. Exponential Smoothing with Linear Trend was most recommended within the five companies, with one being Exponential Smoothing.

ISLAND II: QUALITY PLANNING & PROCESS IMPROVEMENT (A)

SESSION CHAIR: ROGER MERRIMAN, WICHITA STATE UNIVERSITY

Performance Characterization of the Modified Group Control Chart
Abdulaziz G. Abdulaziz and Gamal Weheba
In this paper, we examine the performance of group control charts under varying combinations of shift magnitudes and number of streams affected. A number of simulated scenarios were generated and used to obtain the average run length as the measure of performance under each scenario. The results indicate scenarios where the modified chart would be preferred and suggest areas for future research.

Assessing the Internet Service Providers in Egypt
Khaled S. Abdallah and Yasmin Adel
Egypt has been investing in upgrading the internet infrastructure with major improvements to the speed and stability of the internet connections. Recently, all the major internet service providers in Egypt introduced plans with faster speeds, more traffic cap, and cheaper prices, but the throttling speeds have been sharply decreased. The performance of the four major Internet Service Providers is assessed and the room for improvement is identified.

MONDAY 1:15P SESSION (cont.):

A Systematic Review of Training Statistical Process Control in a Manufacturing Setting
Roger A. Merriman II (Presenting Remotely)
Many organizations struggle with the implementation of statistical process control (SPC). A systematic review of SPC implementations focused on the training aspect was performed to understand what makes an implementation successful, barriers encountered, how training is conducted and how the process is sustained.

MONDAY 2:45P SESSION:

BAY ROOM: SUPPLY CHAIN MANAGEMENT & LOGISTICS

SESSION CHAIR: EWA RUDNICKA, UNIVERSITY OF PITTSBURGH, GREENSBURG

Industry 4.0 in Dynamic Vehicle Routing Problem
Maryam Abdirad and Krishna Krishnan
Industry 4.0 is a good framework for Dynamic Vehicle Routing problem (DVRP) that the delivery vehicles must serve customer demands from multiple depots to have a minimum transit cost without exceeding the capacity constraint of each vehicle. In this paper, we present a heuristic approach for solving this problem.

Hub Location under the Risk of Worst-Case Interdictions
Navneet Vidyarthi, Prasanna Ramamoorthy, Sachin Jayaswal and Ankur Sinha
Hub disruptions can have severe economic impacts as hubs carry consolidated flows from several origin nodes. This motivates the design of networks that are resilient to targeted attacks with minimal economic losses. We model the problem as a trilevel stackelberg game in which the network owner (leader) makes the first move by locating hubs to minimize a weighted sum of pre-interdiction hub location cost and the attacker's reward (maximize post interdiction routing cost).

Electric Vehicles Routing Problem with Variable Speed and Time Windows
Khaled S. Abdallah and Yasmin Adel
In this paper, the dispatching and routing of battery operated electric vehicles is considered. The vehicles can move at variable speeds when moving from a customer to another. When the speed is fast, the charge is depleted fast and small number of customers are served in the route. While when the speed is slow, the charge is depleted slowly, and more customers can be accommodated in the route.

Lot-Streaming Flow-Shop Scheduling Optimization with Setup, Warm-Up, and Idle Times
Behnam Sabzi, Deepak Gupta and Krishna Krishnan
This research provides a new heuristic model based solution framework to evaluate lot-streaming scheduling problem with the objective of minimizing total make-span with warm-up, setup, and idle times. Multiple performance measurement criteria are evaluated to assess the results obtained by our model compared to the existing lot-streaming models that do not consider setup and/or warm-up times.

MONDAY 2:45P SESSION (cont.):

Sustainability in Supply Chain of the Fashion Industry
Ewa Rudnicka
As the pressure surrounding sustainability from consumers increased, businesses in the fashion industry pursued innovation in their supply chains as it relates to environment and social issues. Trends of companies moving their production and manufacturing divisions to developing countries where low-cost labor and more lenient production and general regulations are present occurred. This article examines the impact of the supply chain practices on the environment and the communities involved in making the clothes by the fast fashion companies.

ISLAND I: CONSTRUCTION MANAGEMENT

SESSION CHAIR: GAMAL WEHEBA, WICHITA STATE UNIVERSITY

Analysis of Critical Factors Influencing Performance of Construction Management Undergraduate Students
Nirajan Mani (Presenting Remotely)
With the improvement in the economy after recession, US construction industry is growing and there are huge demand of construction skilled workforce. Construction management and skilled construction workers' shortage is becoming one of the country's great-unsolved problems as the economic expansion has continued because of various reasons, such as low students' enrollment in the construction management and related programs, poor academic performance of students, and low retention and graduation rates of students in US universities.

Energy-Efficient Construction Materials and Instrumentation
Faruk Yildiz and Keith Coogler (Presenting Remotely)
This study of energy-efficient construction materials and instrumentation was to build a system of sensors and install them in a portable small-scale building. The building would be self-powered to test and monitor temperature variations through different construction materials. The challenge associated with this project was that there was no inexpensive system to monitor the many sensors required. There are systems on the market that will take care of this, but these systems can cost thousands of dollars and come with few features.

Integrating BIM in Construction Takeoff and Estimating: A Case Study of an Advanced Cost Estimating Course for Construction Management
Yilei Huang (Presenting Remotely)
This paper presents an Advanced Cost Estimating course for construction management that focuses on integrating BIM in both the takeoff and estimating process. The course streamlines the connection between model-based take-off and estimating to allow quantity data from the model to be transferred to a cost database for bid pricing.

Building Design, Residents Behavior, and Control of Indoor Radon: An Observational Study
Osama Mansour and Bashar Haddad (Presenting Remotely)
This article reports the results of an observational study in 4 houses located in Warren County Kentucky. digital monitors were installed in 4 houses to logging data about indoor air quality for 4 months. The results show significant differences between the houses of different structures and residents' behavior.

MONDAY 2:45P SESSION (cont.):

ISLAND II: HEALTHCARE SYSTEMS

SESSION CHAIR: SAMPSON GHOLSTON, UNIVERSITY OF ALABAMA, HUNTSVILLE

Demographics for Under-Represented Students in Nursing Education for a Training and Resource Program Called "UR-STAR" to Boost Retention and Confidence
Sharon Spencer and Sampson Gholston (Presenting Remotely)
The College of Nursing at a predominately White institution began an initiative to address needs of under-represented minority (URM) students. A university-wide diversity, equity and inclusion campaign was previously implemented. However, the college of nursing recognized the need to develop a nursing specific program to target retention of URM students. What is now the best method to use to collect such data and what should be included?

Utilization of High Fidelity Simulations and Technology in Nursing Academia
Tammy Clemmons (Presenting Remotely)
High fidelity, high-pressured clinical scenarios were designed and staged using simulators and technology for the validation of student clinical safety. Data from this stimulation were utilized to affirm readiness for autonomous and safe clinical practice.

Healthcare Performance Improvement using Engineering Students
Sampson Gholston and Stephanie Ritter (Presenting Remotely)
The purpose of this project is to detail a partnership between industry and academia. Projects that included readmission, retention, and Sepsis compliance were completed with teams of professionals and students. The conclusions include recommendations to improve the partnerships and eliminate some on the identified difficulties in developing such a partnership.

MONDAY 4:30P SESSION:

BAY ROOM: EDUCATION AND TRAINING (B)

SESSION CHAIR: JACOB CRESS, UNIVERSITY OF DAYTON

Critical Thinking Exercises: An Effective Tool of Instruction
B. Andrew Cudmore (Presenting Remotely)
A series of critical thinking exercises (CTEs) were applied to a selection of marketing courses across several terms. Utilizing the Kirkpatrick Model and Bloom's Taxonomy this exploratory research reveals student perceptions in terms of how well they remember, understand, apply, analyze, evaluate, and create.

Quality in E-Learning: Perceptions of Instructors
Mohammed Al-Awadh and Gamal Weheba (Presenting Remotely)
E-Learning is rapidly growing and competing with traditional classroom learning. Advancements in digital technology and democratization of the internet have made e-learning more accessible, flexible, and convenient way for acquiring knowledge. This study examines the instructors' perceptions of quality in e-learning in higher education in the United States.

Entrepreneurial Psychology: Revising the Psych 101 Course
Dennis Ridley
Extant courses in psychology assume that a stable system of government exists and supports the development of entrepreneurship in society. That excludes the discussion of human capital or assumes its existence. This research recognizes the need to release the only source of wealth: human expression of ideas, imagination and creativity.

An Effective Course Assessment to Identify Students Weakness that Leads to Performance Improvement
Stephen Frempong (Presenting Remotely)
Course assessment is a process that seeks to repeatedly determine an effective method to improve student performance in order to meet program educational objectives. This paper will share with the audience about an effective method to assess Electronic Circuits course at the State University of New York at Canton.

MONDAY 4:30P SESSION (cont.):

ISLAND I: LEADERSHIP AND DIVERSITY

SESSION CHAIR: ALEXANDRA SCHÖNNING, UNIVERSITY OF NORTH FLORIDA

Using SAE-Baja Project in Attracting and Empowering Women in Engineering/ Technology: A Case of Success at Northern Kentucky University and Cincinnati State Technical and Community College
Morteza Sadat-Hossieny, Mauricio Torres and Sabira Sadat-Hossieny (Presenting Remotely)
This paper is a chronicle on how a student organizations such as Baja-SAE Club can be used as a catalyst to the involvement and empowerment of women in engineering in higher education. How the strengthening of this effort can be achieved through the collaboration between different institutions is also discussed.

Leadership Engagement for Engineering Technology Students *(Presenting Remotely)*
Iftekhar Ibne Basith, Shani Gomez, Emanuel Sanchez, Edgar Nino, Dorelia Cardona and Faruk Yildiz
This paper describes the leadership and diversity growth in the Engineering Technology department at Sam Houston State University over the past years. Two new student clubs titled as "KatatroniX" and "ETEC Ambassador" has been formed. The members are first generation students, and female students.

Engaging Upper Elementary Students in Activities Aimed to Increase Inclusion in STEM
Alexandra Schönning and Susan Perez (Presenting Remotely)
This paper discusses efforts by the Center for the Advancement of Women in Engineering at the University of North Florida to increase the inclusion in STEM by providing engineering outreach activities for upper elementary students including a research component investigating gender differences in children's likelihood to pursue Engineering.

ISLAND II: COMPUTER APPLICATIONS (B)

SESSION CHAIR: ABDULAZIZ ABDULAZIZ, WICHITA STATE UNIVERSITY

Using Survey Monkey as a Data Source for AHP/ANP in Multi-Criteria Decision-Making Modeling
Judson Stryker and William Adams (Presenting Remotely)
In this research we develop and extend existing software to allow AHP/ANP models to use SurveyMonkey surveys as a data source for participant votes. ANP, the analytic network process, is a mutli-criteria decision analysis framework. We demonstrate this new functionality with a publicly available consumer choice model.

Open-source Embedded Linux Mobile Robot Platform for Mechatronics Engineering and IoT Education
David Malawey, Byul Hur, Joseph A. Morgan, Xingyong Song and Reza Langari (Presenting Remotely)
An embedded Linux based robot was designed to support teaching in Multidisciplinary Engineering Technology (MXET) at Texas A&M University. This robot is SCUTTLE mobile robot, which means Sensing, Connected Utility Transport Taxi for Level Environments. This robot is a payload-capable mobile platform that is made of readily-available off-the-shelf parts and 3D printed designs.

TUESDAY 8:30A SESSION:

BAY ROOM: CORPORATE GOVERNANCE, ENGINEERS AND PRICE

SESSION CHAIR: MOHAMAD EL-HODIRI, UNIVERSITY OF KANSAS

Review of the Logistics System of the International "East-West" Transport Corridor
Mohamed El-Hodiri and Ainur Ongdash (Presenting Remotely)
In this paper, characteristics of West-East transport corridor passing through the territory of Russia are considered. Communications between the organization of the transport systems of the countries of the Western East and the making development model elements are considered. The directions of development of the East Western Transport corridor are offered.

Competitiveness of the Aviation Industry as a Factor in the Economic Development of the Republic of Kazakhstan
Mohamed El-Hodiri and Golmira Altaeva (Presenting Remotely)
The aim of the study is the formation of scientific ideas about the state and prospects of increasing the competitiveness of Kazakhstan airlines in the international passenger air transportation markets in the context of globalization.

Welfare Economic Evolution of Crowding out in the Egyptian Economy
Mohamed El-Hodiri and Walaa Saad El-Khalifa (Presenting Remotely)
Most adherents to the American School of Economics claim that an increase in public spending crowds out private investment, and recite the myth that public management is inefficient while private investment unquestionably is. We present a mathematical macroeconomic model where the issues are clarified to a reasonable extent by seating public interest at the negotiating table. We perform statistical analysis with Egyptian data and confirm our finding by considering the effect of increased government spending on the least advantaged member of society.

TUESDAY 8:30A SESSION (cont.):

ISLAND I: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR

SESSION CHAIR: SAMPSON GHOLSTON, UNIVERSITY OF ALABAMA, HUNTSVILLE

Lessons Learned: An Empirical Investigation of the Social Side of Systems Engineering
Paul D. Nugent
This study analyzes lessons-learned documentation form a defense contracting organization to better understand the social side of the systems engineering contractor-customer relationship. Early themes highlight the importance of demonstrated commitment to the customer as well as the role of communication. Implications for theory and for practice are discussed.

Innovative Design and Delivery of the Business Capstone Course
Robert S. Fleming and Michelle Kowalsky (Presenting Remotely)
This session will discuss how through an innovative approach to the design and delivery of the capstone course that all business students are required to take we have enhanced student engagement in the course and have equipped our graduates with the sustainable skills that will contribute to their professional success.

ISLAND II: QUALITY PLANNING & PROCESS IMPROVEMENT (B)

SESSION CHAIR: ROGER MERRIMAN, WICHITA STATE UNIVERSITY

Group Control Charts for Startup Operations
Clovis S. Ribas and Gamal Weheba
Group control charts (GCC) are utilized to monitor the performance of multiple stream processes. In this paper, we focus on monitoring multiple stream processes during startup operations. We propose a control mechanism based on the GCC for short production runs. Using simulation, we apply this design to uncorrelated data from multiple streams where applications of GCC are most beneficial. We also explore the performance of this design under varying startup conditions and comment on the economic benefits of the proposed design.

A Critical Analysis of the AIAG-VDA FMEA: Does This Newly Released AIAG-VDA Method Offer Improvements over the Former AIAG Method?
Christopher Kluse (Presenting Remotely)
The AIAG-VDA Failure Modes and Effect Analysis (FMEA) Manual, developed by a global team of Tier 1 and OEM FMEA experts and released in June 2019, has been publicized as an improved FMEA method. This research is a critical analysis and comparison of this new method and concludes with a summary of the method advantages, disadvantages, and recommendations for future FMEA method improvement.

TUESDAY 10:00A SESSION:

BAY ROOM: ENGINEERING INNOVATIONS (A)

SESSION CHAIR: ZHAO ZHANG, MISSOURI WESTERN STATE UNIVERSITY

Teaching Students Hands-On Designing, Re-engineering and Rewinding Step-Down Transformer
Stephen Frempong (Presenting Remotely)
Students in Electrical Engineering Technology degree programs need to know more than just using the transformer, and should be able to design, re-engineering and rewinding transformer to specific voltages. Such experience benefits graduate who may be working in industry where they design, troubleshoot, repair, or test transformers. This paper demonstrates how instructor use his industry experience to teach his students on transformer design, rewinding and testing.

The ReptSmile Concept
Andrew Peniston, Basil Abualsiba and Joshua Hixon
There are 1.8 million households in the United States that own and maintain reptiles. There is a significant lack of equipment on the market that is able to control the climate for exotic life such as reptiles, amphibians and plants. A team of students named ReptSmile has designed a system to fill this void. In this paper the reader will find the research and results that were compiled in the making of the system, demonstrating its adaptability and how it makes pet ownership easier than ever before.

Redevelopment of a City into a Sustainable Smart City: A Collaborative Faculty-Students-Community Engaged Project
Nirajan Mani (Presenting Remotely)
This paper focuses on the pilot study of Fitchburg city in Massachusetts, a 19th century industrial center, but now began to lose its economic diversity and stability. The infrastructures built in the 1900s century have not renovated properly. By conducting pilot study, this paper identified various issues of this city and analyzes existing scenario of community connectivity activities by city, public, and service providers. The author proposes a framework for designing a smart city model by collaborating with concerned stakeholders and experts.

ISLAND I: HUMAN FACTORS AND COGNITIVE ENGINEERING (A)

SESSION CHAIR: DEBORAH CARSTENS, FLORIDA INSTITUTE OF TECHNOLOGY

OMIR Event Type and Frequency at a Collegiate Flight Program
Kevin Redden, Davor Bonilla, Gregory Fox, Isaac Silver and Brooke Wheeler (Presenting Remotely)
This research reviewed the Operational Mishap and Incident Reports (OMIRs) at a collegiate, Part 141 flight school over 3 years. No significant difference was found between 4-week intervals when OMIRs were submitted; however, there was a significant difference in the number of OMIRs submitted by the type of event.

TUESDAY 10:00A SESSION (cont.):

Drone Delay: UAS Awareness and Consumer Willingness to Fly
Nicolas Duboc, Zachary St. Amand and Brooke Wheeler (Presenting Remotely)
Unmanned Aerial Systems (UASs) may have an effect on a consumer's willingness to fly on commercial flights. This study was conducted to determine if consumer willingness to fly changed after learning about a recent UAS event; results indicated that it decreased.

The Effectiveness of Smart Compose: An Artificial Intelligent System
Matt Gnacek, Eric Doran, Sharon Bommer and Philip Appiah-Kubi (Presenting Remotely)
The use of artificial intelligence (AI) and its applications continue to grow with some AI technologies designed to reduce the workload of humans or increase their performance. In this study, the AI technology called Smart Compose is tested to see if it meets its goal of improving a user's performance.

Understanding Pilot Decision-Making Based on Weather Source during Preflight
Warren Pittorie, Deborah Carstens and Meredith Carroll (Presenting Remotely)
This study focused on the older technology of a verbal preflight weather briefing compared with the newer and emerging technology of digital textual and graphical weather pertinent to the flight route the pilot has chosen. The qualitative analysis software, Nvivo®, was used to analyze open-ended questions for each weather scenario.

ISLAND II: PRODUCTION AND OPERATIONS MANAGEMENT (B)

SESSION CHAIR: MEHMET YILDIRIM, WICHITA STATE UNIVERSITY

Addressing Corrugated Board Warp with a 2^3 Factorial Design
Robert S. Keyser and Lois A. Jordan (Presenting Remotely)
The conclusion is that the best settings should be Edge Tension = Loose (-), Preheater Wrap Pressure = 25% (-), and Run Speed = 380 ft/min (-) in order to achieve the desired outcome of producing flat corrugated sheet stock off the corrugator.

Managing the Implementation of Remote Racking Tools to Increase Worker Safety at Nuclear Facilities
Robert Urbanski, Aldo A. McLean and Wolday Abrha
This study will examine the challenges and changes required to obtain and implement remote racking tools for a generating station. While complying with the national regulations for safe work practices, transition from manual breaker racking to remote racking are gaining ground. Evaluations will be performed to safely storage of tools while training of personnel will take place to ensure proficiency in proper use of the new technology.

The Application of Markov Decision Process for Decision Making under Uncertainty in the Electric Utility Industry
Anyama Tettey, Kim Hensley, Sampson Gholston and Dale Thomas (Presenting Remotely)
This paper proposes the use of Markov Decision Process to aid with decision making under uncertainties in the electric utility industry. The result of the study ensures that management of utility companies are not overtaken by unforeseen and inevitable conditions and circumstances beyond their control.

TUESDAY 1:15P SESSION:

BAY ROOM: ENGINEERING INNOVATIONS (B)

SESSION CHAIR: ZHAO ZHANG, MISSOURI WESTERN STATE UNIVERSITY

Using Tolerance Interval Method as an Alternate Approach for Monitoring Process Performance (Process Capability) of Surface Roughness of Gear Tooth Flanks to Avoid Grinding Burns
Akaff S. Diam, Ali Kashef and Julie Z. Zhang (Presenting Remotely)
The gear tooth flanks are susceptible to microstructural damage due to high thermal energy generated during the process of grind operation. Achieving process capability of surface roughness is difficult due to the nature of process. In this paper, an alternate approach of statistical tolerance interval is suggested while analyzing and comparing with conventional capability study analysis.

Highway Safety Improvement Project Decision Making Case Studies in Engineering Ethics Course
Stephen Frempong (Presenting Remotely)
Course assessment is a process that seeks to repeatedly determine an effective method to improve student performance in order to meet program educational objectives. This paper will share with the audience about an effective method to assess Electronic Circuits course at the State University of New York at Canton.

Private Home Automation and Security with NodeRED, MQTT, Motion, and OpenCV
Zhao Zhang (Presenting Remotely)
With billions of IoTs and smart devices sold, and WIFI enabled microcontrollers cost $1 or less, the big tide of home automation and security has finally came. While many of these services are cloud based, many people prefer a private system with no uploading of sensitive data to the cloud. This paper proposes a local and private system, while still can provide alarms through emails or other types of social media channel if needed.

Minimizing the Penalty in the Industrial Power Consumption by Engaging a APFCU Unit
Kristopher Neill and Zhao Zhang
This project is adapted to reduce penalty for industrial units by implementing automatic power factor correction unit via automatic power factor correction unit (APFCU). The ratio of actual power being used in an alternating electrical circuit to the power which is apparently drawn from the line causes the angle delay ranging from zero (for a purely resistive load ,pf= 1) to a theoretical maximum of 90° (for a purely inductive load, pf=0). as the cosine of this angle is the power factor, pf.

TUESDAY 1:15P SESSION (cont.):

ISLAND I: HUMAN FACTORS AND COGNITIVE ENGINEERING (B)

SESSION CHAIR: DEBORAH CARSTENS, FLORIDA INSTITUTE OF TECHNOLOGY

A Usability Study of Airline Booking Platforms
Andrew Nakushian (Presenting Remotely)
This usability test compared the perceived usability between booking an airline flight on the website and on the mobile app. It compared the speed at which tasks could be completed and gathered feedback from Generation-Z participants. The study found that despite taking twice as long, the participants preferred booking on the website.

Factors Influencing Human Machine Performance in the Flight Deck
John A. Russack
The successful completion of a Part 121 regional airline flight requires that two pilots form a flight deck team. The success of this team's interaction with cockpit technology is influenced by team situation awareness, mutual performance monitoring, crew resource management (CRM), and shared mental models. This report reviews literature to understand factors influencing team performance in the flight deck.

Cognitive Ergonomics in Manufacturing Processes for Breakthrough Innovations of Smart Factories: A Literature Survey
Lauren Drankoff and Sharon Bommer (Presenting Remotely)
The goal of this review paper is to provide insight on how to implement current cognitive ergonomic principles to support the effective implementation of technology to aid the human operator in smart factory configurations. The technology implementation will aid the human operator by decreasing human errors and increasing task efficiency.

Development of Virtual Reality Simulation for Emergency Evacuation in Education
Ulan Dakeev, Reg Pecen, Faruk Yildiz and Y. Luong (Presenting Remotely)
This study involves employing the Virtual Reality simulation, integrated with the three-dimensional floor plan of the Fred Pirkle Building of Sam Houston State University, to analyze the disparity of time used to locate the nearest emergency exit within VR environment versus actual physical configuration by participants – who have no prior spatial cognition about the experimental environment.

TUESDAY 1:15P SESSION (cont.):

ISLAND II: ADDITIVE MANUFACTURING (A)

SESSION CHAIR: KRISHNA KRISHNAN, WICHITA STATE UNIVERSITY

A Study of the Effect of Vibration on Accuracy of Stereo-Lithographically-Printed Parts
Odai Nassar and Wilfredo Moscoso-Kingsley (Presenting Remotely)
This study discusses the effect of controlled levels of vibrations applied on a stereolithography apparatus on the dimensional accuracy of the printed parts. The goal is to establish tolerable levels of vibration from the workshop environment. The study should also inform AM processes where vibrations are intentionally used.

Rubber De-Vulcanization for 3D Printing
Khunza Meraj, Gamal Weheba and Doug English
In this paper, authors review methods for de-vulcanizing and recycling waste rubber as a source of material for 3D printing. These methods include chemical, mechanical, microwave, ultrasonic and microbial. We present some underlying limitations and advantages that have been reported in the literature. In addition, we discuss desired properties that render rubber suitable for 3D printing. Experiments were carried out to re-evaluate selected methods under controlled conditions.

Applications of Additive Manufacturing in Construction Industry: A Literature Review
Abdelhakim Al-Turk and Gamal Weheba
Additive manufacturing (AM) is the process where three–dimensional (3D) parts are constructed using layer-by layer deposition methods via a computer software. This paper provides a state-of-the-art review on the use, advantages and limitations of additive manufacturing in the construction industry. The review sheds light on the different AM technologies used in concrete printing and highlights contemporary projects and achievements in the construction industry.

TUESDAY 2:45P SESSION

BAY ROOM: MANAGEMENT OF TECHNOLOGY

SESSION CHAIR: VIKAS AGRAWAL, JACKSONVILLE UNIVERSITY

Drivers and Barriers of Advanced Manufacturing Technology Implementation in Saudi Arabia
Abdullah Al-Fatais and Ali Almuflih (Presenting Remotely)
The purpose of this paper is to present a systematic literature review to identify opportunities and challenges that face Advanced Manufacturing Technology (AMT) adoption in Saudi industrial sector. It also highlights the critical factors behind those opportunities and challenges, which need to be taken into consideration when it comes to AMT implementation.

TUESDAY 2:45P SESSION (cont.)

Forecasting U.S. Department of Defense Budget Levels
Jamie Seim, Gordon W. Arbogast, Vikas Agrawal, Lynsey Seim and Jay Marcus (Presenting Remotely)
The Department of Defense (DoD) budget was more than $611 billion in 2016. Its accurate prediction is extremely important. This paper's purpose is to identify key political, economical and social factors that have a significant impact on determining the DoD budget. A resulting regression model explained 82.14% of the variation in the DoD budget.

Using Agent-Based Modeling for Iot Application: A Case Study of an Electric Utility Company
Mohammed Basingab
This paper presents a conceptual study of using IoT technology in a leading electric utility company in Saudi Arabia. Agent-Based Simulation (ABS) was used to simulate the electric meter behaviors. Three different scenarios were applied, and simulation outputs were analyzed to recognize the importance of adopting IoT technology.

Brain-Machine Interface: Past, Present and Future
Refaat El-Said
This paper provides a review of the past and present research in this area and its application in the medical/ neurological fields and a future look at its promising research and strong applied and analytical frameworks.

ISLAND I: BUSINESS/DATA ANALYTICS (C)

SESSION CHAIR: JOHN WANG, MONTCLAIR STATE UNIVERSITY

Mitigating Obsolescence: Diminishing Manufacturing Sources and Material Shortages
Ryan Rust and Ahmad Elshennawy (Presenting Remotely)
The aim of this research to develop a tool for electronic design engineers using Machine Learning predictive algorithms that will accurately predict the product discontinuation date by a manufacturer so that they can make the most informed decision when selecting their components for design or when designing system refreshes.

A Manufacturing Machine Smart Early Fault Detection using Deep Learning
Emoghene Ottah
In today's smart manufacturing, maintainability is vital in order to remain competitive. A smart way to enhance manufacturing maintenance decision making using deep learning approach for smart early fault detection is presented in this study. This is based on vibration data for a manufacturing machine and the impact on the quality of the product.

A Survey of Trends in Data, Technology and Society
Judson Stryker (Presenting Remotely)
In this research I survey various trends in the applications of data and technology to society. Aspects of the development of a Freshmen Seminar for Business students at Stetson University will be discussed. Interesting trends in data analytics to the fields of Fraud Detection, Finance and Accounting will be explored.

TUESDAY 2:45P SESSION (cont.)

ISLAND II: ADDITIVE MANUFACTURING (B)

SESSION CHAIR: KRISHNA KRISHNAN, WICHITA STATE UNIVERSITY

Making the Case for Additive Manufacturing: A Review of Cost Models
Zohreh Lamei and Gamal Weheba
In this paper, we review models for calculating the cost of manufacturing products by utilizing the AM technology and discuss the pros and cons of each model. Cost models have been classified into two fundamentally different groups. One group involves partial utilization of the AM technology and its economic effectiveness compared to traditional manufacturing methods. The other involves full utilization of the technology, accounts for its unique capabilities and anticipated benefits.

Analysis and Comparison of Materials for 3D Printing in Oral/Dental-Care Applications
Lateefah Miller and Ramazan Asmatulu
This is an investigation of various types of materials that have been used in dental restoration with the aid of additive manufacturing (AM). Materials for oral and dental care have seen a great deal of change in recent years. With developments in additive manufacturing, biocompatible materials that would otherwise be too difficult to use for dental applications, can potentially be tailored and processed and custom built for patients.

The Comparative Study of Artificial Neural Network and Box-Behnken Method to Optimize the Surface Roughness of FDM Fabricated Parts
Karin Kandananond
This research objective aims to compare the performance of two methods, artificial neural network (ANN) and a response surface method (RSM), Box-Behnken. The empirical study was conducted on an additive manufacturing (AM) system, fused deposition modeling (FDM). The filament used was the polylactic acid (PLA). The response of the study is the average surface roughness (Ra) while the input factors are namely bed temperature, printing speed, and layer thickness.