MARCH
3-5
2024

PROGRAM

OF THE INTERNATIONAL CONFERENCE ON INDUSTRY, ENGINEERING & MANAGEMENT SYSTEMS

IEMS
2024

#30

DEAR FRIENDS AND COLLEAGUES...

INDUSTRY ENGINEERING &
MANAGEMENT SYSTEMS CONFERENCE

MARCH
3 - 5
2024

On behalf of the IEMS Executive Board, it is our pleasure to welcome all of you to the 30th IEMS Conference. We are proud that the IEMS Conference continues to provide a forum for the exchange of knowledge and research for three decades.

The annual IEMS Conference is directed at those who strive to continuously improve management systems and processes in their business and engineering environments. This covers a broad range of areas in both of these fields. We believe that engineering and management professionals will benefit greatly by sharing and exchanging their ideas and issues in the same forum. Engineering and business are the igniting components for innovation and creativity, and we are grateful and delighted that many of you have chosen our conference to be the venue for the sharing of those ideas.

Our Program Chair, Dr. Hesham Mahgoub, has done an extraordinary job organizing this year's conference. We are pleased with the quality of papers published in both the *Journal for Management and Engineering Integration* (JMEI) and our *Conference Proceedings.* We greatly appreciate the efforts made by Dr. Edwin Sawan and his editorial team in assembling such distinguished top-quality publications. If you have any questions about these publications or wish to serve as a reviewer, please let us know. Last, but not least, we'd like to thank Dalia Mahgoub, our technical director, who puts together all the pieces behind the scenes.

We hope that you will leave this conference having learned and shared many new ideas. In the spirit of constant improvement, if you have any ideas to improve the conference, or if you are interested in taking a leadership role in the conference, please let us know. Thank you for participating and we look forward to seeing you next year!

GAMAL WEHEBA, PH.D.
IEMS 2024 CONFERENCE CHAIR

KEYNOTE SPEAKER

DR. ELIZABETH CUDNEY

PROFESSOR OF DATA ANALYTICS
MARYVILLE UNIVERSITY

MARCH 4
12:45 PM

DATA SYNERGY: BRIDGING BUSINESS, MANAGEMENT, COMPUTERS, AND ENGINEERING GLOBALLY

ABOUT

Dr. Elizabeth Cudney is President of Cudney Consulting Group, LLC, and a Professor of Data Analytics in the John E. Simon School of Business at Maryville University. She received her doctorate in Engineering Management from the University of Missouri-Rolla. Dr. Cudney received the 2022 Crosby Medal from ASQ. She received the 2021 Walter E. Masing Book Prize from the International Academy for Quality for her book on Lean Six Sigma. In 2018, Dr. Cudney received the ASQ Crosby Medal for her book on Design for Six Sigma. Dr. Cudney received the 2018 IISE Fellow Award. She has published 12 books and over 125 peer-reviewed journal papers. Dr. Cudney is a Fellow of the American Society for Quality.

Data synergy is the collaborative and integrated use of data across various domains or disciplines to achieve business objectives. This keynote will discuss how Industrial Engineers can lead this effort to achieve greater efficiency, innovation, and strategic decision-making by breaking down traditional silos and utilizing collective intelligence embedded in data.

INDUSTRY ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

1 zoom link
Monday March 4th

Eastern Time (ET)	Lake 1	Lake 2	Lake 3
8:30-10am	Leadership & Diversity	Management of Technology	Education & Training (A)
10am-12pm	Complex Systems Performance & Improvement	Quality Planning & Process Improvement (A)	Education & Training (B)
12pm-1:45pm Lunch & Learn: Atrium	Keynote Speaker Elizabeth Cudney Data Synergy: Bridging Business, Management, Computers & Engineering Globally		
2pm-3:30pm	Nanomaterials & Nanoengineering	Innovation Management	Human Factors & Cognitive Engineering (A)
3:45-4:45pm		Education Leadership	Business Analytics (A)

2 zoom link
Tuesday March 5th

Eastern Time (ET)	Lake 1	Lake 2	Lake 3
8:30-10am	Supply Chain Management & Logistics	Healthcare Systems	Human Factors & Cognitive Engineering (B)
10am-12pm	Marketing	Artificial Intelligence & Machine Learning	Quality Planning & Process Improvement (B)
12pm-1pm	Lunch in the Atrium		
1:30-2:30pm	Automation, Modeling, & Simulation	Lean Systems	Sustainability & Industry 4.0
2:45-4pm		SID Talk (undergraduates)	

Monday 8:30 AM Sessions

Leadership and Diversity

Session Chair: Alexandra Schönning, University of North Florida

Monday

8:30 AM – 10:00 AM

Leadership and Governance Trends within High Performing Organizations

Nicole Moore

Leadership within an organization is detrimental to its organizational performance, growth, and future success in the industry. Using applications from prior Baldrige Performance Excellence award winning organizations, this paper examines high-performing organizations and trends that exist within their leadership and governance systems to provide greater insight into organizational leadership.

Evolution of Technological Leadership with the Introduction of Industry 4.0: A Literature Review

Scott Hall

Exploring leadership evolution in Industry 4.0, this paper delineates the transition from Industry 1.0 to 4.0, emphasizing the changing role of leaders. The framework introduces dimensions of 'concern for people' and 'concern for innovation and technology,' illustrating the shift from technological to digital leaders in the era of IoT.

Management of Technology

Session Chair: Gordon Arbogast, Jacksonville University

Monday

8:30 AM – 10:00 AM

A Toxic Management Study

Gordon Arbogast

Technology firms have been increasingly beset with Toxic Managers. Empirical evidence and analysis is needed for such firms. A multi-regression analysis with interactions was utilized. It detected negative effects on followers having lower job satisfaction and leaving such firms.

The Impact of Agile Methods on Management and Systems Engineering Practice

Paul Nugent

The author draws upon ethnographic data from engineering practices prior to, and after, the introduction of Agile methods (specifically Jira). It was found that these development methodologies shift technical, political, and social realities in the work practices that are relevant to management and labor studies.

The Q-Val App for Measuring Software Quality In-Use

Abdulaziz Abdulaziz & Gamal Weheba

This paper presents the development of a web-based application (Q-Val). The development was aimed at helping users measure software quality according to the ISO 25022 standard. A case study is presented involving the measurement of the effectiveness and efficiency of statistical analysis software as two major characteristics of quality.

Education & Training (A)

Session Chair: Sandra L. Furterer, Ohio State University

Monday

8:30 AM – 10:00 AM

Designing and building an ultra-high frequency (UHF) 300 MHz – 3 GHz carrier tank for communication transmitter

Stephen Frempong

This paper will demonstrate how electrical engineering technology students can design and build a carrier frequency tank in ultra-high frequency range (300 MHz – 3GHz) to modulate the intelligent signal which can be transmitted and received on your laptop computer using a wide-band software defined radio (SDR).

Analyzing faculty perspectives to for online teaching effectiveness factors

Lakshmy Mohandas, Nathalia Sorgenfrei, Lauren Drankoff , Ivan Sanchez, Sandra Furterer, Elizabeth Cudney, Chad Laux & Jiju Antony

This study aims to identify critical online teaching effectiveness factors from instructors' perspectives and experiences during COVID-19. The analysis identified eight major themes that impact online teaching effectiveness: class recordings; course organization; collaboration; engagement; exam, assignment and quiz grades; games; valuable course content; and student timely feedback and response.

Externship Program: Industry Educator Partnership (IEP) Model

Nirajan Mani

This paper reports the benefits and challenges of "Industry Education Partnership (IEP) Model." It also explores industry experiences for teachers (IET) through externship program, their learning process, and how they implemented learned skills and knowledge in the classroom to educate future workforce.

Enhancing Industrial & Systems Engineering Education with Smart Factory CPS Integration

Ana Wooley & Tyler Thomas

This study aims to utilize UAH's Smart Factory to enhance education in Industrial and Systems Engineering. The Smart Factory is equipped with an array of sensors, IoT devices and automation capabilities. Our research aims to facilitate hands-on learning, offering students crucial skills in automation, control systems, and data processing.

Monday 10:00 AM Sessions

Complex Systems Performance & Improvement

Session Chair: Wilfredo Moscoso, Wichita State University

Monday

10:00 AM – 12:00 PM

Organizational Behaviors and Their Impact on Financial Resources

Taylor Yeazitzis

In complex organizations, understanding the interplay between organizational behaviors and financial resources is crucial for program success. Using a literature review, this paper examines the social aspects within complex systems that may be linked with financial resources, building on previous literature predominately focusing on engineering and economic aspects of organizations.

Low Sensitivity Design of Complex Systems

Jameelah Alotaibi

Low sensitivity linearized models ensure that the predictability and stability of non-linearized models are achieved in a very assertive manner. The stability, which characterizes the trajectory in terms of equilibrium point, is of utmost importance. It should be noted that an equilibrium is considered asymptotically stable when there is LF.

Framework for a Human-Needs-Centered Taxonomy for Benchmarking Nonprofit Impacts: A Case Study in Oregon

Molly Martin & Ean H. Ng

We created a methodology to evaluate the impact of non-profit organization on the population it intended to serve using the Social Return on Investment, in order to establish a benchmark for other non-profit. We used a case study in Oregon to evaluate the methodology we created.

Validation of Empirical Models Used to Predict Surface Damage in Shot Peening

Hamzah Mousa & Wilfredo Moscoso-Kingsley

In this study, the effect of shot peening parameters on the surface damage was investigated. Several conditions were simulated by varying the speed and the angle of incidence. Results from finite element analysis indicated that shooting at angles lower than 45° can cause material removal and rough surfaces.

Quality Planning & Process Improvement (A)

Session Chair: Roger Merriman, Wichita State University

Monday

10:00 AM – 12:00 PM

Employing the Kano Model to Analyze the Voice of the Customer

Elizabeth A. Cudney, Sandra L. Furterer, Ahmad Elshennawy & Cintia Buffon

Organizations must understand customer needs with respect to various customer segments in order to remain viable. This session will walk through how to develop and analyze a Kano survey to understand the voice of the customer for a diverse range of customer segments based on their impact on satisfaction.

A Practical Guide to ISO 25022: Measurement of Software Quality in Use

Bassam Jaradat & Gamal Weheba

This presentation centers on software quality in use. The focus is on providing an accessible overview and practical guide for users to evaluate software quality. The aim is to streamline the process, making it easier for users to assess and enhance the quality of software products in real-world usage scenarios.

Leveraging the Kano Model to Assess Student Perceptions of Gamification

Elizabeth A. Cudney, Mitchell Umano, Sandra L. Furterer, Ahmad Elshennawy, & Cintia Buffon

This research investigates the use of Design for Six Sigma in education, particularly in the context of integrating gamification to boost student engagement. The study employs the Kano Model to assess student perceptions of this innovative approach.

The application of Kano model in education

Cintia Z. Buffon, Ahmad Elshennawy, Elizabeth A. Cudney & Sandra L. Furterer

Customers' experiences define the quality of products and services. This article aims to provide a systematic literature review of the use of the Kano Model in Education to help educators and organizations provide better learning experiences based on understanding the student's voice.

Restoring Historical Buildings Using Additive Manufacturing

Abdelhakim Al Turk & Gamal S. Weheba

This paper provides a proof-of-concept that polyblend calcium carbonate powder can be used as a building material on the ZPrinter 450 3d printer. Such material has promising applications in the construction industry. Findings could be instrumental in offering unprecedented capabilities to preserve and revitalize historical structures and architectural treasures.

Education & Training (B)

Session Chair: Sandra L. Furterer, Ohio State University

Monday

10:00 AM – 12:00 PM

Student Study Abroad Exchange Program Culminating in an Independent Research Project

Nebojsa Sebastijanovic

Study abroad programs are a popular option for college students to enrich their study experience and expand their horizons. Among the many benefits, such as introducing students to different cultures, languages, and environments, it also benefits students by providing them with a unique educational and learning opportunity. Milwaukee School of Engineering (MSOE), in the United States of America, offers an exchange program for students to study at Lübeck University of Applied Sciences (THL), in Germany during their third academic year. The students who participate in the program complete a Bachelor thesis to meet the requirements and earn both the BSME degree from MSOE and the Diplom-Ingenieur from THL. This paper presents the program process and case studies of the impact of the study abroad program experience on students who participated in the program.

The role of transponders in satellite communication systems

Stephen Frempong

This paper will discuss about the role of a satellite transponder, the channels, and its ability to re-condition communication signals between the transmitter and receiver. How the number of transponders in each satellite makes it more economically feasible.

Analyzing student perspectives to identify critical online teaching effectiveness factors

Sandra Furterer, Elizabeth A. Cudney, Ahmad Elshennawy, Philip Appiah-Kubi, Lakshmy Mohandas, Cori Mowrey & Chad Laux

This study aims to determine critical online teaching effectiveness factors from a student's perspective. The researchers collected and analyzed open-ended interview data using inductive coding to identify the themes and patterns. Nine main themes emerged from the interview data collected from the students by the research team.

Quantitative Preparation for Higher Education and Careers Success

Jay Stryker, B. Madhu Rao, Betty Thorne, John Rasp & Joseph M. Woodside

Elementary and High-School U.S. math scores for national and international assessments have continued to decline post-pandemic reaching multi-decade lows. This study seeks to review quantitative curriculum requirements in the context of AACSB-accredited schools, and ensuring students entering and completing college are prepared for academic achievement, learner success, and career success.

Teaching in Time of Pandemic – Case of EMET Program

Andrzej Gapinski

Instructor shares his experiences on university teaching in engineering program in the period of pandemic. The discussed teaching pedagogy covers delivering of engineering classes' contents using various ways that include synchronous and asynchronous methods, hybrid methodology with various level of mixture between face-to-face and online component.

Monday 2:00 PM Sessions

Nanomaterials & Nanoengineering

Session Co-Chair: Eylem Asmatulu, Wichita State University

Session Co-Chair: Ramazan Asmatulu, Wichita State University

Monday

2:00 PM – 3:30 PM

Investigating Mechanical Behaviours of Fire-Retardant Fiber Composites in Aggressive Aviation Fluids

Abdulhammed Hamzat, Md Shafinur Murad, Eylem Asmatulu & Ramazan Asmatulu

The objective of this study is to investigate the mechanical behaviours of the carbon fiber and glass fiber-reinforced polymeric composite prepreg laminates immersed in various aviation fluids for about 720 hours. The interlaminar shear strength studies indicated that the mechanical and other properties of the composites were considerably changed.

Investigating Mechanical and Surface Oxidation Properties of 3D Printed Ti6Al4V Alloys Produced by Direct Metal Laser Sintering Process

Fatih Altun, Emanuel Andrade, Eylem Asmatulu & Ramazan Asmatulu

The purpose of this work is to develop analytical procedures for studying the mechanical and oxidation properties of 3D printed Ti6Al4V alloys. In this study, titanium alloys were produced using a direct metal laser sintering process, and then the prepared samples were heat treated at elevated temperatures to analyze the surface oxidation and its effects on the mechanical properties. Test results indicated that the heat treatment process changed the micro and nanograin structures of the alloys and substantially changed the mechanical properties.

Investigating Fatigue Properties of Al 2024 Alloys after Coating via Alkaline and Acidic Pickling Processes

Md Shafinur Murad, Abdulhammed Hamzat, Eylem Asmatulu & Ramazan Asmatulu

The objective of this study is to investigate the fatigue properties of clad Al 2024-T3 aluminum alloy substrates after coating in alkaline and acidic pickling solutions. Substrate surface pre-treatment with a solvent and then both alkaline and acid pickling processes have been used to prepare the surface coatings at micron and nanoscales. Effects of surface coating and mechanical properties of Al alloys were investigated in detail.

Fabrication and Analysis of Highly Transparent and Robust Laminated Composite Films for Aerospace Applications

Selman Okmen, Enes Makaraci, Eylem Asmatulu & Ramazan Asmatulu

Transparent laminated composites find widespread use in aerospace and defense industries, such as aircraft cabins, canopies, vehicle windows, and face shields. This study is aimed at developing laminated composite layers and enhancing transparency, durability, and lightweight properties of these materials. In this study, various acrylic, polycarbonate and quartz laminated layers at micron and nanoscales are produced and tested against UV degradation, impact loads and wear tests.

Innovation Management

Session Chair: Rick Fernandez, 20-20 Innovation, Inc.

Monday

2:00 PM – 3:30 PM

An Overview of the new ISO 56000 Innovation Management Standards

Rick Fernandez & William Swart

The innovation process, like any process, can be managed. But it can benefit from standards. The International Standards Organization (ISO) is finalizing an international effort involving 54 countries to develop such a set of standards. In this presentation, these standards will be explained.

Experimental electrical power generation using salt water and electronic circuits.

Stephen Frempong

This paper is an experimental investigation on how salt water and electronic circuits can be used to generate electricity. Salt water is used to produce the initial small (dc) voltage, and it is amplified and coupled to an inverter circuit to produce (ac) voltage.

Investigating The Intangible Benefits of Employing Building Information Modeling on The Design and Construction Industry

Yahya Alassaf, Amirsaman Mahdavian & Amr Oloufa

Building information modeling (BIM) is a viable method and technology that can improve the design and construction processes. To understand the effect of BIM on the design and construction industry, a comprehensive survey that consists of a general questionnaire and expert interview was conducted. This study shows that among 41 identified BIM intangibles, 33 are autonomous, relatively disconnected from the system are not affected by or driving other factors.

Applying A Systems Engineering Framework and Tools to Model Food Insecurity

Sandy Furterer

As systems, technology and design become more complex, systems engineering design and modeling principles, tools and methods become more important. This study provides a framework for applying systems engineering tools and methods. The application modeled food insecurity across multiple concepts that were designed to reduce food insecurity.

Human Factors & Cognitive Engineering (A)

Session Chair: Deborah Carstens, Florida Institute of Tech

Monday

2:00 PM – 3:30 PM

Evaluating Gender-Based Effectiveness Within Multi-Attribute Task Battery Studies.

Esther Adeyemi & Sharon Bommer

This study challenges the prevailing belief that females excel at multitasking by scrutinizing cognitive abilities across varying demand scenarios. Analyzing performance in resource management, tracking, monitoring, and communication tasks using the U.S. Army Aeromedical Research Laboratory's simulation software. The findings advocate for a balanced understanding of cognitive abilities.

Perceived Stress for Pilots

Robin Aubry, Deborah Carstens & Michelle Hight

The purpose of the study was to survey student pilots and Certified Flight Instructors (CFI) using the Perceived Stress Scale (PSS) for its applications in categorizing perceptions of chronic stress (Cohen et al., 1983; Cohen, 1994). The survey findings, along with future research areas, are discussed.

Flight Lesson Cancellation Trends Based on Type: 2010-2019

Kaitlyn Glck, Yeonsoo Kim, Meredith Carroll, Brooke Wheeler & Vivek Sharma

This study used archival data to examine flight lesson cancellation trends from 2010-2019 by cancellation types at a Part 141 flight school in Florida. The linear regressions showed that all flight cancellation types (weather-related, student-related, instructor-related, and maintenance-related) have decreased from the years 2010 to 2019.

Machine Learning (ML) in Aerospace and Defense (A&D) Industries: A Systematic Literature Review

Lina Khan, Ahmad Elshennawy, Sandy Furterer & Beth Cudney

Machine Learning (ML) has made significant technical progress due to increased availability of larger data sets, more powerful computing performance, and greater budget allocations. This study provides a systematic review of published material on ML in Defense. The results emphasize the implementation of ML is deemed both threatening and promising.

Monday 3:45 PM Sessions

Education Leadership

Session Chair: Abdelnasser Hussein, University of Houston-Downtown

Monday

3:45 PM – 4:45 PM

Can High School Administrators Provide a Valid Explanation for the Lack of Parental Involvement?

Abdelnasser Hussein

Administrators and educators often encounter a variety of reasons why parents may not be as involved in their children's high school education as expected. This issue must be addressed from high school administrators' standpoint. The session explores three valid reasons participant administrators provided to rationalize and tolerate low parental participation.

Project Based Learning in the Juvenile Justice Educational System

Abdelnasser Hussein & M Catherine F Devine

In recent years there has been pronounced evidence of the ruptures in public education. The juvenile justice educational system is in place for students who have been removed from traditional educational. The contained nature of this alternative educational setting is fertile ground for Project Based Learning strategies and competitions.

Data Matters

Medhat Ali

"Data Matters" is a workshop emphasizing student growth. Covering data collection, analysis, and integration into lesson planning, it explores student-led conferences and RTI implementation. Participants will learn to use diverse assessment data, apply it in lesson planning, and utilize for tiered interventions to foster individualized student development at all Levels.

Business Analytics

Session Chair: John Wang, Montclair State University

Monday

3:45 PM – 4:45 PM

Exploring Nvidia's Evolution, Innovations, and Future Stock Trends

John Wang, Jeffrey Hsu & Zhaoqiong Qin

This paper undertakes a thorough examination of Nvidia's stock market performance, intertwining historical analysis with forward-looking projections to illuminate the dynamic trajectory of this semiconductor industry giant. Commencing with a retrospective review, the author delves into pivotal milestones, technological innovations, and strategic maneuvers that have shaped Nvidia's stock evolution.

Analysis of Tweets With #Vaccine Surrounding the Period of Covid-19 Vaccine Availability

Sue Abdinnour & Sesan Oluseyi Adeniji

This study analyzes the Tweets that included #Vaccine from October 2020 to April 2021. The analysis revealed a shift of sentiments about the Covid-19 Vaccine from skepticism to positivity. The results emphasize the role of effective communication in managing public perception about the vaccine and fostering trust during a crisis.

Tuesday 8:30 AM Sessions

Supply Chain Management & Logistics

Session Chair: Ewa Rudnicka, University of Pittsburgh

Tuesday

8:30 AM – 10:00 AM

A Unified Theoretical Basis for the Pedagogy of Two Supply Chain Optimization Techniques

Angela Tidwell & J. S. Sutterfield

Two widely used optimization techniques used in supply chain optimization are the transportation model and the assignment model. In this paper we examine the theoretical basis, give some practical examples of the underlying theoretical basis and provide some practical pedagogical examples for instruction.

(WIP) Digital Transformation through Six Sigma DMADV – Methodology within the Systems Engineering Plan Framework

Adam Carlton Lynch & Gary Brooking

This preliminary study aimed to explore the application of the Six Sigma methodology, specifically the Define, Measure, Analyze, Design, and Verify (DMADV) approach, in facilitating digital transformation within a Systems Engineering Plan (SEP) framework. The study considered the integration of these two methodologies to enhance digital transformation.

Strategic Development of Solid-State Batteries in the USA: Overcoming Industrial and Supply Chain Barriers

Md Saidur Rahman

This study examines the supply chain and industrial development of solid-state batteries (SSBs) in the USA, focusing on overcoming key challenges such as electrolyte conductivity, interface stability, and large-scale industrialization. It proposes strategies for technological advancement and supply chain optimization to facilitate the commercialization of SSBs in the American market.

Fast Fashion and the Supply Chain Sustainability

Ewa Rudnicka

In last 20 years, fashion manufacturing has doubled, and the consumption have increased by 400%. “Fast fashion” companies are high-volume production at the low cost that brought a negative impact on the environment, ethical sourcing, and the sustainability. The paper analyzes the sector’s efforts to be socially responsible and eco-friendly.

Healthcare Systems

Session Chair: Abdulaziz Abdulaziz, Wichita State University

Tuesday

8:30 AM – 10:00 AM

Increasing Empathy Through Technology in Undergraduate Nursing Students: Recommendations for Mental Health Education

Lauren L. Nilse & Veronica H. Sullivan

The auditory hallucination simulation (AHS) was created to help promote empathy for those experiencing mental health disorders. The Starr Auditory Hallucination Simulation states that empathy is imperative for nurses working in all areas of practice to prevent compassion fatigue and improve healthcare outcomes.

Emergency Management of an Unexpected Overdose in a Rural Setting: an Innovative Use of UAS Technology in Undergraduate Mental Health Nursing

Lauren L. Nilse, Veronica H. Sullivan & Azita Amiri

Unmanned aircraft systems (UAS) use in healthcare is an innovative approach for delivering emergency medical supplies to rural communities. UAS technologies can deliver supplies to areas where it may be unsafe or have inefficient resources.

Mathematical Models for Scheduling of Elective and Emergency Patients in the Operating Rooms

Musa Demirtas

Operating rooms (ORs) are important departments since they generate a significant portion of hospital revenues. Thus, two models are developed to schedule patients in ORs. Two sources of disruptions are considered in these models; (i) the arrival of unexpected emergency patients, and (ii) changes in the surgical durations.

Comparison of Emergency and Elective Operating Room Policies for Emergency Patients

Musa Demirtas

Hospitals have been researching effective scheduling techniques that will reduce costs and improve the quality of care delivered to patients. Thus, this study focuses on comparing emergency and elective room policies for emergency surgeries so that hospitals can decrease their costs while increasing the satisfaction of patients.

Human Factors & Cognitive Engineering (B)

Session Chair: Deborah Carstens, Florida Institute of Tech

Tuesday

8:30 AM – 10:00 AM

Measuring Willingness to Fly Onboard Aircraft Equipped with Two Pilots, a Single Pilot, and a Single Pilot with Artificial Intelligence

Dillon Hanrahan, Andrew C. Angelo, Jeremy S. McFarland, Vivek Sharma & Brooke E. Wheeler

Passengers' Willingness to Fly was examined for three commercial aircraft configurations: two pilots with traditional automation, single pilot with traditional automation, and single pilot with artificial intelligence (AI). Amazon MTurk participants expressed no difference in willingness, which indicates consumers are open to traveling with one pilot and/or AI.

Effect of worker fatigue accumulation on economic production quantity

Mohammed Darwish

One of the assumptions in deriving the Economic Production Quantity (EPQ) model is the performance of worker is 100% during the workday. Usually, worker performance deteriorates with time. We develop a model that modifies the EPQ model such that worker fatigue accumulation and recovery are included in the EPQ model.

Artificial Intelligence & Aviation: Content Analysis of Research Publications from 2013-2023

Victor E. Morales, Jose Sanchez, Jonathan Escalera, Brooke E. Wheeler & Vivek Sharma

Annual rates of "AI and Aviation" publications were collected from the Advanced Technologies & Aerospace Database (ATAD). The regression model indicated a significant positive trend in aviation AI publications from 2013 - 2023. This trend highlights the increasing relevance and importance of AI within the industry.

Annual Wildlife Strike Rate by Damage Category in the U.S. from 2013-2022

Malek Alharbi, Catie Meechan, Vivek Sharma & Brooke E. Wheeler

We gathered FAA (2023) data on wildlife strike reports in the US by types of damage to the aircraft and concluded that the "none" damage category had more annual wildlife strikes than the minor, undetermined, substantial, and destroyed categories.

Tuesday 10:00 AM Sessions

Marketing

Session Chair: Scott Swain, Clemson University

Tuesday

10:00 AM – 12:00 PM

Electricity Deregulation and the Market for Nuclear Power

Stephen Dansky & B. Andrew Cudmore

A model is proposed linking debt and equity financing to revenue risk within the context of electricity deregulation. Analysis provides support for the negative effect of deregulation on nuclear plant financing, thereby limiting nuclear power as an option to reduce greenhouse gases within deregulated markets.

Product Durability as a Sustainability Alibi for Luxury Purchases

Scott D. Swain, Ananya Bakre & B. Andrew Cudmore

Consumers often perceive luxury goods as wasteful, irrational, or materialistic. However, such goods are often superior with respect to product durability, thereby offering a potential alibi for purchasing in the name of sustainable consumption. This research explores conditions in which consumers use product durability to justify luxury purchases.

Process or Purity? The Impact of Analogous Reasoning on Consumers' Choices among Foods Labeled as NonGMO, Organic, and Natural

B. Andrew Cudmore, Scott D. Swain & Stephen Dansky

Consumers often rely on nutritional labels when choosing food products. Yet information asymmetry leaves many consumers skeptical. This study examines the effects of encouraging analogous reasoning on consumers' choices among foods designated as NonGMO, Organic, or Natural. The results shed light on consumer responses to "purity" versus "process" nutritional labeling.

How Movie Trailer Length and Plot Revelation Impact Consumer Anticipation: The Mediating Roles of Arousal and Pleasure

B. Andrew Cudmore & Scott D. Swain

This research finds that shorter (versus longer) movie trailers that reveal more (versus less) of the plot reduce consumers' anticipation for upcoming movies. Further analyses show that these effects are mediated by the emotions of arousal and pleasure. Trailer design suggestions are offered.

Artificial Intelligence & Machine Learning

Session Chair: Hongsheng He, University of Alabama

Tuesday

10:00 AM – 12:00 PM

Bridging Minds and Machines: A Common Reality Based Human-Robot Collaboration Platform

Sai Lakshimi Jashti, Fujian Yan & Hongsheng He

Human-robot collaboration attracts increasing interest, but it is challenging for robots to understand complex environments and unstructured commands from humans. This paper proposes an HRC platform that bridges human workers and robot teammates via an interface surface that can control robots, display robots' intentions, and comprehend humans' commands.

Integrating Advanced Language Models and Vector Database for Enhanced AI Query Retrieval in Web Development

Xiaoli Huan & Hong Zhou

Leveraging state-of-the-art technologies, the framework enhances web query relevance. This synergistic use of advanced AI models leads to a more efficient, user-friendly query system, marking a significant advancement in web development.

Matching Workloads to Systems with Deep Reinforcement Learning

Bing Hu & Nicholas Mason

Assigning workloads to systems best suited to run them is a challenging problem. We propose two deep reinforcement learning approaches. Experimental results show that both approaches can find an optimal system configuration for a given workload with a desired performance objective.

Quality Planning & Process Improvement (B)

Session Chair: Roger Merriman, Wichita State University

Tuesday

10:00 AM – 12:00 PM

Human-Centric Quality Management in Industry 5.0: Bridging People and Technology in Digital Manufacturing

Johnson Olajide Olaitan & Ahmad Elshennawy

This article explores the needs for reconfiguring Quality Management Systems for the digitalized manufacturing industry by incorporating human-focused strategies and innovations from Industry 5.0. It highlights the vital collaboration between people and technology in establishing Quality 5.0 systems, which represents a significant improvement in quality management since the Industrial Revolution.

Sustainable Energy Management Policy in Developing Countries

Nirajan Mani & Sanjay Kaul

By conducting extensive literature reviews, this paper identifies the challenges in the energy management, and also addresses various policy and planning concerns in developing countries. It also discusses the effective strategy for the implementation of energy efficiency and conservation policies and programs.

Six Sigma Certifications – Comparison of Popular and Available Certification Options

Christopher Kluse

Six Sigma certification remains as a popular credential among many quality professionals. With the vast number of options available, a comparison of these options is needed since cost, duration and curriculum varies significantly among the certification options. The paper will serve as a guide to selecting an appropriate certification option.

Use of Statistical Control Methodology in Flight Testing of RNP-AR Navigational Performance Testing

Roger Merriman & Ben Ewoldt

This paper explores the integration of Statistical Control methodologies in the context of Required Navigation Performance Authorization Required (RNP-AR) flight testing. The findings of this research demonstrate that an aircraft has sufficient performance to complete an RNP approach and offer insights for the development and certification of RNP-AR capabilities.

Measuring Food Safety Culture in Food Manufacturing through different metrics

Rita Baeza & Christopher Kluse

The Food Industry experiences food safety challenges and recalls; the practices related to Quality and Food safety culture impact these results. This paper will evaluate the application of existing models to measure food safety culture through performance metrics and maturity matrix scores in a multi-site food manufacturing plant company.

Tuesday 1:30 PM Sessions

Automation, Modeling, and Simulation

Session Chair: Andrzej Gapinski, Penn State University

Tuesday

1:30 PM – 2:30 PM

Control Systems in EVs

Andrzej Gapinski

The purpose of this paper is to review the integrated control systems in current electric vehicles. These control systems encompass a variety of sensory devices, regulated motor-drive system, and battery control system among the most important ones. Technological obstacles and present challenges including production supply chain issues are addressed.

Three-Statement Financial Modeling, employing Monte Carlo Simulation

Adam Carlton Lynch, Pedro Cordeiro Povoa Cupertino, Daniel Ikechukwu Chikwendu, & Sivaganeshwar Subramaniam

This project considers three-statement financial models in three distinct manufacturing sectors with the aim of demonstrating methods to increase flexibility and reduce risk for manufacturing organizations.

Case Study: Digital Transformation in a Job-Shop Environment

Clovis Ribas & Abdulaziz Abdulaziz

Digital transformation design and implementation were performed in a job shop production plant to improve machine performance and increase flexibility. A systematic approach was followed to collect data and make appropriate decisions. The study aims to highlight the potential of digital transformation as a viable strategy in a job-shop environment.

Lean Systems

Session Chair: Deepak Gupta, Wichita State University

Tuesday

1:30 PM – 2:30 PM

Integrating disparate data sources using IIOT 4.0 technologies to enhance operational performance of Dynamic Value Stream Maps

Adam Carlton Lynch, Kiran Kumar Dasaram

This study explores that application of Lean tools in a factory producing wobble and skeet trap machines for the sport shooting industry and the resulting improvements in operational efficiency and financial performance.

The Successful Implementation of LHE Depends on What Happens During the Rapid Improvement Event: A Framework for Understanding and Improvement

Christopher Kluse

Not all Rapid Improvement Events (RIE) are successful. This research paper explores how the steps taken before, during, and after the execution of a RIE can influence the failure, suboptimal implementation, or overall success of this common application of Lean principles and practices in the Higher Education environment.

Lean Strategies in Blood Collection: Optimization with Simulation

Saurabh Sanjay Singh, Deepak Gupta & Vijay Anand

This study leverages Simio, an object-based simulation software, to streamline blood collection drives by identifying bottlenecks. Simio's analysis enables the crafting of leaner, more impactful management strategies, enhancing the operations' efficacy and fluidity. Such simulation capabilities emerge as a powerful instrument for continuous improvement, increasing efficiency of these vital operations.

Sustainability & Industry 4.0

Session Chair: Mehmet Yildirim, Wichita State University

Tuesday

1:30 PM – 2:30 PM

Barriers to safety program implementation in the aerospace industry

Mohand Asiri & Mohammed AlAwadh

This study aims to explore and identify the barriers hindering safety program implementation in the aerospace industry. The study uses the Scopus database. Subsequently, the analytical hierarchy process (AHP) is applied for barrier intensity and ranking. This study prioritizes five barriers that hinder safety program adoption in aerospace.

The evolution into Customer 4.0: A systematic literature review

Cintia Z. Buffon, Ahmad Elshennawy & Elizabeth A. Cudney

As markets evolved into a globalized system, customers changed their behaviors. Organizations must adapt their customer relationship management in the context of evolving expectations. This research aims to provide a systematic literature review of the evolution of customer concepts focusing on Customer 4.0 in the digital era.

Optimization Model for Combined Photovoltaic and Battery Systems for Grid Interconnection

Mehmet Bayram Yildirim & Ashfaque A. Mohib

This paper proposes an optimization model to promote renewable energy and reduce dependence on fossil fuels for electricity generation. The model used linear programming to identify optimum photovoltaic and battery storage system combinations. The study has potential benefits for researchers and utility managers striving for a sustainable future.

Critical Success Factors for Implementing Industry 4.0 in Aerospace and Defense (A&D): A Systematic Literature Review

Lina Khan, Ahmad Elshennawy, Sandy Furterer & Dr. Beth Cudney

Provides a systematic review of published material on Industry 4.0 in A&D to understand critical components needed for successful implementation of smart technologies. The results also emphasize the need for empirical evidence related to implementation of Industry 4.0 and the lack of papers studying Industry 4.0 in A&D settings.

Tuesday 2:45 PM Sessions

SID Talk (undergraduate students only)

Session Chair: Farah Weheba, Robin Hood Foundation

Tuesday

2:45 PM – 4:00 PM

Nitrogen Storm Drain Filter

Ishaan Samantray & Swagatika Swain

The project addresses nitrogen pollution in the Chesapeake Bay. Urbanization and agriculture increase nitrogen runoff, causing harmful algae blooms and low-oxygen dead zones. Testing Cellulose Acetate filters through reverse osmosis, the study found a 50% average reduction in nitrogen levels, indicating their effectiveness in preserving the bay's aquatic ecosystem.

Using Pressure Sensors and Finite Element Analysis to Simulate Pressure Distribution in Biomedical Applications

Muhammad Mahdi NabiZadeh & Alexandra Schonning

Foot pressure distribution, acquired for a female subject in standing position using a Tekscan HRF Scan mat, is applied to a finite element model created from computed tomography data obtained from the National Institutes of Health Visible Human Project. Detailed methodology of data acquisition and CAD/FEM modeling is presented.

Blending Learning and AI: A Teen's Journey in Autonomous Robotics at the World Robotic Olympiad

Evan Girard-Sun

I will share my journey of employing AI in Autonomous competition at the World Robot Olympiad. My talk seeks to understand how AI is reshaping the educational experiences of young learners like myself. Through my story, I aim to explore the balance between traditional learning and AI's revolutionary role.

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