APRIL
7-8
2025

PROGRAM

OF THE INTERNATIONAL CONFERENCE ON INDUSTRY, ENGINEERING & MANAGEMENT SYSTEMS

IEMS
2025

#31

DEAR FRIENDS AND COLLEAGUES...

INDUSTRY ENGINEERING &
MANAGEMENT SYSTEMS CONFERENCE

APRIL
7-8
2025

On behalf of the IEMS Executive Board, it is our pleasure to welcome all of you to the 31st 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 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 the 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 2025 CONFERENCE CHAIR

KEYNOTE SPEAKER

MARK J. ANDERSON

ENGINEERING CONSULTANT,
STAT-EASE, INC.
WWW.LINKEDIN.COM/IN/MARKSTAT/

APRIL 7
12:45 PM

MULTIFACTOR DESIGN OF EXPERIMENTS (DOE) FOR RAPID PROCESS IMPROVEMENT

This talk provides a briefing on statistical design of experiments (DOE) for rapid and effective screening, characterization and optimization of factors affecting process efficiency, quality and reliability. It covers a broad range of DOE tools, including factorial design and response surface methods (RSM). Industrial engineers tasked with process improvement will benefit greatly by learning how to make the most from every experiment via these multifactor testing methods.

ABOUT

MARK IS AN EXPERIENCED CONSULTANT AND WIDELY PUBLISHED AUTHOR FOR THE CAUSE OF CONTINUOUS QUALITY IMPROVEMENT, PARTICULARLY VIA THE MULTIFACTOR TESTING METHODS OF STATISTICAL DESIGN OF EXPERIMENTS. HE OFFERS A DIVERSE RANGE OF EXPERIENCE IN PROCESS DEVELOPMENT, QUALITY ASSURANCE, MARKETING, PURCHASING, AND GENERAL MANAGEMENT. HE IS A PROFESSIONAL CHEMICAL ENGINEER, CERTIFIED QUALITY ENGINEER, MBA AND AN ENGINEERING CONSULTANT AT STAT-EASE, INC.

INDUSTRY ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

1 zoom link
Monday April 7th

Eastern Time (ET)	Sundial 4th Floor	Cardita 5th Floor	Conch 6th Floor
8:30 am – 10:00 am	Engineering Innovations	Supply Chain Management & Logistics	Human Factors & Cognitive Engineering (A)
10:15 am - 12:15 pm	Quality Planning & Process Improvement (A)	Artificial Intelligence & Machine Learning	Production, Operations & Construction Management
12:15 pm - 2:00pm Island 2-1st Floor	**Lunch & Learn** Keynote Speaker Mark J. Anderson Multi-factor Design of Experiments for Rapid Process Improvement		
2:00 pm - 3:30pm	Management of Technology	Automation, Modeling, & Simulation	Human Factors & Cognitive Engineering (B)
3:45 pm - 5:00pm	Quality Planning & Process Improvement (B)	Marketing	Business Analytics

2 zoom link
Tuesday April 8th

Eastern Time (ET)	Sundial 4th Floor	Cardita 5th Floor	Conch 6th Floor
8:30 am -10:00am	Additive Manufacturing (A)	Lean Systems	
10:15 am -12:15 pm	Additive Manufacturing (B)	Energy Engineering & Sustainability	Education Leadership & Training
12:15 pm - 1:45 pm Island 2-1st Floor	**Lunch** AIEMS Member Meeting		

Monday 8:30 AM Sessions

Engineering Innovations

Session Chair: Bassam Jaradat, Wichita State University

Monday
8:30 AM– 10:00 AM

SAP ERP for Supply Chain Resilience: Cargill's Post-COVID Adaptation

Bassam Jaradat, Gamal Weheba

This paper examines the role of Enterprise Resource Planning (ERP) systems such as SAP in mitigating supply chain risks within Cargill's protein business post-COVID. It explores how SAP S/4HANA enhances supply chain visibility, supplier risk management, demand forecasting, and compliance in meat and poultry production. By analyzing Cargill's ERP-driven strategies, this study provides insights into building resilient, efficient, and sustainable protein supply chains in a rapidly evolving global market.

Concepts For a New Cyber-Physical System: Addressing National Defense Challenges in UAV Operations

Adam Lynch, Pedro Cordeiro Povoa Cupertino

This research introduces Cyber-Physical System for defense UAVs. Based on DOD research, the solution improves UAVs. The solutions include KEEN, integrating and aligning the design with needs. Costs, suppliers, equipment, and compatibility with existing UAVs were analyzed. The Gantt Chart deploys in phases considering manufacturability and cost. This research explores financial and operational benefits to DoD UAVs. Combining systems engineering and KEEN, this research baselines CPS challenges in defense UAVs.

Financial Evaluation of a Battery Energy Storage System as an Integrated Resource in Electric Power System Grids

Anyama Tettey, Hieu Pham

This work proposes Battery Energy Storage Systems (BESS) as cost-effective assets in the distribution subsystem of United States Power System Grids for grid resiliency during extreme demand scenarios. A cost-benefit analysis is carried out to ascertain the financial viability of such a project.

Supply Chain Management & Logistics

Session Chair: Ewa Rudnicka, University of Pittsburgh

Monday
8:30 AM– 10:00 AM

Examining Modal Shift in Japan's Logistics

Yutaka Shirai, Hiroyuki Ono

This study considers a modal shift from truck transportation to rail container transportation and ship transportation in Japan's logistics. The analysis includes calculating the three factors of distance, time required and freight rates for truck transportation, rail container transportation and ship transportation, and it clarify the effectiveness of modal shift by section.

Industry 5.0 Attributes for Successful Implementation in Aerospace and Defense: A Systematic Literature Review

Rena Lewis, Ahmad Elshennawy

Industry 5.0 is making its rounds around the academic community. Its technological overlap with Industry 4.0 further increases questions related to the objective and impact of industry 5.0. This systematic literature review conducts a deep dive into literature to obtain an understanding of Industry 5.0 and its core values.

Enhancing Vehicle Routing Efficiency for a Turkish Distributor Using Metaheuristic Algorithms

Ahmad Bassaleh, Ekrem Duman, Mehmet Yildirim

Rising transportation costs and evolving customer requirements highlight the need for efficient logistics. This project addresses a cold routing problem for a Turkish distributor via a new mathematical model and metaheuristic solutions. A two-stage approach is implemented, resulting in a 4.93% reduction in operational costs, outperforming the distributor's existing plan.

The Circular Supply Chains in the Electronics Industry: A Comparative Look at Apple and Fairphone.

Ewa Rudnicka

Circular supply chains aim to extend product lifecycles by integrating processes like recycling, remanufacturing, and designing for reuse which minimizes the environmental footprint of supply chain operations. Forward-thinking companies like Apple, and Fairphone have become leaders in integrating circular economy principles into their operations. The paper seeks to highlight the different approaches to circularity and how these strategies affect their respective supply chains and overall business models.

Human Factors & Cognitive Engineering (A)

Session Chair: Deborah Carstens, Florida Institute of Technology

Monday
8:30 AM– 10:00 AM

Cloudy Views: Collegiate Flight Students Employability Rating of CFI Applicants by Experience & Gender

Brooke Wheeler, Kaylee Crispe, Esther Wilson

This study used standard survey methodologies to examine aeronautic student employability ratings for flight instructor candidates. There was a difference in employability by scenario. Scenarios with high flight time were rated higher than those with low flight time, but there was no difference with gender.

Airport Green Behavior: Intention and Action

Navya Nikhita Agasam, Deborah Carstens

A critical review of literature based on user acceptance and use of technology theories has been conducted. After analyzing various studies, the significance and scope of varied sustainability research are identified. The analysis includes research in the aviation, finance, and information technology sectors.

Next Generation In-Situ Resource Utilization Pilot Excavator Control Room and Facility Design

Deborah Carstens, Jason Schuler

Interviews were conducted with control room operators for NASA's In-Situ Resource Utilization (ISRU) Pilot Excavator (IPEx). IPEx is a robotic excavator designed to mine and transport lunar regolith. The interview findings resulted in fifty recommendations for designing the Next Generation IPEx control room and facility.

Monday 10:15 AM Sessions

Quality Planning & Process Improvement (A)

Session Chair: Roger Merriman, Wichita State University

Monday
10:15 AM – 12:15 PM

Applications of Time Series Analysis to Wildlife-Vehicle Collision Data

Saleh Ateiwi, Gamal Weheba

Wildlife-vehicle collisions (WVCs) in the U.S. cause significant human and economic losses annually. This study applies time-series analysis to identify temporal patterns and contributing factors of WVCs, providing insights for effective mitigation strategies. The findings aim to inform policy decisions and improve road safety measures.

Application Of Group Control Chart for Multiple Stream Process of Aerospace Part Manufacturing – A Case Study

Clovis Ribas, Pedro Casagrande

The use of group control charts (GCC) in manufacturing processes where identical products are delivered by multiple streams is desirable. This work uses a proposed solution for a component of the aerospace industry. Adjusted control limits for variable correlation and other factors specific to the application are presented and discussed.

SoftQSq App for Measuring Software Quality In-Use

Firas Shahin, Bassam Jaradat

This paper introduces a novel framework designed to measure software quality in use and deliver objective results. To support this framework, a web application, SoftQSq, was developed to assist users in evaluating software quality in alignment with the ISO/IEC 25022 standard. A case study is included, demonstrating the measurement of effectiveness, efficiency, and user satisfaction in selected software.

3D Printing: The New Six Sigma Tool

Roger Merriman, Gamal Weheba

3D printing has advanced significantly, offering customization, reduced setup time, and lower energy/material use. It's beneficial in manufacturing, aerospace, medical, and construction industries, aligning with Six Sigma goals. The presentation highlights the integration of 3D printing into Six Sigma projects and training programs through demonstration of experiences from world-class companies.

Artificial Intelligence & Machine Learning

Session Co-Chair: Hongsheng He, University of Alabama
Session Co-Chair: Fujian Yan, Wichita State University

Monday
10:15 AM – 12:15 PM

Real-Time Grasping Force Estimation and Stability in Industrial Robot Gripper

Yimesker Yihun, Amanuel Tereda, Safeh Mawah

This study presents the design of a cost-effective, adaptive industrial gripper integrated with a UR5 robotic arm. Utilizing a four-finger configuration for enhanced strength and flexibility, it employs an Arduino-based real-time system identification to optimize grip force based on object weight, size, and shape. Grasp stability is ensured through dynamic and static analyses, alongside experimental validation using force sensors, enabling secure object manipulation during complex maneuvers.

Hierarchical Multi-Agent Reinforcement Learning for Scalable Robot Teaming in Mars Exploration

Fujian Yan, Sejun Moon

This study addresses Mars exploration challenges by proposing a hierarchical Multi-Agent Reinforcement Learning (MARL) method for scalable robot teaming. The approach reduces computational complexity by organizing agents into layers, with strategic decisions at higher levels and tactical execution at lower levels. The method is evaluated in a ROS 2 environment.

Touching Detection for Common Reality Based Human-Robot Collaboration Platform

Fujian Yan, Chandra Parasa

This research enhances the Common Reality human-robot collaboration platform by improving touch detection on an interactive surface. Designing a deep learning model based on VGG-16, it tackles challenges like noisy lighting, enabling robust fingertip detection. The platform is tested in simulated and real-world environments for effective human-robot interaction.

Process Optimization through AI-Driven Quality Management Systems: A Future Perspective

Johnson Olaitan, Ahmad Elshennawy

AI-driven quality management systems revolutionize manufacturing by enabling real-time monitoring, predictive analytics, and automation, surpassing traditional QMS reliant on post-production checks. This approach reduces defects, optimizes processes, and enhances operational efficiency, setting new standards for quality control and driving innovation in manufacturing.

Application of Artificial Intelligence in Business Operations – A Systematic Literature Review (SID Talk)

Jana Orief

The reliance on Artificial Intelligence (AI) has become not just a strategic objective but a survival imperative. Companies are restructuring themselves around AI. This study provides a systematic literature review of the use of AI in business operations to examine the benefits and limitations of the technology, as well as identify gaps for future research.

Production, Operations & Construction Management

Session Chair: Sandra Furterer, Ohio State University

Monday
10:15 AM – 12:15 PM

Critical Review of Legal Challenges and Disputes in Construction Industry

Nirajan Mani

The paper discusses challenges and causes of disputes in vertical and horizontal construction projects. Through an extensive literature review, the paper identifies and categorizes the most common legal issues encountered in construction projects and underlying causes of these disputes. The authors ranked the factors based on their frequency and impact in the industry.

Crisis Management at Norwegian Cruise Line Holdings: Did Stratospheric Executive Pay Raises Undermine Employee Motivation and Firm Performance?

Tony Lewis

This case study assesses leadership at Norwegian Cruise Line Holdings during the COVID-19 crisis. Facts presented encourage readers to consider whether unusually high COVID-era executive pay increases contributed to long-term lagging performance. The relationship between executive compensation and managers' ability to apply servant leadership principles or communicate authentically is explored.

AI-Driven Project Management: Challenges and Opportunities

Abdelhakim Al Turk, Lisa Onyao, Jovan Zivak

Project management (PM) has undergone significant transformation with the advancement of artificial intelligence (AI), which has introduced new capabilities for managing complex projects and streamlining processes. This paper aims to explore the evolving role of AI in PM, highlighting key opportunities and obstacles for effective adoption. This paper will address the successful integration of AI into PM by examining real scenarios that have occurred in various companies.

Evaluating the Impact of Airport Design and Operations on the Efficiency of Part 139 Certificated Airports in the South and Southeast United States

Vivek Sharma, Shaun Kelly, Gia Kashyap

Several studies in the past have explored the relationship between various airport related variables and operations. This study delves into the impacts of airport design, runway characteristics, services, classifications, and comprehensive data sets on the operational volume of Part 139 certificated airports in the United States by Employing hierarchical regression model.

Critical Success Factors in New Product Development

Ahmad Elshennawy, Elizabeth Cudney, Sandra Furterer

This study explored critical success factors for new product development through a global multi-industry survey analyzed using the Kruskal-Wallis test. It identified 17 key factors in two groups: front-to-end execution (inputs, outputs, and conversion methods) and supporting elements (leadership, empowerment, accountability, and organizational knowledge).

Monday 2:00 PM Sessions

Management of Technology

Session Chair: Gordon Arbogast, Jacksonville University

Monday
2:00 PM – 3:30 PM

The Impact of Investment Amount and Timing on Startup Success

Yooneun Lee, KwangWook Kang, Byunghoon Kim

This study examines how investment timing and amounts affect startup success, measured by IPOs, acquisitions, and major funding rounds, in US semiconductor companies. Using logistic regression and survival analysis on a panel dataset, the research provides insights for investors, entrepreneurs, and policymakers while contributing empirical evidence to venture finance literature.

Key Uncertainties in Jira Meetings and their Implications for Organizational Structuring

Paul Nugent

This paper is an ethnographic analysis of Agile methodology (Jira) meetings at a large defense contracting company. Uncertainties expressed by engineers in the Jira status meetings promise to reveal important shifts in social structure and power.

Evolution of Employee 4.0: Perspectives on Technology in the Hospitality Industry

Scott Hall, Ahmad Elshennawy

This study investigates the evolution of Employee 4.0 within the hospitality sector, focusing on professionals' experiences. While few highlighted technology, those who did expressed fear over job displacement. Contrarily, external participants saw technology as a success enabler. The article analyzes these divergent perspectives and discusses implications for the industry's future.

Leveraging AI for Effective Decision-Making in Leadership

Gordon Arbogast, Shabaz Khan, Arpita Jadav

This research examines how AI can be utilized by leaders in decision making. The research emphasizes the significance of having comprehensive training and access to resources, a well-defined AI adoption strategy, investing in AI talent, being transparent, and tackling challenges related to efficiency and data analysis accuracy.

Automation, Modeling, and Simulation

Session Chair: Andrzej Gapinski, Penn State University

Monday
2:00 PM – 3:30 PM

Monte Carlo Analysis in Engineering Design

Wei Zhan

In engineering designs, one must deal with variations in the design parameter. To make sure the design works with these variations, Monte Carlo Analysis can be used. An example will be used to illustrate how to apply this methodology in design of a low pass filter.

A Comprehensive Workflow for 3D Reconstruction of the Female Knee from CT Data

Alexandra Schonning, Jake Allan

This study presents a workflow for modeling female knee anatomy using CT scan data and advanced software tools, Mimics and Geomagic Wrap. The process involves segmenting bones, refining geometry, and generating accurate 3D models for applications in biomechanics, prosthetics, and orthopedic research. Challenges and solutions in model creation are discussed.

Economic Evaluation of an Electromechanical Facility

Adam Lynch, Sivaganeshwar Subramaniam

The demand for high-quality electromechanical components continues to increase in industries like aerospace. This study examines the valuation of an electromechanical startup facility using engineering economy as part of an integrated financial model. The KEEN framework is considered as part of the theoretical assessment in understanding risk and volatility.

MEMS Devices in Control Systems

Andrzej Gapinski

The MEMS devices underwent a quite dramatic development in recent decade due to progress in the design and manufacturing processes and found widespread adoption and use in a variety of applications. The MEMS devices and sensors due to their nature offer a unique interdisciplinary learning opportunity to students. The paper investigates the role of MEMS devices in control systems.

Human Factors & Cognitive Engineering (B)

Session Chair: Deborah Carstens, Florida Institute of Technology

Monday
2:00 PM – 3:30 PM

Trust in Automation: Examining the Relationship with Decision-making among Adult Drivers in the United States

Gia Kashyap, Vivek Sharma, Kendall Carmody

This study investigates the relationship between trust in automation and decision-making among drivers in the United States. With human error causing 93% of U.S. crashes, understanding the effect of trust in automation on decision-making is essential. Results from a sample of 174 drivers reveal a significant positive effect, emphasizing the need for reliable automated systems in fostering safer driving practices.

Investigating The Relationship Between Population Density Surrounding an Airport and Wildlife Strikes Per Operation

Alexandra Rowe, Brooke Wheeler, Daniel Alves

This study compared the relationship between population density surrounding an airport and reported wildlife strikes per operation. A very weak correlation with no statistical significance was determined which emphasizes the need for future research on wildlife mitigation strategies and understanding wildlife patterns.

Effect of Pilot Mental Health on Passenger Willingness to Fly

Isabella Deloach, Brooke Wheeler, Vivek Sharma

This study explored how passengers' willingness to fly is affected by the mental health condition of pilots, providing insight into public perception of the mental health condition of pilots. Results showed significant differences between all scenarios except the medication scenario vs. therapy scenario.

Monday 3:45 PM Sessions

Quality Planning & Process Improvement (B)

Session Chair: Roger Merriman, Wichita State University

Monday
3:45 PM – 5:00 PM

Measuring Calibration of Internal Food Safety Auditors in a food manufacturing plant

Rita Baeza

Food safety audits are essential to identify risks and build a strong food safety culture in a manufacturing plant. The internal food safety audit is a continuous improvement tool or as preparation for certifications. Food safety audits could be less effective if the auditors are not proficient in them. This paper will evaluate how to measure the calibration of a group of internal auditors with different internal auditor experience levels.

Applying Model-Based Systems Engineering Models for Enhancing Operational Excellence

Sandra Furterer

Model-Based Systems Engineering tools can enhance operational excellence efforts. The goal of this presentation is to demonstrate how some of the SysML tools (activity diagram and use cases) can connect to process mapping and functional decomposition diagrams for enhancing operational excellence.

Implementation of Kano Model in Healthcare Setting: A Review

Mehrnoosh Saeyan, Ahmad Elshennawy, Elizabeth Cudney

This article reviews the application of the Kano model in healthcare (2017–2025) to enhance patient satisfaction and service quality. While the model effectively prioritizes patient needs, challenges such as cultural differences and methodological gaps persist, highlighting the need for further research to maximize its effectiveness.

Marketing

Session Chair: Scott Swain, Clemson University

Monday
3:45 PM – 5:00 PM

Artificial Intelligence Usage and Effects on Critical Thinking in Higher Education

Kyle Woodbine, B. Andrew Cudmore, Christian Sonnenberg, Scott D. Swain

This study examines the impact of AI-enhanced learning on critical thinking in higher education. By comparing AI and non-AI learning methods through multiple-choice and open-ended questions, the research explores how AI affects students' problem-solving skills. Findings suggest AI may hinder critical thinking, especially when open-ended questions are used.

Online Shopping Cart Abandonment: Retargeting and Conversion Methods

Peter Voltaire, B. Andrew Cudmore, Scott D. Swain

This research examines causes of online shopping cart abandonment and evaluates retargeting strategies to recover sales. Specifically, it tests the effectiveness of different urgency cues (e.g., stockout notices and discounts) for boosting conversions. The findings inform digital marketers and e-commerce businesses who seek to minimize abandonment and optimize retargeting.

Digital Detox and Nature Immersion as Drivers of Consumer Well-Being and Brand Loyalty in Hospitality Settings

Maitri Patel, B. Andrew Cudmore, Scott D. Swain

This research examines the potential effects of digital detox and nature immersion on consumers' well-being (mindfulness, stress reduction, and psychological benefits) and brand loyalty in hospitality settings. Using an experimental design to isolate the separate and combined effects, we generate relevant insights for wellness-focused hospitality strategies.

Business Analytics

Session Chair: John Wang, Montclair State University

Monday
3:45 PM – 5:00 PM

The Role of Big Data in Enhancing the Successful Application of Disruptive Technologies in Manufacturing: A Literature Review

Rena Lewis, Ahmad Elshennawy, Beth Cudney

Emerging as a disruptive technology, the utilization of Big Data as a soloist or side kick to enhance business practices, morale, engagement, profitability along with other factors has become a common interest. This article reviews literature assessing how big data is defined and its utilization in manufacturing.

Trends in Medicaid Beneficiary Growth: A Machine Learning Perspective

John Wang, Jeffrey Hsu, Bin Zhou

This study leverages machine learning models to analyze historical Medicaid enrollment data, identifying key trends and forecasting future beneficiary growth. By examining the relationships between socio-economic variables, policy changes, and enrollment dynamics, this research offers data-driven insights to support policymakers in optimizing healthcare resource allocation and anticipating evolving demands.

Creating an Analytics Certificate Program to Enhance Experiential Learning

Frederick Augustine, Joseph Woodside, William Sause

As increasing the experiential learning content of curricula is a strategic focus for many universities, we must create experiential opportunities for students that are meaningful, distinctive, and rewarding. This paper offers an example of an Analytics Certificate program which offers students the opportunity to earn an experientially oriented certification.

Tuesday 8:30 AM Sessions

Additive Manufacturing (A)

Session Chair: Abdelhakim Al Turk, Kent State University

Tuesday
8:30 AM– 10:00 AM

Improving Post-Sale Support and Customers Satisfaction with Additive Manufacturing

Qiushuang Guan, Abdelhakim Al Turk

This study investigates the potential of additive manufacturing (AM) to transform after-sales services by enabling on-demand spare parts production, thereby reducing repair lead times and inventory costs. The research examines the inherent challenge of conventional manufacturing methods. It evaluates AM's potential to address these challenges while introducing new operational considerations. Qualitative case studies are incorporated to further illustrate the improvements in service quality and the challenges encountered during AM integration.

The Future of Safe Manufacturing, Additive Manufacturing Cuts Occupational Hazards

Kartik Modi, Wyatt Burke, Abdelhakim Al Turk

Additive Manufacturing (AM) is a relatively novel manufacturing field when compared to subtractive manufacturing or other traditional manufacturing techniques. From the vast amount of research done on the subject, it has been widely determined that AM is associated with fewer occupational hazards than many other manufacturing methodologies. In this paper, the industrial adoption of AM in regard to decreasing the number of occupational hazards in traditional manufacturing will be discussed.

Reducing Return Rates and Improving Product Fit Through Additive Manufacturing

Asantha Dissanayake, Akshar Patel, Kaustav Kesher, Abdelhakim Al Turk

This paper discusses the role AM in reducing return rates and increasing customer satisfaction by providing a comprehensive literature review of case studies. This research includes examples of companies that have applied this technique. This paper explores methodologies for analyzing customer data, scaling AM, and future potential strategies aimed at reducing return rates.

Innovations in Powder Materials for Binder Jetting

Abdelhakim Al Turk, Gamal Weheba

Additive Manufacturing (AM) is a form of layered manufacturing technique. Among its various methods, the binder jetting technique was one of the earliest AM applications. This paper provides a comprehensive review of the progress made in powder material development for binder jetting systems. This study highlights the progress and challenges in optimizing binder jetting parameters for construction industry applications.

Lean Systems

Session Chair: Adam Lynch, Wichita State University

Tuesday
8:30 AM– 10:00 AM

Using Cluster Analysis to Identify Factors Affecting Lean Implementation

Ahmad Elshennawy, Elizabeth Cudney, Sandra Furterer

This study explores using clustering algorithms to assess lean implementation in organizations. A survey collected industry data, analyzed via k-modes clustering after imputation with a random forest algorithm. Three clusters—low, medium, and high lean implementation—were identified, suggesting the potential for supervised learning to monitor and improve lean adoption.

Instructional Lean Manufacturing Lab Design using SMED

Sura Al-Qudah

Lean manufacturing tools like 5S, SMED, Kanban, and pull vs. push systems help eliminate waste, improve efficiency, and enhance quality. In an undergraduate Manufacturing Process Planning course, lean concepts are taught using hands-on simulations. This study developed a toolkit featuring traditional and SMED assembly processes using t-shirt press machines. Instruction manuals illustrated lean principles, emphasizing the importance of quality work instructions to connect theory with practice effectively.

Digital Transformation Plan Using System Engineering VEE Model

Duy Bui, Ameya Shah, Adam Lynch

This study evaluates the integration of digital transformation methodologies to enhance quote generation process for Request for Proposal and Request for Quote through advanced digital technologies. By synthesizing the (NIST) Cybersecurity Framework, VEE Life Cycle Model, and Cisco's Digital Transformation Model, we aim to develop a secure, efficient digital organization.

Advancing CNC Efficiency through Total Productive Maintenance

Adam Lynch, Ashlynn Clark, Ridge Towner

This study examines Total Productive Maintenance for a Bavius 5-axis CNC machine producing aircraft floor beams. Using 5S, OEE, and Value Stream Mapping, it identifies improvement areas and provides strategies to boost operational efficiency and production performance.

Tuesday 10:15 AM Sessions

Additive Manufacturing (B)

Session Chair: Abdelhakim Al Turk, Kent State University

Tuesday
10:15 AM – 12:15 PM

Additive Manufacturing Supercharging Automotive Parts for Maximum Reliability

Ethan Wenk, Anthony Giancola, Abdelhakim Al Turk

Additive manufacturing (AM) reshaping the automotive industry by offering design flexibility, reduced component weight, and streamlining assembly processes. This paper explores AM technologies advancing the automotive industry through case studies and real-world applications. With AM utilization, automotive industries have achieved improvements in mechanical robustness, system performance, and overall reliability. This paper also discusses the practical applications and the challenges of AM in the automotive industry.

Closed-Loop Recycling: Converting Plastic Waste into 3D Printing Filaments

Ethan Boicey, Schyler Shutler, Cliff Effah, Abdelhakim Al Turk

Plastic waste presents a growing environmental concern. This project introduces a closed-loop system that converts discarded plastics into 3D printing filaments. Using Autodesk Inventor Professional, the system is designed for automation and efficiency. This paper evaluates the viability of recycled plastics in additive manufacturing. Experiments are conducted to analyze material properties, extrusion behavior, and print quality, advancing the role of recycled materials in sustainable manufacturing.

Additive Manufacturing Reduces Failure Modes and Enhances Durability in Aerospace Components

Mubaraq Onifade, Abdelhakim Al Turk

Additive Manufacturing (AM) emerges as a transformative technology in the aerospace industry. This paper examines critical aerospace failure modes, including fatigue, stress corrosion cracking, and structural failure, and explores the role of AM in providing solutions to mitigate these challenges. This paper discusses the key advantages and barriers associated of the application of AM in aerospace industry.

Investigating Mechanical and Surface Oxidation Properties of 3D Printed Ti6Al4V Alloys Produced by Selective Laser Melting

Fatih Altun, Emanuel Andrade, Purva Todmal, Eylem Asmatulu, Ersin Bahceci, Mete Bakir, Ramazan Asmatulu

This study creates analytical techniques to investigate the fatigue and corrosion behavior of 3D printed Ti6Al4V alloys. This study investigates the impacts on surface oxidation, mechanical processes, and the environment using high-temperature procedures and selective laser metal sintering (SLM). The results will improve knowledge of titanium alloys' mechanical characteristics, service life, microstructural development, and reliability.

Energy Engineering & Sustainability

Session Chair: Deepak Gupta, Wichita State University

Tuesday
10:15 AM – 12:15 PM

Aircraft Spar Design: Materials, Methods & Production Management Using Linear Programming.

Karen Erondu, Saurabh Singh, Matthew Neelagandan

This study presents a mixed-integer linear programming (MILP) framework that takes a more united approach to spar designing. We developed several production case studies using different material and process combinations. These case studies were tested using the MILP framework to see how well they performed. The results we obtained showed that using an integrated approach to manufacturing can help engineers reduce waste, improve sustainability, and use materials more efficiently.

Electric Aircraft: Infrastructure Challenges for Airports

Brooke Wheeler, Isaac Silver

Airport technology has trended towards energy efficiency, and therefore, many will not be prepared for the requirements of electric aviation. Using experiences with an electric aircraft, this talk will examine challenges for airports, estimate energy needs for planning, and recommend sustainable options such as on site solar.

Sustainable Energy Management Policy in Developing Countries

Nirajan Mani, Sanjay Kaul

Global demand for energy is significantly increasing due to the rapid population growth and economic development. To successfully implement the sustainable energy agenda, it is crucial to design and implement effective policies that address the specific needs and constraints of developing countries. By conducting an extensive literature review, this paper identifies the challenges in the energy management, and also addresses various policy and planning concerns in developing countries.

A Soft Actor-Critic Approach for Energy-Conscious Flexible Job Shop Scheduling Incorporating Machine Usage Constraints and Job Release Dates with Deterministic Setup and Transportation Times

Saurabh Singh, Deepak Gupta

We propose an innovative Soft Actor-Critic reinforcement learning framework for energy-conscious flexible job shop scheduling that explicitly incorporates machine usage constraints and job release dates. The approach dynamically balances scheduling efficiency and energy consumption while accounting for deterministic setup and transportation times, offering a sustainable solution to complex manufacturing operations.

Education, Leadership & Training

Session Chair: Abdelnasser Hussein, University of Houston-Downtown

Tuesday
10:15 AM – 12:15 PM

Higher Education Student Success: A System to Evaluate Degree Completion

Sandra Furterer, Tatiana Cardona, Elizabeth Cudney

Higher education must adapt to industry demands for technical skills. With low graduation rates, data mining and machine learning analyze student success factors. This study evaluates a neural network model for predicting student success, offering a novel, systematic approach to improve outcomes and close the workforce gap.

Mapping Engineering Students' Preferences: A Kano Model Study on Customer 4.0 Attributes

Cintia Zuccon Buffon, Ahmad Elshennawy, Elizabeth Cudney

This study investigates engineering students' preferences using the Kano model. The attributes selected relate to various aspects of education focused on Customer 4.0 characteristics. Data was

gathered from 419 College of Engineering and Computer Science students at a university in Florida. This research reveals interesting results on how engineering students perceive the fifteen attributes surveyed. From the attributes surveyed, six attributes considered critical to this demographic is tied to innovation, transparency, sustainability, mental health, applicable knowledge, and accessible materials. The results from this research will help universities enhance students' satisfaction by focusing on important attributes and developing student-centric services in this new technological era.

Incorporating Collaboration, Communication and Character into Engineering Education

Sandra Furterer

The goal of KEEN's Entrepreneurial Mindset (EM) is to incorporate learning that enhances students' curiosity, connectedness of material, and creates value expressed through collaboration, communication and character. This presentation will provide a framework for incorporating collaboration, communication and character into engineering education.

Bridging Theory and Practice: 3D Printing as a Hands-On Tool for STEM Higher Education

Natasha Spivak, Ethan Boyes, Abdelhakim Al Turk

Oftentimes, STEM students struggle to connect concepts in the classroom without the help of physical representations. By implementing additive manufacturing processes in higher-level education, professors can better convey concepts to their students. This study was done at Kent State University's College of Aeronautics and Engineering to evaluate the implementation of 3D printing in STEM classes. Surveys and 3D models were sent to students to assess their satisfaction with the implementation.

Balancing Act: Promoting Wellness and Resilience of Educational Leaders

Abdelnasser Hussein

In the demanding field of educational leadership, maintaining wellness and resilience is crucial for effective and sustainable leadership. This presentation, titled "Balancing Act: Promoting Wellness and Resilience of Educational Leaders," explores the multifaceted challenges faced by educational leaders and proposes strategies to enhance their well-being. It further examines the impact of these stressors on leaders' mental and physical health, job performance, and overall school environment.

WE'D LIKE TO THANK OUR SPONSORS

BECOME A SPONSOR.
CONTACT US.

INFO@IEMSCONFERENCE.COM

INDUSTRY ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

IEMS 2025

THE 31ST CONFERENCE

WICHITA STATE UNIVERSITY

College of Engineering

Since 1928, Wichita State's College of Engineering has built a reputation for equipping engineering and computing students with the most complete education possible. Shocker engineering boasts hands-on research using the latest technology, Kansas' center of industry, applied learning and professional connections.

ASQ

Committed to providing enhanced expertise, professional networks, tools, and solutions to help our members advance their products, services, and industries.

TOOLINGU | SME

With nearly 90 years of experience, Tooling U-SME partners with educators, workforce organizations and the manufacturing industry to build capacity, and to provide training and development workforce education solutions that will help narrow the skills gap within manufacturing communities.

SHUTTLE AEROSPACE

We specialize in manufacturing of parts and assemblies for the Aerospace Industry. Shuttle Aerospace is specialized in metallic and non-metallic machined components: heat treatment, surface finishing, and welding.

Cargill

We work to nourish the world. Sitting at the heart of the global supply chain, we bring people together to make the world`s food and agriculture system more sustainable, resilient, and accessible. With over 159 years of experience, we offer trusted expertise and a long-term view, so we can do the right thing — today and for generations to come.