APRIL
6-7
2026

PROGRAM

OF THE INTERNATIONAL CONFERENCE ON INDUSTRY, ENGINEERING & MANAGEMENT SYSTEMS

IEMS
2026

#32

DEAR FRIENDS AND COLLEAGUES...

INDUSTRY ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

APRIL 6-7 2026

On behalf of the IEMS Executive Board, it is our pleasure to welcome all of you to the 32nd 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 2026 CONFERENCE CHAIR

KEYNOTE SPEAKER

DR. RAVI PENDSE

VICE PRESIDENT FOR INFORMATION TECHNOLOGY
AND CHIEF INFORMATION OFFICER
UNIVERSITY OF MICHIGAN

APRIL 6
1:00 PM

DEVELOPING AIQ - OUR FUTURE WITH AI

Generative AI is the most impactful technology of this century and can be a force for positive disruption if used thoughtfully, responsibly, and ethically. In this interactive conversation, we will discuss the approach the University of Michigan has taken to deploy generative AI (GenAI) tools at scale to our community. Our process was collaborative and included guidance from all areas of our campus. Key takeaways will include ideas on how to deploy generative AI at scale, affirmation of human centric AI, and the potential higher education disruption in the age of AI.

ABOUT

DR. PENDSE SERVES AS AN EXECUTIVE OFFICER OF THE UNIVERSITY AND PROVIDES UNIVERSITY-WIDE LEADERSHIP AND STRATEGIC DIRECTION FOR INFORMATION TECHNOLOGY. HE HAS EXTENSIVE EXPERIENCE AS A SUCCESSFUL AND COLLABORATIVE UNIVERSITY LEADER. HE IS A PROFESSOR, RESEARCHER, TEACHER, AND ADVISOR TO STUDENTS.
DR. PENDSE'S SUCCESSES INCLUDE SECURING MORE THAN $21 MILLION IN EXTERNAL RESEARCH GRANTS, DEVELOPING UNIVERSITY COURSES, EARNING SEVERAL TEACHING AWARDS, AND PUBLISHING NUMEROUS SCHOLARLY ARTICLES AND PAPERS CO-AUTHORED BY STUDENTS.

INDUSTRY ENGINEERING & MANAGEMENT SYSTEMS CONFERENCE

1 Zoom Link

Day 1 April 6th

Eastern Time (ET)	Sundial 4th Floor	Cardita 5th Floor	Conch 6th Floor
8:30 am - 10:45 am	AI & Human Systems Innovations (A)	Human Factors & Cognitive Engineering (A)	AI & Machine Learning
11:00 am - 12:30 pm	AI & Human Systems Innovations (B)	Quality Planning & Process Improvement (A)	Lean Systems
12:30 pm - 2:00 pm Lunch & Learn: 1st Floor	Keynote Speaker Dr. Ravi Pendse Developing AIQ - Our Future with AI		
2:15 pm - 4:15 pm	Sustainability & Industry 4.0	Human Factors & Cognitive Engineering (B)	Education Leadership & Training (A)
4:30 pm - 6:00 pm	AI & Human Systems Innovations (C)	Automation, Modeling, & Simulation	Energy Engineering & Sustainability

2 Zoom Link

Day 2 April 7th

Eastern Time (ET)	Sundial 4th Floor	Cardita 5th Floor	Conch 6th Floor
8:30 am - 10:45 am	Additive Manufacturing (A)	Marketing	Systems Engineering
11:00 am - 1:00 pm	Additive Manufacturing (B)	Management of Technology	Education Leadership & Training (B)
1:00 pm - 2:00 pm 1st Floor	Lunch		
2:30 pm - 4:30 pm	Nanomaterials & Nanoengineering	Quality Planning & Process Improvement (B)	Complex Systems Performance & Improvement

Monday 8:30 AM Sessions

Artificial Intelligence & Human Systems Innovations (A)

Session Chair: Abram Walton, Florida Institute of Technology

Monday
8:30 AM– 10:45 AM

AI Adoption as a Design Challenge: Why Strategy Alignment Determines Adoption Success

Shellie Halstead

Organizations increasingly adopt AI to improve efficiency and decision-making, yet many initiatives underperform due to tool-centered approaches that overlook human and organizational systems. This presentation frames AI adoption as a socio-technical design challenge, emphasizing alignment with strategy, business needs, and work systems, and offering practical insight into designing effective human–AI collaboration.

The Human Foundations of AI-Enabled Innovation

Rob Rudd

As AI transforms how organizations operate, human-centered conditions like psychological safety and structural flexibility become critical. This study explores how organizational environments foster or stifle innovation. Findings suggest that building trust, reducing rigidity, and designing adaptive systems are essential for enabling meaningful, scalable innovation alongside emerging AI technologies.

From Art to Engineering: Applying AI to Team Performance

Robert Chicvak

Organizations engineer products and systems with rigor, yet team performance is often managed intuitively. This presentation introduces an AI-enabled framework that identifies high-impact teaming tasks and behaviors, revealing where improvement opportunities exist. The approach supports evidence-based decisions, helping leaders apply engineering discipline to human systems through structured, data-driven insight.

Anticipating Risk Before It Escalates: AI-Enabled Fraud Mitigation in Human Systems

Taylor Mooney, Abram Walton, Natalie Shah

Human Resources can transition from a reactive to a proactive fraud mitigation approach through artificial intelligence use. Traditional control measures struggle to keep up with the complexity of current fraud activity. When applied thoughtfully, machine learning models surface early behavioral risk signals that warrant attention, enabling intervention before misconduct escalates.

Human Factors & Cognitive Engineering (A)

Session Chair: Deborah Carstens, Florida Institute of Technology

Monday
8:30 AM– 10:45 AM

Hierarchical Regression Analysis of FOQA Data to Predict Touchdown G for the Boeing 787

Vivek Sharma, George Chan Kwon Ning, Brooke Wheeler

Hard landings are a perennial issue for airlines, resulting in lost aircraft utilization and landing gear damage. Boeing 787 series is widely used globally; this study aims to quantify the influence of flight parameters on the vertical load factor at touchdown from the aircraft's Quick Access Recorder (QAR). Hierarchical regression was performed on 13 variables AND was statistically significant ($p < .001$), explaining 14% of the variance in touchdown G.

Case Study on Crew Compatibility and Dynamics in an Arctic Mars Analog

Ruth Nichols, John Deaton, Deborah S. Carstens

A simulated space mission took place at the Mars Society's Flashline Mars Arctic Research Station (FMARS). Simulation participants answered crew compatibility and dynamics questions at the beginning, middle, and end of the mission. The case study findings will inform crew selection for future space missions.

Speaking Up: Aeronautics Student Voice Propensity and Power Distance by Experience

Brooke Wheeler, Nicholas Forthofer, Shellbie Reed, Mihir Wadhwa, Vivek Sharma

This study examined the difference in aeronautic student voice propensity (confidence in raising concerns) and perceived power distance (level of instructor authority) by experience level. Across 317 Part 141 students, both power distance and voice propensity showed statistically significant differences between experience groups.

Population Density and Recorded Unmanned Aerial Systems Sightings in Southeastern Cities

Vivek Sharma, Brooke Wheeler, Avalon Bozard, Rebecca Berris, Mario Perez

An analysis of 2020 FAA and Census data from 94 southeastern U.S. cities found a moderate positive correlation ($r = .58$, $p < .001$) between population density and UAS sightings, highlighting the need for updated FAA regulations to ensure safe NAS integration.

From Curb to Gate: How Usable Is Your Airport App?

Deborah Carsten, Arjun Nair, Syed Ali Abbas, Anna Berenika Wojdecka

Research examined the usability of an airport App prototype, including think-aloud sessions, open-ended interviews, and a USE questionnaire. The evaluation focused on assessing the clarity and effectiveness of core functions. Findings identify key strengths and deficiencies in usability, providing evidence-based guidance for refining the App's design and passenger experience.

Artificial Intelligence & Machine Learning

Session Chair: Fujian Yan, Truman State University

Monday
8:30 AM– 10:45 AM

Understanding Overdose Mortality: A Statistical Analysis of Risk Factors in the United States

Veronica Wood, Harsha Raja Neathala, Daniel Smith, Isaac Gang

The United States continues to face a worsening drug overdose crisis with the CDC reporting more than 100,000 deaths in 2023. This project investigates which demographic factors and drug categories are most strongly associated with overdose deaths. The goal is to inform more effective public health interventions.

Decentralized Reinforcement Learning for Multi-Robot Collaboration on LeoRover Platforms

Fujian Yan

We propose a reinforcement learning–based multi-agent framework for coordinating mobile robots. Agents learn decentralized cooperative policies through shared rewards and interaction with the environment, enabling efficient task allocation, coordinated navigation, and adaptive collaboration in dynamic and uncertain environments.

A Global Pattern in Population Growth, Life Expectancy, and GDP (1960-2024)

Prithvi Bhattarai, Isaac Gang

This study analyzes the change in the population growth and life expectancy correlating to the economic performance i.e., the GDP of around 266 countries from 1960 to 2024. The data has about 17000 records which is from the 266 countries where it has given a much broader sense of explanation on questions that can be placed in front of the dataset.

Monday 11:00 AM Sessions

Artificial Intelligence and Human Systems Innovations (B)

Session Chair: Abram Walton, Florida Institute of Technology

Monday
11:00 AM – 12:30 PM

Human Systems–Driven Wraparound Support to Strengthen STEM Workforce Pathways for Youth Aging Out of Foster Care

Maria Fernanda Sagastume Hurtado, Juan Avendano

Youth aging out of foster care face limited STEM exposure, career direction, and readiness for STEM pathways. This study evaluates a human systems driven workforce program integrating wraparound supports to enhance career outcomes and STEM proclivity. Using secondary data, we assess impacts on GED completion, credential enrollment, and job placement, illustrating innovation in workforce transformation.

AI Governance: Practical Guide for Compliance Officer

Janell Smith

Many organizations lag in AI governance, with limited alignment to Code of Conduct, privacy, and security policies. This session presents an approach compliance teams can implement, beginning with executive sponsorship and stakeholder engagement. As an interim risk step, employees attest to AI use, reinforcing restrictions on unapproved tools and redaction to prevent disclosure of PII, PHI, and proprietary data. In parallel, compliance develops a formal policy integrated into controls.

Cross-Team Handoffs as Process Failure: Integrating Lean Six Sigma, Systems Thinking, and Policy Design

Joshua Howell, Abram Walton, Natalie Shah

Cross-functional handoffs frequently erode momentum, clarity, and accountability. This study conceptualizes transitions as a measurable process failure, integrating Lean Six Sigma methods, systems thinking, and policy/procedure governance. A focused literature synthesis summarizes evidence, identifies unresolved gaps in sustaining direction through transfer points, and proposes research and improvement approaches for critique.

Quality Planning & Process Improvement (A)

Session Chair: Bassam Jaradat, Cargill Corporation

Monday
11:00 AM – 12:30 PM

Assessing Prosthetic Hand Reliability Utilizing Failure Modes and Effects Analysis

Eliana Contreras, Ethan Bell, Kelsey Robinson

Evaluating electromyographic prosthetic hands is challenging as limited metrics can hinder comprehensive performance assessments. The researchers designed a quality assessment to empirically measure functionality via Failure Modes and Effects Analysis paired with Root Cause Analysis, featuring tests until failure and tests with troubleshooting to create a repeatable quality assessment.

Applying the Six Sigma Methodology in Academic Institutions

Thomas Jones

The Six Sigma methodology has been widely used across several industries. Development of Six Sigma skills requires hands on project experience which cannot be replicated through textbook style practice problems. Faculty led projects utilizing student teams present opportunities towards process improvement, skills development, and student certification simultaneously.

Integrating Development Models to Enhance Customer Satisfaction and Product Excellence

BassamJaradat, Firas Shahin

The paper presents a hybrid software development approach that integrates Waterfall, Prototyping, and the House of Quality. It emphasizes early customer involvement, iterative feedback, and continuous improvement. The integrated model helps reduce defects, improve efficiency, and ensure software aligns closely with evolving user needs and expectations across modern complex projects.

Lean Systems

Session Chair: Adam Lynch, Wichita State University

Monday
11:00 AM – 12:30 PM

Manufacturing System Design for Scalable Light Sport Aircraft Production

Adam Lynch, Pedro Cupertino, Rajendra Balusu

Early-stage manufacturers must design production systems that scale while preserving cost, quality, and delivery performance. This study presents a scalable manufacturing system for Light Sport Aircraft production, integrating Lean and DFMA principles. Using phased layouts and indexed metrics, results show improved flow, reduced handling, and enhanced cost–quality–delivery tradeoffs.

Facility Layout Design for Light-Sport Aircraft Assembly Using the Uddevalla Production Model

Pedro Cupertino, Uriel Batukandikila, Adam Lynch

Aerospace startups operating under FAA MOSAIC face early facility layout decisions constrained by capital, quality, and delivery requirements. This study develops a CQD-driven layout design approach integrating the Uddevalla production model, Lean Six Sigma, DMADV, and CAD/CAE to support cost-efficient, high-quality, and flexible assembly in low-volume manufacturing environments.

Optimizing Inventory and Forecasting Simultaneously

Mohammed Darwish

Modern supply chains face uncertainty and strict service-level constraints, rendering EOQ and EPQ ineffective. Current practice separates forecasting and inventory optimization, causing inefficiencies. This research introduces a multi-period model integrating both, dynamically optimizing forecasts and production to minimize total costs while satisfying fill-rate requirements.

Monday 2:15 PM Sessions

Sustainability & Industry 4.0

Session Chair: Mehmet Bayram Yildirim, Wichita State University

Monday
2:15 PM – 4:15 PM

Digital Health Service Attributes Influencing Patient Satisfaction in Healthcare 4.0: A Systematic Literature Review

Mehrnoosh Saeyan, Ahmad Elshennawy

Healthcare increasingly adopts digital health services, making patient satisfaction a critical success measure. This study reviews 40 empirical studies to identify digital health service attributes influencing patient satisfaction in Healthcare 4.0. Through systematic synthesis and expert refinement, a comprehensive set of service attributes is developed and organized into five dimensions.

Occurrence of Six Sigma Failure Factors and Success Factors Related to Strategic Alignment: A Systematic Literature Review

Quintcey Smith, Ahmad Elshennawy, Sandra Furterer

This systematic literature review investigates strategic alignment influence on Six Sigma implementation. Using the PRISMA protocol, Six Sigma success and failure factors were evaluated. Findings show evidence of strategic alignment influence on Six Sigma projects, justifying future research and potential to enhance current methodology. Top influencer was top management commitment

Routing Electric Trucks with Trailer Handling under Time Constraints

Ahmad Bassaleh, Mehmet Bayram Yildirim

We propose the Electric Truck and Trailer Routing Problem with Time Windows, supporting sustainable freight by reducing emissions through electrification and efficient routing. The model captures detachable trailers, charging decisions, and time windows, and combines a strengthened MILP with a hybrid Simulated Annealing approach that delivers high-quality solutions efficiently.

Human Factors & Cognitive Engineering (B)

Session Chair: Deborah Carstens, Florida Institute of Technology

Monday
2:15 PM – 4:15 PM

Dysmenorrhea: A Literature Review on Women's Health Within Engineering Management

Esther Adeyemi, Sharon Bommer

This paper recognizes women's roles in engineering by examining the impact of dysmenorrhea on performance, drawing on studies in aviation, healthcare, and athletics. It advocates human factors interventions such as flexible scheduling, task design, and awareness to enhance well-being and equity.

The Effect of Perceived Controllability of Interactivity from Augmented Reality-Based Shopping Applications on Purchase Intention: The Moderating Role of Privacy Risk

Abdurrezzak Sener, Mehmet Fatih Açar, Mutlu Yuksel Avcilar

Augmented reality (AR) applications for shopping for cosmetic makeup are experiencing a surge in popularity. This study delves into the influence of perceived interactivity controllability on consumers' decision making for purchases within the framework of the stimulus-organism-response (S-O-R) model in the context of AR makeup shopping applications.

Clear the Air: Willingness to Pilot and Willingness to Pay with Leaded and Unleaded Fuel

Brooke Wheeler, Vivek Sharma, Jaely Soto, Jay Helstone, Bryson Harber

Pilots reported a higher willingness to pilot (WTPilot) with traditional leaded avgas compared to the unleaded alternative. Willingness to pay (WTPay) was lower when the unleaded fuel was priced higher, showing sensitivity to cost. Results revealed that familiarity and affordability matter when considering sustainable fuel for flight training.

Air Traffic Control Staffing Deficiencies and Their Relationship to Incidents and Accidents

Ashton Irons, Sunkyum Kim, Gianna Mendez, Vivek Sharma, Brooke Wheeler

Air Traffic Control (ATC) staffing deficiencies are a long-standing systemic crisis. This study revealed a statistically significant but weak positive relationship between ATC staffing deficiencies and incident and accident rates.

Education Leadership & Training (A)

Session Chair: Abdelnasser Hussein, University of Houston Downtown

Monday
2:15 PM – 4:15 PM

Surveying Barriers to STEM Higher Education for Low-Income High School Students

Kaylyn Hornbeak, Abdelhakim Al Turk

This study examines how limited STEM resources in underfunded northern Ohio high schools reduce low-income students' access to labs, hands-on learning, and real-world experience. Survey results show these gaps weaken skill development and create barriers to pursuing STEM degrees, highlighting systemic obstacles that limit students' higher-education opportunities.

Preparing Business Statistics Students for a Career in Data Analytics: Innovative Strategies including R and Python

William Sause, Betty Thorne, Jay Stryker

In response to increasing job market demand for Python and R skills in data analytics, business statistics courses and textbooks are being revised to include these languages as core tools for data analysis. This paper highlights recent updates to an undergraduate business statistics course and textbook emphasizing a programming-based approach.

AI in Higher Education: Key Barriers and Successes

Abdulaziz Abdulaziz, Abdelhakim Al Turk

Artificial Intelligence (AI) is transforming higher education by enhancing teaching, learning, and administrative efficiency. This study examines the status of AI adoption in higher education through a quantitative data analysis of peer-reviewed literature published research. The paper identifies key opportunities and barriers to implementation, including ethical concerns, data privacy, faculty readiness, and infrastructure challenges. Findings provide insights and recommendations to support effective AI integration and sustainable innovation in higher education.

Equity-Centered Leadership: Advancing Cultural Competence and Social Justice in Schools

Abdelnasser Hussein

Newspapers are full of stories about injustice in society at large as well as in educational institutions. Schools, like other organizations, mirror our society and reflect its social, economic, and cultural trends. This means that rather than being neutral spaces, schools often reinforce existing disparities in wealth, power, and access to opportunities. Therefore, equity-oriented educational leaders are committed to addressing the structural inequities that may impact students' educational experiences.

Monday 4:30 PM Sessions

Artificial Intelligence and Human Systems Innovations (C)

Session Chair: Abram Walton, Florida Institute of Technology

Monday
4:30 PM – 6:00 PM

Human-Centered AI in Trauma-Informed Nursing Practice

Lorelei Walton, Abram Walton, Natalie Shah

As artificial intelligence becomes increasingly embedded in healthcare systems, new opportunities emerge to strengthen trauma-informed nursing practice. Drawing on nursing, counseling, and the health sciences, this presentation examines how AI-enabled decision-support tools can enhance holistic bedside care by supporting early identification of distress, preventive interventions, and resilient clinical workflows—while preserving empathy, meaning-making, and patient-centered relationships.

Quality of Work Life as a Human System: Differential Stigma Toward Behavioral Addictions and Substance Use Disorders in Contemporary Organizations

Alex Silverman, Abram Walton

Integrates a multidimensional Quality of Work Life framework with research on differential employee stigma toward behavioral addictions versus substance use disorders. It examines perceptual mechanisms, contextual moderators, and system-level implications for policy, design, and leadership, inviting innovative human-systems approaches to reduce stigma, support well-being, and enhance organizational functioning outcomes.

Operationalizing AI-Ability for Responsible Human Systems Innovation and High-Impact Organizational Outcomes

Natalie Shah, Abram Walton

As organizations accelerate AI adoption, the constraint is not technology but human systems integrating AI responsibly while sustaining value. The session highlights how AI-ability can reduce implementation risk, improve adoption, and strengthen outcomes such as decision quality, throughput, accountability, and Quality of Work Life (QWL).

Automation, Modeling, and Simulation

Session Chair: Andrzej Gapinski, Pennsylvania State University

Monday
4:30 PM – 6:00 PM

Haptic-Enabled Sculptural CAD in the Engineering Curriculum

Alexandra Schonning

This paper presents a pilot study introducing haptic-enabled sculptural CAD in a mechanical engineering course. The module is motivated by biomechanics modeling, emphasizing organic geometry derived from computed tomography data, tactile interaction, and CAD-to-analysis thinking. The work illustrates how haptic-based CAD can be used in design, manufacturing, and biomechanics.

DC Motor Control with MATLAB Simulations

Andrzej Gapinski

The paper reviews DC motor models, associated transfer functions, and control methods. In modern society the electric motors' importance cannot be overemphasized. DC motors in particular play an essential role in industrial automation and manufacturing processes. The article analyzes various DC motor designs and the model responses with MATLAB simulations.

Energy Engineering & Sustainability

Session Chair: Deepak Gupta, Wichita State University

Monday
4:30 PM – 6:00 PM

Critical Review of Legal Challenges and Disputes in Construction Industry

Nirajan Mani

The study reviews common legal challenges in construction, identifying frequent dispute causes, such as payment delays, defects, compliance issues, and coordination problems. Using RII and Mann-Whitney analyses, it ranks key factors and emphasizes that clearer contracts, improved communication, and better planning can help reduce the impact of inevitable construction disputes.

A Multi-Agent Reinforcement Learning Approach to Solve the DFJSP with Sequence-Dependent Setup Times

Saurabh Singh, Rahul Joshi, Deepak Gupta

This study addresses the Distributed Flexible Job-Shop Scheduling Problem (DFJSP) with sequence-dependent setup times using a multi-agent deep reinforcement learning framework. A multi-Pointer Graph Networks architecture trained via multi-Proximal Policy Optimization learns job, factory, and machine selection sub-policies. Results show the proposed approach produces high-quality scheduling decisions, outperforming genetic algorithms in solution quality and MILP models in computational efficiency and scalability.

Tuesday 8:30 AM Sessions

Additive Manufacturing (A)

Session Chair: Abdelhakim Al Turk, Kent State University

Tuesday
8:30 AM– 10:45 AM

Magnetic Adhesion Strategies for Space-Based Polymer Additive Manufacturing

Chris DeDonato, Abdelhakim Al Turk

Currently polymer-based additive operations are limited to small tools and structures aboard the International Space Station. This study evaluates iron-infused PLA filaments 3D printed on metallic, magnetized build sheets to enhance first layer and interlayer adhesion for space-based additive manufacturing aboard the International Space Station. Performance will be assessed through adhesion testing, interlayer strength measurements, magnetic field analysis, simulations, and laboratory-based 3D printing experiments.

Lightweighting Autonomous Systems Through Additive Manufacturing

Ethan Boyes, Abdelhakim Al Turk

Autonomous systems often rely on heavy components produced using traditional manufacturing methods. Additive manufacturing enables design flexibility and weight reduction not achievable through conventional processes. In this study, a fully assembled VEX robotic system was analyzed, and several traditionally manufactured components were redesigned and replaced with additively manufactured parts. As a result, the total mass of the robot was reduced by approximately 50% compared to the original configuration, maintaining performance.

Safety and Facility Guidelines for Ideal Multi-Family Additive Manufacturing Lab

Johnathan Puts, Susan Puts, Abdelhakim Al Turk

Additive manufacturing (AM) consists of seven distinct technology families, each presenting unique safety concerns and facility design challenges. This paper examines AM laboratories and the associated multi-hazard environments, including fire, chemical, powder, thermal, and mechanical risks. The appropriate safety requirements, facility design, and specific controls and procedures are presented. Engineering controls and training for access are used to propose how to implement the ideal multi-family AM laboratory model.

Design for Additive Manufacturing: An Updated Review of Available Methods and Software

Saleh Ateiwi, Gamal Weheba

This paper provides a review of DfAM methods and software developed over the last five years. The review includes most recent design guidelines and offers a structured framework to better leverage AM capabilities during the design stages.

Marketing

Session Chair: Scott Swain, Clemson University

Tuesday
8:30 AM– 10:45 AM

The Price of Trust: Consumer Reactions to Misinformation and Mistakes from AI Influencers

Rachel Partsch, B. Andrew Cudmore

This study examines how AI influencer errors affect brand credibility and consumer betrayal. Distinguishing misinformation from unintentional mistakes, it draws on SCCT and the continued influence effect. A 2×2 experiment manipulates error type and severity, extending crisis theory to AI endorsements and offering guidance for protecting brand trust strategically effectively.

Scarcity Signals in Luxury Watches: Effects of Waitlists and Limited Editions on Willingness-to-Pay

Tejas Yashwant Mhaisdhune, B. Andrew Cudmore

Luxury watch brands employ scarcity cues such as limited editions and waitlists to sustain exclusivity and pricing power. Using a 2×2 experiment, this study examines how supply and demand-based scarcity influence perceived uniqueness and willingness-to-pay, and how these effects differ between heritage and micro-brands.

Suspicious Minds: Predicting Replicability from Published Study Features

Danny Weathers, Scott Swain

Published findings in marketing research often fail to replicate. We train machine-learning models on over 2,000 studies, using observable features (N, effect size, p-value, discipline) and the language used to describe the original claim to predict replication probability. Two independent holdout samples totaling 260 studies validate the models and highlight signals that distinguish robust findings from fragile ones.

Pandora's Panel: Synthetic Respondents and the Illusion of Measurement

Scott Swain, Billy Mastrone

Synthetic respondents are being marketed as a faster, cheaper alternative to human samples, but they blur the line between measurement and simulation. This presentation surveys current applications in marketing practice, including persona-seeded synthetic panels. It also examines some of the critical questions that synthetic sampling raises for validity, bias, transparency, and research integrity.

Emotional Congruency in Hospitality Storytelling Marketing

Quang Anh Duong, B. Andrew Cudmore

Within the high-end hospitality market, the prevalence of standardized amenities has constrained meaningful brand differentiation. Utilizing an experimental design, we investigate the influence of emotional (high vs low arousal) congruency in storytelling between adventure-oriented and relaxation-oriented travelers on hotel booking intentions. Relevant strategic insights offered for hospitality marketing practice.

Systems Engineering

Session Chair: Sandra Furterer, Ohio State University

Tuesday
8:30 AM– 10:45 AM

"DFMA- and DMADV- Driven Design Optimization for Aircraft Components Under FAA Part 22 (MOSAIC)"

Pedro Cupertino, Richard Sack, Adam Lynch

Aircraft interior components strongly influence cost, assembly, and comfort in low-volume production under FAA MOSAIC. This study presents a DFMA- and DMADV-driven design framework integrating CAD/CAE ergonomics and U.S. supply chains. An aircraft seat case study achieved 50–70% part-count reduction and 10–30% assembly-effort savings, improving delivery predictability under performance-based regulation.

Deference, Demeanor, and Asymmetric Knowledge: An Ethnographic Analysis of Subject Matter Experts

Paul Nugent

This ethnography examines empirical data from engineering working meetings to consider the roles that Erving Goffman's concepts deference and demeanor play in the interactions between Subject Matter Experts (SMEs) and non-SMEs. Preliminary results show that some of dynamics of deference and demeanor prevalent in broader society are reversed in interesting ways in this engineering setting offering insights into the social nature of engineering work.

Traceability Without Complexity: A Systems Engineering Approach to Motor - Pump Correlation

Rohan Dharmendrakumar Patel, Joyce Chiam, Adam Lynch

This research project presents a systems engineering based, barcode-enabled traceability solution for motor and pump testing in a manufacturing environment. Using an offline, Excel-VBA tool, motor test results are serialized and linked to pump performance data, improving traceability, reducing manual effort, and enabling future data-driven evaluation of non-value-added motor testing.

Incorporating Generative AI Into Engineering Education Ethics Cases to Explore Implications of Ethical Decisions with an Industrial and Systems Engineering Course

Sandra Furterer

This presentation will provide examples of incorporating generative Artificial Intelligence (AI) tools as a sounding board for students' understanding of when ethical violations occur within real-world case studies as part of an industrial and systems engineering course. The goal of the case studies is to enhance ethical decision making and character-building within engineering education.

Tuesday 11:00 AM Sessions

Additive Manufacturing (B)

Session Chair: Abdelhakim Al Turk, Kent State University

Tuesday
11:00 AM – 1:00 PM

Key Barriers of Implementing Recycled Thermoplastic in Additive Manufacturing for Aerospace Application

Caleb Layman, Abdelhakim Al Turk

Additive manufacturing has seen immense growth in the 21st century, and concerns of sustainability bring opportunities for growth. Most frequently Additive manufacturing employs thermoplastics that can be easily recycled. Using content analysis in NVivo, this study examines peer-reviewed papers on the use of recycled materials in additive manufacturing. The analysis reveals the key barriers to applying these materials in aerospace contexts.

Customized 3D Printed Footwear for Pressure Relief in Diabetic Wound Care

Natasha Spivak, Abdelhakim Al Turk

Due to circulatory complications associated with diabetes, patients often experience foot ulcers and delayed wound healing. Combined with ill-fitting footwear, these conditions can severely hinder daily function. Current solutions, such as generic compression shoes, lack personalization. This study explores the creation of 3D-printed, pressure-reducing footwear tailored to each patient's foot anatomy to enhance comfort, accelerate healing, and reduce the risk of ulcer-related complications.

Customized Orthopedic Braces Using Additive Manufacturing

Jonathon Cundra, Adam Hodali, Abdelhakim Al Turk

Additive manufacturing has transformed prosthetic design by enabling highly customized, lightweight, and cost-effective solutions. By integrating reverse engineering and 3D scanning techniques, accurate digital models of a patient's limb or body segment can be captured directly, ensuring a precise geometric representation for design. This paper investigates the potential of combining additive manufacturing, 3D scanning, and reverse engineering as an effective approach for designing and producing customized orthopedic braces.

Feasibility and Applications of 3D Printing TPU on Textile Substrates Using FDM

Wyatt Burke, Abdelhakim Al Turk

Fused Deposition Modeling (FDM) is an AM process that builds parts layer by layer by extruding melted thermoplastic through a heated nozzle. In this study, a LulzBot 3D printer was used to print thermoplastic polyurethane (TPU) onto cotton fabric. This paper investigates the feasibility and applications of 3D-printed textile–polymer composites, with potential uses in soft robotics, orthotic medical devices, back braces, personal protective equipment (PPE), fashion, and smart textiles.

Management of Technology

Session Chair: Sue Abdinnour, Wichita State University

Tuesday
11:00 AM – 1:00 PM

Toward 6G-Driven Ultra-Reliable Low-Latency Networks for Human-Centric Industry 5.0

Tamer Adel Mohamed, Ahmed S. I. Amar, Mohamed Boumalkha

This paper surveys 6G-enabled technologies for Industry 5.0, focusing on ultra-reliable and low-latency communication (URLLC). It reviews architecture integrating terahertz (THz) communication, reconfigurable intelligent surfaces (RIS), multi-access edge computing (MEC), and artificial intelligence (AI)-driven optimization. Key enablers, challenges, and future research directions are identified for secure, deterministic, and sustainable industrial wireless systems.

A Longitudinal Analysis of Strategic Funding Timing and Success Trajectories within the Semiconductor Venture Ecosystem

Yooneun Lee, Seungbeom Kim, KwangWook Gang

This study utilizes Joint Modeling and Competing Risks analysis to examine how funding trajectories drive semiconductor startup exits. By integrating Random Survival Forests and Aalen's Additive models, the research reveals time-varying impacts of investment timing on IPO versus acquisition likelihood, offering a dynamic framework for high-tech venture strategy.

From Anticipation to Action: A Longitudinal Analysis of Public Vaccine Discourse on Social Media

Sue Abdinnour

We analyze 1.6 million vaccine-related tweets to compare public discourse before and after vaccine availability. Using sentiment analysis and topic modeling, we identify major shifts in attitudes and concerns. Findings reveal evolving public sentiment, emerging themes, and significant transformations in vaccine-related communication over time.

Multi-Dimensional Framework for Industry 5.0: Integrating Human-Centricity, Sustainability, and Operational Resilience

Tamer Adel Mohamed, Mohamed Boumalkha, Ahmed S. I. Amar

This paper develops a multi-dimensional framework for Industry 5.0 implementation, addressing the critical transition from technology-centric automation to human-centric manufacturing systems. The research synthesizes recent advances in collaborative robotics (cobots), digital twins, and artificial intelligence to operationalize the three pillars of Industry 5.0: human-machine collaboration, environmental sustainability, and operational resilience.

Education Leadership & Training (B)

Session Chair: Abdelnasser Hussein, University of Houston Downtown

Tuesday
11:00 AM – 1:00 PM

Bridging the Gap: Curriculum Innovation in Manufacturing Engineering to Meet Evolving Industrial Needs

Daniel Efobi, Daniel Fonseca

The University of Alabama's Manufacturing Engineering program, in partnership with IMaDE, is redesigning its curriculum to align with evolving industry needs. Combining theoretical foundations with hands-on skills in manufacturing, automation, and advanced production, it develops students' adaptability, problem-solving, and innovation, preparing them for Industry 4.0 careers or entrepreneurial ventures.

Increasing Ethical Awareness Among Civil Engineering Students: A Statistical Analysis

Elizabeth Cudney

This study examines the impact of an ethics module on the ethical decision-making of civil engineering students. Using pre- and post-surveys with scenario-based judgments, the researchers applied Chi-square analysis to measure changes in ethical perspectives. Results demonstrate the importance of structured ethics instruction in strengthening students' awareness and preparing them for responsible professional practice.

A Systematic Literature Review of Industry 5.0 Concepts in College STEM Courses

Faisal Cheema, Ahmad Elshennawy

Industry 5.0 techniques–such as real-time feedback, gamification, and adaptive learning–can help college-level STEM students in bottleneck courses. These have the potential to lower STEM failure rates, but challenges remain in the implementation of these Industry 5.0 techniques. This paper is a systematic literature review of these concepts in practice.

The Five Factor Framework: A Tool to Increase Engineer Awareness and Skills for Comprehensive Solution-Finding

Shazib Vijlee

The Five Factor Framework—technology, environment, society, politics, and economics—structures a systems-level approach to comprehensive problem solving. Through pre/post assessments embedded in engineering coursework, this study demonstrates how targeted instruction strengthens students' ability to integrate cross-functional constraints and stakeholders, thereby promoting more effective decision-making within complex management and engineering systems

Tuesday 2:30 PM Sessions

Nanomaterials & Nanoengineering

Session Chair: Ramzan Asmatulu, Wichita State University

Tuesday
2:30 PM – 4:30 PM

Acoustic Hologram Enabled Control of Electrospun Nanofiber Trajectory and Deposition

Richard Sack, Adam Lynch, Ramazan Asmatulu

In a novel manufacturing approach, ultrasonic phased arrays generate acoustic holograms in an electrospinning process. The approach enables non-contact control of nanofiber trajectory and deposition, improving process stability and scalability while establishing a field-based manufacturing control capability for advanced electrospun nanofiber production.

Conductive Multilayer Thin Film Coatings on Polycarbonate: Optical and Electrical Property Comparison

Ozge Sagir, Sirac Enes Makaraci, Ramazan Asmatulu

This study examines how varying PVD thicknesses and material configurations influence the optical and electrical properties of coated polycarbonate. Multilayers of ITO/Au/ITO, and ITO/Ag/ITO were analyzed. The test results showed sheet resistances between 7.28 and 16.37 Ω/sq, with transmittance reaching 67.97%, compared to 78.25% for the uncoated reference.

Effects of Spring-Based Holder Configuration and Stiffness on Thickness Distribution and Fiber Orientation in Thermoforming Process

Marawan Rohayem, Halil Yildirim, Ramazan Asmatulu

This study examines the effects of spring-based holder configurations and stiffness in the thermoforming process. The structural performance of thermoformed composite parts relies on thickness distribution and fiber orientation, both significantly influenced by process parameters. Results show that higher stiffness increases shear angles but does not significantly alter thickness distribution.

Improving Flame Resistance of Aircraft Interiors Via Electrospun Polymeric Nanocomposite Fibers

Zaara Ali, Eylem Asmatulu

With the increase in air traffic, safety standards for passengers, crew, and aircraft assets must be continually raised. Traditional cabin materials are combustible and dangerous in case of fire. One solution could be the use of flame-resistant electrospun polymer nanocomposites, which offer lightweight and durable alternatives. The incorporation of flame-retardant additives into polymers is a trend that is safer for aircraft structural and interior components.

Quality Planning & Process Improvement (B)

Session Chair: Bassam Jaradat, Cargill Corporation

Tuesday
2:30 PM – 4:30 PM

A Modified Individual Measurements Charts for Monitoring the Average of 20 > M > 40 Streams

Pedro Augusto Smielevski Casagrande, Gamal Weheba

This research addresses the effect of the number of streams and the level of correlation on the width of control limits. Tables for corrected values of the width factor based on the number of streams and their correlations are proposed.

Preventive Maintenance On-Time Completion Rate Improvement for HVAC at Major University Facilities Management Department

Jeffery Smith

This project applies the DMAIC methodology to improve HVAC preventive maintenance on-time completion at a major university. Using baseline analysis, root cause identification, and process improvements, the team targets increasing completion rates from 65.96% to 75% while establishing a pathway toward a long-term 90% performance goal.

Drowsiness Detection to Avoid Road Accidents

Houda El Bouhissi, John Wang, Jeffrey Hsu

This thesis proposes a driver drowsiness detection system using YOLOv8 to extract eye and mouth descriptors (EAR and MAR). Features are optimized via the Grey Wolf Optimizer (GWO) and classified by a Transformer model. Achieving 89% accuracy on the UTA-RLDD dataset, the approach is designed for real-time ADAS deployment.

Complex Systems Performance & Improvement

Session Chair: Wilfredo Moscoso-Kingsley, Wichita State University

Tuesday
2:30 PM – 4:30 PM

A Physics Based Tool Wear and Production Scheduling Framework for Orthogonal Cutting Applications

Sanley Liss, Wilfredo Moscoso-Kingsley

A physical model of tool wear is utilized to schedule production of a part to be roughed and finished by machining. The model is incorporated in an algorithm that returns minimal cost production schedules. The tool wear model is based on numerical fits to physical simulation of the cutting process.

Mechanistic and Economic Insights into Recent Developments in Modulation Assisted Machining (MAM)

Wilfredo Moscoso-Kingsley

In this presentation the author reviews recent advances in modulation-assisted machining (MAM) and its potential to reduce tool wear and energy expenditure by control of the chip formation process. The mechanisms for reduced wear and energy are analyzed. An economic assessment for MAM is developed by the author.

Comparing Photogrammetry and 3D Scanning for Scan-Based Repair Patch Generation

Diego Pascual, Jutima Simsiriwong, William Seymore

This study compared photogrammetry and 3D scanning for measuring crater defects through error analysis and physical validation. The results are then used in a CAD-based repair workflow that applies dimensional scaling correction to convert scan data into dimensionally accurate, 3D-printable repair patches validated through physical fit testing.

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