2024 ASEE North Central Section Conference - Conference Schedule
March 22-23, 2024 - WMU College of Engineering and Applied Sciences

Friday, March 22, 2024

Welcome Reception - 5:00-8:00pm - Floyd Hall 1st Floor Lobby

NCS Executive Board Meeting - 6:30-8:00pm - Floyd Hall Room D202

Saturday, March 23, 2024

8:00-8:45 AM Light Continental Breakfast - Floyd Hall 1st Floor Lobby

Please check your handouts for list of paper and poster titles!

8:45-10:00 AM Technical Session 1, Floyd Hall

Session 1A, D204 Moderator-Steve Carr		Session 1B, D115 Moderator-Simin Masihi		Session 1C, D109 Moderator-Carmen Cioc		Session 1D, C136 Moderator-Yufeng Hu		Session 1E, D132 Sakhi Aggrawal
Paper ID	**Presenting Time**	**Paper ID**	**Presenting Time**	**Paper ID**	**Presenting Time**	**Paper ID**	**Presenting Time**	**Workshop**
41403	8:45am-9:00am	44590	8:45am-9:00am	44560	8:45am-9:00am	44562	8:45am-9:00am	Developing Self-Regulation in Student Teams: Integrating Project-Based Learning with Scrum
44563	9:00am-9:15am	44591	9:00am-9:15am	44600	9:00am-9:15am	44574	9:00am-9:15am	
44583	9:15am-9:30am	44604	9:15am-9:30am	44608	9:15am-9:30am	44653	9:15am-9:30am	
44602	9:30am-9:45am	44612	9:30am-9:45am	44594	9:30am-9:45am	41170	9:30am-9:45am	
44596	9:45am-10:00am	44615	9:45am-10:00am	44581	9:45am-10:00am	[EMPTY]	9:45am-10:00am	

10:00-10:15 AM Session Break

Please visit D120-Faculty Lounge for a snack or beverage during breaks!

10:15-11:30 AM Technical Session 2, Floyd Hall

Session 2A, D204 Moderator-Steve Carr		Session 2B, D115 Moderator-Simin Masihi		Session 2C, D109 Moderator-Claudia Fajardo		Session 2D, C136 Moderator-Matthew Cavalli		Session 2E, D132 Prakash Ranganathan, et al.
Paper ID	**Presenting Time**	**Paper ID**	**Presenting Time**	**Paper ID**	**Presenting Time**	**Paper ID**	**Presenting Time**	**Workshop**
44584	10:15am-10:30am	44592	10:15am-10:30am	44561	10:15am-10:30am	44635	10:15am-10:30am	How to Design an Interdisciplinary ABET Compatible Cybersecurity Curriculum? A Workshop for Creating Undergraduate Programs
44586	10:30am-10:45am	44603	10:30am-10:45am	44639	10:30am-10:45am	44640	10:30am-10:45am	
44595	10:45am-11:00am	44616	10:45am-11:00am	44551	10:45am-11:00am	44667	10:45am-11:00am	
44643	11:00am-11:15am	44681	11:00am-11:15am	44642	11:00am-11:15am	44572	11:00am-11:15am	
44704	11:15am-11:30am	44674	11:15am-11:30am	44617	11:15am-11:30am	44611	11:15am-11:30am	

11:30-11:40 AM Session Break

11:40 AM-12:40 PM Poster Session, Floyd Hall Second Floor Lobby

12:40-2:00 PM Lunch, Keynote Speaker: Dr. Larry Mallak, Floyd Hall D109

Additional lunch seating can be found in our cafeteria area

2:15-3:30 PM Technical Session 3, Floyd Hall

Session 3A, D204 Moderator-David Sanchez		Session 3B, D115 Moderator-Damon Miller		Session 3C, D109 Moderator-Robin Hensel		Session 3D, C136 Aparajita Jaiswal	Session 3E, D132 Bin Chen
Paper ID	**Presenting Time**	**Paper ID**	**Presenting Time**	**Paper ID**	**Presenting Time**	**Workshop**	**Workshop**
44618	2:15pm-2:30pm	44623	2:15pm-2:30pm	44597	2:15pm-2:30pm	Enhancing Intercultural Learning for Engineering Students through Curricular Innovation	Student Academic Performance Prediction Using Machine Learning
44622	2:30pm-2:45pm	44625	2:30pm-2:45pm	44631	2:30pm-2:45pm		
43106	2:45pm-3:00pm	44636	2:45pm-3:00pm	44641	2:45pm-3:00pm		
45027	3:00pm-3:15pm	44766	3:00pm-3:15pm	44614	3:00pm-3:15pm		
44637	3:15pm-3:30pm	[EMPTY]	3:15pm-3:30pm	44610	3:15pm-3:30pm		

3:30-3:45 PM Session Break

3:45-5:00 PM PM Technical Session 4, Floyd Hall

Session 4A, D204 Moderator-Nicholas Baine		Session 4B, D115 Moderator-Kimberlyn Gray		Session 4C, D109	Session 4D, C136 John C. Olivia	Session 4E, D132 Carmen Cioc, et al.
Paper ID	**Presenting Time**	**Paper ID**	**Presenting Time**		**Workshop**	**Workshop**
44588	3:45pm-4:00pm	44652	3:45pm-4:00pm		Test Drive Simcenter FLOEFD	Empowering Educators: Integrating Engineering Education with KEEN's EML Framework
44620	4:00pm-4:15pm	44657	4:00pm-4:15pm			
44673	4:15pm-4:30pm	44634	4:15pm-4:30pm			
44671	4:30pm-4:45pm	44676	4:30pm-4:45pm			
44664	4:45pm-5:00pm	44781	4:45pm-5:00pm			

5:00-5:30 PM Session Break

5:30-7:00 PM Awards Dinner, Floyd Hall D109

2024 ASEE NCS Conference Agenda

Friday, March 22, 2024

5 to 8 p.m.	Welcome Reception (1st floor lobby)
5 to 7 p.m.	*VR stations available! (Parkview Room, D-132)*
6:30 to 8 p.m.	Executive Board Meeting (room D-202)

Get Connected! Wi-Fi Instructions

1. Connect to the network titled WMU Guest
2. If your device does not prompt you to agree to the Acceptable Use Policy, please open a web browser and you should be redirected to the Acceptable Use Policy page.
3. Accept the policy. You are now connected to the network

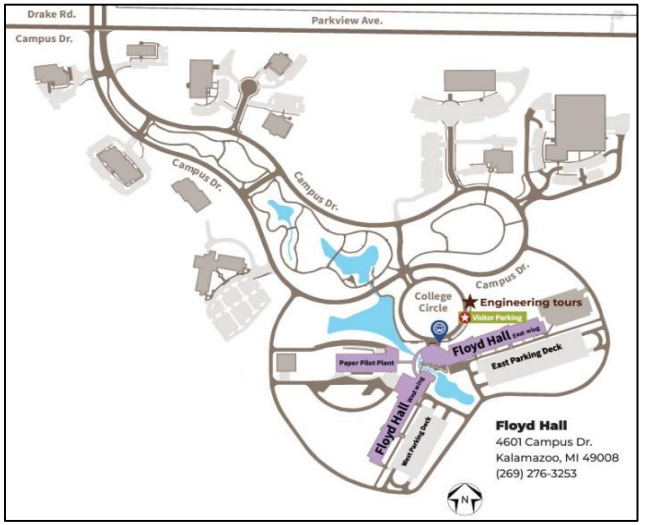
Driving Directions

Driving from Delta Hotels (2747 South 11th Street, Kalamazoo) to WMU College of Engineering and Applied Sciences West Parking Deck (4701 Campus Drive, Kalamazoo)

Saturday, March 23, 2024

8 to 8:45 a.m.	Light Continental Breakfast (1st floor lobby)
8:45 to 10 a.m.	Technical Session 1
10 to 10:15 a.m.	Session Break 1
10 to 11:30 a.m.	*Posters can be set up (2nd floor lobby)*
10:15 to 11:30 a.m.	Technical Session 2
11:30 to 11:40 a.m.	Session Break 2
11:40 a.m. to 12:40 p.m.	Poster Session (2nd floor lobby)
12:40 to 2 p.m.	Lunch with Keynote Speaker Dr. Larry Mallak (room D-109)
2:15 to 3:30 p.m.	Technical Session 3
3:30 to 3:45 p.m.	Session Break 4
3:45 to 5 p.m.	Technical Session 4
5 to 5:30 p.m.	Session Break 5
5:30 to 7 p.m.	Awards Dinner (room D-109)

WMU College of Engineering and Applied Sciences (Floyd Hall)



Workshop Abstracts

Workshop Title: Developing Self-Regulation in Student Teams: Integrating Project-Based Learning with Scrum

Time: 8:45-10:00am Location: C136

Abstract:

In the dynamic field of higher education, cultivating self-regulation within student teams is crucial for effective learning. This workshop, "Developing Self-Regulation in Student Teams: Integrating Project-Based Learning with Scrum", aims to explore the intersection of project-based learning (PBL) and Scrum methodology as a transformative approach to education. PBL, known for its emphasis on real-world problems, enhances student engagement and responsibility. When combined with Scrum, an agile framework designed for efficient project management, it offers a structured yet flexible approach that promotes self-regulation and collaborative problem-solving among student teams.

The workshop offers a blend of theoretical insights and practical applications. Participants will explore the principles of PBL and Scrum, and their combined potential to enrich learning environments.

Attendees will leave the workshop with a comprehensive toolkit, including detailed guides on implementing PBL and Scrum in their courses, templates for project planning and evaluation, and access to a network of educators for ongoing support and collaboration. This repository of resources, coupled with the practical experience gained, will enable educators to effectively transform their teaching methods and enhance self-regulation and teamwork in student groups.

Workshop Title: How to Design an Interdisciplinary ABET Compatible Cybersecurity Curriculum?

A Workshop for Creating Undergraduate Programs

Time: 10:15-11:30am Location: C136

Abstract:

Nowadays, there is a remarkable need for running undergraduate cybersecurity programs. This is because of growing cyber threat landscape and the high demand for the workforce in industry. Creating of such undergraduate programs require designing curriculums ensuring interdisciplinary connections as a result of the technical and societal scope of the cyber security. Moreover, it is important to build well-rounded sets of courses, which are compatible with the ABET criteria. Eventually, such cyber security curriculum should also reflect strategies for attracting and engaging students from diverse backgrounds. Moving from the related state, this workshop aims to share experiences by the presenter team and trigger a collaborative study environment to think about how to design the desired cybersecurity programs.

The flow of the workshop will start with a general introduction to the impact of cyber world and threats, and a discussion on recent perspectives / future insights from the industry. Next, the workshop will point the role of higher education institutions for catching the needs effectively, and explain the foundational knowledge and skills of cybersecurity as well as their integration in the context of Electrical Engineering and Computer Science.

These will be followed by evaluating the compliance of a created program with the ABET criteria and discussing about the pre-requisite courses that can serve as a foundation for the students from different backgrounds. The next steps will include general evaluation of active cybersecurity programs around the U.S, and a brief presentation of the proposed curriculum design in the University of North Dakota (UND), School of Electrical Engineering and Computer Sciences (SEECS). The workshop will then divide the participants into

Workshop Title: Enhancing Intercultural Learning for Engineering Students through Curricular Innovation

Time: 2:15-3:30pm Location: C136

Abstract:

study abroad. This session focuses on using curricular innovation to scale up intercultural competence development on campus by leveraging the campus's learning management system (e.g., Canvas, Moodle, Brightspace). The goal of this session is to help participants implement the use of backward design model for creating short interactive modules on intercultural learning that could be integrated into any STEM course. We will showcase the Portable Intercultural Modules (PIMs), created by Purdue University, CILMAR team.

The goal is to offer a concise overview of PIM, outlining the rationale behind their creation, the learning theories that guide their design, and the necessity they address. We will delve into the structure of a specific PIM, discussing its learning objectives, embedded activities and capstone assignment. Additionally, we will present concrete examples illustrating how PIMs are seamlessly integrated into both courses and in a learning community at Purdue University and how their effectiveness has been established through research. The session will include an interactive group activity where participants collaborate to brainstorm topics and outline content and activities for an asynchronous module that meets the learning needs with which they work. Finally, the session will conclude with a Question and Answer session.

Workshop Abstracts Continued

Workshop Title: Student Academic Performance Prediction Using Machine Learning

Time: 2:15-3:30pm Location: D132

Abstract:

Educational data analysis has become an effective tool to predict student academic achievements. This workshop will introduce machine learning algorithms for classification and regression, and use public student academic datasets as examples to predict student performance using the latest machine learning algorithms. Participants will gain hands-on experience with machine learning models and predictions, enabling them to tackle diverse tasks such as: forecasting final grades for a specific course, predicting overall GPA for an academic year, or estimating the likelihood of graduation.

Workshop Title: Test Drive Simcenter FLOEFD

Time: 3:45-5:00pm Location: C136

Abstract:

The workshop I am proposing falls under the topic area of simulation tools and applications integrated for education in engineering and technology. In my role as a Solutions Consultant at Siemens Digital Industries Software, I primarily support a tool named Simcenter FLOEFD. FLOEFD is a CAD embedded computational fluid dynamics (CFD) tool that puts the power of a general purpose CFD suite in the hands of engineers without the need for advanced training in fluid mechanics or computational methods. We have thousands of corporate customers that use FLOEFD around the world to design and analyze systems spanning industries and disciplines.

I would like to propose a hands-on workshop for the 2024 North Central Section Conference in which attendees can try FLOEFD out for themselves. The session will focus on how FLOEFD can be incorporated into engineering and technology curriculums to supplement learning objectives. The real power of a tool like FLOEFD can be leveraged in classes where insight into thermal / fluid systems is beneficial, but they are not the focus of the class itself. Simcenter FLOEFD is simple enough that it can be used by first year engineering students, or even pre-college students, yet it is still powerful enough to be used in industry by professional engineers.

At the end of the workshop, attendees will learn how they can get Simcenter FLOEFD for use by their students and colleagues back at their home institutions. Even though we are a software company, please recognize that we are not trying to sell anything through this outreach effort. Siemens has a well-established grant program in which our software is provided to academic institutions largely free of charge.

Workshop Title: Empowering Educators: Integrating Engineering Education with KEEN's EML Framework

Time: 3:45-5:00pm Location: D132

Abstract:

This session serves as an introduction and offers a platform and examples for seamlessly adopting and implementing Entrepreneurial Mindset Learning (EML) initiatives in engineering science and engineering technology education curricula. The primary focus is on sharing best strategies and practices implemented and tested by the workshop facilitators in their own courses.

This will be accomplished through demonstrating the efficacy of EML in enhancing students' engineering knowledge and skills and enhancing their preparation for the professional environment. The discussion also includes various forms of assessment to support EML.

This 90-minute workshop aims to achieve three primary objectives:

1. Present and discuss entrepreneurship as an effective pedagogical approach.
2. Familiarize the participants with the KEEN EML framework.
3. Complete an activity in which EML is applied in a scenario:

- Participants will collaborate to create rubrics for both individual and group-based assignments within their respective courses.
- Engage in a brainstorming session to generate ideas for their individual EML-related projects and explore the concept of drafting a card

List of Poster Presentations

Poster ID	Poster Title
P1	Experimental Determination of the Thermal Resistance for Free Convection in 10-PPI Open-Cell Aluminum Foam
P2	GLP1R, an Exceptional Drug Target for Diabetes and Weight Loss, is Decreased in Alzheimer's Disease
P3	Final Development of Next Generation Column Guard for Storage Rack Protection
P4	Novel Eutecto-Gel Methods for Water Purification
P5	Low-risk Assessment of Fluid Mechanics Understanding through Real-Time Personal Response
P6	Hand Therapy Through Simulation of Recoil, Racking, and Reloading Motions
P7	Internet of Things for the James Lehr Kennedy Building at Ohio Northern University
P8	Superior Slapshot Systems - SSS
P9	Traffic Flow Management of the State Street-Bayfront Parkway Intersection with Simulation Modeling and Analysis
P10	Graphical User Interface for Malicious Device Detection Applications
P11	Heart Arrhythmia Detection Using AI-Driven Techniques
P12	Reduction of Process Takt Time for Wheels of Mining Trucks via Simulation
P13	Machine Learning for PPG Analysis in Wearable Health Devices
P14	Integrating Sustainability across Engineering Curricula
P15	A Novel Haptic System with Advanced Force Sensing Capabilities for Soft-Robotic Applications
P16	Impact of HIV1-Vpr on Cell Replication
P17	Digital Twin-enabled Smart Infrastructure Management: A Data Fusion Based Decision Support System for Predictive Maintenance
P18	Water Collection Unit at Because You Care Animal Shelter
P19	Spray Cooling of Metal Disks and Spur Gears at High Rotational Speed and Load Conditions
P20	LeafLife: A Plant Monitoring System
P21	Identification & Quantification of the Bus-related Features Affecting the Usage of Park & Ride System: A Case of Madinah, Saudi Arabia
P22	Enhancing Intercultural Competence in Pre-Freshman Study Abroad Students
P23	Preparation of Brewer’s Spent Grain Film for Food Packaging Application
P24	Digital Twin-based Fire Safety Management Framework for Smart Buildings
P25	Development of a Portable Photo-/Chemi-luminescence Sensor Based on Low-cost Silicon Avalanche Photodiode
P26	Exploring the Roots of Intercultural Competence: Insights from the Beliefs, Events, Values, Inventory (BEVI) Scale
P27	H2-NO
P28	Electrohydrodynamic Thrust Generation and Measurement
P29	The HuLC Smash Lunar Landing Pad
P30	Gaming, SolarPunk, and Afrofuturism: Experimenting with Themed Pop-up Collections in Grainger Engineering Library
P31	EEG-Based Emotion Recognition Using Convolutional Neural Network Method
P32	Self Maintaining Solar Panel
P33	Robotic Football Localization and Tracking System
P34	The Solar Scrubber
P35	PolarProf Unleashed: Custom Education Game Capstone
P36	C++ Neural Networks
P37	A Natural Language Processing-based Approach to Automated Construction-oriented Quantity Take-off
P38	Experimental AIr Heater For Internal Convective Heat Transfer Research

Professional Papers

Paper ID	Paper Title
41170	Design of Simulator Test Interfaces for Wireless Sensor Networks
41403	Progress in K-12 Computer Science Education: are Engineering Students Being Left Behind?
43106	The Bridge Down the Road: Review of Bridge Programs for Graduate School
44560	Can Courses Improve Courses?
44561	Optimizing the Design for Additive Manufacturing Project in the Manufacturing Processes Lab Course Using the Taguchi Orthogonal Arrays
44562	Towards Fuzz Testing a Procedurally-Generated Video Game
44563	Advancing Engineering Education with a Comprehensive and Continuous Course Assessment Framework
44572	Narrative Integration in Engineering Education through Story-Based Pedagogy: Lessons from a First-Year Engineering Case Study
44574	Use of simulation and power electronics hardware trainer for teaching an introductory undergraduate power electronics course
44581	The Service We Offer in Teaching About Common Sense
44583	Updates on a Work in Progress Assessing Student Perceptions of the Benefits of Continuing HyFlex Course Format Beyond the Covid-19 Pandemic
44584	Cadence setup for chip layout
44586	Development of a 3-Credit Multidisciplinary University Autonomous Vehicles Course Without Prerequisites and Open to Any Major
44588	Designing a Cyber Security Engineering Curriculum by Considering Multi-Field Programs
44594	Impact of Mentoring and Skills Sessions on Student Professional Preparation
44595	Implementation of a Semester-long, Real-World Problem Project in a Critical Systems Thinking Course
44596	Curriculum Design for Wind and Solar Energy Education
44597	The Impact of Social Networking on Retention of Mothers in Engineering Careers
44600	Combined Degree Scholarship Program. A Great Opportunity Which Can Come with Hard Choices
44602	Finessing the Introductory Standards Workshop: Efforts Toward Active Learning
44608	Early Dropout Risk Detection in Regional Universities
44611	Modeling and Simulation Analysis of Coal Fly Ash Compounds Settling in West Virginia
44614	Impact of Formative and Summative e-Assessment on the Active Learning Process
44618	Incorporating Sustainability Concepts into the Course Design of Fluid Mechanics: An Approach to Improving Studentsâ€™ Problem-Solving Skills with Environment Science
44620	Developing Teamwork Skills Across the Mechanical Engineering Curriculum
44622	An elective course in Green Chemical Engineering and Sustainability
44631	Work In Progress - Building Empathy without Community Partners
44635	First Year Civil and Architectural Engineering Student Project
44637	Revisiting Undergraduate Student Engagement Through Hands-On Laboratory Activities
44640	A Three Year Perspective: Effectiveness And Lessons Learned From An Engineering REU Program
44641	Data Driven Methods for Improving Team Culture within Capstone Capstone Design
44643	Sustainability-Focused Project-Based Learning in a Heat Transfer Course
44653	Exploring Taxi-Out Times at Airports with Intersecting Runways Using Discrete-Event Simulation
44664	The benefits of design-project learning approach in an engineering course
44667	Undergraduate Research Experiences for Automated and Connected Vehicle Algorithm Development using Real Vehicles
44671	Integrating Innovation: A Transdisciplinary Approach to Engineering Education with AI and Lean Six Sigma
44673	Developing a Writing Rubric to Answer Research Questions (not for Grading!)
44704	Sustainability Components Assessment of Engineering Capstone Projects at Western Michigan University
44781	Promoting Distance Learning in Metal Casting by Implementing Four Simulation Activities
45027	Determining Student Self-Efficacy as Engineers Through a Multi-Cohort Mechanical Engineering Design Project

Student Papers

Paper ID	Paper Title
44551	Walk and Draw: Digital Cartography as Artistic Practice for K-12 Students
44590	Engineering Experiences and Lessons Learned from 2023 Annular Eclipse Ballooning
44591	Visualizing the Invisible: Object Detection via Wi-Fi Signal Mapping Emulation
44592	Development of a VHF/UHF-Band Video-Streaming Payload for Near-Space Operation and Lessons Learned
44603	Work In Progress: A Hands-On Activity on Equilibrium of Rigid Bodies in Statics
44604	Development and Validation of an Experimental System for Investigating Oxygen Singlet Sigma State Effects on Premixed Methane-Air Flames
44610	Enhancing Student Understanding of Thermodynamic Principles Through 3D Visualization
44612	Design of a Smart Alert System Based on Electroencephalography Signal Analysis
44615	A Study of the Effects of Commercially Available Self-Cleaning Coatings on Photovoltaic Panels
44616	Converting Text Into 3D Printable Braille
44617	Enhancing Student Understanding of Digital logic and Computer Architecture Through Turing Complete Game Challenges
44623	A Study of Ackerman Steering and Its Applicability to SAE Mini Baja
44625	Fault Recognition and Mitigation in Food Processing Equipment
44634	The Effect of Injection Molding Process Parameters on the mechanical properties of ABS and PP polymer
44636	Photogrammetry System to Reconstruct Syndactyly Hand Models
44639	Navigating Academic Feedback: A Comparative Study of Topic Modeling Techniques
44642	Campus Interactive Map Application
44652	On Amino Acid Modeling with Efficient Neural Architecture Search - An AutoML approach
44657	A Dive into Vehicle Suspension
44674	Creating Interdisciplinary Sustainability Focused Projects for Engineering Students Through Partnership with Company Y
44676	Assessment of the Integration of Artificial Intelligence (AI) into Building Information Modeling (BIM) for Smart Construction Management and Decision-Making
44681	Quantum and Classical Supervised Learning Study of Synthesisâ€“Structure Relationships in Epitaxiallyâ€“Grown ZnO
44766	Helping Pedestrians with Special Needs to Cross the Roads using a Robot