



2026 ASEE North Central Section Conference

Transformative Engineering

March 27-28, 2026

University of Mount Union

Brenton School of Engineering

Alliance, OH



Friday, March 27, 2026

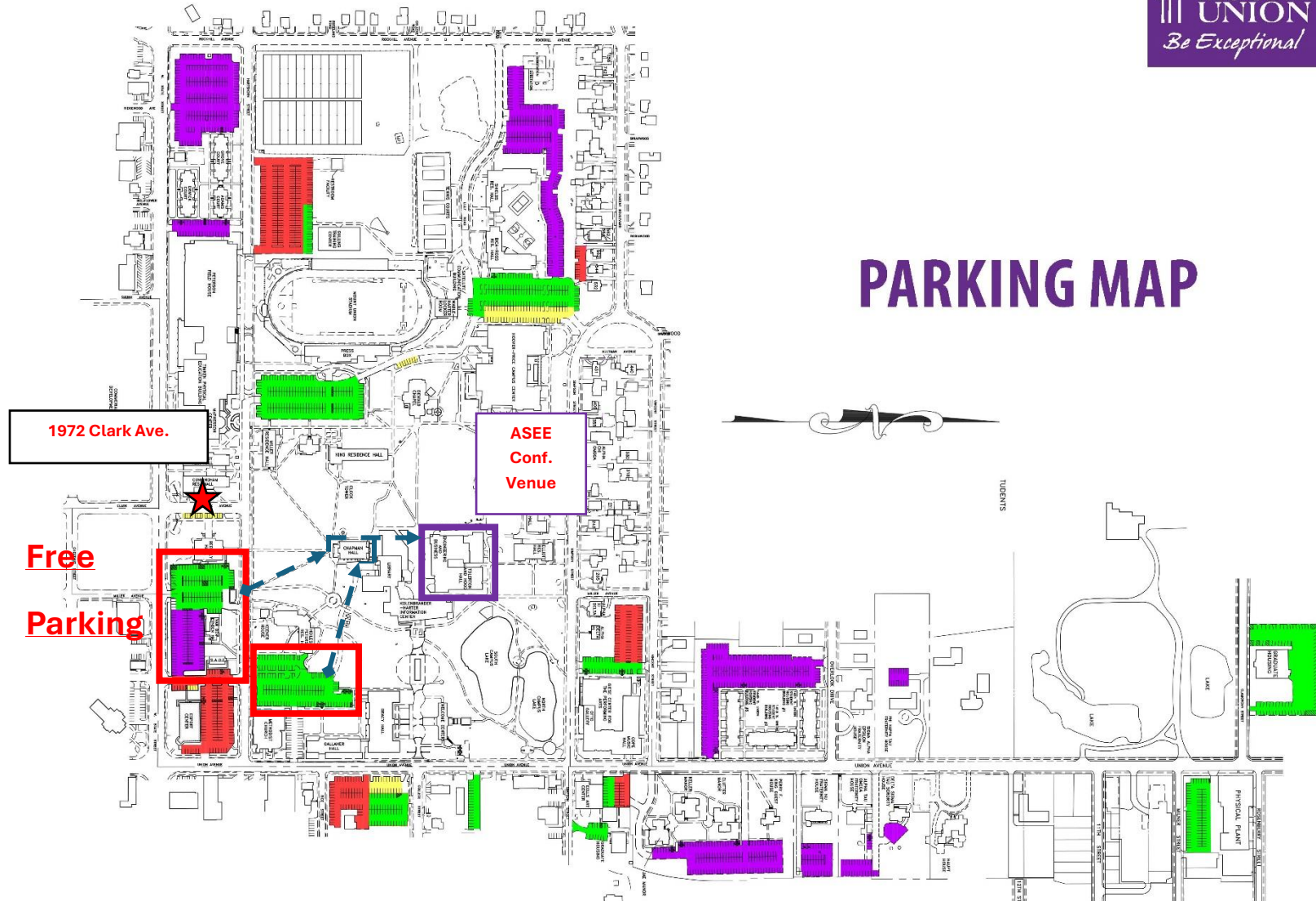
- 5:00 – 8:00pm Registration and Welcome Table (Outside Oak 144)
- 5:00 – 8:00pm Welcome Reception with Appetizers (Oak 144)
- 6:30 – 8:00pm ASEE NCS Executive Board Meeting (Oak 200)

Saturday, March 28, 2026

- 8:00 – 11:00am Registration (Oak Lobby)
- 8:00 – 8:45am Light Continental Breakfast (Oak Lobby)
- 8:45 – 10:00am **Technical Session 1**
- 10:00 – 10:15am Break with Drinks and Snacks (2nd Floor of Oak Hall and Oak 144)
- 10:15 – 11:30am **Technical Session 2**
- 11:30 - 11:45am Break
- 11:45 – 1:15pm Conference Lunch and **Keynote with Dr. Caroline Baillie** (HPPC – Kresge Solarium)
- 1:30 – 2:00pm Poster Session (Oak and T&H 1st Floor Hallway)
- 2:15 – 3:30pm **Technical Session 3**
- 3:30 – 3:45pm Break with Drinks and Snacks (2nd Floor of Oak Hall and Oak 144)
- 3:45 – 5:00pm **Technical Session 4**
- 5:00 - 5:30pm Break
- 5:30 – 7:00pm Awards Dinner (HPPC – Newbold Room)

Driving Directions and Parking

Parking is Free on the Mount Union campus for the conference on Friday afternoon and Saturday. Please park in the designated parking lots as indicated on the Parking Map. The star marks the spot of 1972 Clark Ave., Alliance, OH 44601. The parking lots for the conference are a short walk (<5 mins.) from the conference venue Oak Hall/Tolerton&Hood Hall as indicated by blue dash lines on the Parking Map. There are two other events on campus Saturday, so parking in other lots on campus may be limited.



PARKING MAP

BUILDING KEY

| | | |
|------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------|
| 1. Hartshorn Street Townhouses | 22. Elliott Residence Hall | 41. Bracy Hall of Science |
| 1a. Orwick Court | 23. Oak Hall | 42. Clarke Astronomical Observatory |
| 1b. Adams Court | 24. Tolerton and Hood Hall | 43. Gartner Welcome Center |
| 1c. Grove Court | 25. Kolenbrander-Harter Information Center (Library) | 44. Alpha Xi Delta Sorority House |
| 2. Moore Field at Wable Park | 26. Chapman Hall | 45. Giese Center for the Performing Arts |
| 3. Montgomery Field | 27. King Residence Hall | 45a. Brush Performance Hall |
| 4. Gullwing Training Center | 28. Dewald Chapel | 45b. Gallaher Theatre |
| 5. Dom and Karen Capers Academic and Athletic Center | 29. Victoria's Garden | 45c. Otto Art Gallery |
| 6. Whitehill Tennis Courts | 30. Mount Union Stadium | 45d. Cope Music Hall |
| 7. Shields Residence Hall | 31. Miller Residence Hall | 45e. Presser Recital Hall |
| 8. Bica-Ross Residence Hall | 32. McPherson Academic and Athletic Complex (The MAAAC) | 46. William H. Eells Art Center |
| 9. Commuter Student House | 32a. Peterson Field House | 47. Simpson Apartments |
| 10. 532 - 564 Vincent St. | 32b. Timken Physical Education Building | 48. Brown Village |
| 11. Weber House | 32c. McPherson Center for Health and Well-Being | 48a. Jae Manor |
| 12. 330 - 254 Vincent St. | 33. McCready Residence Hall | 48b. Keller Manor |
| 13. 205 Simpson St. | 34. Cunningham Residence Hall | 48c. Clutter Manor |
| 14. Diversity Center and Black Student Union Offices | 35. Beeghly Hall | 49. Perry F. King Guest House (Alpha Delta Pi Sorority House) |
| 15. Alpha Chi Omega Sorority House | 36. van den Bynden Hall | 50. Sigma Nu Fraternity House |
| 16. 355 Simpson St. | 37. Structural and Geotechnical Engineering and Projects Lab (SAGEP Lab) | 51. Alpha Tau Omega Fraternity House |
| 17. Campus Security | 38. Esports Center | 52. Dussell House (Delta Sigma Tau Sorority House) |
| 18. 431 Simpson St. | 39. Hoiles-Peterson Residence Hall | 53. Fred J. Haupt President's House |
| 19. Hoover-Price Campus Center | 40. Gallaher Hall | 54. Phi Kappa Tau Fraternity House |
| 20. McMaster Residence Hall | | 55. Sigma Alpha Epsilon Fraternity House |
| 21. Ketcham Residence Hall | | 56. Union Avenue Townhouses |

Buildings 23-24: Conference Venue - Oak and Tolerton&Hood (T&H) Halls

Building 19: Lunch, Dinner and Award Ceremony – Hoover-Price Campus Center (HPCC)

Important Information and Schedule Notes

Internet Access – All conference goers can access the UMU-Guest wireless while on-campus.

Paper Oral Presentations – The conference preference for oral presenters is to bring their presentation on a USB drive to the presentation room and load onto the A/V system desktop. A UMU faculty member or student will be present to assist with this. As a back-up, you may use your own device to connect to the A/V system HDMI cable, though please bring the correct adaptor for your device to connect.

Each presenter will have a **15-minute time slot**, which includes a 10 min. presentation, 2-3 minutes for Q&A and 2 minutes to transition to the next presenter. Please plan accordingly ahead of time. The session moderator will show a 2 minute remaining card to you at the 8 minute mark.

Poster Presentations - The poster session easels and boards will have pushpins provided for each poster. The posters will be located in the first-floor hallways of Oak Hall and T&H Halls. Each board will be clearly marked with a number that corresponds to the poster in the program. You will be able to attach your poster to the boards **after 11am**. Please remove your poster after the poster session is completed so that the conference can break down the easels and boards.

Restrooms and Elevators – Restrooms are located on each floor of Oak Hall and Tolerton&Hood Hall. In HPCC restrooms are located inside the luncheon venue and in the hallway. Tolerton&Hood hall has an elevator to provide accessibility from the first floor to the 2nd floors of Oak Hall and Tolerton&Hood Hall.

Conference Lounge – Oak Hall 144 (1st Floor) will be open throughout the conference on Saturday, March 28th, for attendees to have a space to relax and network. Refreshments will be available at 10am and 3:30pm in Oak 144.

Technical Session 1 – 8:45am-10:00am

| Session 1A, T&H 201 Moderator: Carmen Cioc | Session 1B, Oak 203 Moderator: Abishek Balsamy Kamaraj | Session 1C, Oak 206 Moderator: Philip Rufe | Session 1D, T&H 230 Moderator: Yin-ping Chang |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 54074. Integrating AI-Enabled, Student-Created Design Projects in Fluid Mechanics and Mechanical Design Courses. <i>Carmen Cioc, Sorin Cioc, Noela A. Haughton</i> | 54174. GRID Flowcharting: An Algorithmic Approach to Generating Pedagogical Flowcharts. <i>Torsten Maier, Andrew Lawrence Watchorn</i> | 54058. Learning by Measurement: Student Experiences in Quantifying Video Streaming Quality from High-Altitude Balloon Payloads. <i>Isaiah D Yoder, Connor J Angiel, Wookwon Lee, Nicholas B Conklin</i> | 54089. A Finite Element Analysis Comparing the Biomechanical Stability of Fascia-Wrapped versus PRF-Embedded Diced Cartilage Grafts in Dorsal Augmentation Rhinoplasty. <i>Yewon Jang, Colleen H Kottmyer, Hui Shen</i> |
| 54202. An Educational Comparison of Classical and Modern Controllers on Truss Structures with Stress-Based Sizing Constraints. <i>Charles Richard DiCanio, Arjumand Ali</i> | 54195. Integrating the Indy Autonomous Challenge into Scalable Coursework, Research, and Outreach at a Land-Grant Public University. <i>Josh Siegel, Daniel Morris, Shaunak D. Bopardikar, Pragyan Dahal, Judson Herzer</i> | 54205. Reimagining Engineering Education Through Arts-Based Research: Centering the Social in our Social Science. <i>Elizabeth Meintel, Whitney Gaskins</i> | 54234. Integrating User-Centered Design and Ethics in Biomedical Engineering Curriculum using Disability Context. <i>Paul David Gordon</i> |
| 54239. Challenges and Opportunities in Launching and Accrediting a New Civil Engineering Program. <i>Emad Y Tanbour, Suleiman A. Ashur, Raed Jarrah, Asmaa Radwan</i> | 54196. Leading Educational Transformation: How One Secondary School Pioneered University Research Integration to Inspire STEM Exploration. <i>Josh Siegel, Kieren Reynolds, Gregory C Miller, Katherine Sinclair, Pragyan Dahal</i> | 54244. The Importance of Language Arts in Early Engineering Education: A Look into the Boys in Engineering Academy. <i>Christopher Thomas Frontiero</i> | 54071. Development of a Method for Measuring Human Skin Mechanical Properties for Surgical Applications. <i>Anna Dillenbeck, Arilanto Randy Ramanase, Hui Shen</i> |
| 54252. A Study on the Fundamental Metrics Impacting Ranking of Engineering Schools. <i>Asmaa Radwan, Mohamad S. Qatu</i> | 54207. Teaching Showcase: Recognizing and Encouraging Teaching Faculty Innovation. <i>Robin A.M. Hensel, Susie A. Huggins, Todd R Hamrick, Lizzie Santiago</i> | 54281. Employer Expectations and Student Self-Perceptions of Employability Skills in Construction Management: A Quantitative Analysis. <i>Rachana Bekkem, Salem k Alrosan, Franklin Kwame Owusu Acheaw, Raed Jarrah</i> | 54240. Bridging the Gap in Undergraduate Engineering Education through a Semester-Long Transformer- and LLM-Based Cancer Cell Image Classification Project. <i>Ashish Kharel, Bhaavya Srivastava, Thien Quy Pham, Arjun Raj Rajesh, Anita Esmaeilian, Shirin Kazemi Varnamkhasti, Bhaigyashree Hazarika</i> |
| 54213. Superpixel-Based Semantic Segmentation of Hyperspectral Strawberry Images Using Perceiver-Style Cross-Attention. <i>Aniruddha Maiti, Kartha Veerya Reddy Jammuladinne, Ayesha Sarker</i> | 54229. Building a Closed-Loop Bioprinting System Through Multi-Level Mentorship: Integrating High School, Undergraduate, and Graduate Students in Interdisciplinary Research. <i>Abishek Balsamy-Kamaraj, John Chibueze Chikwe, Ethan Moon</i> | 54225. Westward: The Oregon Trail Game Reimagined. <i>Benjamin Westover, Dylan Michael Catte, John K. Estell</i> | |

Technical Session 2 – 10:15am-11:30am

| Session 2A, T&H 201 Moderator: Thuan Do | Session 2B, Oak 203 Moderator: Susie A. Huggins | Session 2C, Oak 206 Moderator: Akua Oppong-Anane | Session 2D, T&H 200A |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 54255. Development of A Low-Cost Rotational Motion Test System Through Interdisciplinary Senior Design. <i>Zhijun Wu, Yin-ping Chang, Daniel Llamocca</i> | 53729. Little Squaw Creek Historical Runoff Analysis, Stream and Bank Reconfiguration: A Project-Based Engineering Technology Case Study. <i>Robert J. Korenic</i> | 54173. A Capstone Software Project for Teaching Engineering Economics: Design of an Interactive Cash Flow Diagram Tool. <i>Ryan Fehn, Torsten Maier</i> | WORKSHOP 54531. Transformative Engineering: Learning from Nature. <i>Shehla Arif, Caroline Baillie, Ananda Lee Tan</i> |
| 54273. Developing a Structured Curriculum for Building Energy Modeling: Process, Challenges, and Initial Outcomes. <i>Baye Alioune Ndiogou, Fatima Kebe, Nassif E Rayess</i> | 54180. Understanding Construction Standards Through ACI Field Testing Technician Certification Program. <i>Sujan Subedi, Luis A Mata</i> | 54222. A Capstone Design Project based on requirements of a Community-Based Organization. <i>Demetrios N Svingos, Brian D. Woerner, Andrew C. Nix</i> | |
| 54274. The accuracy and robustness of a student-developed pin-ball machine compared to a commercial projectile launcher apparatus. <i>Yin-ping Chang, Zhijun Wu</i> | 54284. Factors Influencing Women’s Pathways into Construction Management Careers: A Quantitative Comparative Study. <i>Tehetna Suraphel Hailu, Adam Joseph Bogedain, Suleiman A. Ashur</i> | 54265. Are Lightweight Vision Transformers Enough for Deepfake Face Detection? Performance, Scalability, and Explainability Study. <i>Omar Al Babele, Pingping Zhu, Trevor Bihl, Wook-sung Yoo, Haroon Malik</i> | |
| 54278. Experiential Learning in Online Engineering Education: A Pilot Study in Fluid Mechanics. <i>Carmen Cioc, Sorin Cioc, Noela A. Haughton</i> | 54184. STATLER CONNECT: A Structured Alumni-Student Mentorship and Networking Model for Engineering Education. <i>Omar Ahmed Al-Shebeeb, Cerasela Zoica Dinu, Philomena Krosmico</i> | 54078. Intelligent Cat Toy Capstone: A Case Study in Data-Driven Product Development. <i>Macy Jayne August, Julia Ann DeVore, Jonathan Heinlein, Max Watercutter</i> | |
| 50434. The West Virginia Bridge Design and Build Contest: Engaging K–12 Students through Hands-on Engineering. <i>Cameron Robert Rusnak, Brian Dickman, Kase Poling</i> | 54283. From Duty to Mentorship: Strategies for Strengthening Faculty Advising in Engineering Education. <i>Isaac W Wait, Greg Michaelson, Justin Fleming</i> | 54263. Predicting Injury Severity in Highway Construction Zones Using Descriptive Frequency Analytics and Multinomial Logistic Regression. <i>Tehetna Suraphel Hailu, Suleiman A. Ashur</i> | |

Conference Keynote Address – 11:45am-12:20pm (at the beginning of lunch), HPCC Kresge Dining Hall Solarium

Transforming Engineering Education: Transdisciplinarity and Sustainability

Dr. Caroline Baillie, University of San Diego

In 2020 we saw the beginning of what is now a familiar and unwelcome challenge to global health. The covid pandemic arrived and everyone across the globe, in all walks of life experienced irreversible changes to their lives. During the same period we saw increasing unrest amongst those who understood the inequities in our systems. We saw the impact of climate change at an ever-increasing rate with floods and wildfires, to add insult to injury to those already suffering the impact of the pandemic. Today we face unprecedented threats to our social, political, economic and environmental systems. We urgently need to ask the question: how can our engineering education programs live up to these demands? How can we support the development of graduate capabilities for an unknown future? In this talk I will explore some key concepts and underlying questions around the need for transdisciplinary approaches to our education system. I will then share the emerging story of *MESH (MS Engineering, Sustainability and Health)*, which was born out of the pandemic and has now supported multiple cohorts along its pathways. More so than a single University course, I would like to see MESH as a paradigm of change towards true transdisciplinary learning, which can shed the light on our undergraduate programs for the future.

Keywords: transdisciplinary; sustainability; social justice; liminal space



Caroline Baillie is Professor of Integrated Engineering and Social Justice at the University of San Diego, and Director of MESH – MS in Engineering, Sustainability and Health. She brings over 30 years of experience in teaching engineering across multiple engineering disciplines and countries, research and development in engineering and education as well as community development and social justice work. Previously she was Chair of Engineering Education for the Faculty of Engineering, Computing and Mathematics at

University of Western Australia, Chair of Engineering Education at Queens University, Canada, educational developer and materials lecturer at Imperial College, UK and the University of Sydney as well as holding a three year position founding and running the Materials Engineering Subject Centre in the UK. Baillie’s research considers socio-technical processes and systems, which enhance social justice, and educational systems that promote these. She brings lessons learnt from these studies and practices into the curriculum and the classroom to facilitate the transformation of future generations of engineers. In 2006 Baillie founded Waste for Life (wasteforlife.org), to ‘practice what she preached’ as a socially just engineer. WFL ‘socialises knowledge’ about materials engineering with communities wishing to transform waste into composite material products for income generation. Her most recent program, ‘Standing People Together’ <http://wasteforlife.org/spt/> adapts *forest school* / nature based pedagogy in support of grassroots community work. Baillie also co-founded the Engineering Social Justice and Peace network in 2004 (esjp.org). She has published 27 scholarly books, an edited series of books on ‘Engineers, Technology and Society’ and over 200 book chapters, peer reviewed journal and conference papers. Her most recent book, (Coedited by Paul Kadetz) ‘Reimagining Engineering Education: Health. Justice. Sustainability’ with Springer was published in 2024.

Poster Session – 1:30pm-2:00pm – Oak and T&H 1st Floor Hallways

| Poster# | Paper ID | Title | Authors |
|---------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1 | 54061 | Designing a Portable Roller System for Recycling Boat Shrink Wraps | Kyle Westfall |
| 2 | 54087 | Design of an Autonomous Trash Collection System For Hospital Use | Charles Remesz, Qin Hu |
| 3 | 54164 | Design and Development of an Autonomous Indoor Mail Delivery Robot | Samuel Heaton, Qin Hu, Ashok C. Crawford, Sajad Jasim Abood, Agnes Peruth Nakimuli, Muhammad Humzah Ashraf |
| 4 | 54183 | Lessons Learned for Industry-Based Engineering Capstone Projects: A Coordinator's Perspective | Makenzie Keepers |
| 5 | 54187 | Teaching Strategies in the First-Year Engineering Seminar Course | WenJuan Mo, Lizzie Santiago, Susie A. Higgins, Akua B. Oppong-Anane, Gia Huy Pham |
| 6 | 54193 | Omnidirectional Drive System Robot | Brad Hanely, Quentin Louis Osterhage, Trent R. Kelleman, Ashton Beresford, Henry Charles |
| 7 | 54203 | Effects of Calming Music on Muscle Activation During a Stressful Social VR Simulation | Ayana Mei Ihara, Kinsey Cotton Kelly |
| 8 | 54204 | Thrill or Tension: Physiological Response to VR Rollercoasters in Enjoyers and Non-Enjoyers | Gretchen Jo Culler, Reganne Ashley Koskela, Kaden Curtis, Kinsey Cotton Kelly |
| 9 | 54211 | Concussion Detection Headband | Sydney Nicole Little |
| 10 | 54220 | Northern Knowledge | Nathan E Rasmussen |
| 11 | 54233 | Exploring the use of "Virtual Reality" as an enhancement for learning Piping and Instrumentation Diagrams (P&ID)- Pneumatic shut-down valve in-context of a P&ID diagram | Andrew L Vogel, Mandar Vinod Kathe |
| 12 | 54236 | Anticipatory Postural Adjustments in Predictable vs. Unpredictable Virtual Startle Events | Annabel Kathleen Stanley, Kinsey Cotton Kelly, Lillian O'Neal, Landon Michael Miller |
| 13 | 54241 | Restoring Allegheny River Boulevard: Civil & Environmental Engineering Capstone for Equity and Connection | Fethiye Ozis, Sara Jane Christian |
| 14 | 54246 | Portable Traffic Light | Ryan McAfee Grudell, Sara Currier |
| 15 | 54267 | Transforming Biomedical Instrumentation Education with a Low-Cost, Arduino-Based Acquisition Platform and Hands-On Lab Sequence | Daniel Duque Urrego, Stephen M. Cain |
| 16 | 54276 | Innovative Hybrid Pedagogical Framework for Engineering Technology: Integrating Online Platforms, Tangible Physical Models, and AI-Driven Interactive Assignments | Punya A Basnayaka |
| 17 | 54491 | Improving the operational efficiency utilizing method study and facility redesign. | Vito Pisani |
| 18 | 54495 | Series Pressure Vessels for Use in Water Rockets | Jacob Cerra |
| 19 | 54497 | Custom 3D Printed Insole System | Charles Nieder, Anthony Rivellino |
| 20 | 54514 | Oil Blending Quality & Vibration Analysis at Valvoline Plant | Brady Lee Holzworth, Connor Michael Grossman, Shawna Pack |
| 21 | 54522 | Cool Springs Creek Bridge Replacement | Bethany J DeRose, Amber Grace Maurer, Ashley J. Rimmel, Rachel Rose Ferrick, Zachary Donaldson |
| 22 | 54527 | Baldwin Wallace NASA M2M eXploration Capstone | Alexander Smith |



2026 ASEE North Central Section Conference: March 27-28
Conference Schedule: Saturday, March 28, 2026



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| 23 | 54530 | Thermal-Electromagnetic Coupling in Planar Microwave and Millimeter-Wave Circuits: FEM Analysis, Modal Effects, and Mitigation Strategies | James Allen Lutes |
| 24 | 54533 | A Critical Review and Analysis of US Healthcare Disparity Data - an Undergraduate Research Experience | M.m Azizur Rahman, Sakib A. Rahman, M.M. A. Rahman |
| 25 | 54190 | Biomechanical Analysis of Lumbar Spine Forces During Two-Person Patient Lifting in Healthcare Settings | <i>Eileen Cui, Xiaoxu Ji, Xin Gao, Paige Johnson</i> |
| 26 | 54228 | Investigating Poly(lactic-co-glycolic)-Gelatin Scaffold for Treating Diabetic Foot Ulcers | Jillian Rymer, Rodolfo Portles, Amelia Francisco, Lynn Dudash |
| 27 | 54254 | Polar Autonomous IGVC Capstone | Selby Wilt, Sean Edgar, Elijah Spinner |
| 28 | 54308 | Integrating a Cyber-Physical Smart Grid Testbed into Undergraduate Research and Active Learning in Power Engineering | Md Fazley Rafy |
| 29 | 54505 | Two Decades of Industry 4.0 and IoT Research: A Bibliometric Analysis of Global Trends, Market Dynamics, and Technological Convergences (2004-2024) | Unais Ali |
| 30 | 54231 | The Tensile Tester Heating Chamber | Pierce Stephens, Gabriello Francantonio Casilio, Andrew Robert Saari |
| 31 | 54194 | Psychrometrics: A Cool Approach to Teaching Hot and Humid Air | Long Tan Huynh, Diego Rios |

Technical Session 3 – 2:15pm-3:30pm

| Session 3A, T&H 201 Moderator: Aniruddha Maiti | Session 3B, Oak 203 Moderator: Abishek Balsamy Kamaraj | Session 3C, Oak 206 Moderator: Manar Yamany | Session 3D, T&H 200A |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 54060. Stratasys FDM Additive Manufacturing Certification Program: University Implementation and Lessons Learned. <i>Philip Rufe</i> | 54081. Towards the Safety of Autonomous Vehicles: Measuring Friction for Roadway Contaminants. <i>Thiyapa Sriprom, Diane L Peters</i> | 54083. Developing and Benchmarking Control Algorithms for Automated Driving with MRC Track Data. <i>Leah Burdette, Jeanne Kim, Diane L Peters</i> | WORKSHOP 54185. Collaborative Makerspace-to-Classroom and Manufacturing Integration: Low-Cost Virtual Learning and Production Labs. <i>Omar Ahmed Al-Shebeeb</i> |
| 54235. Six Years of Insights: Integrating Exit Survey and FE Topic Coverage for Continuous Improvement in Mechanical Engineering. <i>Emad Y Tanbour, Asmaa Radwan Suleiman A. Ashur</i> | 54243. Advancing Bridge Inspection Practices with Laser Scanning: Feasibility Assessment Using the I-75 River Rouge Bridge Case Study. <i>William M Notes, Suleiman A. Ashur, Mohammad Heilat, Salem k Alrosan</i> | 54192. Examining the Reliability of ChatGPT: A Quantitative Comparison of Human and LLM Emotion Classification. <i>Torsten Maier, Saemi Mendez, Amanyani Daniella Gonzales, Samantha Grace Kneebone</i> | |
| 5423. Beyond the Classroom: The Impact of Project-Based Learning on Mechanical Engineering Student Outcomes. <i>Emad Y Tanbour, Asmaa Radwan, Suleiman A. Ashur</i> | 54245. Investigation of Localized Electrochemical Deposition Using a Modified FDM Platform with a Titanium Cathode for Micro-Scale Metal Additive Manufacturing. <i>Vamsi Madhavchowdary Madamanchi, Abishek Balsamy-Kamaraj</i> | 54223. Evaluating Vision-Language Models for Trust Feedback in an Autonomous Vehicle Simulation. <i>Cassandra Lanza, Giuseppe Turini, Marcela Mera Trujillo, Reem Alzahabi, M Gandy</i> | |
| 54247. Integrating Course Projects into Mastery-Based Grading. <i>Derek Breid</i> | 54224. Monocrystalline Solar Cell Encapsulation. <i>Musa Sillah, Pratima Parajuli, Heidi Jiao</i> | 54277. Physical and Virtual Model of High Voltage Power Transmission Systems. <i>Dylan Wolf, Trevor Bihl</i> | |
| 54253. Integrating Enterprise Resource Planning (ERP) Systems into the Engineering education to make engineering student employable. <i>Vaibhav Mishra, Manish Kumar Garg</i> | 54269. Real-Time Distracted Driving Detection Using Lightweight CNNs on Edge Devices. <i>Haroon Malik, ifeanyi Kingsley Obi, Fatma Outay</i> | 54226. Brushstroke: Capturing Artistic Nuance Through Domain Adaptive Diffusion. <i>Baylee Senator, Ananya Jana, Satya Sri Rajiteswari Nimmagadda, Anastasiia Sukhanova</i> | |

Technical Session 4 – 3:45pm-5:00pm

| Session 4A, T&H 201 Moderator: Sihe Zhang | Session 4B, Oak 203 Moderator: Brian Woerner | Session 4C, Oak 206 Moderators: Omar Ahmed Al-Shebeeb and Loay Al-Zube | Session 4D, T&H 200A |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 54197. Using Generative Artificial Intelligence to support Undergraduate Learning in Computing in Chemical Engineering Course. <i>Sihe Zhang, Torsten Maier, Susan Farhat</i> | 54064. West Virginia Robotics (Exploring the Role of After-School Robotics Programs in Rural STEM Education). <i>Manar Yamany, Susie A. Huggins, Jeffrey Scott Carver, Robin A.M. Hensel</i> | 54088. Design & Implementation of Smart-Following Suitcase. <i>Michael Christian Litogot, Leonardo Oliveira, Rodney Perry, Hussein J Ahmad, Anna Patricia Nanteza, Travis Jay Kurth, Darius Sebastian Pelean, Qin Hu</i> | WORKSHOP 54493. GRID Flowcharting: A New Approach to Teaching Python Programming with Flowcharts. <i>Torsten Maier</i> |
| 54200. Investigating Engineering Judgment Through the AIR Model of Epistemic Cognition. <i>Michael Robinson</i> | 54189. Pathways to STEM Equity: Addressing Socioeconomic and Regional Gaps in Appalachian Education. <i>Manar Yamany, Jeffrey Scott Carver</i> | 54218. Project BOREALIS: A Mixed-Signal, Beginner-Focused Music Synthesizer. <i>Alexander Burkholder, Ethan Berei, Cindy Durliat</i> | |
| 54201. A Scoping Review of Generative AI Literacy Interventions: Shaping Undergraduate Students' Awareness of Ethical Use and Misuse in Academic Writing. <i>Haoyong Lan, Sanjitha Govindan, Yuhan Deng, Qingyuan Zhu, Dema Al-Shirawi</i> | 54230. Enhancing Workforce Readiness for Adults with Intellectual and Developmental Disabilities via Virtual Reality. <i>Maria Kay Lyons, Farha Jahan, Cal Grantham, Lillie Kacir, Domenic Pilla, Chase Michael Collert</i> | 54285. WIP: SVD-Guided Microcontrol for Obstacle-Aware Very-Large-Scale Robotic Swarms. <i>Jacob Colby Lee, Samuel Ray Sutphin, Pingping Zhu, Haroon Malik</i> | |
| 54216. Text to Automata Diagrams: Comparing TikZ Code Generation with Direct Image Synthesis. <i>Ethan Young, Aniruddha Maiti, Ananya Jana, Zichun Wang, Satya Sri Rajiteswari Nimmagadda</i> | 54232. WIP: Examining Motivation of Engineering Doctoral Students: Insights from the Rising Doctoral Institute. <i>Shuyu Wang, Jordan Peyton, Mayra S Artilles</i> | 54199. Pick-and-Place Robot Simulation Using UR3 in Simumatik and URSim. <i>Lydia Slippe, Robert L. Williams, Jesus M. Pagan, Trevor Bihl</i> | |
| 54210. Integrating AI into Introductory Programming: A Structured Framework for Learning and Assessment. <i>Wassnaa Al-Mawee</i> | 54272. When the Grid Goes Dark: Pop Culture, Public Perception, and the Fear of Energy Collapse. <i>Ta'than Gray, Trevor Bihl, Haroon Malik</i> | 54294. Hands-On Approach to Motor Control Using Raspberry Pi Pico and a Semikron AC-DC-AC Converter. <i>Rasoul Milasi, Joseph Stoner</i> | |

Workshop Abstracts

Session 2D, T&H 200A, 10:15am-11:30am

54531. Transformative Engineering: Learning from Nature.

Shehla Arif, Caroline Baillie, Ananda Lee Tan

Engineering has been about control and use of Nature to serve the dominant economic system. How might the practice of engineering change if we viewed ourselves as part of Nature, instead of, being above it. Indigenous peoples have long held that view. Join us to explore how each worldview materializes in the engineered world. In this time of imminent change, what does just transition look like and what is the role of engineering in attaining it.

Session 3D, T&H 200A, 2:15pm-3:30pm

54185. Collaborative Makerspace-to-Classroom and Manufacturing Integration: Low-Cost Virtual Learning and Production Labs.

Omar Ahmed Al-Shebeeb

This workshop explores an innovative approach to engineering education that combines physical makerspace activities with classroom instruction and low-cost virtual labs. The goal is to create a hybrid learning environment where students can engage in design, simulation, and production workflows that mirror real-world manufacturing processes. Participants will learn strategies for integrating virtual tools and simulations into traditional hands-on activities to enhance accessibility, reduce costs, and support iterative learning. The session will highlight methods for fostering collaboration, problem-solving, and reflective practice while preparing students for modern digital-physical workflows common in industry. At the end of the workshop, attendees will gain practical insights into implementing scalable, technology-enhanced teaching models that bridge the gap between theory and practice, equipping learners with essential skills for contemporary manufacturing environments.

Session 4D, T&H 200A, 3:45pm-5:00pm

54493. GRID Flowcharting: A New Approach to Teaching Python Programming with Flowcharts.

Torsten Maier

Flowcharting is a mainstay of introductory programming and computational thinking courses because it provides a visual representation of information flow, program logic, and execution order. When used effectively, flowcharts help establish a shared mental model between instructors and students—whether the instructor is introducing a new concept or the student is demonstrating understanding. While formal standards such as ANSI X3.5 and ISO 5807:1985 define flowchart symbols and their meanings, they offer no guidance on layout. As a result, flowchart design is often treated as an art rather than a system: two instructors may produce markedly different diagrams for the same code. Existing tools that automatically convert code into flowcharts exacerbate this problem, as they are not designed for pedagogical use and typically produce diagrams that are too complex, cluttered, or opaque to support learning—particularly for core constructs such as loops and conditionals.

This workshop introduces a new, educator-designed method for representing Python code in flowcharts that is both systematic and pedagogically focused. The method provides an algorithmic approach to flowchart layout that can be applied by hand or digitally, yielding diagrams that are consistent, readable, and instructional. The full methodology is described in the submitted paper, “GRID Flowcharting: An Algorithmic Approach to Generating Pedagogical Flowcharts.”

After a brief introduction to the underlying principles, the instructor will demonstrate how the method is applied to foundational programming concepts, including expressions, selection statements, and loops. Each concept will be explained verbally, modeled visually, and then practiced by attendees using guided examples. Participants may work either digitally or with pen and paper.

By the end of the workshop, attendees will be able to construct clear, consistent flowcharts for introductory Python programs and will leave with a practical technique they can immediately integrate into their own teaching. The session concludes with open discussion and peer feedback, allowing participants to reflect on classroom applications and adaptations across disciplines. Observational notes and a post-workshop survey will be used to evaluate the usability and instructional value of the methodology, with findings shared in a future conference or publication.