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Welcome to Digital Twin for Manufacturing Sustainability, Safety, and Resilience

We are pleased to announce that DigiTwin 2024 for Manufacturing Sustainability, Safety, and Resilience, scheduled to take place from October 15th to 16th, 2024, at Purdue University, West Lafayette. This event will run in parallel with the main event of the 4th Digital Twin International Conference (DigiTwin 2024), hosted at Politecnico di Milano, Milan, Italy (http://www.dtiac.com/). The Organizing Committee warmly invites you to join us at this international event and contribute to the ongoing advancement of digital twin technologies. We look forward to welcoming you to West Lafayette, where people and ideas converge to drive innovation and excellence in digital twins.

Organizing Committee Chairs:

Dr. Ragu Athinarayanan
Professor, School of Engineering Technology
Director, Purdue SMIC
Purdue University, United States

Dr. Martin Jun
Professor, School of Mechanical Engineering
Co-Director, Purdue SMIC
Purdue University, United States

Dr. Thorsten Wuest
Professor, College of Engineering and Computing
University of South Carolina, United States

Dr. Xingyu Li
Assistant Professor, School of Engineering Tech.
Member, Purdue SMIC
Purdue University, United States

Conference Schedule

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October 14	
5:00 PM - 6:30 PM	Registration *(STEW 109BC)*

October 15	
6:50 AM - 7:00 AM	Welcome and Introduction *(STEW 218AB)*
7:00 AM - 8:00 AM	Keynote - Dr. Fu Zhao (Purdue) *(STEW 218AB)*
9:00 AM - 10:30 AM	Technical Session 1 *(STEW 218AB)*
10:30 AM - 11:00 AM	Coffee Break *(STEW 204)*
11:00 AM - 12:00 PM	Industry Panel Discussion *(STEW 218AB)*
12:00 PM - 1:30 PM	Lunch *(STEW 204)* Keynote - Mr. Mark Beckmann (Microsoft) *(STEW 218AB)*
1:30 PM - 3:30 PM	Technical Session 2 *(STEW 218AB)*
3:30 PM - 4:00 PM	Coffee Break *(STEW 204)*
4:00 PM - 5:00 PM	Poster Session *(STEW 278)*
5:00 PM - 6:00 PM	Social Hour *(STEW 206)*

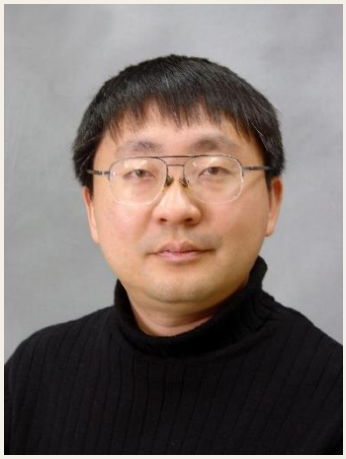
October 16	
8:50 AM - 9:00 AM	Wecome and Introduction *(STEW 218AB)*
9:00 AM - 10:00 AM	Keynote - Dr. Ali Malik (Oakland U) *(STEW 218AB)*
10:00 AM - 11:30 AM	Student Poster Presentation *(STEW 218AB)*
11:30 AM - 1:00 PM	Lunch *(STEW 204)* Poster Award Ceremony *(STEW 218AB)* Closing Session *(STEW 218AB)*
1:00 PM - 2:00 PM	Purdue Smart Facility Tour *(DUDL 4353)*

Keynote Presentations

Keynote Presentation 1: Digital Twin Enabled Life Cycle Inventory Modelling – Building the Data Foundation for Sustainable Manufacturing

Time: 7:00 AM – 8:00 AM, October 15, 2024
Location: STEW 218AB

Presenter: Prof. Fu Zhao, Professor, Mechanical Engineering and Environmental and Ecological Engineering, Purdue University



Presenter Bio: Dr. Fu Zhao is a Professor with joint appointment in the School of Mechanical Engineering and the School of Environmental and Ecological Engineering at Purdue University. Dr. Zhao's research is largely in the area of environmentally sustainable design and manufacturing. He has extensive experience conducting life cycle assessment (LCA) for a variety of products and applications, including biofuel, solar thermal systems, traditional and additive manufacturing processes. His research has been supported by NSF, DOE, DOD, EPA, NIST, as well as industry. He has published more than 130 journal papers and over 50 conference proceedings. Dr. Zhao received his BS (1993) and MS (1996) degree, both in Thermal Engineering, from Tsinghua University. He received his second MS degree in Electrical Engineering-Systems (2001) and his PhD in Mechanical Engineering (2005) from the University of Michigan. Dr. Zhao is a fellow of ASME.

Keynote Presentation 2: Digital Twins: Accelerating the Path toTomorrow

Time: 12:30 PM – 1:30 PM, October 15, 2024
Location: STEW 218AB

Presenter: Mr. Mark R. Beckmann, Sr. Director, Worldwide Microsoft Manufacturing Industry Solutions

Presenter Bio: As the Sr. Director, Worldwide Microsoft Manufacturing Industry Solutions, Mr. Beckmann works across Microsoft's global manufacturing clients to help them innovate, improve their performance, develop new services, and grow their business. His work with leading manufacturers in discrete and process industries focuses on innovation, engineering and design, manufacturing execution and operations intelligence, workforce, supply chain, sales and dealer management systems. And, the intersection, implications and advantages of AI in each of these areas. He also shares Microsoft's perspectives in manufacturing around the technologies that are driving change in manufacturing, including IoT, AI, digital twins, augmented reality, and the data management required to fuel change and innovation. His discussions have also included digital and precision agriculture and Microsoft's view and role in helping companies thrive as digital businesses that provide sustainable food and nutrition to the world.

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Keynote Presentation 3: Enhancing Manufacturing Resilience Through Interoperability of Digital Twins

Time: 9:00 AM – 10:00 AM, October 16, 2024
Location: STEW 218AB

Presenter: Dr. Ali Ahmad Malik, Assistant Professor, Oakland University

Presenter Bio: Dr. Malik is an Assistant Professor at Oakland University specializing in smart manufacturing, digital twins, and Industry 4.0-inspired manufacturing systems. He is engaged in projects on digital twins with NIST and USCAR and has contributed to different manufacturing domains, including wind energy, collaborative robots, and electronics manufacturing. Dr. Malik's work has been published in leading outlets such as the Journal of Manufacturing Systems, Science Robotics, and CIRP Annals. He earned his Ph.D. in Manufacturing Systems from the University of Southern Denmark in 2020.

Industry Panel Discussion

Time: 11:00 AM – 12:00 PM, October 15, 2024

Panelists: Mr. Prasad Satyavolu, Mr. Mark R. Beckmann, Dr. Ali Ahmad Malik
Moderator: Prof. Martin Byung-Guk Jun, Professor, School of Mechanical Engineering, Purdue University
Location: STEW 218AB

Panelist: Mr. Prasad Satyavolu, Managing Director, Accenture Industry X – Manufacturing

Panelist Bio: Mr. Satyavolu leads the Manufacturing & Automation capability for Accenture's Industry X practice in the Americas. During his career, spanning more than three decades, Prasad has led global supply chain operations for Commercial Vehicle Manufacturer; founded a startup for a global engine manufacturer and served in global practice leadership roles.

Mr. Satyavolu's consulting, innovation and digital services incubation & scaling experience spans Automotive, Industrial, Transportation, Consumer Goods and Life sciences sectors. He has advised C-suite clients on large scale transformation roadmaps and helped implement new business models in Connected Services. Prior to joining Accenture in 2021, he has served as an Executive Board Member for a start-up focused on Enterprise Risk Management.

A key area of focus for Mr. Satyavolu is Talent and Skill development in the Manufacturing sector as a key pillar of Digital Manufacturing scale and network development. He has extensive experience designing and executing large scale programs across manufacturing value chain on that couple talent & skill development with latest advances in technologies such as AI, Digital Twins, Simulations.

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Technical Presentations

Time: 9:00 AM – 10:30 AM, October 15, 2024
1:30 PM – 3:30 PM, October 15, 2024

Technical Session 1:

Time: 9:00 AM – 10:30 AM, October 15, 2024
Location: STEW 218AB
Chair: Prof. Leon Lawrence Robert Jr., Professor, School of Chemical Engineering, Purdue University

TS-1: Fatigue Monitoring Using CVD Polymer-Coated Fabric Sensors for Foundry Safety

Time: 9:00 AM – 9:30 AM
Presenter: Prof. Gaurav Nanda, Assistant Professor, School of Engineering Technology, Purdue University

TS-2: Digital Twin and AI Technologies for Design and Use of Manufacturing Equipment

Time: 9:30 AM – 10:00 AM
Presenter: Mr. Prasad Satyavolu, Managing Director, Accenture Industry X – Manufacturing

TS-3: The Use of a Digital Twin to Achieve Military Munitions Manufacturing Excellence

Time: 10:00 AM – 10:30 AM
Presenter: Prof. Leon Lawrence Robert Jr., Professor, School of Chemical Engineering, Purdue University

Technical Session 2:

Time: 1:30 PM – 3:30 PM, October 15, 2024
Location: STEW 218AB
Chair: Prof. Suranjan Panigrahi, Professor, School of Engineering Technology, Purdue University

TS-4: Crafting a Knowledge Graph and Ontology-Based Manufacturing System Digital Twin for Interoperability

Time: 1:30 PM – 2:00 PM
Presenter: Dr. Marvin Carl May, MIT Visiting Scholar and KIT Chief Engineer Production System Planning

TS-5: Efforts toward Enhancing Digital Twin Capability with Manufacturing Automation for Sustainability

Time: 2:00 PM – 2:30 PM
Presenter: Dr. Chandra Nath, Senior Research Associate, Environmental and Ecological Engineering, Purdue University

TS-6: Physics-Based Digital Twin for Hydraulic Equipment

Time: 2:30 PM – 3:00 PM
Presenter: Prof. Jose Garcia-Bravo, Professor, School of Engineering Technology, Purdue University

TS-7: Digital Twin: A Potential Platform for Enhancing Sustainability and Climate Resiliency in Agricultural and Food Sectors

Time: 3:00 PM – 3:30 PM
Presenter: Prof. Suranjan Panigrahi, Professor, School of Engineering Technology, Purdue University

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Student Poster Presentations

Time: 10:00 AM – 11:30 AM, October 16, 2024

Best Poster Award Competition:
Location: STEW 218AB
Chair: Prof. Jose Garcia-Bravo, Professor, School of Engineering Technology, Purdue University

SP-1: Physics-Based Digital Twin for Hydraulic Equipment
Time: 10:00 AM – 10:10 AM
Presenter: Marvin Raymundo Durango Cogollo

SP-2: Sustainable Management of Rare Earth Elements for Clean Energy Using Prescriptive Digital Twins
Time: 10:10 AM – 10:20 AM
Presenter: MD Shafikul Islam

SP-3: Stages of Integrating Digital Twin in Fused Deposition Modelling
Time: 10:20 AM – 10:30 AM
Presenter: Azmine Toushik Wasi

SP-4: Transforming Teleoperation through Immersive Digital Twins: A Collaborative Extended Reality (XR) Environment for Seamless Remote Operations
Time: 10:30 AM – 10:40 AM
Presenter: Israa Azza

SP-5: A Multi-Level Scheduling Approach for Enhancing Supply Chain Resilience Using Digitalization and Cloud Manufacturing
Time: 10:40 AM – 10:50 AM
Presenter: Wei Ye

SP-6: Unlocking Potential of Remanufacturing through Machine Learning, Digitalization and Data-Driven Models – A Survey
Time: 10:50 AM – 11:00 AM
Presenter: Yong Han Kim

SP-7: Digital Twin and Vision Guided Autonomous Robotic Path Planning
Time: 11:00 AM – 11:10 AM
Presenter: Hojun Lee

SP-8: Generative AI Based Real-Time Human-Data Interaction for Smart Manufacturing
Time: 11:10 AM – 11:20 AM
Presenter: Jiho Lee