2025 Digital Engineering Conference

TUESDAY, MAY 20 – WEDNESDAY, MAY 21, 2025

OBJECTIVE: To formalize and coordinate digital engineering, digital twinning, digital transformation and artificial intelligence activities across next generation energy systems.

Visit Information

ATTIRE

Business casual

CONTACTS

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Frank Alexander
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Gabriela Ciocarlie
Acting Chief Technology Officer; Cybersecurity Manufacturing Innovation Institute

Jake DeWitte
Co-founder and Chief Executive Officer; Oklo

Kevin Flood
President, Ansys Government Initiatives

Marianne Walck
Laboratory Director; National Energy Technology Laboratory

Neeraj Joshi
Chief Technology Officer of Energy and Resources Industry; Microsoft

Nelli Babayan
Federal Director of Artificial Intelligence; Microsoft

Scott Parent
Vice President & Field Chief Technology Officer; Ansys

Todd Combs
Deputy Laboratory Director; Idaho National Laboratory

Host: Chris Ritter
Protocol Officer: Kim Whitehouse
Final r17

DAY ONE: TUESDAY, MAY 20, 2025

ATTIRE FOR TODAY: Business casual.

INL Meeting Center	775 MK Simpson Blvd., Idaho Falls
7:30	**Arrival and Check-in** INL Tour Ambassadors
8:00	**Welcome and Announcements** Christopher Ritter; Director of Digital Innovation Center of Excellence (DICE), Idaho National Laboratory
8:15	**Morning Keynote** Neeraj Joshi; Chief Technology Officer of Energy and Resources Industry, Microsoft
8:55	**Transition**
9:00	**Scientific Computing Panel** Frank Alexander; *Director AI Research and Strategic Development*; Argonne National Laboratory Gabriela Ciocarlie; Acting Chief Technology Officer; Cybersecurity Manufacturing Innovation Institute Nelli Babayan; Federal Director of Artificial Intelligence; Microsoft Scott Parent; Vice President & Field Chief Technology Officer; Ansys
10:00	**Break and Transition**
10:30	**Breakout Sessions** Unlocking the Power of Digital Twins: Revolutionizing System Integration; EIL #A102 Driving Innovation with Model-Based Systems Engineering; EIL #A112-A113 Artificial Intelligence: The Catalyst for Transformative Solutions; C3 Auditorium
12:30	**Lunch** (catered)
1:30	**Afternoon Keynote** Kevin Flood; President, Ansys Government Initiatives
2:30	**Transition**
2:45	**Breakout Sessions** Building Cyber Resilience: Advancing Instrumentation & Control; EIL #A112-A113 Harnessing Decision Science & Visualization for Enhanced Insights; C3 Auditorium
4:45	**Close**
INL Meeting Center	775 MK Simpson Blvd., Idaho Falls
5:00	**AI Expo & Poster Session Reception**
7:00	**Close**

TUESDAY, MAY 20, 2025 (Morning Track)

BREAKOUT SESSION: Unlocking the Power of Digital Twins: Revolutionizing System Integration (EIL #A102)

10:30am	Digital Twin-Enabled Operation of Hydrogen Production Systems; Maria Coelho
10:50am	Benefits & Challenges of connecting MBSE to Operations & Sustainment via Hybrid Digital Twins; Vitor Lopes
11:10am	Transients of Steam-CO2 Co-Electrolysis Solid Oxide Electrolyzes (SOEC) During Rapid Load Transitions: A Real-Time Simulation Study; Biao Zhang
11:30am	Risk-informed Graded Approach for Reliability and Performance Assessment of Advanced Condition Monitoring Technologies; Hector Mendoza
11:50am	Multi-sensor Assimilation Yielding Enhanced Reliability - Digital Engineering in Nuclear Safeguards; Philip Honnold
12:10pm	Development and Experimental Validation of High-Fidelity Neutronics Model for Purdue University Reactor Number One (PUR-1); Haoyu Wang

BREAKOUT SESSION: Driving Innovation with Model-Based Systems Engineering (EIL #A112-A113)

10:30am	Securing Nuclear Facilities and Power Plant Delivery through the Integration of Design and Project in a Unified Virtual Twin; Adeniyi Olubunmi
10:50am	Automated Generation of 3D Building Designs from Systems Engineering Diagrams; Nicholas Crowder
11:10am	MIT Lincoln Laboratory's Digital Engineering Transformation: Case Studies in Adoption; Stephanie Sposato
11:30am	Insights on How to Successfully Scope and Deliver Digital Engineering Pilot Efforts; Max Danik
11:50am	Technical and Regulatory Considerations in Use of Advanced Conditional Monitoring Technologies for In-Service Testing Program; Vaibhav Yadav

BREAKOUT SESSION: Artificial Intelligence: The Catalyst for Transformative Solutions (C3 Auditorium)

10:30am	Explainability in AI/ML: I Don't Think That Means What You Think It Means; Torrey Mortenson
10:50am	Digital Models for Fusion Energy device optimization and design; Michael Churchill
11:10am	Hyperspectral Imaging Anomaly Detection: A Novel Use Case for a Lesser-Known Model; Dempsey Rogers
11:30am	Explainable Artificial Intelligence for Enabling Predictive Maintenance in Nuclear Power Plants; Linyu Lin

TUESDAY, MAY 20, 2025 (Afternoon Track)

BREAKOUT SESSION:	Building Cyber Resilience: Advancing Instrumentation & Control (EIL #A112-A113)
2:45pm	An AI-Driven Cyber-Physical Testbed for Small-Scale Advanced Reactors; Yang Liu
3:05pm	Automated Reasoning for UAV Safety & Security; Maxwell Taylor
3:25pm	Guardians of AI: Fortifying Artificial Intelligence with Cyber-Informed Engineering; Patience Yockey
3:45pm	An Integrated Framework for Hazard Identification and Risk Assessment of Digital Instrumentation and Control Systems; Congjian Wang
4:05pm	Building Cyber Resilience: Advancing Instrumentation & Control; Anthony Starleaf
4:25pm	Resilient Controlled System through Instrumenting Programmable Logic Controller Programs; Abdullah Al Farooq

BREAKOUT SESSION:	Harnessing Decision Science & Visualization for Enhanced Insights (C3 Auditorium)
2:45pm	Interactive Distributed Wind Scenario Visualization for Decision-Making; Jeffrey Laurence-Chasen
3:05pm	Faraday: An Electrolysis Cell Warehousing and Analytics Platform; Nathan Woodruff
3:25pm	Scientific Priorities and Flexecution Operations: A New Paradigm for Decisions in Lunar Exploration; Shannon Nawotniak
3:45pm	Using XR to Evaluate Radiation Work Areas and Practices; Jack Dunker
4:05pm	Innovative Interactive 3D Slice Visualization Tool: Bridging Accessibility, Insight, and Immersive Analysis for Complex Data Exploration; Rajiv Khadka

DAY TWO: WEDNESDAY, MAY 21, 2025

ATTIRE FOR TODAY: Business casual.

INL Meeting Center	775 MK Simpson Blvd., Idaho Falls
8:30	**Arrival**
8:45	**Welcome and Announcements** Christopher Ritter; Director of Digital Innovation Center of Excellence (DICE), Idaho National Laboratory
9:00	**Leading Edge Technology: A Talk with National Laboratory Directors** Marianne Walck; Laboratory Director, National Energy Technology Laboratory Todd Combs; Deputy Laboratory Director, Idaho National Laboratory
10:00	**Break and Transition**
10:30	**Breakout Sessions** Unlocking the Power of Digital Twins: Revolutionizing System Integration; EIL #A102 Driving Innovation with Model-Based Systems Engineering; EIL #A112-A113 Artificial Intelligence: The Catalyst for Transformative Solutions; C3 Auditorium
12:30	**Lunch** (catered)
1:30	**Breakout Sessions** The Digital Thread: Connecting Data for Smarter Decisions; EIL #102 Human Factors: Bridging Technology and Usability; EIL #A112-A113 Official Use Only Session (HSPD-12/CAC and U.S. Citizen to Attend); C3 Auditorium
3:30	**Break and Transition**
3:45	**Afternoon Keynote** Jake DeWitte; Co-founder and Chief Executive Officer, Oklo
4:45	**Closing Remarks**
5:00	**Close**

BREAKOUT SESSION:	Unlocking the Power of Digital Twins: Revolutionizing System Integration (EIL #A102)
10:30am	Safeguarding Advanced Microreactors with a Transformative Digital Twin; Ryan Stewart
10:50am	Track Testing Connected and Automated Vehicle Technologies with Augmented Reality; Qichao Wang
11:10am	A Transformative Process for Design Reviews; Peter Drozdzewicz
11:30am	Digital Twins for Continuous Development of Electron Microscopy Workflows; Anees Al Najjar
11:50am	University of Texas Reactor Digital Twin Initiative: Overview and TRIGA Case Study; John Ross and Cole Gentry

BREAKOUT SESSION:	Driving Innovation with Model-Based Systems Engineering (EIL #A112-A113)
10:30am	MBSE Methodology; Risk Analysis and Requirements Management; Nicole Davis
10:50am	Simulation Process Data Management (SPDM) to Improve Efficiency of the Model Based Systems Engineering (MBSE) Process; Peter Dugan
11:10am	Understanding Organizational Factors in the Aerospace Industry's Transition to Model-Based Systems Engineering; Sarah Shaw
11:30am	Digital Engineering Framework, Establishing the use of a Digtital Thread within the NSE; Johan Valcarcel
11:50am	Demonstration of Full Lifecycle Systems Engineering (FLSE) Embodying Several Key Tenets of DoD Instruction 5000.97; Walter Schwarz
12:10pm	The Reality & Promise of Model-Based Systems Engineering; Alan Mendel

BREAKOUT SESSION:	Artificial Intelligence: The Catalyst for Transformative Solutions (C3 Auditorium)
10:30am	From Discovery to Defense: Compound AI Systems for Nuclear and Biological Security; Will Dupree
10:50am	System Engineers and Decisions: It's All about Knowledge; Diego Mandelli
11:10am	Modelling Microbial Cognition for the development of Spiking Neural Networks to control Nonlinear Dynamical Systems; Daniel Bluedorn
11:30am	Enhancing Digital Twin Accuracy for Nuclear Reactors Using Physics-Informed Synthetic Data and Rolling Statistics; Jaden Palmer
11:50am	Advancing Privacy-Preserving Federated Learning for Science Foundation Models; Todd Munson
12:10pm	Safeguarding Nuclear Applications using DevSecOps; Drazen Krajina

WEDNESDAY, MAY 21, 2025 (Afternoon Track)

BREAKOUT SESSION: The Digital Thread: Connecting Data for Smarter Decisions (EIL #A102)

1:30pm	Enhancing Utility Operations with Digital Threads: The Role of Cloud Computing in Integrated Data Management and Decision-Making; Julia Morgan
1:50pm	Continuous Compliance on Digital Threads with Open-Format Data; Sriram Krishnan and Ross Billings
2:10pm	Supporting the Digital Thread Using Requirements Traceability for Nuclear Power Plant Design; Paul Lusardi
2:30pm	Digital Engineering for Accelerated Component Design; Taylor Hall
2:50pm	Model-Based Systems Engineering, Validating Requirements with Simulation and Formal Methods; Ricardo Martinez
3:10pm	Leveraging the MOF Repository as an Enabling Environment to Promote Digital Engineering Model Interchange (DEMI) to Impact DOE's Future; Steven MacLaird

BREAKOUT SESSION: Human Factors: Bridging Technology and Usability (EIL #A112-A113)

1:30pm	Harnessing Decision Science and Visualization for Enhanced Insight Applied to an Operational Excellence Model; Robert Blackburn
1:50pm	Next Generation Model-Based Enterprise (MBE) Index for Digital Product Realization; Curtis Brown
2:10pm	Digital Engineering for Humans: A Nuclear Perspective; Ronald Boring
2:30pm	Secure Collaboration in Aerospace and Defense Manufacturing: A Cloud-Based Approach to 3D CAD Visualization; Ben Collen
2:50pm	3D Technical Data Exchange Demonstration; Dan Feighery

BREAKOUT SESSION: Official Use Only (HSPD-12/CAC and be a U.S. citizen to attend) (C3 Auditorium)

1:30pm	Air Force Mission Resilience Digital Transformation (MRDT) Project; Peter Suyderhoud
1:50pm	PRIDE - Digital Thread Current State; Anthony Matta
2:10pm	Integrating a Physics-Based Model into the Digital Twin of the Signals Exploration Testbed; John Chilleri
2:30pm	eXtended Reality Engineering Visualization (XREV) Supporting Digital Engineering; Ruby Ta
2:50pm	A Machine Learning Pipeline for Portable Wireless Signal Detection, Classification, and Analysis; Daniel Wells