

Conference Schedule

Time/Date	Dec. 8		
		Seminar Room 2.1	Seminar Room 2.2
8:30	Registration SMU School of Accountancy (Level 1)	Short Course 1	Short Course 2
17:00		Introduction to PHM and HUMS: Technologies for Smarter Maintenance and System Readiness Dr. Eric Bechhoefer & Dr. Peeyush Pankaj	Generative AI and Foundation Models in Advanced Manufacturing Prof. Xiaoli Li

Conference Schedule

Time/Date	Dec. 9				
8:30	Opening Ceremony (Hall)				
8:45					
8:45	Keynote 1 (Hall)				
9:40	Intelligent PHM in the Big Data Era: A Collaborative Paradigm of Deep Learning and Physics Prof. Ruqiang Yan				
9:40	Keynote 2 (Hall)				
10:35	Outlook of PHM Transformation with Recent Advances of LLM and Industrial Large Knowledge Model Prof. Jay Lee				
10:35	Tea Break				
10:55					
10:55	Tutorial 1 (Hall)				
11:55	AI-Driven Optimization & Model Calibration When Failure Data Is Scarce Mr. Peeyush Pankaj				
12:00	Lunch & Networking				
13:30					
	Seminar Room 2.1	Seminar Room 2.2	Seminar Room 2.3	Seminar Room 2.4	Seminar Room 2.5
	Track 1: PHM for Commercial Airplanes/Aerospace Engineering	Track 2: Rolling or Bearing	Track 3: RUL prediction	Track 4: PHM for Device Monitoring/Turbines/ Motors	Best paper presentation
13:30	4340: A Multi-Sensor Fault Diagnosis Method for Aero-Engine Bearings Based on Complex-Valued Convolution and Dual Attention Mechanism	4516: Development of Bearing Fault Diagnosis Model Using Low Frequency Data Based on Knowledge Distillation	4488: Combining Statistical Models and AI for Predictive Maintenance: RUL Estimation of Reactor Protection System Components	4505: Graph-Based Adaptive Anomaly Detection Framework for Dual-Fuel Marine Engines	4646: Real-time Sensor Data Streaming for deployment in Edge AI for Health Index Construction and Remaining Useful Life Prediction
13:45					
13:45	4524: Enhanced Fault Isolation and Part Recommendation for Airplane Health Management with Hybrid Probabilistic Modeling	4448: Study of the Degradation of Rolling Element Bearings with Artificial Dents	4487: A Practical Hybrid Framework for RUL Prediction in Ion Mill Etching by Integrating Operational States	4496: A Prediction of Thermal Stress Profiles in the Steam Turbine Startup Phase Using Fourier Neural Operator	4645: Unsupervised Health Indicator Construction via Deep Reinforcement Learning with Terminal-Dominant Reward
14:00					
14:00	4423: A System of Systems Architecture for Optimizing Aircraft Health Management in Civil Aviation	4584: From state observer to deep neural network: design, optimization, and application in bearing dynamics modeling	4554: A Transfer Learning Framework for Remaining Useful Life Estimation	4540: An innovative Machine Learning driven approach to detect anomalous behavior of Dry Gas Seal Heaters for Centrifugal compressors	4576: LLM Enabling Model-Based RAMS Through LLM-Driven Legacy Data Transformation
14:15					
14:15	4701: Development and Sharing of a Multi-Modal Indoor UAV Dataset for PHM Research	4490: Intelligent Bearing Fault Diagnosis Under Various Load Conditions Using Bias Mitigation	4547: Complete Life Cycle Degradation Trajectory Learning Utilizing Time-Transformer and Denoise Auto-Encoder for Remaining Useful Life Prediction		4586: Bivariate degradation modeling and reliability analysis based on a shared frailty factor with truncated normal distribution
14:30					
	Track 1: PHM for Commercial Airplanes/Aerospace Engineering	Track 5: Digital Twin and Simulation for PHM	Track 3: RUL prediction	Track 4: PHM for Device Monitoring/Turbines/ Motors	Best paper presentation
14:40	4647: RAVEN: Unsupervised Anomaly Detection in Multivariate Jet Engine Time Series using Residual Learning on Real Test Data	4493: Development of an Interactive Twinverse System : Metaverse Platform Integrating Digital Twin and AI Agent	4672: Multi-Agent AI Logistics Scheduling with Transformer RUL Prediction	4666: A Multi-task Incremental Learning Approach for Fault Diagnosis of Gearbox under Non-stationary Conditions	4525: Methods and Systems for Hybrid Digital Twin Driven Health Predictions for Aircraft Sub-systems
14:55					
14:55	4461: Damage Localization in a CFRP Beam via Modal Frequency Shifts and Nearest Neighbor Classification	4468: Development of a HUMS for UAV hybrid power system using digital twin and AI techniques	4440: Irregular Time-Series Hybrid Model for Enhanced Prognostics of Engine Degradation and Failures	4619: Towards Open-Set Fault Diagnosis for Reactor Coolant Pumps under Unknown Fault Conditions	4613: Shared Representation Learning for Generalizable SOH Estimation Across Multiple Battery Configurations
15:10					
15:10	4465: Towards Adaptive and Robust Unsupervised Anomaly Detection in Satellite Telemetry	4518: Fault-Induced Signal Distortion in FMCW Automotive Radar: A Simulation-Based Analysis	4651: Self-Adaptive RUL Prediction of Power Electronic Devices with Package Failure	4615: Multi-source Variable Decoupling Network for Compound Fault Diagnosis of Train Bogie	4597: Multi-Branch Joint Time-Frequency Transformer for Domain Generalization on Fault Diagnosis of Rotating Machinery
15:25					
15:25	4445: Assessment of simulation-based data augmentation technique by Uncertainty Quantification for spacecraft propulsion system PHM				4527: Causal Graph-Based Anomaly Detection for Battery Modules in Electric Heavy-Duty Vehicles
15:40					
16:00	Tea Break				
16:00	Tutorial 2 (Seminar Room 2.1) From Concept to Reality: Role of Digital Twin Technology in Prognostics and Health Management Dr. Geng Xue & Mr. Xu Qing		Tech Demo (Seminar Room 2.2) SADEED Technology Dr. Zahi M. Omer		Data Challenge Presentation & Networking (Seminar Room 2.3) Host by Dr. Wu Min
17:00					
17:00	Ice Breaking & Networking (<i>Drinks and Snacks will be provided</i>)				
18:30					

Conference Schedule

Time/Date	Dec. 10				
8:45	Keynote 3 (Hall) Challenging Difficult Helicopter Gearbox Failure Modes via HUMS2023/2025 Data Challenges with an overview of DSTG's Gear Diagnostics work and emerging challenges to Gearbox Diagnostics Prof. Wenyi Wang				
9:40	Panel Discussion 1 (Hall) Adoption of AI in Real-world Industrial Operations: Opportunities, Challenges, and the Road Ahead Panelist: Dr. Partha Adhikari, Dr. Ahmed Farahat, Dr. Ng Huey Yuen, Dr. Haissam Wakeb Moderator: Dr. Savitha Ramasamy				
9:40					
10:40					
10:40	Tea Break				
11:00	Tutorial 3 (Hall) Open Access Tools, Ontologies, and Data Sets for Extraction and Semantic Exchange of Maintenance Information Prof. Melinda Hodkiewicz				
12:00					
12:00					
13:30	Lunch & Networking				
	Seminar Room 2.1	Seminar Room 2.2	Seminar Room 2.3	Seminar Room 2.4	Seminar Room 2.5
	Track 5: PHM Applications for Urban Infrastructure Resilience and Maintenance	Track 8: General AI Methods	Track 6: Smart Monitoring / Maintenance Operation	Track 7: PHM for Power Electronics/Systems/Battery	Track 10: Probabilistic Methods and Reliability
13:30	4481: From Engineering Drawings to Assembly Instructions: A Vision and Language Model Approach	4570: Adversarial Domain Adaptation Fault Diagnosis Method Based on Self-attention Graph Convolutional Network	4389: Enabling Condition Based Maintenance Strategy for Radar Systems – Data Driven Approach	4511: MLOps Framework for Fault Diagnosis in Air Conditioners Using Field Noise	4608: Probabilistic Graphical Models for Diagnosing Defectivity Patterns
13:45					
13:45	4486: Cleaning Maintenance Logs with LLM Agents for Improved Predictive Maintenance	4427: Improving Virtual Metrology Predictions via Transfer Learning and Active Learning	4633: Explainable and Trustworthy AI for Fault Classification in the Tennessee Eastman Process: A Step Toward Industrial Autonomy	4563: Improved LSTM-Based Battery SOH Estimation with Differential Evolution Hyperparameter Optimization	4463: Towards Systematic Reliability Assessment: A Multi-Criteria Decision Framework for Modeling Heat Pump Systems
14:00					
14:00	4449: Multilevel Fault Diagnostics for Railway Applications Using Limited Historical Data	4600: A Bidirectional Structure Constraint framework for Domain Generalization in Intelligent Fault Diagnosis	4652: Predicting Maintenance Actions from Historical Logs using Domain-Specific LLMs	4455: Robust Fault Diagnosis of Electric Vehicle Drivetrain Using Amplitude Adjustment Techniques	4583: Evaluating Failure Time Probabilities for Compound Degradation with Linear Path and Mixed Jumps
14:15					
14:15	4435: Leveraging Few-Shot In-Context Learning for Scaling Railway Log Anomaly Detection	4303: HM-Vibench: A Unified and Factory-Style Vibration Benchmarking Framework for the Foundation Model Era	4650: Fractal-based Satellite Health Monitoring	4673: Remote monitoring system for detection of faults in drive motors of electric vehicles	
14:30					
	Track 6: Smart Monitoring / Maintenance Operation	Track 8: General AI Methods	Track 4: PHM for Device Monitoring/Turbines/ Motors	Track 9: Technologies and Methods for Achieving Zero Defect Manufacturing under Industry 4.0 / 5.0	Track 2: Rolling or Bearing
14:40	4480: LLM-based multi-agent system for autonomous maintenance process of machine tools	4447: Flare Gas Flow Rate Estimation Using Multimodal Deep Learning	4519: High-Performance Gearbox Fault Diagnosis Using a Novel Domain Adaptation and Pre-Trained Mode	4596: Hierarchical Anomaly Detection and Model Update Framework for Steel Manufacturing	4648: SAE_FSC: A Siamese Attention Encoder–Based Few-Shot Cross-Domain Fault Diagnosis Framework for Bearings
14:55					
14:55	4621: Radar Health Monitoring Using Anomaly Detection	4607: Nonlinear and Trend-Aware Industrial Time Series Anomaly Detection with Federated Learning	4655: Anomaly Detection Framework for Rotary Equipment Using Continuous Wavelet Transform and U-Net Autoencoders	4536: Enhancing Machine Reliability in Industrial Plants Leveraging Diagnostic and Prognostic Approach to measure reliability improvements	4565: Towards Autonomous PHM: An Application to Turboshift Engine Torque Prediction
15:10					
15:10	4502: Data-driven Anomaly Detection for Quadcopter UAV Indoor Flight Platform		4458: Rotary Encoder-Based Health Indicators for Early Detection of Gear Pitting in Commercial Gearboxes	4325: AI-Driven Design Optimization of Engineering Systems: A Case Study on Turboshift Engines	4529: Unsupervised Modeling of Progressive Wear in Aircraft Engines for Predictive Maintenance
15:25					
15:25	4624: Interpretable Sensor Importance-Based Multi-Sensor Integration for Condition Monitoring of Rotating Machinery		4441: Development of Virtual Thermal Sensor based on Multivariate Time Series Prediction for Estimating Internal Contact Temperature of High-Voltage Relays	4521: ONGOING: A Human-readable, Model-enriching, Continuous Technician Knowledge Modeling Framework	
15:40					
15:40	Tea Break				
16:00	16:00				
16:00	Tutorial 4 (Seminar Room 2.1) From Concept to Reality: Role of Digital Twin Technology in Prognostics and Health Management Dr. Pradeep Kundu		Demo (Seminar Room 2.2) Time series Anomaly Detection and Predictive Maintenance with MATLAB Mr. Peeyush Pankaj		
17:00					
17:30	Banquet + Awards				
19:30					

Conference Schedule

Time/Date	Dec. 11
9:00	Keynote 4 (Hall) Foundation Models and Agentic AI for PHM in Manufacturing Dr. Wang Wei
9:40	
9:40	Tutorial 5 (Hall) Generative AI Meets PHM: From Building Worker Assistants to Training Domain-Specific Models Dr. Ahmed Farahat & Dr. Aman Kumar
10:40	
10:40	Tea Break
11:00	
11:00	Tutorial 6 (Hall) Applying Causation Based AI for Explainable Prognostics & Health Management Dr. Navid Zaman & Dr. You-Jung Jun
12:00	
12:00	Closing Ceremony (Hall)
12:15	
12:15	Lunch & Networking
13:30	
13:30	Local Tour (Self-organized)
18:00	Discover complimentary passes from our website https://phmap25.org/sentosadiscovery.html