

13th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR2025)

PROGRAMME

08 - 10 JULY 2025

University of Lorraine

2 Av. de la Forêt de Haye, 54500

Vandœuvre-lès-Nancy

Programme with Abstracts



INSTITUTE OF
MATHEMATICS &
ITS APPLICATIONS



UNIVERSITÉ
DE LORRAINE



The University of
Nottingham

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Day 1 – Tuesday 08 July 2025

08:15-09:00	Registration with tea and coffee	
	Room A (Amphi. Mauduit)	Room B (Amphi. Solvay)
09:00-09:20	Welcome	
09:20-10:05	Keynote Talk - <i>From theory to practice: the process of optimisation of preventive maintenance policies</i> Prof. Shaomin Wu (University of Kent, UK) <u>Chair:</u> Rasa Remenyte-Prescott	
	S1A- AI and maintenance optimization <u>Chair:</u> Phil Scarf	S1B: Degradation modelling and reliability assessment <u>Chair:</u> Christophe Berenguer
10:10-10:30	<i>Interpretable Maintenance Impact Quantification for Aircraft Using Boltzmann KAN with Self-Supervised Learning</i> Weikun Deng, Khanh Nguyen, Phuc Do and Kamal Medjaher	<i>Model-Based Load-Dependent Degradation Modeling For PEM Fuel Cells: A Multi-Health Index Approach Toward Energy Management in Multi-Stack Systems</i> Mouhamad Houjayrie, Catherine Cadet and Christophe Berenguer
10:30-10:50	<i>Optimal maintenance decision-making for continuously degrading systems with imperfect repairs using Markov decision processes</i> Quang Khai Tran, Tuan Huynh, Antoine Grall and Yves Langeron	<i>Uncertainty Quantification as a Complementary Latent Health Indicator for Remaining Useful Life Prediction on Turbofan Engines</i> Lucas Thil, Jesse Read, Rim Kaddah and Guillaume Doquet
10:50-11:10	<i>Joint optimization of operation & maintenance for navy ships</i> Mirel Maraha, Bram Westerweel and Tiedo Tinga	<i>A Petri Net approach to predict the lifespan of a railway track asset</i> Emily Buttriss, John Andrews and Rasa Remenyte-Prescott
11:10-11:30	Tea and coffee break	
	S2A: Predictive maintenance <u>Chair:</u> Ed Pohl	S2B-Special Session: Advancements in Prognostics and Health Management <u>Chair:</u> Nick Eleftheroglou
11:30-11:50	<i>Task Grouping Optimization for Gas Insulated Substations (GIS) Predictive Maintenance: Trade-off between cost and environmental impact</i> Wenbo Wu, Rim Kaddah, Miguel Anjos, Paul-Henri Langlois and Sihem Tebbani	<i>Real-Time Monitoring of Nozzle Clogging in Cold Spray Process Using Airborne Acoustic Emission and Data-Driven Prognostics</i> Stratos Koufis, Pascal Dinglinger, Nathan Eskue, Dimitrios Zarouchas and John-Alan Pascoe
11:50-12:10	<i>Risk Assessment of Condition-Based Maintenance Contracts</i> Stijn Loeys, Melvin, Drent, Collin Drent, Robert Boute and Katrien Antonio	<i>Data-driven Prognostics under uncertainty: A comparative study on the state-of-the-art HMMs</i> Thanos Kontogiannis, Mariana Salinas-Camus, Dimitrios Zarouchas and Nick Eleftheroglou

12:10-12:30	<i>Towards Automating xGSPN-mBSPN Model Generation for Scalable Fault Diagnostics in Dynamic Systems</i> Taofeeq Badmus, Rasa Remenyte-Prescott and Darren Prescott	<i>Optimal maintenance planning for offshore wind farms considering time-varying costs and limited manpower</i> Roby Cremers and Rommert Dekker
12:30-12:50	<i>Predicting the remaining life of lithium-ion batteries: a frugal data-based approach</i> Antoine Gaignard, Christophe Farges and Franck Cazaurang	<i>Redefining Prognostic Essentials: Focus on Reliability, Robustness and Feasibility</i> Nick Eleftheroglou
12:50-14:10	Lunch	
	S3A-Special Session: <i>Data-driven decision-making models for predictive maintenance.</i> <u>Chair:</u> Mihaela Mitici	S3B: <i>Reliability and maintenance engineering</i> <u>Chair:</u> Geert-Jan Houtum
14:10-14:30	<i>Optimizing a maintenance strategy by combining age-based maintenance and an imperfect prognostic fault detection model</i> Ingeborg de Pater	<i>Evaluation of Mission Reliability for a System under the Presence of Spare Parts</i> Reem Alrashed, Frank Coolen, Tahani Coolen-Maturi and Geert-Jan Houtum
14:30-14:50	<i>On the Value of Predictive Spare Parts Printing as the Second Supply Mode</i> Ipek Tanil, Collin Drent and Rob Basten	<i>ReLife: a free and open-source Python library for data-driven decision-making in asset management based on reliability theory</i> Alexis Frémond, Thomas Guillon and William Grison
14:50-15:10	<i>A Probabilistic and Machine Learning Approach to Predictive Maintenance of Railway Tracks</i> N G D D Santos and Babakalli Alkali	<i>Evaluating Maintenance Strategies for Locomotive Wheelsets: A Petri Net-Based Modelling Framework</i> Maksym Ocheretniuk, Darren Prescott and Rundong Yan
15:10-15:30	<i>From prognostics-based predictive maintenance to end-to-end predictive maintenance for complex systems</i> Mihaela Mitici	<i>Reliability Prediction for Combined Hardware-Software Systems Using Survival Signature</i> Wejdan Alahmadi
15:30-15:50	<i>Data-Driven Maintenance Optimization for a Unit with a Bivariate Deterioration Process</i> Bram de Jonge	<i>Trust is Good, Monitoring is Better: FPGA- & TEE-Based Monitoring for Malware-Detection</i> Friederike Bruns, Georg Gläser, Florian Kögler, Jonas Lienke, Nithin Nanjundaswamy, Gregor Nitsche, Behnam Perjikolaei and Jörg Walter
17:00 – 19:00	Cultural visits	

Day 2 – Wednesday 09 July 2025

	Room A (Amphithéâtre 1)	Room B (Amphithéâtre 2)
08:30-09:15	Keynote Talk - <i>Asset management and reliability theory for infrastructure managers. Some key challenges in moving from science to industry practice: open problems, knowledge transfer and standardization</i> Dr. Thomas Guillon (Senior Expert R&D, RTE-France) <u>Chair:</u> Christophe Bérenguer	
	S4A: <i>Machine learning and data analysis in reliability and maintenance engineering</i> <u>Chair:</u> Hai-Canh Vu	S4B: <i>Degradation modelling and reliability assessment</i> <u>Chair:</u> Richard Dwight
09:20-09:40	<i>Robust Fault Detection with Incomplete Data: A Weakly Supervised Approach</i> Felix Waldhauser, Hamza Boukabache, Martin Dazer and Daniel Perrin	<i>Determination of supercapacitors' reliability based on accelerated life tests</i> José Sobral, Arcilio Semente, Rui Sampaio, Teresa Moura E Silva and Fátima Montemor
09:40-10:00	<i>Hybrid Deep Learning Architecture for Remaining Useful Life Prediction of Fuel Cells in Electro-Hydrogen Generators Under Real Dynamic Operating Conditions</i> Soufian Echabbarri, Phuc Do, Hai Canh Vu and Pierre-Yves Liegeois	<i>Prognostic-Driven Energy Management and Maintenance Strategies for Multi- Stack Fuel Cells with Stochastic Degradation under Dynamic Loads</i> Mouhamad Houjayrie, Catherine Cadet and Christophe Berenguer
10:00-10:20	<i>A data-driven robust approach to a problem of optimal replacement in maintenance</i> Sina Shahri Majarshin, Ahmadreza Marandi, Claudia Fecarotti and Geert-Jan van Houtum	<i>Energy Pipeline Individual Defect Growth Prediction Using In-Line-Inspection Data</i> Muhammad Hussain, Tieling Zhang and Richard Dwight
10:20-10:40	<i>Optimal Design of Hybrid Offshore Renewable Systems with Realistic O&M Considerations</i> Luciana Yamada, Masoud Golalikhani, Flávia Barbosa and Luís Guimarães	
10:40-11:00	Short Break	
	S5A: <i>Predictive maintenance</i> <u>Chair:</u> Rommert Dekker	S5B: <i>Reliability and maintenance optimization</i> <u>Chair:</u> Babakalli Alkali
11:00-11:20	<i>A Data-Driven Approach for Optimising Rolling Stock Fleet Using Time Series Analysis and SARIMAX Model</i> Md Mahabubur Rahman, Babakalli Alkali, Amit Kumar Jain, Juan Manuel Parrilla Gutierrez, Jim Nelson and Calum Mcneil – Remote presentation	<i>A study of maintenance efficacy of Gangway in a liquified petroleum gas plant</i> Babakalli Alkali and Eloi Pereira

11:20-11:40	<i>An Actuarial Approach to Data-Driven Warranty Pricing</i> Anouck Vercammen and Robert Boute	<i>Zero inflated model for rare failure analysis</i> Marek Skarupski, Maarten Wouters, Miklas Veenvliet and Stella Kapodistria
11:40-12:00	<i>A Framework for Maintenance Scheduling in Reconfigurable Manufacturing Systems</i> Huu Truong Le, Phuc Do, Alexandre Voisin and Chiara Franciosi	<i>Shannon entropy and its variants for the maintenance of large meshed system architectures</i> Christian Tanguy
12:00-12:20	<i>Failure Detection in Photovoltaic Inverters using feature engineering</i> Jorge Ruiz Amantegui, Phuc Do, Hai-Canh Vu, Nicolas Favrot and Marko Pavlov	<i>A Hybrid Inspection and Preventive Replacement Policy for Improved Maintenance Management</i> Alexandre Alberti, Thalia de Moura de Queiroz and Alcione dos Santos Oliveira
12:20-12:40	<i>On the effect of time-varying costs on condition- and time-based maintenance of a wind turbine</i> Myrthe van den Reek, Bram de Jonge and Rommert Dekker	<i>Mitigating Contamination Risks: The Crucial Role of Breathers in Rotating Equipment Lubrication Tanks</i> Nawaf Alshuthaywani
12:40-14:00	Lunch	
	S7A-Special Session: Sustainable Maintenance 4.0 <u>Chair</u> : Lucas Equeter	S7B: Resilience engineering & Operational research <u>Chair</u> : Shaomin Wu
14:00-14:20	<i>A flexible maintenance policy for systems with CBM and FBM components: leveraging opportunistic maintenance</i> Ipek Kivanc, Claudia Fecarotti, Néomie Raassens and Geert-Jan van Houtum	<i>Probabilistic Framework for Enhancing Hydraulic Resilience in Water Networks: A Pressure-Based Critical Pipe Analysis</i> Gloria Maruchu, Rasa RemenYTE-Prescott and Silvia Tolo
14:20-14:40	<i>A Causal AI-Driven Framework for Sustainable Decision-Making in Operations Management</i> Theresa Madreiter and Fazel Ansari	<i>Enhancing Rail Network Resilience: A Real-Time Hybrid Simulation-Optimisation Model for Disruption Management Using Genetic Algorithms</i> Kang Rui Tan, Rasa RemenYTE-Prescott, Darren Prescott, Adam Cooper Watson and Andrew Dutton
14:40-15:00	<i>A Concept of knowledge-based Recommendation System for Sustainable Maintenance in Flexible Manufacturing Systems</i> Gábor Princz, Katharina Spiess, Selim Erol and Fazel Ansari	<i>Optimal joining strategy and profit analysis in M/M/1retrial queue with service interruptions and impatience</i> Nidhi Nidhi and Sudeep Singh Sanga
15:00-15:20	<i>Joint environmental and economic assessment of cutting tool replacement policies in Ti6Al4V milling under uncertain condition estimate</i> Lorenzo Colantonio, G�r�me Moroncini, Olivier S�n�chal, Pierre Dehombreux, Fran�ois Ducobu and Lucas Equeter	
15:20-16:00	Tea and coffee break	
	S4A-Special Session: Reliability, maintenance and resilience modelling of distribution systems	S4B: Fault detection and diagnosis <u>Chair</u> : Claver Diallo

	<u>Chair:</u> Abdelhakim Khatab	
16:00-16:20	<i>Decision Support Tool for Optimizing Performance and Recruitment in Football</i> Eya Kalboussi, Nadia Ndhaief and Nidhal Rezg	<i>From knowledge graphs to probabilistic models for system-level diagnostics</i> Thomas Nägele, Leonardo Barbini, Gert-Jan van den Braak, Micha Lipplaa and Alvaro Piedrafita
16:20-16:40	<i>Optimal Manufacturing-Remanufacturing-Transport Planning in a Sustainable Supply Chain with Carbon Tax Considerations</i> Basma Abassi, Sadok Turki and Sofiene Dellagi	<i>Comparative Performance of Machine Learning Architectures for Fault Detection and Diagnosis in Chemical Processes</i> Rayane Ammar Khodja, Alexandre Voisin, Victor Costa, Fanny Casteran, Benoit Celse and Benoit lung
16:40-17:00	<i>Joint optimization of maintenance and mission-abort in mission-critical systems operating under uncertainty</i> Ryan O'Neil, Claver Diallo, El Houssaine Aghezzaf and Abdelhakim Khatab	<i>Federated Multi-source Domain Adaptation via Barycenter for Intelligent Fault Diagnosis of Machine Groups</i> Bin Yang, Yaguo Lei, Xiang Li and Naipeng Li
17:00-17:20	<i>Optimizing budget allocation for multi-mission selective maintenance planning</i> Farzad Falahaty, Ryan O'Neil, Zhuojun Liu, Abdelhakim Khatab and Claver Diallo	<i>Low-Power Runtime Monitoring for Hardware Based on Time-Sensitive Behavioral Contracts</i> Behnam Perjikolaei, Friederike Bruns, Dennis Kempf and Jörg Walter
17:20-17:40	<i>Reliable Dual-Channel Supply Chain: Integrating Leasing, Remanufacturing, Maintenance and Pricing Policies</i> Ahmed Farouk Hamzaoui, Sadok Turki and Nidhal Rezg	<i>From Single Output Centralized Learning to Federated Learning: Introducing a Cross-Teaching Multi-Output Model for Physical Assets</i> Sayaka Kamei and Sharareh Taghipour
19:30-23:00	Gala-dinner at Café Foy (Stanislas Square)	

Day 3 – Thursday 10 July 2025

	Room A (Amphithéâtre 1)	Room B (Amphithéâtre 2)
08:30-09:15	<i>Keynote Talk - Stochastic Approaches for Optimizing Maintenance of Continuously Degrading Systems in the Era of AI: Are they still Relevant?</i> Prof. Antoine Grall (Université de Technologie de Troyes, Fr) Chair: Phuc Do	
	S8A-Predictive maintenance <u>Chair:</u> Bram de Jonge	S8B-Degradation modelling and reliability assessment <u>Chair:</u> Antoine Grall
09:20-09:40	<i>Rare failure analysis - challenges and perspectives from high-tech industry</i> Marek Skarupski, Maarten Wouters, Miklas Veenvliet, Stella Kapodistria and Bas Dielissen	<i>Dynamic Vapour Sorption Experiments: analysis of results, advantages and future development in supporting systems modelling</i> Cathie Wells
09:40-10:00	<i>Quality indicator prediction utilizing historical production data: A case study in steel manufacturing</i> Thanos Kontogiannis, Wanda Melfo, Nick Eleftheroglou and Dimitrios Zarouchas	<i>Preliminary Data Exploration for Bayesian Stochastic Petri Net-Based Degradation Modelling in Hydropower Assets</i> Jack Lally, Christophe Bérenguer, Jean-Marc Tacnet and Sébastien Gigot
10:00-10:20	<i>A physic-informed neural network for predicting the differential pressure in a desalination system</i> Son Phan, Thanh-Ha Do and Phuc Do	<i>Evaluation of the health state of oil-immersed transformer based on dissolved gas analysis: An empirical study</i> Huy Vu Tran, Kim Anh Nguyen, Duc Hanh Dinh, Dinh Duong Le, Huu-Truong Le and Phuc Do
10:20-10:40	<i>Imperfect condition-based maintenance policy for stochastic degradation systems in dynamic environments</i> Yuxi Mai and Mitra Fouladirad	<i>Innovative Modeling of Age Replacement Policy for Infrastructure Renewal Decisions</i> Yasmine Debbagh, Thomas Guillon and Jean-Yves Dauxois
10:40-11:00	Short Break	
	S9A-Special Session: <i>Maintenance Modelling for Supporting Safety and Risk Management</i> <u>Chair:</u> Cristiano Cavalcante	S9B: <i>Reliability and maintenance engineering</i> <u>Chair:</u> Nicolae Brinzei
11:00-11:20	<i>A Maintenance Policy for Complex Systems with Multiple Components Arranged in Complex Configurations</i> Alexandre Alberti and Ronald Ramos da Silva Oliveira	<i>Advanced Repair and Coating Methods for Enhancing Reliability in Rotating Equipment</i> Fawaz Alkhulaiwi and Rakan Ahmed
11:20-11:40	<i>Proactive Maintenance of Protection Systems: Addressing Internal Degradation and External Shocks</i>	<i>Advancing Bearing Lubrication by Harnessing Pressurized Air for Enhanced Reliability</i> Abdulrahman Aljabr and Abdulrahman Aburoyan

	Rodrigo Lopes, Augusto Rodrigues, Yan Melo, Cristiano Cavalcante and Hanser Jiménez	
11:40-12:00	<i>Hybrid Maintenance Strategy for Critical Equipment in the Food Industry: A Case Study in Meat Packaging</i> Hanser Jiménez, Augusto Rodrigues, Yan Melo, Cristiano Cavalcante and Rodrigo Lopes	
12:00-12:20	<i>Maintenance management for a protection system composed of two interdependent components</i> Augusto Rodrigues, Cristiano Cavalcante and Rodrigo Lopes	
12:20-12:40	<i>Threshold-Based Maintenance for Systems with Unobservable Degradation: A Hybrid Preventive-Corrective Approach</i> Hanser Jiménez, Phuc Do, Alexandre Voisin and Chiara Franciosi	
12:40-14:00	Lunch	
	S10A- Maintenance modelling and applications <u>Chair:</u> Inma T. Castro	
14:00-14:20	<i>Evaluating reliability and maintenance effectiveness of a system modelled by a Continuous Time Hidden Markov Model</i> Mluz Gámiz, Nikolaos Limnios and María Segovia García	
14:20-14:40	<i>Sewer pipe inspection, maintenance, and replacement optimization under incomplete information</i> Geert-Jan van Houtum, Ragnar Eggertsson, Rob Basten and Hajo Molenaar	
14:40-15:00	<i>Statistical inference and imperfect maintenance in a bivariate Wiener degradation model considering unbalanced observations</i> Inma T. Castro, Lucía Bautista, Christophe Bérenguer, Olivier Gaudoin and Laurent Doyen	
15:00-15:20	<i>Sustainable Predictive Maintenance: Balancing Circularity and Spare Parts Availability Within Finite Maintenance Horizons</i> Ghofrane Boujemaa, Christophe Berenguer and Elodie Robert	
15:20-15:40	Closing Remarks	

Conference venue

Université de Lorraine: **2 Av. de la Forêt de Haye, 54500 Vandœuvre-lès-Nancy**

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From Nancy centre, take a bus T1 towards CHU Brabois and stop at "Forêt de Haye" station: about 25 minutes.



Cultural visits - Tuesday 08 July 2025 at 17:00 (duration: 90 minutes):

Group 1: meeting point at the **Nancy tourism office, 1 Pl. Stanislas, Nancy**

Group 2: meeting point at the **Nancy tourism office, 1 Rue des Dominicains, Nancy**

Group 3: meeting point at the Stanislas statue, **1 Pl. Stanislas, Nancy**

Please make sure to arrive on time and strictly adhere to your assigned group to ensure a smooth and well-organized visit.