



The 16th International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering (QR2MSE2026)

July 22-25, 2026, Qingdao, Shandong, China

Special Session #2 on:

Korean Research Activities in AI-Based Prognostics and Health Management (Presentation Only) **[Session Chair: Prof. Jongseong Brad Choi]**

Recent advances in artificial intelligence, data-driven modeling, and physics-informed approaches have significantly contributed to the development of prognostics and health management (PHM) technologies for engineering systems. In South Korea, extensive research activities have been conducted to improve the reliability, accuracy, and applicability of AI-based methods in various industrial fields, including physical AI, robotic systems, measurement systems, and equipment health monitoring.

This special session will present recent Korean research findings in AI-based prognostics and health management. The session covers a wide range of topics, including neural rendering techniques for solving Sim2Real problems in physical AI, training data sizing for artificial neural network-based inverse kinematics solutions, numerical analysis of annular 3-Omega heater design for anisotropic thermal conductivity measurement, and remaining useful life prediction based on Bayesian LSTM and physics-informed constraints.

Through these presentations, the session aims to provide valuable insights into current Korean research activities related to AI-based modeling, simulation-to-real transfer, measurement reliability, and predictive maintenance. This session is expected to promote knowledge exchange and technical collaboration among researchers and practitioners working in reliability, prognostics, health management, and intelligent engineering systems.



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Presentations:

#1. Jongseong Brad Choi*, Do-Young Ko, Dongsoo Kang, Jongmoon Park, and Sang Hyuk Lee
(The State University of New York, Korea; Korea Hydro & Nuclear Power; Doosan Enerbility Co.; Woojin Co.; Korea Institute of Machinery & Materials)

Micro-Splatting for Physical AI: High-Fidelity Neural Rendering, Digital Twins, and Applications to Automated Inspection of Nuclear Power Plants.

#2. Dong-Won Lim*

(The University of Suwon),

On the Training Data Sizing for the ANN Inverse Kinematics Solutions.

#3. Junyoung Park, Doheon Koo, Mugyeom Jung, Sangyeun Park, Hye Seok Na, Wondo Kim, Hyun Sung Park, Hongyun So*

(Hanyang University),

Numerical Analysis of Annular 3-Omega Heater Design for Anisotropic Thermal Conductivity Measurement.

#4. JongWoon Kim, Min Kim, YoungSeon Kim*, YunKyung Park

(Nemosys Co., Ltd.),

Development of an Equipment Remaining Useful Life Prediction Model Based on Bayesian LSTM and Physics-Informed Constraints.