

# AI-Hydro Futures: 1st International Workshop (Online)

March 23, 2026 | 12:30 PM – 6:00 PM (JST)

Hosted by DPRI, Kyoto University



## Introduction

The **AI-Hydro Futures International Workshop** is an interdisciplinary scientific forum dedicated to advancing the application of **artificial intelligence (AI) and Digital Twin technologies** in hydrology, water resources management, flood risk reduction, and climate resilience. In the face of intensifying hydro-climatic extremes, rapid urbanization, and expanding multi-source data streams, the workshop explores how **machine learning, deep learning, hybrid AI–physical models, and Digital Twins** can jointly enhance system understanding, real-time prediction, scenario analysis, and decision-making in complex water environments.

Hosted by the **Disaster Prevention Research Institute (DPRI), Kyoto University**, the workshop brings together **researchers, engineers, practitioners, and policymakers** to exchange cutting-edge research, operational experiences, and future visions. A core emphasis is placed on **bridging advanced research with operational deployment**, enabling Digital Twin–based platforms for early warning systems, infrastructure management, and adaptive water governance.

With strong participation from **Japan, the Middle East, Europe, and other regions**, the workshop serves as a platform for **international collaboration, capacity building, and long-term networking**, shaping the next generation of AI- and Digital Twin–driven water and disaster science.

The **AI-Hydro Futures: 1st International Workshop** brings together advances in artificial intelligence and Digital Twin technologies to address critical challenges in hydrology, flood risk management, water resources, and climate resilience. The workshop covers AI-driven and hybrid AI–physical approaches for flood hazard and vulnerability assessment, real-time forecasting, reservoir and infrastructure operation, groundwater and urban water systems, and hydro-climatic analysis under climate change. It also highlights deep learning applications in remote sensing, uncertainty-aware prediction, and adaptive Digital Twins for dynamic water systems. By connecting cutting-edge research with operational practice and policy needs, the workshop promotes international collaboration, capacity building, and the development of practical, AI-enabled solutions for water and disaster resilience.

### Project details

**Title:** *AI-HYDRO FUTURES: Cross-disciplinary Research Network on AI in Hydrology and Climate Resilience*

**Funding Program:** FY2025 Cross-sectoral Research Platform Development Program, Kyoto Univ.

**Principal Investigator:** Dr. Mohamed Saber, Associate Professor, DPRI, Kyoto University

**Registration link:** [bit.ly/ai-hydrofutures](https://bit.ly/ai-hydrofutures)

## Workshop Program:

*Conference Chair: Mohamed Saber (Associate Professor, DPRI, Kyoto University)*

| Time (JST)   | Speaker & Academic Title  | Affiliation   | Lecture Title   |
|--|---|---|---|
| <b>Opening, Strategic Vision &amp; Introductory Lecture (Monday, 23, 2026)</b> |   |   |   |
| 12:30-12:35  | Prof. Tetsuya Sumi,<br>(on behalf of DPRI Director)   | DPRI, Kyoto University,<br>Japan  | Welcome message: Advancing Disaster Prevention through AI and Water Science   |
| 12:35-12:50  | Prof. Sameh Kantoush<br>(Professor)   | DPRI, Kyoto University,<br>Japan  | AI-Hydro Futures: Vision, Challenges, and Global Collaboration  |
| 12:50-13:10  | Prof. Mohamed Saber<br>(Associate Professor)  | DPRI, Kyoto University,<br>Japan  | From Data to Decisions: Machine Learning in Water-Related Applications  |
| <b>13:10-13:20   Short Break</b>   |   |   |   |
| <b>Session 1: Climate Intelligence and Forecasting</b>                         |   |   |   |
| 13:20-13:40  | Prof. Sunmin Kim (Associate Professor)  | Dept. of Civil & Earth Resources Eng., Kyoto University, Japan                            | Reinforcement Learning of Flood Control for Dam Reservoir Operation without Any Forecasting Information   |
| 13:40-14:00  | Eng. Amirreza Tabataba (Student)  | DPRI, Kyoto University, Japan   | Z-Number Approach for addressing the uncertainty in monthly extreme precipitation prediction  |
| 14:00-14:20  | Eng. Hadir Abdelmoneim (Student)  | DPRI, Kyoto University, Japan   | Uncovering Hydro-hazard Risks in MENA Region: Linking Climate Change and Teleconnections with Machine Learning  |
| 14:20-14:40  | Eng. Sinh Nguyen Phuoc (Student)  | DPRI, Kyoto University, Japan   | Safety of Cascading Dam Systems under Future Extreme Events: A Deep Learning-Based Assessment of Climate Change-Driven Flood and Sedimentation Dynamics |
| <b>14:40-14:55   Short Break</b>   |   |   |   |
| <b>Session 2: AI Methods for Water Systems and Hydrology</b>                   |   |   |   |
| 14:55-15:15  | Prof. Vahid Nourani   | University of Tabriz, Iran  | Emotional AI, a method to catch the peaks of hydroclimatic processes  |
| 15:15-15:35  | Prof. Hussam Elzain<br>(Environmental Hydrogeologist)   | Water Research Center, Sultan Qaboos University, Oman                                     | Advancing the Future Toward Digital Water: AI Application on Groundwater Hydrology  |
| 15:35-15:55  | Prof. Rami Al-Hajj (Associate Professor)  | American University of the Middle East (AUM), Kuwait                                      | Topological Data Analysis of time series data for machine learning models using Persistent  |
| 15:55-16:15  | Prof. Emad Mabrouk<br>(Associate Professor)   | American University of the Middle East (AUM), Kuwait                                      | Memetic programming Algorithms for Multi-Applications   |
| <b>16:15-16:30   Short Break</b>   |   |   |   |
| <b>Session 3: Flood and Multi-hazard Spatial Intelligence</b>                  |   |   |   |
| 16:30-16:50  | Prof. Tayeb BOULMAIZ<br>(Professor)   | Department of Hydraulic, University of Badji Mokhtar Annaba, Algeria                      | Mitigating Backscatter Ambiguity in Hyper-Arid Flood Detection: A Component-Level Analysis of Deep Learning Pipelines                                   |
| 16:50-17:10  | Prof. Qihua Liang (Professor and UNESCO Chair in Informatics and Multi-hazard Risk Reduction) | Loughborough University, UK   | Human and Natural Systems (CHANS) framework integrated with reinforcement learning for urban flood mitigation   |
| 17:10-17:30  | Prof. Mohamed Abdel-Fattah  | Civil Engineering and Quantity Surveying Department, Military Technological College, Oman | Flash Flood Susceptibility Mapping with Machine Learning in Al-Khaborah, Oman   |
| 17:30-17:50  | Prof. Mohammad Mahdi Rajabi   | University of Luxembourg, Luxembourg  | From 2D Maps to 3D Reality: Machine Learning for Hydrological Modeling  |
| 17:50-18:00  | Prof. Mohamed Saber<br>(Associate Professor)  | DPRI, Kyoto University, Japan   | Future Directions, Collaboration Opportunities, and Next Steps  |